

Sailor

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**INSTRUKTIONSBOG FOR
SAILOR S1303/S1304 - I**

**INSTRUCTION BOOK FOR
SAILOR S1303/S1304 - I**



A/S S. P. RADIO · ÅLBORG · DENMARK

FOR YOUR INFORMATION

This preliminary instruction book for S1303/04-I is based on the instruction book for S1303/04, which you have to observe when using the service section in this preliminary book.

The VCO and HARMONIC FILTER modules have the module numbers 1200/1300 because the modules from the receiver R1119/20/21 have been used in S1303/04-I.

VCO module 1200/R11XX = module 300 S1303/04-I.

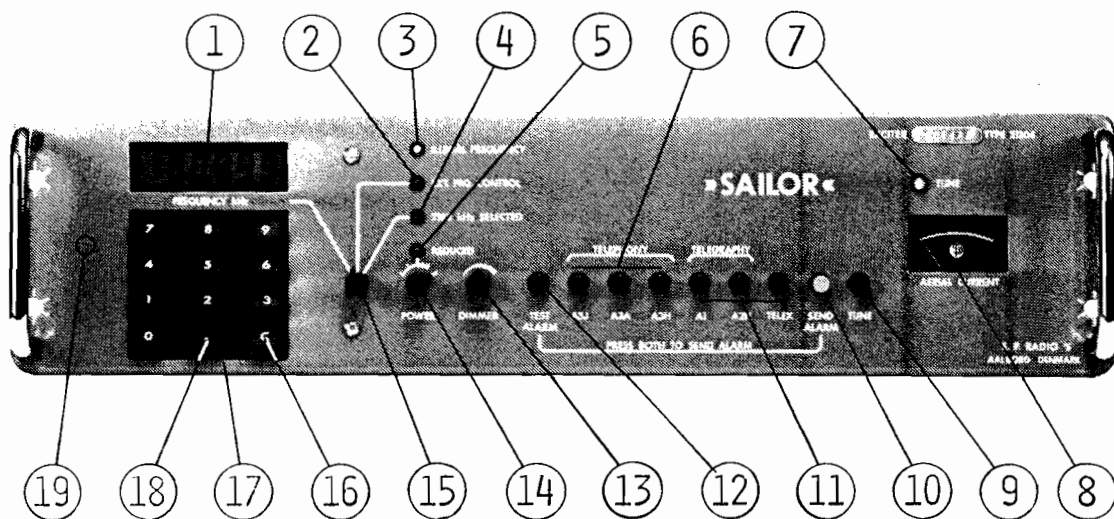
HARMONIC FILTER module 1300/R11XX = module 400 S1303/04-I.

If you want to receive the final instruction book when it is ready, please fill in the form in front of this book and return it to us. You will then receive the final instruction book when it is ready.

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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.

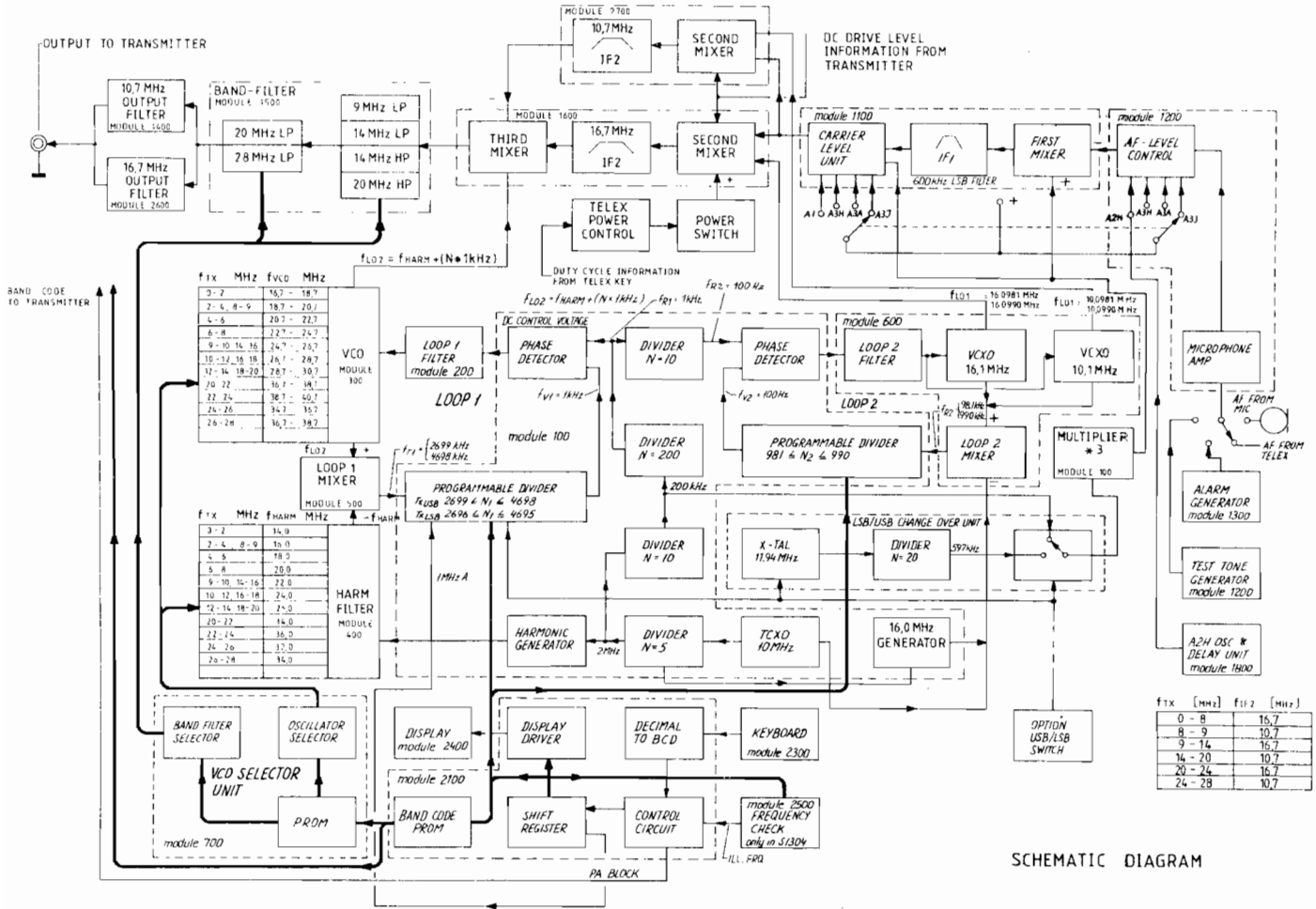
SI 303/04 A3/1

CONTROLS cont.:

- SI 303/04 A3/2
- 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

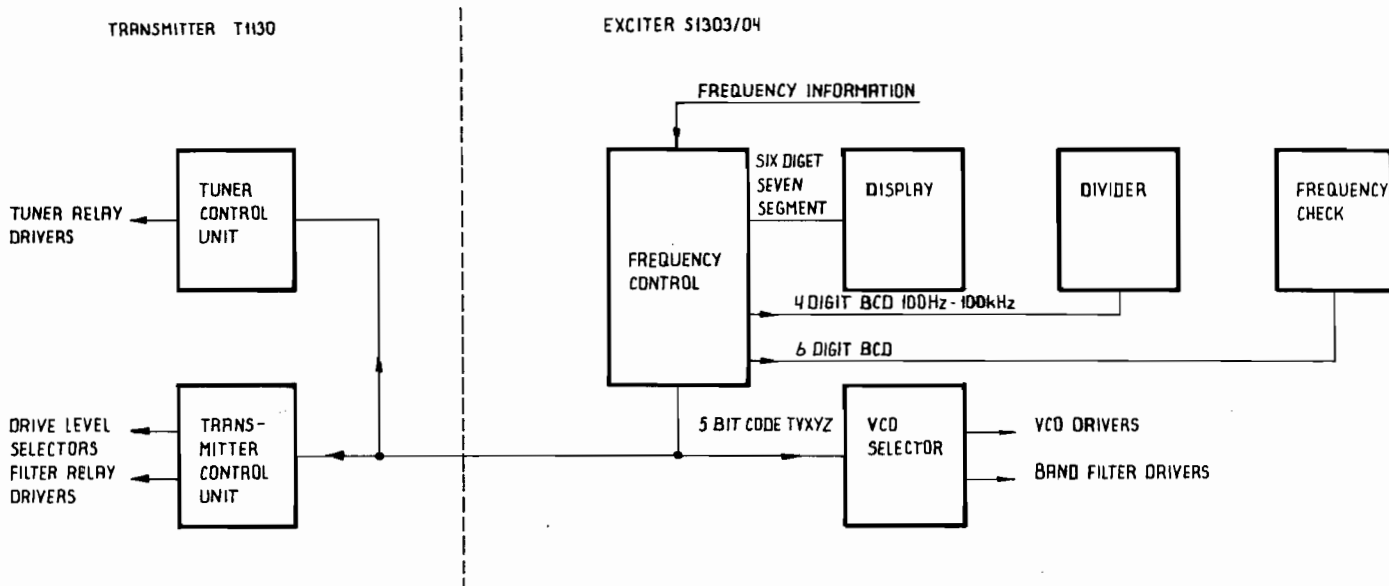


SCHMATIC DIAGRAM

CIRCUIT DESCRIPTION FREQUENCY CONTROL S1303/04

The frequency control unit receives the frequency input from the keyboard (or external equipment) and transfers this input to usable codes for control units in exciter and PA-unit. The frequency information from the keyboard is converted to a six digit BCD-code which is used in the divider unit and by the frequency check unit (S1304). A five bit code (T, V, X, Y, Z) is generated from the three most significant of the six digit BCD-code. With this five bit code the frequency area (1,6 - 28 MHz) is split up in a certain amount of bands. The area 1,6 - 8,5 MHz is covered by 21 codes and the frequency bands 12, 16, 22, 25 and 2182 MHz fixed are allocated one code each. Two codes are used for blocking of the PA-stage (00000, 11111). Since five bits give 32 possible codes, there are four left for special use. The five bit code controls the VCO and bandfilter selection in the exciter. Besides it is used in the PA-stage to control the pre-setting of the aerial coupler. In addition it is used in connection with selection of drive level potentiometer and harmonic filter in the PA-stage.

S1303/4 A1/9
4-0-25101



FREQUENCY STORE

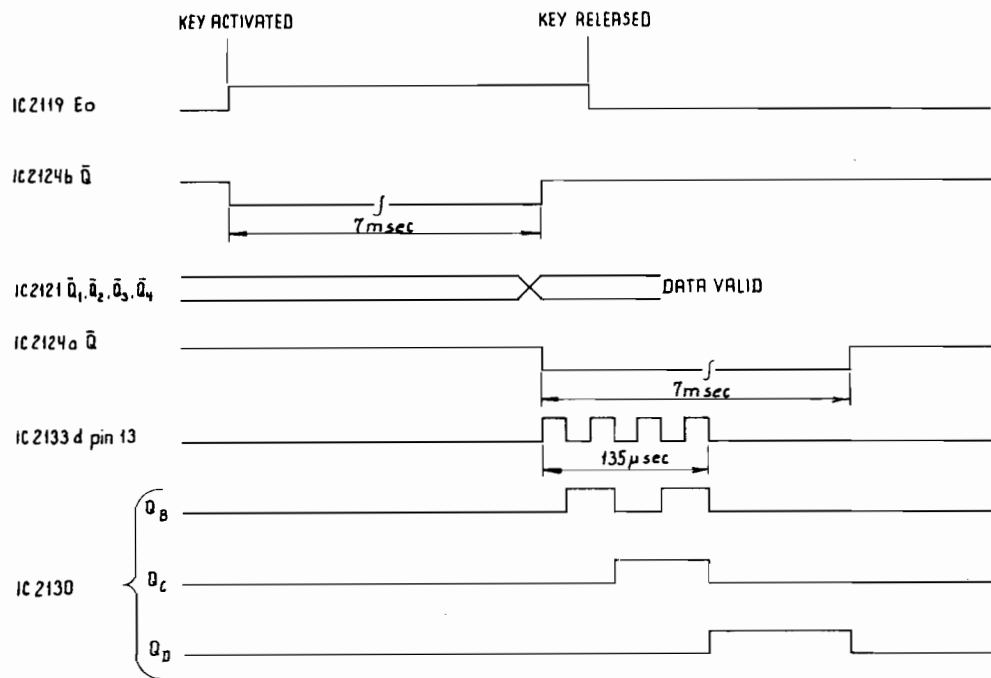
The frequency input is stored in six eight bit shift registers IC2107-IC2112, which can be loaded both in parallel and in serial mode, depending on the logic level of the S/L input "0" for parallel mode. The frequency information runs in series into the registers and when the input is finished, the registers are shifted to parallel mode, and now they will be loaded with their own information if any clockpulses come (can occur by activating the keyboard keys).

Read-in begins in the 100 Hz digit and if a new number is keyed in, the former shifts a step to the left in the display and so on. When the point key is activated, a zero is read in on the 100 Hz place, and after this the digits to the left of the point must not be changed by a new key press. This is obtained by putting IC2108-IC2112 in parallel mode by means of IC2129a. A subsequent key press will cause a read-in of the digit into IC2107, besides IC2129b will change state and thereby set IC2107 in parallel mode, which will prevent further input into IC2107 until CLEAR has been activated. A press on the TUNE button will cause the same change of mode for IC2107-IC2112. 22V for TUNE will, via gate 28 and gate 27, cause a zero read into IC2107. Furthermore IC2129b and IC2129a will change state in the mentioned order and thereby set IC2107-IC2112 in parallel mode. When IC2129a is cleared by IC2129b, it will clear IC2126a, which will turn on the point in the display

FREQUENCY INPUT VIA KEYBOARD

The key CLEAR zeroes the register IC2107-IC2112 and sets IC2129a and clears IC2129b so that serial input to IC2107-IC2112 is permitted. A subsequent key press sets up, via IC2119 and IC2120, the BCD-code for the digit in question on the data inputs of IC2121. Simultaneously the monostable FF IC2124b is triggered and after 7 msec (it is assumed that keybounce is over now) it returns and clocks the digit information into IC2121, which is a four bit register. Furthermore the monostable FF IC2124a is triggered by IC2124b and thereby allows the oscillator IC2133d to start. Now the digit information in IC2121 is fetched via IC2122 and clocked into the register IC2107 on the positive edge of the clockpulses. IC2122 is an eight input multiplexer. The output Y_0 is connected to one of the inputs D_1 - D_8 of which one is selected with the code on inputs A, B, C. IC2122 is controlled by the counter IC2130 which counts up on the negative edge of the clockpulses to the shift register IC2107. When the counter reaches four it stops the oscillator via IC2127 and IC2131. Later the monostable FI IC2124a returns and clears the counter IC2130. Now the circuit is ready for another key press. The timing of the keyboard input is shown in fig.

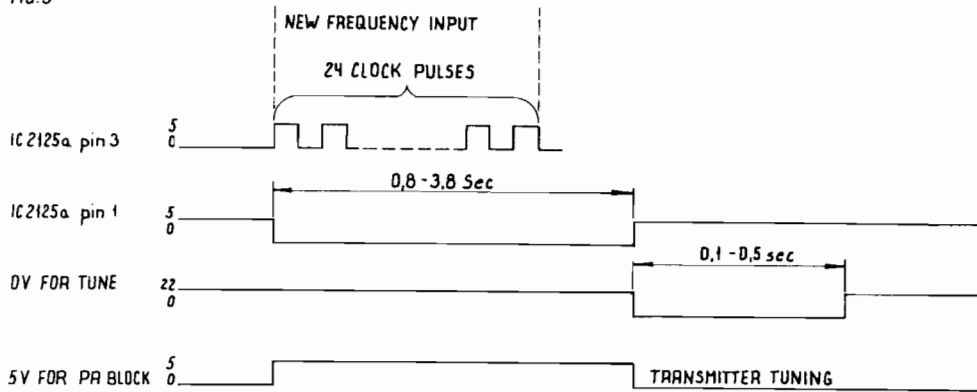
FIG. 2

TIMING OF FREQUENCY INPUT VIA KEYBOARDFREQUENCY INPUT FROM EXTERNAL EQUIPMENT

The external input mode is obtained when the input EXT. FRQ. CONTROL is grounded. Then IC2129b is cleared and IC2129a is pre-set and hereby the registers IC2107-IC2112 are ready for serial input. The serial data must consist of 24 data bits with corresponding clockpulses. The clock and datapulses are shaped in the Schmidt triggers IC2133b and IC2133a. To avoid disturbance from the keyboard, IC2122 is cleared on pin 7 and IC2124b on pin 11.

At external frequency input the PA-stage is blocked when the first clock-pulse arrives, and when the read-in is over, a tune information is sent to the PA-stage, if the HTON input is held on 22V. If HTON is low at the end of a read-in the transmitter will not tune automatically, but now it will tune when HTON is turned on 22V. The circuit which handles the above-mentioned events consists of IC2125a, IC2125b and surrounding components. The actual timing of transmitter blocking and tuning is shown in fig. 3.

FIG. 3



THE SHOWN DIAGRAM IS ONLY VALID IF HT ON = 22V AND EXTERNAL FREQUENCY INPUT IS SELECTED WHICH CAUSE IC2125a's pin 5 ON DV.

GENERATION OF THE FIVE BIT CODE (T, V, X, Y, Z)

The five bit code is programmed in the PROMs IC2114 and IC2115. The frequency information from 10 MHz, 1 MHz and 100 kHz digits is used to address one of the two PROMs. In this way it is possible to change band code in 100 kHz steps. The 10 MHz and 1 MHz BCD-codes are in a BCD to binary converter IC2216 and IC2118 transformed to a binary code which addresses the PROMs, besides this circuit selects the PROM which has to be active. The BCD to binary conversion takes place in an adder IC2116. A fixed figure (depending on 10 MHz input) on the B-input of the adder is added to the 1 MHz input on the A-input. This results in a binary representation of the BCD-digits at 10 and 1 MHz. The used figures on input B are shown in table 1. To 2182 kHz fixed corresponds a special band code which is obtained by turning high the address inputs A_2 and A_3 on IC2114 and IC2115.

Additionally the PROMs contain a blocking possibility for the PA-stage with 100 kHz steps. To block the transmitter it is necessary to programme a "1" in the output 1 on the desired 100 kHz steps. The blocking takes place via T2105 and T2101.

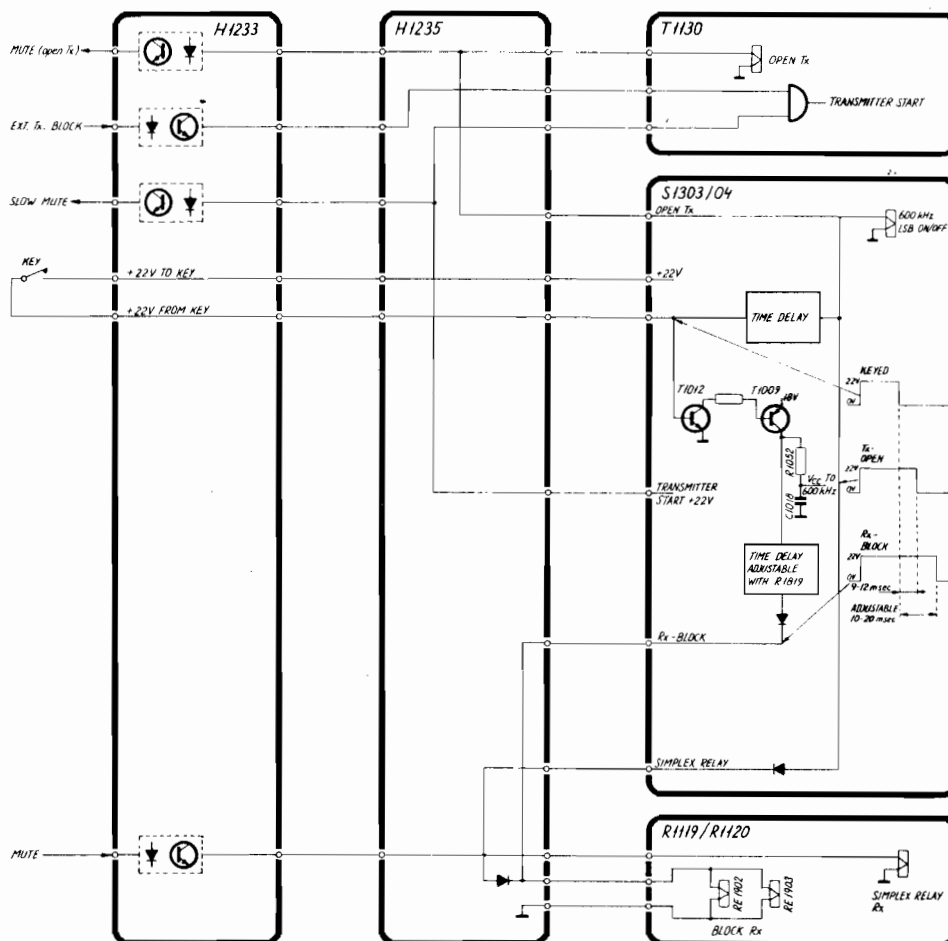
TABLE 1

FREQUENCY	B ₄ B ₃ B ₂ B ₁	B-Input on ADDER IC2116
$0 \leq f < 10$ MHz	0 0 0 0	IC2115 selected
$10 \leq f < 20$ MHz	1 0 1 0	IC2114 selected
$20 \leq f < 30$ MHz	0 1 0 0	

DISPLAY DRIVER

The display is a LCD display which demands an alternating voltage across every segment. A segment is turned on if the alternating voltage on the backplane is out of phase with the alternating voltage on the segment in question, and the segment is off if the voltages are in phase. The oscillator IC2133c runs at 100 Hz which is divided by two in IC2126b. The 50 Hz signal is led to the backplane driver 3/4 IC2132 via a level shifter T2112. Additionally the 50 Hz signal is used in the segment drivers IC2101-IC2106 which converts the BCD-input to a seven segment code, and with an alternating output voltage for the LCD segments. The point in the display is driven from 1/4 IC2132 and the state of it (ON/OFF) is established by IC2126a. Depending of the logic state on pin 13 of IC2123 the exclusive - or gate acts as an inverter or a non-inverter and hereby turns the point on or off.

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 msec 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 msec 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.

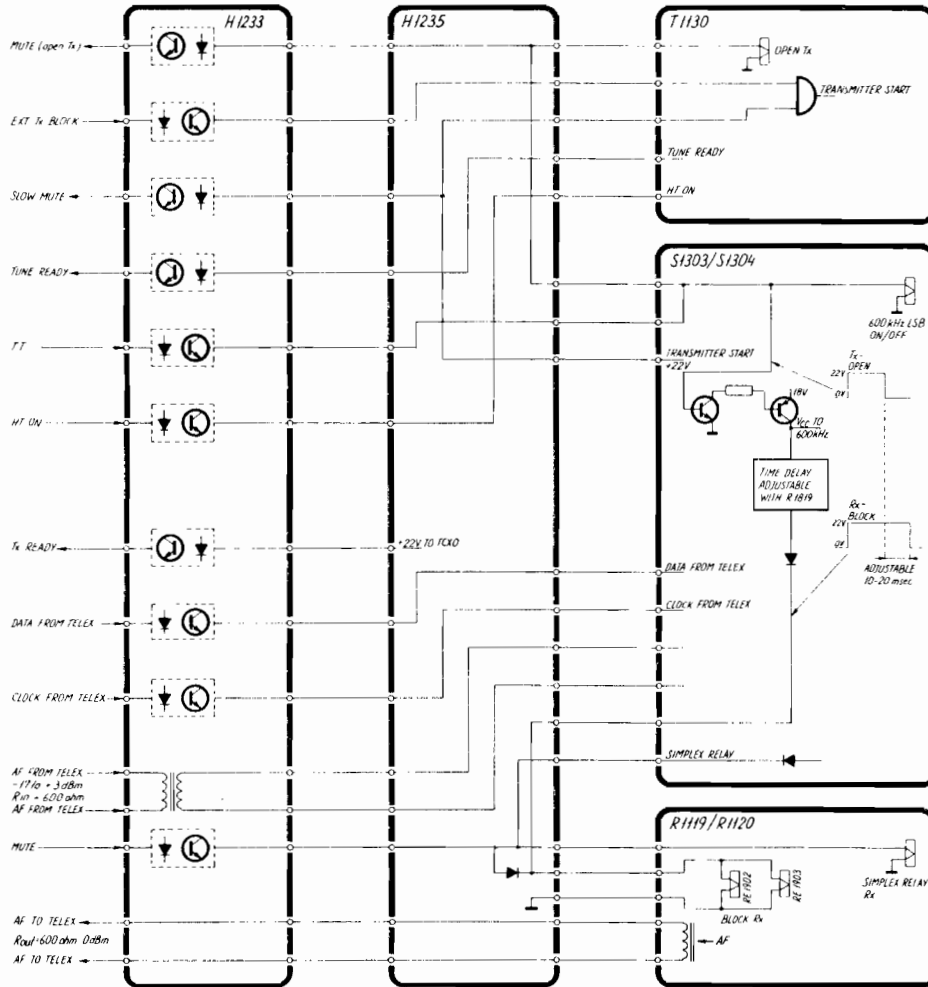
MUTE (open TX):

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 msec 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 msec which secures a good reception with only 20 dB attenuation between the receiver and the transmitter aerials.

PRINCIPAL DESCRIPTION OF TELEX MODE cont.:

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.

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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

01 02 03 04 05 06 07 08

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.

PROGRAMMING OF S1304 FREQUENCIES cont.:

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

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SERVICE

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

1. MAINTENANCE

1.1.

When the SAILOR SHORT WAVE PROGRAMME 1000/B has been correctly installed, the maintenance can, depending on the environment and working hours, be reduced to a performance check at the service workshop at intervals not exceeding 5 years. A complete performance check list is enclosed in the PERFORMANCE CHECK section.

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

Along with each set a TEST SHEET is delivered, in which some of the measurements 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

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

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NECESSARY TEST EQUIPMENT cont.:

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

S1302/05/04 A7/4

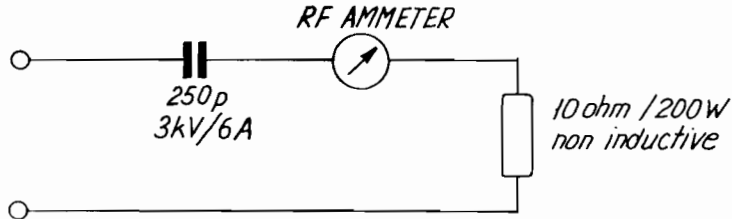
NECESSARY TEST EQUIPMENT cont.:

TX	EXC	RX	PS
X	X		
X			

DUMMY LOAD for HF bands, 4 - 25 MHz:

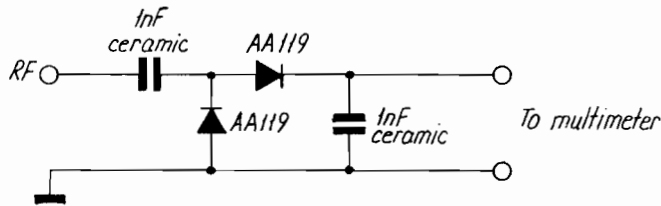
Impedance 50 ohm
 Frequency range 4 - 25 MHz
 Power range 400W
 SWR 1:1.2
 E.g. Bird Termaline Coaxial Resistor Model 8401

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

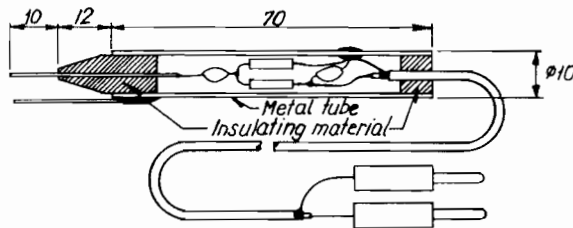


E.g. Draloric type 06-1291TD 20x50L 8KV 250 pF $\pm 20\%$ R85
 E.g. 10 pcs. Dale type PH-25A-17, 100 ohm, 5%, 25W

DIODE PROBE

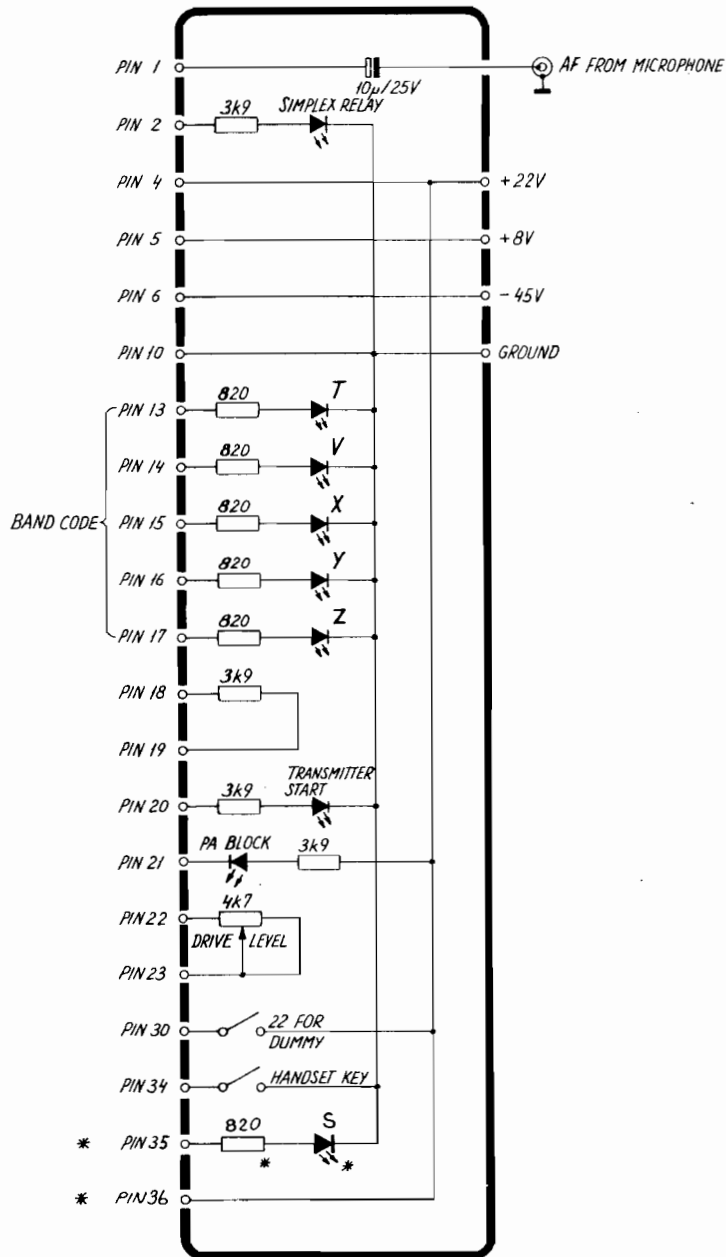


LAYOUT OF THE PROBE



S1302 A7/5

SCHEMATIC DIAGRAM FOR TESTBOX S1302/03/04

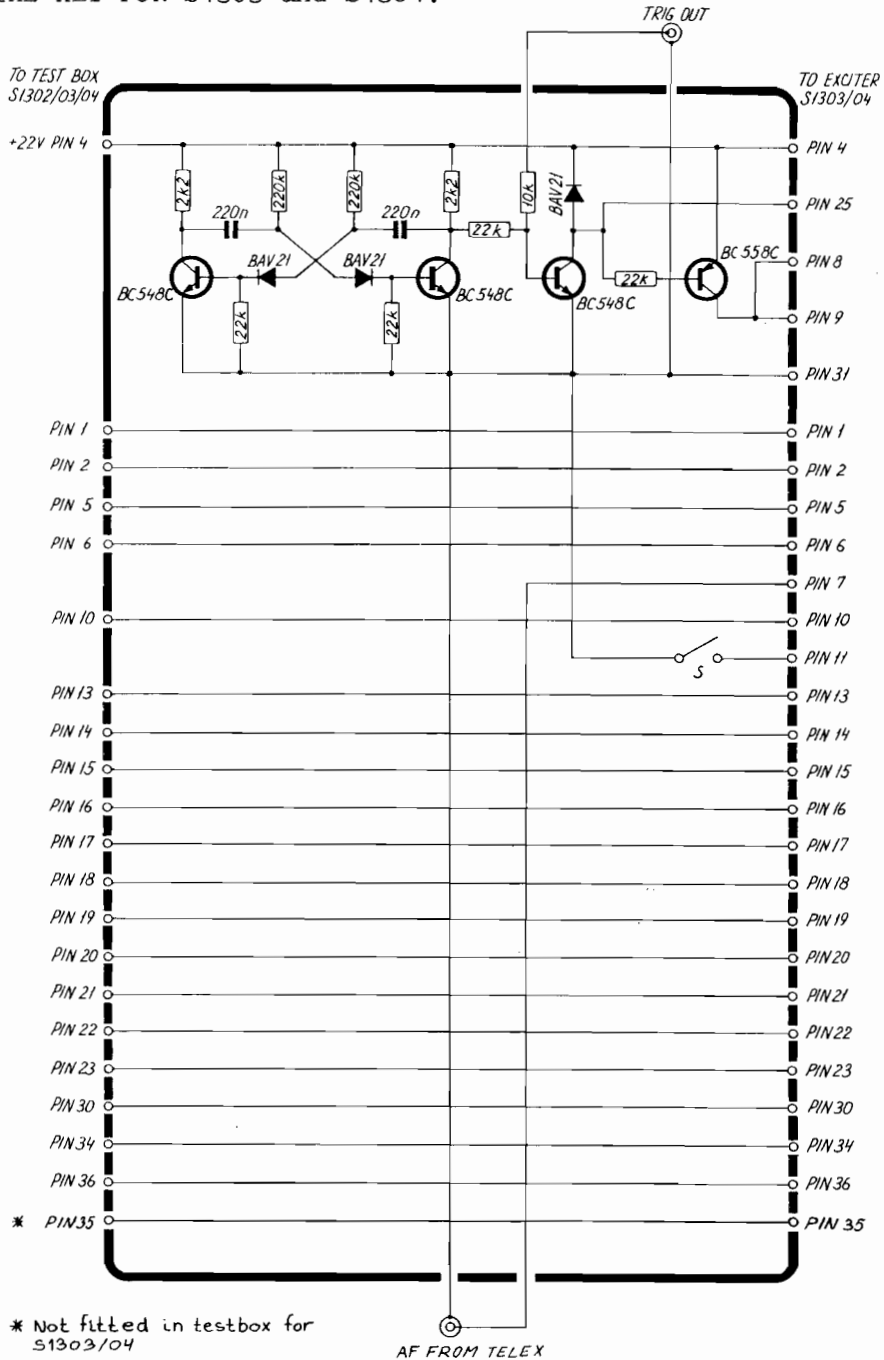


* Not fitted in testbox for S1303/04

- TVXYZ: The diodes are a light according to the chosen bandcode.
- TRANSMITTER START: The diode is a light when handset key is activated, when TUNE, and in SEND ALARM. In S1303/04 the diode is a light in TELEX and in TELEGRAPHY.
- PA BLOCK: The diode is a light 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 a light when TUNE is activated in 2182 kHz + handset key is on, and in SEND ALARM.

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4-0-23878

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 ADJUSTMENT AFTER REPAIR to see, whether the unit has to be adjusted or not.

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

TROUBLE-SHOOTING IN THE FREQUENCY GENERATING CIRCUIT

LOOP 1

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

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

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

1. Check the Loop 1 mixer output signal on the terminal "Loop 1 out".
 - a. If there is no output signal, the failure is on Loop 1 mixer, harmonic filter unit or VCO unit.
 - b. If the output frequency is approx. 2 MHz or approx. 5 MHz, the VCO unit Loop 1 mixer and the harmonic filter unit are apparently ok.
2. Check that the frequency on the phase/frequency detector IC106, pin 1 is 1 kHz.

3. Check the Loop 1 programmable divider.
 - a. If the frequency on the input terminal "Loop 1 in" is approx. 2 MHz and the frequency on the phase/frequency detector IC106, pin 3 is lower than 1 kHz, the programmable divider is apparently ok.
 - b. If the frequency on the input terminal "Loop 1 in" is approx. 5 MHz and the frequency on the phase/frequency detector IC106, pin 3 is higher than 1 kHz, the programmable divider is apparently ok.
4. Check the phase/frequency detector IC106.
 - a. Measure 1.5V DC on the terminal "PD1 (1.5V) out" on divider unit.
 - b. If the input frequency on IC106, pin 3 is higher than 1 kHz and the DC voltage on the terminal "PD1 out" on divider unit is approx. 0.7V, the phase/frequency detector is apparently ok.
 - c. If the input frequency on IC106, pin 3 is lower than 1 kHz and the DC voltage on the terminal "PD1 out" on divider unit is approx. 2.3V, the phase/frequency detector is apparently ok.
5. Check the integrator IC202 on Loop 1 filter & +18V supply unit.
 - a. If the DC voltage on the terminal "PD1 in" is approx. 0.7V and the DC voltage on output terminal of IC202, pin 6 is approx. -4V, the integrator IC202 is apparently ok.
 - b. If the DC voltage on the terminal "PD1" is approx. 2.3V and the DC voltage on the output terminal of IC202, pin 6 is approx. -17V, the integrator IC202 is apparently ok.
6. If the failure has not been found yet the 1 kHz loop filter IC201 and the wirings to the VCO must be checked.

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 VCX0 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.

S1302/03/04 A8/3

4. PERFORMANCE CHECK FOR S1303/04

Before executing the performance check the exciter must be connected to the power supplies +22V, +8V, and -45V (N1405) via the testbox S1303/04 and the artificial key for S1303/04. These two test boxes must be connected in series. The RF output connector must be loaded with 50 ohm.

It is necessary to change the proms IC702, IC2114, IC2115 with the supplied test proms.

The test proms have the following check sums: IC702 "0FDA", IC2114 "D674", IC2115 "DD6C".

The following performance check steps start with the selected frequency and the selected modulation mode of the exciter, e.g. A1, tune.

4.1. DC CONTROL

- 4.1.1.
Connect voltmeter to TP1.
- 4.1.2.
Check the voltage to be within 18V
+/-0.2V.
- 4.1.3.
Connect voltmeter to TP2.
- 4.1.4.
Check the voltage to be within -18V
+/-0.2V.
- 4.1.5.
Connect voltmeter between TP1 and
TP3.
- 4.1.6.
Check the voltage to be within 100
mV.
- 4.1.7.
Connect voltmeter to TP31.
- 4.1.8.
Check the voltage to be within 5V
+/-0.2V.
- 4.1.9.
Connect voltmeter to TP33.
- 4.1.10.
Check the voltage to be within 5V
+/-0.2V.

4.2. TCXO CONTROL

- 4.2.1.
Connect frequency counter to TP4.
- 4.2.2.
Check the frequency to be within 10
000 000 Hz +/-1 Hz.
- 4.3.
KEYBOARD AND DISPLAY.
 - 4.3.1.
Press the keyboard C, the display
shows 000000.
 - 4.3.2.
Press the keyboard 1 six times. The
display shows 111111.
 - 4.3.3.
Repeat 4.3.2. for 0.2.3.4.....
and 9.
 - 4.3.4.
Press the keyboard point. The display
shows 99999.0.
 - 4.3.5.
Press the keyboard 9. The display
shows 99999.9.
 - 4.3.6.
Check that the illegal frequency lamp
is illuminated.
 - 4.3.7.
Set the switch on the artificial key
in position OFF.

PERFORMANCE CHECK FOR S1303/04 cont.:

4.3.8.
Set the display input switch in position EXT.FRQ.CONTROL.

4.3.9.
Check that the display is empty except for the point, and that the EXT.FRQ.CONTROL lamp is illuminated.

4.3.10.
Set the switch on the artificial key in position ON.

4.3.11.
Check that the display shows 00000.0.

4.3.12.
Set the display input switch in position 2182 kHz selected.

4.3.13.
Check that the display shows 02182.0.

4.3.14.
Set the display input switch in position keyboard.

4.4.
VCO SELECTOR:
The band select output code is controlled.

4.4.1.
Set the frequency to 8500.0 kHz.

4.4.2.
Check that the diodes on the testbox indicates the code
ZYXVZ
01010

where a "1" represents an illuminated diode.

