Sailor

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INSTRUKTIONSBOG FOR SAILOR S1303/S1304

INSTRUCTION BOOK FOR SAILOR S1303/S1304

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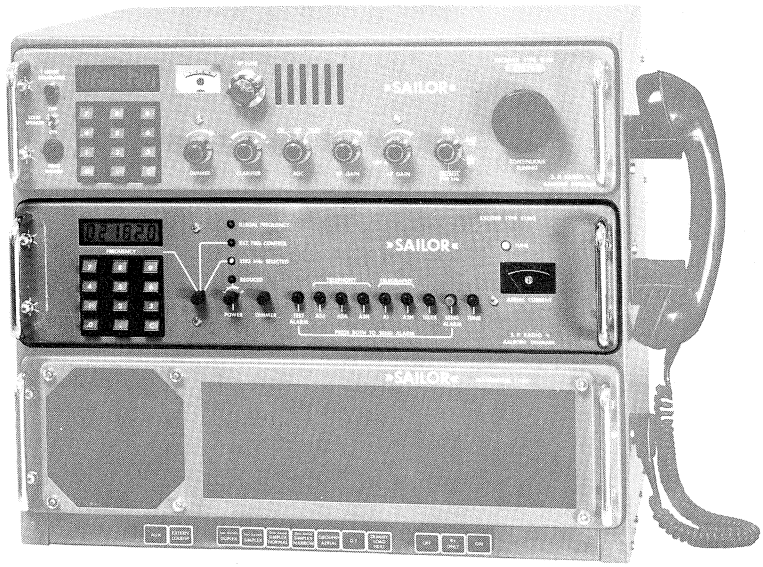


INSTRUCTION BOOK FOR EXCITER S1303/04

Valid from serial No. 261439

GENERAL DESCRIPTION

SAILOR S1303/04 is a telephony, telegraphy and telex exciter for use in conjunction with the transmitter T1130.

SAILOR S1303 is for radio officer operation with free selection of the transmitting frequency from the keyboard.

SAILOR S1304 is skipper operated with 256 PROM programmed frequencies free selected from the keyboard.

SAILOR S1303/04 has LCD display for frequency readout.

SAILOR S1303/04 can operate on any frequency inside the frequency range 1.6 to 8.5 MHz and the maritime frequency bands 12, 16, 22 and 25 MHz.

SAILOR S1303/04 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 S1303/04 uses a digital synthesizer for frequency generation. The frequency stability depends on a 10 MHz TCXO.

SAILOR S1303/04 is capable of producing emission of classes A3H (H3E), A3A (R3E), A3J (J3E), A2H (H2A). A1 (A1A), and TELEX (F1B, F1C).

SAILOR S1303/04 is provided with a built-in alarm signal generator for distress calls.

SAILOR S1303/04 can as option have a sideband change-over unit, which can change the transmitted sideband from the upper to the lower or opposite.

TECHNICAL DATA

The exciter S1303/04 delivers USB signals on the displayed frequency.

As option a USB/LSB change-over unit can be built into the exciter S1303/04. This unit changes the transmitted sideband from the upper to the lower or opposite.

Frequency ranges:	MF: 1.6 - 4.0 MHz HF: 4.0 - 8.5 MHz The maritime bands 12, 16, 22 and 25 MHz.

As option the frequency range can be extended by two extra frequency bands in the frequency range 8.5 - 10.0 MHz and 11.5 - 28 MHz.

Frequency transmitted:	Any frequency inside the frequency range 1.6 - 8.5 MHz and the maritime bands 12, 16, 22 and 25 MHz. (resolution 100 Hz).

The exciter S1304 operates only on the 256 programmed frequencies.

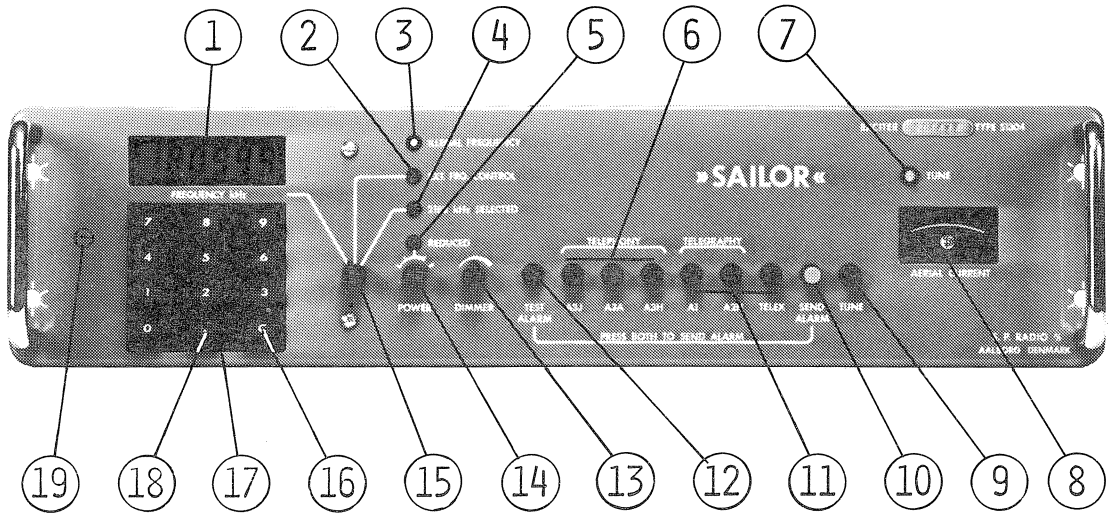
Frequency stability:

Temperature range 0°C to +40°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.

Mode of operation:	A3H (H3E), A3A (R3E), A3J (J3E), A2H (H2A), A1 (A1A) and TELEX (F1B, F1C).
Distress call:	Automatic A3H (H3E) on 2182 kHz Two-tone-Alarm: 1300 and 2200 Hz with a duration of 45 sec.
Output power:	50 mW PEP/50 ohm
Output power reduction:	Four 5 dB steps
Modulation 8W:	350 - 2700 Hz with compressor.
Operation temperature range:	-15°C to +55°C

CONTROLS



(1) DISPLAY

Displays the keyed-in figures or the transmitted frequency.

(2) EXT. FRQ. CONTROL

With the switch (15) in position EXT. FRQ. CONTROL the lamp lights. The displayed and transmitted frequency can be controlled from an external unit the SAILOR ARQ H1240.

(3) ILLEGAL FREQUENCY

When the displayed frequency is a non operative frequency, the lamp lights.

(4) 2182 kHz SELECTED

With the switch (15) in position 2182 kHz SELECTED the lamp lights. The displayed and transmitted frequency is 2182 kHz.

(5) REDUCED

Is alight when the output power is reduced by the power switch (14) .

(6) A3J (J3E), A3H (H3E) and A3A (R3E).

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

(7) 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.

(8) AERIAL CURRENT

Shows the current at the aerial insulator of AT1500.

CONTROLS cont.:

(9) TUNE

Starts the automatic tune system of T1130 and AT1500.

(10) SEND ALARM/TEST ALARM

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

(11) TELEX, A2H (H2A) and A1 (A1A)

Selects the transmission mode TELEX (F1B, F1C) or the TELEGRAPHY modes, A2H (H2A) or A1 (A1A). The modulating frequency in A2H (H2A) mode is 465 Hz.

(12) TEST ALARM

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

(13) DIMMER

Controls the light intensity of the DISPLAY, the aerial current METER and the lamps EXTERNAL FRQ. CONTROL, 2182 kHz SELECTED, POWER REDUCED.

(14) POWER

Reduces the RF output power in four 5 dB steps.

(15) DISPLAY INPUT SWITCH

With the switch in position KEYBOARD the displayed and transmitted frequency is keyed-in from the keyboard. With the switch in position EXT. FRQ. CONTROL the displayed and transmitted frequency is controlled from an external unit (SAILOR ARQ H1240).
With the switch in position 2182 kHz SELECTED the displayed and transmitted frequency is 2182 kHz.

(16) CLEAR

When pushed the display is cleared and a new frequency can be keyed-in.

(17) KEYBOARD

Enters the frequency into the frequency synthesizer and the display. The frequency shall be entered in kHz, and only if a fractional kHz is wanted it is necessary to activate the decimal point key. Before a new frequency is entered, and if a wrong figure is keyed-in, all the display is cleared by means of the clear key C and the new frequency can be keyed-in.

(18) DECIMAL POINT KEY

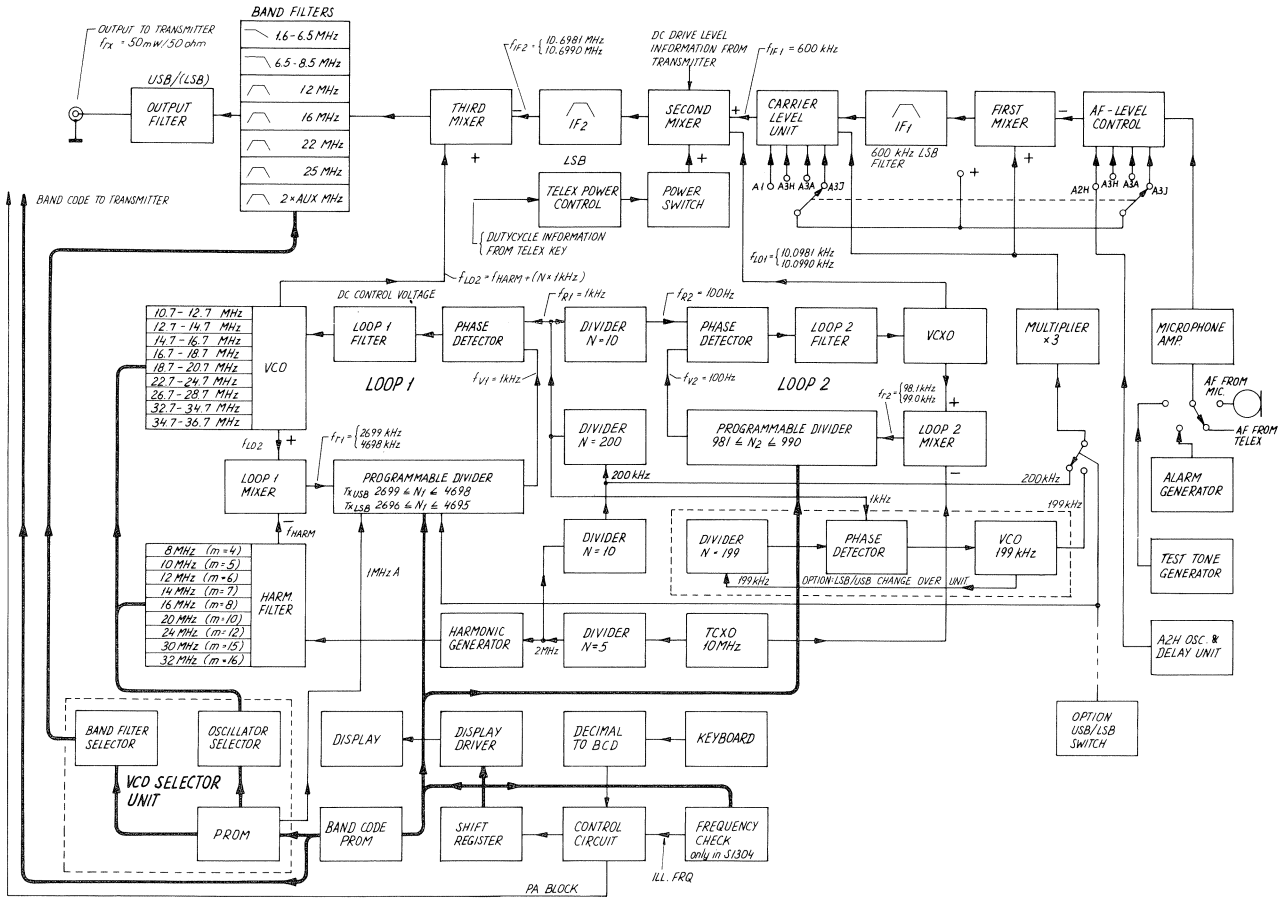
If a fractional kHz is wanted it is necessary to activate the decimal point key.

(19) USB/LSB

If fitted, the transmitted sideband, the upper or the lower, can be chosen by the switch.

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

PRINCIPLE OF OPERATION



S1303/04 A4/1

EXCITER S1303 AND S1304

The SAILOR exciter S1303 and S1304 are fully synthesized and deliver 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 as 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), A3H (H3E), A2H (H2A) and TELEX (F1B , F1C). The first mixer is a balanced modulator where a 600 kHz double sideband signal is generated. The DSB signal is 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), A3H (H3E), A2H (H2A) and A1 (A1A) takes place. The 600 kHz signal is fed through the 600 kHz LSB delay relay on the A2H (H2A) P.C. board 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 the transmitter, which attenuates the output from the mixer to the wanted drive level. The output from the second mixer is an LSB signal f_{IF2} and it passes through a crystal filter and amplifier 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 RF output terminal. The output filter removes the remnant of the 10.7 MHz IF signal in the output signal.

IF FITTED

As option the transmitted sideband can be chosen as the USB or the LSB, but the working principle in the signal route is the same as the above described. The difference is in the generation of frequencies.

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 code information 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 by the band code information 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}

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

PRINCIPLE OF OPERATION cont.:

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.

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

A special code from the band code PROM to the VCO selector unit selects the right 2 MHz bands 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: $2000 + P_1$; $0 \leq P_1 \leq 1999$

Stop-figure: $S1 = -699$

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

Output frequency from loop 1:

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

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 information in the displayed frequency.

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

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

PRINCIPLE OF OPERATION cont.:

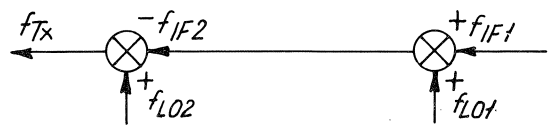
Start figure:	$0 \leq P_2 \leq 9$
Stop figure:	$S_2 = 990$
Dividing figure:	$N_2 = S_2 - P_2 = 990 - P_2$

Output frequency from loop 2:

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

$f_{LO1} = 10.099\ MHz - (P_2 \times 0.1\ kHz);$

CARRIER FREQUENCY f_{TX} FROM EXCITER S130X
(upper sideband transmitted)



f_{MOD} audio frequency modulation tone.

$f_{IF1} = 0.600\ MHz - f_{MOD}$

$f_{LO1} = 10.099\ MHz - (P_2 \times 0.1\ kHz);$

$f_{IF2} = f_{IF1} + f_{LO2} = 10.699\ MHz - (P_2 \times 0.1\ kHz) - f_{MOD}$

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

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

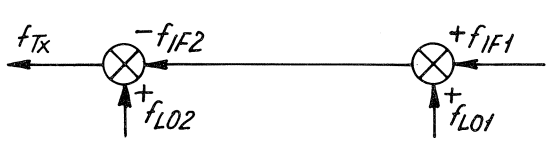
IF FITTED

CARRIER FREQUENCY f_{TX} FROM EXCITER S130X
(lower sideband transmitted)

As option the exciter S130X can be equipped to transmit the lower or the upper sideband on the carrier frequency f_{TX}.

The working principle of the exciter is the same whether it is the upper or the lower sideband which is transmitted. To transmit the lower sideband the generation of frequencies are changed.

F_{IF} is changed from 600 kHz to 597 kHz which is generated from a third phase locked loop. The VCO signal f_{LO2} is changed by 3 kHz by changing the stop figure S_1 of the programmable counter from -699 to -696.



PRINCIPLE OF OPERATION cont.:

f_{MOD} audio frequency modulation tone

$f_{IF1} = 0.597\ MHz + f_{MOD}$

$f_{LO1} = 10.0990\ MHz - (P_2 \times 0.1\ kHz),\ 0 \leq P_1 \leq 9$

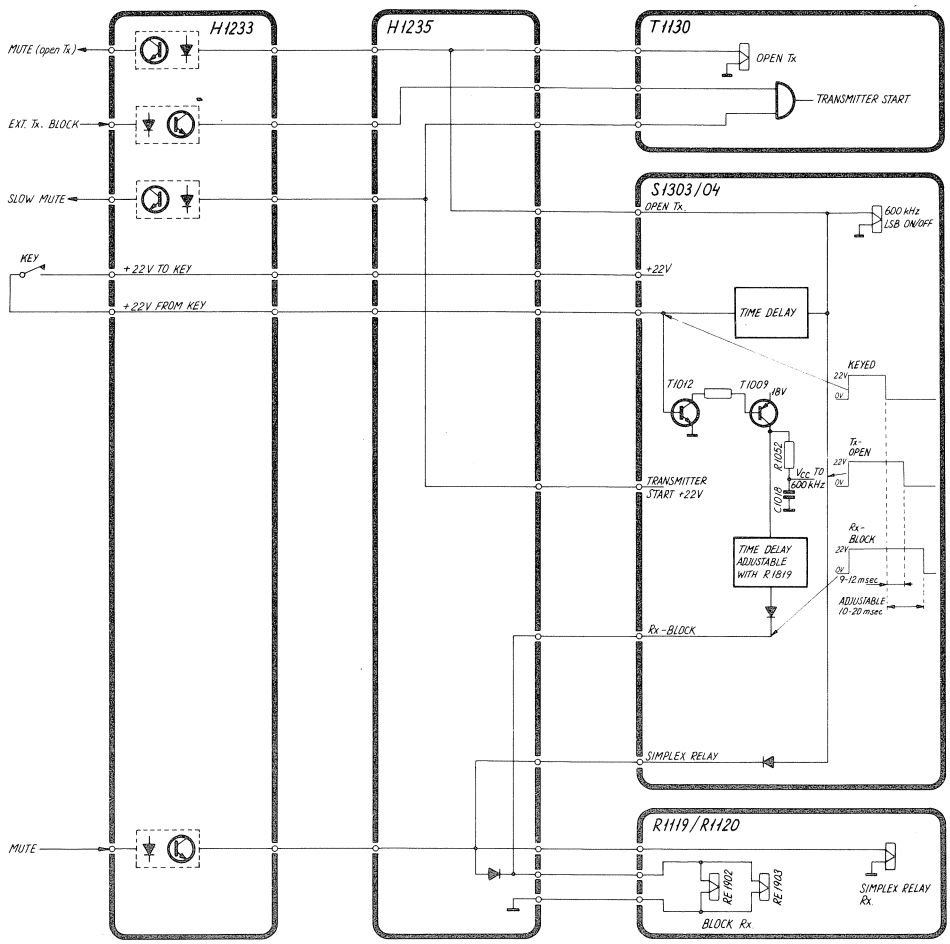
$f_{IF2} = f_{IF1} + f_{LO1} = 10.6960\ MHz - (P_2 \times 0.1\ kHz) + f_{MOD}$

$f_{LO2} = m \times 2\ MHz + (P_1 \times 2696) \times 1\ kHz,\ 4 \leq m \leq 16,\ 0 \leq P_1 \leq 1999$

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

$4 \leq m \leq 16,\ 0 \leq P_1 \leq 1999,\ 0 \leq P_2 \leq 9$

PRINCIPAL DESCRIPTION OF TELEGRAPHY MODE



TELEGRAPHY:

See principal diagram above.

PULSE SHAPING:

When the key is pressed and released the transmission starts and stops. The switch off time of the transmitter is delayed 9-12 msecs in order to produce the correct output signal shape (R1052, C1018).

FULL BREAK-IN:

The receiver is blocked for a time period of about 10-20 msecs after the key is released. This secures full break-in on the receiver.

MUTE:

The receiver can be blocked when a DC voltage is applied to MUTE.

EXT. TX BLOCK:

The transmitter can be blocked when a DC voltage is applied to EXT. TX BLOCK.

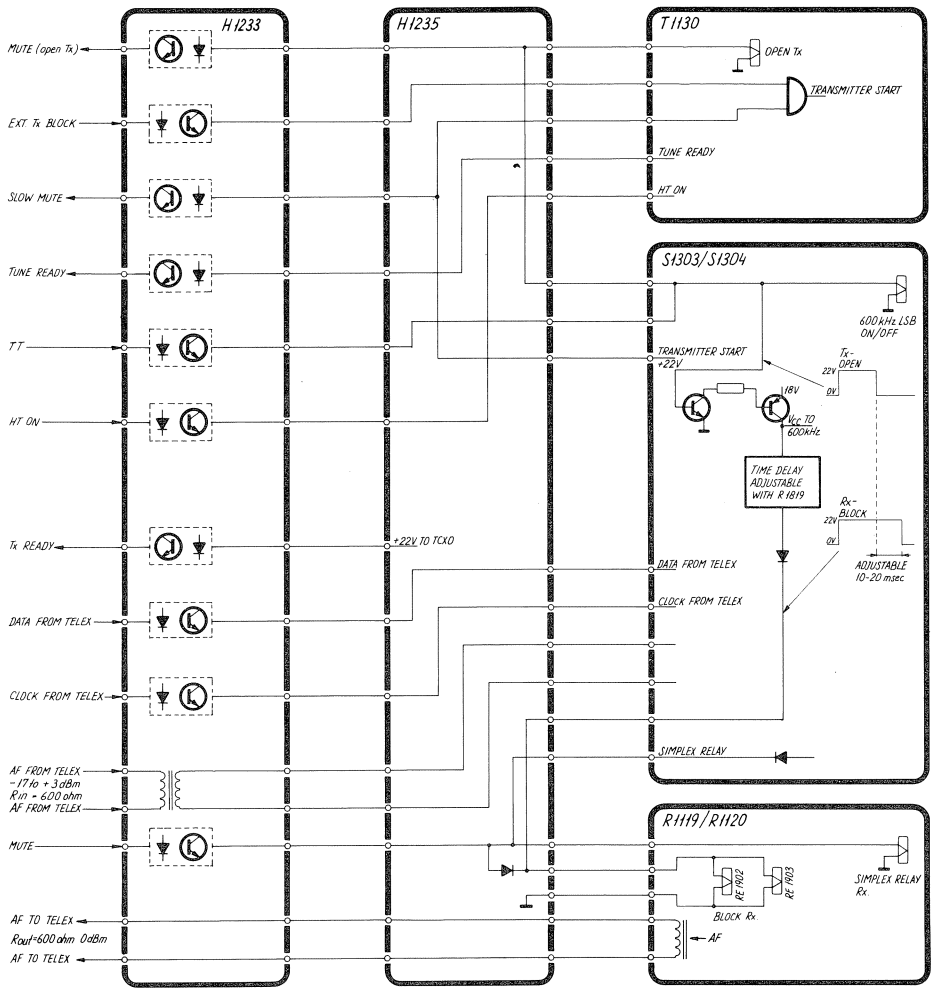
MUTE (open TX):

MUTE (open TX) can be used to block another transmitter when key down.

SLOW MUTE:

SLOW MUTE: can be used to block another transmitter.

PRINCIPAL DESCRIPTION OF TELEX MODE



TELEX:

See the principal diagram above.

TX READY:

Indicates that the transmitter is switched on.

HT ON:

Switch on the 22V DC supply to the exciter and the 8V DC supply to the power unit (T1130).

TT

This information is used to switch the short wave set between transmit and receive mode by setting open TX on/off.
When TT from telex is in transmit mode the transmitter is open and the receiver is blocked. When TT from telex changes to the receive mode the transmission stops immediately and the receiver is blocked for another 10-20 msecs controlled from the TIME DELAY (adjustable with R1819). This delay must last until the transmitter output is less than the sensitivity of the receiver. The delay is pre-adjusted from the factory to 12 msecs which secures a good reception with only 20 dB attenuation between the receiver and the transmitter aerials.

TUNE READY:

Indicates that the transmitter is ready to transmit, a steady yellow light is seen on the exciter front plate.

MUTE (open TX):

Is connected to TT and can be used to block another transmitter.

EXT. TX BLOCK:

The transmitter can be blocked when EXT. TX BLOCK is activated.

SLOW MUTE

Is connected to transmitter start and can be used to block another transmitter. When the exciter is in TELEX MODE transmitter start is activated.

MUTE:

The receiver can be blocked when MUTE is activated.

AF TO TELEX:

A constant level AF output from the receiver to the telex equipment.

AF FROM TELEX

The AF input signal from the telex equipment to the exciter is connected here.

DATA FROM TELEX/CLOCK FROM TELEX

This are input terminals to the exciter external frequency control. The transmitting frequency can be controlled by data on this input terminals.

PROGRAMMING OF S1304 FREQUENCIES

To open a new transmitting frequency in the exciter S1304 it is necessary to program the PROM's IC2512, IC2510 and IC2508 placed on the frequency check band. The PROM's are preprogrammed with a set of frequencies, but not all the prom addresses are used. The not used addresses can be programmed when it is wanted to open a new transmitting frequency.

PROM IC2512 is programmed with the 10 MHz and 1 MHz frequency information in BCD code.

PROM IC2510 is programmed with the 100 kHz and 10 kHz frequency information in BCD code.

PROM IC2508 is programmed with the 1 kHz and 100 Hz frequency information in BCD code.

To program a new frequency into the PROM's the PROM PROGRAMMER SAILOR H233 together with the address input unit SAILOR H237 can be used.

PROGRAMMING EXAMPLE S1304:

1. Select the appropriate PROM-manufactor on the PROM PROGRAMMER H233.
2. Activate the RESET button on the PROM PROGRAMMER H233 once.
3. Press the INSERT push button on the PROM PROGRAMMER H233.
4. The PROM to be programmed is placed in the appropriate socket.
   Start the programming procedure with IC2508.
5. Release the INSERT push button.
6. Change the address input from the ADDRESS UNIT H237 until a not used address is found. All the red diodes will be alight.
7. Select the output code to be programmed by means of the eight slide switches. The output code is indicated by the yellow diodes with a lighting diode representing a logic "high" level.

   IC2508: address set up 9A
   wanted frequency 7.5 kHz

	O_1	O_2	O_3	O_4	O_5	O_6	O_7	O_8
BCD:	1	0	1	0	1	1	1	0

8. Activate the BURN push button on H233.
9. The red and yellow diodes shall now show the same code.
10. Change IC2508 by IC2510.
11. Set up the wanted frequency code and push the BURN button.
12. Change IC2510 by IC2512.
13. Set up the wanted frequency code and push the BURN button.
14. Replace the PROM's in the exciter and control, by setting up the programmed frequency on the display, that the yellow diode ILLEGAL FREQUENCY on the front plate is not alight.

If more frequencies are to be programmed, start at point 1. of this procedure for every new frequency.

CONVERTION TABLE (decimal to BCD).

Decimal	BCD			
	0_1	0_2	0_3	0_4
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1

PROM CODES

The standard prom code in IC702 placed on the VCO selector board (700) is as illustrated below. The illustration is in Hexadecimal code, a convertion table is illustrated below.

Addresses	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	10	01	02	01	01	01	02	02	01	0D	1D	13	24	3C	45	FF
0010	0F	80	81	81	81	81	80	82	9D	9D	DE	82	FF	FF	FF	1A
	IC702				Module 700							$ 0B42				

Convertion table.

Decimal	0	1	2	3	4	5	6	7
Binary	0000	0001	0010	0011	0100	0101	0110	0111
Hex	0	1	2	3	4	5	6	7
Decimal	8	9	10	11	12	13	14	15
Binary	1000	1001	1010	1011	1100	1101	1110	1111
Hex	8	9	A	B	C	D	E	F

The standard prom codes in IC2114 and IC2115 placed on the frequency control board (2100) is as illustrated below. The illustration is in Hexadecimal code, a convertion table is illustrated below.

Addresses	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	Frequency range
0000	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	0.0 - 0.9 MHz
0010	FF	FF	FF	FF	FF	FF	CA	CA	AE	AE	EE	EE	EE	EE	EE	EE	1.0 - 1.9 MHz
0020	F6	F6	BE	BE	BA	BA	DE	DE	9E	9E	EE	EE	EE	EE	EE	EE	2.0 - 2.9 MHz
0030	EA	AA	AA	AA	CE	CE	CE	8E	8E	8E	EE	EE	EE	EE	EE	EE	3.0 - 3.9 MHz
0040	DA	DA	DA	9B	9B	9B	FB	FB	FB	FB	EE	EE	EE	EE	EE	EE	4.0 - 4.9 MHz
0050	A3	A3	A3	A3	A3	8B	8B	8B	8B	8B	EE	EE	EE	EE	EE	EE	5.0 - 5.9 MHz
0060	B7	B7	B6	B6	F3	F3	F3	F3	F3	F3	EE	EE	EE	EE	EE	EE	6.0 - 6.9 MHz
0070	E7	E7	E7	E7	E7	E7	A7	A7	A7	A7	EE	EE	EE	EE	EE	EE	7.0 - 7.9 MHz
0080	B3	B2	B2	B2	B2	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	8.0 - 8.9 MHz
0090	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	9.0 - 9.9 MHz
00A0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	10.0 - 10.9 MHz
00B0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	11.0 - 11.9 MHz
00C0	FF	FF	FF	D6	D6	D6	D6	FF	FF	FF	EE	EE	EE	EE	EE	EE	12.0 - 12.9 MHz
00D0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	13.0 - 13.9 MHz
00E0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	14.0 - 14.9 MHz
00F0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	15.0 - 15.9 MHz
	IC2115 Module 2100 $ E73F																

Addresses	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	Frequency range
0000	FF	FF	FF	FF	96	96	96	96	96	FF	EE	EE	EE	EE	EE	EE	16.0 - 16.9 MHz
0010	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	17.0 - 17.9 MHz
0020	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	18.0 - 18.9 MHz
0030	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	19.0 - 19.9 MHz
0040	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	20.0 - 20.9 MHz
0050	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	21.0 - 21.9 MHz
0060	D2	D2	D2	D2	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	22.0 - 22.9 MHz
0070	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	23.0 - 23.9 MHz
0080	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	24.0 - 24.9 MHz
0090	E2	E2	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	25.0 - 25.9 MHz
00A0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	26.0 - 26.9 MHz
00B0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	27.0 - 27.9 MHz
00C0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	28.0 - 28.9 MHz
00D0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	
00E0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	
00F0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	
	IC2114 Module 2100 $ F5A5																

PROM CODES continued (S1303/04)

Convertion Table.