4.4.3.
Set the frequency to 19000.0 kHz.

4.4.4.
Check that the diode on the testbox indicates the code.
ZYXVZ
10101

where a "1" represents an illuminated diode.

4.4.5.
Set the frequency to 26000.0 kHz.

4.4.6.
Check that the 2182.0 kHz lamp is alight.

4.4.7.
Activate the key switch on the testbox.

4.4.8.
Check that the transmitter starts and the simplex relay lamps are alight.

4.4.9.
Activate the 22V for dummy switch on the testbox.

4.4.10.
Check that the PA block lamp on the testbox is alight.

4.4.11.
Set the 22V for dummy switch in neutral position.

4.5.
HARMONIC FILTER AND VCO.
Load TP26 with 68 ohm.

4.5.1.
Connect frequency counter to TP30.

4.5.2.
Connect voltmeter to TP6.
Connect voltmeter to TP7.

4.5.3.
Go through the frequencies indicated in fig. 1 and check the above mentioned test points.

4.5.4.
In the A positions read 4698 kHz.
In the B positions read 2699 kHz.

4.5.5.
In all positions check that the TP6 voltage is below 3.5V.

4.5.6.
In A positions check that the TP7 voltage is 15V \pm 1V and in B positions check that the TP7 voltage is above 5.0V.

4.5.7.
Disconnect the 68 ohm load from TP26.

PERFORMANCE CHECK FOR S1303/04 cont.:

VCO under test	Pos.	Freq.select
L315	A	1999.0
	B	0000.0
L313	A	3999.0
	B	2000.0
L314	A	5999.0
	B	4000.0
L306	A	7999.0
	B	6000.0
L304	A	9999.0
	B	8000.0
L305	A	13999.0
	B	12000.0
L309	A	17999.0
	B	16000.0
L307	A	23999.0
	B	22000.0
L308	A	25999.0
	B	24000.0

Fig. 1

4.6. STEP RESPONSE.

4.6.1. Connect oscilloscope to TP7.

4.6.2. Set the frequency to 2400.9 kHz, short-circuit black/yellow control wire on divider board to ground. Step response is seen on oscilloscope, compare to fig. 2.

4.6.3. Connect oscilloscope to TP8.

4.6.4. Set the frequency to 2400.9 kHz, short-circuit grey control wire on divider board to ground. Step response is seen on oscilloscope, compare to fig. 3.

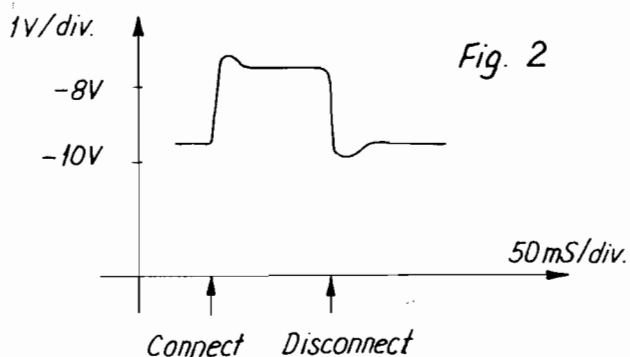


Fig. 2

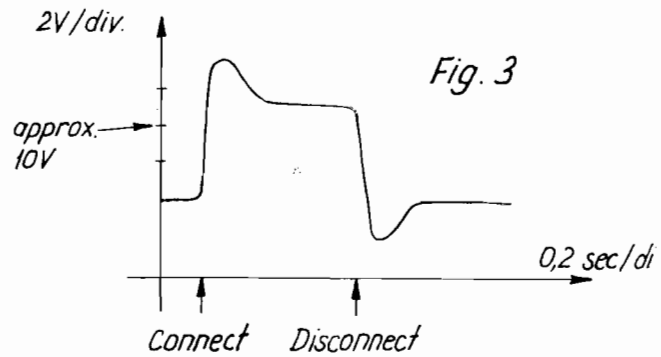


Fig. 3

4.7. LEVEL CHECK

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

4.7.2. Check the voltage to be above 1.7Vpp at the frequency 2000.5 kHz.

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

4.7.4. Check the voltage to be above 1.6Vpp at the frequency 2000.5 kHz.

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

4.7.6. Check the voltage to be above 2.5Vpp at the frequency 2000.5 kHz.

4.7.7. Connect voltmeter to TP8.

4.7.8. Check the voltage to be within 6V to 11V at the frequency 2000.5 kHz.

4.7.9. Check the voltages to be below 14.5V at the frequency 2000.0 kHz.

4.7.10. Check the voltage to be above 4V at the frequency 2000.9 kHz.

4.8.
MICROPHONE AMPLIFIER.

4.8.1.
Connect oscilloscope to TP12.

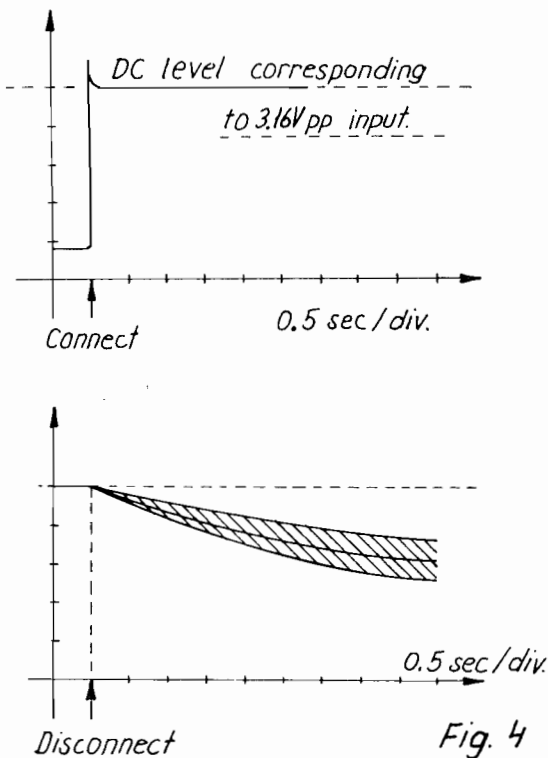
4.8.2.
Set the frequency to 2000.5 kHz and the mode switch to A3J (J3E), connect the tone generator (1000 Hz) to the testbox.

4.8.3.
Adjust the tone generator output voltage from a minimum, until the level at TP12 is just constant. This limitation must happen at approx. 1Vpp measured at TP25.

4.8.4.
Add 10 dB to tone generator (3.16Vpp) and check that the measured signal is approx. symmetrical clipped.

4.8.5.
The attack- and decay time of the microphone amplifier is measured on TP24, connect the oscilloscope to this TP.

4.8.6.
By connection and disconnection of the tone generator signal the measured voltage must be as shown on fig. 4a and b.



4.9.
OUTPUT LEVEL

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

4.9.2.
Set the frequency to 2000.5 kHz, tune, full power and power level potentiometer fully clockwise. Measure the output voltage to be within 4.2Vpp and 4.8Vpp.

4.9.3.
With the tune button activated, control that the tune lamp on the front plate is alight, and that the SIMPLEX RELAY lamp on the testbox is alight.

4.9.4.
Connect TP24 to ground.

4.9.5.
Press the tune button and adjust the power level potentiometer until there is full deflection (8 cm) on the oscilloscope. The output signal is symmetrical clipped.

4.9.6.
Disconnect TP24 from ground, the output signal seen on the oscilloscope is 7 cm and the signal is not clipped.

4.10.
POWER REDUCTION.

4.10.1.
Connect diode probe to TP21.

4.10.2.
Set the frequency to 2.000,0 kHz, A3H (H3E), full power, and activated key, check that the power level potentiometer on the testbox can change the output RF level between 10 and 13 dB.

4.10.3.
With power level potentiometer on the testbox fully clockwise, check the first power reduction step to be between 4 dB and 6 dB below full power, the second step 8 dB, the third step 12 dB to 18 dB and the fourth step 17 dB to 23 dB below full power.

3/4 A7/4

PERFORMANCE CHECK FOR S1303/04 cont.:

4.10.4.

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

4.11.

A3H, A3A, A2H, A1 and TELEX.

4.11.1.

Connect oscilloscope to TP21 via 1:10 probe.

4.11.2.

Select 2000.5 kHz, tune and full power, adjust power level potentiometer until there is full deflection (8 cm) on oscilloscope screen.

4.11.3.

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

4.11.4.

Connect tone generator, 1000 Hz and 3Vpp to microphone plug.

4.11.5.

Check the output in A3H, A3A, A2H and A3J to be within 7 cm pp. and 8 cm pp. on oscilloscope.

4.11.6.

Check the output in A1 to be within 5 cm pp. and 6.4 cm pp. on the oscilloscope.

4.11.7.

Select 2000.5 kHz and A3J. Connect tone generator, 1500 Hz and 3Vpp to the microphone plug and adjust the output level to full deflection (8 cm) on the oscilloscope screen. Connect tone generator to the artificial key.

4.11.8.

Select 2000.5 kHz and telex, and check that the peak amplitude of the output signal is within 7 cm pp. and 8 cm pp. on the oscilloscope.

4.11.9.

Connect pin 3 and pin 8 on IC1001 (mode switch board) and check that the peak amplitude of the output signal is within 5 cm pp. and 6 cm pp.

4.11.10.

Remove the pin 3 and pin 8 connection and press the tune knob for 10 secs.

4.11.11.

Check that the peak amplitude of the telex signal again is 7-8 cm pp.

4.12.

A2H OSCILLATOR AND DELAY UNIT.

4.12.1.

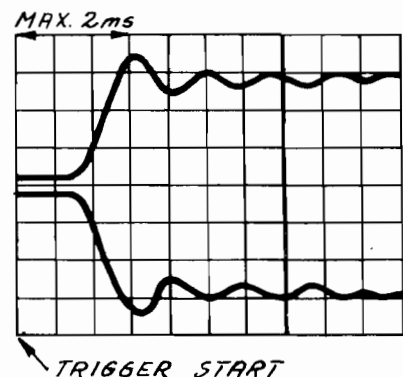
Connect frequency counter to TP32, and check the frequency to be within 455 Hz to 475 Hz in A2H position.

4.12.2.

Connect oscilloscope to TP21, and tone generator to the artificial key. Tone generator output: 1500 Hz and 3Vpp.

4.12.3.

Select 2000.5 kHz and telex, trig the oscilloscope from the artificial key, and check the output envelope on the oscilloscope with the figure below.

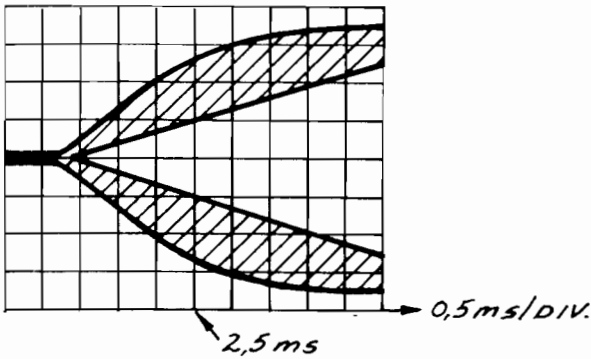


4.12.4.

Select 2000.5 kHz, A1 and oscilloscope sensitivity to 0.1V/div., adjust power level potentiometer until the steady state level is 8 cm pp. on the screen.

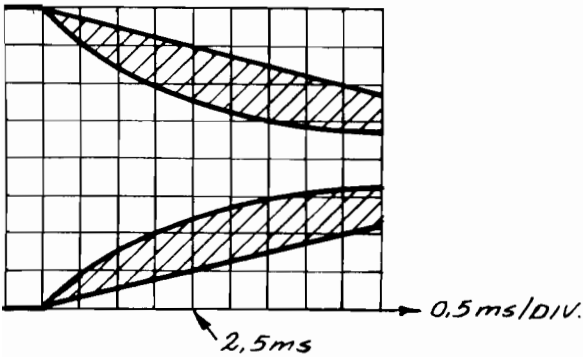
4.12.5.

Trig the oscilloscope from the artificial key and check the output envelope on the oscilloscope with the figure below.



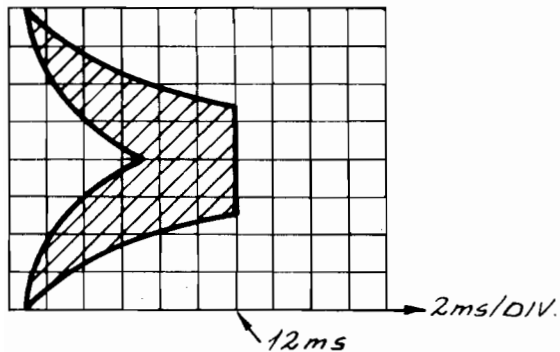
4.12.6.

Trig the oscilloscope on the opposite edge and check the output envelope with the figure below.



4.12.7.

Change sweep rate to 2 mS/div. and check the +22V from delay as indicated on the figure below.



4.12.8.

Connect the oscilloscope to TP35 and trig the oscilloscope from the artificial key. Load TP35 with 1 kohm.

4.12.9.

Check that the RX block pulse stays at +22V for a time period between 6 msec and 20 msec after key-off.

4.13.

BANDPASS FILTER UNIT

Lowpass filters and bandpass filters are checked as described in adjustment procedure 5.11.

4.14.

ALARM TONE GENERATOR

4.14.1.

Connect oscilloscope to TP22 via 1:10 probe.

4.14.2.

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

4.14.3.

Connect oscilloscope to TP11 via a 1:10 probe.

4.14.4.

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

4.14.5.

Connect the counter to TP11 via 1:10 probe.

4.14.6.

Connect TP22 to ground (pin 8 of IC1308). Check the frequency to be 1300 Hz +/- 10 Hz.

4.14.7.

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

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

4.15.	FREQ. (MHz)
FREQUENCY RESPONSE	
Frequency responses from LF input (on testbox) to the RF output is measured as described in adjustment procedure 5.9.1. and 5.9.3.	2888.8 4444.4 12300.0 22200.0 25000.0 5999.0 16799.0

4.16.
DISTRESS

4.16.1.
Connect the oscilloscope to TP21. Switch the frequency to 2182.0 kHz.

4.16.2.
Press alarm and test alarm at the same time.

4.16.3.
The distress signal can now be seen on the oscilloscope. The time from start of alarm signal until it automatically disappears is checked by a watch to be approx. 45 secs. Control that the modulation index is at least 0.7.

4.16.4.
When the alarm tone signal is seen on the oscilloscope press the tune button and check that the peak to peak voltage now seen is approx. the same as that of the alarm tone signal.

4.17.
FREQUENCY SELECTION

4.17.1.
Change the proms IC702, IC2114 and IC2115 from the test prom to the prom supplied with the exciter.

4.17.2.
Press the A3H (H3E) button and disconnect the AF tone generator on the test box.

4.17.3.
Connect the frequency counter to TP21 via a 1:10 probe.

4.17.4.
With the frequencies shown below control the frequencies.

4.17.5.
Connect the oscilloscope to TP21 and switch the DISPLAY INPUT SWITCH to position 2182 selected.

4.17.6.
Control that the diode 2182 kHz selected is alight.

4.17.7.
Turn the POWER REDUCTION button counter clockwise and control by means of the oscilloscope that the power is not reduced and that the power reduction lamp is not alight.

4.17.8.
Set the DISPLAY INPUT SWITCH to position keyboard. Check that the illegal frequency lamp is alight.

4.17.9.
Set the frequency to 4125.0 kHz and check that the illegal frequency lamp is not alight.

4.18.
FREQUENCY CHECK (only S1304)

4.18.1.
Reconnect the plugs from the frequency, check unit on the frequency control unit.

4.18.2.
Key-in the frequencies of the frequency table placed beside the short wave set or in the operating instruction manual.

4.18.3.
Check that the illegal frequency lamp is not alight when an allowed frequency is keyed-in.

5. ADJUSTMENT PROCEDURE FOR S1303/04

Before executing adjustment procedure the exciter must be connected to the power supplies +22V, +8V and -45V via the testbox S1303/04 and the artificial key for S1303/04. These two test boxes are connected in series. The RF output connector must be loaded with 50 ohm.

It is necessary to change the PROM's IC702, IC2114, IC2115 with the supplied test points.

The following adjustment steps start with the selected frequency and the selected modulation mode of the exciter e.g. A1 tune.

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

5.1. DC ADJUSTMENTS.

5.1.1.
Connect voltmeter to TP1.

5.1.2.
Adjust R902 to +18V.

5.1.3.
Connect voltmeter to TP2.

5.1.4.
Adjust R209 to -18V.

5.1.5.
Connect voltmeter between TP1 and TP3.

5.1.6.
Adjust R214 to less than 100 mV.

5.2. TCXO

5.2.1.
Connect frequency counter to TP4.

5.2.2.
Adjust R112 to 10 000 000 +-1 Hz.

5.3. VCO OSCILLATOR.

5.3.1.
Disconnect the VCO output coaxial cable and connect a 50 ohm resistor to the VCO output terminal (VCO OUT).

5.3.2.
Connect a voltmeter to VCO CONTROL IN.

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

5.3.4.
Select each VCO coil unit by keying-in the frequencies listed below.

5.3.5.
The VCO coil unit is adjusted by turning the core of the selected coil until voltage reaches the value -15.0V +-1V.

fTX (MHz)	VCO coil
1.999	L315
3.999	L313
5.999	L314
7.999	L306
9.999	L304
13.999	L305
17.999	L309
23.999	L307
25.999	L308

5.3.6.
Connect an oscilloscope to the 50 ohm resistor at the VCO output terminals.

5.3.7.
Key-in the frequencies listed below and control that the oscilloscope voltage is 1.5Vpp +-0.4Vpp and control that the voltmeter shows -8 +-2V DC.

ADJUSTMENT PROCEDURE FOR S1303/04
cont.:

f _{TX} (MHz)	VCO coil
0.000	L315
2.000	L313
4.000	L314
6.000	L306
8.000	L304
12.000	L305
16.000	L309
22.000	L307
24.000	L308

5.3.8.
Disconnect the 50 ohm resistor at the VCO output terminals.
Connect the VCO output coaxial cable again.

5.4.
HARMONIC FILTERS.

5.4.1.
Load TP26 with 68 ohm.

5.4.2.
Connect voltmeter to TP7.

5.4.3.
Turn core of each coil to the level of the coil former.

5.4.4.
Select each harmonic filter by keying-in the frequencies specified in 5.4.11.

5.4.5.
The harmonic filters are adjusted by turning the core of the selected coil until the voltage reaches the value -15V +-1V.

5.4.6.
Connect voltmeter to TP6.

5.4.7.
Execute 5.4.11. and adjust each selected coil to minimum voltage (AGC-voltage). This voltage must be 1.5V +-0.5V.

5.4.8.
Connect voltmeter to TP7.

5.4.9.
Execute 5.4.11. and check that the voltage is -15V +-1V.

5.4.10.
Disconnect 68 ohm load.

5.4.11.

f_{TX} (MHz) Selected harmonic filter (MHz)

1.999	8	L403
3.999	10	L402
5.999	12	L401
7.999	14	L404
9.999	16	L405
13.999	20	L406
17.999	24	L407
23.999	30	L409
25.999	32	L408

5.5.
MICROPHONE AMPLIFIER.

5.5.1.
2000.5 kHz, A3J (J3E). Connect tone generator, 1000 Hz and 1V_{pp} measured on TP25.

5.5.2.
Connect oscilloscope to TP12.

5.5.3.
Turn R1201 fully counter clockwise and then clockwise until the measured level is just constant.

5.5.4.
Add 10 dB to tone generator output 1V_{pp}.

5.5.5.
Adjust R1224 for symmetrical clipping.

5.5.6.
Connect oscilloscope to TP13.

5.5.7.
Change to tune position.

5.5.8.
Adjust R1232 to 80 mV_{pp}.

5.6.
SIGNAL PATH.

5.6.1.
2000.5 kHz, A3J (J3E), handset key on, with no input from tone generator. Connect oscilloscope to TP9 via 1:10 probe.

5.6.2.
Adjust L101, L1101, and L1102 for max.

5.6.3.
Adjust R1125 and C1123 for min. This adjustment must be repeated until the measured signal is almost a 1.2 MHz Sine.

5.6.4.
Turn power level potentiometer fully clockwise.

5.6.5.
Connect oscilloscope to TP23 via 1:10 probe.

5.6.6.
Adjust R1625 to min.

5.6.7.
2000.5 kHz, tune full power. Connect oscilloscope to TP21 via 1:10 probe. If the signal is clipped reduce output until it is undistorted.

5.6.8.
Adjust L1106, L601, L1603 and L1604 for max.

5.6.9.
Connect oscilloscope to TP6 via 1:10 probe.

5.6.10.
Turn R1149 fully clockwise.

5.6.11.
Adjust R1158 until there is full deflection (8 cm) on oscilloscope screen. The signal seen on the oscilloscope is symmetrical clipped.

5.6.12.
Adjust R1149 until the deflection seen on the oscilloscope is 7 cm. The signal seen is not clipped.

5.6.13.
Connect oscilloscope to TP17 via 1:10 probe and set the output to max. by turning the power level meter fully clockwise.

5.6.14.
Adjust R1158 to 350 mVpp.

5.6.15.
Connect oscilloscope to TP20 via 1:10.

5.6.16.
Adjust R1631 to 2.8 Vpp.

5.6.17.
Connect oscilloscope to TP21 via 1:10 probe.

5.6.18.
Adjust R1534 to 4.5 Vpp.

5.6.19. (USA version only)
Connect oscilloscope to TP20 via 1:10 probe.

5.6.20. (USA version only)
Adjust R1631 to 1.4 Vpp.

5.6.21. (USA version only)
Connect oscilloscope to TP21 via 1:10 probe.

5.6.22. (USA version only)
Adjust R1534 to 4.5 Vpp.

5.7.
A3H AND A2H LEVEL.

5.7.1.
Connect frequency counter to TP32.

5.7.2.
2000.5 kHz, A2H. Adjust L1801 to 465 Hz \pm 5 Hz.

5.7.3.
2000.5 kHz, tune and full power. Connect oscilloscope to TP21 via 1:10 probe.

5.7.4.
Adjust power level potentiometer to full screen (8 cm).

ADJUSTMENT PROCEDURE FOR S1303/04
cont.:

5.7.5.
Change to A3H without modulation.
Adjust the A3H carrier now seen to
4.4 cm with R1109.

5.7.6.
Change to A2H and adjust R1806 until
the A2H signal now seen is 8 cm pp.

5.7.7.
Connect oscilloscope to TP35 and
trig the oscilloscope from the arti-
ficial key and load TP35 with 1
kohm.

5.7.8.
2000.5 kHz, A1. Adjust the voltage
now seen to be +22V for a time per-
iod of 10 mS +-1 mS on the potenti-
ometer R1819.

5.8.
ALARM GENERATOR.
No adjustments to be executed. For
a performance check execute point
4.11 and 4.13.

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

5.9.
600 kHz SSB FILTER.

5.9.1.
2000.5 kHz, tune. Connect oscillo-
scope to TP21 via 1:10 probe.

5.9.2.
Adjust L1104 and L1105 for max.

5.9.3.
Control of filter response is car-
ried out in mode A3J (J3E), with
tone generator connected to the test
box, output 3Vpp measured on TP25.

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

5.9.4.
2000.5 kHz, TUNE. Turn the power
level potentiometer fully clockwise.
Go through 5.6.9. - 5.6.22. and
5.7.1. - 5.7.3.

5.10.
10.7 MHz FILTER.

5.10.1.
598.0 kHz, A3H (H3E) without modula-
tion. Disconnect inner core of coax-
ial cable W1/6-16. 1 .

5.10.2.
Connect point 1 to point 5 on mixer-
board with an external wire.

5.10.3.
Connect oscilloscope to TP19 via
1:10 probe.

5.10.4.
Adjust L1601 and L1602 to max.

5.10.5.
Adjust slightly L1601 and/or L1602
until the amplitude is the same
within +-0.25 dB at the frequencies
595.0 kHz, 598.0 kHz and 601.0 kHz.

5.10.6.
Remove wire between 1 and 5 , re-
connect W1/6-16.

5.10.7.
2000.5 kHz, tune. Turn the power
level potentiometer fully clockwise,
Go through 5.6.7. to 5.6.8. without
the adjustment of L1106 and L601,
and go through 5.6.13. - 5.6.22.

5.11.
LOWPASS FILTER AND BANDPASS FILTER
UNIT.

5.11.1.
4500.0 kHz, A3H (H3E) without modu-
lation. Disconnect the 50 ohm load
at the RF output terminal and con-
nect an oscilloscope to TP21 via
a 1:1 probe.

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

5.11.3.
With max. sensitivity on the oscilloscope adjust L1501 to min. output voltage.

5.11.4.
Set the frequency to 9999.9 kHz.

5.11.5.
Adjust L1502 to min. output voltage.

5.11.6.
Reconnect the wires W1/15-16 and W1/3-16.

5.11.7.
6600.0 kHz, A3H (H3E) without modulation.

5.11.8.
Adjust L1503 to max. output voltage.

5.11.9.
9000.0 kHz, A3H (H3E) without modulation.

5.11.10.
Adjust L1504 to max. output voltage.

5.11.11.
Reconnect the 50 ohm load at the RF output terminal.

5.11.12
1600.0 kHz, A3H (H3E) without modulation, connect diode probe to TP21.

5.11.13.
Adjust power level potentiometer until 0.775V, corresponding to 0 dB on the decibel scale, is attained.
Set the frequency to 1800.0, 2400.0, 4299.0 and 6600.0 kHz and control that the output difference does not exceed 0.6 dB.

5.11.14.
8500.0 kHz, A3H (H3E) without modulation. Control that the output voltage is between -1 dB and +0.5 dB with reference to the adjustment in 5.11.13.

5.11.15.
A3H (H3E) without modulation.

5.11.16.
Set the frequency to A = 12330.0 kHz, B = 12491.0 kHz and C = 12652.0 kHz and execute 5.11.20.

5.11.17.
Set the frequency to A = 16460.0 kHz, B = 16660.0 kHz and C = 16859 kHz, and execute 5.11.20.

5.11.18.
Set the frequency to A = 22000.0 kHz, B = 22156.0 kHz and C = 22311.0 kHz, and execute 5.11.20.

5.11.19.
Set the frequency to A = 25070.0 kHz, B = 25090.0 kHz and C = 25110.0 kHz, and execute 5.11.20.

5.11.20.
The frequencies for the bandpass filter adjustments is chosen so that the center frequency is in position B, and band limits in position A and C.

Every single bandpass filter must be adjusted to max. output. The output must be within ± 0.25 dB in A and C relative to B and the deflection on the center frequency position B must be between -1.0 dB and +0.5 dB with reference to the adjustment in 5.11.13.

5.11.21.
1A TUNE. Turn the power level potentiometer fully clockwise. Go through 5.6.15. - 5.6.22.

5.12.
OUTPUT FILTER.

5.12.1.
0000.0 kHz, A3H (H3E) without modulation. Connect oscilloscope to TP21 via 1:1 probe (wire).

ADJUSTMENT PROCEDURE FOR S1303/04
cont.:

5.12.2.

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

5.12.3.

Connect the 6 brown/black wire to the 4 red/black wire on the band filter board.

5.12.4.

Turn the potentiometer R1534 fully counter clockwise.

5.12.5.

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

5.12.6.

Reconnect the wires of point 5.12.2. - 5.12.3. at their proper place.

5.12.7.

2000.5 kHz, TUNE. Turn the power level potentiometer fully clockwise. Go through 5.6.17. - 5.6.22.

5.13.

VCO FILTER (only in USA).

5.13.1.

13.999,0 kHz, A3J (J3E). Connect oscilloscope to the inner core of coaxial cable 5 W1/3-16 (the VCO input to mixer unit).

5.13.2.

Disconnect the wires connected to the 6 MHz LP and 9 MHz LP on the VCO filter unit and connect the 6 MHz LP terminal to +18V DC.

5.13.3.

Adjust L2204 to minimum output.

5.13.4.

Set the frequency to 23300.0 kHz.

5.13.5.

Adjust L2202 to minimum output.

5.13.6.

Set the frequencies to 1600.0 kHz and 8500.0 kHz and control that the VCO signal is not attenuated through the VCO filter.

5.13.7.

Reconnect the wires of point 5.13.2. at their proper place.

S1303/4
A6/6

6. NECESSARY ADJUSTMENTS AFTER REPAIR FOR S1303/04

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

6.1. DIVIDER UNIT

Execute 4.1.7. - 4.1.18, 5.2. and adjust L101 as described in 5.6.1. and 5.6.2. Check 4.6., 4.9., 4.16. and 4.17.1. - 4.17.4.

6.2. LOOP 1 FILTER & +-18V POWER SUPPLY

Execute 5.1.
Check 4.5., 4.6.1. and 4.6.2.

6.3. VCO UNIT OR LOOP 1 MIXER

Execute 5.3.
Check 4.5., 4.6.1. - 4.6.2. and 4.17.1. - 4.17.4.

6.4. HARMONIC FILTER

Execute 5.4.
Check 4.5. and 4.17.1. - 4.17.4.

6.5. VCXO AND LOOP 2 FILTER

Execute 5.6.7. - 5.6.8. without adjusting L1106, L1603 and L1604.
Execute 5.6.15. - 5.6.22.
Check 4.6.3. - 4.6.4.
Check 4.7.5. - 4.7.10.

6.6. VCO SELECTOR

Check 4.4. and 4.17.1. - 4.17.4.

6.7. FILTER BOARD

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

6.8. MODE SWITCH

Perform a FUNCTION CHECK 7.

6.9. SSB GENERATOR

Execute 5.6. without adjusting L101, L601, L1603 and L1604.
Execute 5.7.

6.10. MICROPHONE AMPLIFIER

Execute 5.5., 5.6.9. - 5.6.22. and 5.7.
Check 4.8.

6.11. ALARM SIGNAL GENERATOR

Check 4.14. and 4.16.

6.12. OUTPUT FILTER

Execute 5.12.

6.13. LP AND BP FILTER

Execute 5.11. and 5.6.15. - 5.6.22.
Check 4.17.1. - 4.17.4.

6.14. MIXER UNIT

Execute 5.6.4. - 5.6.22. without adjusting L1106 and L601.

6.15. A2H, OSCILLATOR AND DELAY UNIT

Execute 5.7. without adjusting R1109.

NECESSARY ADJUSTMENTS AFTER REPAIR FOR S1303/04 cont.:

6.16.
FREQUENCY CONTROL
Check 4.1.9. - 4.1.10, 4.3. and 4.17.
and perform a FUNCTION CHECK 7.

6.17.
POWER SWITCH
Perform a FUNCTION CHECK 7.

6.18.
VCO FILTER (only USA version)
Execute 5.13. and perform a FUNCTION
CHECK.

6.19.
KEYBOARD
Check 4.3. and perform a FUNCTION
CHECK 7.

6.20.
FREQUENCY CHECK
Check 4.18. and perform a FUNCTION
CHECK 7.

S1303/4 A2/2

7. FUNCTION CHECK FOR S1303/04

7.1.1.

Connect the testbox S1303/04 and the artificial key S1303/04 to the exciter. Connect the power supplies and an AF tone generator to the testbox. The RF output connector must be loaded with 50 ohm.

7.1.2.

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

7.1.3.

Set exciter to A3H (H3E) full power, power level potentiometer on testbox fully clockwise and no modulation. Set the handset key placed on the testbox in position ON.

7.1.4.

Measure the RF output carrier frequency one in each band but in the CT band one frequency below and one frequency above 2 MHz.

Compare the measured frequencies to the frequency table, placed beside the short wave set or in the operating instruction manual.

The frequency accuracy must be within 1.0 ppm.

7.2.1.

Connect a diode probe to the RF output connector.

7.2.2.

Change to TUNE position and set the handset key on the testbox in off position.

7.2.3.

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

7.2.4.

In tune position the tune lamp must be alight. The transmitter start - and simplex relay lamp on the testbox must be alight.

7.2.5.

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

7.2.6.

Change to A3H (H3E).

With the power level potentiometer on the testbox fully clockwise, set the handset key on the testbox in ON position.

Check the first power reduction step to be between 4 dB and 6 dB below full power, the second step 8 dB to 12 dB, the third step 12 dB to 18 dB and the fourth step 17 dB to 23 dB below full power.

7.2.7.

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

7.2.8.

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

7.3.1.

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

7.3.2.

Supply 1500 Hz and 3.16V RMS to the AF input plug on the testbox S1303/S1304.

7.3.3.

Adjust the power level potentiometer on the testbox until the meter deflection (diode probe connected to the RF output) is 2.45V corresponding to 0.0 dB.

7.3.4.

Change the AF tone generator frequency between 500 Hz and 2500 Hz, and check that the output amplitude ripple is below 2 dB.

Check that -6 dB frequencies are approx. 300 Hz and 2700 Hz.

7.3.5.

Set AF tone generator to 1500 Hz.

7.3.6.

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

7.3.7.

Change to tune position.

FUNCTION CHECK FOR S1303/04 cont.:

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

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

7.3.10.
Supply 1500 Hz and 3.16V RMS to the AF input connector on the artificial key S1303/04.

7.3.11.
Check that the peak amplitude is within 7 cm pp. and 8 cm pp. in the positions TELEX and A2H. It can be necessary to activate the tune button a short moment.

7.3.12.
Check that the peak amplitude is within 5 cm pp. and 6 cm pp. in the position A1.

7.4.1.
Set the display input switch in position 2182 kHz selected.

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

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

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

7.5.1.
Set the data/clock switch on the artificial key in position OFF.

7.5.2.
Set the display input switch in position EXT.FREQ.CONTROL.

7.5.3.
Check that the display is blank.

7.5.4.
Set the data/clock switch on the artificial key in ON position.

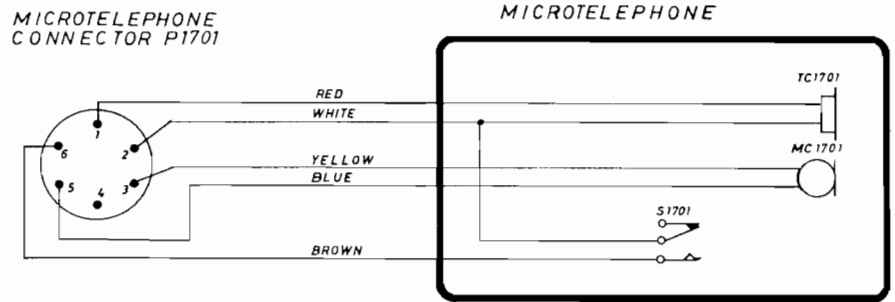
7.5.5.
Check that the display is filled with zeroes.

7.6.1.
Check that the dimmer switch is working.

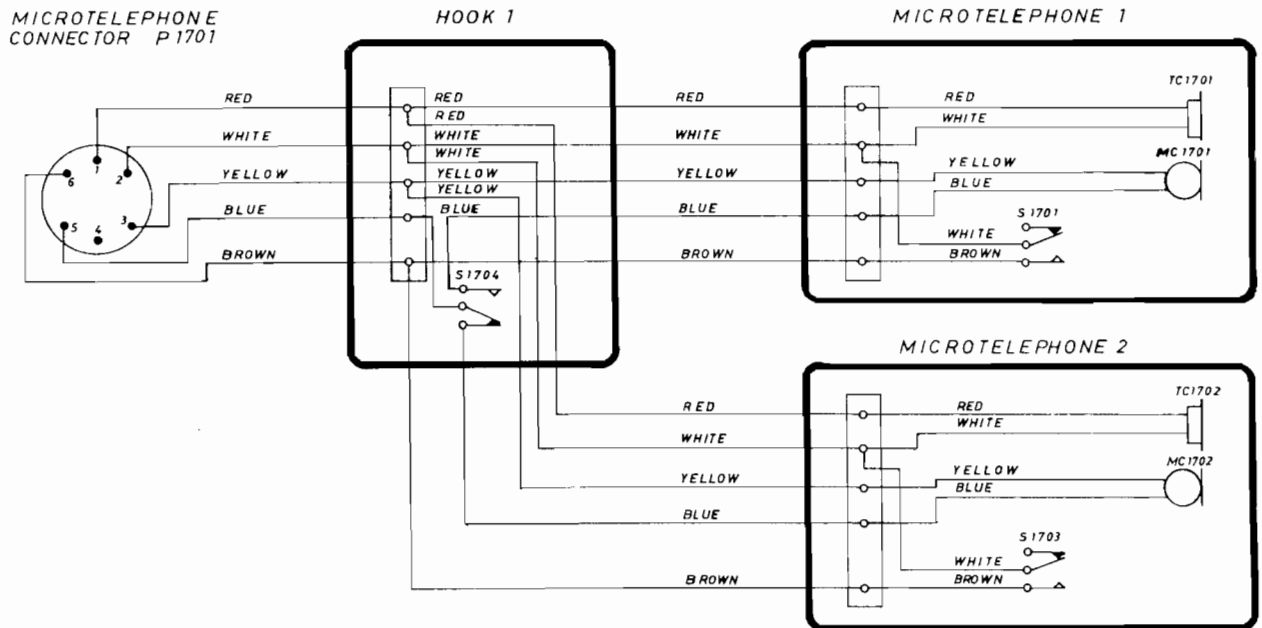
MICROTELEPHONE INSTALLATION S1300

It is possible on request to get a special two microphone installation as described on the schematic diagram below.

NORMAL INSTALLATION WITH ONE MICROTELEPHONE

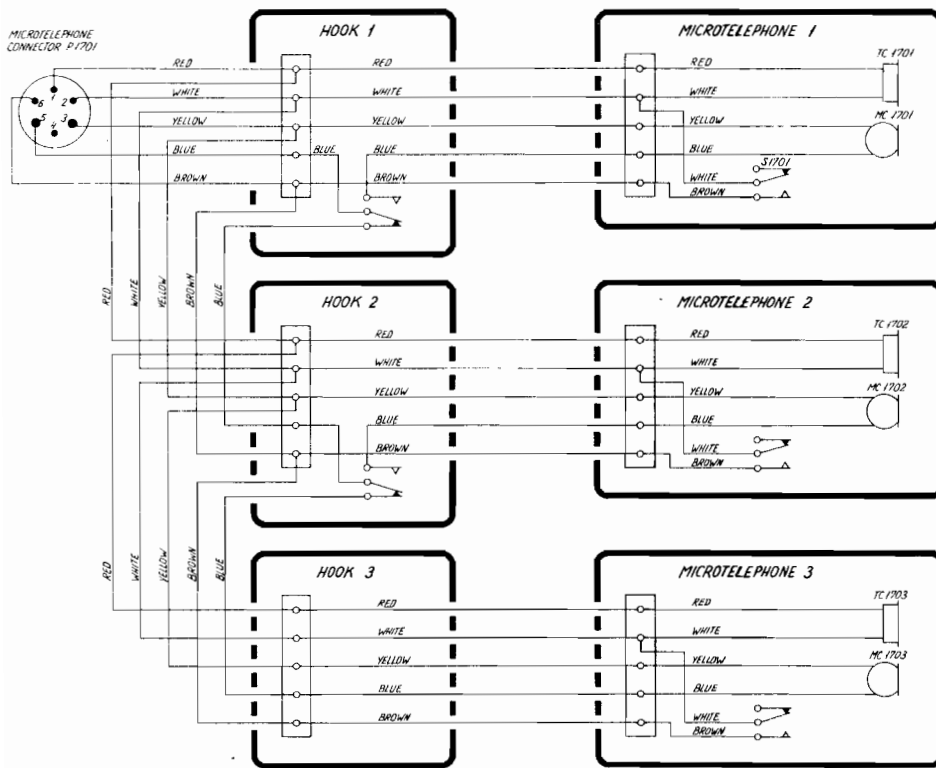


SPECIAL INSTALLATION WITH TWO MICROTELEPHONES Microtelephone one with preference.

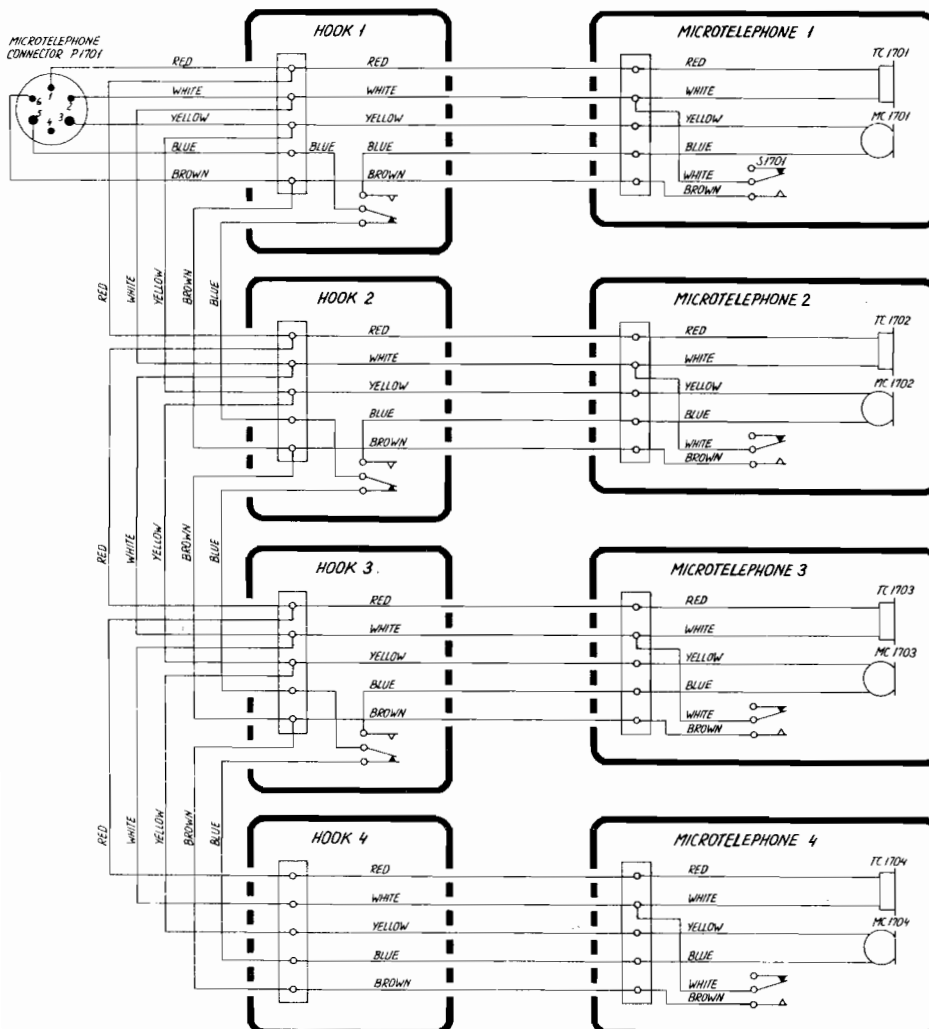


A

SPECIAL INSTALLATION WITH 3 MICROTELEPHONES



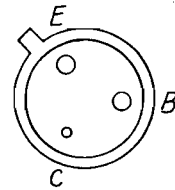
SPECIAL INSTALLATION WITH 4 MICROTELEPHONES



BOTTOM VIEW



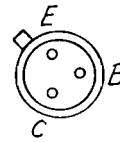
*BC 639
BC 640*



BFW 17A



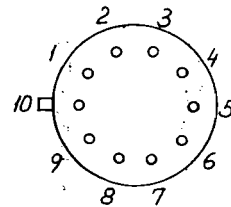
*BC 328-25
BC 338
BC 547
BC 548 A, B, C
BC 556 A,
BC 558 A, B, C,*



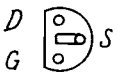
2N 2368



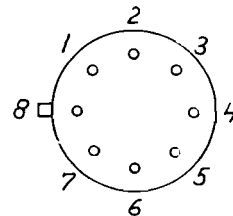
*BF 199,
BF 494*



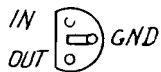
CA 3019



BF 256 A, B, C



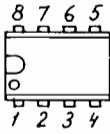
LM 3053



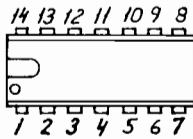
MC 78 L05 ACP

SI 302/03/04 A13/1

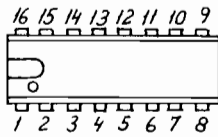
TOP VIEW



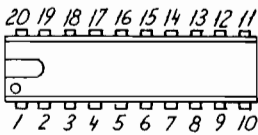
LM 308N
LM 358



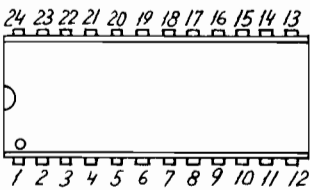
LM 329
MC 4044
MC 14081 B CP
SN 7407N
SN 7410N
SN 7472N
SN 74LS 20N
SN 74LS 27N
SN 74LS 290N
SN 74LS 197N
SN 74LS 32N



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

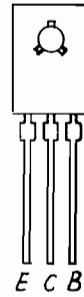


MMI 6308-1

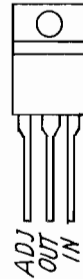


MC 14515 BCB

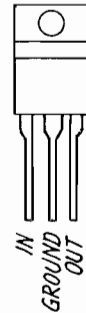
FRONT VIEW



BD 138
BD 139



LM 317T

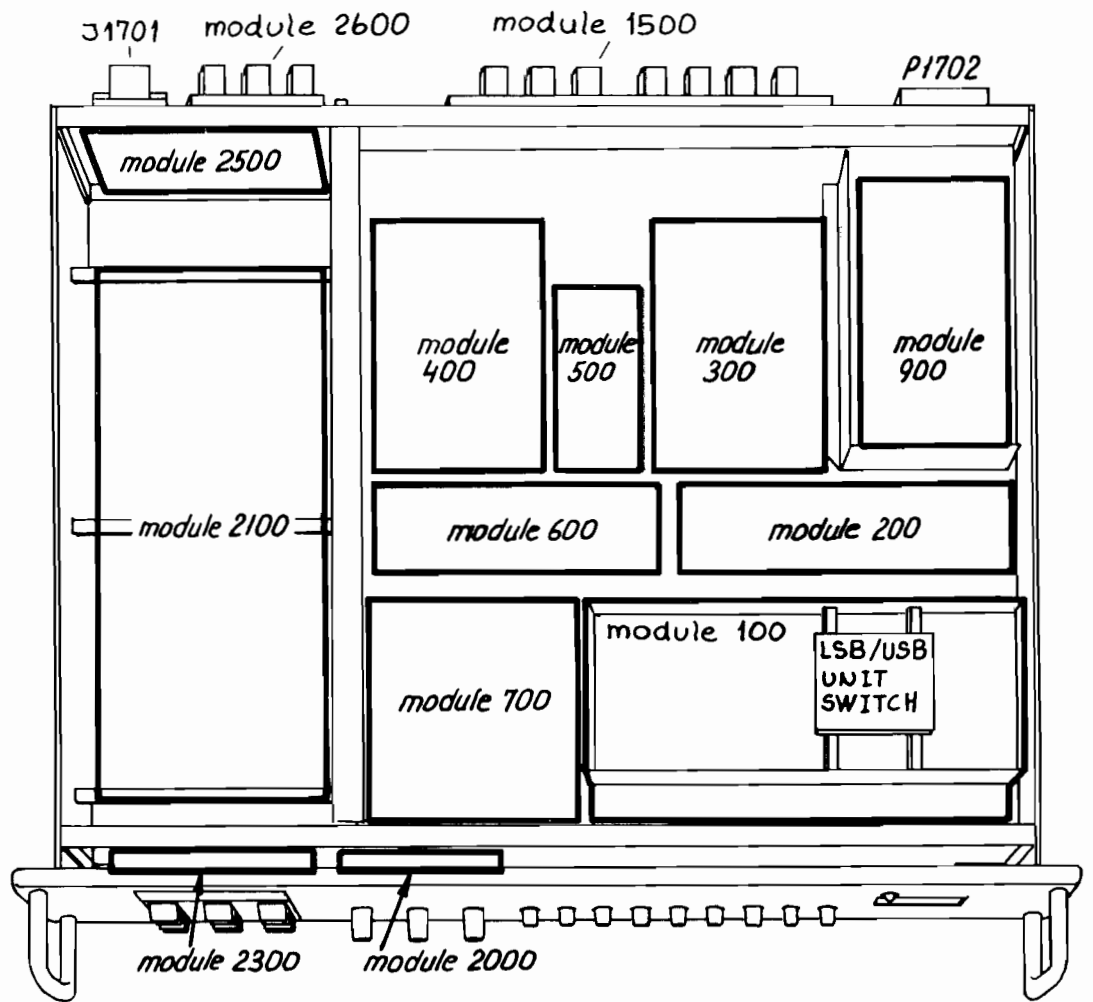


MC 7805 CT

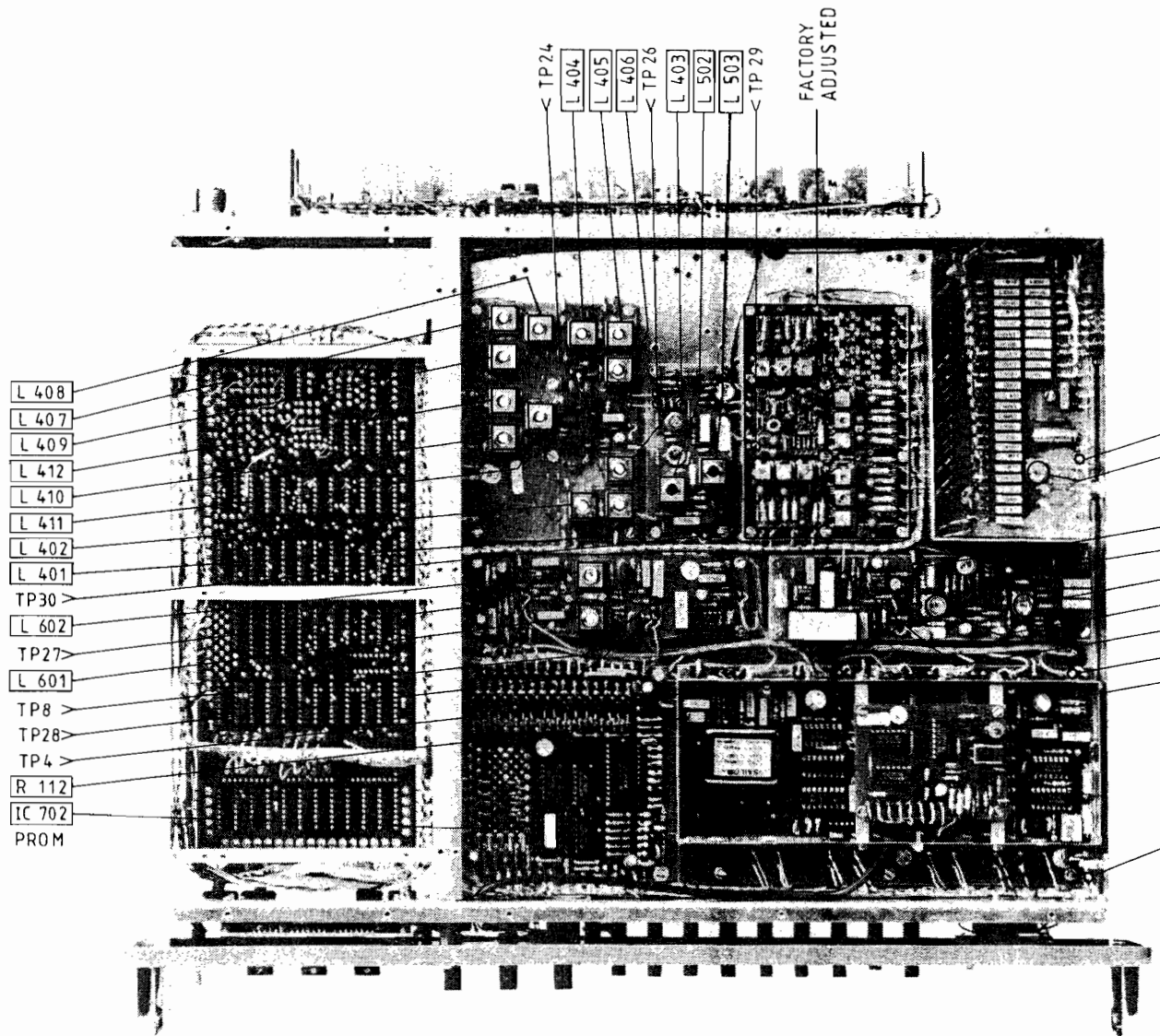
TEST POINT LOCATIONS S1303/04

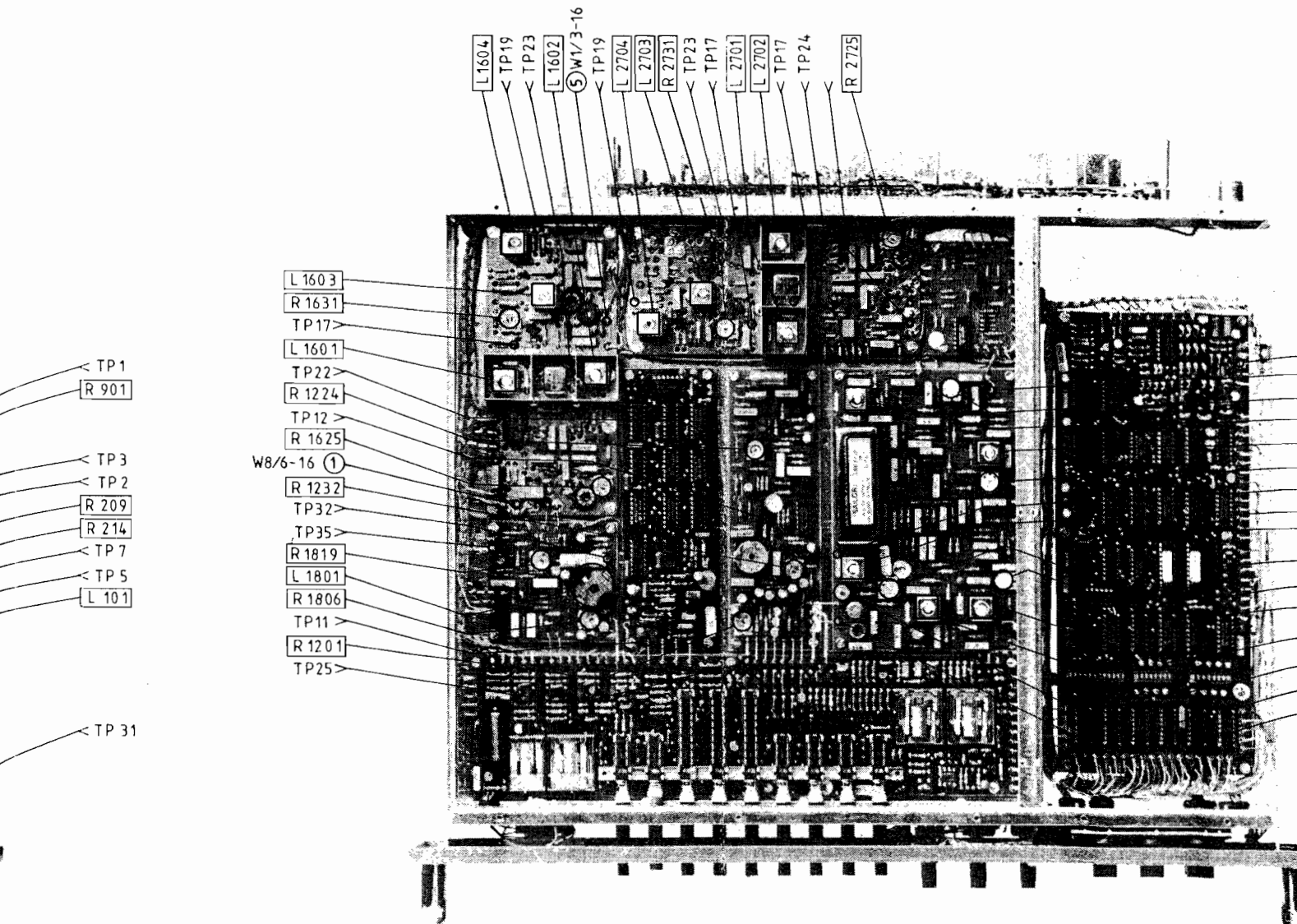
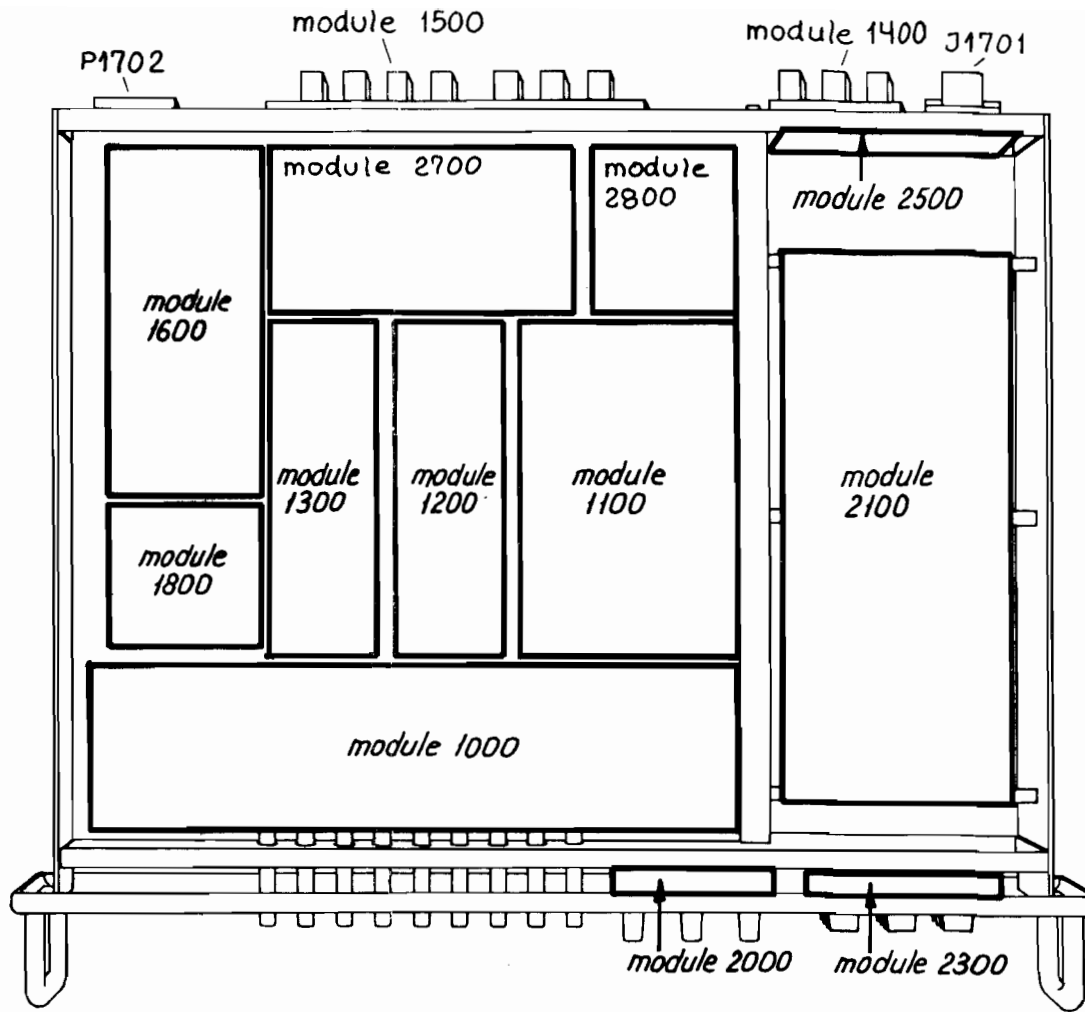
TP:	MODULE	
1.	Filter module: +18V DC out	(900)
2.	Loop 1 filter & +-18V supply unit: -18V out	(200)
3.	Loop 1 filter & +-18V supply unit: +18V out	(200)
4.	Divider unit: 10 MHz TCXO out	(100)
5.	Divider unit: 600 kHz output signal	(100)
6.	Harmonic filter: V _{AGC}	(400)
7.	Loop 1 filter & +-18V supply unit: VCO control out	(200)
8.	VCXO and loop 2 filter: Control voltage	(600)
9.	SSB-Generator: DSB signal to LSB filter	(1100)
10.		
11.	Alarm tone generator: Alarm tone signal out.	(1300)
12.	Microphone amplifier: Amplifier output	(1200)
13.	Microphone amplifier: AF signal output	(1200)
14.	SSB-Generator: 600 kHz carrier amp.	(1100)
15.	SSB-GENERATOR: 600 kHz to modulator balance	(1100)
16.	SSB-GENERATOR: SSB output signal	(1100)
17.	Mixer unit: 10.7 MHz filter output	(1600)
18.	Mixer unit: 10.7 MHz amplifier T1605 Basis	(1600)
19.	Mixer unit: 10.7 MHz 3. mixer input	(1600)
20.	Band-filter: Input to output amplifier	(1500)
21.	Output filter: RF signal out to PA	(1400)
22.	Alarm tone generator: 250 msec control pulse	(1300)
23.	Mixer unit: 10.7 MHz filter input	(1600)
24.	Microphone amplifier: Compressor control voltage	(1200)
25.	Microphone amplifier: Microphone input	(1200)
26.	Harmonic filter: Harmonic filter out to loop 1 mixer	(400)
27.	VCXO and loop 2 filter: loop 2 mixer out	(600)
28.	VCXO and loop 2 filter: 10.0976 MHz out to 2. mixer	(600)
29.	VCO unit: VCO out to 3. mixer	(300)
30.	Divider unit: loop 1 input 2.7 - 4.7 MHz	(100)
31.	Divider unit: +5V input	(100)
32.	A2H-oscillator and delay unit: A2H oscillator collector	(1800)
33.	Frequency control: +5V input	(2100)
34.		
35.	A2H-oscillator and delay unit: RX-block out	(1800)

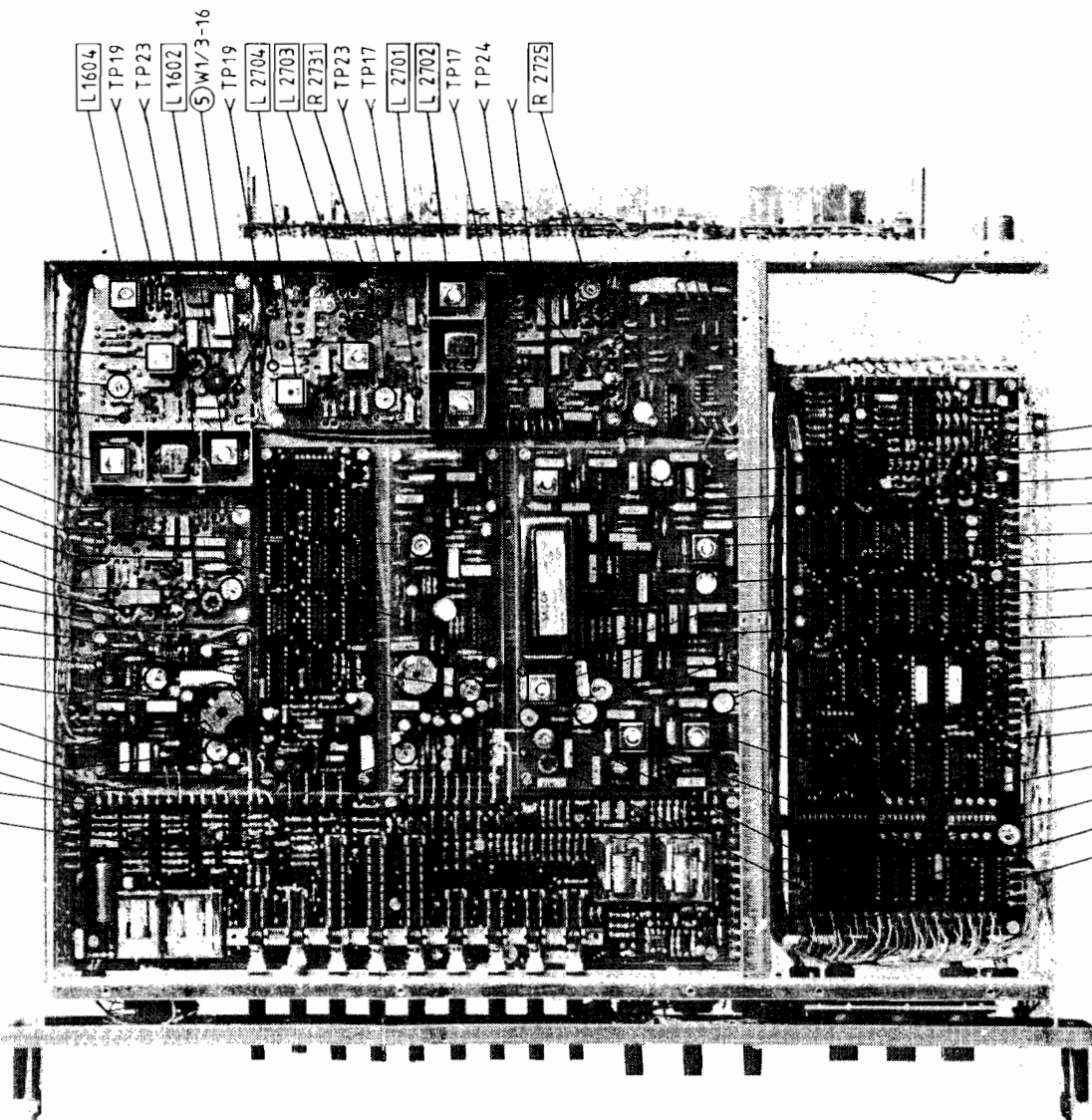
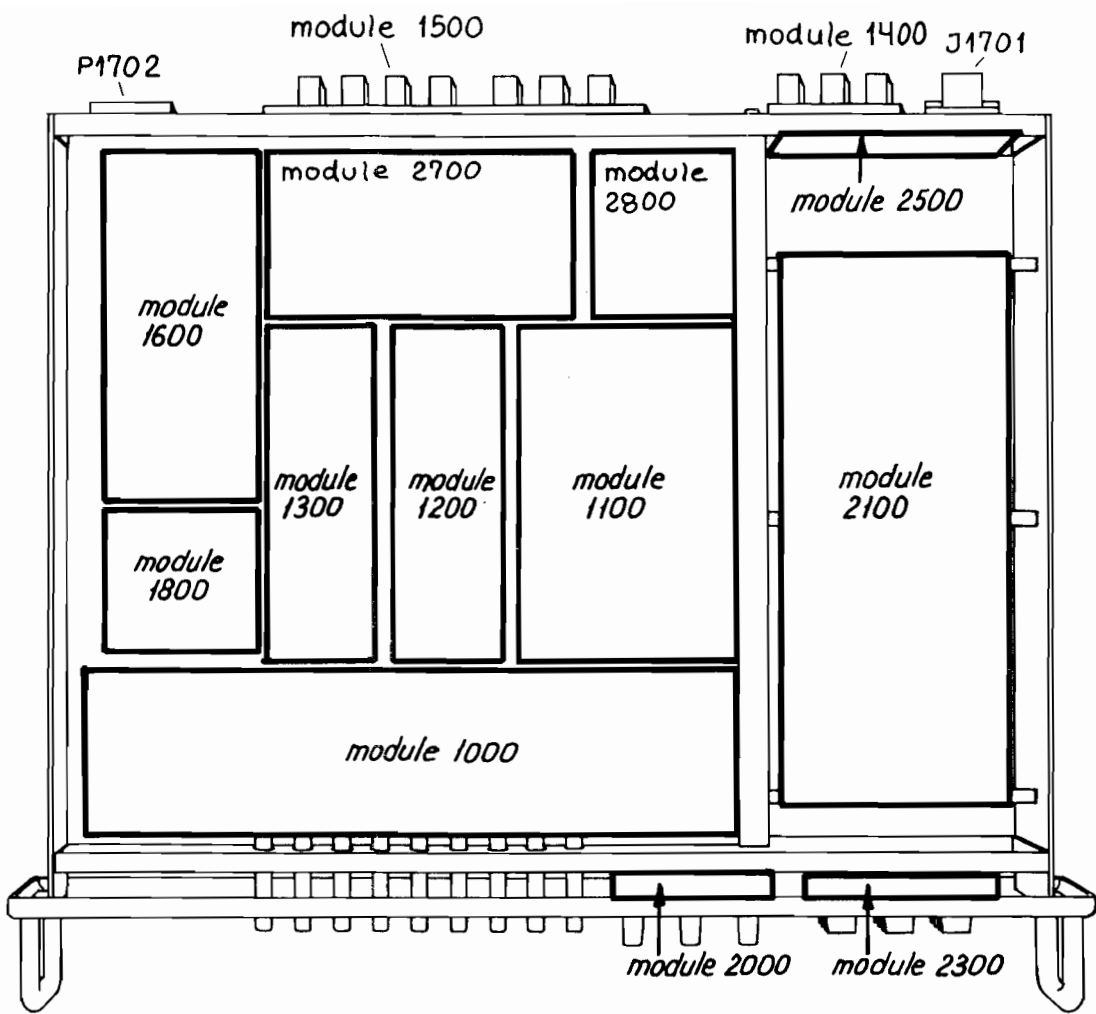
S1303/4-I 4-6-25512 4-6-25513
 4-6-25520 4-6-25509 4-6-25510
 4-6-25511



Chassis montage module 1700







- L1604
- TP19
- TP23
- L1602
- SM1/3-16
- TP19
- L2704
- L2703
- R2731
- TP23
- TP17
- L2701
- L2702
- TP17
- TP24
- R2725

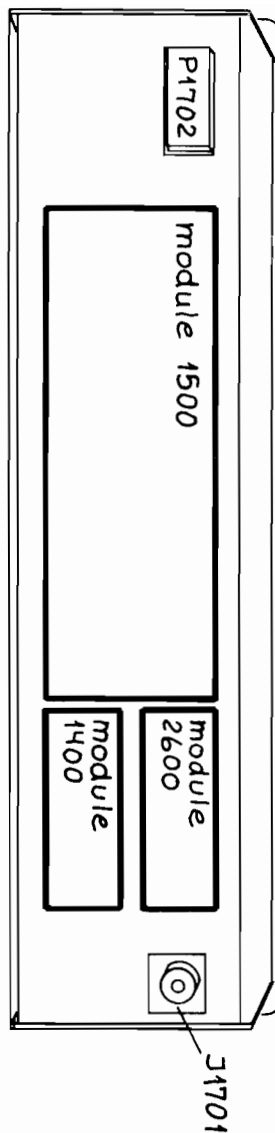
- TP33
- TP16
- R1158
- L1105
- L1106
- R1149
- TP9
- L1104
- IC2115
- IC2114
- R1125
- R1109
- L1101
- L1102
- C1123
- TP13

PROM
PROM

- L1501
- L1502
- L1505
- L1506

- L1509
- L1510
- L1511
- TP20
- R1541

- L1404
- L1403
- L1401
- TP21

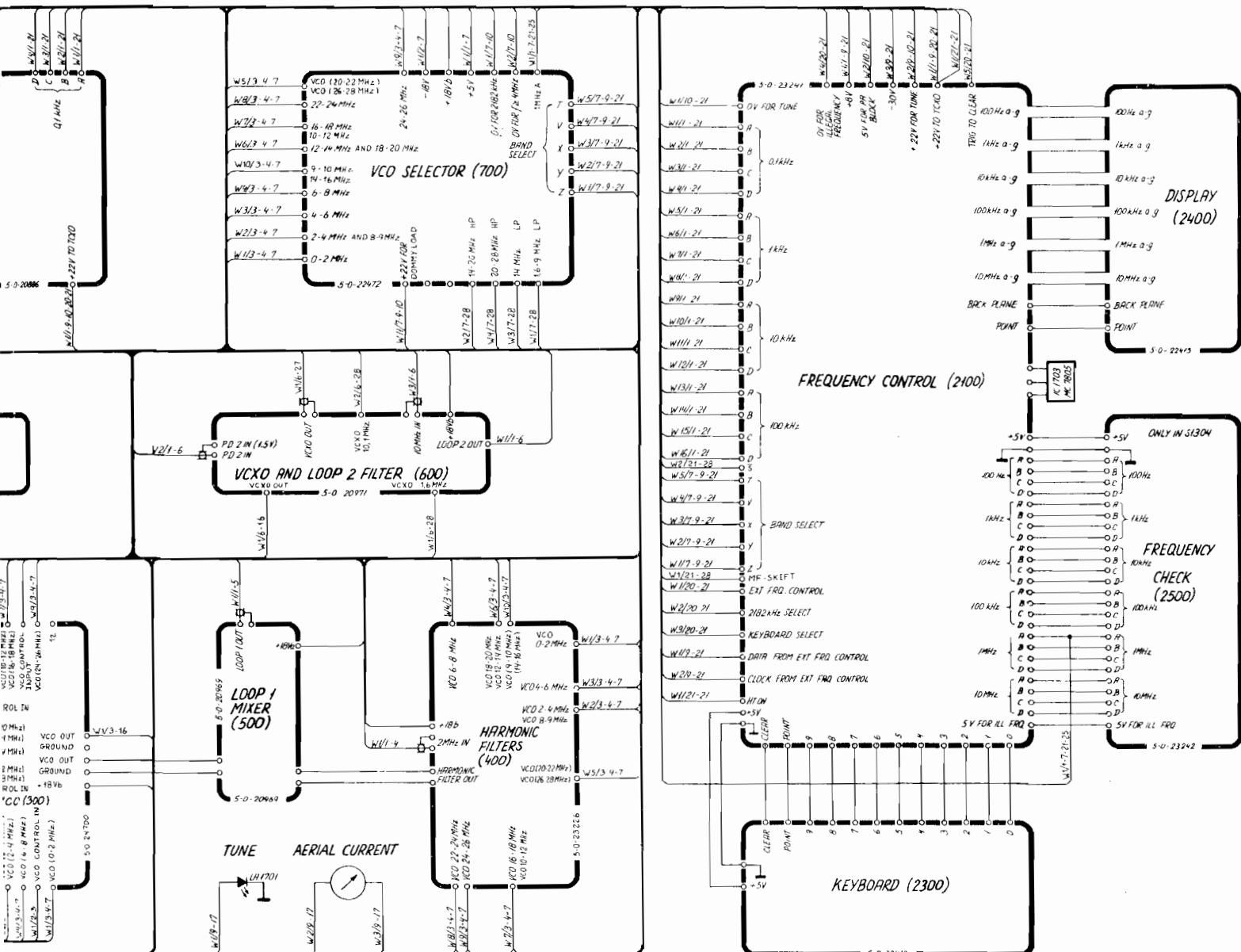


- < TP33
- < TP16
- R1158
- L1105
- L1106
- R1149
- < TP 9
- L1104
- IC 2115 PROM
- IC 2114 PROM
- R1125
- R1109
- L1101
- L1102
- C1123
- < TP13

- L1501
- L1502
- L1505
- L1506
- L1509
- L1510
- L1511
- TP 20
- R1541
- L1404
- L1403
- L1401
- TP21
- L1503
- L1504
- L1507
- L1508
- L1512
- L1513
- L1514
- L2602
- L2603
- L2604

MODULE LOCATION S1303/4-I

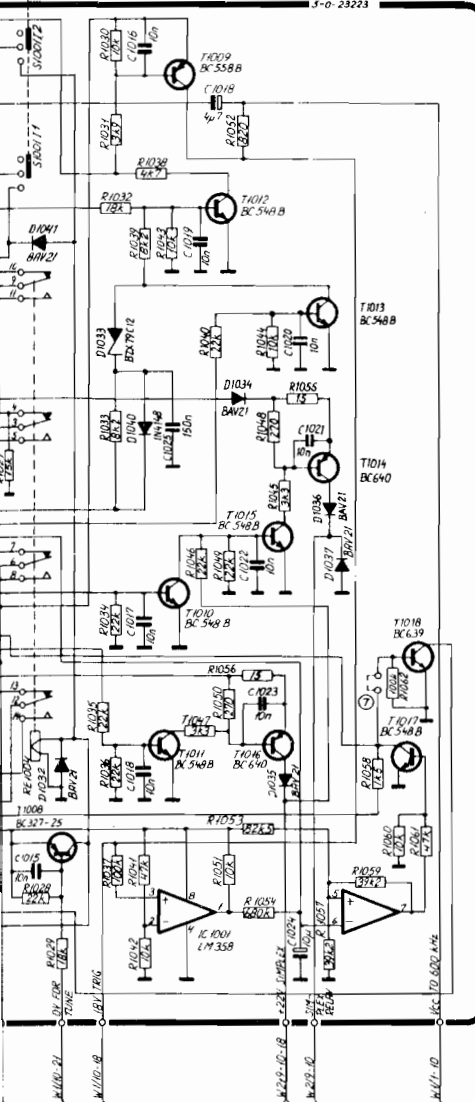
ADJUSTMENT LOCATION S1303/4-I



AF FROM MICROPHONE	13 T	25 CLOCK FROM EXT FREQ CONTROL
STRAEK RELAY	14 V	26 AERIAL METER 1
1 BLOCK	15 X	27 AERIAL METER 2
+22V	16 Y	28 AF TO MICROTELEPHONE
+5V	17 Z	29 OPEN TX
-5V	18 22V FOR TUNE	30 22V FOR DUMMY LOAD
AF FROM TELEX	19 TO TUNE LAMP	31 GROUND FOR MIC AND TELEX
T FROM TELEX	20 TRANSMITTER START	32 +22V SIMPLEX
2V FROM KEY	21 PH BLOCK	33 AF TO LOUDESTAFKMER
GROUND	22 DRIVE LEVEL 1	34 HANDSET KEY
DATA FROM EXT FREQ CONTROL	23 DRIVE LEVEL 2	35 5 BIT
G FROM EX	24 HT ON	36 +22V TO TCXO

MAIN SCHEMATIC DIAGRAM
FOR
SAILOR EXCITER S1303/S1304
WITH OPTION I

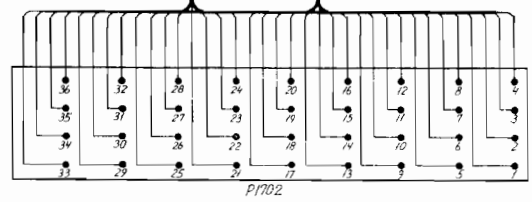
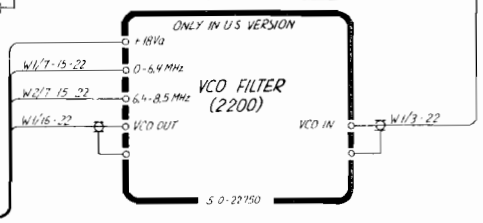
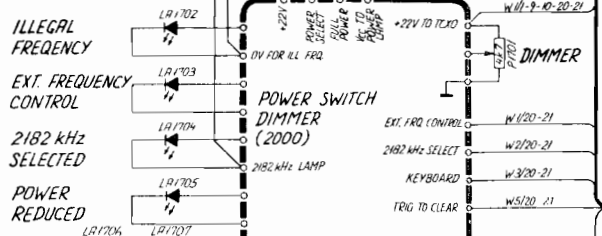
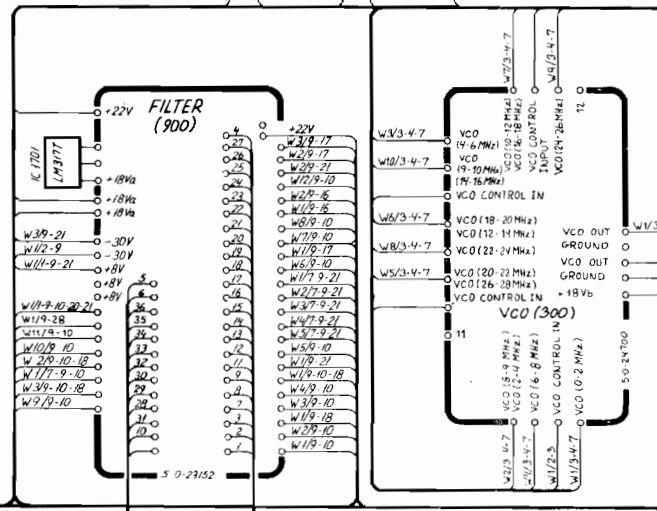
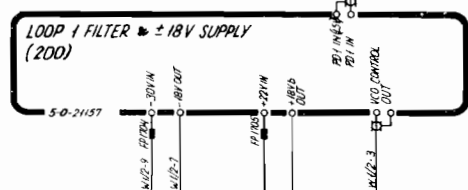
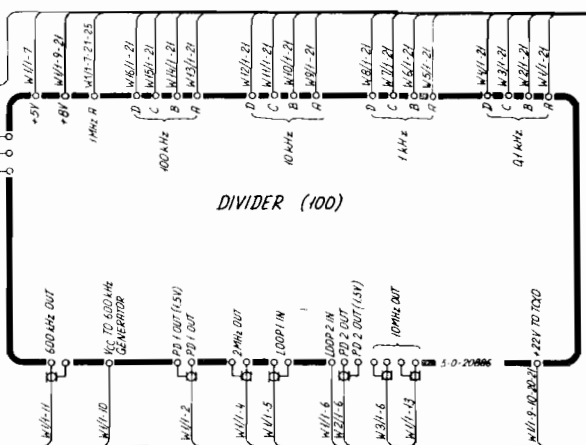
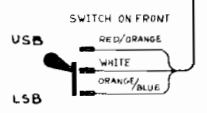
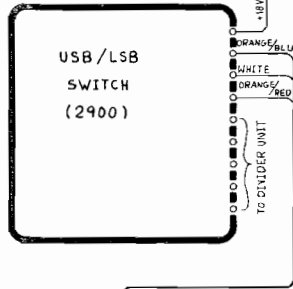
TUNE
5-0-23223