Decimal	0	1	2	3	4	5	6	7
Binary	0000	0001	0010	0011	0100	0101	0110	0111
Hex	0	1	2	3	4	5	6	7
Decimal	8	9	10	11	12	13	14	15
Binary	1000	1001	1010	1011	1100	1101	1110	1111
Hex	8	9	A	B	C	D	E	F

The prom output code is fed to the VCO selector board (module 700) and the output bit O_1 is used to block the transmitter when a frequency outside the allowed transmitting bands is keyed into the display.

The transmitter block information can be changed by programming a new prom where the prom output O_1 is changed from "1" to "0" on the frequency addresses where it is wanted to use the transmitter.

With a standard prom the transmitter is blocked in the frequency range 4.3 - 6.1, 6.4 - 8.0 MHz. To override this block information a new prom IC2115 shall be programmed as illustrated below.

Addresses	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	Frequency range
0000	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	0.0 - 0.9 MHz
0010	FF	FF	FF	FF	FF	FF	CA	CA	AE	AE	EE	EE	EE	EE	EE	EE	1.0 - 1.9 MHz
0020	F6	F6	BE	BE	BA	BA	DE	DE	9E	9E	EE	EE	EE	EE	EE	EE	2.0 - 2.9 MHz
0030	EA	AA	AA	AA	CE	CE	CE	8E	8E	8E	EE	EE	EE	EE	EE	EE	3.0 - 3.9 MHz
0040	DA	DA	DA	9A	9A	9A	FA	FA	FA	FA	EE	EE	EE	EE	EE	EE	4.0 - 4.9 MHz
0050	A2	A2	A2	A2	A2	8A	8A	8A	8A	8A	EE	EE	EE	EE	EE	EE	5.0 - 5.9 MHz
0060	B6	B6	B6	B6	F2	F2	F2	F2	F2	F2	EE	EE	EE	EE	EE	EE	6.0 - 6.9 MHz
0070	E6	E6	E6	E6	E6	E6	A6	A6	A6	A6	EE	EE	EE	EE	EE	EE	7.0 - 7.9 MHz
0080	B2	B2	B2	B2	B2	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	8.0 - 8.9 MHz
0090	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	9.0 - 9.9 MHz
00A0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	10.0 - 10.9 MHz
00B0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	11.0 - 11.9 MHz
00C0	FF	FF	FF	D6	D6	D6	D6	FF	FF	FF	EE	EE	EE	EE	EE	EE	12.0 - 12.9 MHz
00D0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	13.0 - 13.9 MHz
00E0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	14.0 - 14.9 MHz
00F0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EE	EE	EE	EE	EE	EE	15.0 - 15.9 MHz
	IC2115				Module 2100						$ E71B						

S1302/03/04

SERVICE

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.

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
X	X	X	X
X	X	X	
	X	X	
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

PASSIVE PROBE:

Attenuation	20 dB (10X)
Input resistance	10 Mohm
Input capacitance	15 pF
Compensation range	10 - 30 pF
E.g. PHILIPS type	PM8925

MULTIMETER:

Sensitivity DC (f.s.d.)	1V
Input impedance	10 Mohm
Accuracy (f.s.d.)	±2%
E.g. PHILIPS type	PM2505

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

TONE GENERATOR:

Frequency range	200 - 3000 Hz
Output voltage	1V RMS
Output impedance	600 ohm
E.g. PHILIPS type	PM5107

NECESSARY TEST EQUIPMENT cont.:

TX	EXC	RX	PS
		X	
	X	X	
		X	
X			X
	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

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

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

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-24-0V-R
1 pc. LAMBDA type (N1407/T1130)	LXS-G-24-0V-R

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

S1302/03/04 A7/3

NECESSARY TEST EQUIPMENT cont.:

TX	EXC	RX	PS		
	X	X		R1119, R1120; S1302, S1303, S1304	
				V_{out} 1	22V
				I_{out} 1	1A
				V_{out} 2	8V
				I_{out} 2	1A
				V_{out} 3	-45V
				I_{out} 3	-0.1A
				E.g. SAILOR types	N1402 spec. N1405
	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

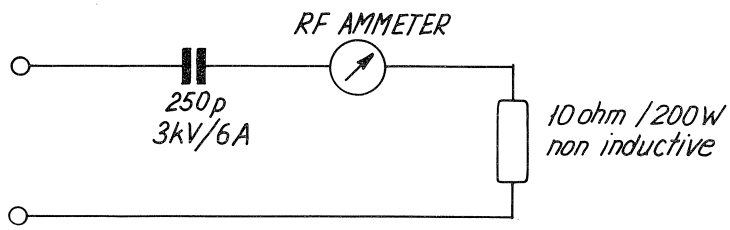
NECESSARY TEST EQUIPMENT cont.:

TX	EXC	RX	PS
X	X		
X			

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

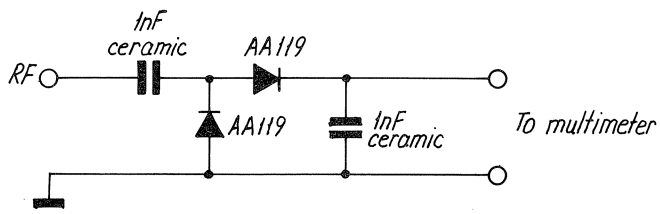
DUMMY LOAD for C.T. band 1.6 - 4 MHz:



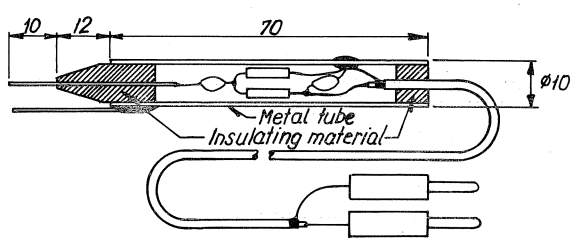
E.g. Draloric type 06-1291TD 20x50L 8KVs 250 pF ±20% R85

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

DIODE PROBE



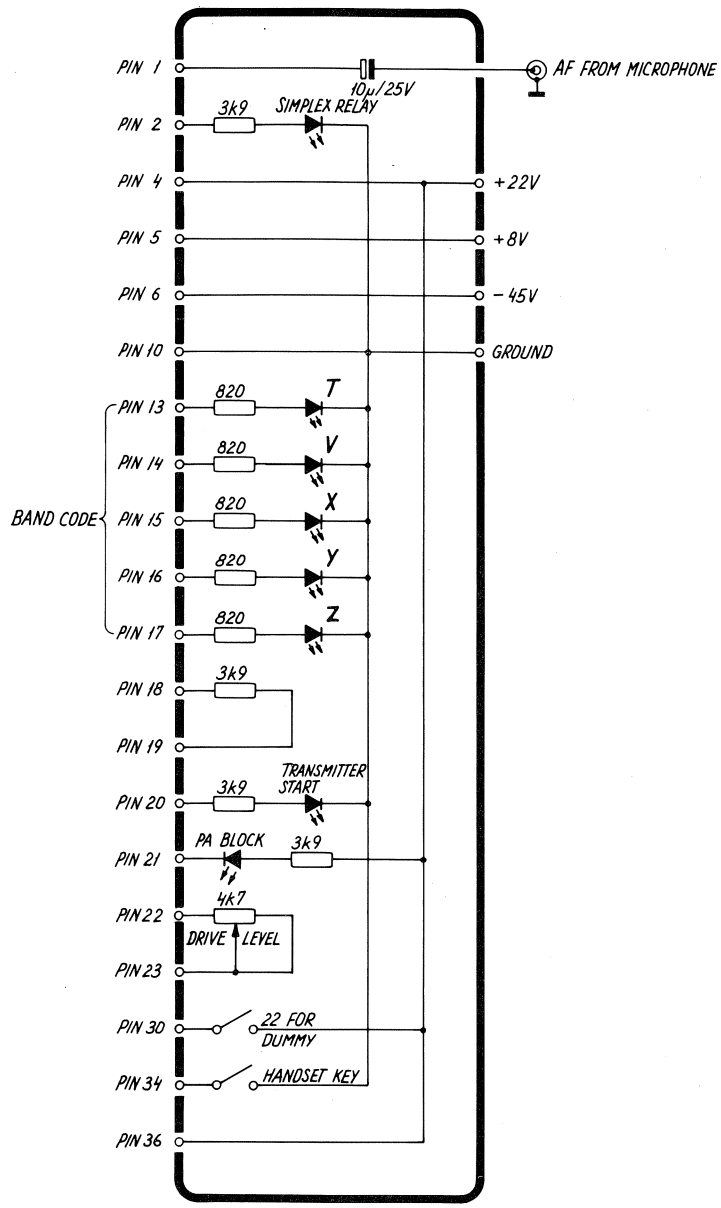
LAYOUT OF THE PROBE



S1302 A7/5

NECESSARY TEST EQUIPMENT cont.:

SCEMATIC DIAGRAM FOR TESTBOX S1302/03/04



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

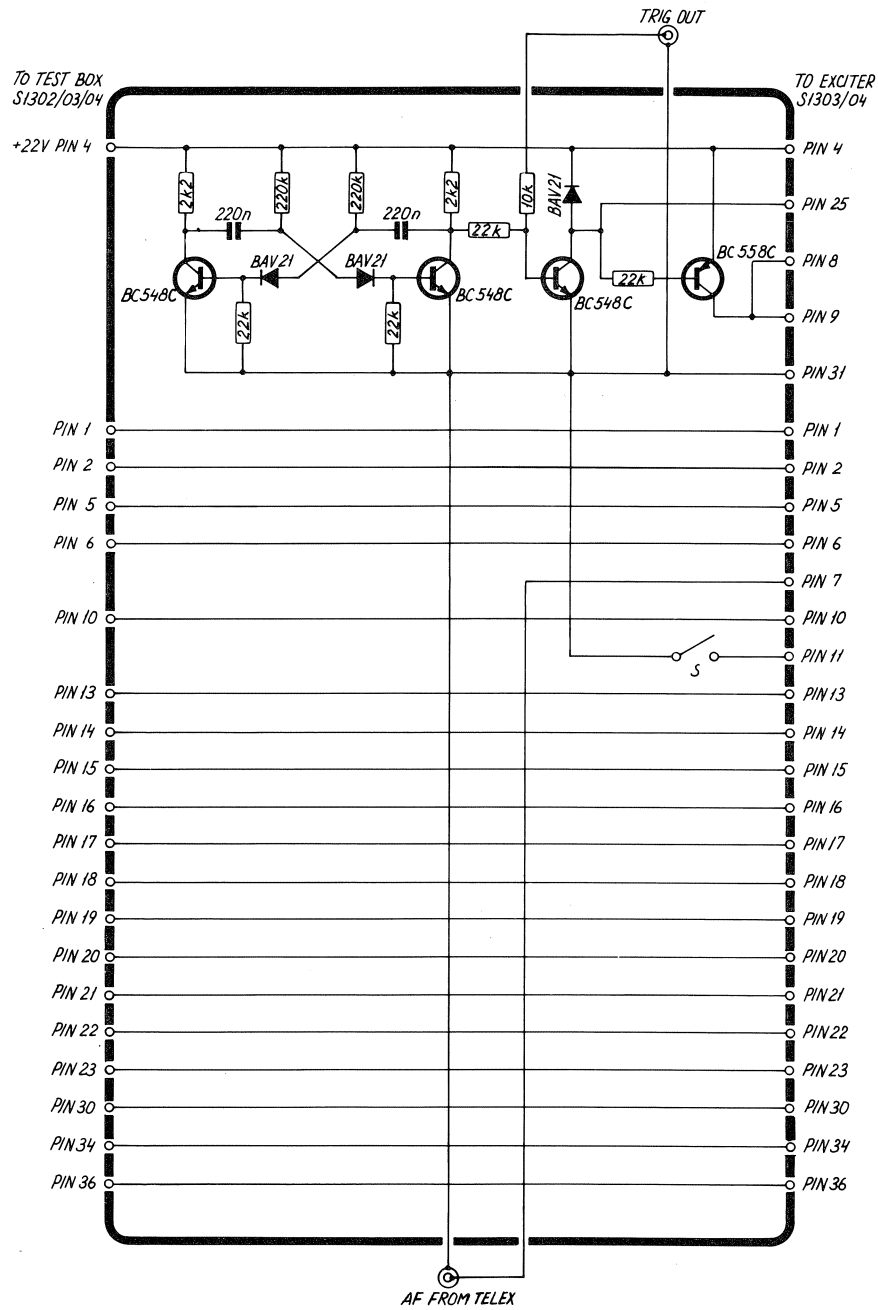
TRANSMITTER START: The diode is alight when handset key is activated, when TUNE, and in SEND ALARM.
In S1303/04 the diode is alight in TELEX and in TELEGRAPHY.

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.

NECESSARY TEST EQUIPMENT cont.:

ARTIFICIAL KEY FOR S1303 and S1304.



The ARTIFICIAL KEY is designed to connect between the EXCITER S1303/04 and the TESTBOX S1302/03/04. The necessary wires are fed through to the TESTBOX S1302/03/04 and a multivibrator keys via two transistors the exciter in the telex and telegraphy mode. The key frequency is approx. 15 Hz. An output TRIG OUT taken from the multivibrator can be used to trig an oscilloscope. An input terminal can be used to feed an AF signal into the exciter to modulate it is TELEX mode.

The switch on the front plate of the ARTIFICIAL KEY is together with the square wave on pin 25 used to test the external frequency read in.

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 & $\pm$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.

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.

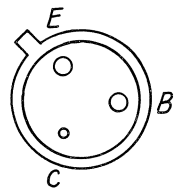
   a. If the DC voltage on the terminal "PD2 in" is approx. 0.7V and the DC voltage on output terminal of IC601, pin 6 is approx. 17V, the integrator IC601 is apparently ok.

   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.

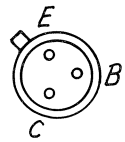
BOTTOM VIEW

BC639
BC640



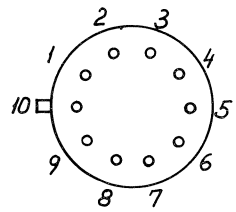
BFW 17A

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

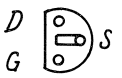


2N 2368

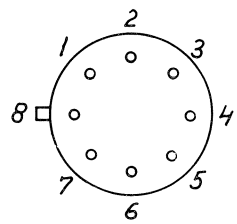
BF 199
BF 494



CA 3019



BF 256 A, B, C

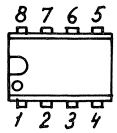


LM 3053

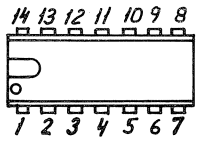
MC 78 L05 ACP

S1302/03/04 A13/1

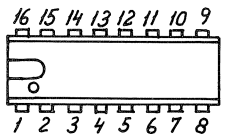
TOP VIEW



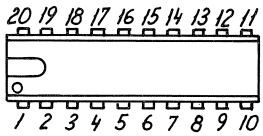
LM 308N
LM 358



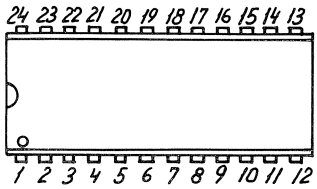
LM 329
MC 4044
MC 14081 B CP
SN 7407 N
SN 7410 N
SN 7472 N
SN 74 LS 20N
SN 74 LS 27N
SN 74 LS 290N
SN 74 LS 197N
SN 74 LS 32N
SN 74 LS 86N
SN 74 LS 00N
SN 74 LS 08N
SN 74 LS 74N
SN 74 06
MC 14071 BCP
MC 14082 BCP
MC 14073 BCP
MC 14011 BCP



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

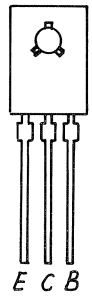


MMI 6308-1

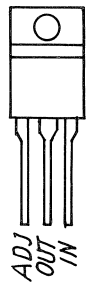


MC 14515 BCB

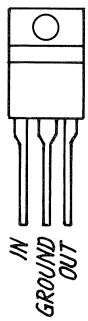
FRONT VIEW



BD 138
BD 139



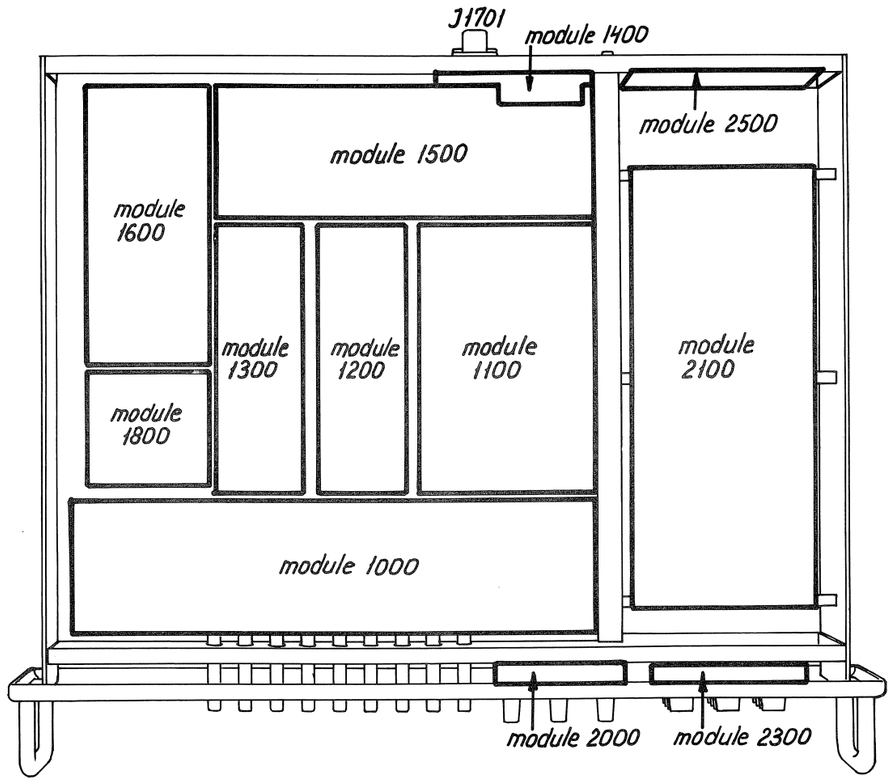
LM 317T



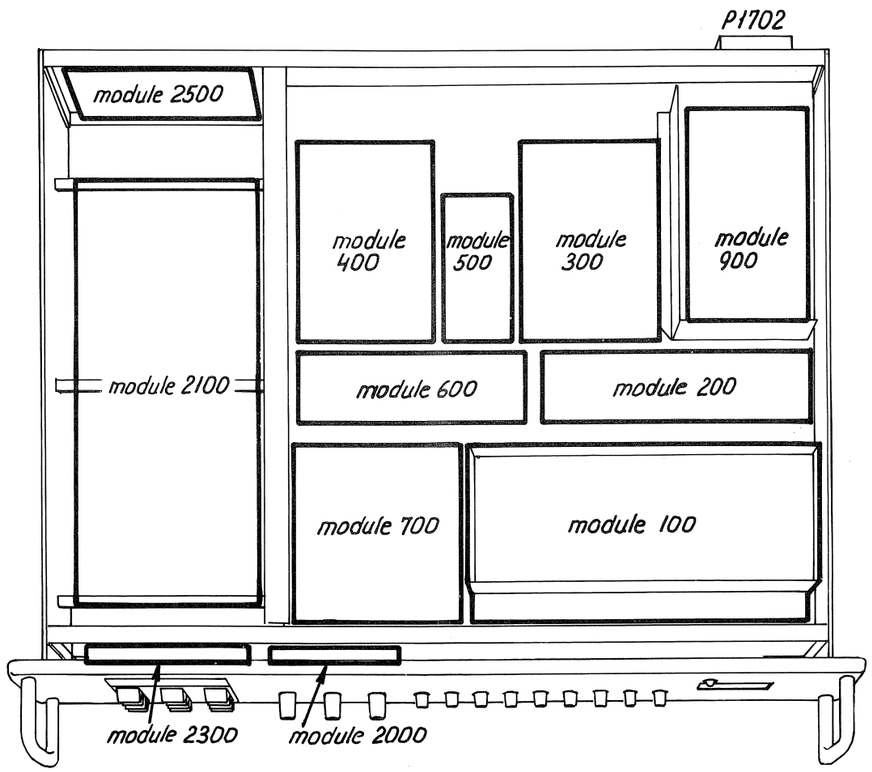
MC 7805 CT

SL302/03/04 AL 3/2

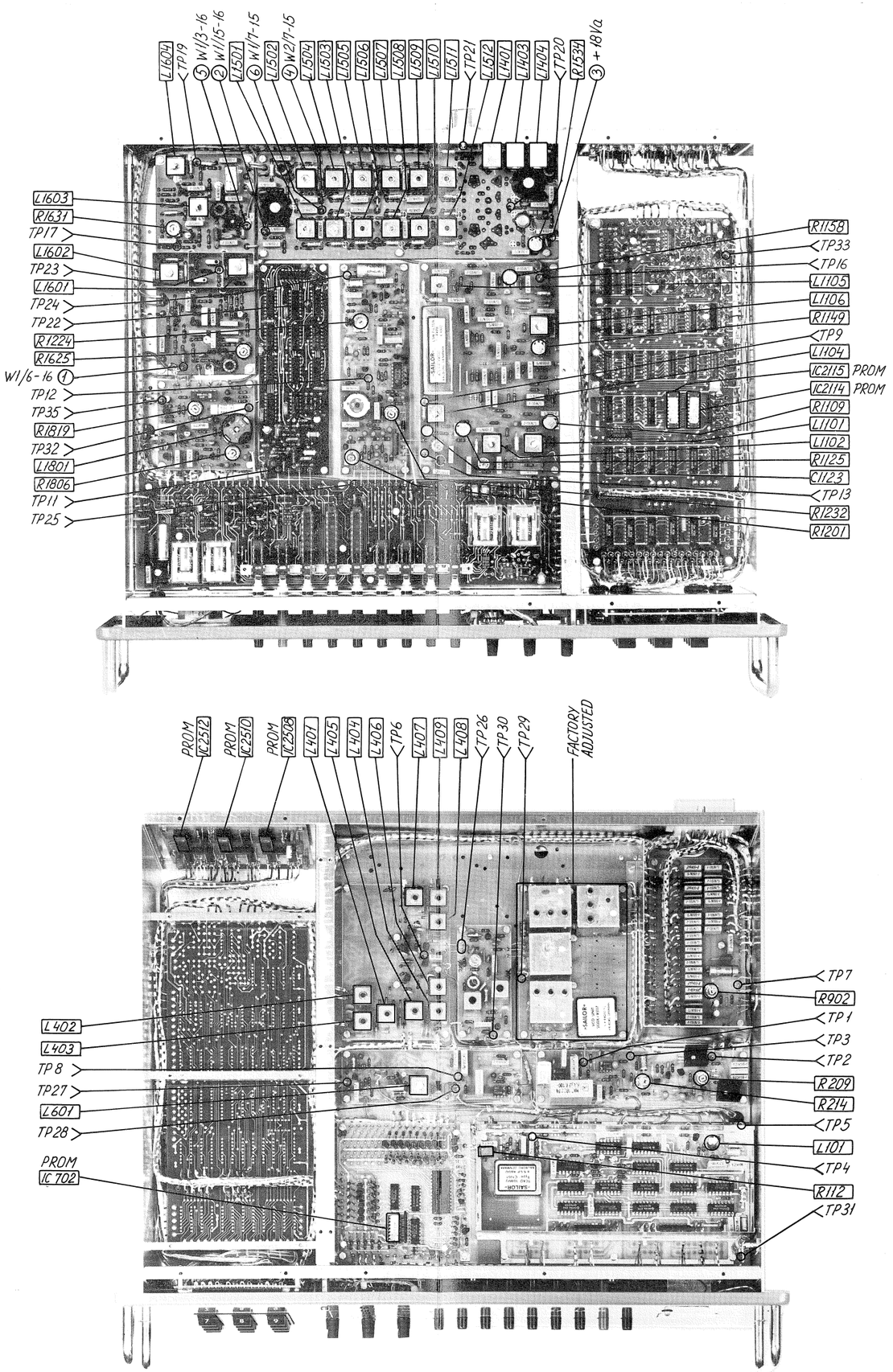
S 1303/04



Chassismontage module 1700



MODULE LOCATION S1303/04



ADJUSTMENT LOCATION S1303/04

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

C DIVIDER UNIT S1300/R1117 2/3

Symbol	Description		Manufact.	
C101	Capacitor, polyester 10nF±20%	400V	Philips	2222 344 54103
C102	Capacitor, electrolytic 10uF 20%	35V	ROE	EKI00AA210F
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 NP0±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 3/3

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 1,5Kohm +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 2/2

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 electrolytic 10uF- 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

MODULE NO: 300

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 3/3

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

B VCXO AND LOOP 2 FILTER FOR S1300

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 electrolytic 10uF 20% 35V	ROE	EKI00AA210F
C603	Capacitor polyester 47nF±10% 100V	Philips	2222 344 25473
C604	Capacitor ceramic 33pF ±2% 100V	Philips	2222 638 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 ± 0,25pF 63V	Draloric	3x4 N150/1B
C612	Capacitor ceramic 10nF-20/+80% 32V	Ferroperm	9/0145,9
C613	Capacitor electrolytic 10uF 20% 35V	ROE	EKI00AA210F

B VCXO AND LOOP 2 FILTER S1300 2/2

Symbol	Description	Manufact.	
C614	Capacitor polyester 47nF ±20% 100V	Philips	2222 344 24473
C615	Capacitor electrolytic 10uF 20% 35V	ROE	EKI00AA210F
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

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 3/4

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

MODULE NO: 700

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

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

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 S1303/S1304 Module 1000 1/4

Symbol	Description			Manufact.	
R1001	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R1002	Resistor	22 kohm ±5%	0,33W	PHILIPS	2322 211 13223
R1003	Resistor	330 ohm ±5%	1,15W	PHILIPS	2322 214 13331
R1004	Resistor	18 kohm ±5%	0,33W	PHILIPS	2322 211 13183
R1005	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R1006	Resistor	6,8 kohm ±5%	0,33W	PHILIPS	2322 211 13682
R1007	Resistor	3,9 kohm ±5%	0,33W	PHILIPS	2322 211 13392
R1008	Resistor	3,9 kohm ±5%	0,33W	PHILIPS	2322 211 13392
R1009	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R1010	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R1011	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R1012	Resistor	15 ohm ±5%	0,33W	PHILIPS	2322 211 13150
R1013	Resistor	68 ohm ±5%	0,33W	PHILIPS	2322 211 13680
R1014	Resistor	18 kohm ±5%	0,33W	PHILIPS	2322 211 13183
R1015	Resistor	4,7 kohm ±5%	0,33W	PHILIPS	2322 211 13472
R1016	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R1017	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R1018	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R1019	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R1020	Resistor	18 kohm ±5%	0,33W	PHILIPS	2322 211 13183
R1021	Resistor	3,3 kohm ±5%	0,33W	PHILIPS	2322 211 13332
R1022	Resistor	270 ohm ±5%	0,33W	PHILIPS	2322 211 13271
R1023	Resistor	820 ohm ±5%	0,33W	PHILIPS	2322 211 13821
R1024	Resistor	0,2 kohm ±5%	0,33W	PHILIPS	2322 211 13222
R1025	Resistor	1,5 kohm ±5%	0,33W	PHILIPS	2322 211 13152
R1026	Resistor	22 kohm ±5%	0,33W	PHILIPS	2322 211 13223
R1027	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R1028	Resistor	22 kohm ±5%	0,33W	PHILIPS	2322 211 13223
R1029	Resistor	18 kohm ±5%	0,33W	PHILIPS	2322 211 13183
R1030	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R1031	Resistor	3,9 kohm ±5%	0,33W	PHILIPS	2322 211 13392
R1032	Resistor	18 kohm ±5%	0,33W	PHILIPS	2322 211 13183
R1033	Resistor	8,2 kohm ±5%	0,33W	PHILIPS	2322 211 13822
R1034	Resistor	22 kohm ±5%	0,33W	PHILIPS	2322 211 13223
R1035	Resistor	22 kohm ±5%	0,33W	PHILIPS	2322 211 13223
R1036	Resistor	22 kohm ±5%	0,33W	PHILIPS	2322 211 13223
R1037	Resistor	100 kohm ±5%	0,33W	PHILIPS	2322 211 13104
R1038	Resistor	4,7 kohm ±5%	0,33W	PHILIPS	2322 211 13472
R1039	Resistor	8,2 kohm ±5%	0,33W	PHILIPS	2322 211 13822
R1040	Resistor	22 kohm ±5%	0,33W	PHILIPS	2322 211 13223
R1041	Resistor	47 kohm ±5%	0,33W	PHILIPS	2322 211 13473