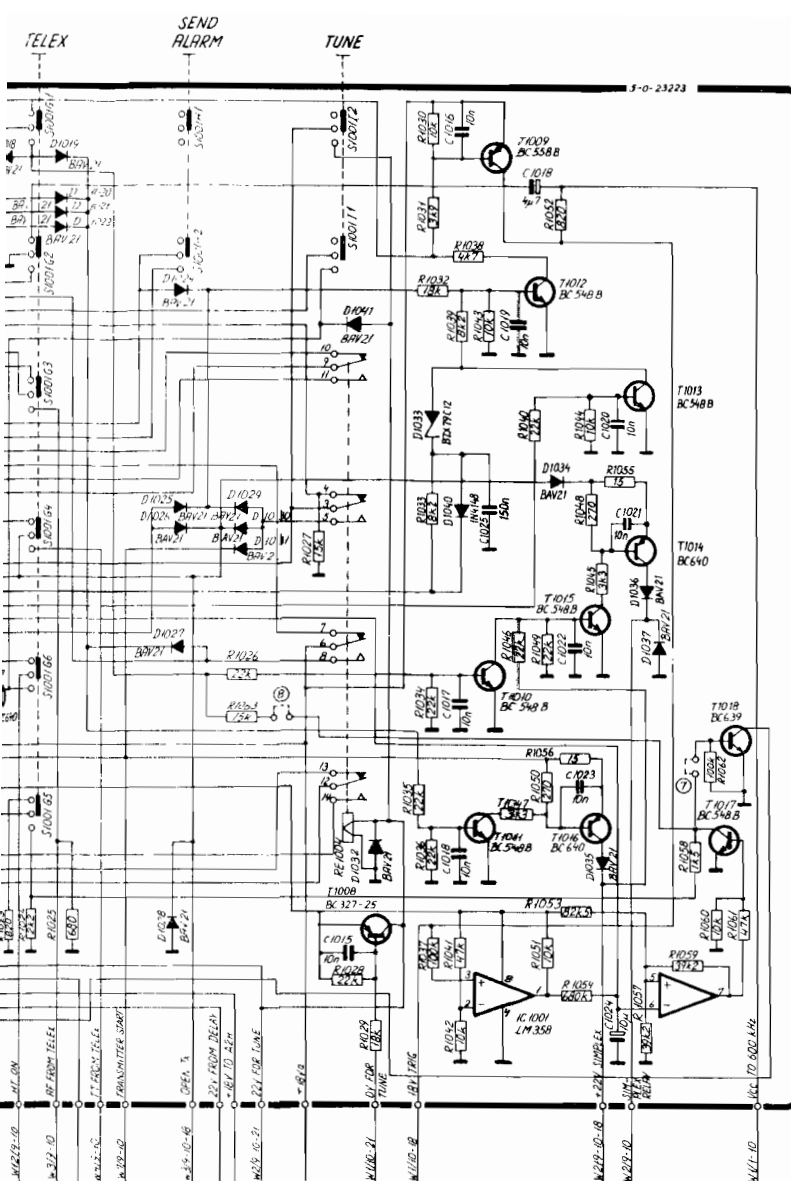
2182 kHz FIXED

MODE SELECTED	DIODE MOUNTED
R3H	D1002, D1004
R3J	D1007
VIA MODE SWITCH	D1009

- ① ALARM SIGNAL IS SEND IN R3J
- ② ALARM SIGNAL IS SEND IN R3H
- ③ R3H } CAN NOT BE SEND ABOVE 4MHz
- ④ R3H }
- ⑤ R3A } CAN NOT BE SEND
- ⑥ R3H }
- ⑦ INSERT THE STRAPS 7 AND 8 TO PREVENT CONTINUOUS CARRIER IN MARITEX MODE.
- ⑧



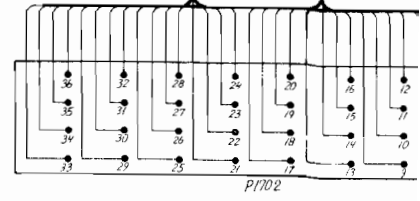
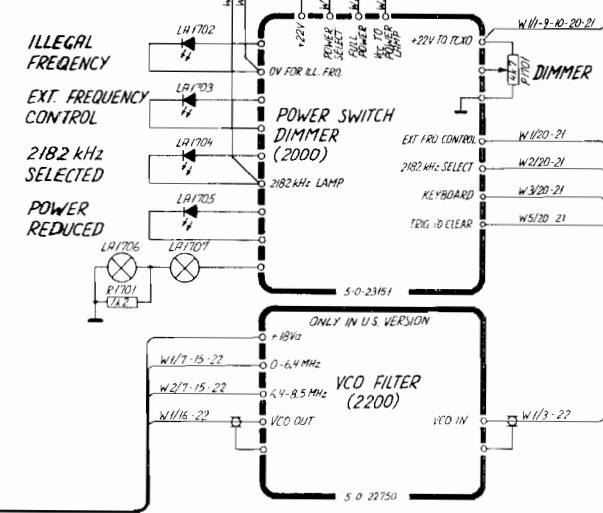
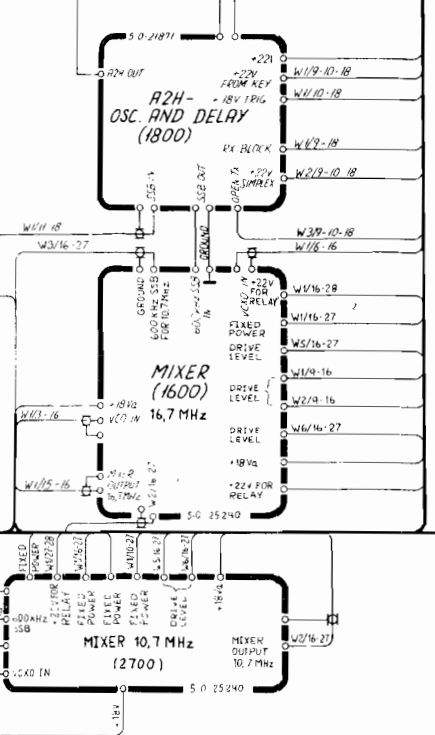
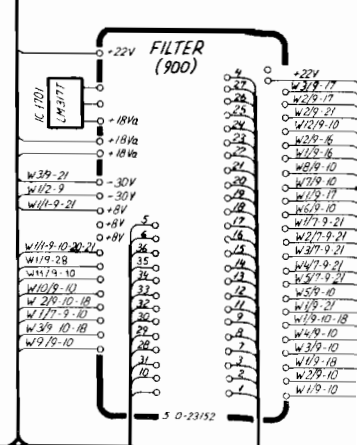
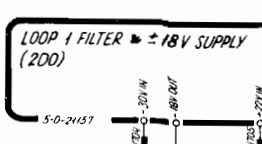
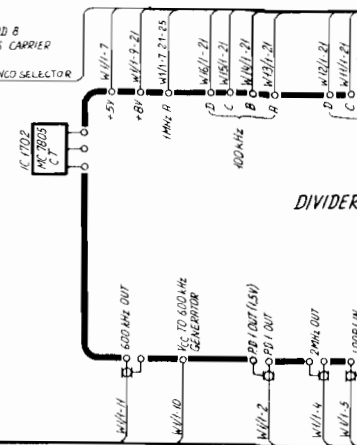
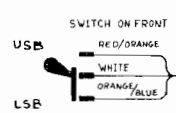
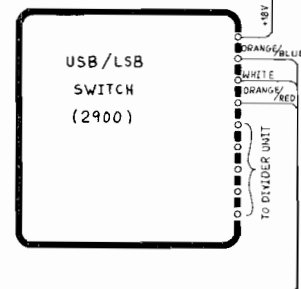
- 1 HF FROM MICROPHONE
- 2 SIMPLEX RELAY
- 3 KEY BLOCK
- 4 +22V
- 5 -18V
- 6 -15V
- 7 HF FROM TELEX
- 8 TT FROM TELEX
- 9 22V FROM KEY
- 10 GROUND
- 11 DATA FROM EXT FREQ CONTROL
- 12 4F FROM RX



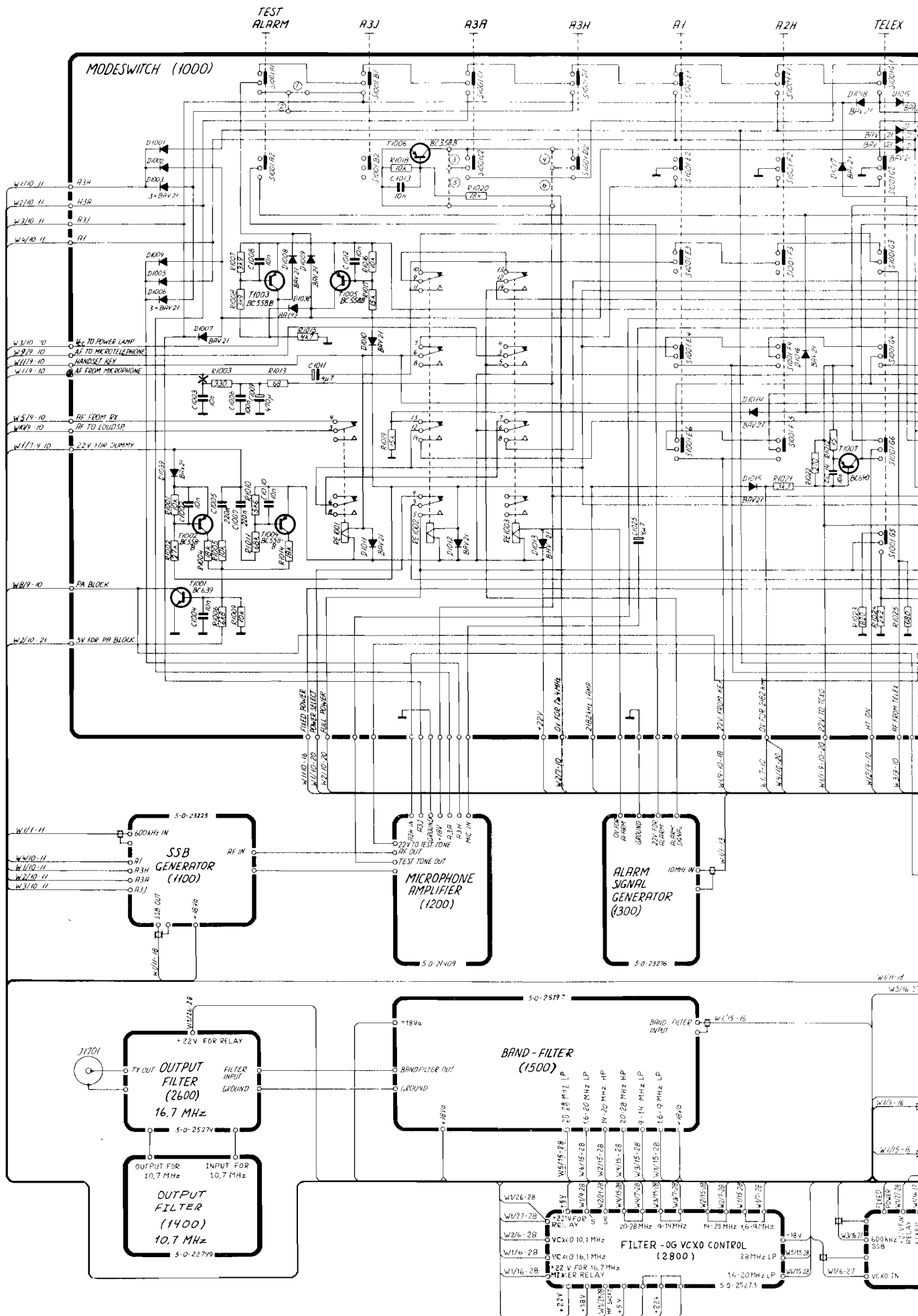
2182 kHz FIXED

MODE SELECTED	DIODE MOUNTED
R3H	D1002, D1004
R3J	D1007
VIA PAPER SWITCH	D1009

- ALARM SIGNAL IS SEND IN R3J
- ALARM SIGNAL IS SEND IN R3H
- R3J
- R3H
- R3J
- R3H
- INSERT THE STRAPS 7 AND 8 TO PREVENT CONTINUOUS CARRIER IN MARITA MODE
-



S1303/4-I
4-0-25396



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 X0101. The 10 MHz reference signal is amplified in the transistors T103 and T104.

REFERENCE DIVIDER

The counters IC115, IC111 and IC107 divides the 10 MHz reference signal down to respectively $f_{R1} = 1$ kHz and $f_{R2} = 100$ Hz.

2 MHz HARMONIC SPECTRUM GENERATOR

With a repetition frequency of 2 MHz the output Q_D of IC115 goes low and the nand-gates in IC114 will generate a narrow pulse due to the delay-time in the gates.

600 kHz GENERATOR

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

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.

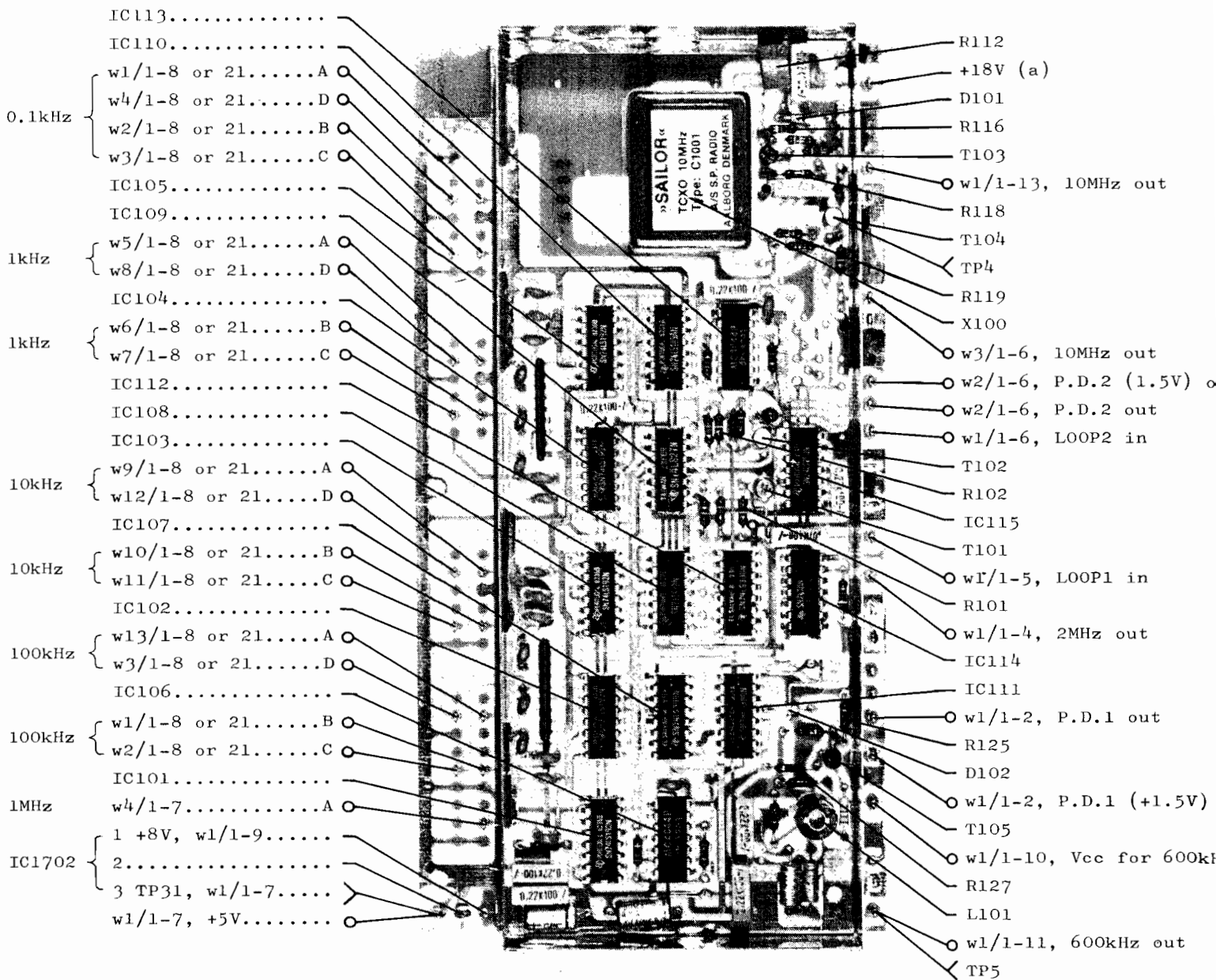
The stop figure S_2 is controlled from the gate IC108a. When the counter outputs Q_A , Q_B , Q_C ... etc. equals the stop figure $S_2 - 2$ the J-K flip-flop IC110a uses 2 clock pulses to load the start figure P_2 into the counters IC105 and IC112. The counter will count up from the start figure P_2 to the stop figure S_2 and thus the dividing figure is $N_2 = S_2 - P_2$.

LOOP 2 PHASE/FREQUENCY DETECTOR

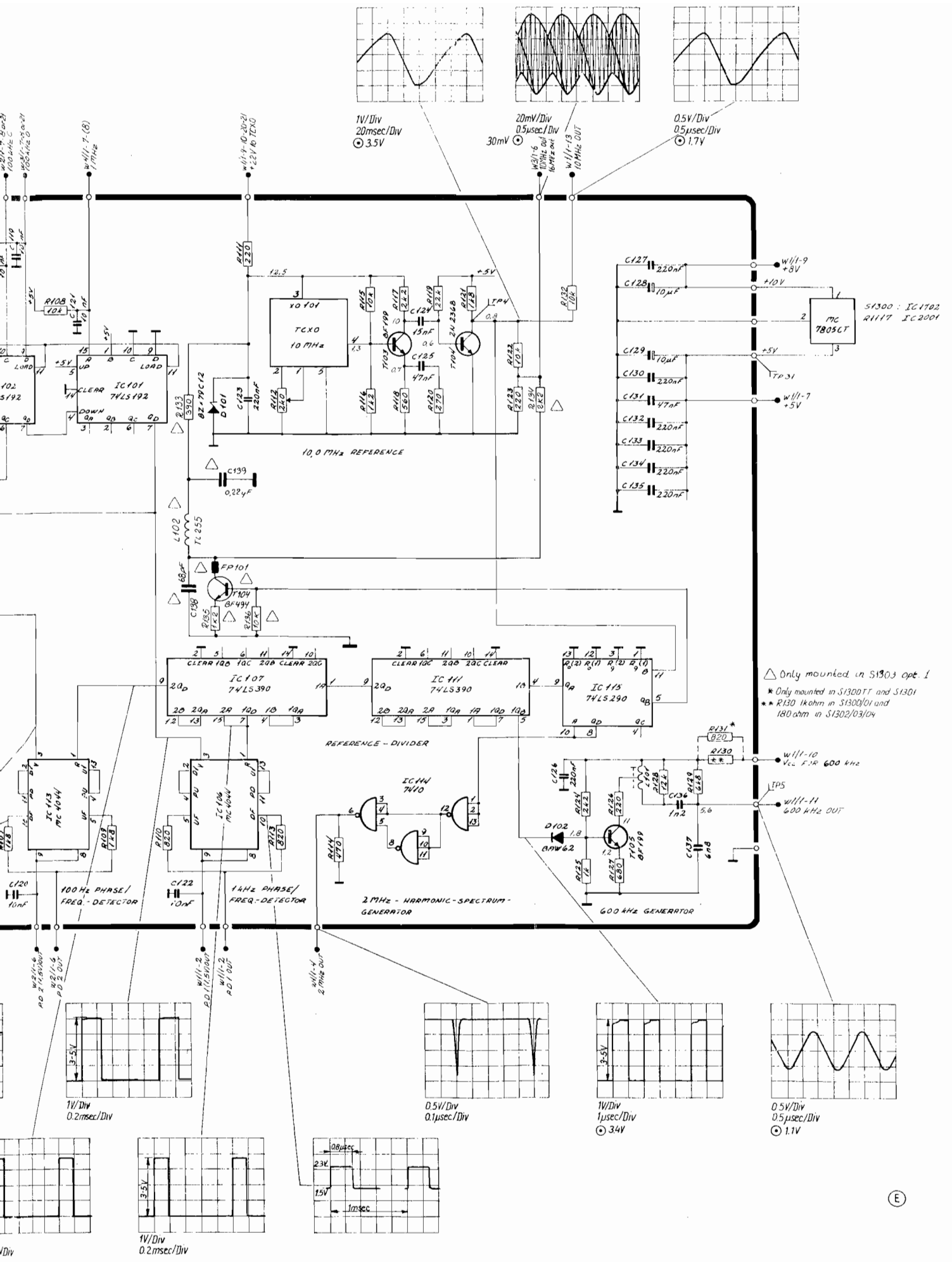
The reference frequency $f_{R2} = 100$ Hz and the variable frequency $f_{V1} = 100$ Hz are fed into the phase/frequency detector IC113. The phase/frequency detector IC113 generates an error voltage proportional to the frequency or the phase difference between the two signals mentioned above. This error voltage is fed into the integrator on the VCXO & LOOP 2 FILTER UNIT.

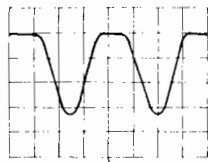
TEST CONDITIONS

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

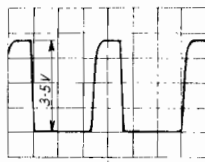


Wire numbers in brackets: S1300, S1301 only.
 Module 800 only in S1300, S1300T, S1300TT and S1302
 Module 2100 only in S1301, S1303 and S1304

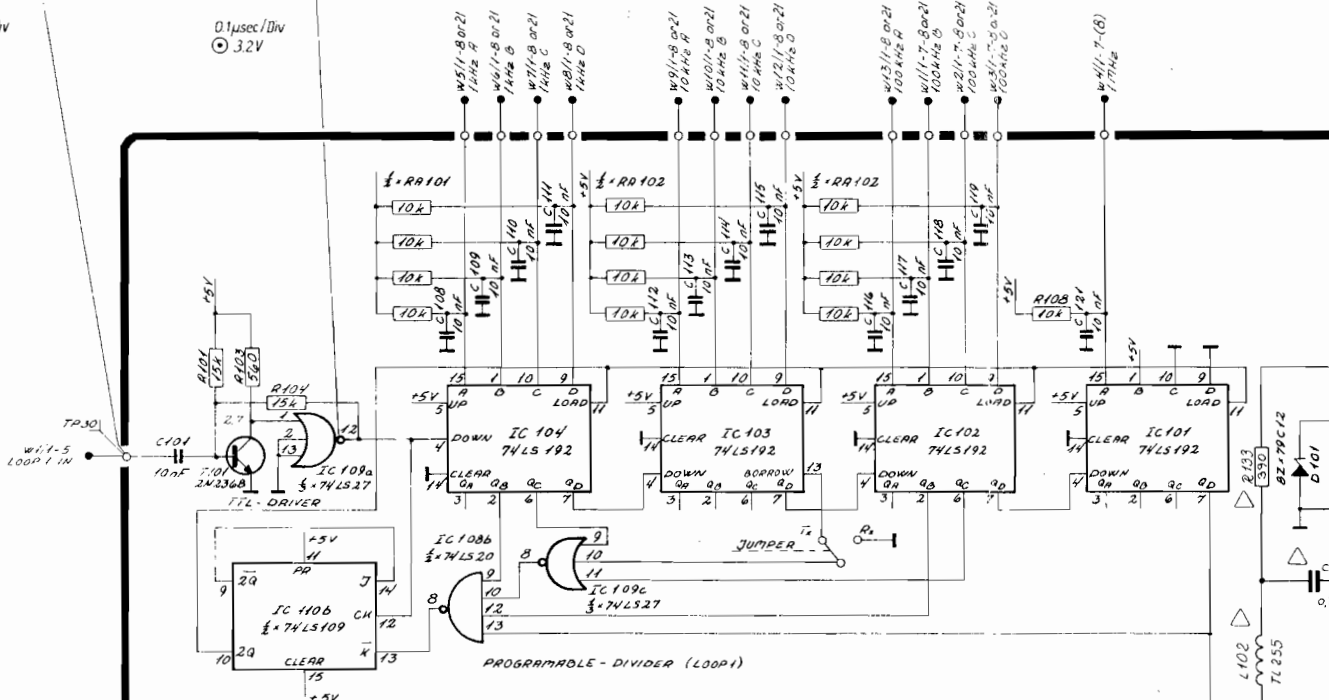




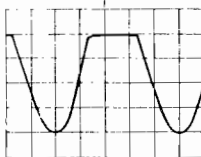
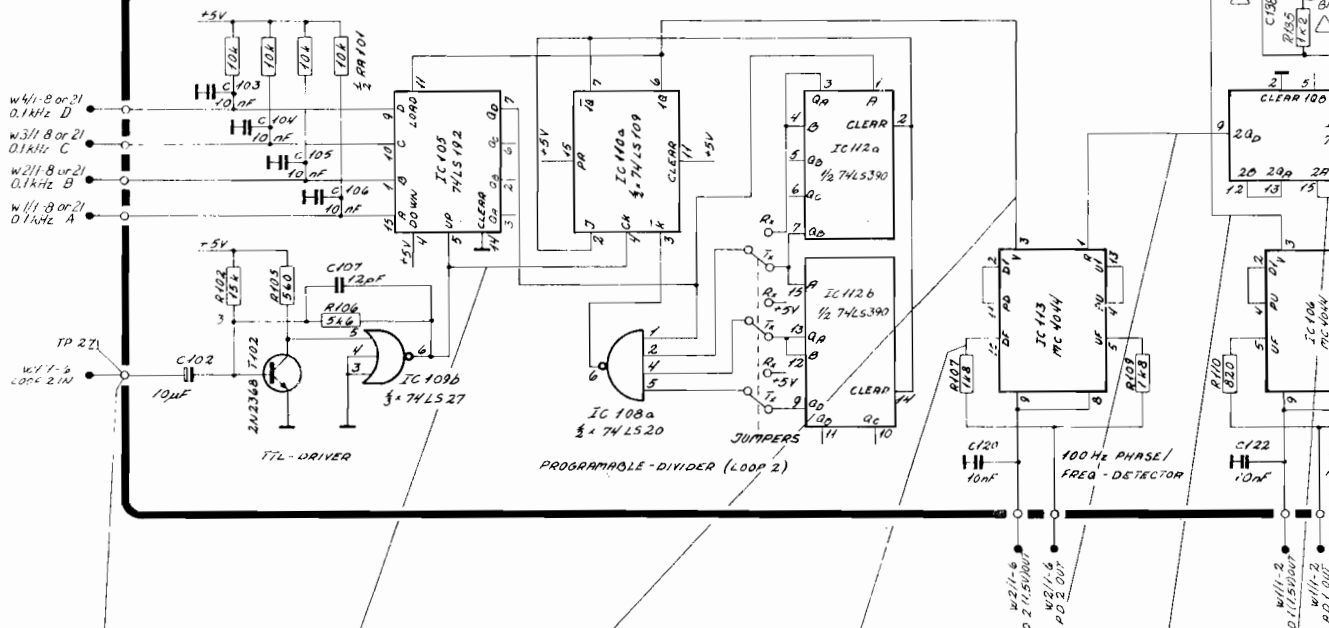
0.5V/Div
1ms/Div
⊙ 1.5V



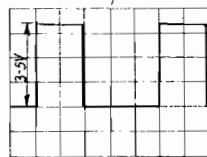
0.1μsec/Div
⊙ 3.2V



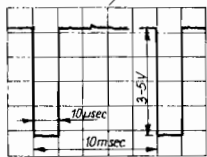
DIVIDER - UNIT



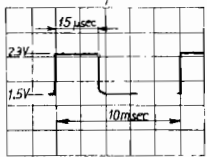
0.5V/Div
2μsec/Div
⊙ 1.7V



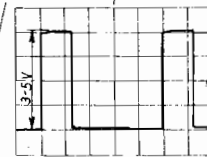
1V/Div
2μsec/Div
⊙ 3V



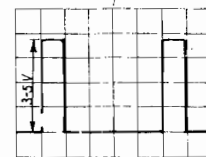
1V/Div
10μsec



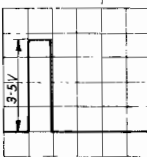
0.5V/Div
10μsec



1V/Div
0.2msec/Div



1V/Div
2msec/Div



1V/Div
0.2msec/Div

CIRCUIT DESCRIPTION LOOP 1 FILTER & $\pm 18V$ 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 T205, 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

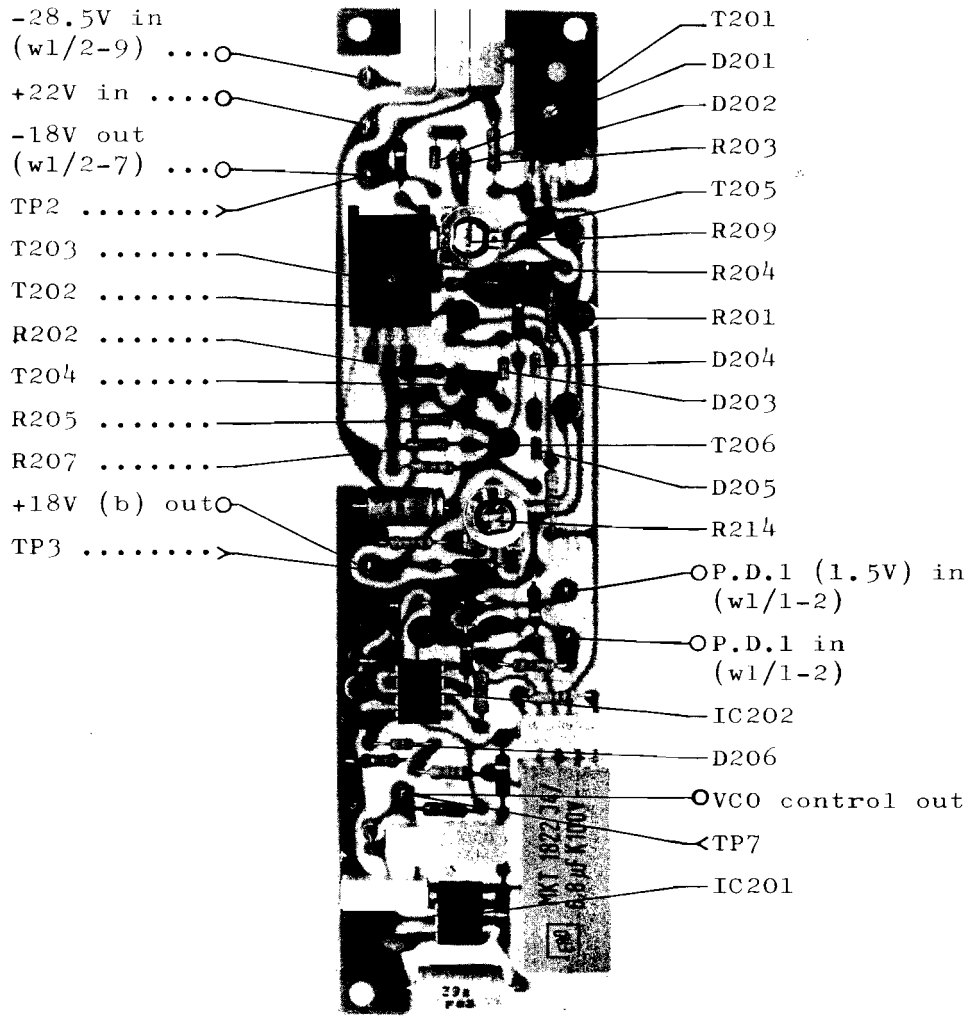
Frequency selector : 1A ($f = 2.0005$ MHz)
Oscilloscope input : Passive probe 10 Mohm/11 pF
DC voltmeter input : 10 Mohm

⊙ : Diode probe measurements

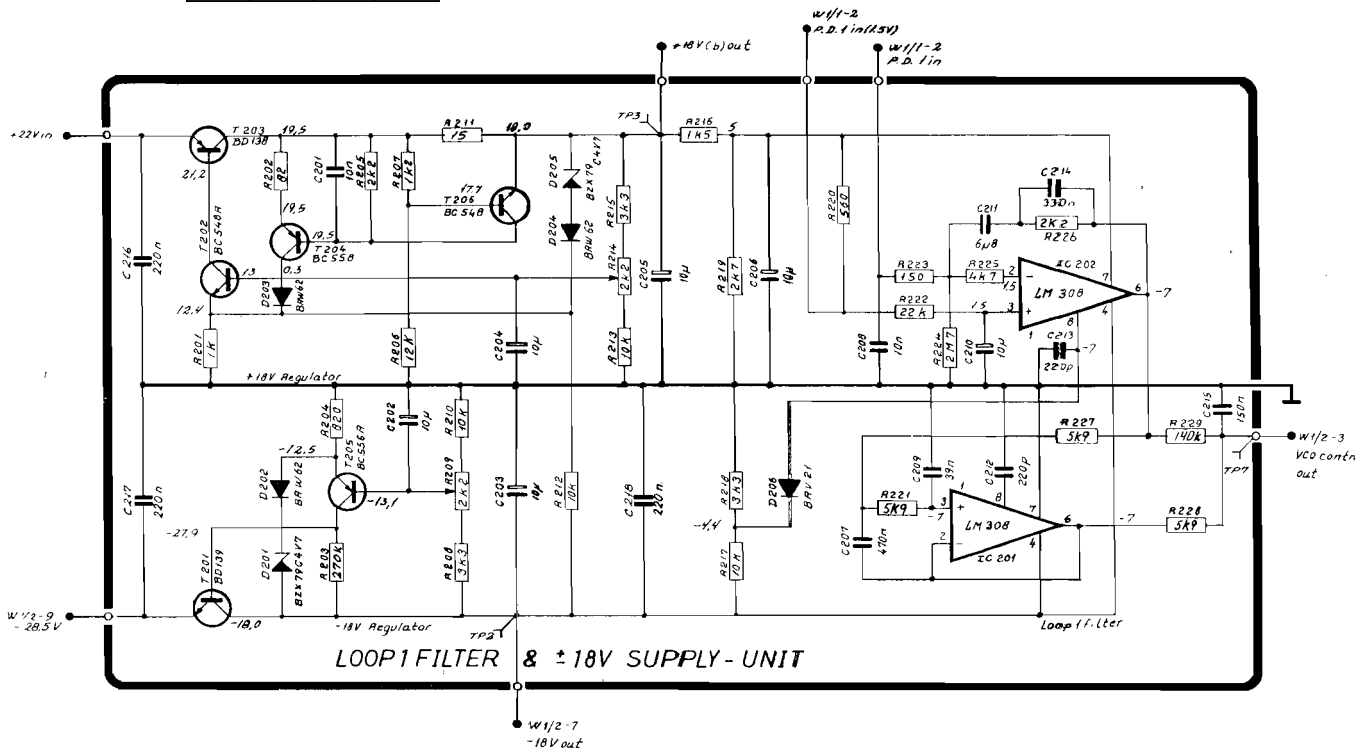
TP: Testpoints

All voltage statements are typical

E2/2 S130X 4-0-21635D
 4-6-21635D/4-0-21995A



	S130X	R111X S130XA	
R203	270k Ω	150k Ω	R1104
R211	15 Ω	10 Ω	R1108



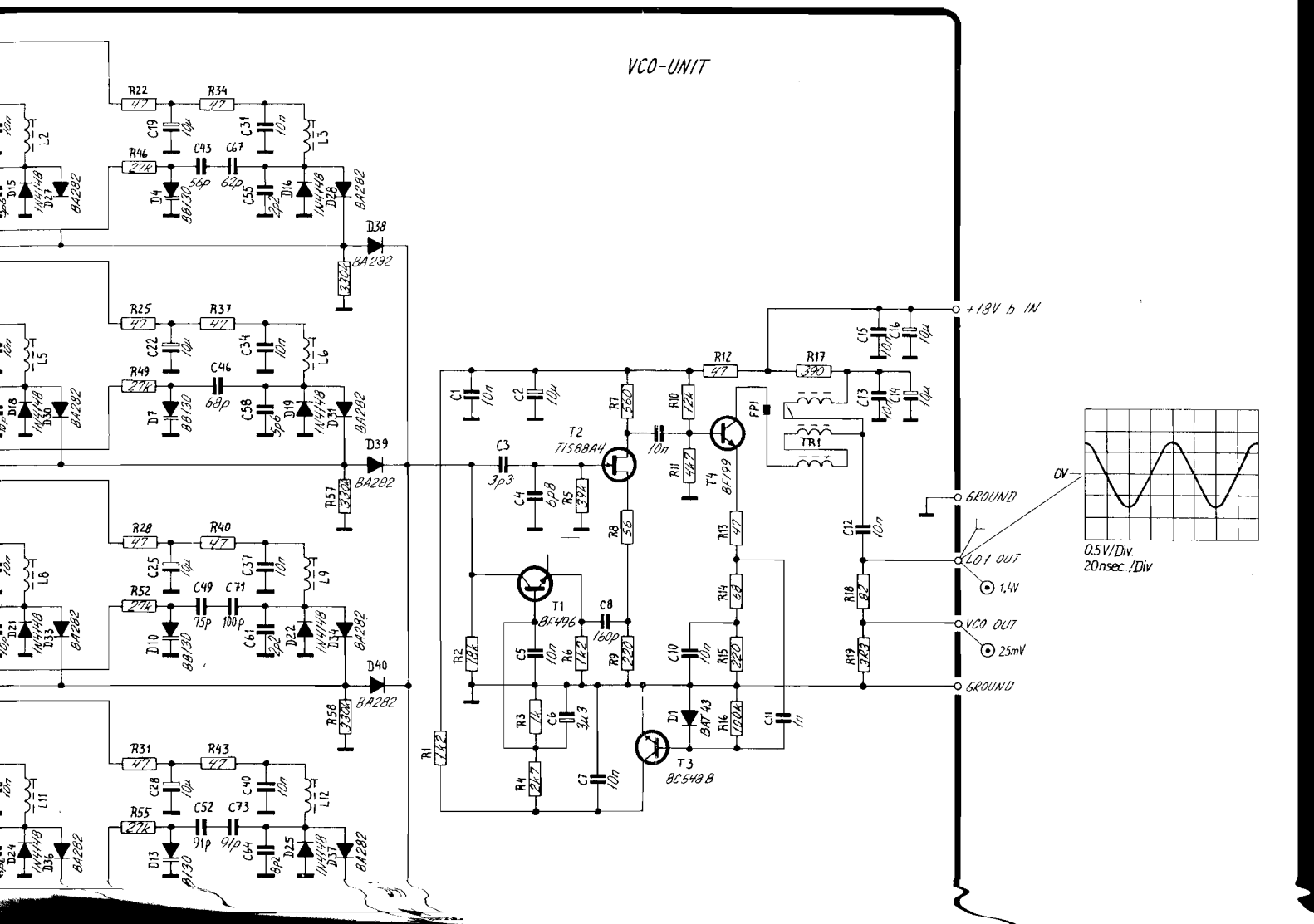
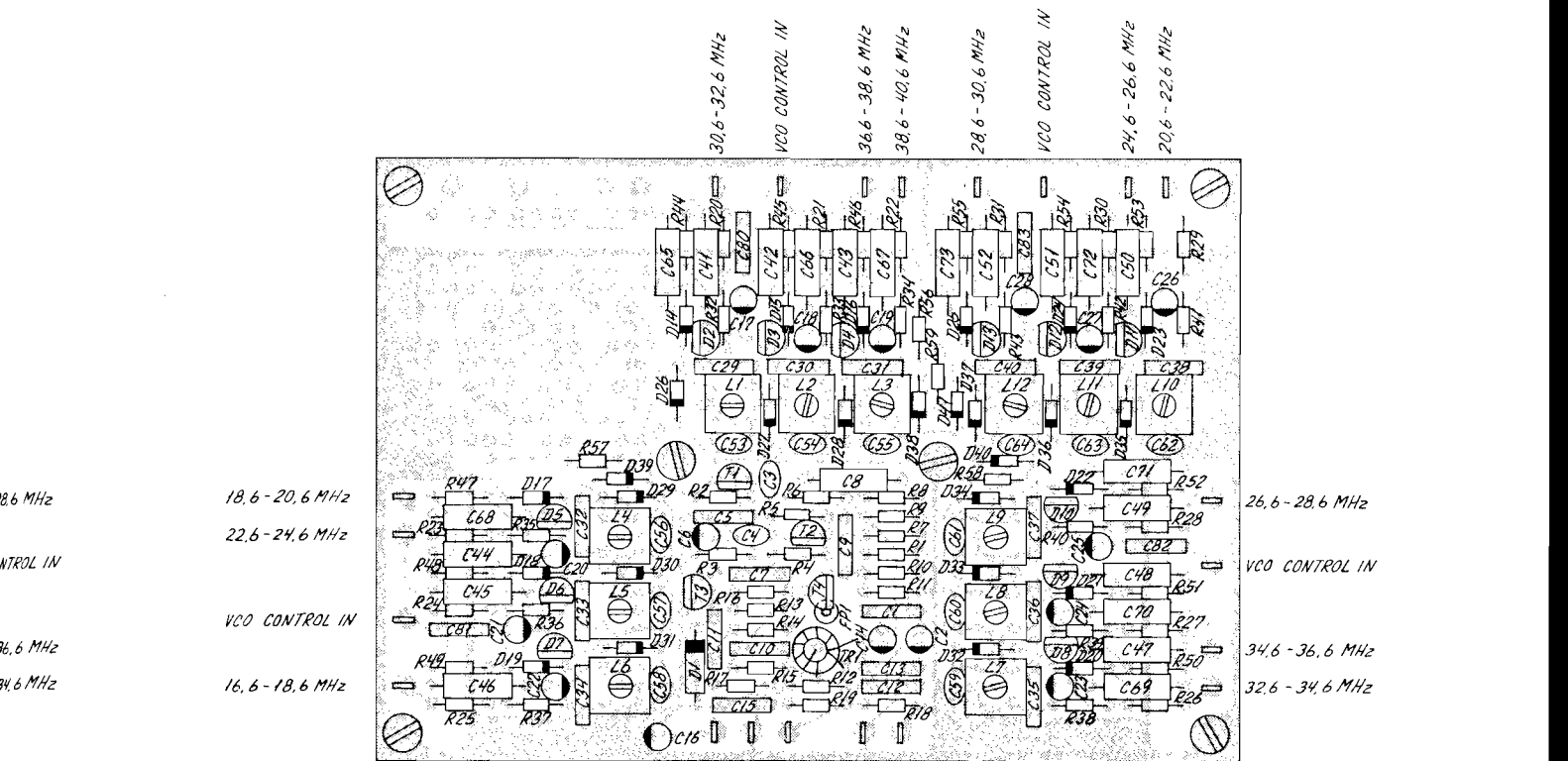
MODULE 200
 LOOP 1 FILTER & +/- 18V SUPPLY

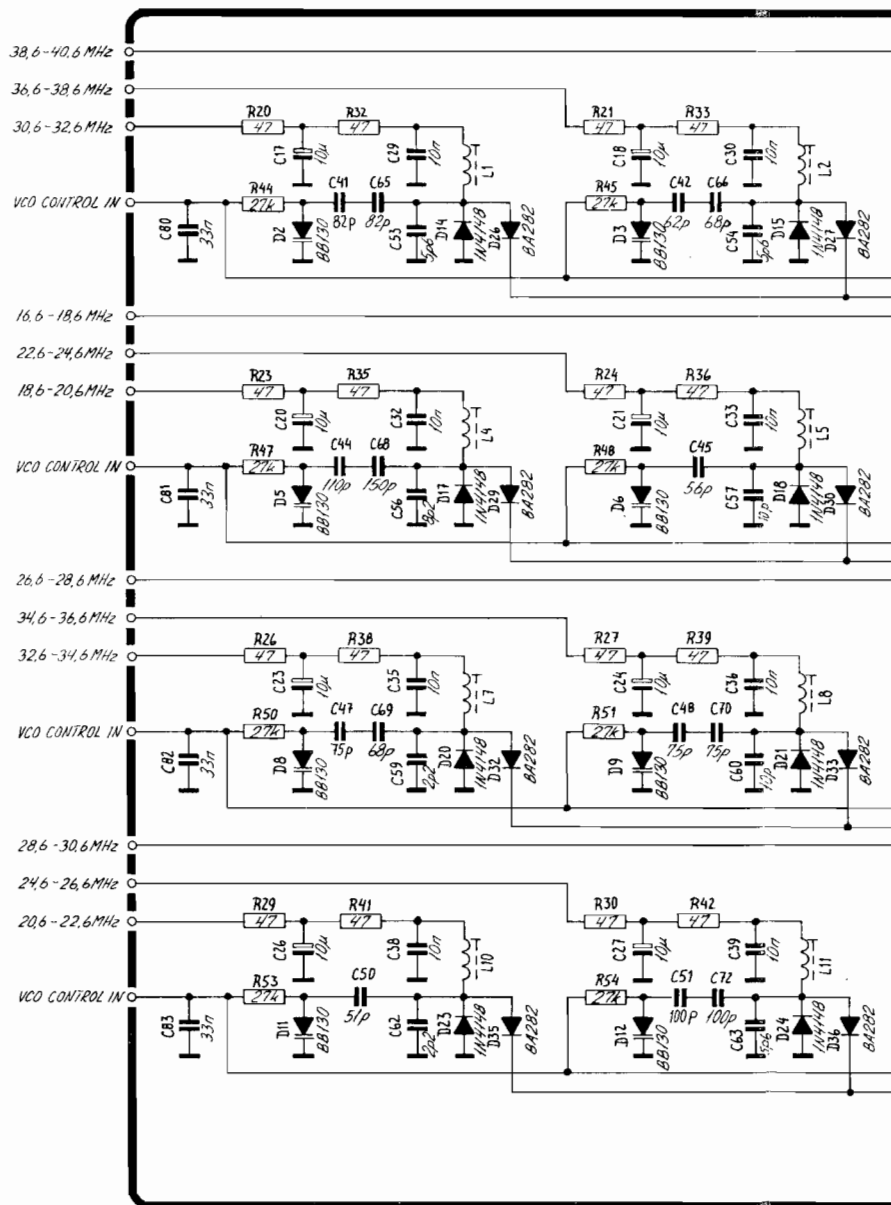
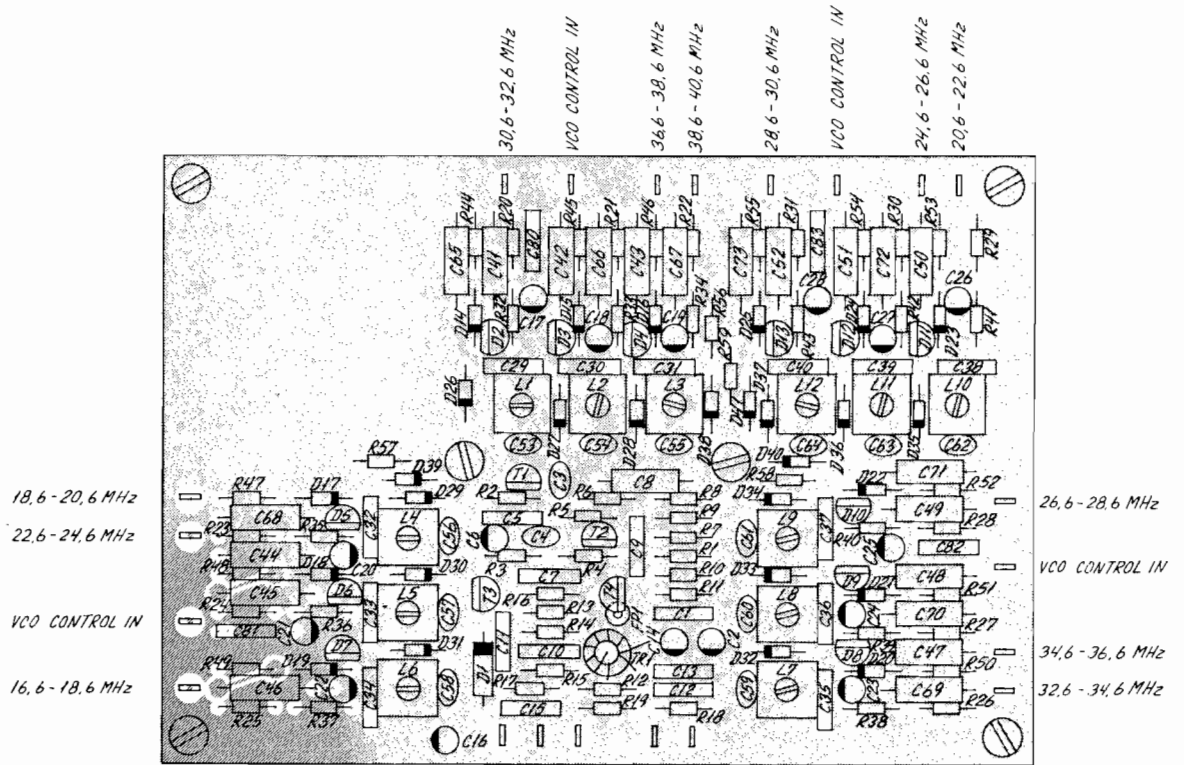
CIRCUIT DESCRIPTION FOR VCO-UNIT S13XX

The VCO-unit comprises a common active negative resistance transistor-circuit and 9 parallel tuned circuits, which can be connected to the first mentioned circuit - one at a time - by means of diode switches. The negative resistance is generated by means of the feed-back around T301 and T302. When a parallel tuned circuit is connected to the collector of T301 by means of a pair of band switching diodes D326 to D334 and D338 to D340, the circuit will oscillate. Each coil section will cover an output frequency range of 2 MHz.

The frequency of oscillation can be varied by means of the VCO-control input via the appropriate variocap. diode D302 to D310. The appropriate coil L304 to L315 is adjusted to give the maximum output frequency in the selected 2 MHz band for a control voltage of $\pm 15V$. When the output frequency is varied 2.0 MHz for each coil section the control voltage will change about 6 to 9.5 Volts.

The AC amplitude level at the tuned circuit and also at the buffer output port is kept constant by means of an ALC-circuit. The output level is sensed at R314 by the level detector C311, R316, and D301. Via T303 and R301 the DC-current and so the gain in T301 are regulated to give a constant output amplitude from the buffer amplifier built around T304. The DC-level at the collector of T303 will be able to vary between about 4.5V and 10.5V over the entire frequency range. The output level will be about 1.4V_{pp} at C312 and about 50 mV_{pp} at the top of R319.



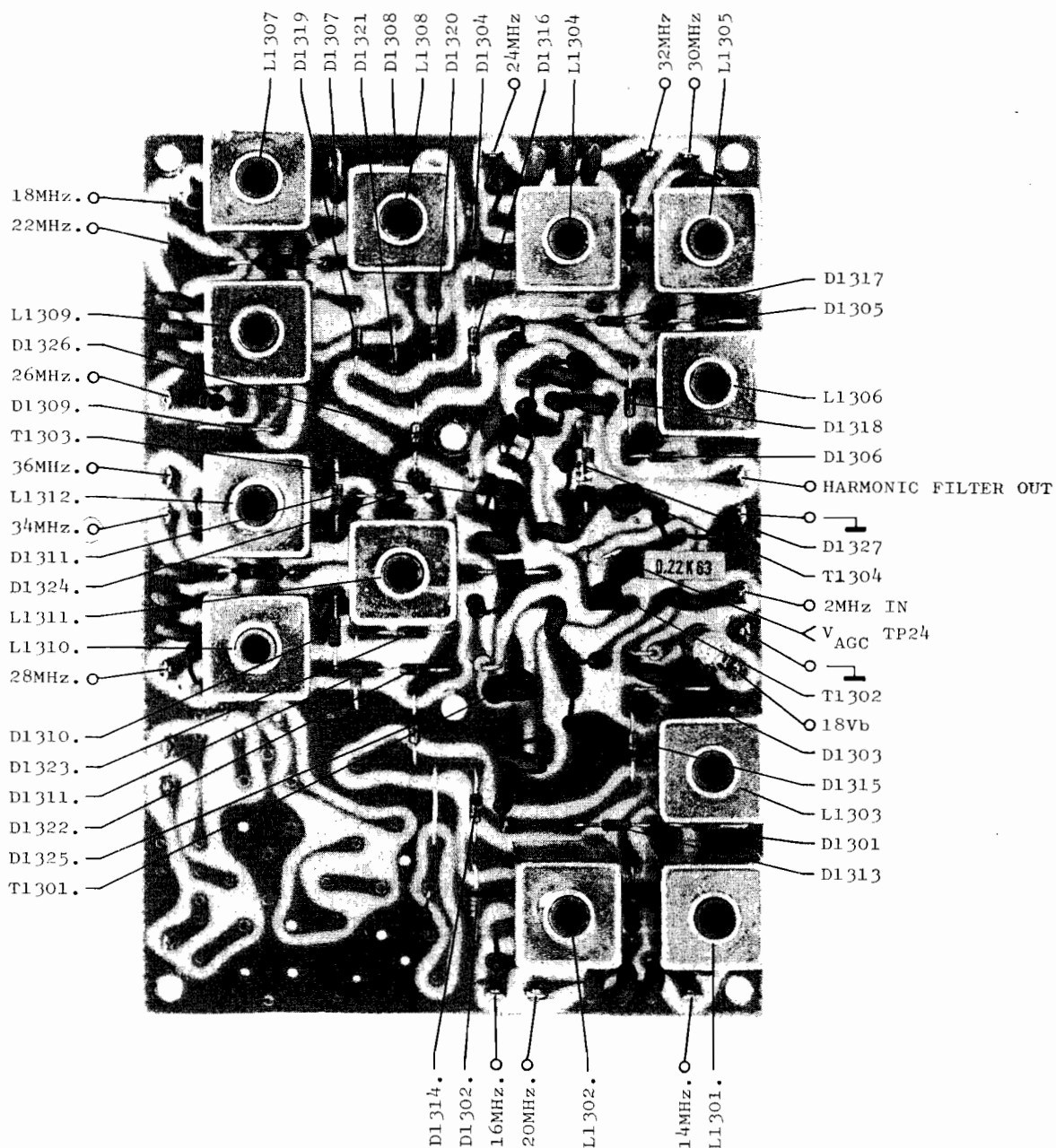


CIRCUIT DESCRIPTION HARMONIC FILTERS R1119 & R1120

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

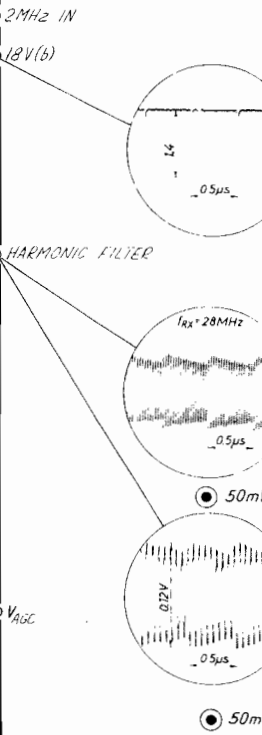
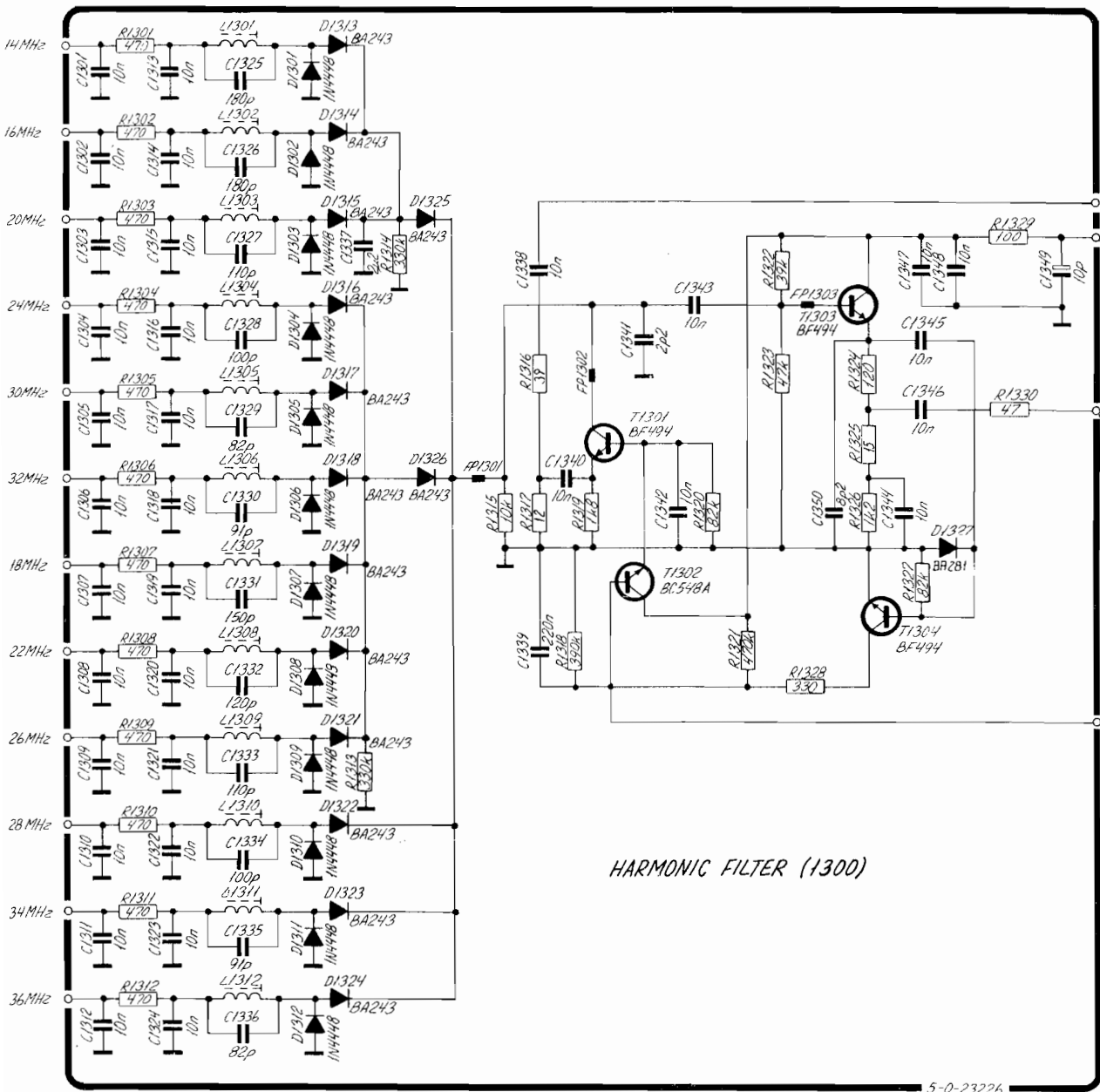
The circuit receives signal from the 2 MHz spectrum generator located on the divider board, and the selected LC-circuit together with T1301 filters out and amplifies the wanted harmonic of the input signal. The collector signal of T1301 is then fed to the emitter follower T1303.

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



TEST CONDITIONS

- Frequency setting : 2.0005 MHz
- Oscilloscope input : Passive probe 10:1
- DC voltmeter input : 10 Mohm
- ⊙: Diode probe measurement
- TP: Testpoint
- All voltage statements are typical

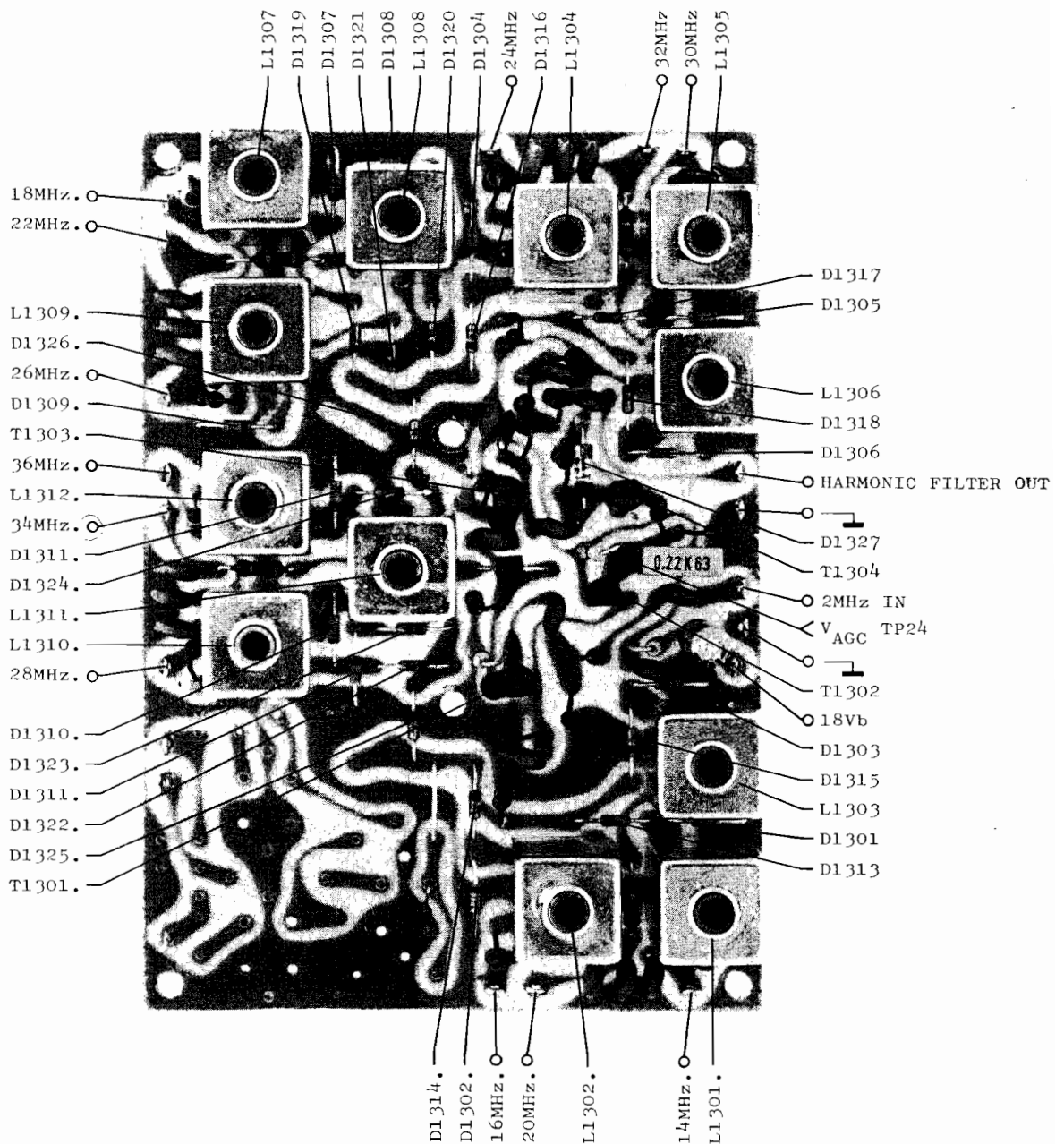


CIRCUIT DESCRIPTION HARMONIC FILTERS R1119 & R1120

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

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

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



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

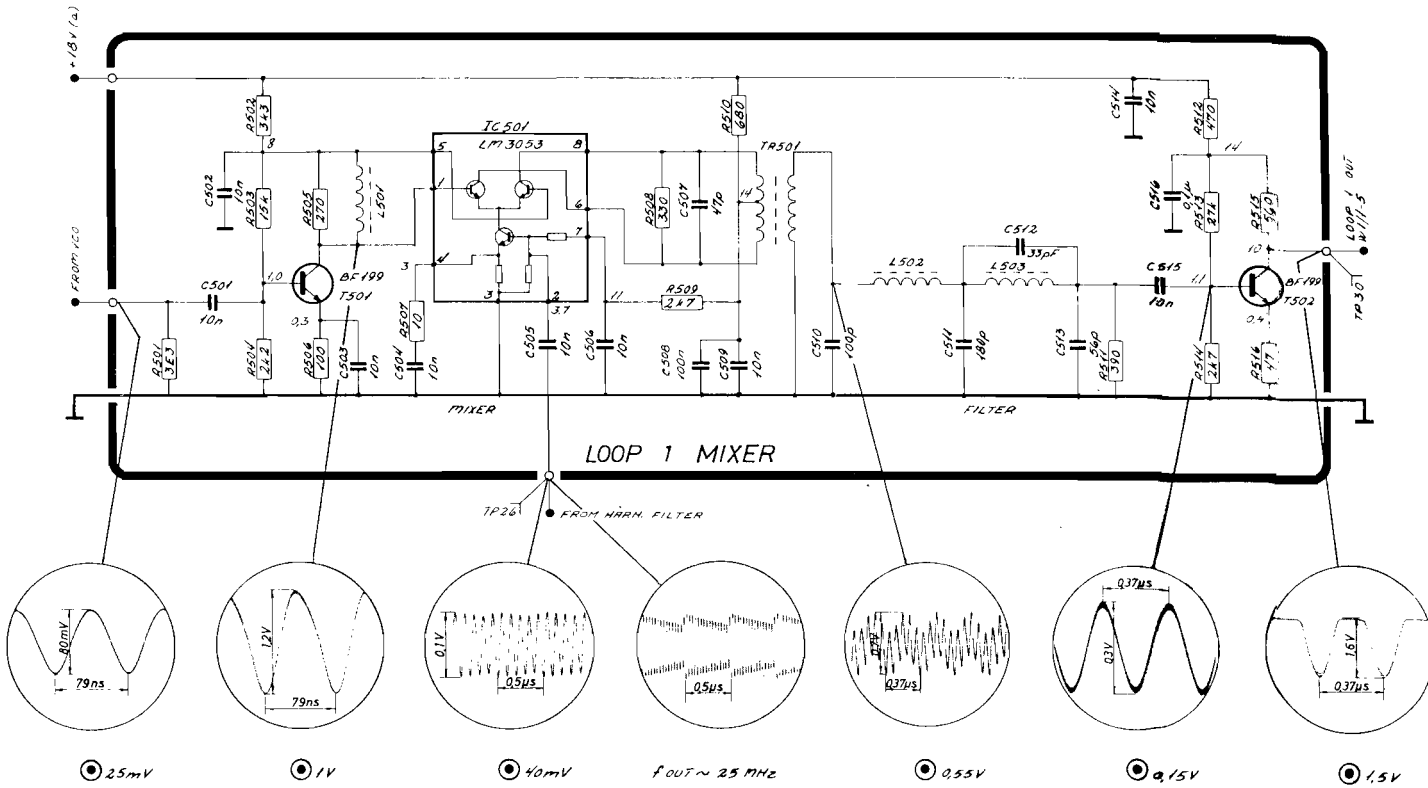
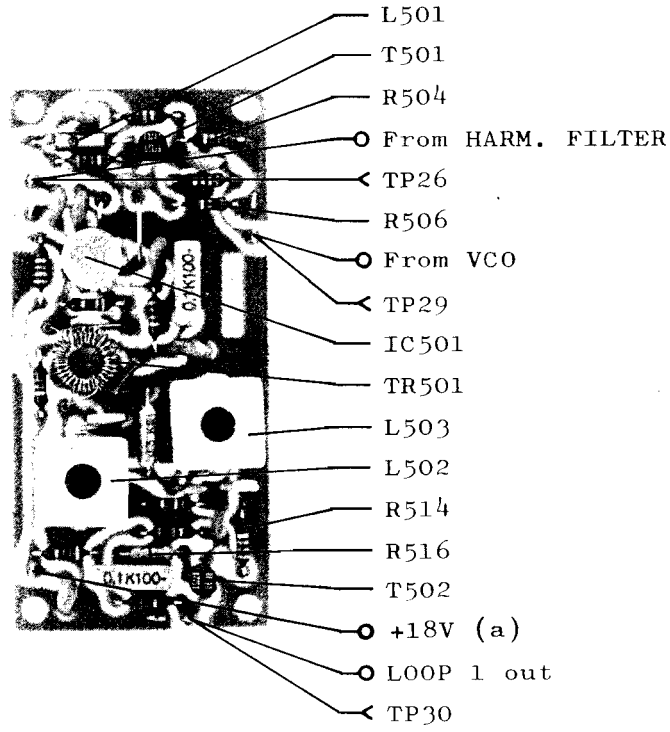
⊙ : Diode probe measurements

TP: Testpoints

All voltage statements are typical

B1/2 S130X

C2/2 S130X
 4-0-21636,A, 4-0-22093
 4-0-22014



CIRCUIT DESCRIPTION VCXO & LOOP 2 FILTER S130X

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

LOOP 2 FILTER

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

VCXO

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

LOOP 2 MIXER

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

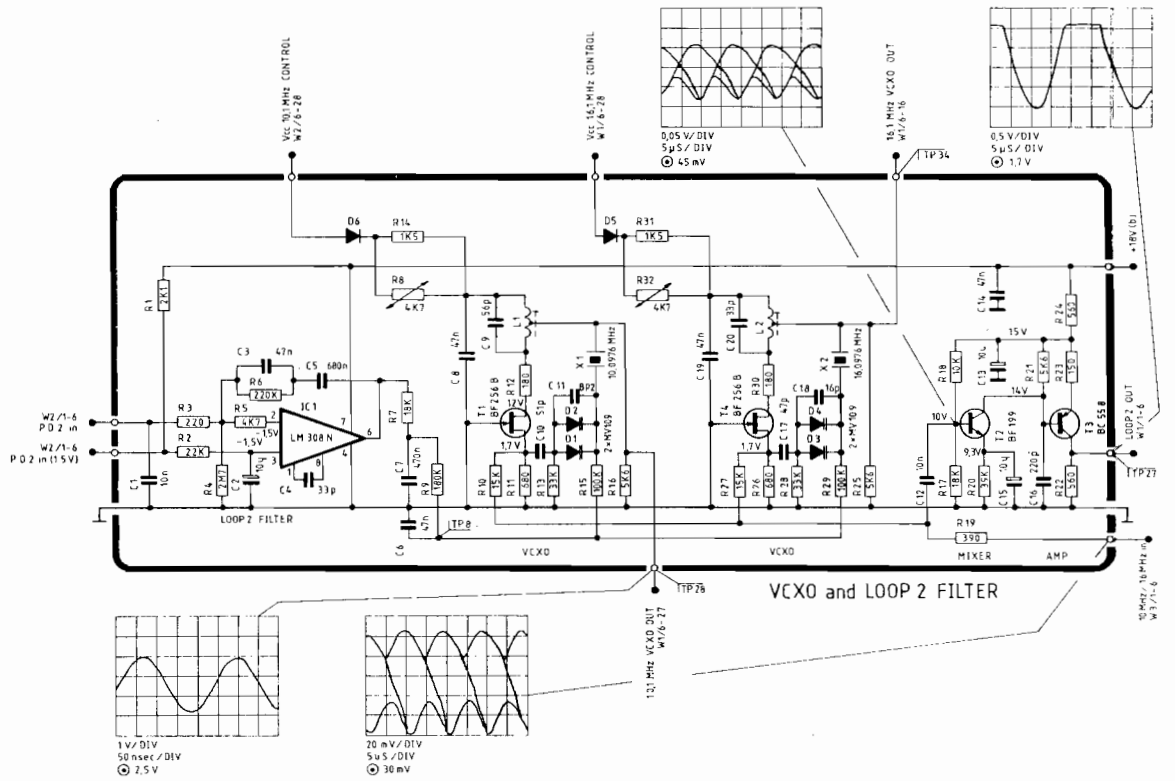
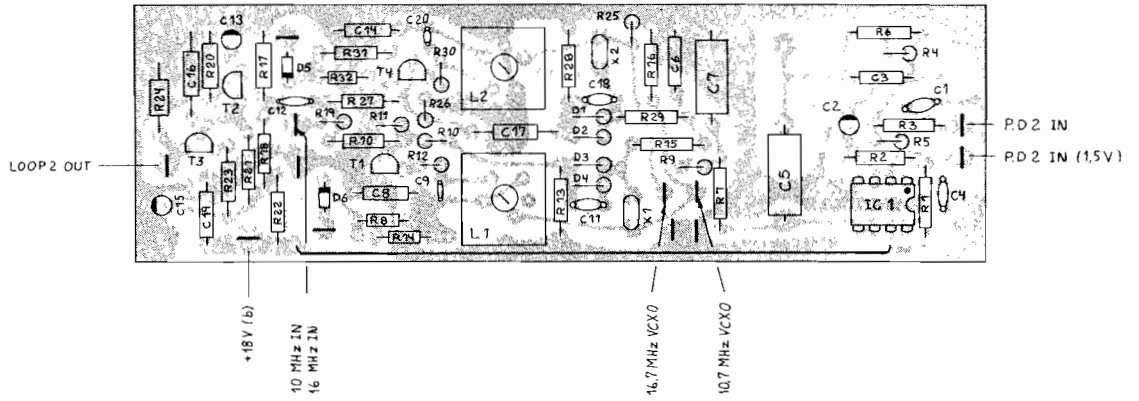
TEST CONDITIONS

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

⊙ : Diode probe measurements

TP : Testpoints

All voltage statements are typical



MODULE 600
VCXO & LOOP 2 FILTER

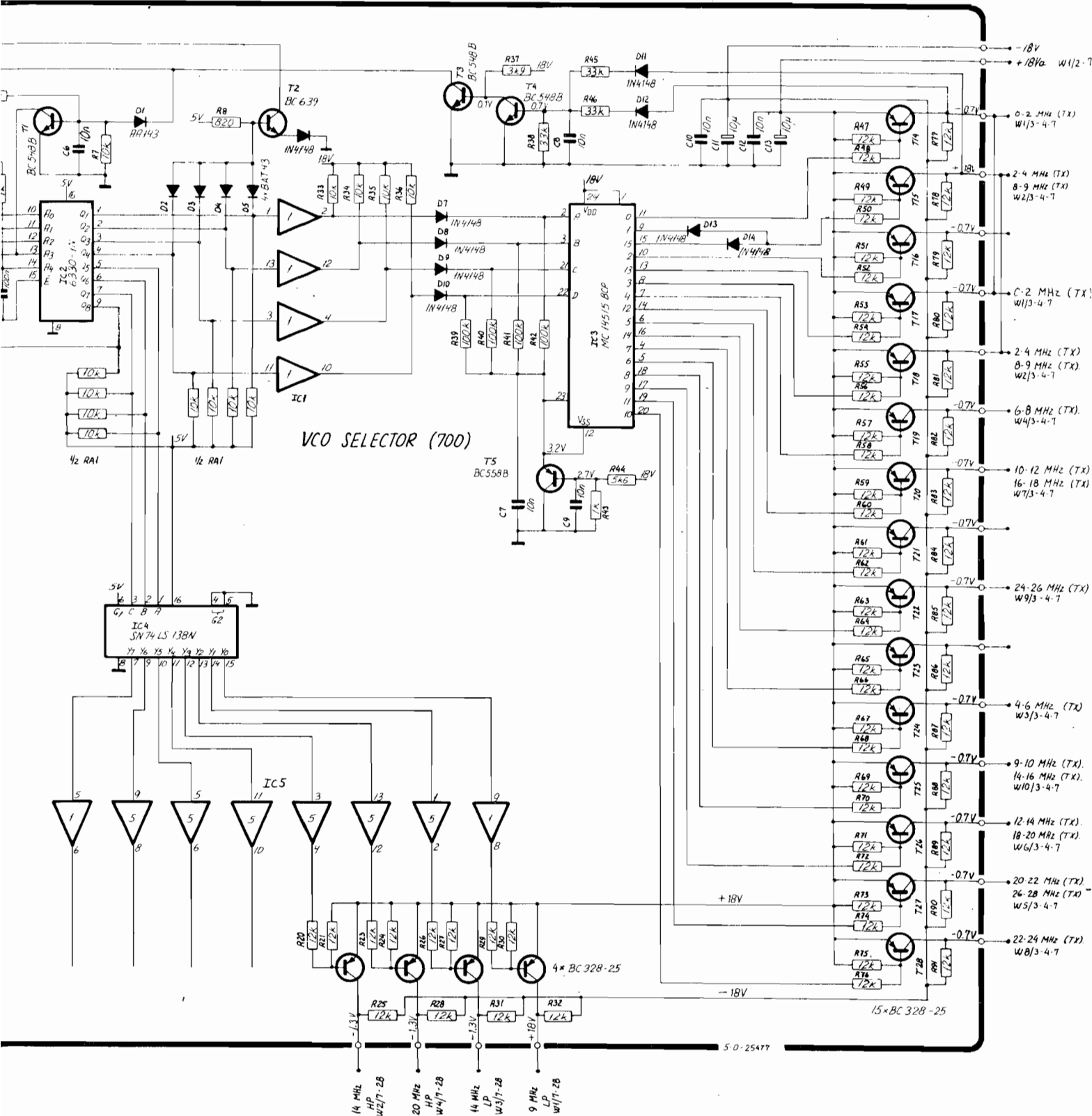
CIRCUIT DESCRIPTION VCO SELECTOR S130X

This unit has a five bit code input (T,V,X,Y,Z) and according to this information it will select the proper VCO and band filter. The five bit code addresses a prom IC702 which contains the code for VCO, band filter, and 1 MHzA information corresponding to every band. IC704 is a 3 to 8 line decoder which controlled from the prom IC702 turns one of the outputs low. This output selects via a buffer and a driver transistor the band filter in question.

The VCO code is from the prom IC702 fed to a 4 to 16 line decoder via a level shifter formed by IC701, R33-36, D707-D710, R739-R742 and T705 with surrounding components. Controlled by the code of the inputs ABCD IC703 turns low an output and via a driver transistor selects a VCO.

T703 and T704 detect whether the frequency is below 4 MHz or not. T702 and the diodes D702-D705 indicate when the band code for 2182 kHz fixed is at the inputs T,V,X,Y,Z.

T701 turns low the Y bit in the five bit code if dummy load is selected below 4 MHz. This results in a blocking of the band 2.0 - 2.199 MHz as it has the band code (TVXYZ) 00010. The band code is turned in the code 00000 and if the operator tries to transmit into the dummy-load in the frequency band 2.0 - 2.199 MHz, the PA stage will prevent transmission because it will not accept the code 00000.