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MODE SWITCH S1303/S1304 Module 1000 2/4

Symbol	Description	Manufact.	
R1042	Resistor 22 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1043	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1044	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1045	Resistor 3,3 kohm ±5% 0,33W	PHILIPS	2322 211 13332
R1046	Resistor 22 kohm ±5% 0,33W	PHILIPS	2322 211 13223
R1047	Resistor 3,3 kohm ±5% 0,33W	PHILIPS	2322 211 13332
R1048	Resistor 270 ohm ±5% 0,33W	PHILIPS	2322 211 13271
R1049	Resistor 22 kohm ±5% 0,33W	PHILIPS	2322 211 13223
R1050	Resistor 270 ohm ±5% 0,33W	PHILIPS	2322 211 13271
R1051	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1052	Resistor 820 ohm ±5% 0,33W	PHILIPS	2322 211 13821
R1053	Resistor 82,5 kohm ±5% 0,33W	PHILIPS	2322 211 58253
R1054	Resistor 680 kohm ±5% 0,33W	PHILIPS	2322 211 13684
R1055	Resistor 15 ohm ±5% 0,33W	PHILIPS	2322 211 13150
R1056	Resistor 15 ohm ±5% 0,33W	PHILIPS	2322 211 13150
R1057	Resistor 39,2 kohm ±5% 0,33W	PHILIPS	2322 211 53923
R1058	Resistor 1,5 kohm ±5% 0,33W	PHILIPS	2322 211 13152
R1059	Resistor 39,2 kohm ±5% 0,33W	PHILIPS	2322 211 53923
R1060	Resistor 10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R1061	Resistor 47 kohm ±5% 0,33W	PHILIPS	2322 211 13473
C1001	Not used		
C1002	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE705SYF103Z
C1003	Capacitor Polyester ±20% 400V	PHILIPS	2322 344 54103
C1004	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1005	Capacitor Polyetylen 0,22uF ±10% 100V	SIEMENS	B32511-D1224-D
C1006	Capacitor Polyester 100nF ±10% 100V	PHILIPS	2322 344 25104
C1007	Capacitor Polyetylen 0,22uF ±10% 100V	SIEMENS	B32511-D1224-D
C1008	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SYF103Z
C1009	Capacitor Electrolyt 470uF -10/+50% 25V	ERO	EB00GD347E
C1010	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1011	Capacitor Electrolyt 4,7uF ±20% 50V	ERO	EKI00AA147H
C1012	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
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
C1017	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1018	Capacitor Electrolyt 4,7uF ±20% 50V	ERO	EKI00AA147H
C1019	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1020	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z

MODE SWITCH S1303/S1304 Module 1000

Symbol	Description	Manufact.	
C1021	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1022	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1023	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1024	Capacitor Electrolyt 10nF -20/+50% 25V	ERO	ETP 3F
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 Silicon	PHILIPS	BAV21
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
D1021	Diode Silicon	PHILIPS	BAV21
D1022	Diode Silicon	PHILIPS	BAV21
D1023	Diode Silicon	PHILIPS	BAV21
D1025	Diode Silicon	PHILIPS	BAV21
D1026	Diode Silicon	PHILIPS	BAV21
D1027	Diode Silicon	PHILIPS	BAV21
D1028	Diode Silicon	PHILIPS	BAV21
D1029	Diode Silicon	PHILIPS	BAV21
D1030	Diode Silicon	PHILIPS	BAV21
D1031	Diode Silicon	PHILIPS	BAV21
D1032	Diode Silicon	PHILIPS	BAV21
D1033	Diode Zener 12V 0,4W	PHILIPS	BZX79C12
D1034	Diode Silicon	PHILIPS	BAV21
D1035	Diode Silicon	PHILIPS	BAV21
D1036	Diode Silicon	PHILIPS	BAV21
D1037	Diode Silicon	PHILIPS	BAV21

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MODE SWITCH S1303/S1304 Module 1000

Symbol	*Description*	*Manufact.*	
D1038	Diode Germanium	ITT	AA143
D1039	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	BC640
T1008	Transistor	PHILIPS	BC558B
T1009	Transistor	PHILIPS	BC558B
T1010	Transistor	PHILIPS	BC548B
T1011	Transistor	PHILIPS	BC548B
T1012	Transistor	PHILIPS	BC548B
T1013	Transistor	PHILIPS	BC548B
T1014	Transistor	PHILIPS	BC640
T1015	Transistor	PHILIPS	BC548B
T1016	Transistor	PHILIPS	BC640
T1017	Transistor	PHILIPS	BC548B
RE1001	Relay 24V	NATIONAL	NF2-24V
RE1002	Relay 24V	NATIONAL	NF4-24V
RE1003	Relay 24V	NATIONAL	NF4-24V
RE1004	Relay 24V	NATIONAL	NF4-24V
S1001	Switch 9x17,5 2U Tast 3,4,5 = 6U -GR	SHADOW	
IC1001	Integrated Circuit	NATIONAL	LM358

SSB GENERATOR S1302/3/4 1/4

Symbol	Description			Manufact.	
R1101	Resistor	6K8 ohm ±5%	0.33W	Philips	2322 211 13682
R1102	Resistor	1KO ohm ±5%	0.33W	Philips	2322 211 13102
R1103	Resistor	220 ohm ±5%	0.33W	Philips	2322 211 13221
R1104	Resistor	1KO ohm ±5%	0.33W	Philips	2322 211 13102
R1105	Resistor	1KO ohm ±5%	0.33W	Philips	2322 211 13102
R1106	Resistor	1KO ohm ±5%	0.33W	Philips	2322 211 13102
R1107	Resistor	1KO 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	1KO ohm ±5%	0,33W	Philips	2322 211 13102
R1136	Resistor	1KO 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	1KO ohm ±5%	0.5W	Philips	2322 642 12102

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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

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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.	

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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

D

MICROPHONE AMPLIFIER S1300

Symbol	*Description*	*Manufact.*	
R1201	Preset pot.meter, cermet 1Kohm ±20%0,5W	Philips	2322 482 20102
R1202	Resistor 560 ohm ±5% 1,6 W	Philips	2322 191 35601
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 5,6Kohm ±5% 0,33W	Philips	2322 211 13562
R1209	Resistor 100Kohm ±5% 0,33W	Philips	2322 211 13104
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

D 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 electrolytic 33uF 20% 16V	ROE	EKI00AA233D
C1202	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1203	Capacitor electrolytic 0,22uF 20% 50V	ROE	EKI00AA022H
C1204	Capacitor ceramic 1nF-20/+80% 40V	Ferroperm	9/0129,8
C1205	Capacitor ceramic 1nF-20/+80% 40V	Ferroperm	9/0129,8
C1206	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1207	Capacitor tantal 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 electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1211	Capacitor ceramic 150pF ±10% 25V	Ferroperm	9/0121,8
C1212	Capacitor polyester 100nF ±5% 100V	Philips	2222 344 23104
C1213	Capacitor polyester 68nF ±5% 250V	Philips	2222 344 43683
C1214	Capacitor electrolytic 10uF-10/+50% 63V	Siemens	B41283-A8106-T
C1215	Capacitor polyester 68nF ±5% 250V	Philips	2222 344 43683
C1216	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1217	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1218	Capacitor electrolytic 10uF 20% 35V	ROE	EKI00AA210F
C1219	Capacitor polyester 47nF ±10% 250V	Philips	2222 344 41473
C1220	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1221	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1222	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1223	Capacitor polyester 68nF ±10% 250V	Philips	2222 344 41683
C1224	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1225	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1226	Capacitor electrolytic 4,7uF 20% 50V	ROE	EKI00AA147H
C1227	Capacitor polyester 220nF ±20% 100V	Philips	2322 344 24224
L1201	Coil	S.P.	TL 219

MODULE NO: 1200

B	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%	0,4W	Philips	BZX79 C5V1
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			Motorola	MC14013 BC

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 1/1

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 ± 0p5F 50V	K.C.K.	HE40SJPH068D
C1516	Capacitor ceramic 4p7 ± 0p5F 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

MODULE NO: 1500

BAND-FILTER S1302/3/4 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

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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

D 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 electrolytic 10uF 20%	35V	ROE	EKI00AA210F
C1602	Capacitor, polyester 47nF ±20%	250V	Philips	2222 344 40473
C1603	Capacitor electrolytic 10uF 20%	35V	ROE	EKI00AA210F
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

MODULE NO: 1600

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

b A2H - OSCILLATOR & DELAY UNIT S1300 1/2

Symbol	Description		Manufact.	
R1801	Resistor 1kohm ± 5%	0.33W	Philips	2322 211 13102
R1802	Resistor 100kohm ± 5%	0.33W	Philips	2322 211 13104
R1803	Resistor 39kohm ± 5%	0.33W	Philips	2322 211 13393
R1804	Resistor 4.7kohm ± 5%	0.33W	Philips	2322 211 13472
R1805	Resistor 33kohm ± 5%	0.33W	Philips	2322 211 13333
R1806	Preset pot.meter 1kohm ± 20%	0.5W	Philips	2322 482 20102
R1807	Resistor 1kohm ± 5%	0.33W	Philips	2322 211 13102
R1808	Resistor 2.2kohm ± 5%	0.33W	Philips	2322 211 13222
R1809	Resistor 56kohm ± 5%	0.33W	Philips	2322 211 13563
R1810	Resistor 120kohm ± 5%	0.33W	Philips	2322 211 13124
R1811	Resistor 10kohm ± 5%	0.33W	Philips	2322 211 13103
R1812	Resistor 3.9kohm ± 5%	0.33W	Philips	2322 211 13392
R1813	Resistor 10kohm ± 5%	0.33W	Philips	2322 211 13103
R1814	Resistor 56kohm ± 5%	0.33W	Philips	2322 211 13563
R1815	Resistor 10kohm ± 5%	0.33W	Philips	2322 211 13103
R1816	Resistor 10kohm ± 5%	0.33W	Philips	2322 211 13103
R1817	Resistor 3.9kohm ± 5%	0.33W	Philips	2322 211 13392
R1818	Resistor 56kohm ± 5%	0.33W	Philips	2322 211 13563
R1819	Preset pot.meter 100kohm ±20%	0.5W	Philips	2322 482 20104
R1820	Resistor 56kohm ± 5%	0.33W	Philips	2322 211 13563
R1821	Resistor 3.9kohm ± 5%	0.33W	Philips	2322 211 13392
R1822	Resistor 10kohm ± 5%	0.33W	Philips	2322 211 13103
R1823	Resistor 10kohm ± 5%	0.33W	Philips	2322 211 13103
R1824	Resistor 56kohm ± 5%	0.33W	Philips	2322 211 13563
R1825	Resistor 10kohm ± 5%	0.33W	Philips	2322 211 13103
R1826	Resistor 10kohm ± 5%	0.33W	Philips	2322 211 13103
R1827	Resistor 3.9kohm ± 5%	0.33W	Philips	2322 211 13392
C1801	Capacitor tantalum 10uF-20/+50%	25V	Ero	ETP 3F
C1802	Capacitor tantalum 10uF-20/+50%	25V	Ero	ETP 3F
C1803	Capacitor tantalum 4.7uF-20/+50%	35V	Ero	ETP 2E
C1804	Capacitor polystyrene 56nF ± 1%	63V	Philips	2222 444 45603
C1805	Capacitor tantalum 4.7uF-20/+50%	35V	Ero	ETP 2E
C1806	Capacitor tantalum 4.7uF-20/+50%	35V	Ero	ETP 2E
C1807	Capacitor polyester 100nF ±10%	100V	Philips	2222 344 25104
C1808	Capacitor polyester 220nF ±10%	400V	Philips	2222 344 25224
C1809	Capacitor polyester 220nF ±10%	100V	Philips	2222 344 25224
C1810	Capacitor polyester 10nF ±20%	400V	Philips	2222 344 54103

MODULE NO: 1800

a A2H - OSCILLATOR & DELAY UNIT S1300 2/2

Symbol	*Description*	*Manufact.*	
L1801	Coil	S.P.	TL 267
D1801	Diode, silicon	Philips	BAV 21
D1802	Diode, silicon	Philips	BAV 21
D1803	Diode, silicon	Philips	BAV 21
D1804	Diode, silicon	Philips	BAV 21
D1805	Diode, silicon	Philips	BAV 21
D1806	Diode, silicon	Philips	BAV 21
T1801	Transistor	Philips	BC 548
T1802	Transistor	Philips	BC 548
T1803	Transistor	Philips	BC 548
T1804	Transistor	Philips	BC 548
T1805	Transistor	Philips	BC 558
T1806	Transistor	Philips	BC 548
T1807	Transistor	Philips	BC 548
T1808	Transistor	Philips	BA 548
T1809	Transistor	Philips	BC 558
RE1801	Relay	Siemens	V23100-V4024-A001

POWER SWITCH S1303 Module 2000 1/1

Symbol	Description		Manufact.	
R2001	Resistor	1 kohm ±5% 0,5 W	PHILIPS	2322 212 13102
R2002	Resistor	1 kohm ±5% 0,5 W	PHILIPS	2322 212 13102
R2003	Resistor	1 kohm ±5% 0,5 W	PHILIPS	2322 212 13102
R2004	Resistor	10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R2005	Resistor	10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R2006	Resistor	33 kohm ±5% 0,33W	PHILIPS	2322 211 13333
R2007	Resistor	10 kohm ±5% 0,33W	PHILIPS	2322 211 13103
R2008	Resistor	3,6 kohm ±5% 0,33W	PHILIPS	2322 211 13362
P2001	Potmeter	4,7 kohm ±5% 0,1 W	PHILIPS	2322 380 01206
C2001	Resistor Ceramic	10nF -20/+80% 50V	KCK	HE70SJYF103Z
T2001	Transistor		PHILIPS	BC548B
T2002	Transistor		PHILIPS	BD139
S2001	Switch		JEAN RENAU	RBD12FA3,3
S2002	Switch		JEAN RENAU	RBD12FA2,5
D2001	Diode Silicon		PHILIPS	BAV21

FREQUENCY CONTROL S1303/S1304 Module 2100 1/4

Symbol	Description			Manufact.	
R2101	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2102	Resistor	3,3 kohm ±5%	0,33W	PHILIPS	2322 211 13332
R2103	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2104	Resistor	5,6 kohm ±5%	0,33W	PHILIPS	2322 211 13562
R2105	Resistor	5,6 kohm ±5%	0,33W	PHILIPS	2322 211 13562
R2106	Resistor	5,6 kohm ±5%	0,33W	PHILIPS	2322 211 13562
R2107	Resistor	5,6 kohm ±5%	0,33W	PHILIPS	2322 211 13562
R2108	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R2109	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R2110	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R2111	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R2112	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2113	Resistor	12 kohm ±5%	0,33W	PHILIPS	2322 211 13123
R2114	Resistor	6,8 kohm ±5%	0,33W	PHILIPS	2322 211 13682
R2115	Resistor	6,8 kohm ±5%	0,33W	PHILIPS	2322 211 13682
R2116	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2117	Resistor	33 kohm ±5%	0,33W	PHILIPS	2322 211 13333
R2118	Resistor	33 kohm ±5%	0,33W	PHILIPS	2322 211 13333
R2119	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R2120	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R2121	Resistor	500 ohm ±5%	0,33W	PHILIPS	2322 211 13561
R2122	Resistor	1 kohm ±5%	0,33W	PHILIPS	2322 211 13102
R2123	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2124	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2125	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2126	Resistor	12 kohm ±5%	0,33W	PHILIPS	2322 211 13123
R2127	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2128	Resistor	3,3 kohm ±5%	0,33W	PHILIPS	2322 211 13332
R2129	Resistor	1,8 kohm ±5%	0,33W	PHILIPS	2322 211 13182
R2130	Resistor	1,0 kohm ±5%	0,33W	PHILIPS	2322 211 13102
R2131	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2132	Resistor	3,3 kohm ±5%	0,33W	PHILIPS	2322 211 13332
R2133	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2134	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2135	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2136	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2137	Resistor	10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2138	Resistor	22 kohm ±5%	0,33W	PHILIPS	2322 211 13223
R2139	Resistor	22 kohm ±5%	0,33W	PHILIPS	2322 211 13223
R2140	Resistor	15 kohm ±5%	0,33W	PHILIPS	2322 211 13153

MODULE NO: 2100

FREQUENCY CONTROL S1303/S1304 Module 2100

Symbol	Description		Manufact.	
R2141	Resistor 15 kohm ±5%	0,33W	PHILIPS	2322 211 13153
R2142	Resistor 1,8 kohm ±5%	0,33W	PHILIPS	2322 211 13182
R2143	Resistor 47 kohm ±5%	0,33W	PHILIPS	2322 211 13470
R2144	Resistor 12 kohm ±5%	0,33W	PHILIPS	2322 211 13123
R2145	Resistor 10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2146	Resistor 3,9 kohm ±5%	0,33W	PHILIPS	2322 211 13392
R2147	Resistor 2,7 kohm ±5%	0,33W	PHILIPS	2322 211 13272
R2148	Resistor 10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2149	Resistor 2,7 kohm ±5%	0,33W	PHILIPS	2322 211 13272
R2150	Resistor 10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2151	Resistor 10 kohm ±5%	0,33W	PHILIPS	2322 211 13103
R2152	Resistor 8,2 kohm ±5%	0,33W	PHILIPS	2322 211 13822
RA2101	Resistor Array 8x10 kohm ±5%	0,125W	ITT	VR8 10 kohm
C2101	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C2102	Capacitor Electrolyt 4,7uF ±20%	50V	ERO	EKI00AA147H
C2103	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C2104	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C2105	Capacitor Electrolyt 4,7uF ±20%	50V	ERO	EKI00AA147H
C2106	Capacitor Polyetylen 22nF ±10%	400V	SIEMENS	B32234-B6223-K
C2107	Capacitor Polyester 0,1uF ±20%	100V	PHILIPS	222 344 24104
C2108	Capacitor Electrolyt 10uF ±20%	35V	ERO	EKI00AA210F
C2109	Capacitor Electrolyt 4,7uF ±20%	50V	ERO	EKI00AA147H
C2110	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C2111	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C2112	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C2113	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C2114	Capacitor Ceramic 10nF -20/+80%	50V	KCK	HE70SJYF103Z
C2115	Capacitor Electrolyt 10uF ±20%	35V	ERO	EKI00AA210F
C2116	Capacitor Electrolyt 10uF ±20%	35V	ERO	EKI00AA210F
C2117	Capacitor Polyester 0,22uF ±20%	100V	PHILIPS	222 344 24224
C2118	Capacitor Electrolyt 10uF ±20%	35V	ERO	EKI00AA210F
D2101	Diode Silicon		PHILIPS	IN4148
D2102	Diode Silicon		PHILIPS	IN4148
D2103	Diode Germanium		ITT	AA143
D2104	Diode Germanium		ITT	AA143
D2105	Diode Silicon		PHILIPS	BZX79C5VI

FREQUENCY CONTROL S1303/S1304 Module 2100 3/4

Symbol	*Description*	*Manufact.*	
T2101	Transistor	PHILIPS	BC558B
T2102	Transistor	PHILIPS	BC548B
T2103	Transistor	PHILIPS	BC548B
T2104	Transistor	PHILIPS	BC548B
T2105	Transistor	PHILIPS	BC548B
T2106	Transistor	PHILIPS	BC548B
T2107	Transistor	PHILIPS	BC639
T2108	Transistor	PHILIPS	BC639
T2109	Transistor	PHILIPS	BC639
T2110	Transistor	PHILIPS	BC639
T2111	Transistor	PHILIPS	BC639
T2112	Transistor	PHILIPS	BC558B
T2113	Transistor	PHILIPS	BC558B
IC2101	Integrated Circuit	RCA	CD4056B
IC2102	Integrated Circuit	RCA	CD4056B
IC2103	Integrated Circuit	RCA	CD4056B
IC2104	Integrated Circuit	RCA	CD4056B
IC2105	Integrated Circuit	RCA	CD4056B
IC2106	Integrated Circuit	RCA	CD4056B
IC2107	Integrated Circuit	TEXAS	SN74LS195N
IC2108	Integrated Circuit	TEXAS	SN74LS195N
IC2109	Integrated Circuit	TEXAS	SN74LS195N
IC2110	Integrated Circuit	TEXAS	SN74LS195N
IC2111	Integrated Circuit	TEXAS	SN74LS195N
IC2112	Integrated Circuit	TEXAS	SN74LS195N
IC2113	Integrated Circuit	TEXAS	SN74LS32N
IC2114	Integrated Circuit	MMI	6308-1
IC2115	Integrated Circuit	MMI	6308-1
IC2116	Integrated Circuit	TEXAS	SN74LS83N
IC2117	Integrated Circuit	TEXAS	SN74LS32N
IC2118	Integrated Circuit	TEXAS	SN74LS86N
IC2119	Integrated Circuit	TEXAS	SN74LS148N
IC2120	Integrated Circuit	TEXAS	SN74LS00N
IC2121	Integrated Circuit	TEXAS	SN74LS173AN
IC2122	Integrated Circuit	TEXAS	SN74LS151N
IC2123	Integrated Circuit	TEXAS	SN74LS86N
IC2124	Integrated Circuit	TEXAS	SN74LS123N
IC2125	Integrated Circuit	TEXAS	SN74LS123N
IC2126	Integrated Circuit	TEXAS	SN74LS109AN

MODULE NO: 2100

FREQUENCY CONTROL S1303/S1304 Module 2100

Symbol	*Description*	*Manufact.*	
IC2127	Integrated Circuit	TEXAS	SN74LS32N
IC2128	Integrated Circuit	TEXAS	SN74LS08N
IC2129	Integrated Circuit	TEXAS	SN74LS74AN
IC2130	Integrated Circuit	TEXAS	SN74LS197N
IC2131	Integrated Circuit	TEXAS	SN7406
IC2132	Integrated Circuit	MOTOROLA	MC14011BCP
IC2133	Integrated Circuit	NATIONAL	LM339

FREQUENCY CHECK S1304 Module 2500 1/1

Symbol	Description		Manufact.	
R2501	Resistor 560 ohm ±5%	0,33W	PHILIPS	2322 211 13561
R2502	Resistor 3,9 kohm ±5%	0,33W	PHILIPS	2322 211 13392
R2503	Resistor 2,2 kohm ±5%	0,33W	PHILIPS	2322 211 13222
R2504	Resistor 4,7 kohm ±5%	0,33W	PHILIPS	2322 211 13472
R2505	Resistor 4,7 kohm ±5%	0,33W	PHILIPS	2322 211 13472
RA2501	Resistor Array 8X10 kohm ±5%	0,125W	ITT	VR8 8X10 kohm
RA2502	Resistor Array 8X10 kohm ±5%	0,125W	ITT	VR8 8X10 kohm
RA2503	Resistor Array 8X10 kohm ±5%	0,125W	ITT	VR8 8X10 kohm
C2501	Capacitor Polyetylen 10nF ±10%	400V	SIEMENS	B32234-B6103-K
C2502	Capacitor Polyetylen 10nF ±10%	400V	SIEMENS	B32234-B6103-K
C2503	Capacitor Polyetylen 10nF ±10%	400V	SIEMENS	B32234-B6103-K
C2504	Capacitor Polyetylen 0,22uF ±10%	100V	SIEMENS	B32234-B1104-K
C2505	Capacitor Polyetylen 0,22uF ±10%	100V	SIEMENS	B32234-B1104-K
C2506	Capacitor Polyetylen 0,22uF ±10%	100V	SIEMENS	B32234-B1104-K
C2507	Capacitor Polyetylen 0,22uF ±10%	100V	SIEMENS	B32234-B1104-K
T2501	Transistor		PHILIPS	BC548B
IC2501	Integrated Circuit		TEXAS	SN74LS85N
IC2502	Integrated Circuit		TEXAS	SN74LS85N
IC2503	Integrated Circuit		TEXAS	SN74LS85N
IC2504	Integrated Circuit		TEXAS	SN74LS85N
IC2505	Integrated Circuit		TEXAS	SN74LS85N
IC2506	Integrated Circuit		TEXAS	SN74LS85N
IC2507	Integrated Circuit		NATIONAL	LM339
IC2508	Integrated Circuit		MMI	6308-1
IC2509	Integrated Circuit		TEXAS	SN74LS197N
IC2510	Integrated Circuit		MMI	6308-1
IC2511	Integrated Circuit		TEXAS	SN74LS197N
IC2512	Integrated Circuit		MMI	6308-1

CIRCUIT DESCRIPTIONS AND SCHEMATIC DIAGRAMS

S 1302/03/04

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 XO101. 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.

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.

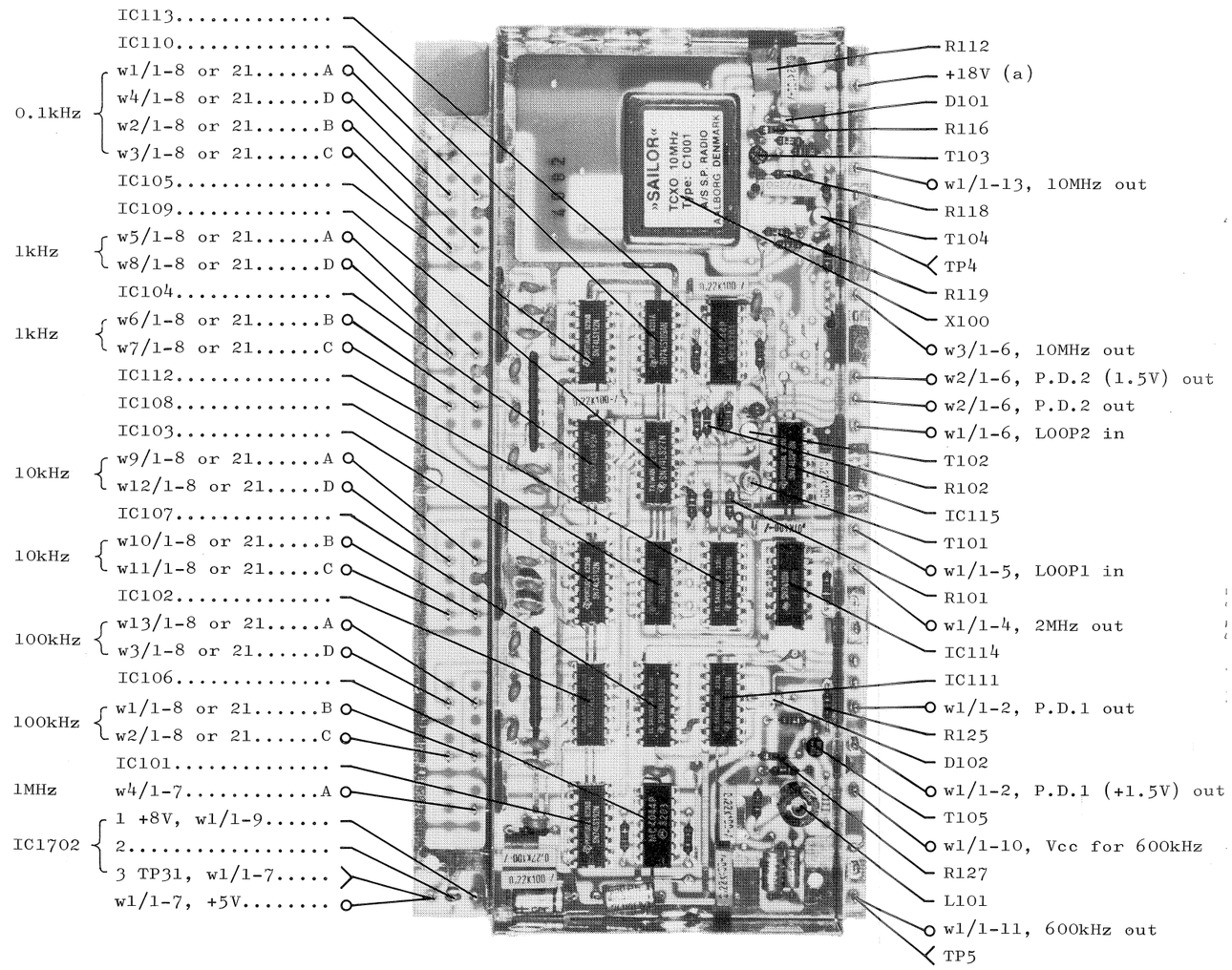
TEST CONDITIONS

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

10MHz out

0MHz out
.D.2 (1.5V) out
.D.2 out
OOP2 in

OOP1 in

MHz out

'.D.1 out

'.D.1 (+1.5V) out

Vcc for 600kHz

600kHz out

)1 only.
)0TT and S1302
S1304

DIVIDER - UNIT

PROGRAMMABLE - DIVIDER (LOOP1)

PROGRAMMABLE - DIVIDER (LOOP 2)

REFERENCE - DIVIDER

10,0 MHz REFERENCE

2 MHz - HARMONIC - SPECTRUM - GENERATOR

600 kHz GENERATOR

100 Hz PHASE/ FREQ. - DETECTOR

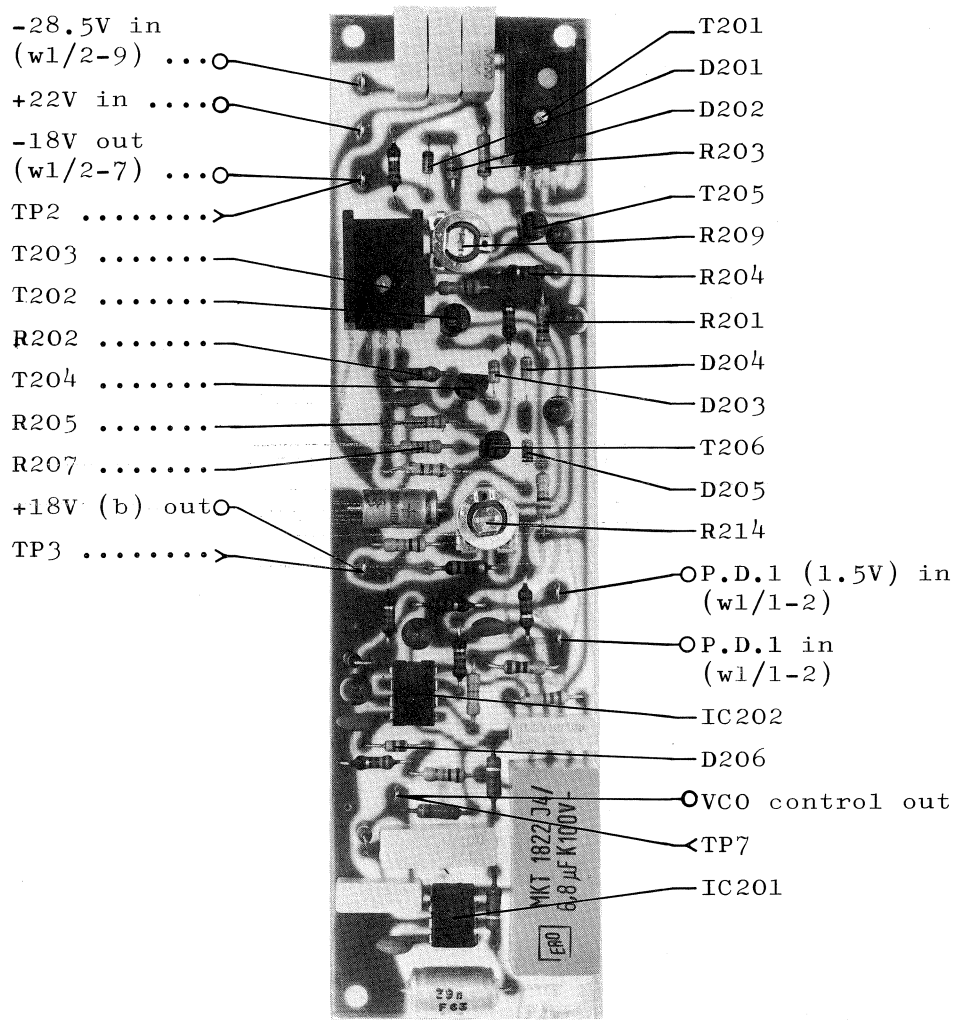
1 kHz PHASE/ FREQ. - DETECTOR

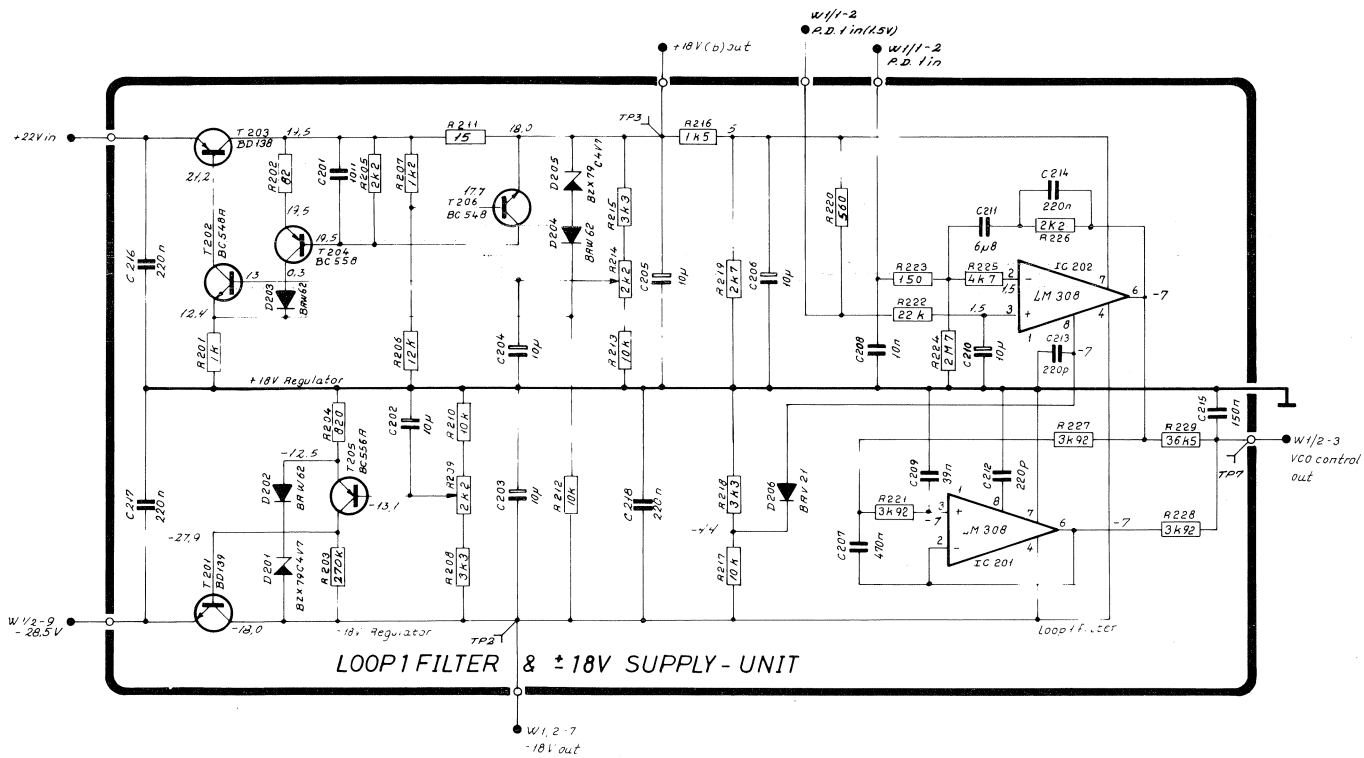
TTL - DRIVER

JUMPER

S1300 : IC1702
R1117 IC2001

* Only mounted in S1300TT and S1301
** R130 1kohm in S1300/01 and 180 ohm in S1302/03/04.

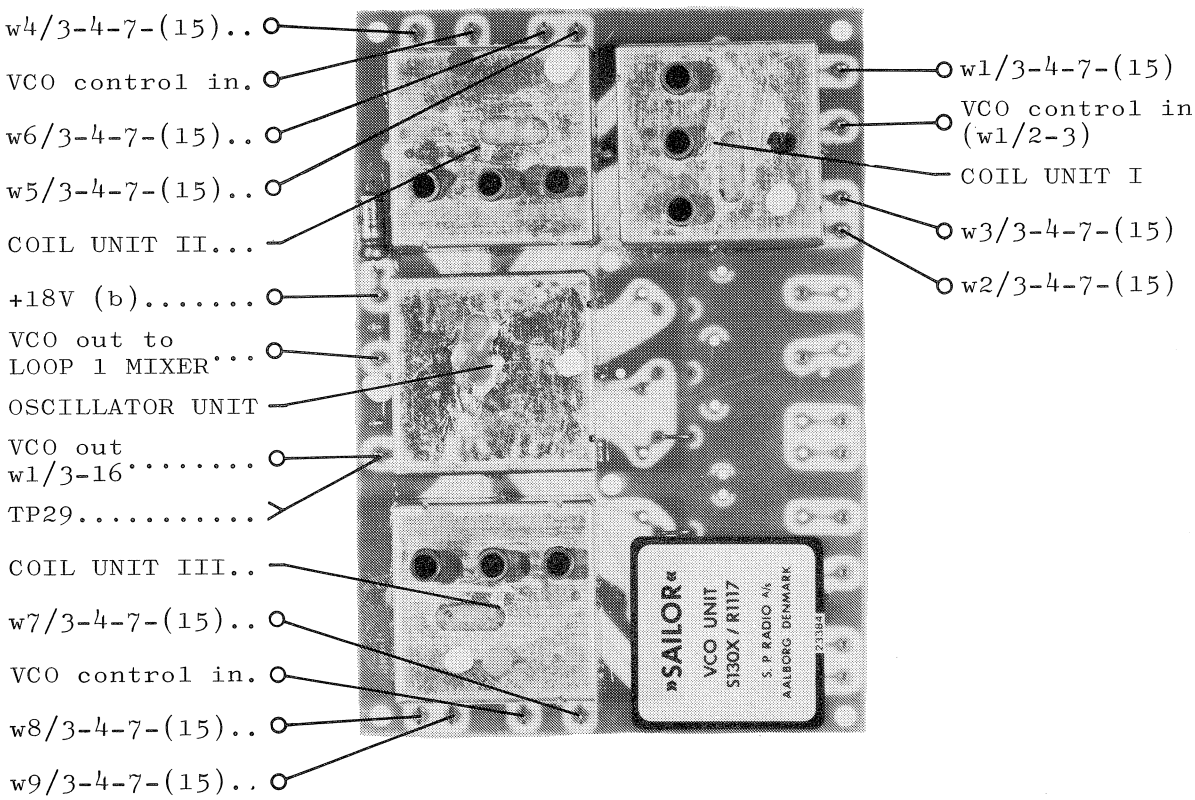

-28.5V in
(w1/2-9) ...
+22V in ....
-18V out
(w1/2-7) ...
TP2 .....
T203 .....
T202 .....
R202 .....
T204 .....
R205 .....
R207 .....
+18V (b) out
TP3 .....
T201
D201
D202
R203
T205
R209
R204
R201
D204
D203
T206
D205
R214
P.D.1 (1.5V) in
(w1/1-2)
P.D.1 in
(w1/1-2)
IC202
D206
VCO control out
TP7
IC201
MKT 1822J4/
0,8 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
+18V Regulator
-18V Regulator
LOOP1 FILTER & ±18V SUPPLY-UNIT
W1/2-3
VCO control out
TP7
W1,2-7
-18V out
LM 308
IC 202
IC 201

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)

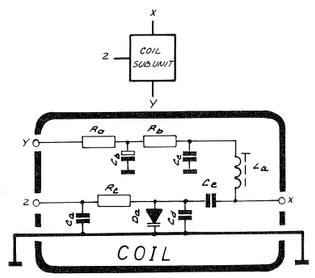
Oscilloscope input : Passive probe 10 Mohm//11 pF

DC voltmeter input : 10 Mohm

⦿ : Diode probe measurements

TP : Testpoints

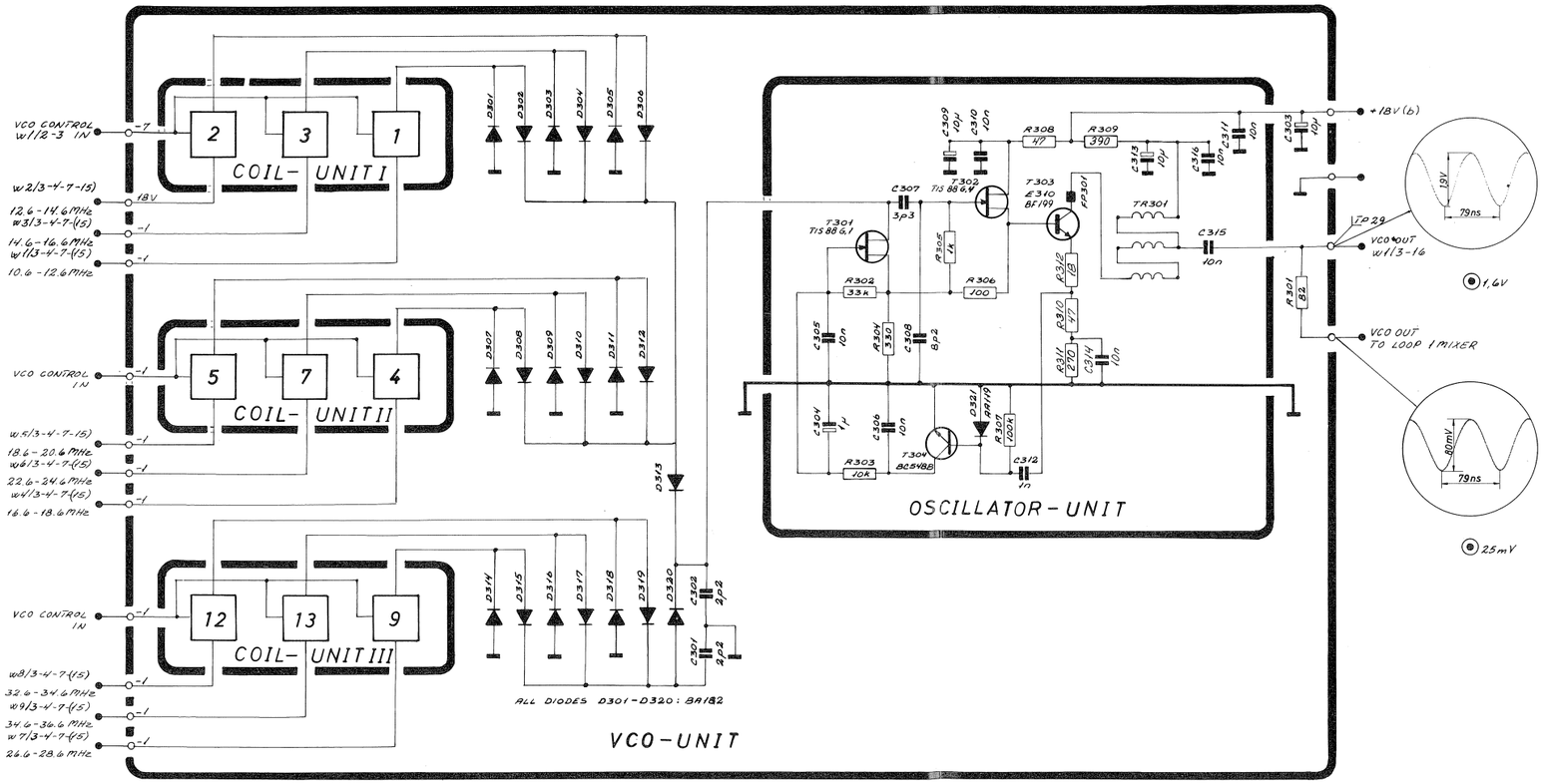
All voltage statements are typical



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

S1302, S1303 and S1304
WIRE NUMBERS: (S1300) and (S1301)

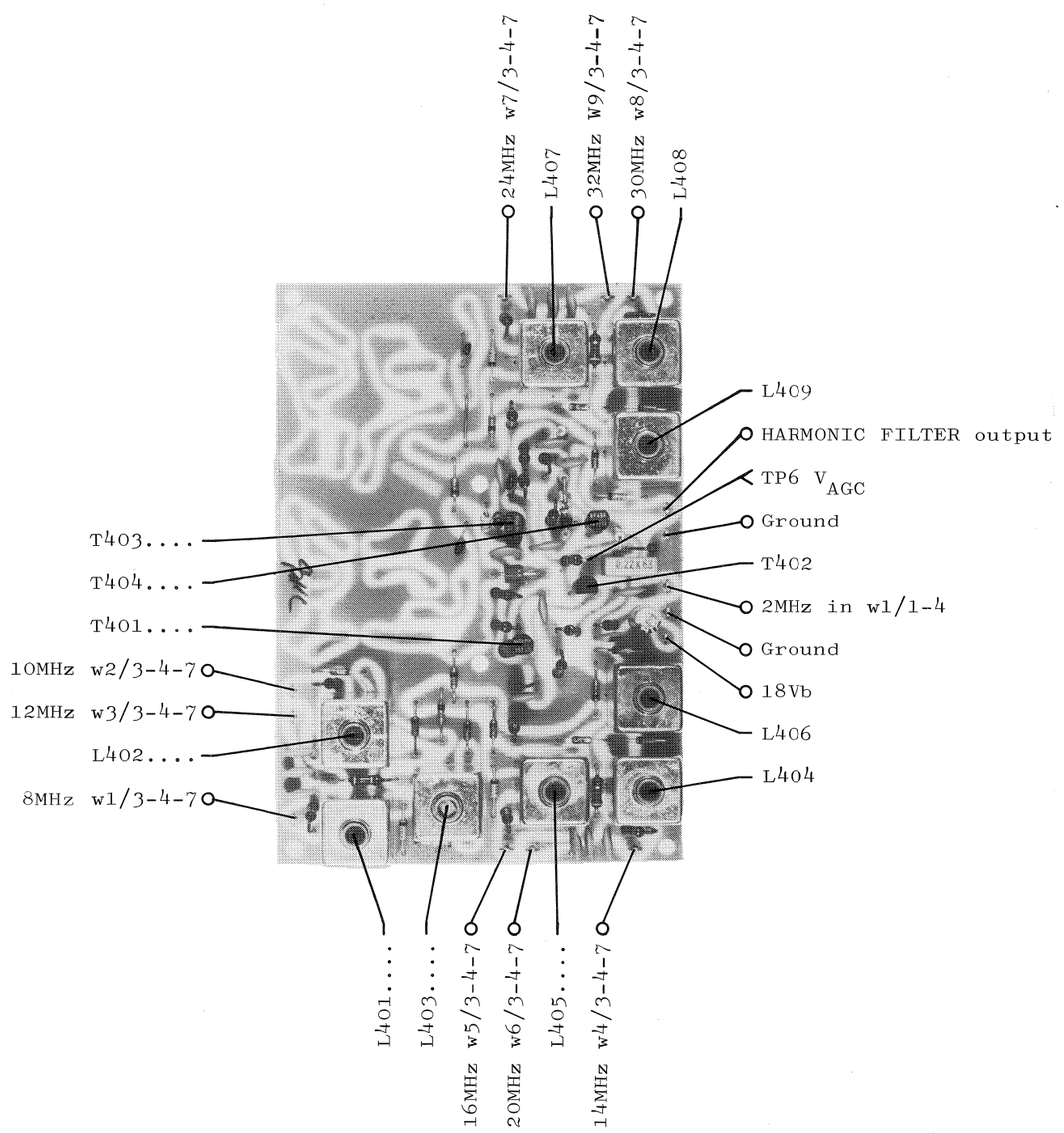


CIRCUIT DESCRIPTION HARMONIC FILTERS S130X

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.



TEST CONDITIONS

Frequency selector : 1A (f = 2.0005 MHz)

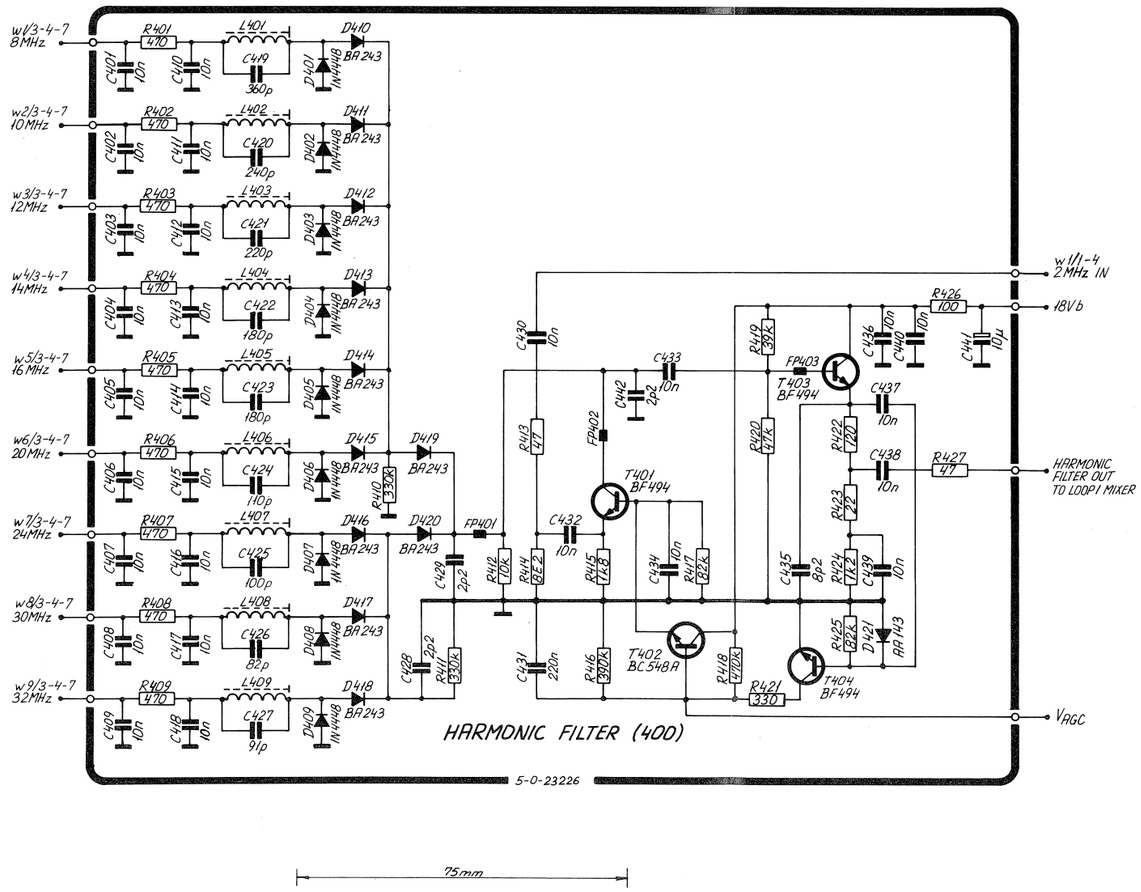
Oscilloscope input : passive probe 10 Mohm//11 pF

DC voltmeter input : 10 Mohm

⦿ : Diode probe measurements

TP : Testpoints

All voltage are typical



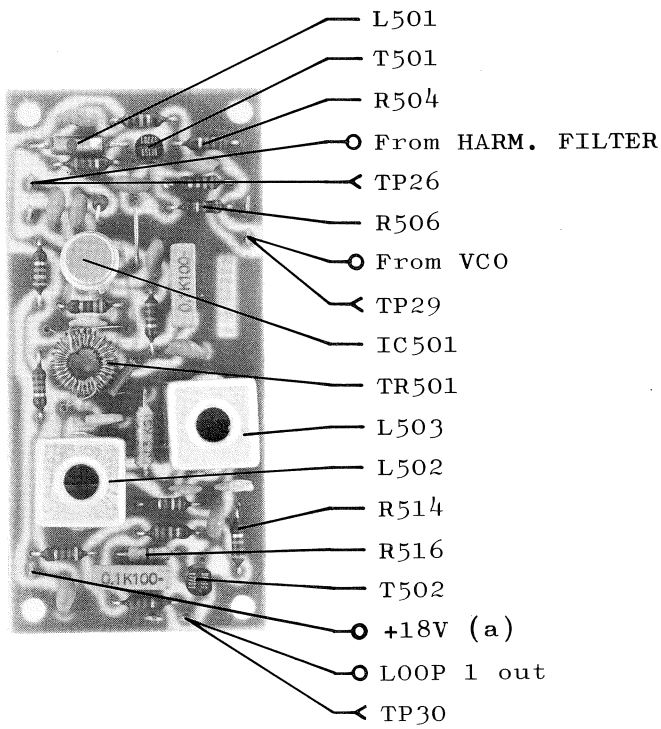
CIRCUIT DESCRIPTION LOOP 1 MIXER S130X

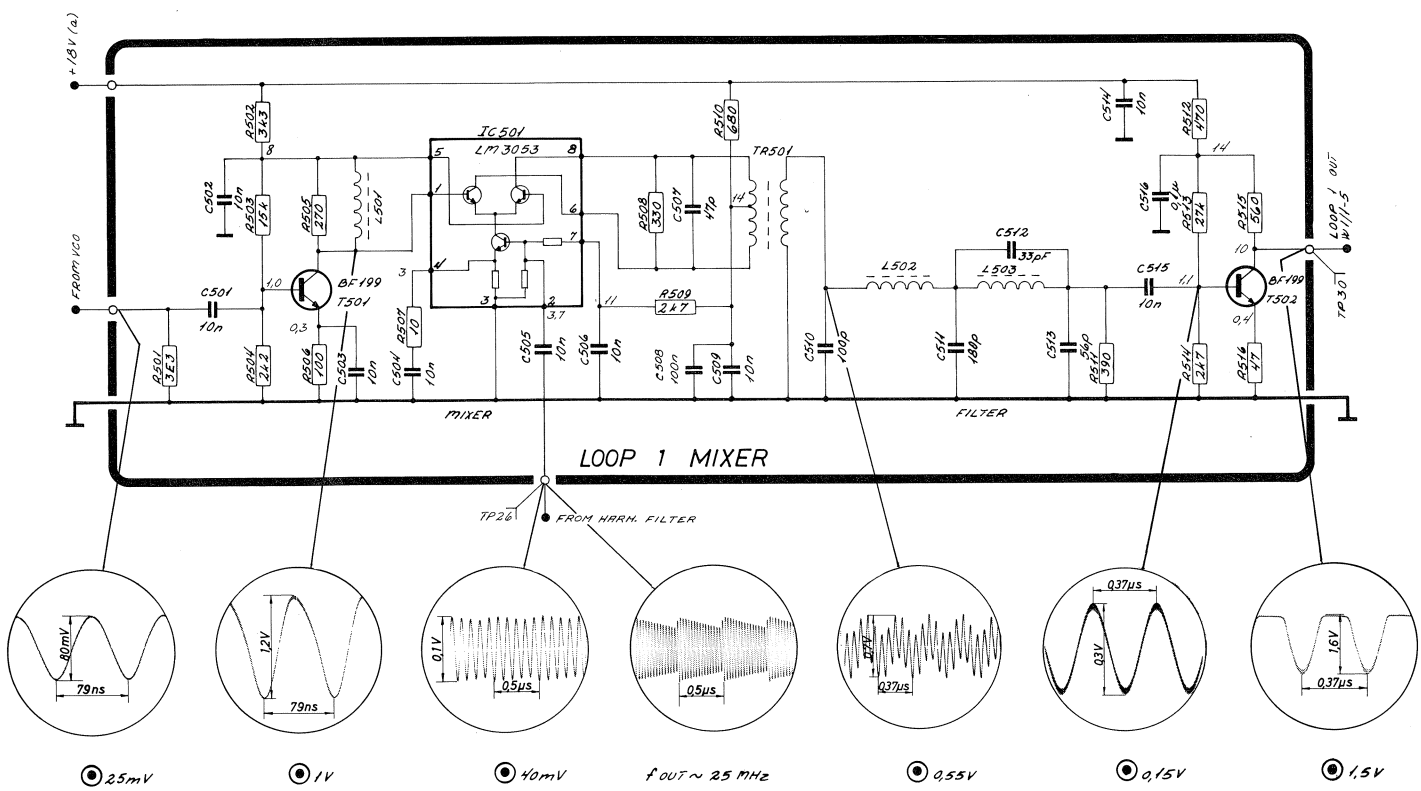
This unit mixes together the VCO signal and the signal from the harmonic filter and filters out the difference frequency to supply the variable divider.

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


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
BF199
T502
L502
L503
C512
33pF
LOOP 1 OUT
TP30
MIXER
FILTER
LOOP 1 MIXER
TP26
FROM HARM. FILTER
80mV
79ns
1,2V
79ns
0,1V
0,5µs
0,5µs
0,37µs
0,37µs
0,3V
1,6V
0,37µs
25mV
1V
40mV
fOUT ~ 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.