MODULE 700
VCO SELECTOR

TEST CONDITIONS

Frequency Selector: 1A (f = 2.0005 MHz)

Power Level: FULL

Mode: TUNE

Maximum drive, 50 ohm connected to TX out, L1702

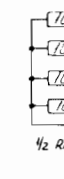
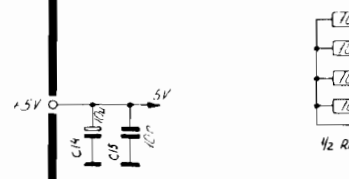
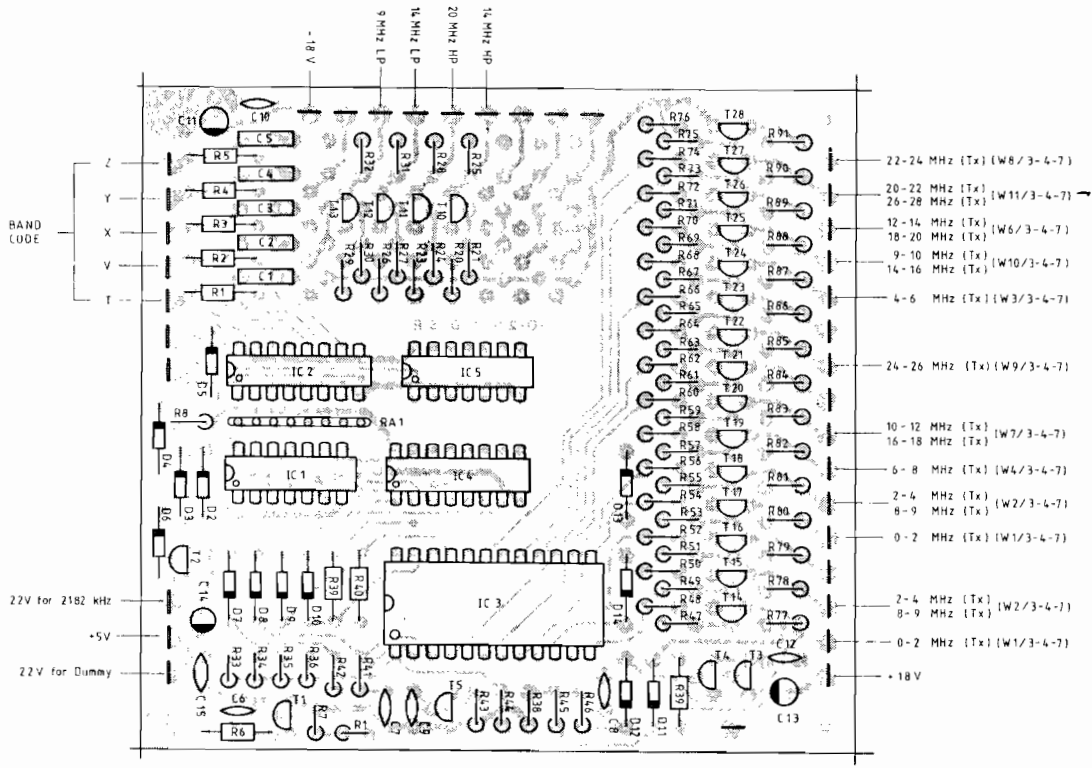
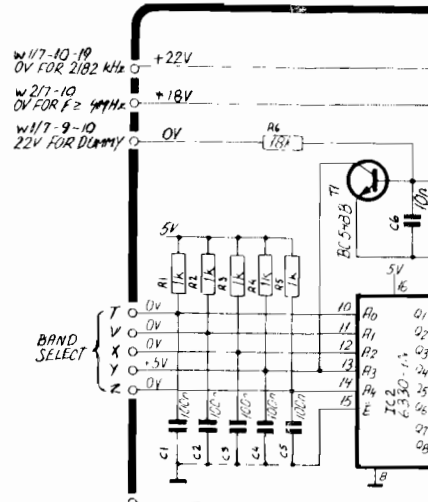
Oscilloscope input: Passive probe 10 Mohm/11 pF

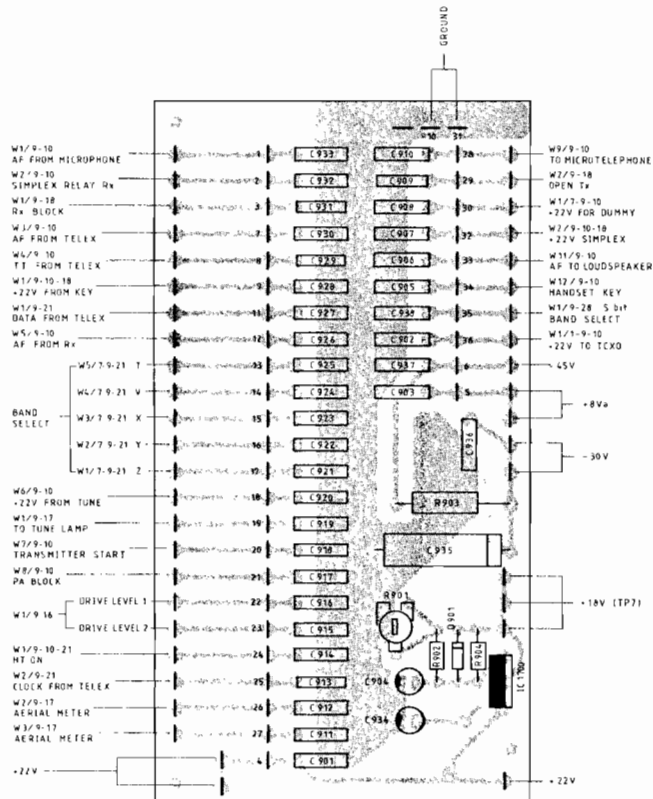
DC voltmeter input: 10 Mohm

⊙ : Diode probe measurements

TP : Testpoints

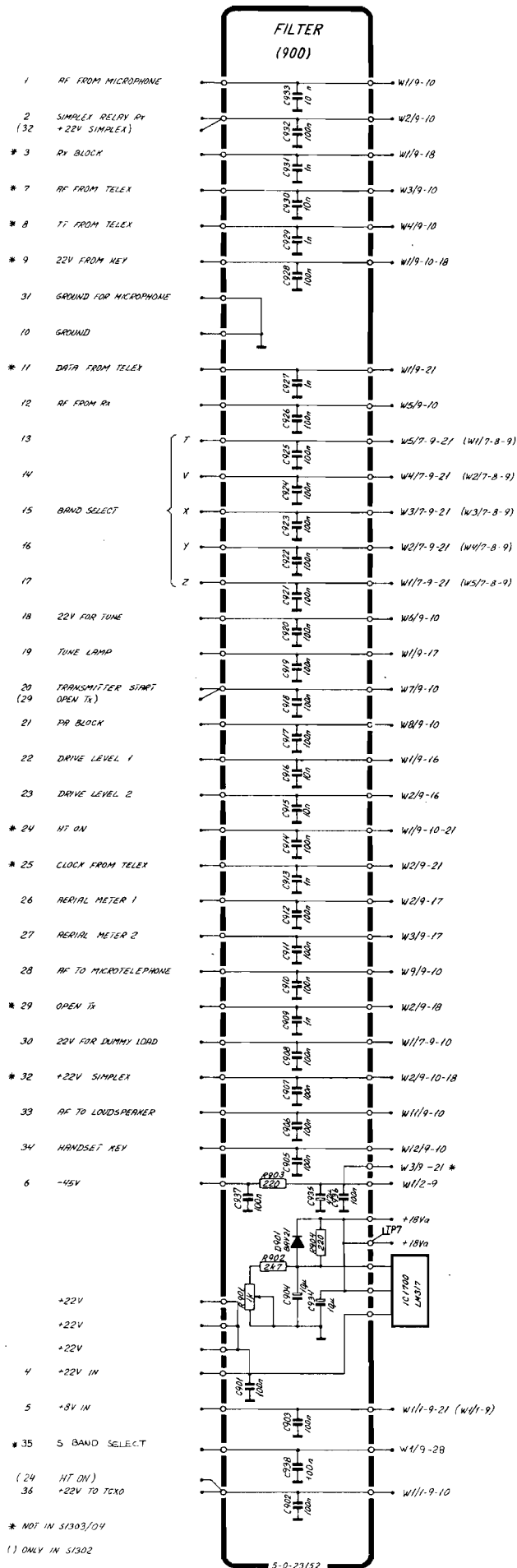
All voltage statements are typical





4-6-231528

D1/1 S1302/3/4/-I
4-0-23152B



MODULE 900
FILTER

CIRCUIT DESCRIPTION SSB GENERATOR S130X

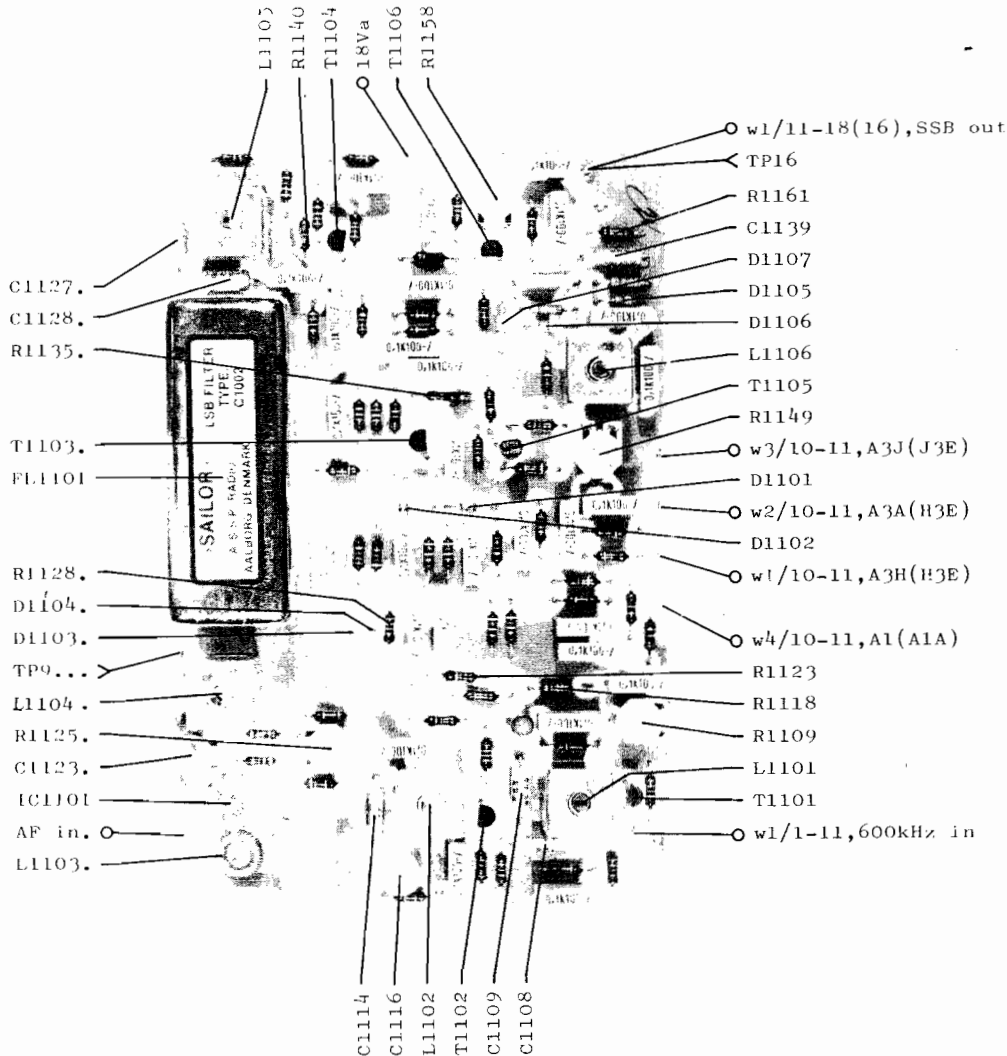
In this unit the required types of signals are generated A3A (R3E), A3H (H3E), A3J (J3E) and A1 (A1A).

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.



D 2/2 S130X
4-0-23225A

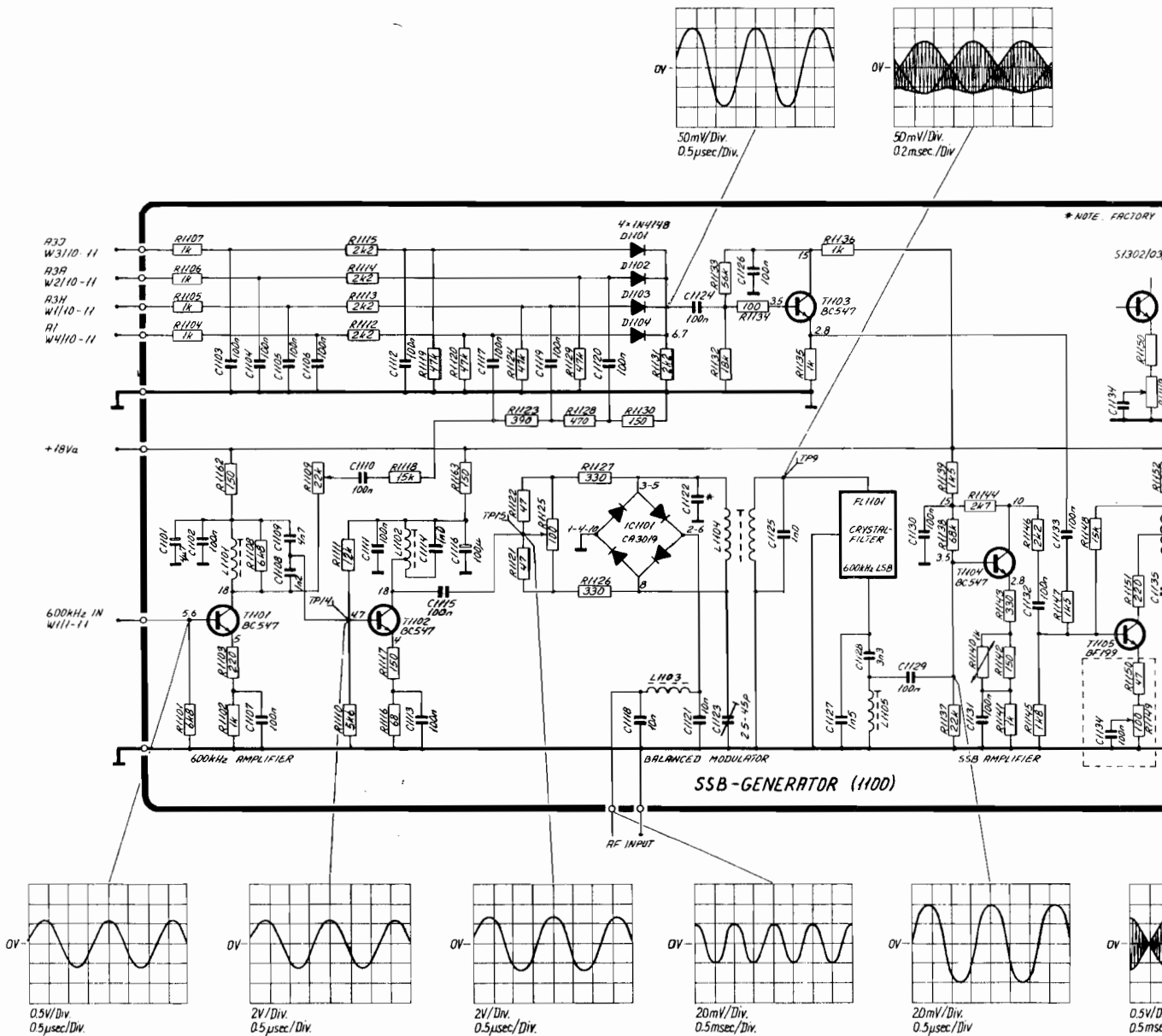
TEST CONDITIONS

Frequency selector: 1A (f = 2.0005 MHz)
 Mode: A3H
 AF input 1 kHz: 3 Vpp (serial condenser) } via mic
 KEY: ON
 Oscilloscope input: Passive probe 10 Mohm//11 pF
 DC voltmeter input: 10 Mohm

⊙ : Diode probe measurements

TP: Testpoints
 All voltage statements are typical

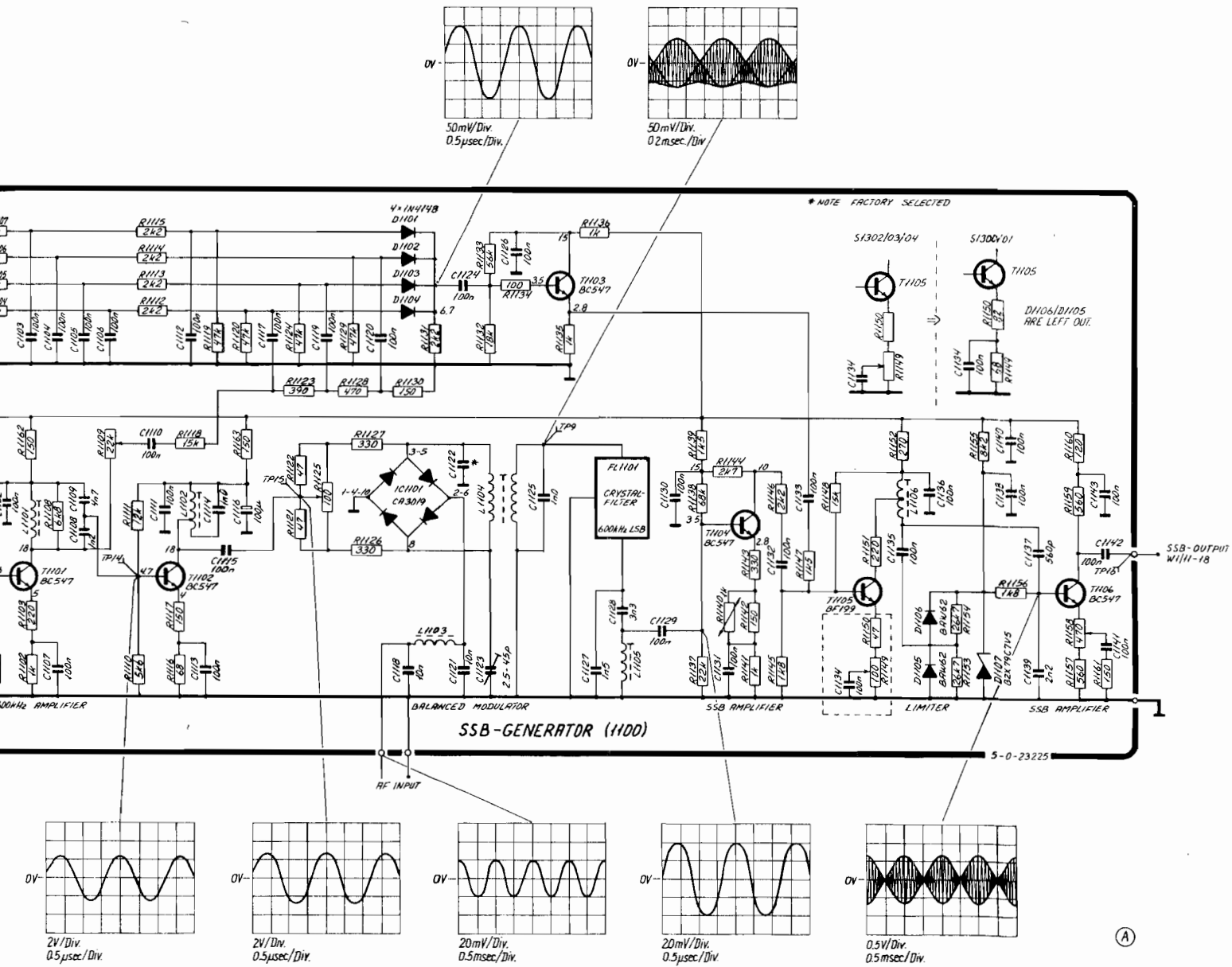
D 2/2 S130X
 4-0-23225A



TEST CONDITIONS

Frequency selector: 1A ($f = 2.0005 \text{ MHz}$)
 Mode: A3H
 AF input 1 kHz: 3 Vpp (serial condenser) } 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 statements 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.

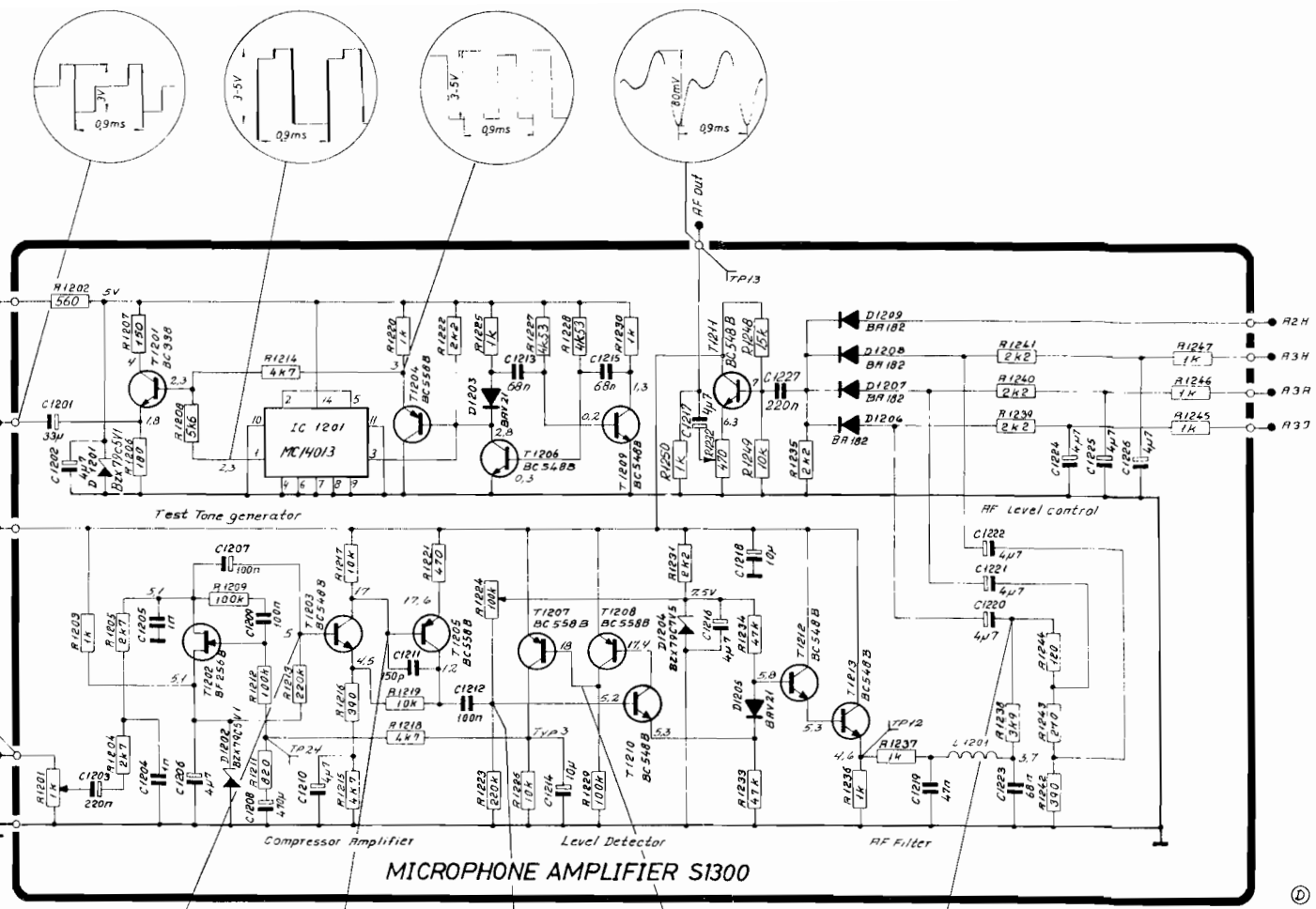
The voltage across C1214 is slowly discharged via R1218 and the filter circuit R1211 and C1208 and is applied to the gate of the previously mentioned FET T1202 via R1212.

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.

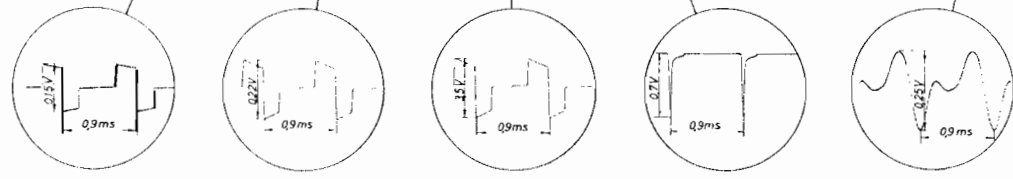
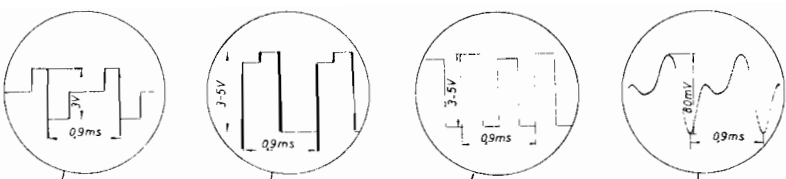
TEST TONE GENERATOR

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.

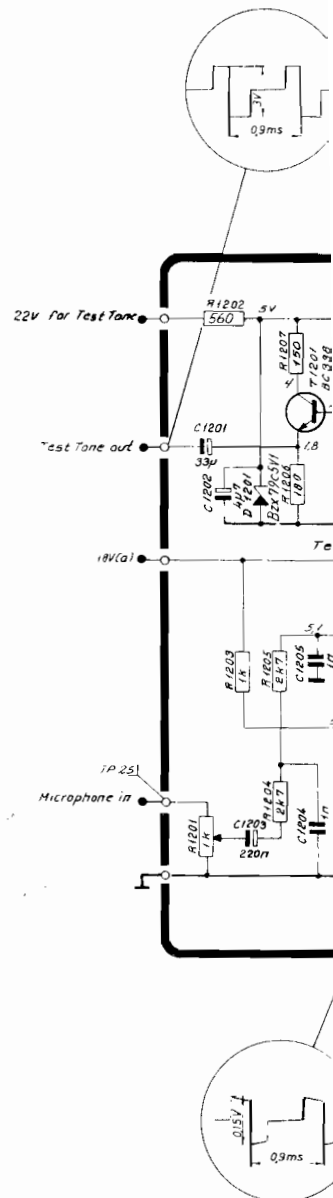
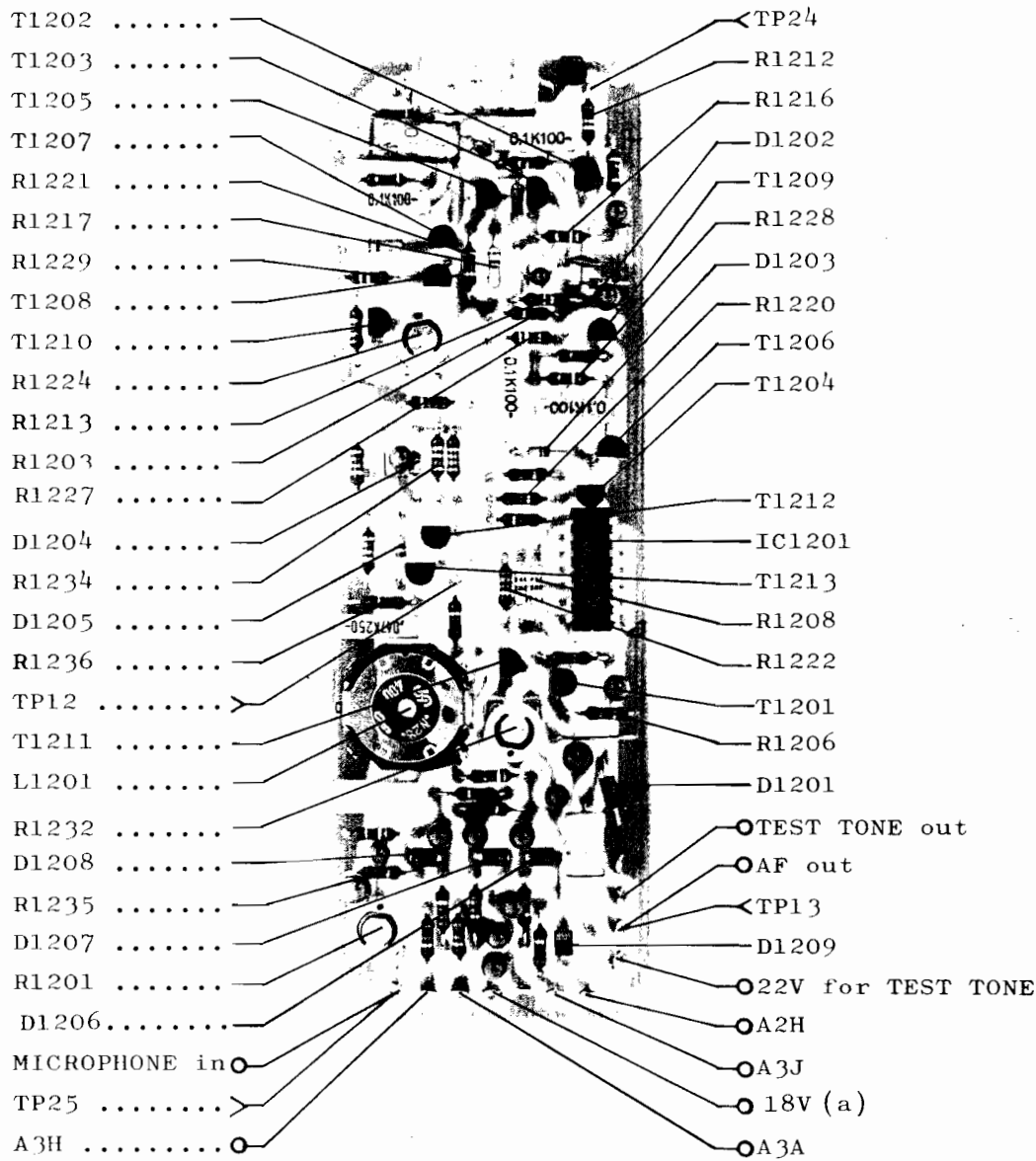


MICROPHONE AMPLIFIER S1300



TEST CONDITIONS

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



CIRCUIT DESCRIPTION ALARM SIGNAL GENERATOR S130X

The alarm signal generator creates the alarm signal which consists of 2200 Hz and 1300 Hz - tones, which are transmitted in 45 secs alternately with intervals of 250 msecs. Additionally it is possible to strap the generator to repeat the alarm signal transmission after a 2 minutes pause.

The alarm tones are generated by dividing down the 10 MHz TCXO signal to the wanted frequencies. The generator starts when the 22V supply is applied. T1303 and T1304 amplify the 10 MHz signal to TTL level. IC1313 is a 16 divider and its output on 625 kHz is fed to the programmable divider consisting of IC1307, IC1312, IC1302b, IC1302d, IC1303a and IC1311. Pin 9 of IC1312a goes high when IC1307 has received 141 clock pulses. If pin 12 of IC1302d is high (2200 Hz) the J input of IC1311a follows the output of IC1312a and then the FF 1311a will toggle on the next clock pulse. This clears the counter IC1307, now J and K input of IC1311a is "0" and "1" which will let it toggle on the next clock pulse and then the counter IC1307 will start counting again.

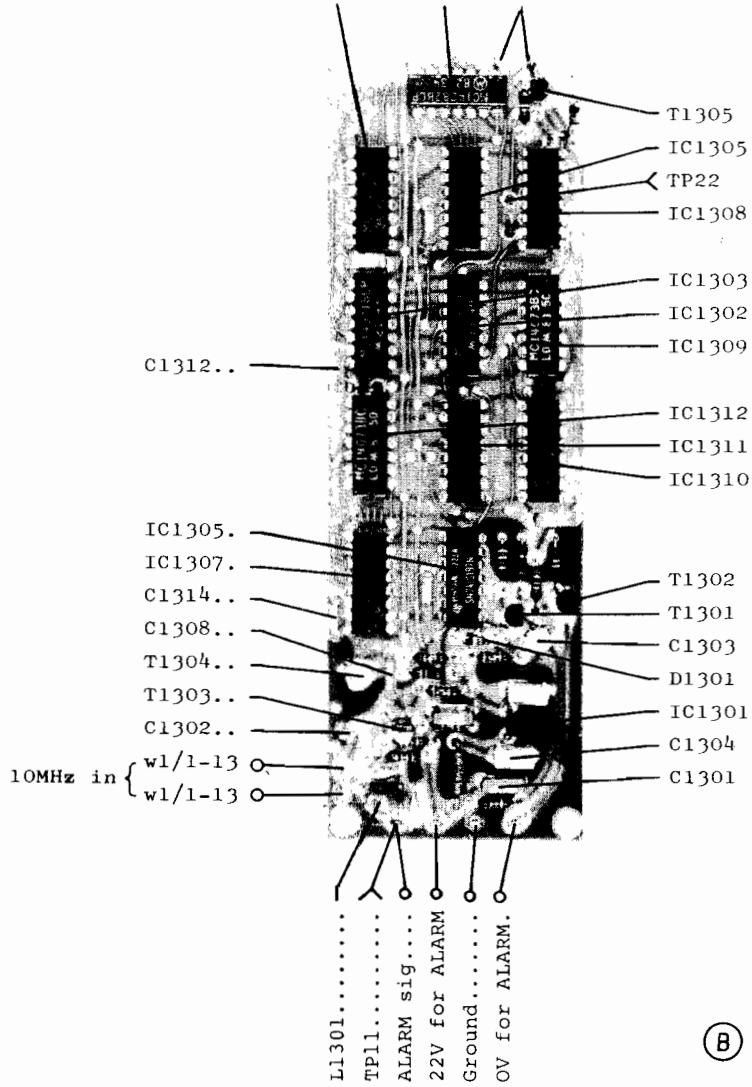
The timing is shown on fig. 1. After a division by two in IC1311b the output at pin 15 will be 2200 Hz which occurs like this $625000/(141+1)2 = 2200$.

When the wanted frequency is 1300 Hz, pin 12 on IC1302d must be "0" and then the J input on IC1311a will not be "1" before the output of IC1312a and IC1312b both are "1". When this happens the amount of clock pulses to IC1307 is $141 + 98 = 239$ (141 detected by IC1312a and 98 detected by IC1312b). The dividing figure from clock input of IC1307 to Q output of IC1311b is $(141 + 98 + 1)2$ and the resulting frequency is $625000/(141 + 98 + 1)2 = 1302$ Hz. With a mode of operation similar to the before mentioned divider, which generates the 2200 Hz and the 1302 Hz tones, a circuit formed by IC1310, IC1309, IC1302a, IC1303b and IC1308 dividers. These tones down to 2 Hz which means that the output of IC1308b changes state every 250 msecs. The dividing figures detected at the output of IC1309b and IC1309c are 549 and 324 respectively.

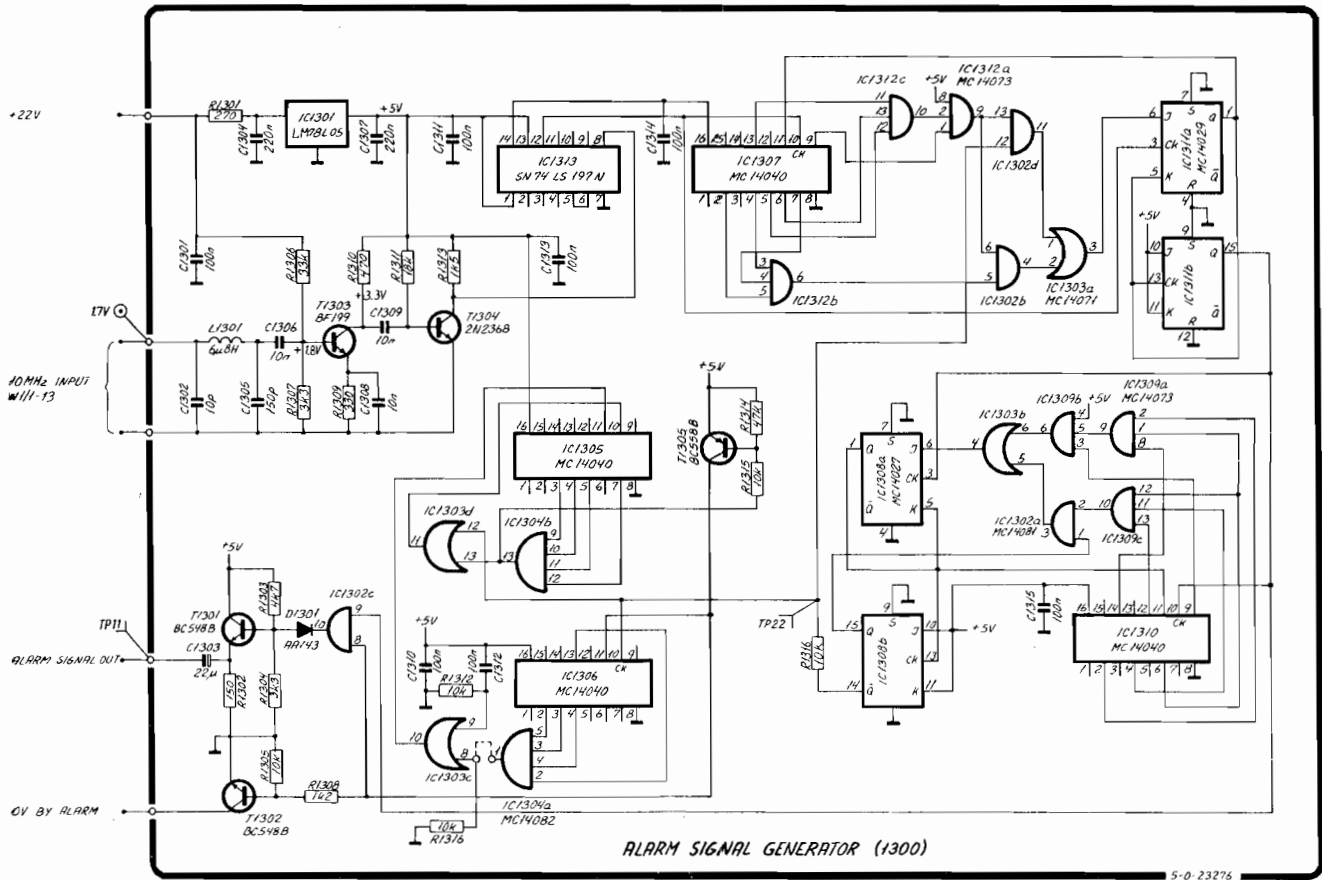
This dividing circuit controls both its own dividing figure (IC1308b pin 15) and the dividing figure (IC1308b pin 14) in the circuit which makes the 2200 and 1302 Hz tones. The timing is shown in fig. 1.

When the alarm generator starts by power-up, IC1305 is reset via IC1303c. This turns on T1305 which gates the alarm signal to the ALARM SIGNAL OUT connection. IC1305 counts the 2 Hz pulses from IC1308b and when an amount of 90 is reached (after 45 secs) the output of IC1304b is "1" which stops the clock pulses to IC1305 and turns off T1305 which blocks the gate IC1302c and hereby stops the alarm signal transmission. However the 2 Hz pulses at IC1308b are still running as long as the unit is powered up. When alarm transmission is stopped by T1305, IC1306 is not reset any longer and it will start counting the 2 Hz pulses. After 240 pulses (2 minutes) pin 1 of IC1304a is "1" and if the strap to pin 8 of IC1303c is on, IC1305 will be reset and the alarm signal transmission starts for another 45 secs. If the mentioned strap is present the alarm signal transmission will be repeated for every 2 3/4 minutes, otherwise it is only transmitted for one 45 secs. period.