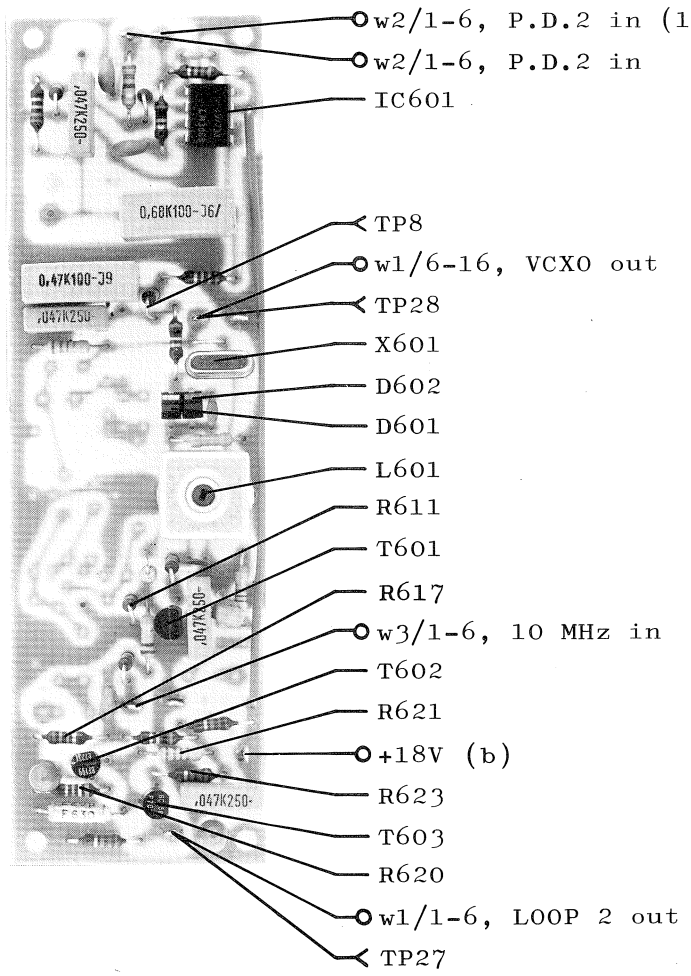
LOOP 2 MIXER

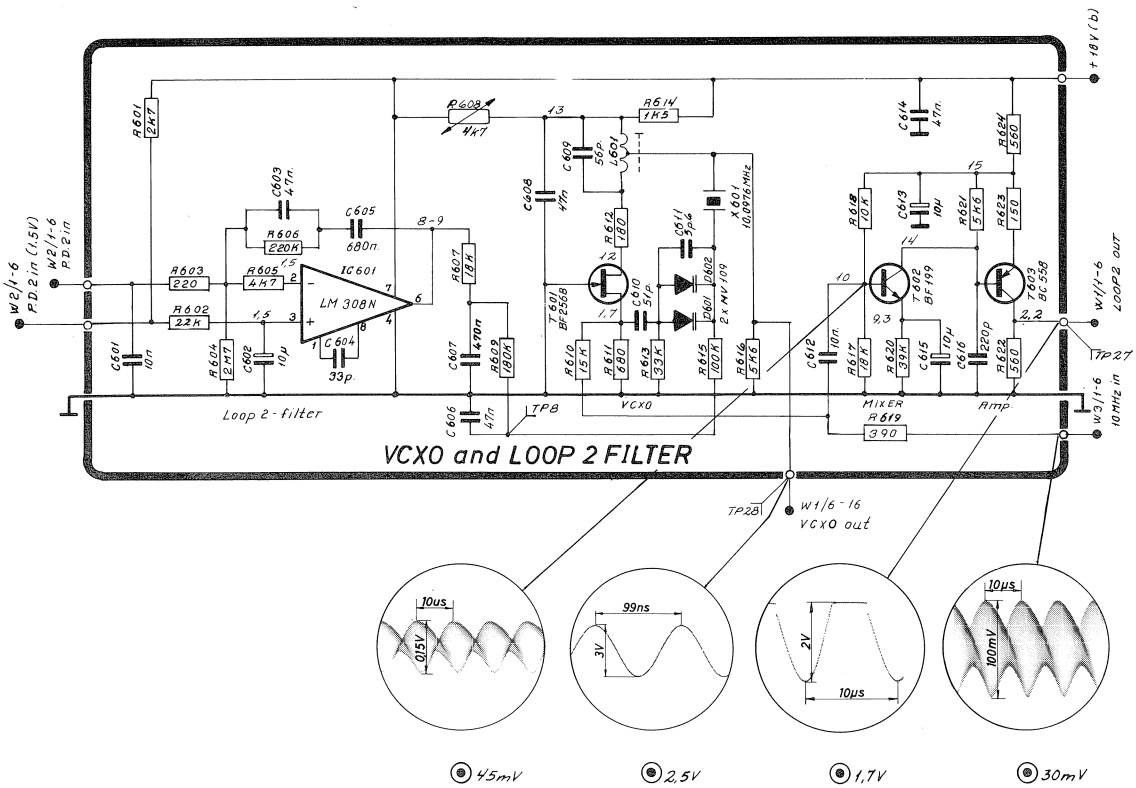
As mentioned above the VCXO signal is fed into the base of mixer transistor T602 via R610. 10 MHz from the TCXO are applied to the same base via R619. Because of the big difference between the two oscillator frequencies and the wanted output frequency the only filtering needed to filter out the wanted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

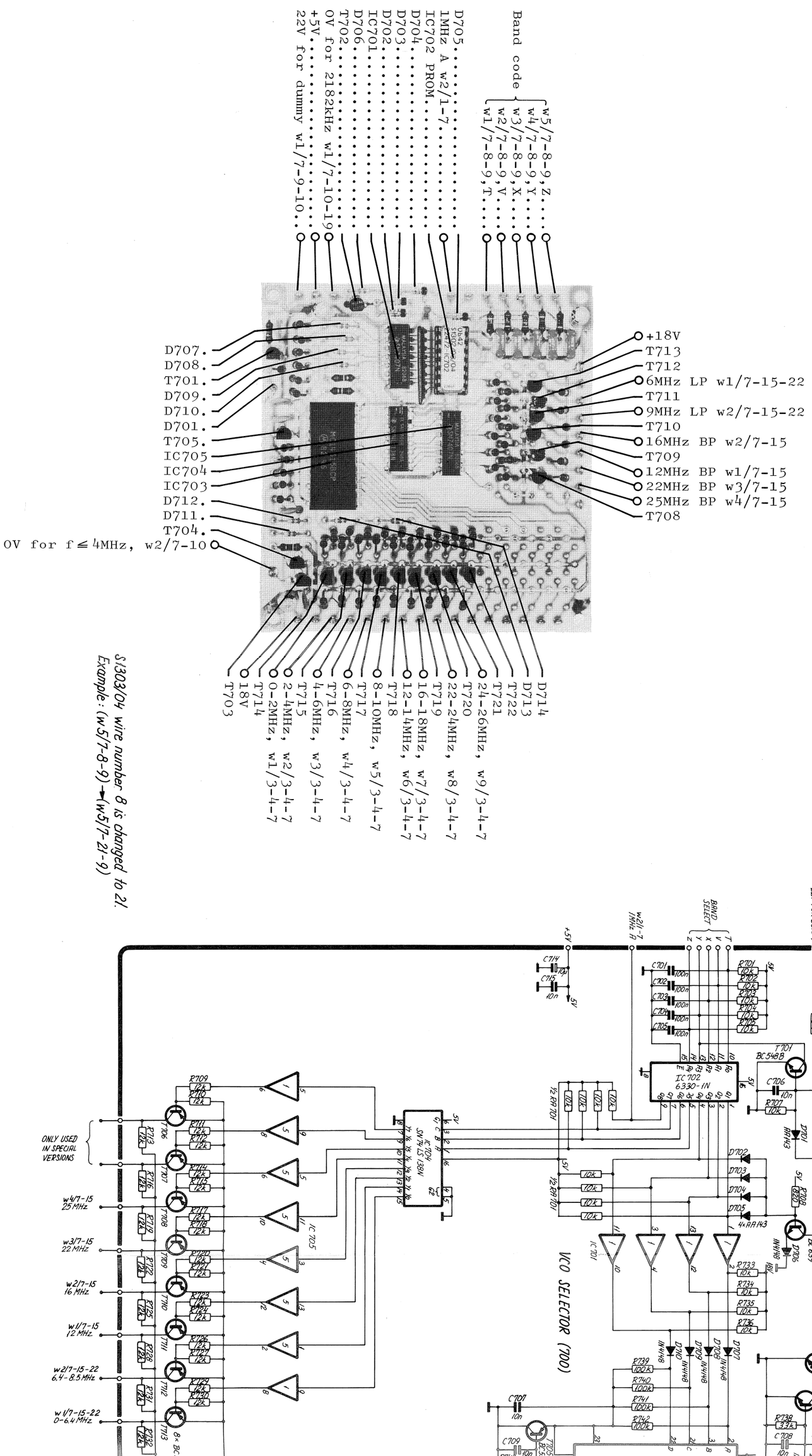
B 1/2 S 130 X

TEST CONDITIONS

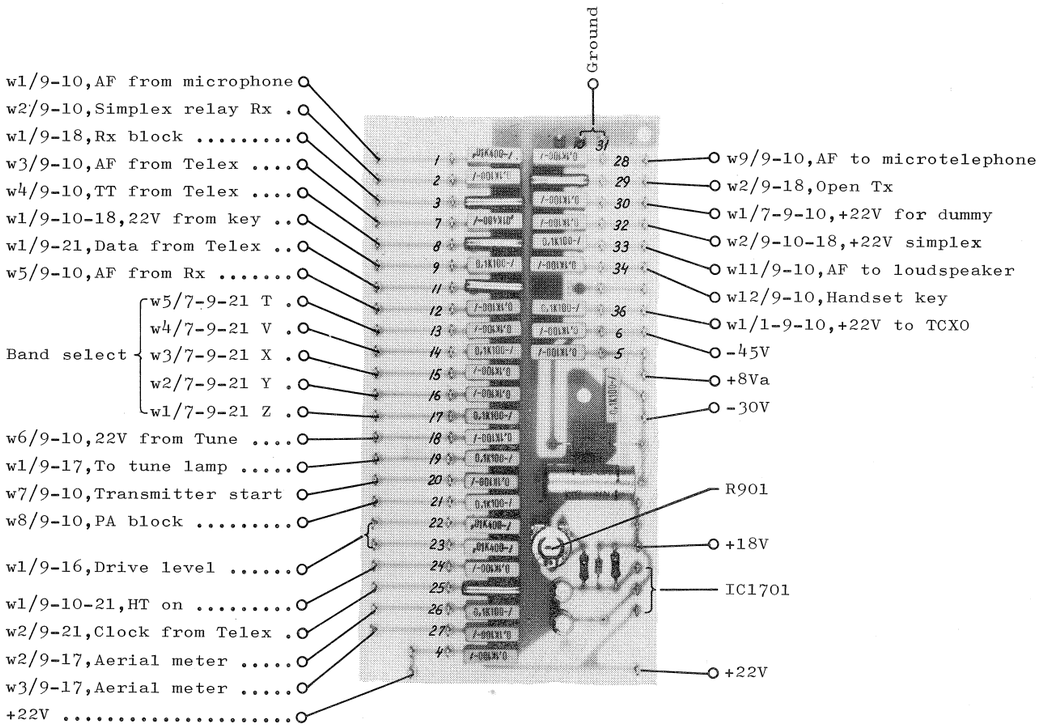
Frequency selector : 1A (f = 2.0005 MHz)
Oscilloscope input : Passive probe 10 Mohm/11 pF
DC voltmeter input : 10 Mohm
⊙ : Diode probe measurements
TP : Testpoints
All voltage statements are typical


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
Loop 2 - filter
VCXO
MIXER
Amp.
LM 308N
IC601
IC 604
X601 10,0076 MHz
2 x HV 109
T601 BF256B
T602 BF199
T603 BC 558
TP8
TP27
TP28
W1/6-16 VCXO out
W2/1-6 P.D.2 in (1,5V)
W2/1-6 P.D.2 in
W1/1-6 LOOP2 OUT
W3/1-6 10MHz in
+18V(b)
10µs
0,15V
99ns
3V
2V
10µs
10µs
100mV
45mV
2,5V
1,7V
30mV

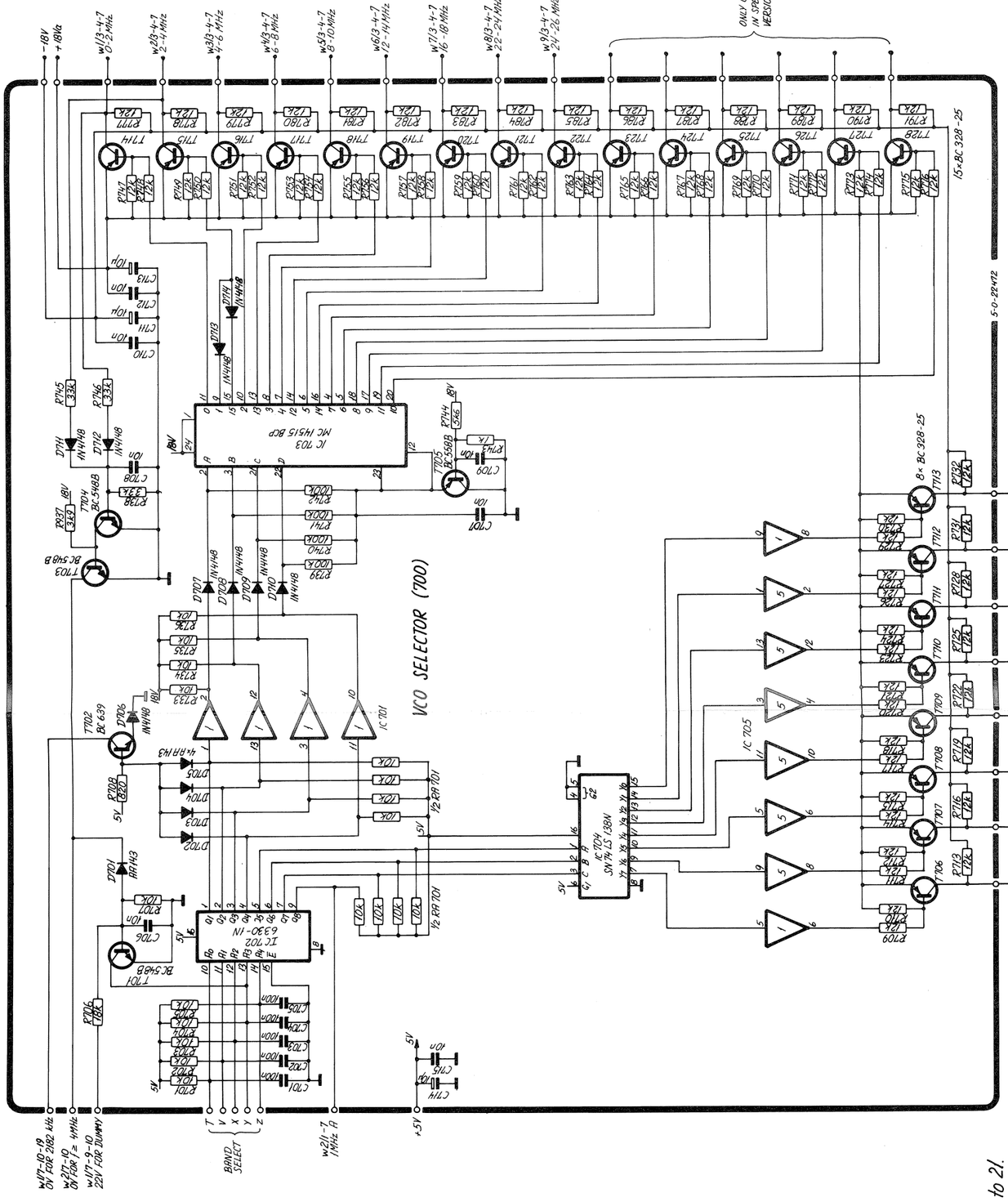

D705.....
1MHz A w2/1-7.....
IC702 PROM.....
D704.....
D703.....
D702.....
IC701.....
D706.....
T702.....
0V for 2182kHz w1/7-10-19
+5V.....
22V for dummy w1/7-9-10..
Band code
w5/7-8-9, Z....
w4/7-8-9, Y....
w3/7-8-9, X....
w2/7-8-9, V....
w1/7-8-9, T....
D707.
D708.
T701.
D709.
D710.
D701.
T705.
IC705
IC704
IC703
D712.
D711.
T704.
0V for f≦4MHz, w2/7-10
+18V
T713
T712
6MHz LP w1/7-15-22
T711
9MHz LP w2/7-15-22
T710
16MHz BP w2/7-15
T709
12MHz BP w1/7-15
22MHz BP w3/7-15
25MHz BP w4/7-15
T708
T703
18V
T714
0-2MHz
T715
2-4MHz
T716
4-6MHz
T717
6-8MHz
T718
8-10MHz
T719
16-18MHz
T720
22-24MHz
T721
24-26MHz
T722
D713
D714
Example: (w5/7-8-9) → (w5/7-21-9)
S1303/04 wire number 8 is changed to 21
VCO SELECTOR (700)
IC 703
IC 704
IC 705
IC 701
IC 702
6330-1N
BAND SELECT
ONLY USED IN SPECIAL VERSIONS
w4/7-25 MHz
w3/7-15 22 MHz
w2/7-15 16 MHz
w1/7-15 12 MHz
w2/7-15-22 6.4-8.5 MHz
w1/7-15-22 0-6.4 MHz
8 × BC 328
+5V
18V
w2/1-7 1MHz A
w4/7-10-19 0V for 2182 kHz
w2/7-10 0V for f ≦ 4MHz
w1/7-9-10 22V for dummy

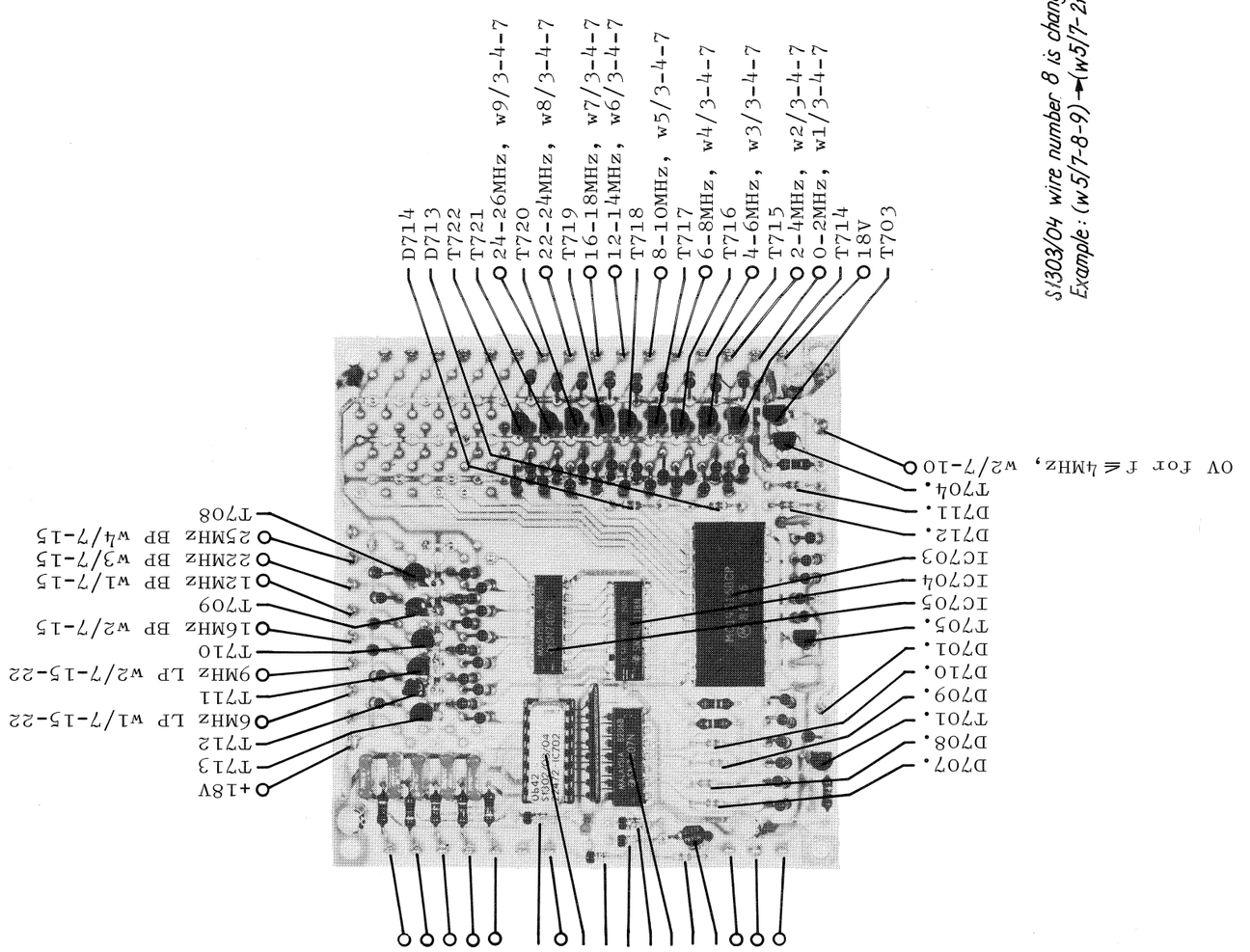
FILTER S1303/04



S1303/04

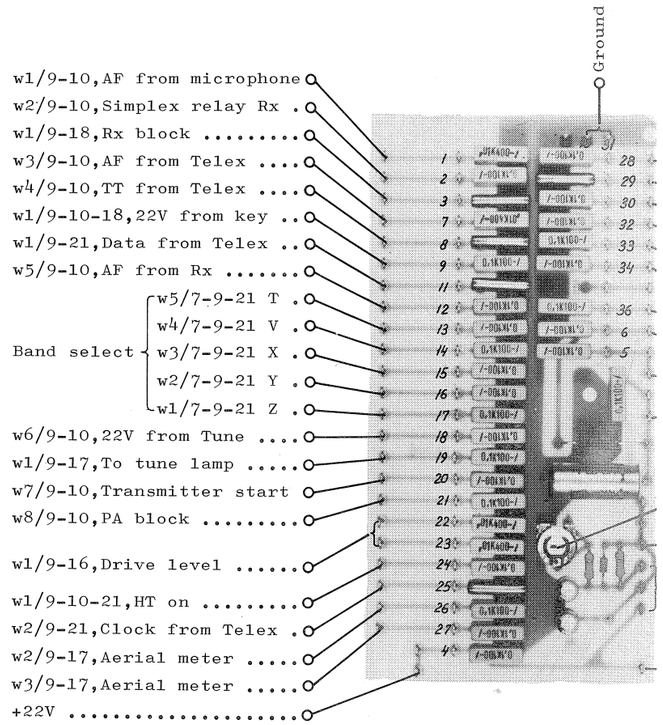
MODULE 900



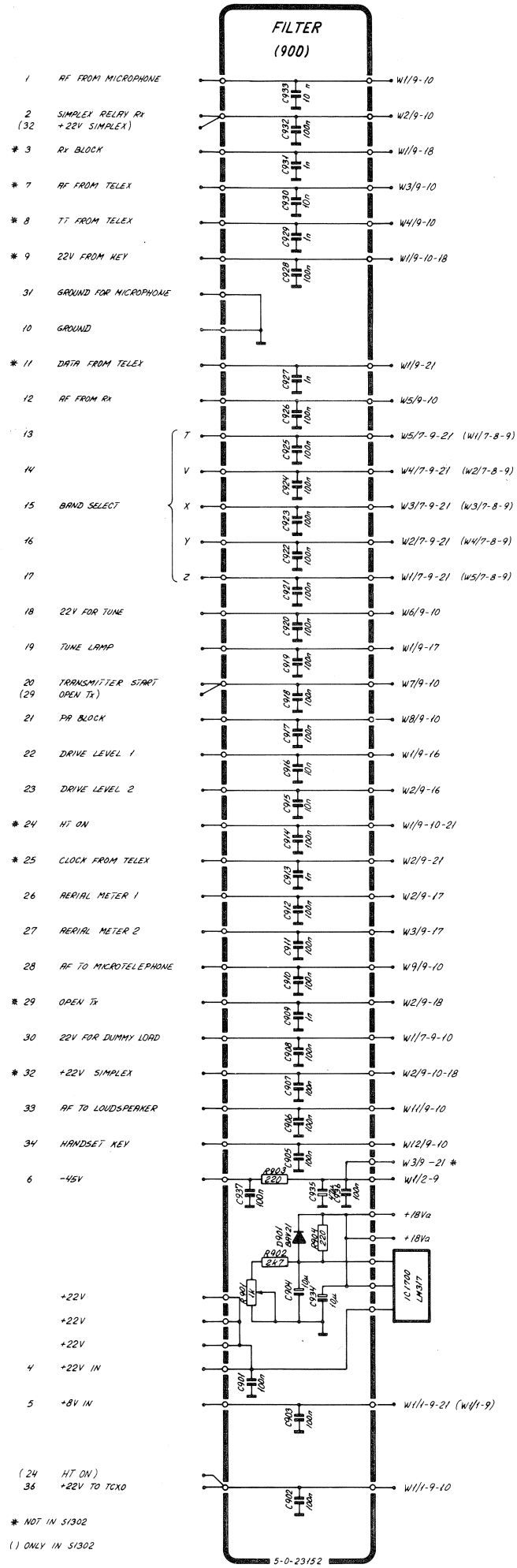


S1303/04 wire number 8 is changed to 21.
Example: (w5/7-8-9)→(w5/7-21-9)

FILTER S1303/04



MODULE 900



* NOT IN S1302

( ) ONLY IN S1302

CIRCUIT DESCRIPTION SSB GENERATOR S130X

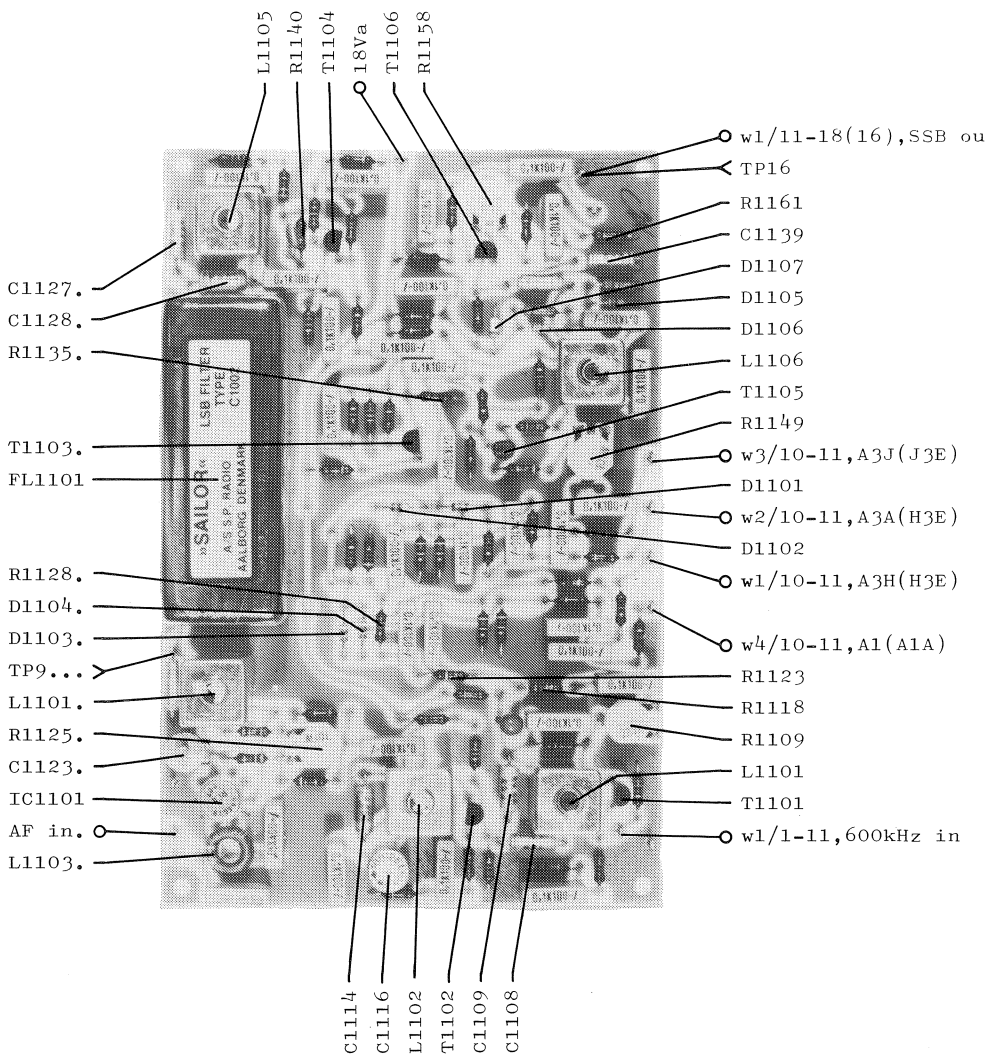
In this unit the required types of signals are generated A3A (R3E), A3H (H3E), A3J (J3E) and A1 (A1A).

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.