IC1306 IC1304 2 min. repeat



(B)



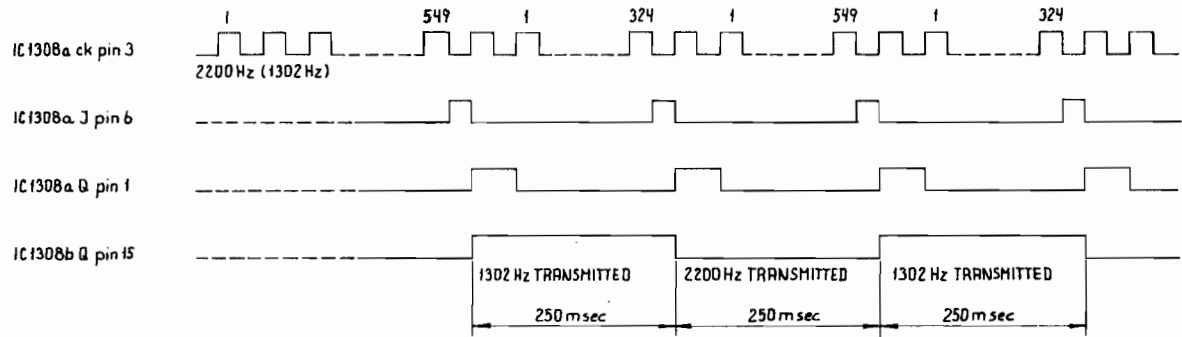
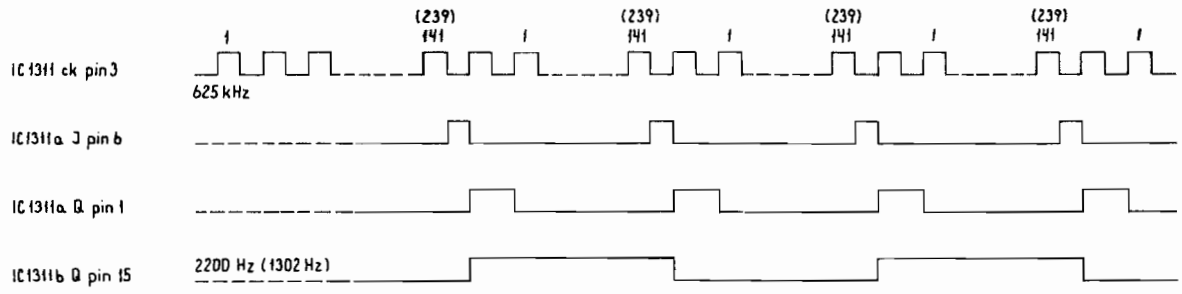
ALARM SIGNAL GENERATOR (1300)

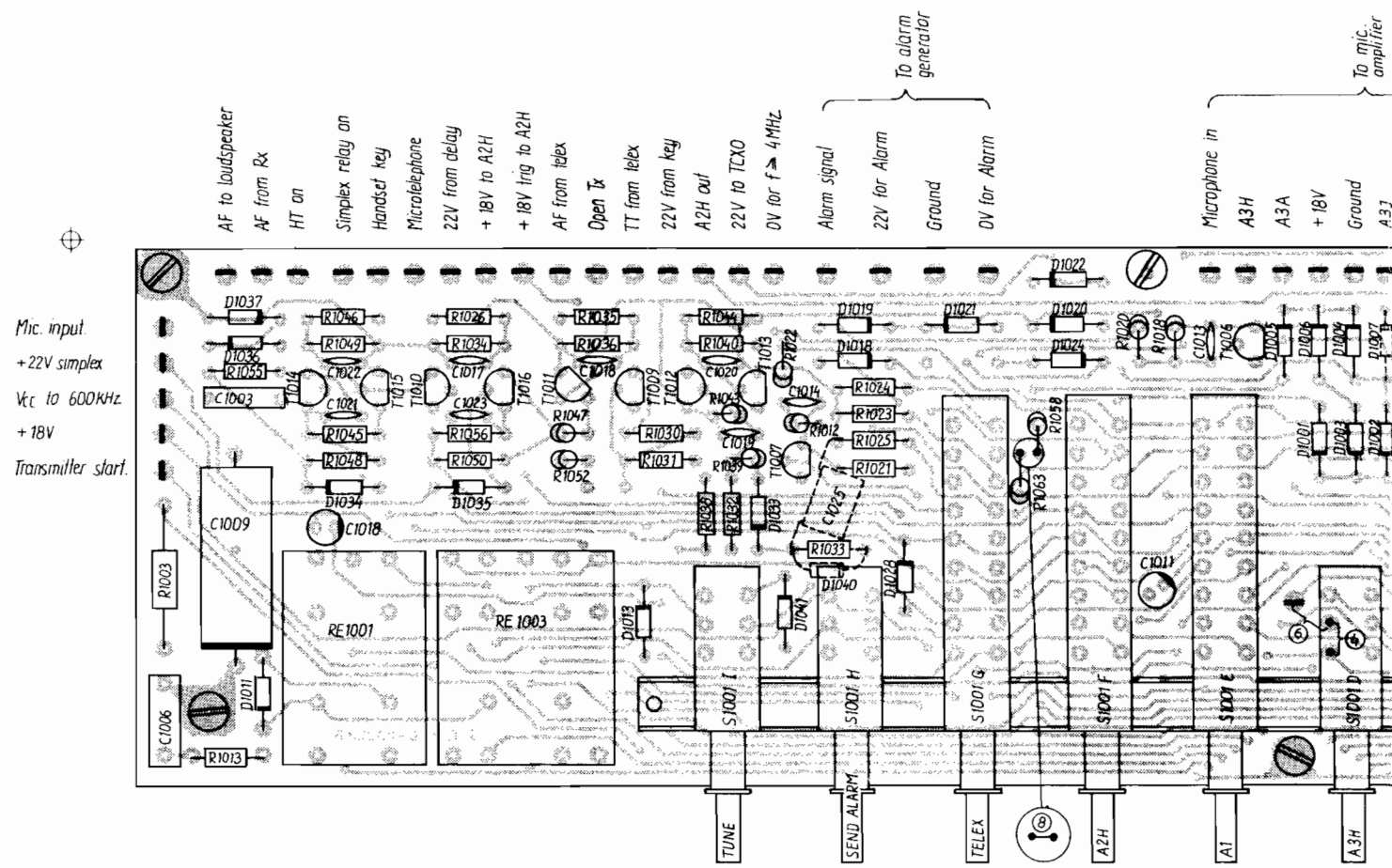
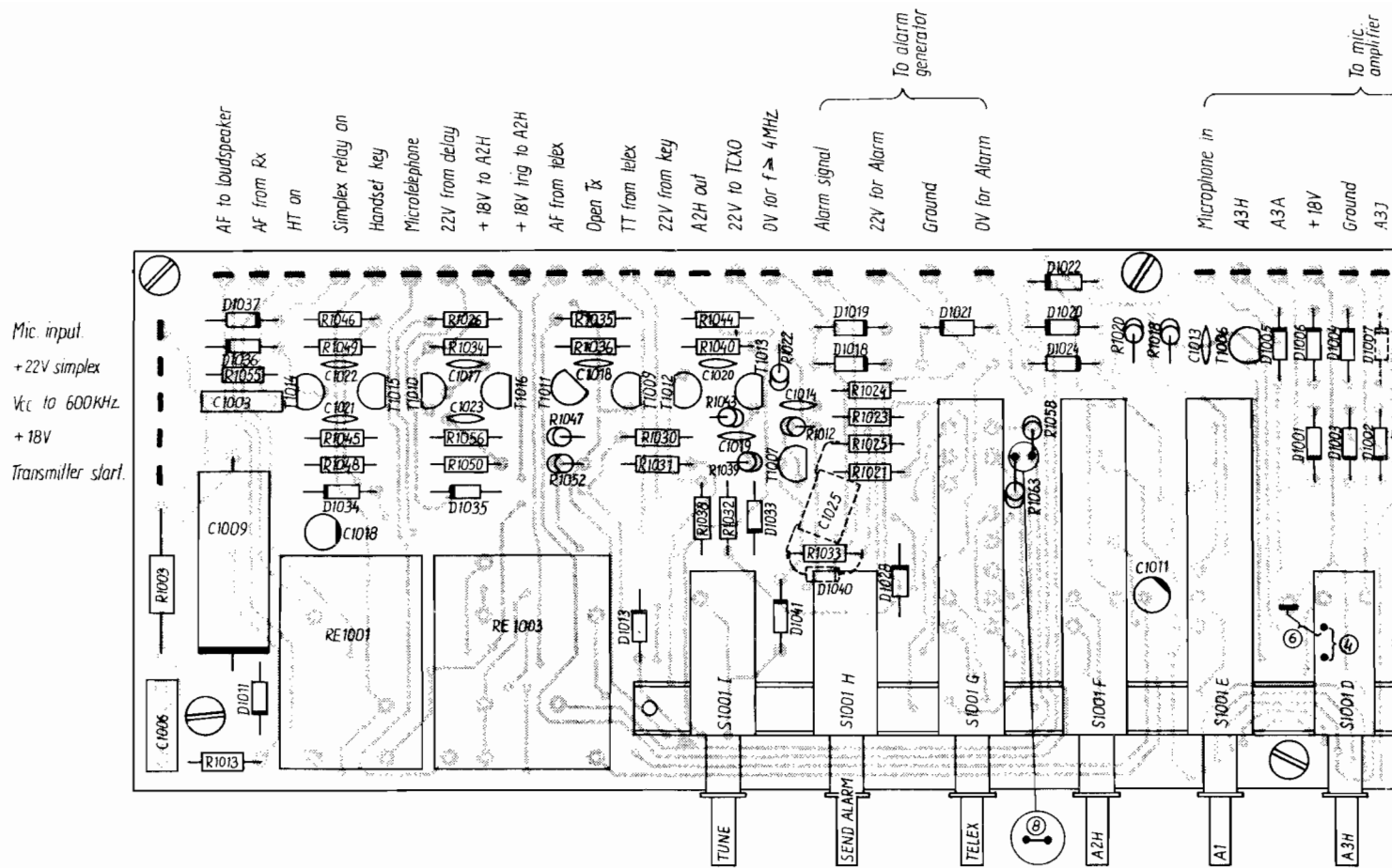
(B)

FIG. 1

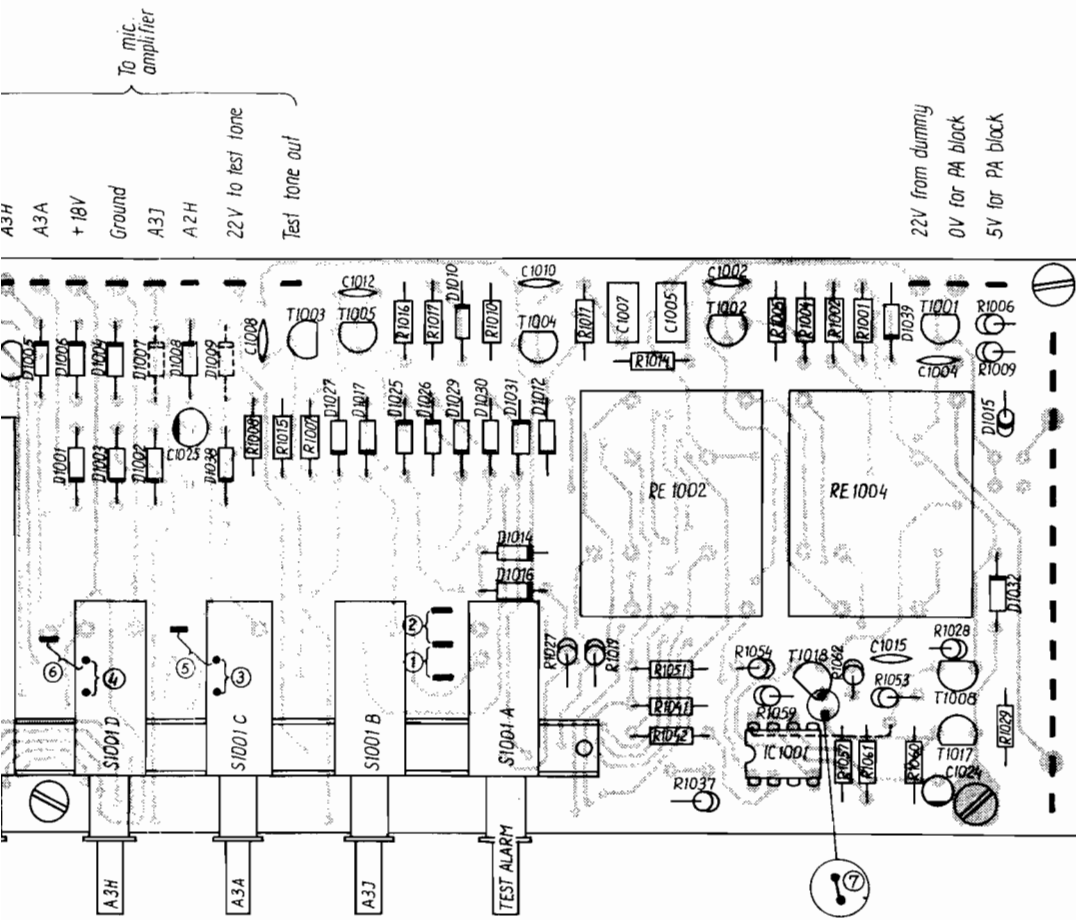
NUMBERS WITHOUT BRACKETS ~ 2200 Hz, IC 1302 d PIN 12 = "1"

NUMBERS WITH BRACKETS ~ 1302 Hz, IC 1302 d PIN 12 = "0"

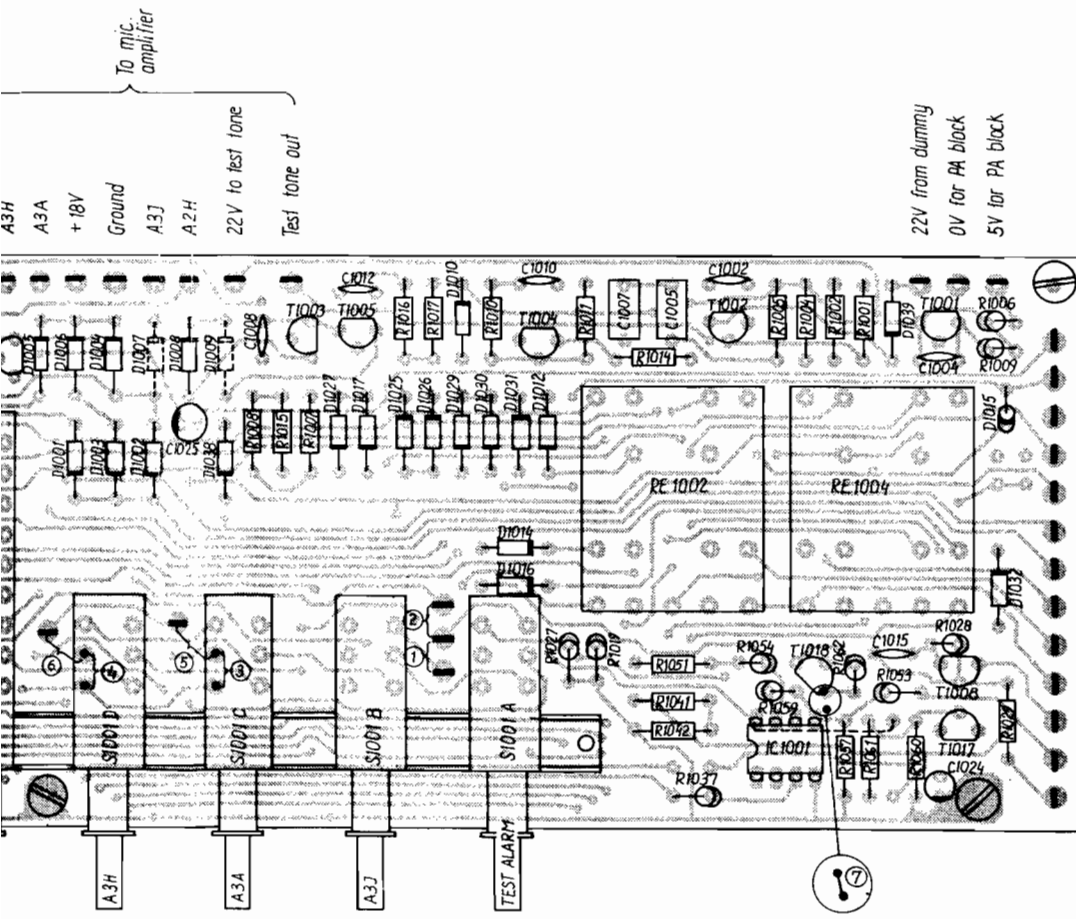




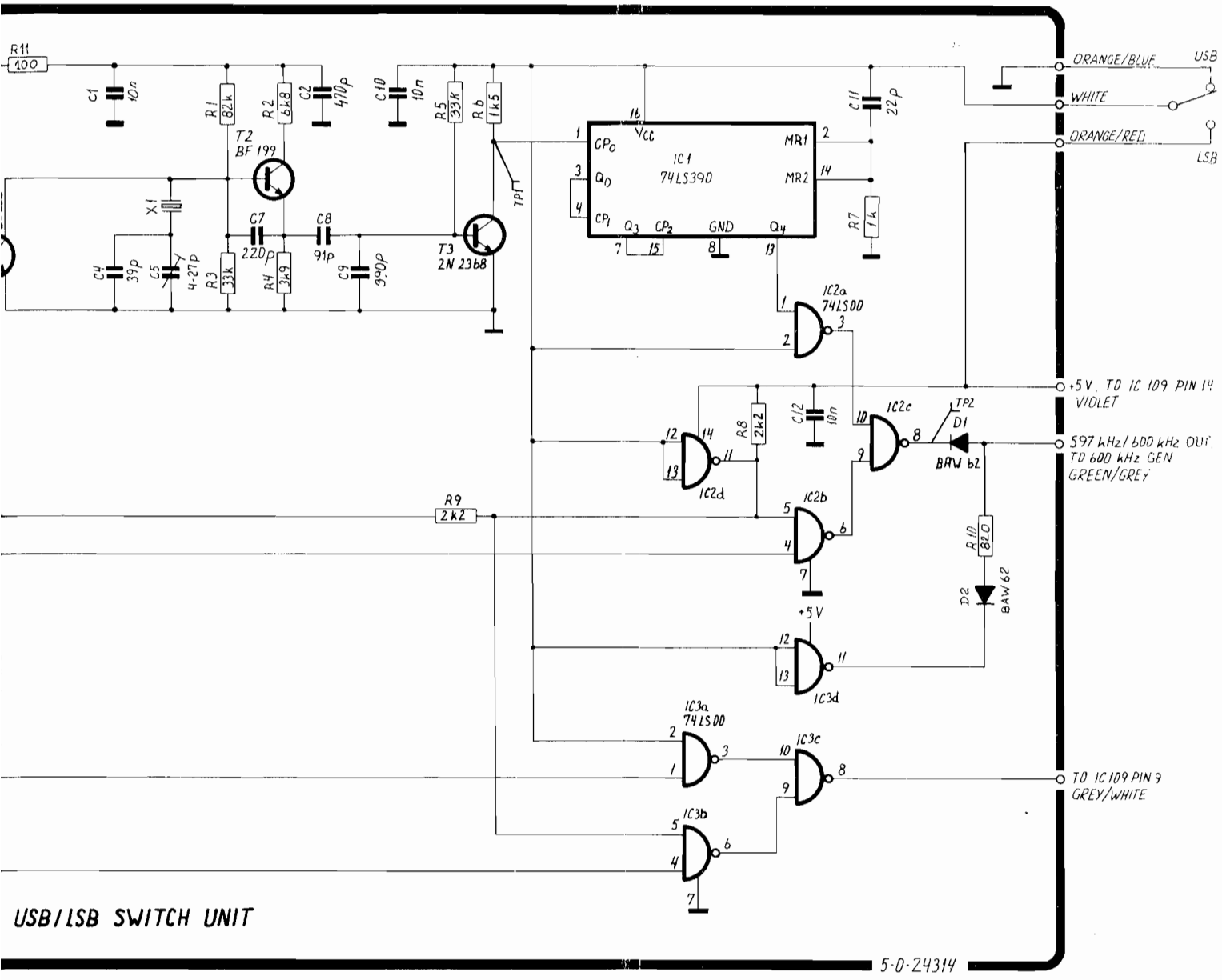
COMPONENT LOCATION MODE SWITCH (MODULE 1000)



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



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

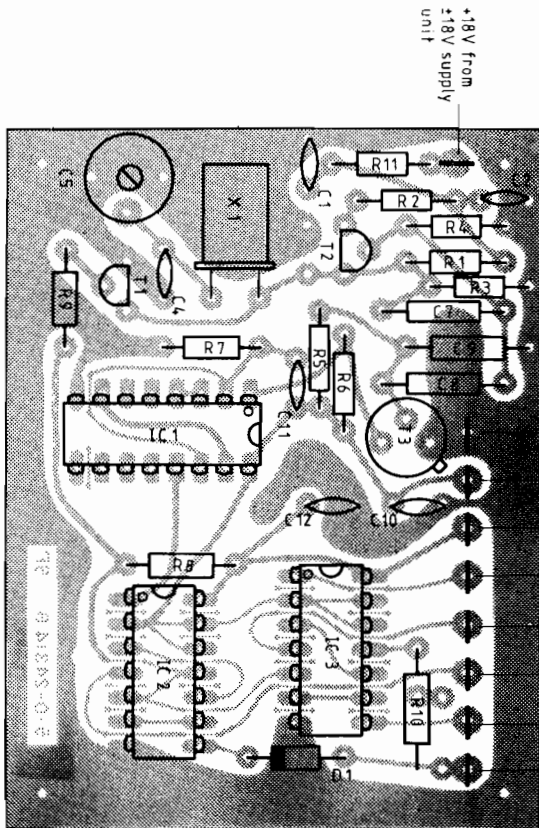


USB/LSB SWITCH UNIT

5-0-24314

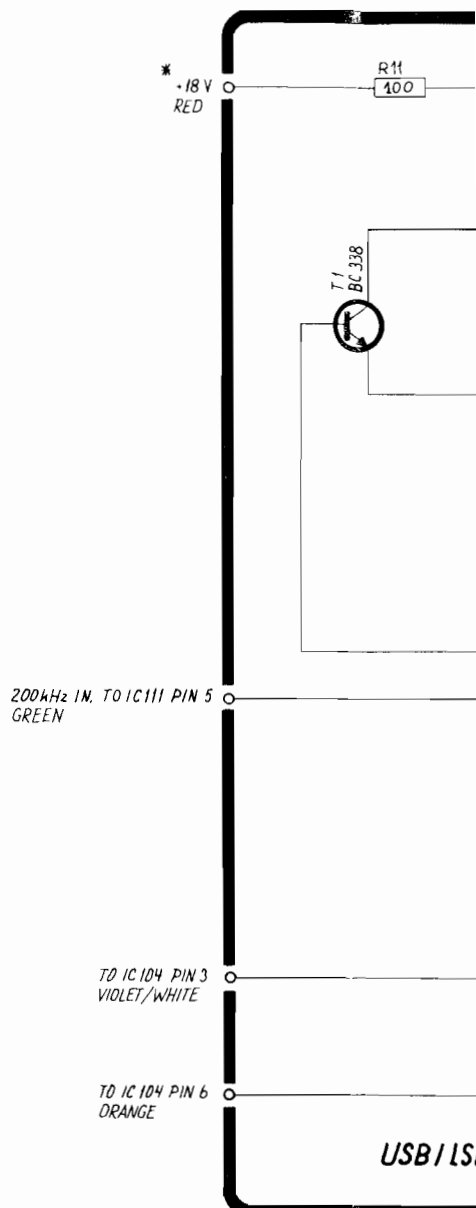
RY IS TAKEN FROM THE +18V SUPPLY UNIT
 (16) OUT" (CONFER WITH THE PICTURE IN QUESTION)

MODULE 2900
 USB/LSB SWITCH



+18V from
+18V supply
unit

- To LSB/USB switch (ORANGE/BLUE)
- To LSB/USB switch (WHITE)
- +5V to IC109 pin4 (VIOLET)
To LSB/USB switch (ORANGE/RED)
- To IC104 pin3 (VIOLET)
- To IC104 pin6 (ORANGE)
- 200 kHz in to IC111 pin5 (GREEN)
- To IC109 pin9 (GREY/WHITE)
- 597/200 kHz out (GREEN/GREY)



* THE 18V SUPPLY IS TAKEN FROM THE "+18V(6) OUT" (CONNECTION POINT)

CIRCUIT DESCRIPTION OUTPUT FILTER S1302/03/04

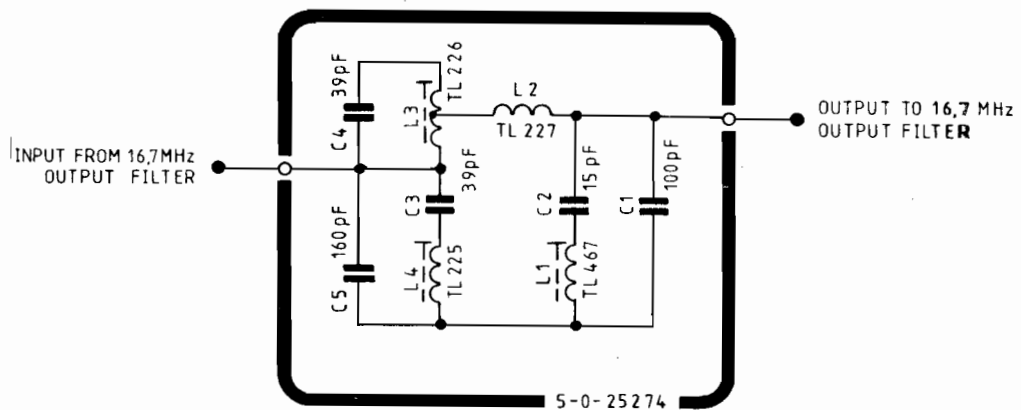
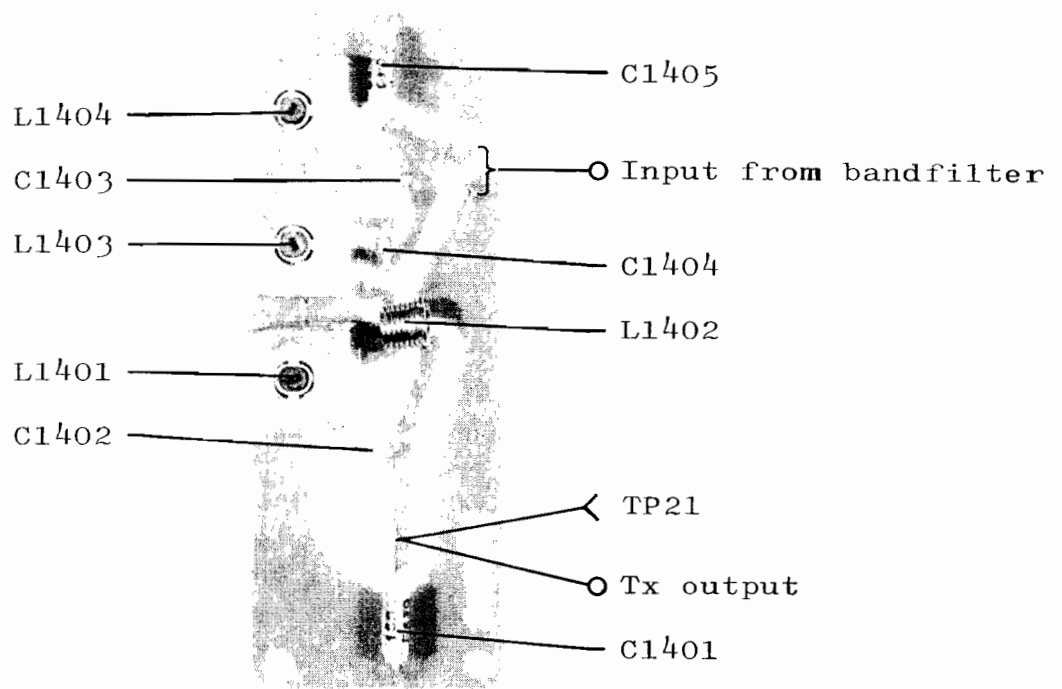
This unit contains a combined band stop and low-pass filter.

The band stop filter has a 1 dB bandwidth of approx. 1.7 MHz and the center frequency is 10.7 MHz.

The low-pass filter has a 3 dB frequency of approx. 33.3 MHz.

The band stop frequency is adjusted with L1401, L1403, and L1404.

The low-pass frequency is adjusted with L1402.



OUTPUT FILTER

CIRCUIT DESCRIPTION BAND FILTER S1302/03/04

This unit contains two amplifiers, four band-pass filters, and two low-pass filters.

The signal from the third mixer appears at the base of the first amplifier T1501 via C1501. This amplifier is supplied with feed-back via R1501 and R1505 to act as the correct load for the mixer. The output from this amplifier is via an 1:2 transformer TR1501 fed to the selected band-pass filter or low-pass filter.

The proper filter is selected with DC voltages from the VCO selector unit. When the 0-6.4 MHz LP filter is selected, the supplied DC control voltage is biasing the diodes D1501, D1505, and D1507 in the forward direction and the diode D1503 in the reverse direction.

The output from the chosen filter is fed to the buffer transistor T1502 and via a frequency compensating network, consisting of L1513 and C1549, through the transistor T1503 to the output terminals.

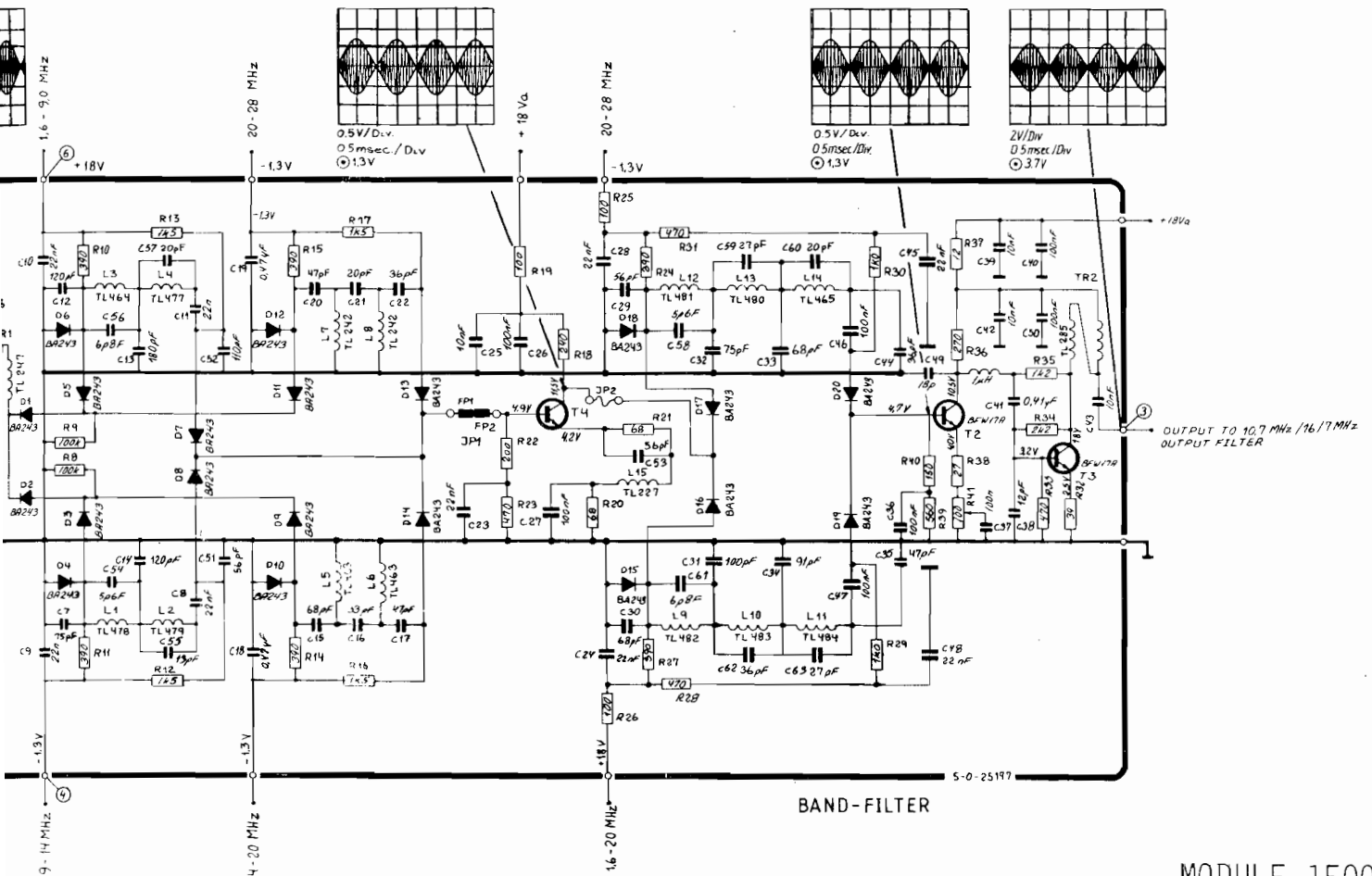
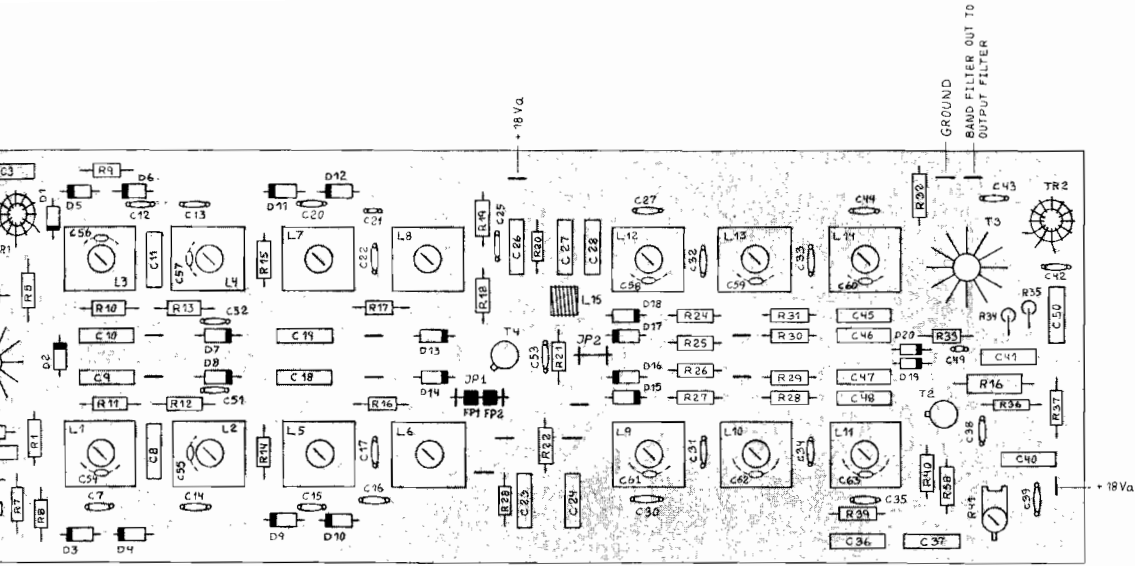
TEST CONDITIONS

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

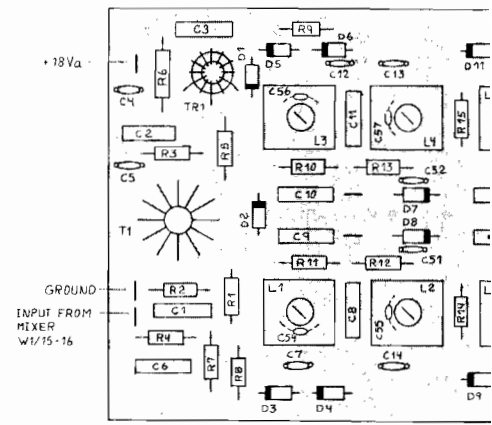
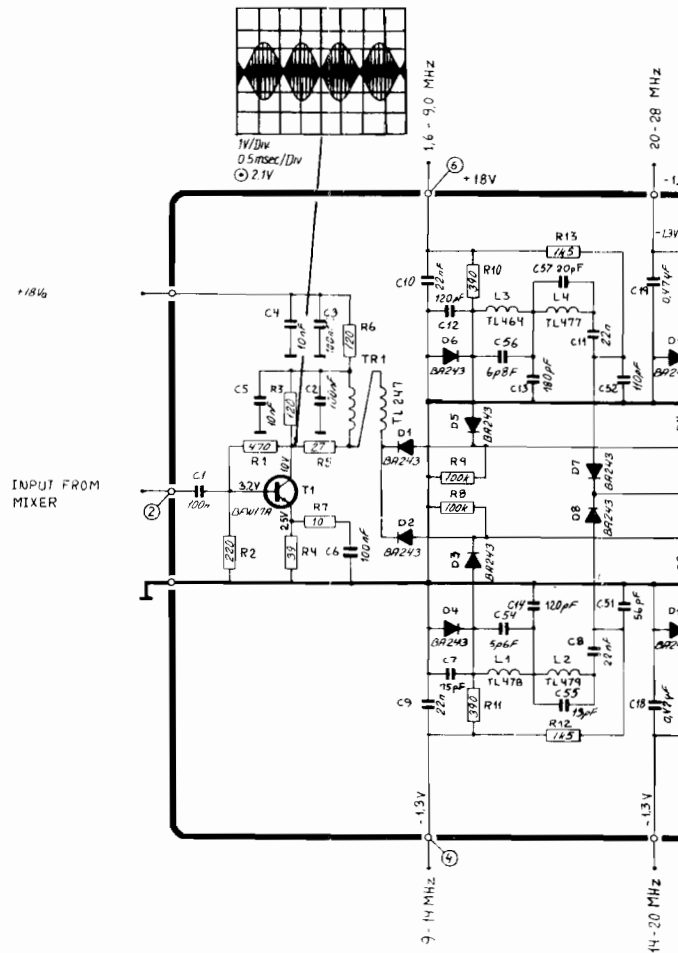
TP: Testpoints

All voltage statements are typical



MODULE 1500
BAND FILTER

D2/2 S1303/4-I
 4-0-25197 4-6-25197



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 second 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