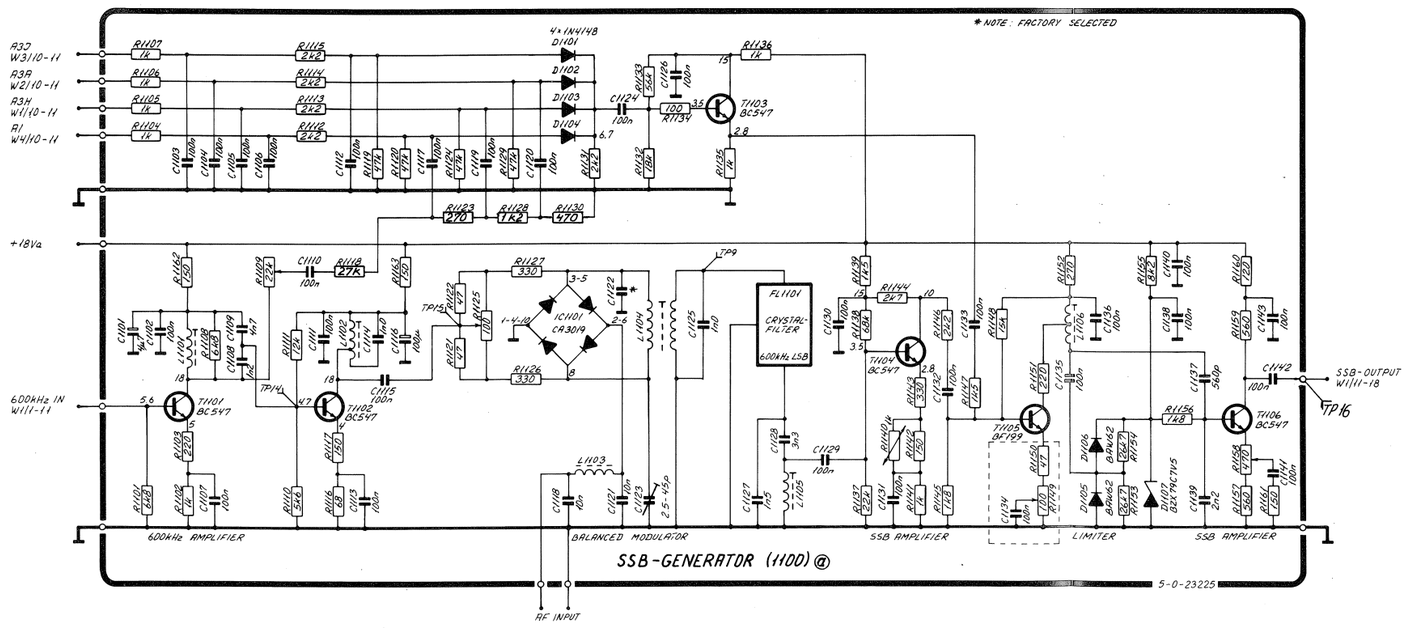
CARRIER INSERTION

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
Oscilloscope input : Passive probe 10 Mohm//11 pF
DC voltmeter input : 10 Mohm
⊙ : Diode probe measurements
TP : Testpoints
All voltage are typical



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

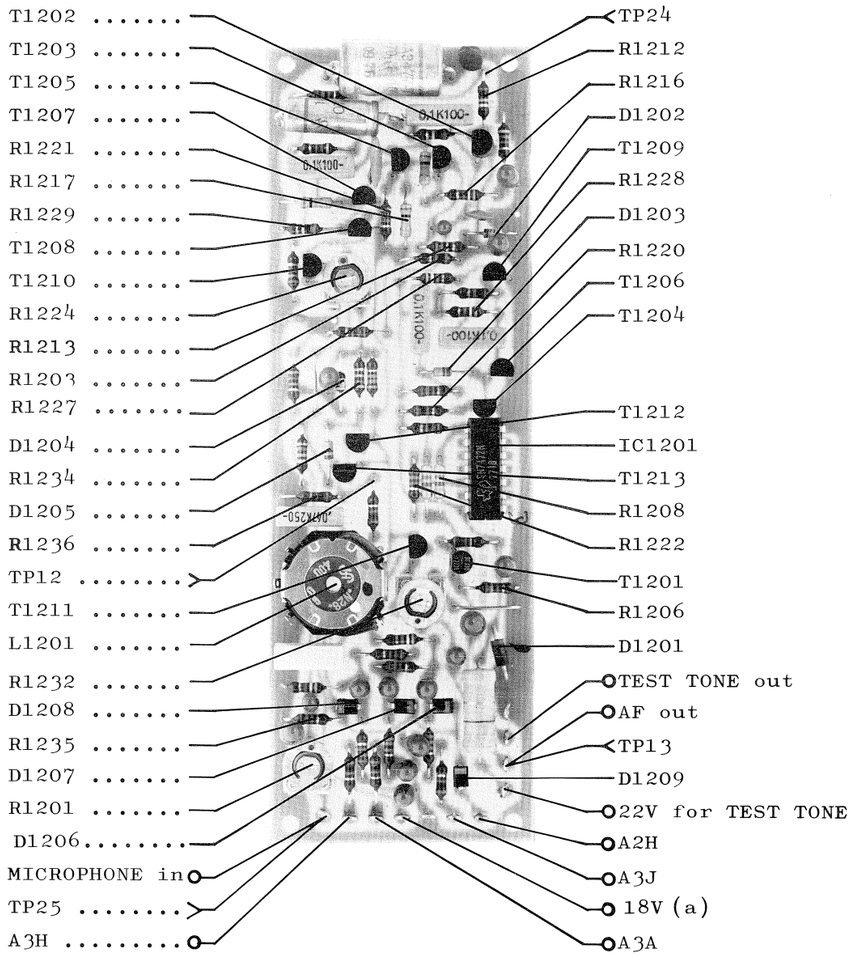
The test tone generator is a two-tone generator operating at the frequencies 2400 Hz and 1200 Hz. The multivibrator, composed of T1206, T1209 is oscillating at 2400 Hz, and in the integrated circuit IC1201 this frequency is divided to 1200 Hz, which can be measured on pin 8.

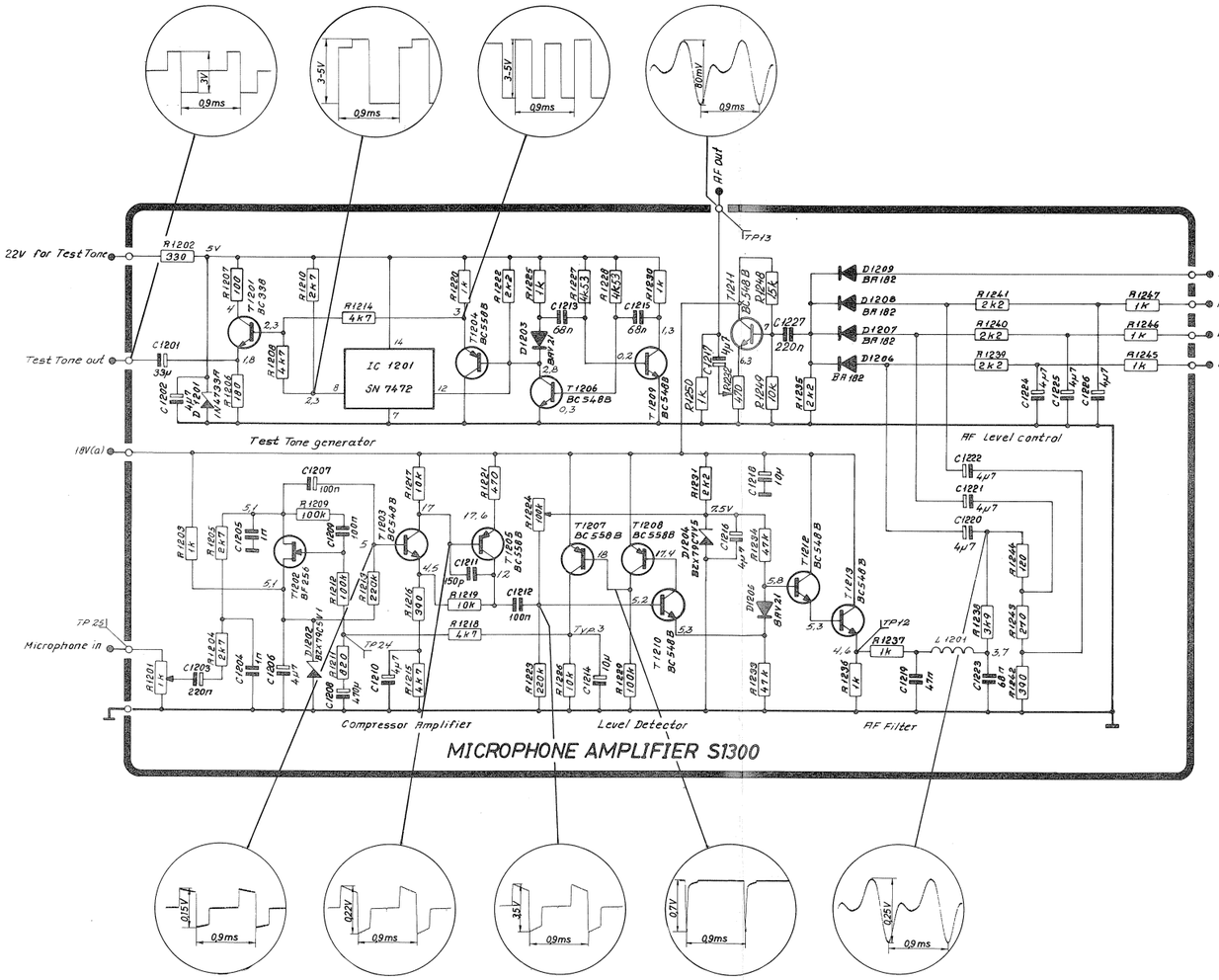
T1204 functions as emitter follower, and the 2400 Hz signal is fed from here via R1214 to the output transistor T1201. The 1200 Hz signal is also fed to T1201 via R1208 and is mixed with the 2400 Hz signal. The mixed signal is supplied to the compressor input during tuning of the transmitter and owing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

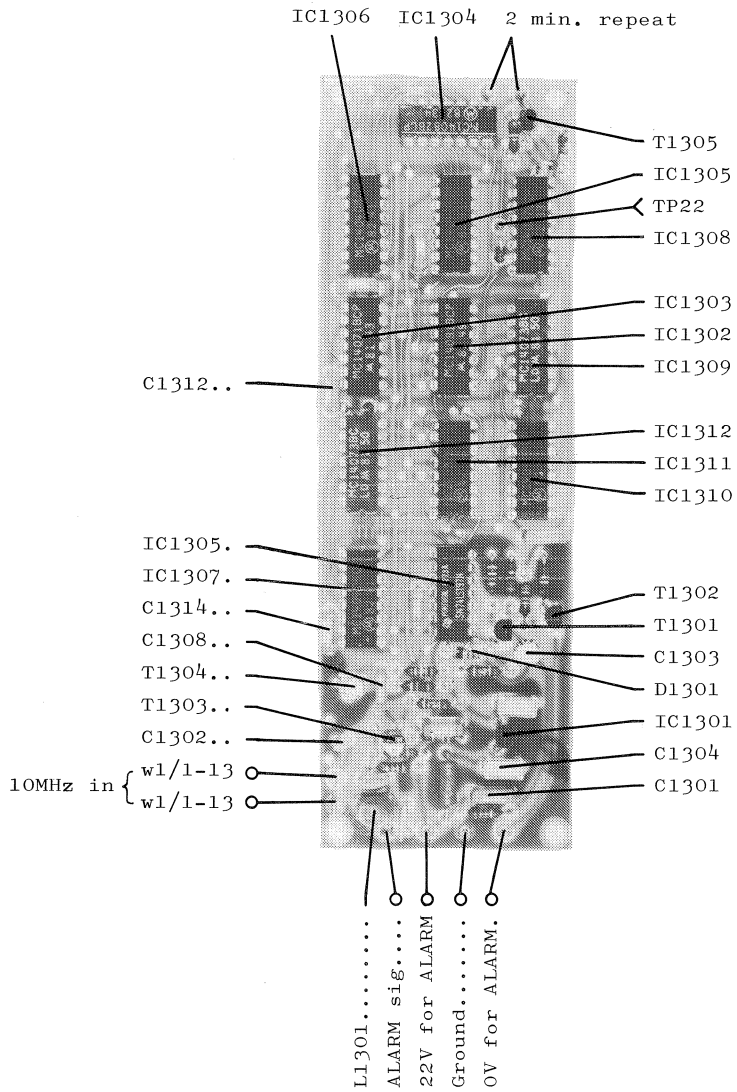
MODULE NO. 1200

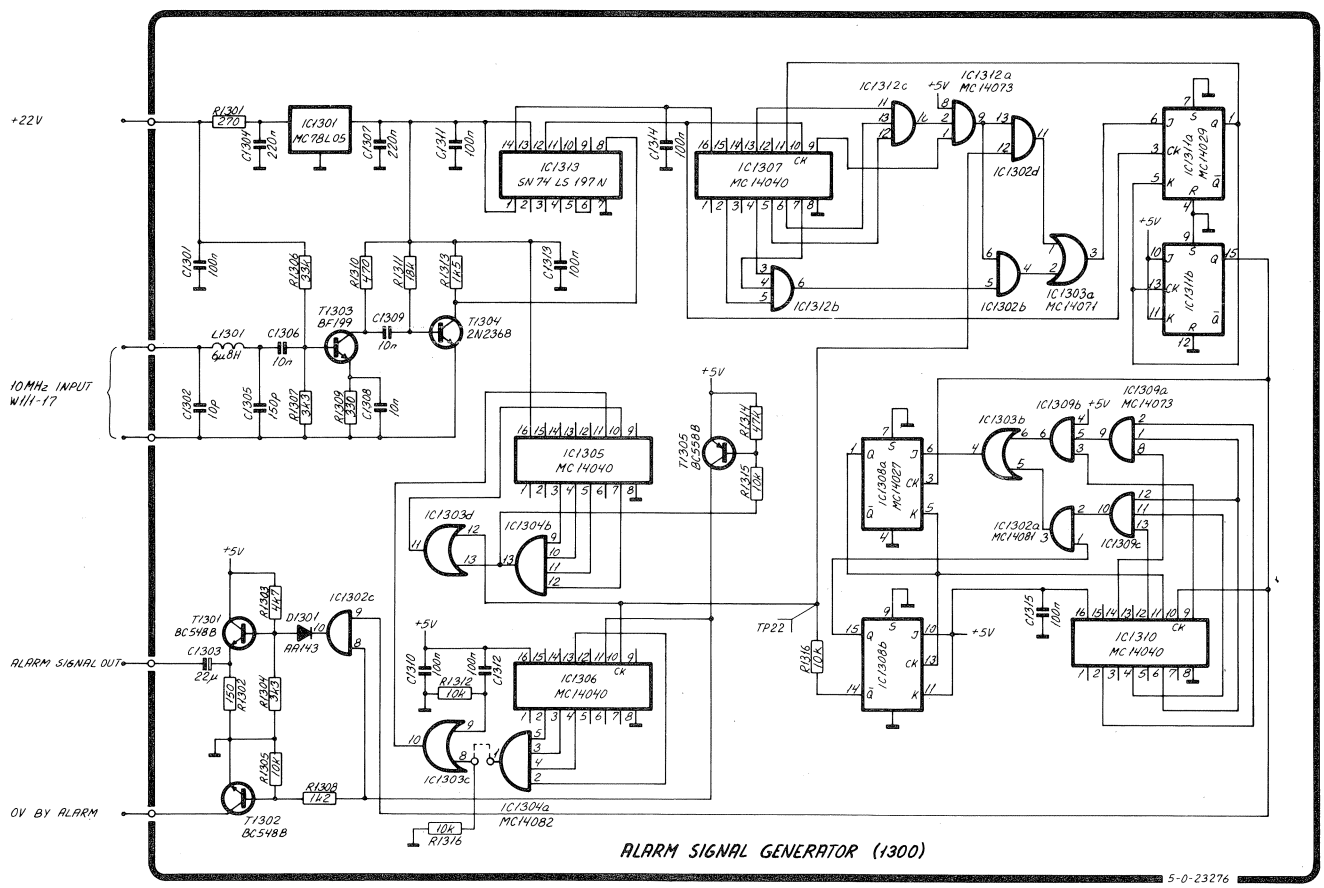
TEST CONDITIONS

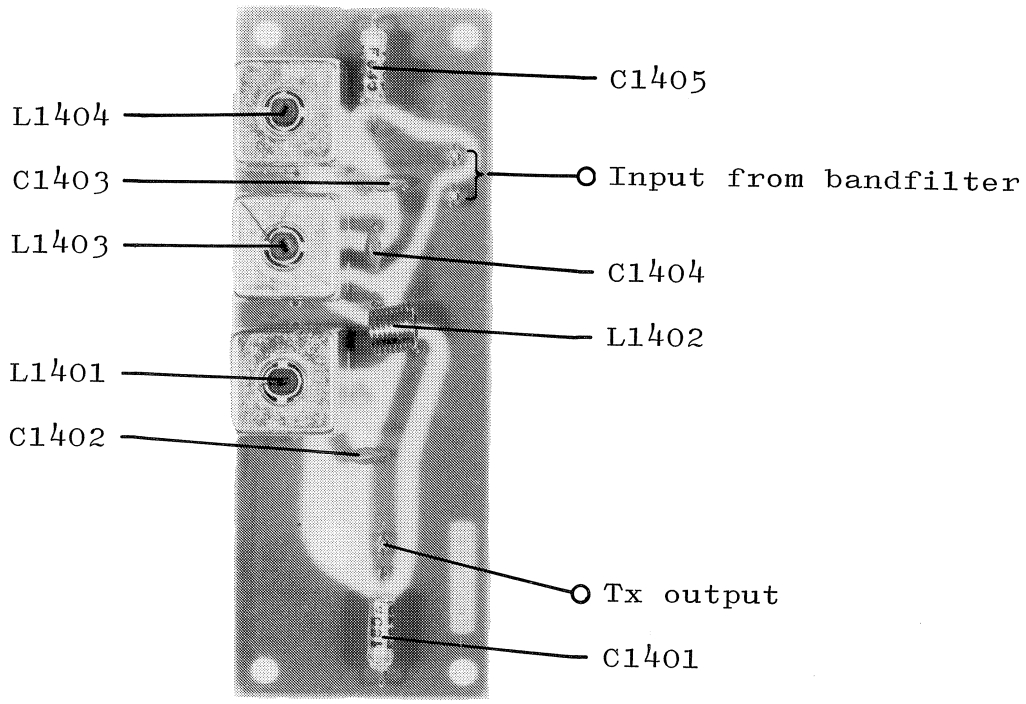
Mode : TUNE
Oscilloscope input : Passive probe 10 Mohm//11 pF
DC voltmeter input : 10 Mohm
TP: Testpoints
All voltage statements are typical

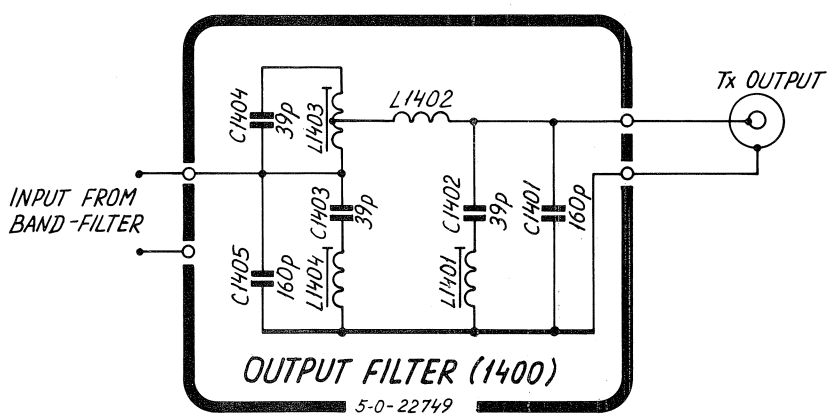


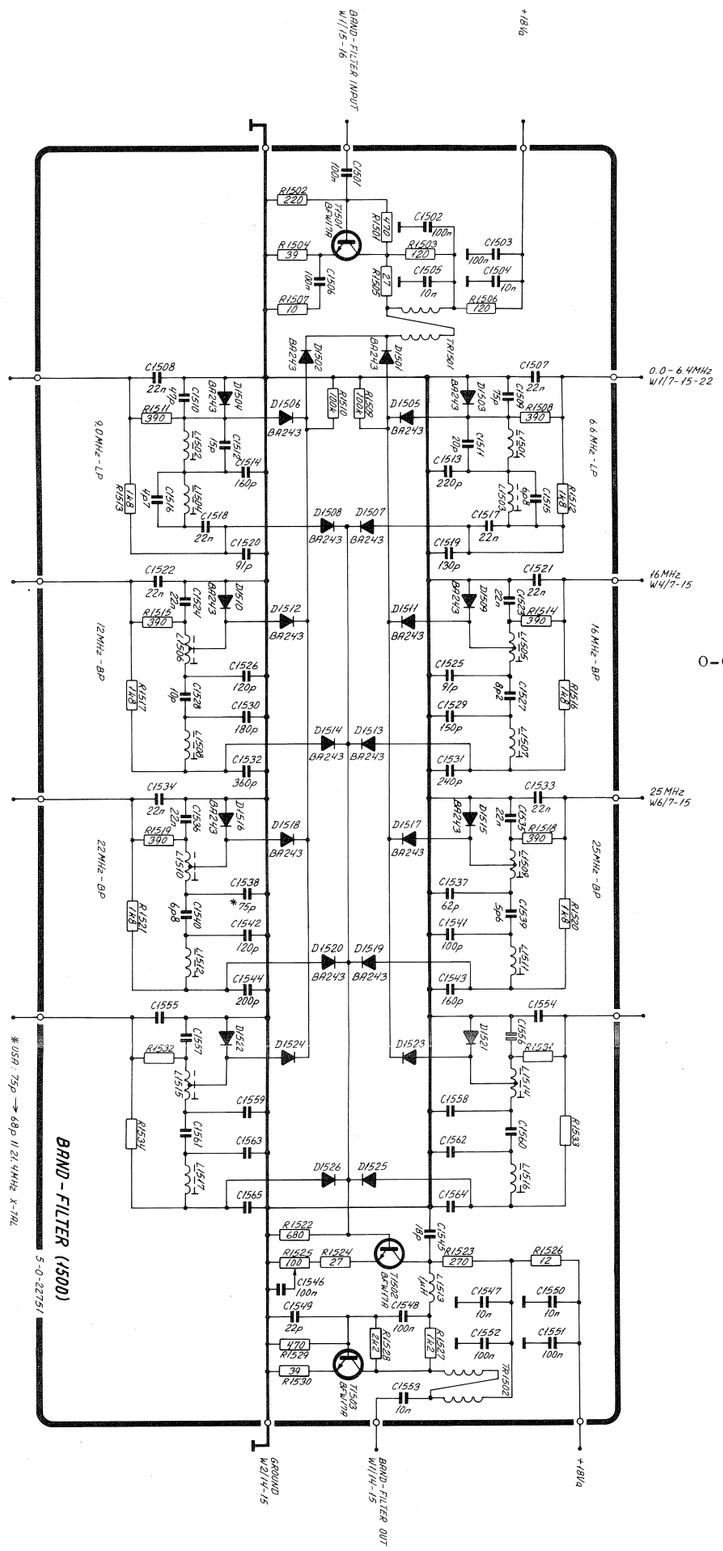


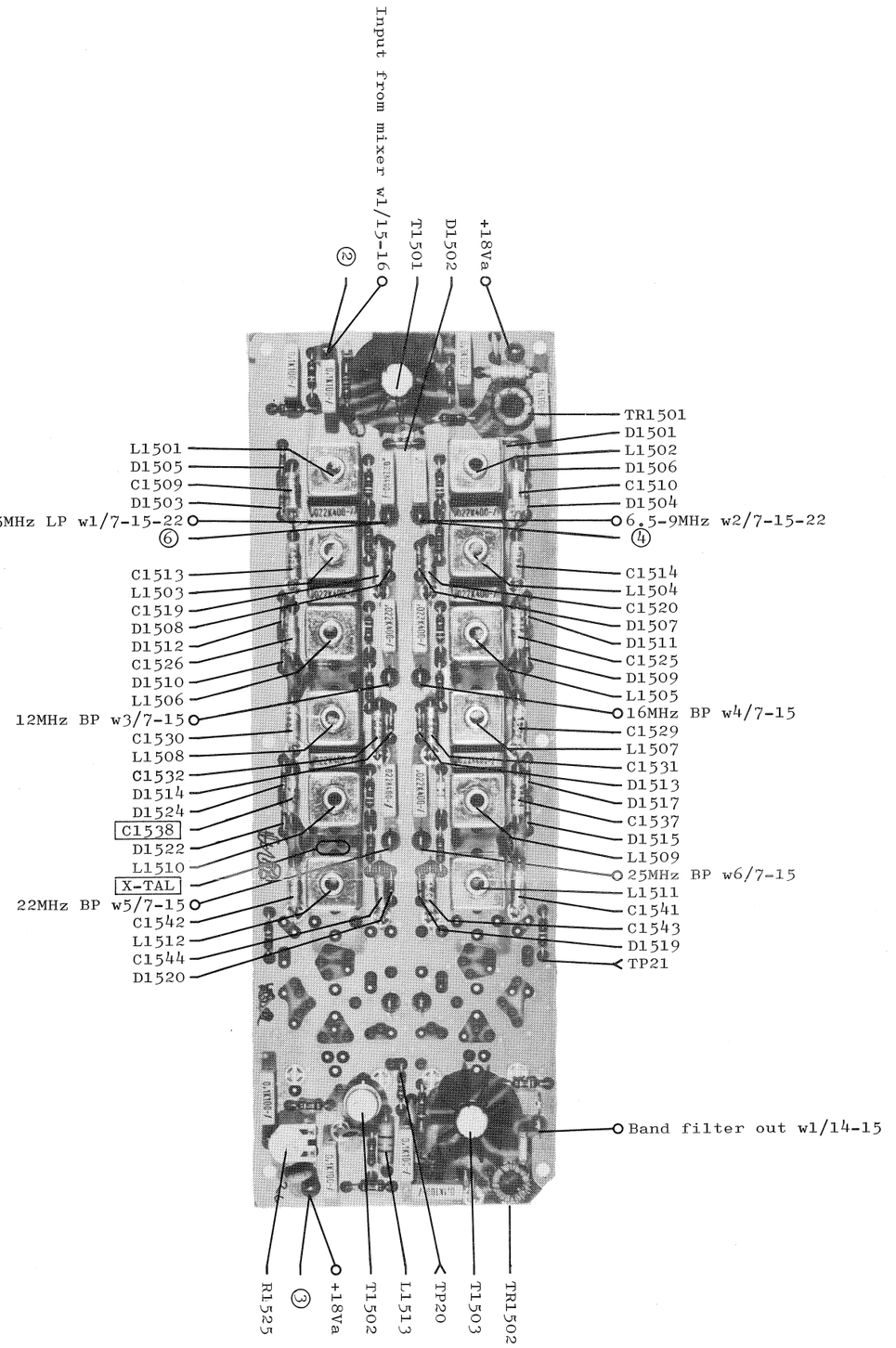

IC1306
IC1304
2 min. repeat
T1305
IC1305
TP22
IC1308
IC1303
IC1302
IC1309
C1312..
IC1312
IC1311
IC1310
IC1305.
IC1307.
C1314..
C1308..
T1304..
T1303..
C1302..
10MHz in
w1/1-13
w1/1-13
T1302
T1301
C1303
D1301
IC1301
C1304
C1301
L1301.....
ALARM sig....
22V for ALARM
Ground.....
0V for ALARM.


+22V
10MHz INPUT
w1/1-17
ALARM SIGNAL OUT
0V BY ALARM
IC1301 MC78L05
IC1313 SN74 LS 197N
IC1307 MC14040
IC1312a MC14073
IC1312c
IC1312b
IC1302d
IC1303a MC14071
IC1302b
IC1310a MC14029
IC1310b
IC1305 MC14040
IC1303d
IC1304b
IC1303b
IC1309b
IC1309a MC14073
IC1308a MC14027
IC1308b
IC1302a MC14081
IC1309c
IC1306 MC14040
IC1303c
IC1304a MC14082
IC1310 MC14040
T1303 BF199
T1304 2N2368
T1305 BC558B
T1301 BC548B
T1302 BC548B
D1301 AA143
TP22
ALARM SIGNAL GENERATOR (1300)
5-0-23276


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


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


BAND-FILTER (1500)
5-0-2275/
BAND-FILTER INPUT w1/15-16
+18Va
6,4-8,5MHz w2/7-15-22
0,0-6,4MHz w1/7-15-22
9,0MHz-LP
6,6MHz-LP
12MHz w3/7-15
12MHz-BP
16MHz w4/7-15
16MHz-BP
22MHz w5/7-15
22MHz-BP
25MHz w6/7-15
25MHz-BP
*USA 75p → 68p if 21,4MHz X-TAL
GROUND w2/14-15
BAND-FILTER OUT w1/14-15
+18Va


Input from mixer w1/15-16
T1501
D1502
+18Va
TR1501
D1501
L1501
L1502
D1505
D1506
C1509
C1510
D1503
D1504
0-6,5MHz LP w1/7-15-22
6,5-9MHz w2/7-15-22
C1513
C1514
L1503
L1504
C1519
C1520
D1508
D1507
D1512
D1511
C1526
C1525
D1510
D1509
L1506
L1505
12MHz BP w3/7-15
16MHz BP w4/7-15
C1530
C1529
L1508
L1507
C1532
C1531
D1514
D1513
D1524
D1517
C1538
C1537
D1522
D1515
L1510
L1509
X-TAL
25MHz BP w6/7-15
22MHz BP w5/7-15
L1511
C1542
C1541
L1512
C1543
C1544
D1519
D1520
TP21
Band filter out w1/14-15
R1525
+18Va
T1502
L1513
TP20
T1503
TR1502

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.

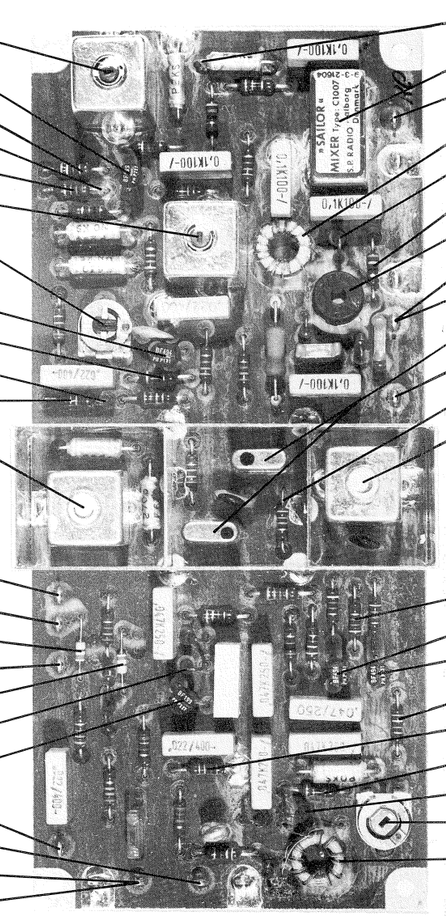
TEST CONDITIONS

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 .....

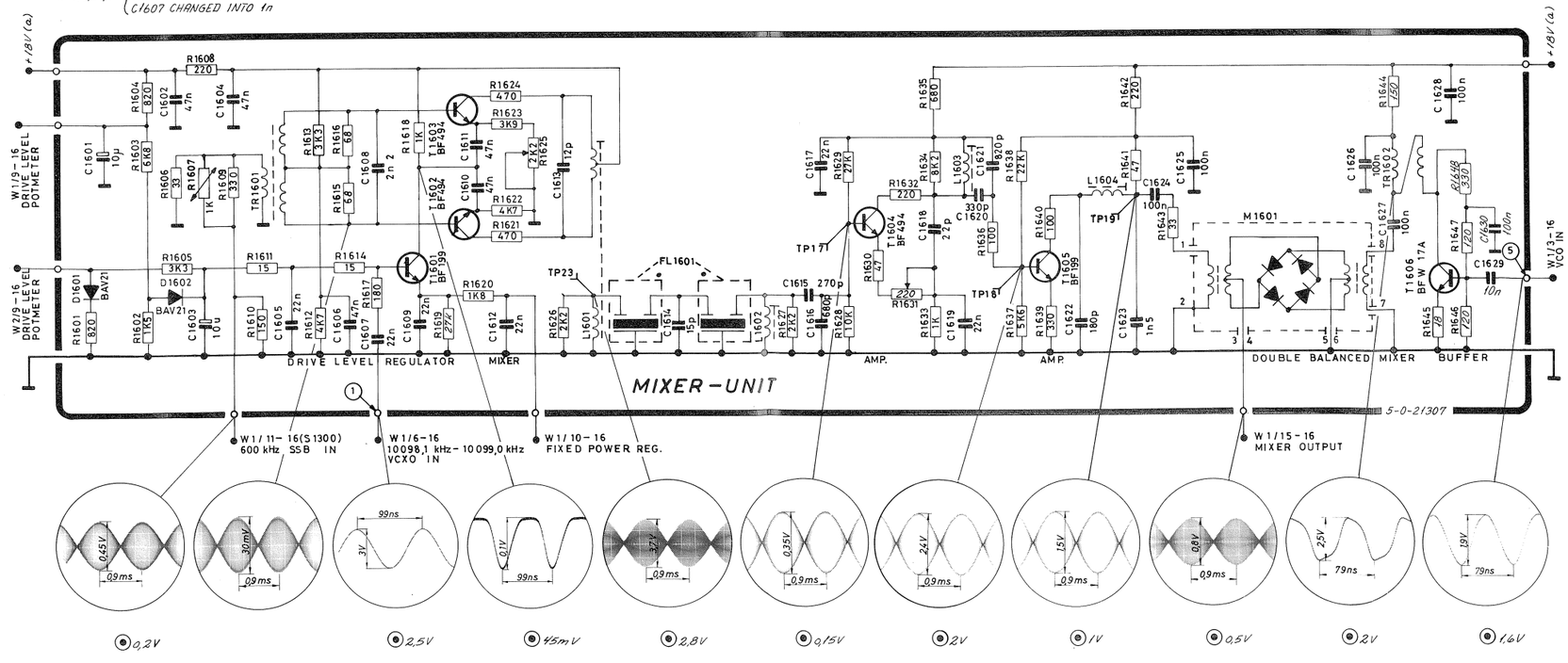
18V(a) .....
w2/9-16 .....
D1601 .....
w1/9-16 .....
D1602 .....
R1614 .....
T1601 .....
w1/10-16,Fixed power reg .....
w1/11-16,(S1300),600kHz SSB in
w1/6-16,VCXO in .....
TP28 .....



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 }



CIRCUIT DESCRIPTION A2H OSCILLATOR AND DELAY UNIT S130X

This unit generates the necessary AF signal to modulate the exciter in the A2H mode and the necessary time delays for the telegraphy and telex operation.

A2H OSCILLATOR

The A2H AF oscillator is built-up around T1801 with the tuned circuit C1803, C1804 and L1801 adjustable to the wanted frequency 465 hz.

The output is a combination of a DC voltage to switch on the diode in the microphone amplifier, and the AF signal which is controlled via potentiometer R1806.

TX-DELAY

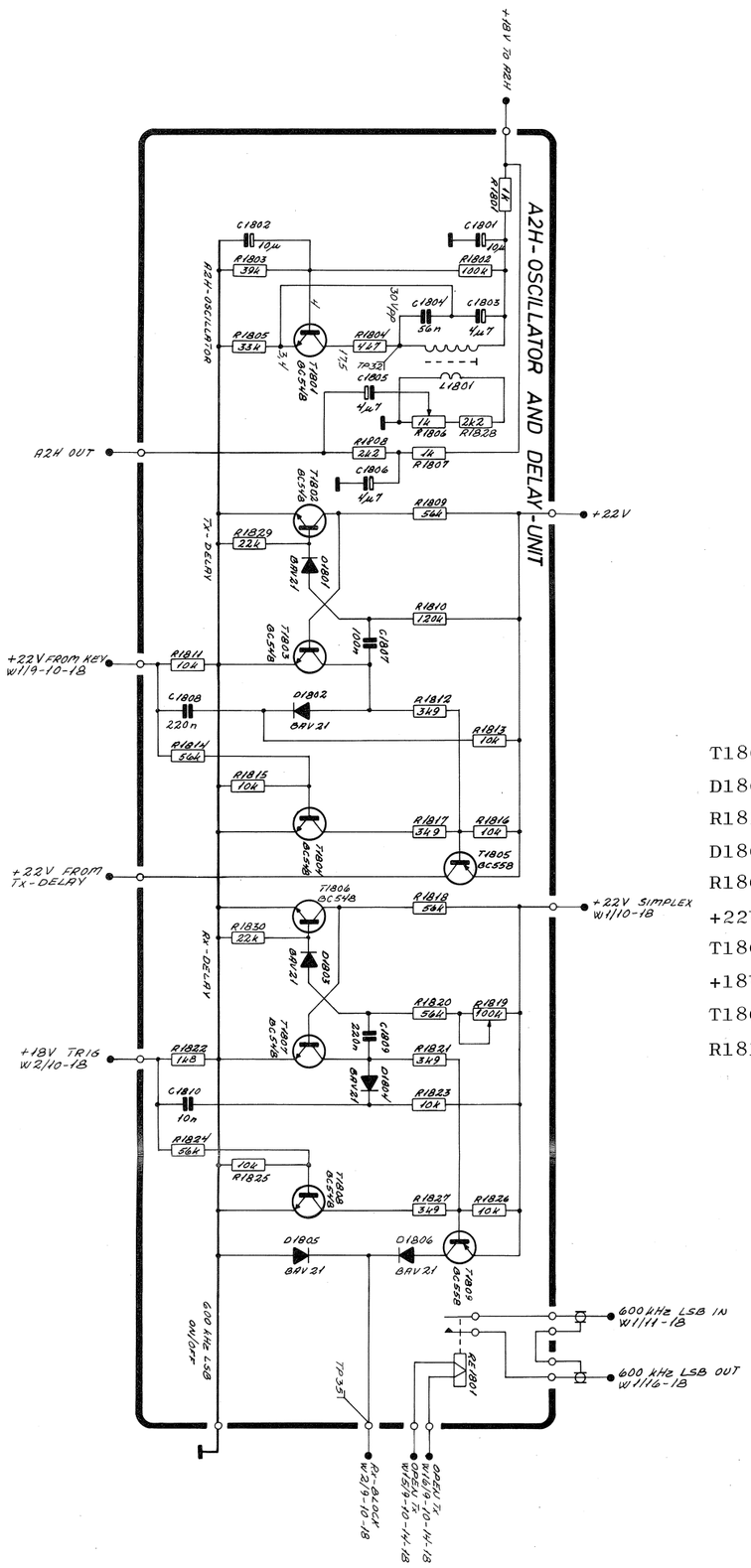
+22V FROM KEY controls T1805 to conduct, and T1805 will then supply +22V FROM TX-DELAY to the relays 600 kHz LSB ON/OFF and TX ON/OFF in telegraphy mode. When the key is released T1804 is off, but T1803 goes on for a time period of approx. 10 mS determinated by the monostable multivibrator T1802 and T1803.

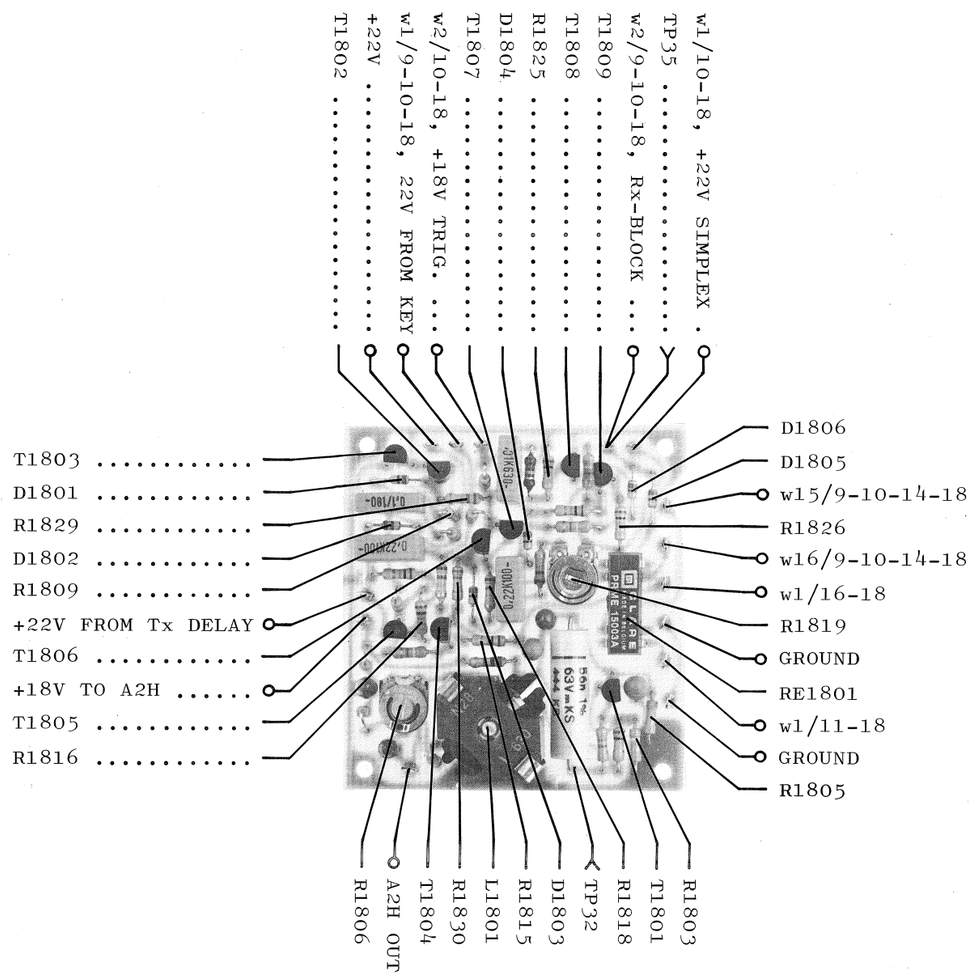
RX-DELAY

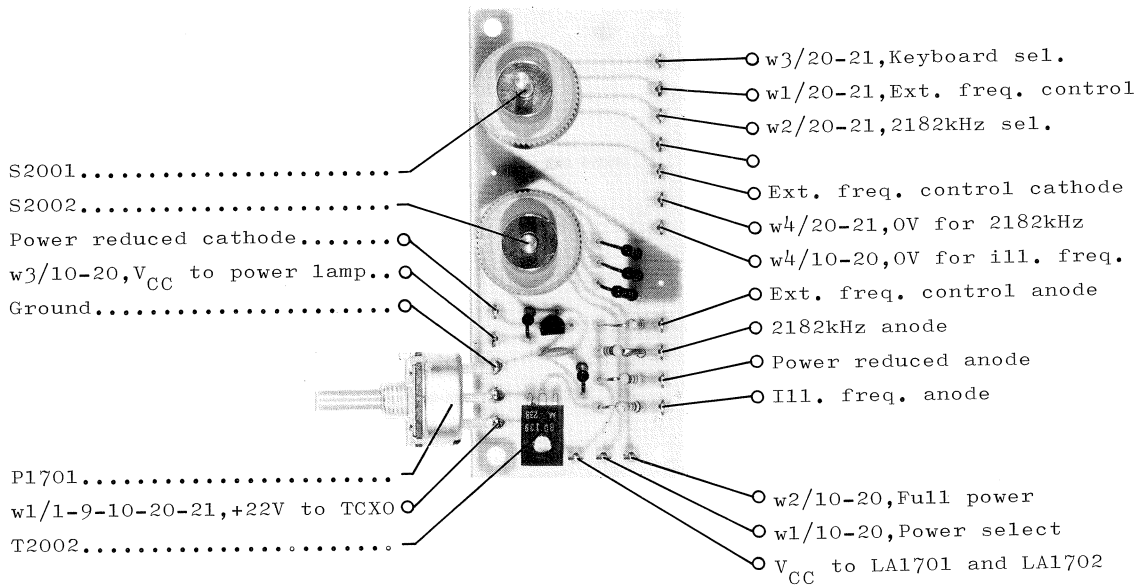
With the transmitter keyed there is +18V on +18V TRIG. keeping T1809 conducting, and in this way the receiver is blocked. When the key is released T1808 is off, but T1807 goes on and stays on for a time period between 13 mS and 30 mS determinated by the monostable multivibrator T1806 and T1807 and adjustable with R1819.

600 kHz LSB ON/OFF

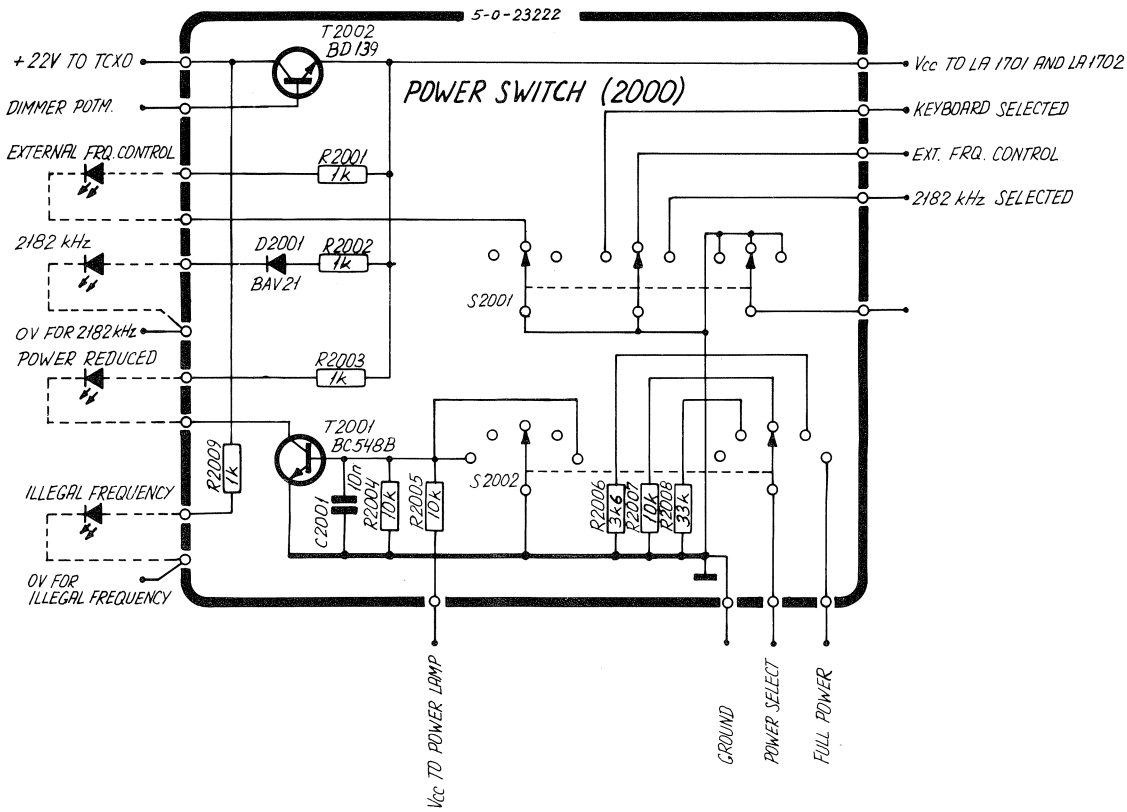
The relay RE1801 switches the signal from the SSB generator to the mixer unit off in receive mode.


A2H-OSCILLATOR AND DELAY-UNIT
+18V TO A2H
A2H-OSCILLATOR
TX-DELAY
RX-DELAY
A2H OUT
+22V
+22V FROM KEY W1/9-10-18
+22V FROM TX-DELAY
+22V SIMPLEX W1/10-18
+18V TRIG W2/10-18
600 kHz LSB on/off
600 kHz LSB IN W1/11-18
600 kHz LSB OUT W1/16-18
RE1801
TP35
RX-BLOCK W2/9-10-18
OPEN Tx W1/9-10-14-18
W15/9-10-14-18

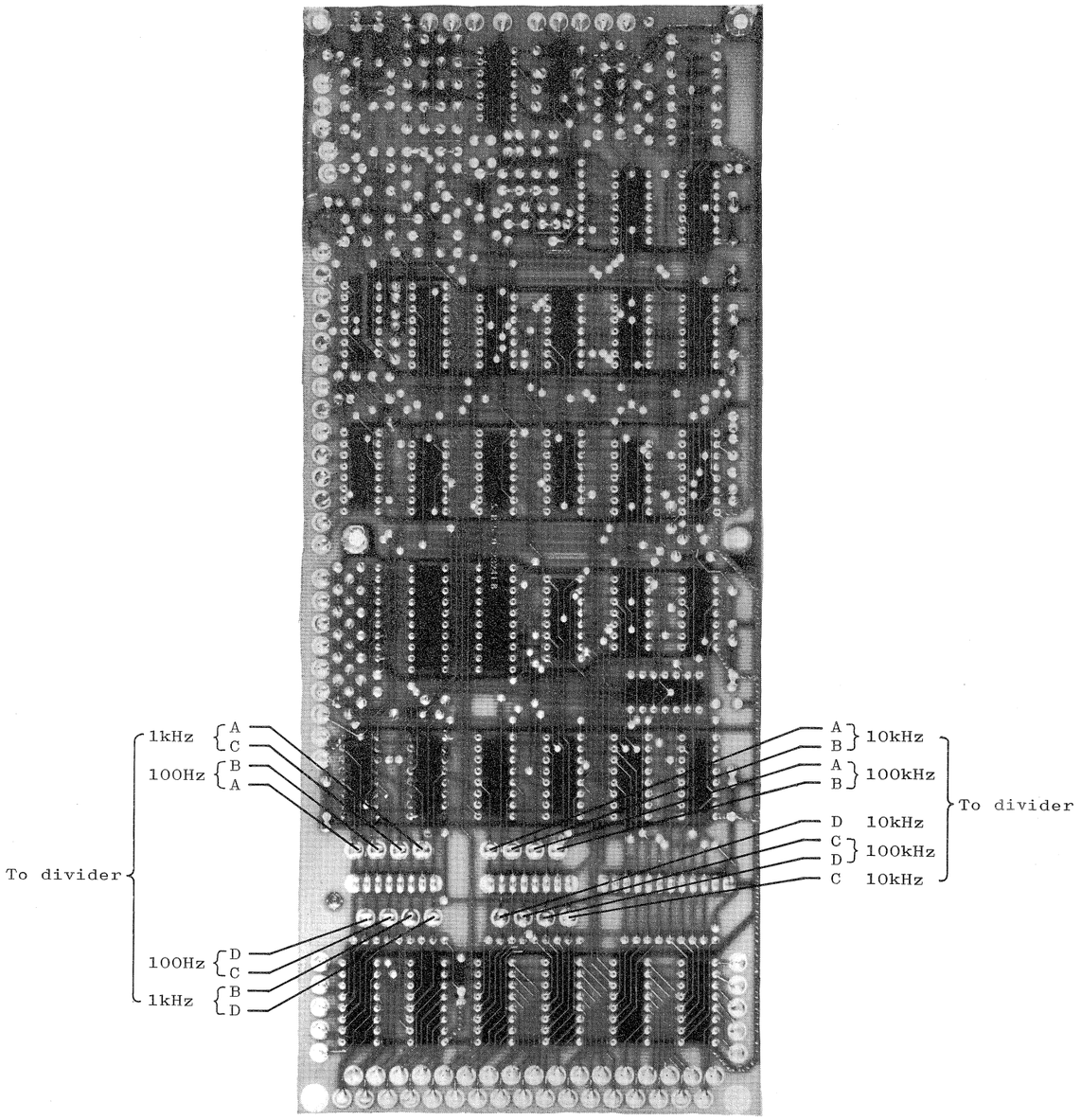

w1/10-18, +22V SIMPLEX
TP35
w2/9-10-18, Rx-BLOCK
T1809
T1808
R1825
D1804
T1807
w2/10-18, +18V TRIG.
w1/9-10-18, 22V FROM KEY
+22V
T1802
T1803
D1801
R1829
D1802
R1809
+22V FROM Tx DELAY
T1806
+18V TO A2H
T1805
R1816
D1806
D1805
w15/9-10-14-18
R1826
w16/9-10-14-18
w1/16-18
R1819
GROUND
RE1801
w1/11-18
GROUND
R1805
R1806
A2H OUT
T1804
R1830
L1801
R1815
D1803
TP32
R1818
T1801
R1803

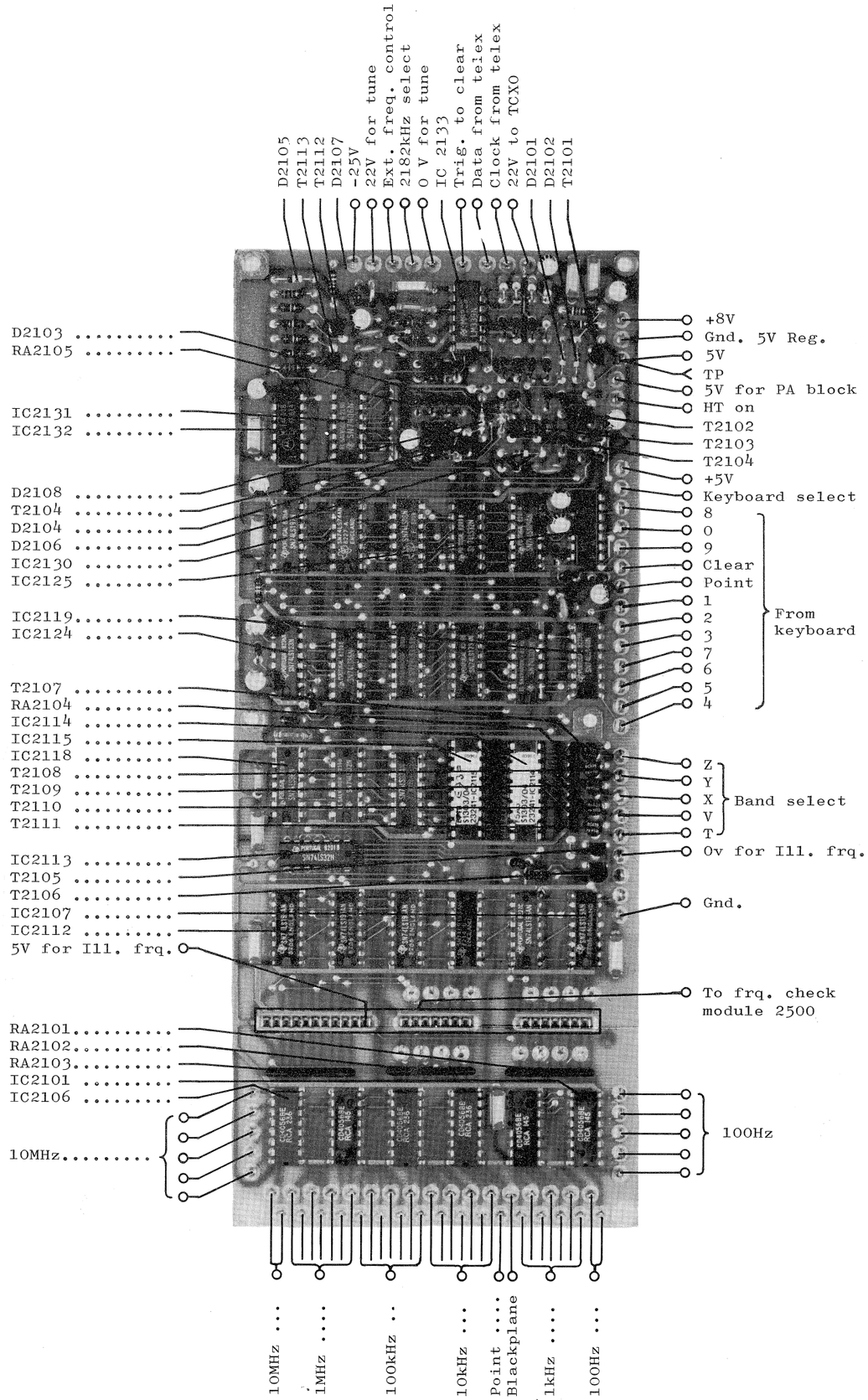

S2001.....
S2002.....
Power reduced cathode.....
w3/10-20,V_{CC} to power lamp..
Ground.....
P1701.....
w1/1-9-10-20-21,+22V to TCXO
T2002.....
w3/20-21,Keyboard sel.
w1/20-21,Ext. freq. control
w2/20-21,2182kHz sel.
Ext. freq. control cathode
w4/20-21,0V for 2182kHz
w4/10-20,0V for ill. freq.
Ext. freq. control anode
2182kHz anode
Power reduced anode
Ill. freq. anode
w2/10-20,Full power
w1/10-20,Power select
V_{CC} to LA1701 and LA1702

S1303/04


5-0-23222
POWER SWITCH (2000)
+22V TO TCXO
DIMMER POTM.
EXTERNAL FRQ.CONTROL
2182 kHz
0V FOR 2182kHz
POWER REDUCED
ILLEGAL FREQUENCY
0V FOR ILLEGAL FREQUENCY
T2002 BD139
R2001 1k
D2001 BAV21
R2002 1k
R2003 1k
T2001 BC548B
R2009 1k
C2001 10n
R2004 10k
R2005 10k
S2001
S2002
R2006 3k6
R2007 10k
R2008 33k
Vcc TO LA1701 AND LA1702
KEYBOARD SELECTED
EXT. FRQ. CONTROL
2182 kHz SELECTED
Vcc TO POWER LAMP
GROUND
POWER SELECT
FULL POWER

COMPONENT LOCATION MODULE 2100


1kHz A C
100Hz B A
To divider
100Hz D C
1kHz B D
A B 10kHz
A B 100kHz
D 10kHz
C D 100kHz
C 10kHz
To divider


D2105
T2113
T2112
D2107
-25V
22V for tune
Ext. freq. control
2182kHz select
0 V for tune
IC 2133
Trig. to clear
Data from telex
Clock from telex
22V to TCXO
D2101
D2102
T2101
D2103
RA2105
IC2131
IC2132
D2108
T2104
D2104
D2106
IC2130
IC2125
IC2119
IC2124
T2107
RA2104
IC2114
IC2115
IC2118
T2108
T2109
T2110
T2111
IC2113
T2105
T2106
IC2107
IC2112
5V for Ill. frq.
RA2101
RA2102
RA2103
IC2101
IC2106
10MHz
+8V
Gnd. 5V Reg.
5V
TP
5V for PA block
HT on
T2102
T2103
T2104
+5V
Keyboard select
8
0
9
Clear
Point
1
2
3
7
6
5
4
From keyboard
Z
Y
X
V
T
Band select
0v for Ill. frq.
Gnd.
To frq. check module 2500
100Hz
10MHz ...
1MHz ....
100kHz ..
10kHz ...
Point ....
Blackplane
1kHz ....
100Hz ...

FREQUENCY CONTROL (2100)

5V FOR PA BLOCK
HT. ON
0V FOR TUNE
22V FOR TUNE
CLOCK FOR EXT. FRQ. CONTROL
22V TO TCXO
DATA FOR EXT. FRQ. CONTROL

100Hz TO FRQ. CHECK
1kHz TO FRQ. CHECK
10kHz TO FRQ. CHECK
100kHz TO FRQ. CHECK
1MHz TO FRQ. CHECK
10MHz TO FRQ. CHECK

IC 2107 - IC 2112
6×SN74LS195

IC2125a
½ MC14013BCP

IC2125b
½ MC14013BCP

IC 2133b
¼ LM339

IC 2133a
¼ LM339

IC 2133d
¼ LM339

IC 2133c
¼ LM339

IC2126a
SN74LS109

IC2126b
½ SN74LS109

IC2129a
SN74LS74

IC2129b
SN74LS74

IC2130
SN74LS197

IC2124a
SN74LS123

IC2124b
SN74LS123

IC2122
SN74LS151

IC2121
SN74LS173

IC2120
SN74LS00

IC2119
SN74LS148

IC2101 - IC2106
CD4056B

IC2114
6308-1

IC2115
6308-1

IC2116
SN74LS83

IC2131
MC14011BCP

IC1703
MC7805

T2101 BC558B
T2102 BC548B
T2103 BC548B
T2104 BC548B
T2105 BC548B
T2106 BC548B
T2107 BC639
T2108 BC639
T2109 BC639
T2110 BC639
T2111 BC639
T2112 BC558B
T2113 BC558B
T2114 BC548B

D2101 1N4148
D2102 1N4148
D2103 BZX79C18
D2104 BAW43
D2105 BZX79C8V1

RR 2101
RR 2102
RR 2103
RR 2104
RR 2105

GATE NO. 13 : SN 74 LS 32
17 : SN 74 LS 32
18 : SN 74 LS 86
23 : SN 74 LS 86
27 : SN 74 LS 32
28 : SN 74 LS 08

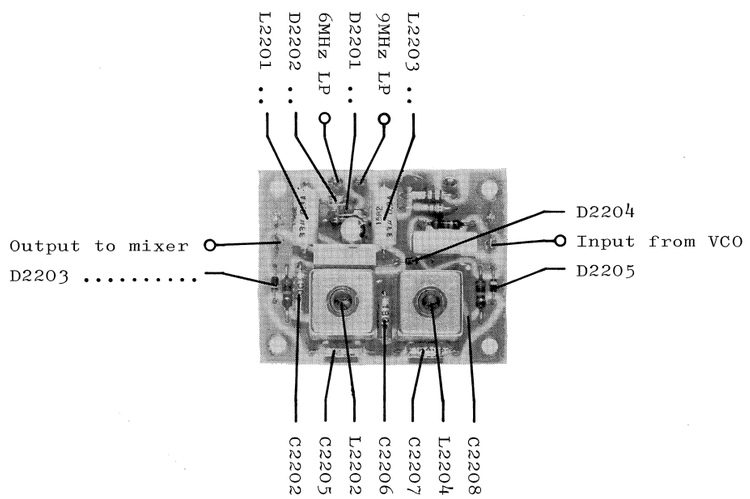
TO ILLEGAL FRQ. LAMP
5V FOR ILLEGAL FRQ.
Z
Y
X
V
T
BAND SELECT

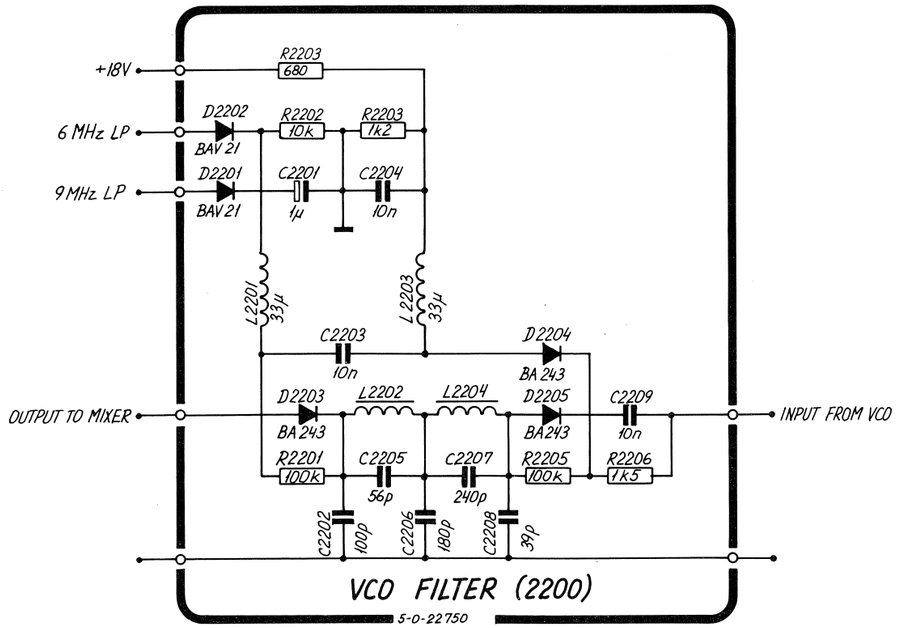
100kHz TO DIVIDER
10kHz TO DIVIDER
1kHz TO DIVIDER
100Hz TO DIVIDER
POINT TO DISPLAY
BACK PLANE TO DISPLAY

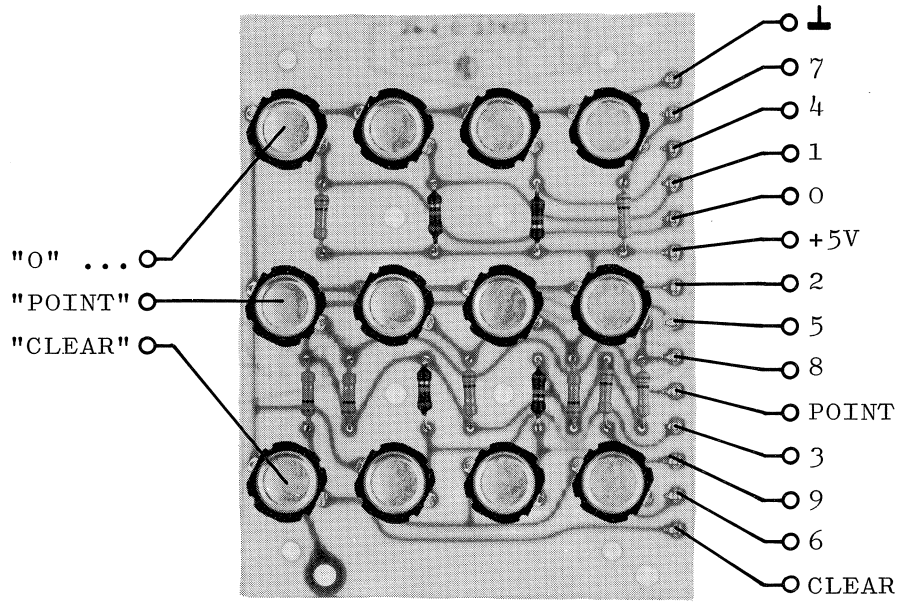
FROM KEYBOARD
POINT
CLEAR
KEYBOARD SELECTED
EXT. FRQ CONTROL
2182 kHz
TX/RX CLEAR
100kHz TO DISPLAY
1kHz TO DISPLAY
10kHz TO DISPLAY
100kHz TO DISPLAY
1MHz TO DISPLAY
10MHz TO DISPLAY
~25V

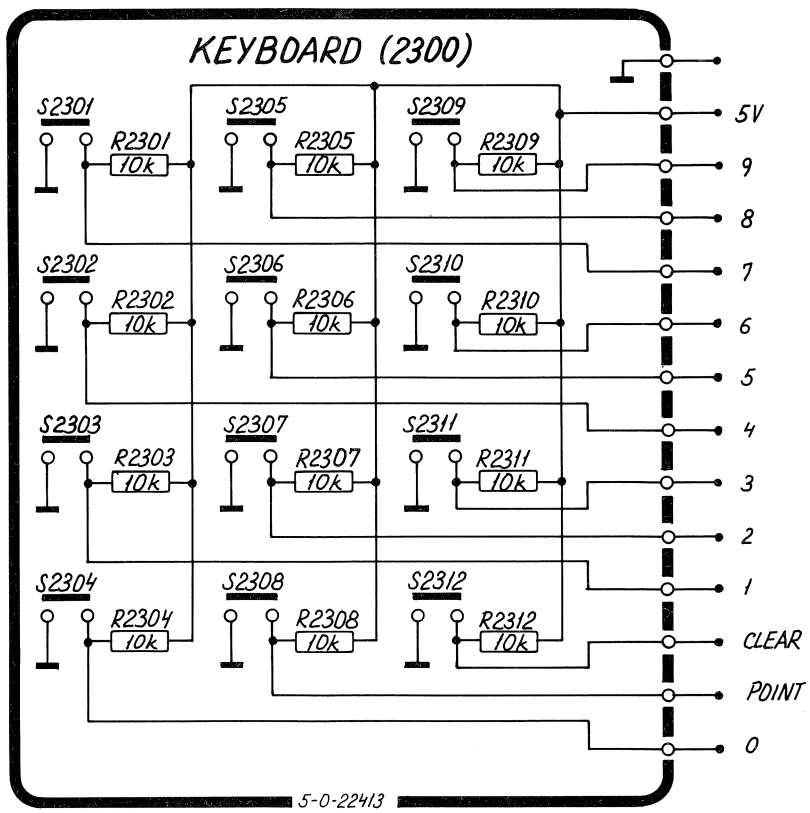
5-0-23241

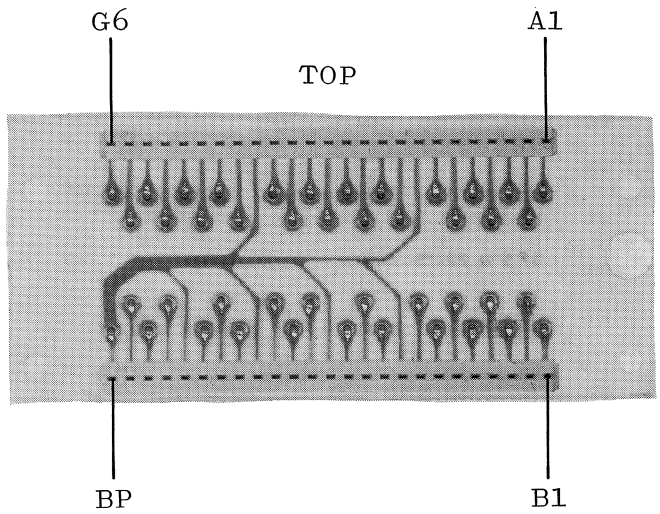
B

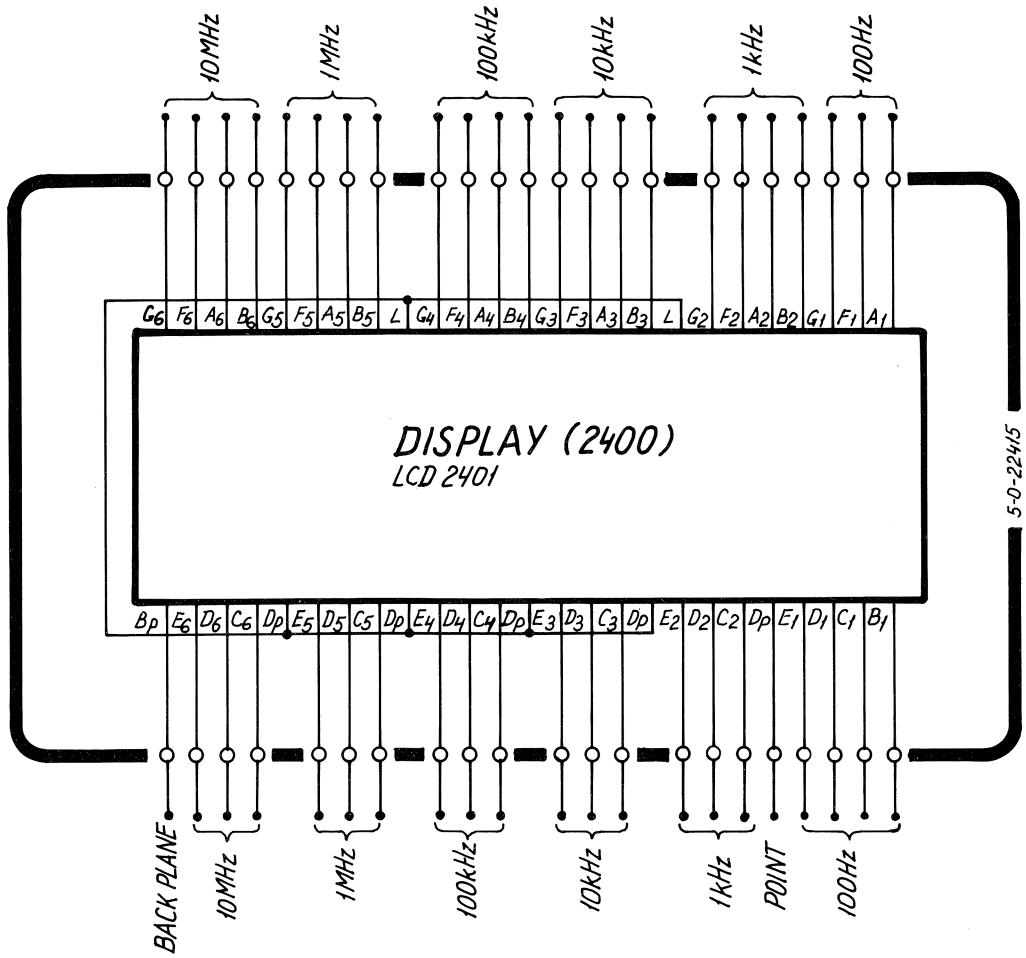

L2201
D2202
6MHz LP
D2201
9MHz LP
L2203
Output to mixer
D2203
D2204
Input from VCO
D2205
C2202
C2205
L2202
C2206
C2207
L2204
C2208


+18V
R2203
680
6 MHz LP
D2202
BAV 21
R2202
10k
R2203
1k2
9 MHz LP
D2201
BAV 21
C2201
1µ
C2204
10n
L2201
33µ
L2203
33µ
C2203
10n
D2204
BA 243
OUTPUT TO MIXER
D2203
BA 243
L2202
L2204
D2205
BA 243
C2209
10n
INPUT FROM VCO
R2201
100k
C2205
56p
C2207
240p
R2205
100k
R2206
1k5
C2202
100p
C2206
180p
C2208
39p
VCO FILTER (2200)
5-0-22750

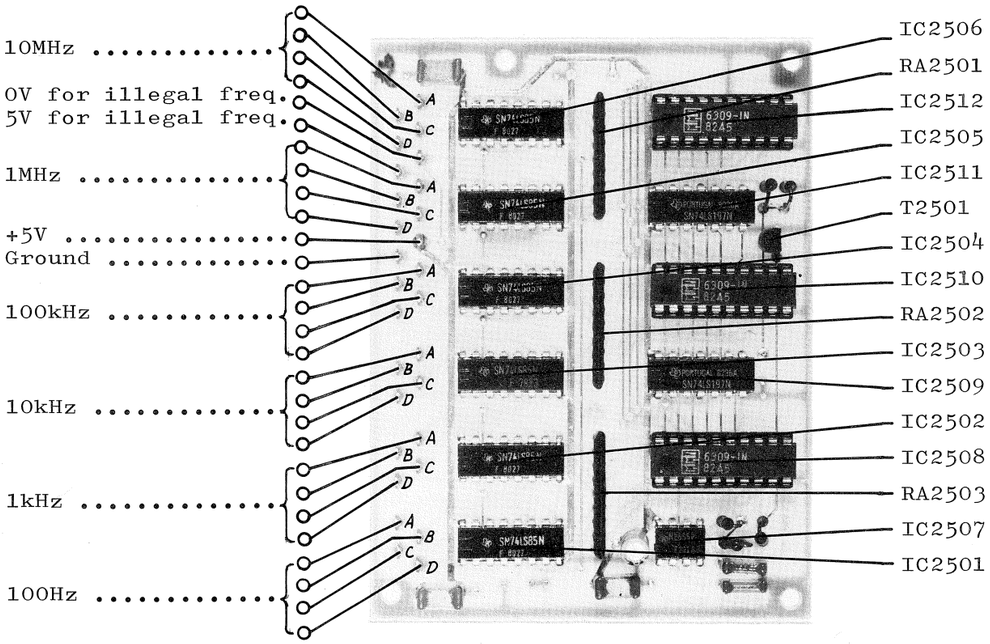

"0" ...
"POINT"
"CLEAR"
⊥
7
4
1
0
+5V
2
5
8
POINT
3
9
6
CLEAR

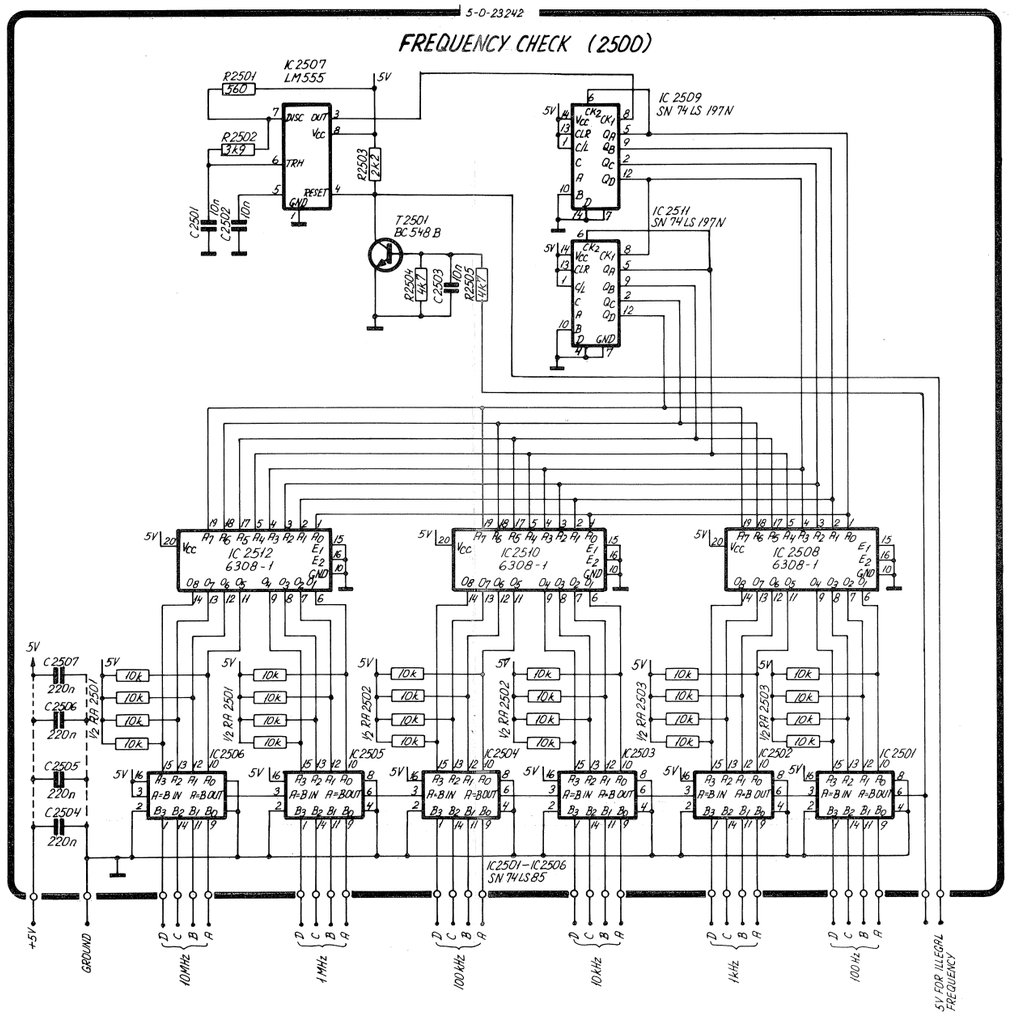

KEYBOARD (2300)
S2301
R2301 10k
S2305
R2305 10k
S2309
R2309 10k
S2302
R2302 10k
S2306
R2306 10k
S2310
R2310 10k
S2303
R2303 10k
S2307
R2307 10k
S2311
R2311 10k
S2304
R2304 10k
S2308
R2308 10k
S2312
R2312 10k
5V
9
8
7
6
5
4
3
2
1
CLEAR
POINT
0
5-0-22413

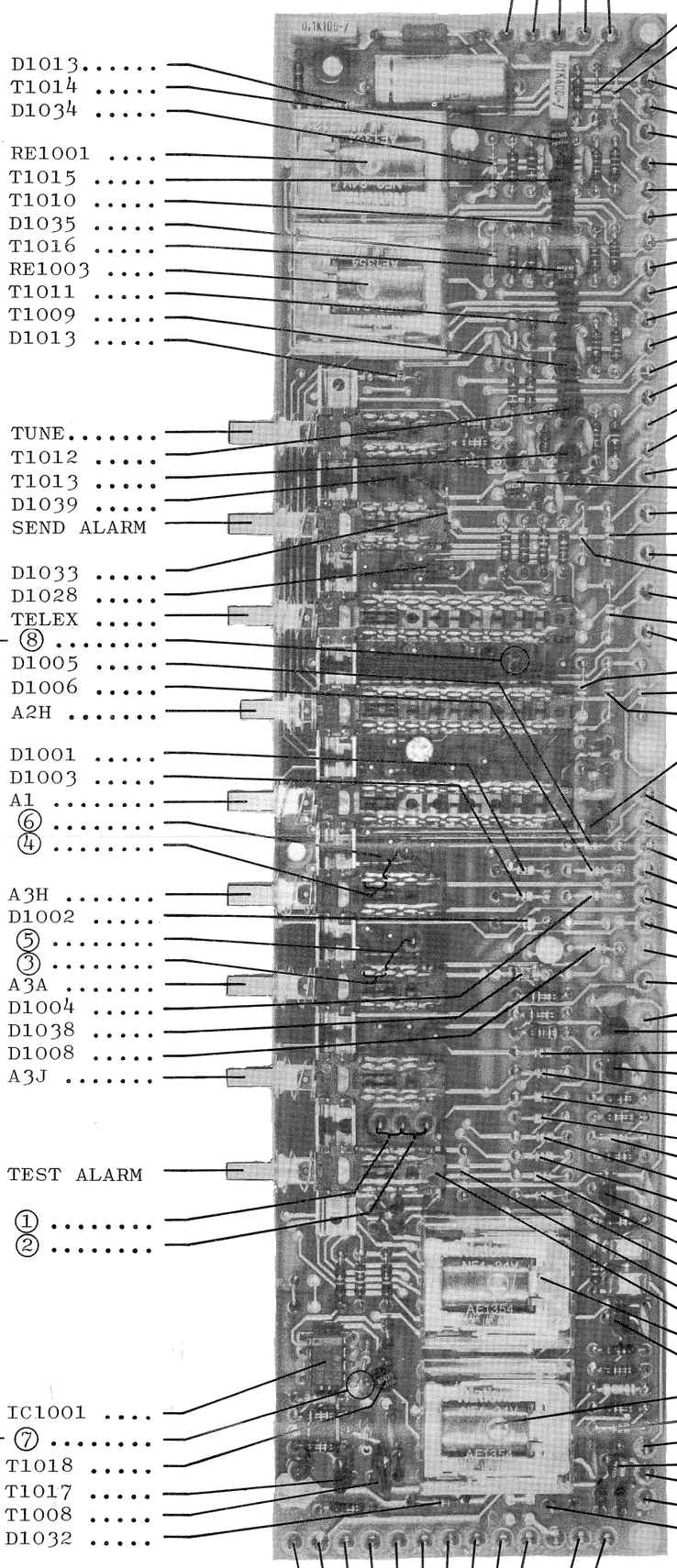

G6
A1
TOP
BP
B1


10MHz
1MHz
100kHz
10kHz
1kHz
100Hz
G6 F6 A6 B6 G5 F5 A5 B5 L G4 F4 A4 B4 G3 F3 A3 B3 L G2 F2 A2 B2 G1 F1 A1
DISPLAY (2400)
LCD 2401
Bp E6 D6 C6 Dp E5 D5 C5 Dp E4 D4 C4 Dp E3 D3 C3 Dp E2 D2 C2 Dp E1 D1 C1 B1
5-0-22415
BACK PLANE
10MHz
1MHz
100kHz
10kHz
1kHz
POINT
100Hz

S1303/4


10MHz
0V for illegal freq.
5V for illegal freq.
1MHz
+5V
Ground
100kHz
10kHz
1kHz
100Hz
A
B
C
D
IC2506
RA2501
IC2512
IC2505
IC2511
T2501
IC2504
IC2510
RA2502
IC2503
IC2509
IC2502
IC2508
RA2503
IC2507
IC2501


5-0-23242
FREQUENCY CHECK (2500)
IC 2507 LM 555
R2501 560
R2502 3k9
R2503 22k2
C2501 10n
C2502 10n
T 2501 BC 548 B
R2504 4k7
C2503 10n
R2505 47k2
IC 2509 SN 74 LS 197 N
IC 2511 SN 74 LS 197 N
IC 2512 6308-1
IC 2510 6308-1
IC 2508 6308-1
C2507 220n
C2506 220n
C2505 220n
C2504 220n
½ RR 2501
½ RR 2502
½ RR 2503
10k
IC2506
IC2504
IC2505
IC2503
IC2502
IC2501
IC2501–IC2506 SN 74LS85
+5V
GROUND
10MHz
1MHz
100kHz
10kHz
1kHz
100Hz
5V FOR ILLEGAL FREQUENCY



Mic. input .....
+22V simplex ....
Vcc to 600kHz ...
+18V .....
Transmitter start

D1036
D1037

AF to loudspeaker
AF from Rx
HT on
Simplex relay on
Handset key
Microtelephone
22V from delay
+18V to A2H
+18V trig to A2H
AF from telex
Open Tx
TT from telex
22V from key
A2H out
22V to TCXO

D1013.....
T1014 .....
D1034 .....
RE1001 ....
T1015 .....
T1010 .....
D1035 .....
T1016 .....
RE1003 ....
T1011 .....
T1009 .....
D1013 .....

TUNE.....
T1012 .....
T1013 .....
D1039 .....
SEND ALARM

OV for f ≧ 4MHz
T1007
Alarm signal
D1019
22V for alarm
D1018
Ground
D1021
OV for Alarm

To alarm generator

D1033 .....
D1028 .....
TELEX .....
⑧ .....
D1005 .....
D1006 .....
A2H .....

D1024
D1022
D1020
T1006

D1001 .....
D1003 .....
A1 .....
⑥ .....
④ .....

Microphone in
A3H
A3A
+18V
Ground
A3J
A2H
22V to test tone
Test tone out

To mic. amplifier.

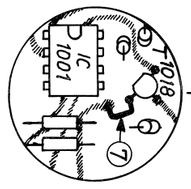
A3H .....
D1002 .....
⑤ .....
③ .....
A3A .....
D1004 .....
D1038 .....
D1008 .....
A3J .....

T1003
D1027
T1005
D1017
D1025
D1026
D1010
D1029
D1030
T1004
D1031
D1012
D1014
D1016
RE1002
T1002
RE1004
D1039
22V from dummy
T1001
0V for PA block
5V for PA block
D1015

TEST ALARM

① .....
② .....

IC1001 ....
⑦ .....
T1018 .....
T1017 .....
T1008 .....
D1032 .....



0V for tune
+22V
22V for tune
Full power
Power select
Fixed power
A1
A3H
A3A
A3J
To SSB generator
0V for 2182kHz
Vcc to power lamp

Insert the straps 7 and 8 to prevent continuous carrier in maritex mode.

TEST ALARM | A3J | A3A | A3H | A1 | A2H | TELEX | SEND ALARM | TUNE

MODESWITCH (1000)

5-0-23223

2182 kHz FIXED	
MODE SELECTED	DIODE MOUNTED
A3H	D1002, D1004
A3J	D1007
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 }
7. } INSERT THE STRAPS 7 AND 8
8. } TO PREVENT CONTINUOUS CARRIER IN MARITEX MODE.

DIVIDER (100)

5-0-21157

LOOP 1 FILTER & ± 18V SUPPLY (200)

FILTER (900)

5-0-20894

5-0-23152

P1702

5-0-23225

SSB GENERATOR (1100)

5-0-21409

MICROPHONE AMPLIFIER (1200)

5-0-23276

ALARM SIGNAL GENERATOR (1300)

5-0-21871

A2H - OSC. AND DELAY (1800)

5-0-22751

BAND-FILTER (1500)

5-0-22749

OUTPUT FILTER (1400)

5-0-21307

MIXER (1600)

5-0-23151

POWER SWITCH DIMMER (2000)

DIMMER

ILLEGAL FREQENCY

EXT. FREQUENCY CONTROL

2182 kHz SELECTED

POWER REDUCED

5-0-22750

VCO FILTER (2200)

ONLY IN U.S. VERSION

2182 kHz FIXED	
MODE SELECTED	DIODE MOUNTED
A3H	D1002, D1004
A3J	D1007
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 }
(7) } INSERT THE STRAPS 7 AND 8
(8) } TO PREVENT CONTINUOUS CARRIER IN MARITEX MODE.

DIVIDER (100)

VCO SELECTOR (700)

FREQUENCY CONTROL (2100)

DISPLAY (2400)

LOOP 1 FILTER & ± 18V SUPPLY (200)

VCXO AND LOOP 2 FILTER (600)

FILTER (900)

VCO (300)

LOOP 1 MIXER (500)

HARMONIC FILTERS (400)

FREQUENCY CHECK (2500)

KEYBOARD (2300)

TUNE

AERIAL CURRENT

ILLEGAL FREQENCY
EXT. FREQUENCY CONTROL
2182 kHz SELECTED
POWER REDUCED

POWER SWITCH DIMMER (2000)

DIMMER

VCO FILTER (2200)

ONLY IN U.S. VERSION

P1102

1	AF FROM MICROPHONE	13	T	25	CLOCK FROM EXT. FRQ. CONTROL
2	SIMPLEX RELAY	14	V	26	AERIAL METER 1
3	RX BLOCK	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	AF FROM TELEX	19	TO TUNE LAMP	31	GROUND FOR MIC AND TELEX
8	TT FROM TELEX	20	TRANSMITTER START	32	+ 22V SIMPLEX
9	22V FROM KEY	21	PA BLOCK	33	AF TO LOUDSPEAKER
10	GROUND	22	DRIVE LEVEL 1	34	HANDSET KEY
11	DATA FROM EXT. FRQ. CONTROL	23	DRIVE LEVEL 2	35	
12	RF FROM RX	24	HT ON	36	+ 22V TO TCXO

MAIN SCHEMATIC DIAGRAM FOR (B) SAILOR EXCITER S1303/S1304