FIXED POWER
W1/27-16

+23V FOR RELAYS
W8/16-28

DRIVE LEVEL
W5/16-27

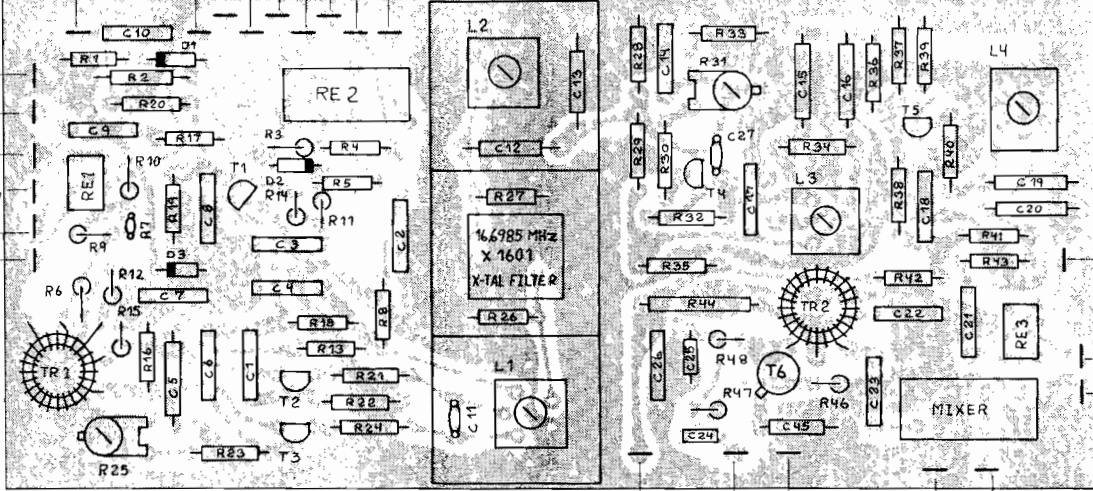
DRIVE LEVEL
W6/16-27

DRIVE LEVEL
W17/9-16

DRIVE LEVEL
W2/9-16

+18V_{dc}

+22V FOR DRIVE LEVEL
RELAY W8/16-28



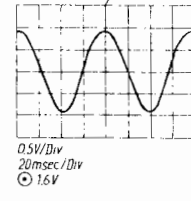
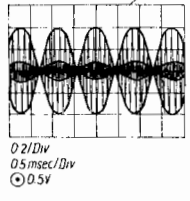
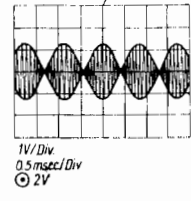
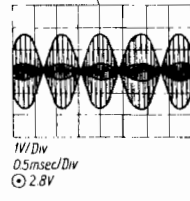
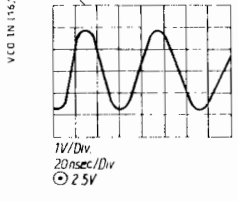
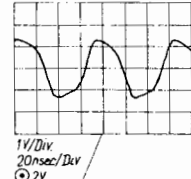
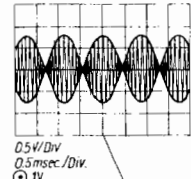
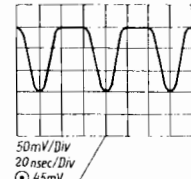
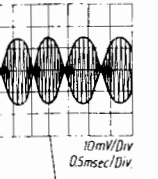
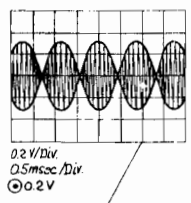
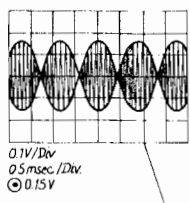
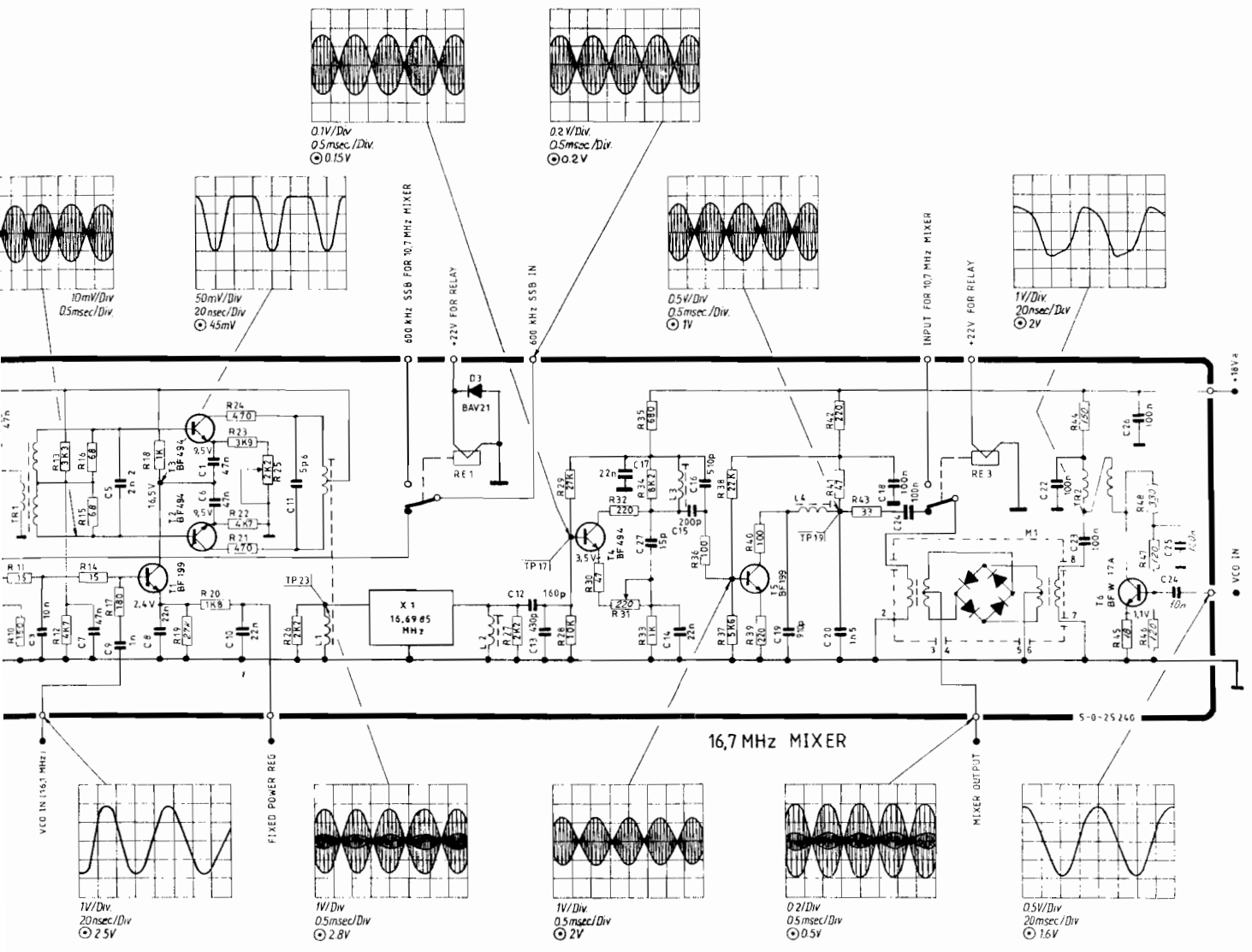
+22V FOR RELAY
W8/16-28

10.7 MHz MIXER
INPUT W8/16-27

GROUND

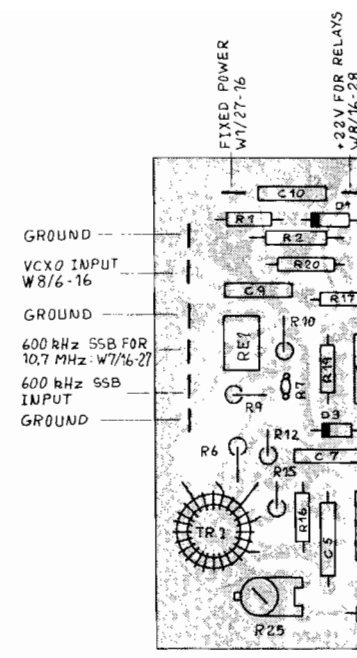
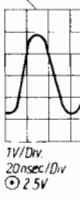
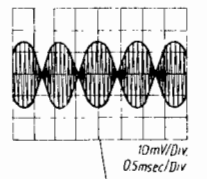
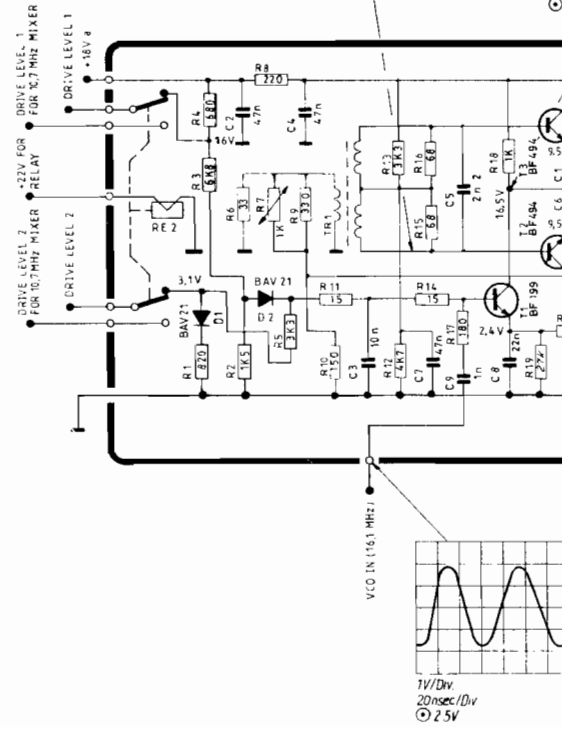
GROUND

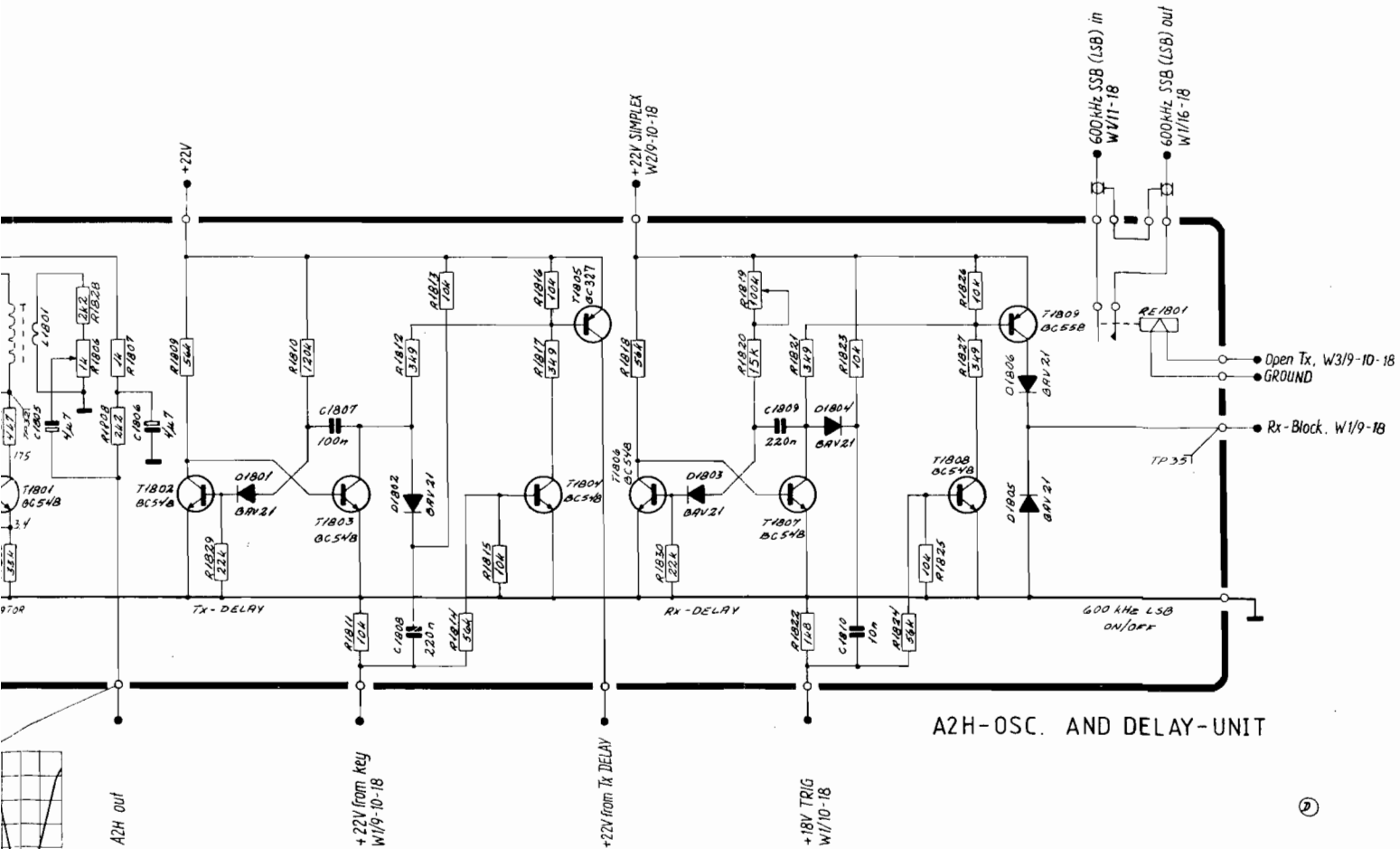
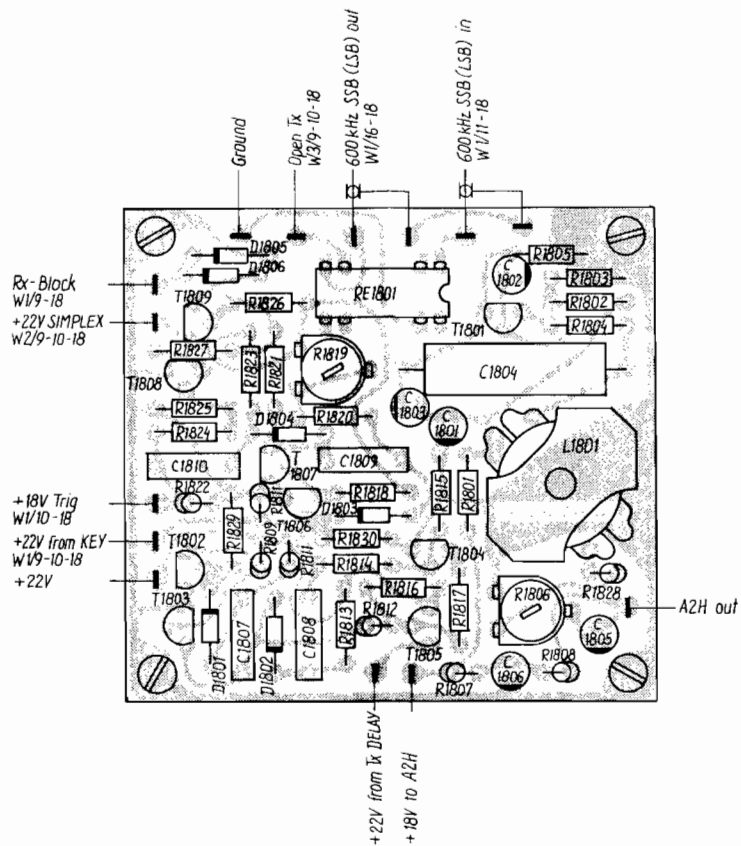
MIXER OUTPUT
W1/15-16



MODULE 1600
MIXER 16.7MHz

B1/2 S1303/4-I
 4-0-25240A &-9-25240





A2H-OSC. AND DELAY-UNIT

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

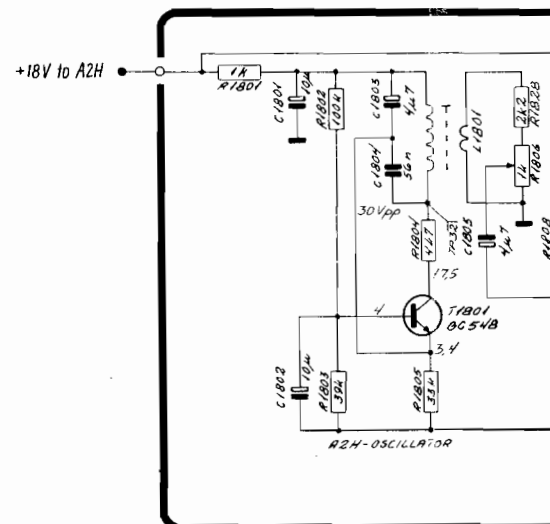
+22V FROM KEY controls T1805 to conduct, and T1805 will then supply +22V FROM TX-DELAY to the relays 600 kHz LSB ON/OFF and TX ON/OFF in telegraphy mode. When the key is released T1804 is off, but T1803 goes on for a time period of approx. 10 mS determined by the monostable multivibrator T1802 and T1803.

RX-DELAY

With the transmitter keyed there is +18V ON +18V TRIG. keeping T1809 conducting, and is 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 8 mS and 30 mS determined 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.



CIRCUIT DESCRIPTION POWER SWITCH S1303/04

Transistor T2001 controls the power reduction led, which is alight as soon as the switch S2002 is activated to reduce the power. The Vcc to power lamp information is controlled by the tune information and is 0.0 Volt when tuning.

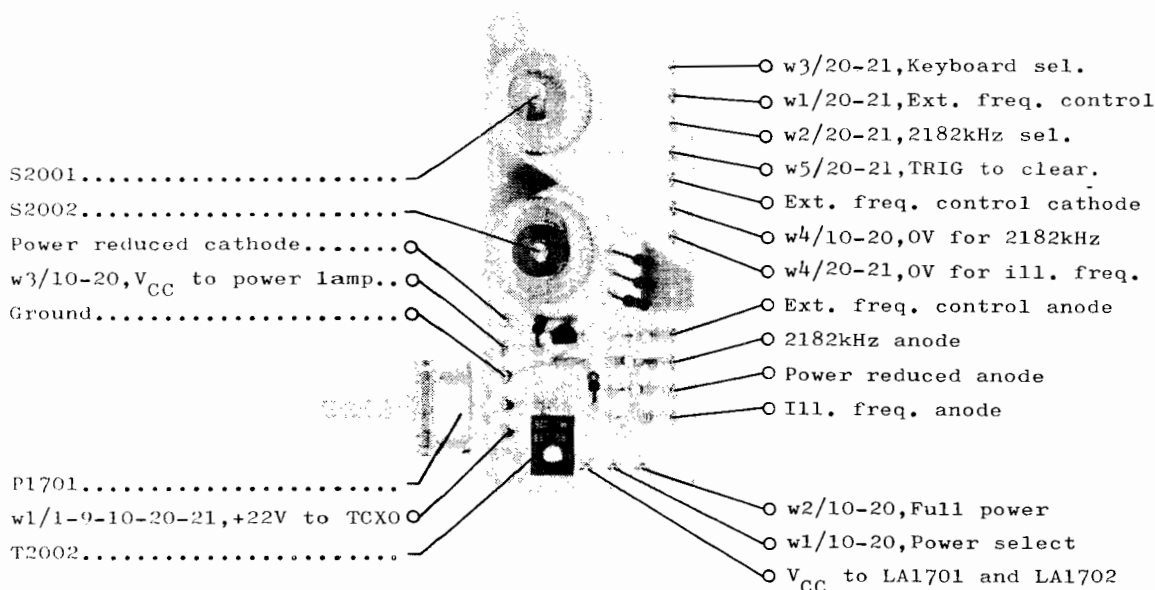
The transistor T2002 is connected to the dimmer potentiometer and the emitter is connected to the light emitting diodes, EXTERNAL FRQ. CONTROL, the 2182 kHz selected, and the POWER REDUCED.

The trig to clear information is a 5 Volt pulse, which clears the display when the display input switch is activated.

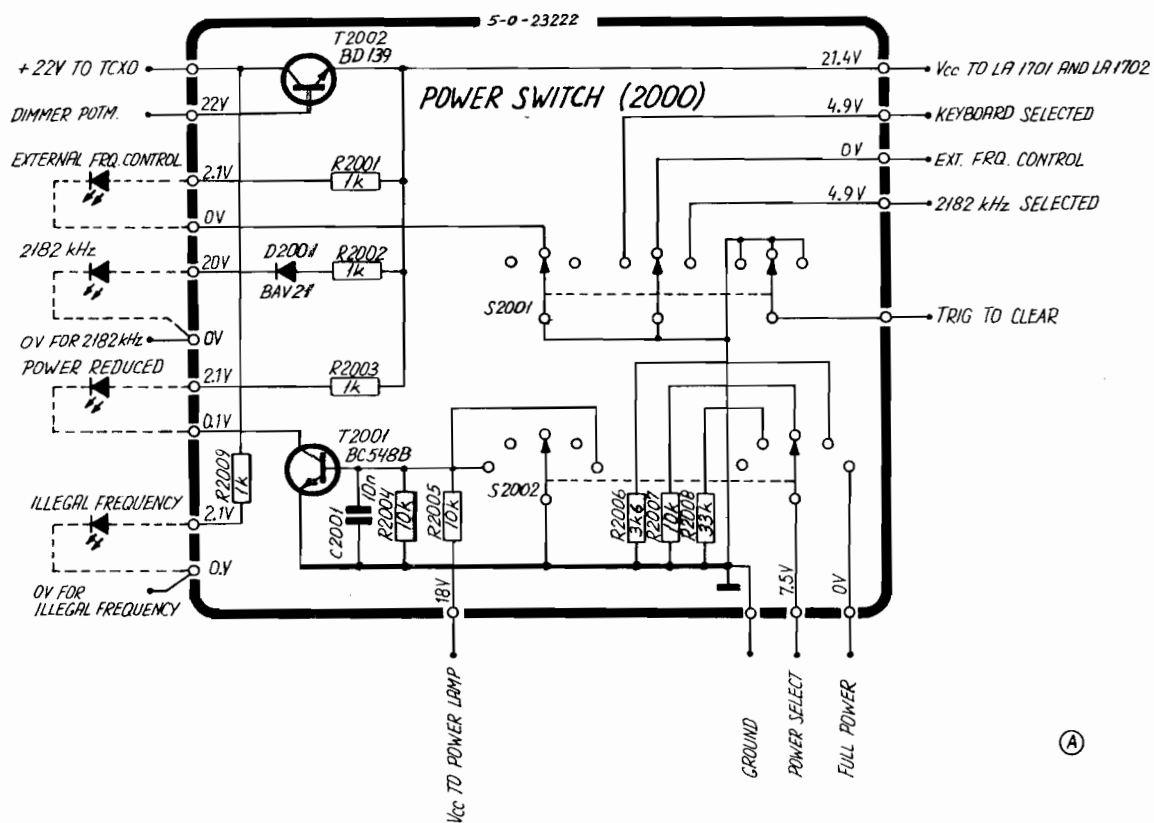
TEST CONDITIONS

Frequency:	EXTERNAL FRQ CONTROL
Power level:	POWER REDUCED (two steps)
Dimmer:	FULL ALIGHT
DC voltmeter input:	10 Mohm

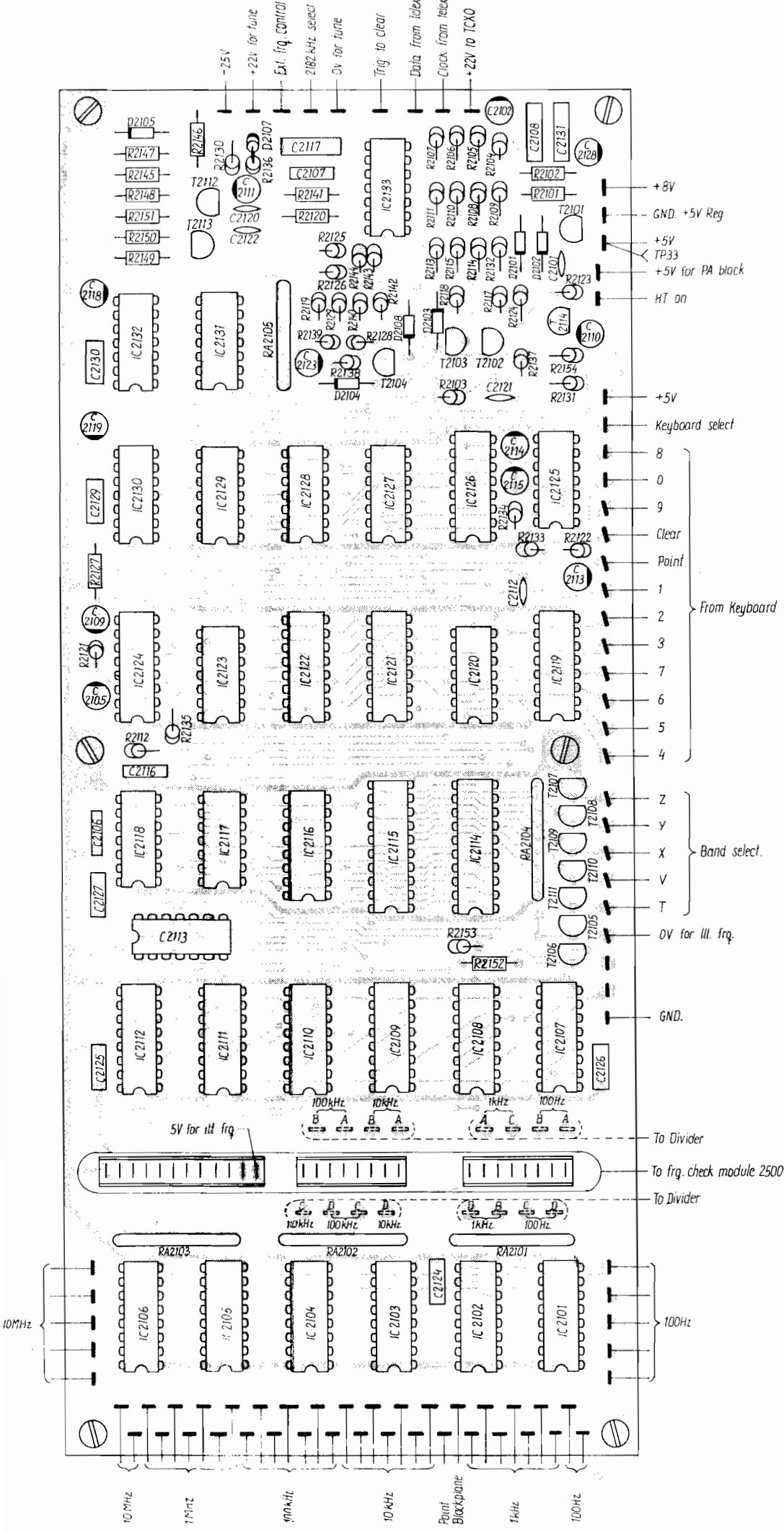
All voltage statements are typical.



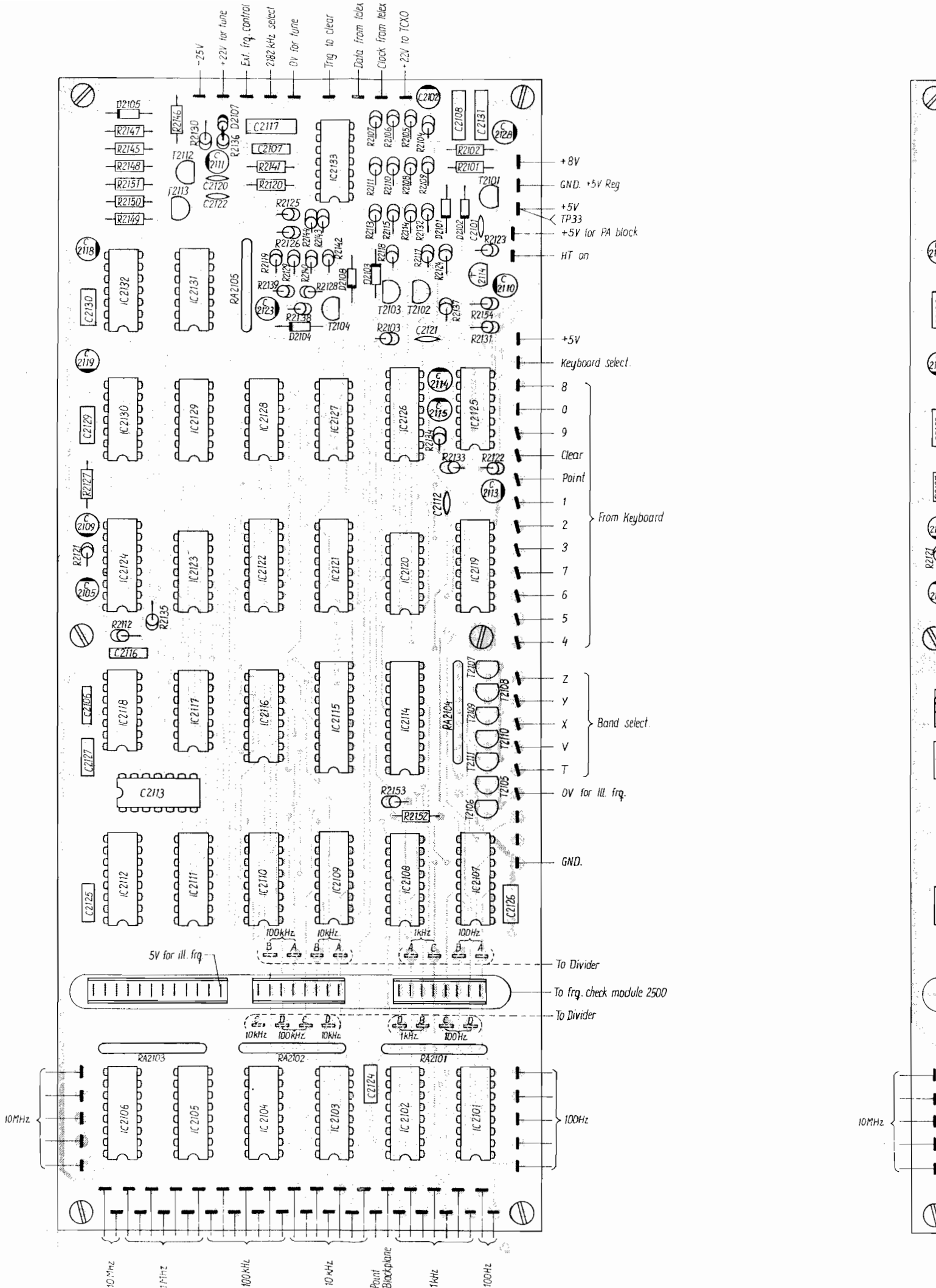
B2/2 S1303/4
4-6-23222B 4-0-23222A



(A)

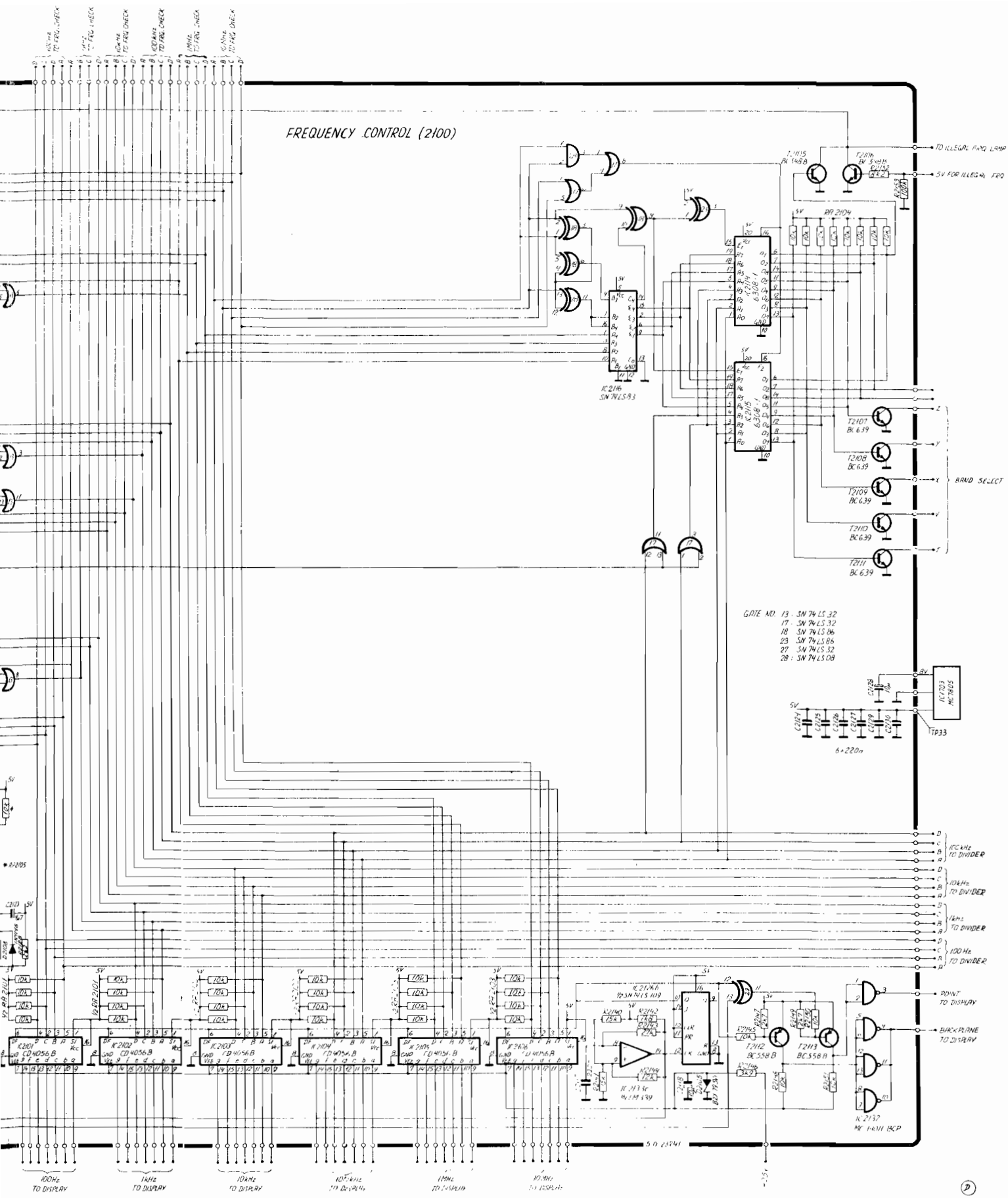


Seen from component side with upper side tracks



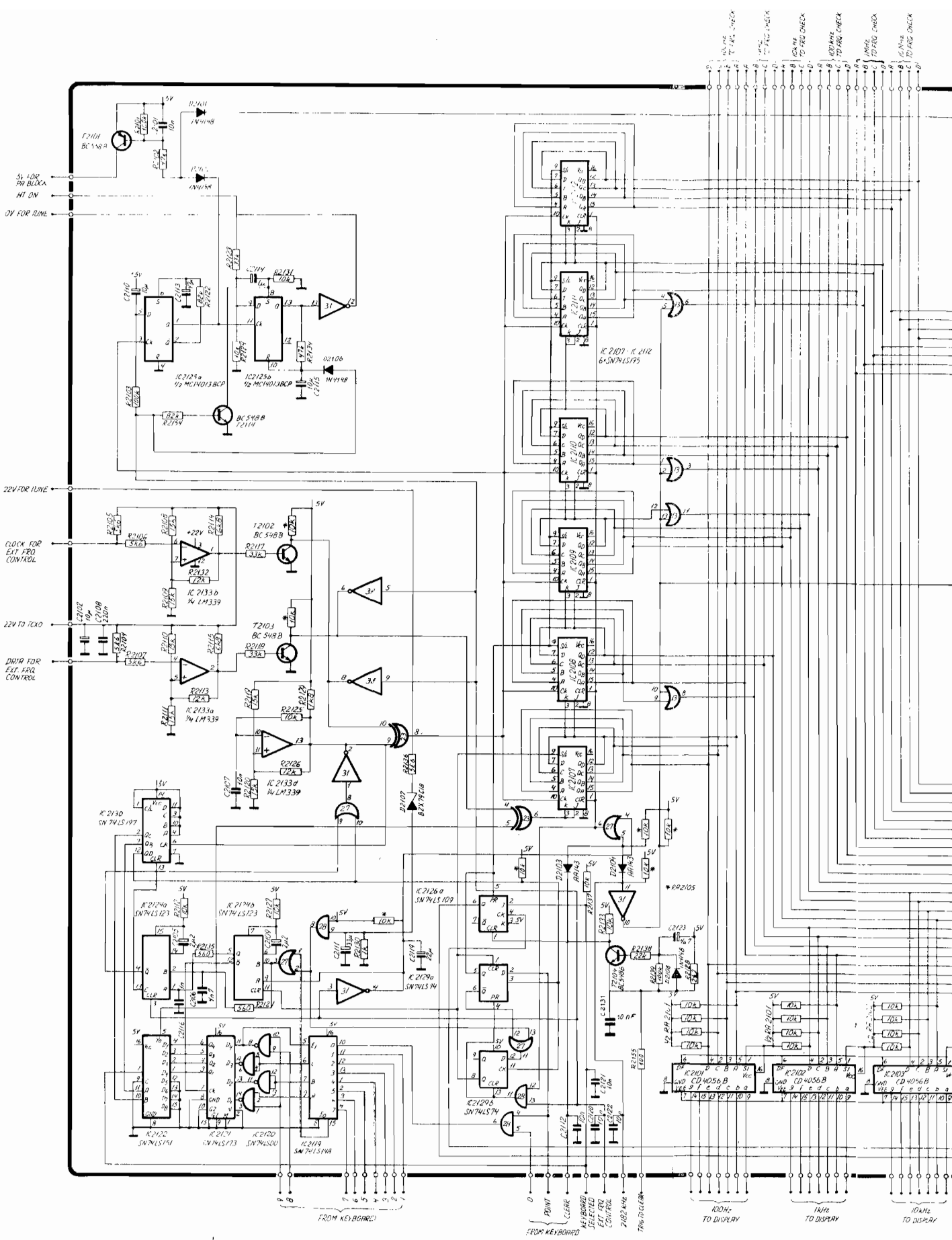
Seen from component side with lower side tracks

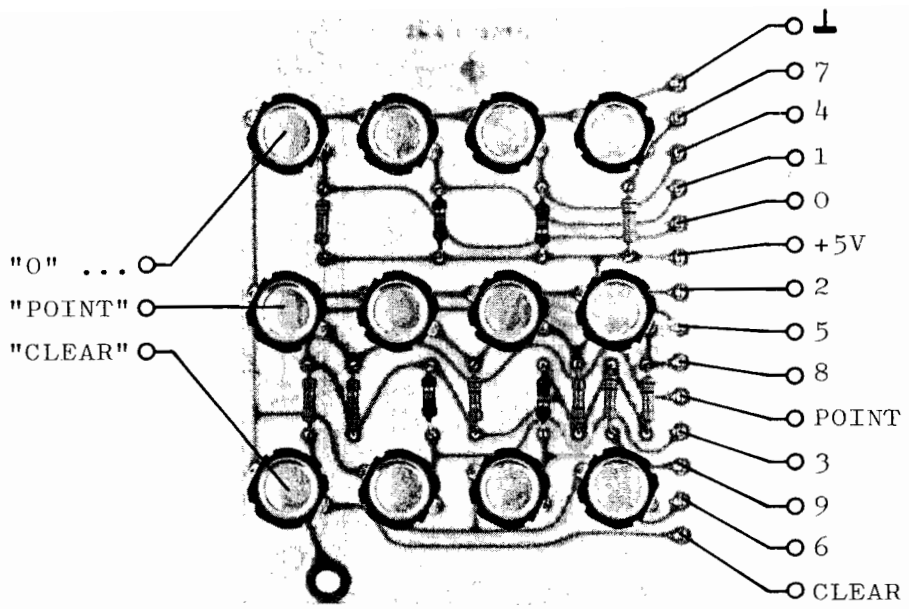
See



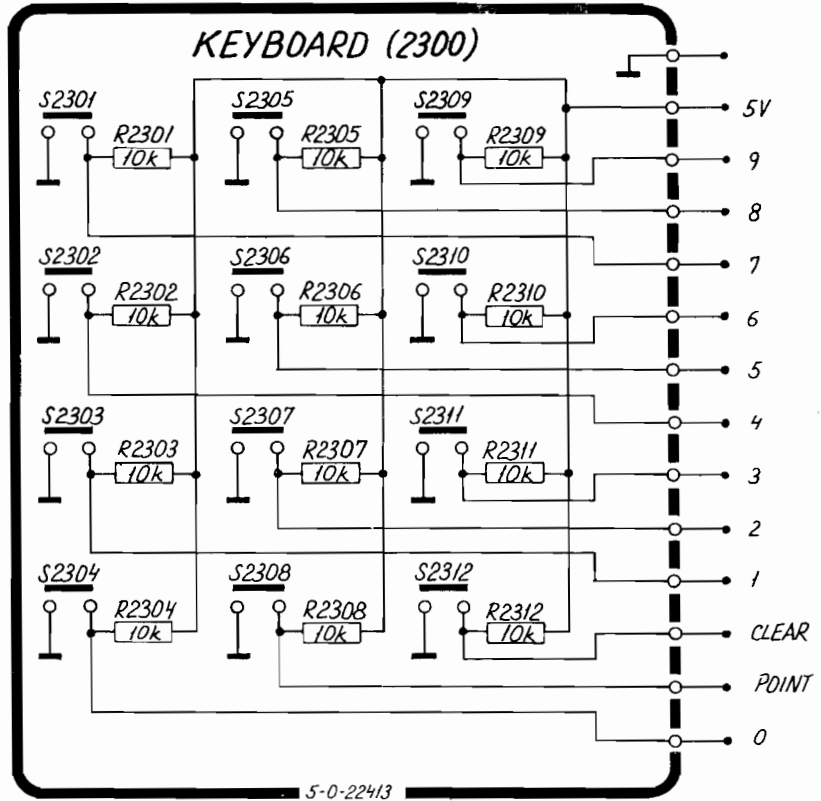
FREQUENCY CONTROL (2100)

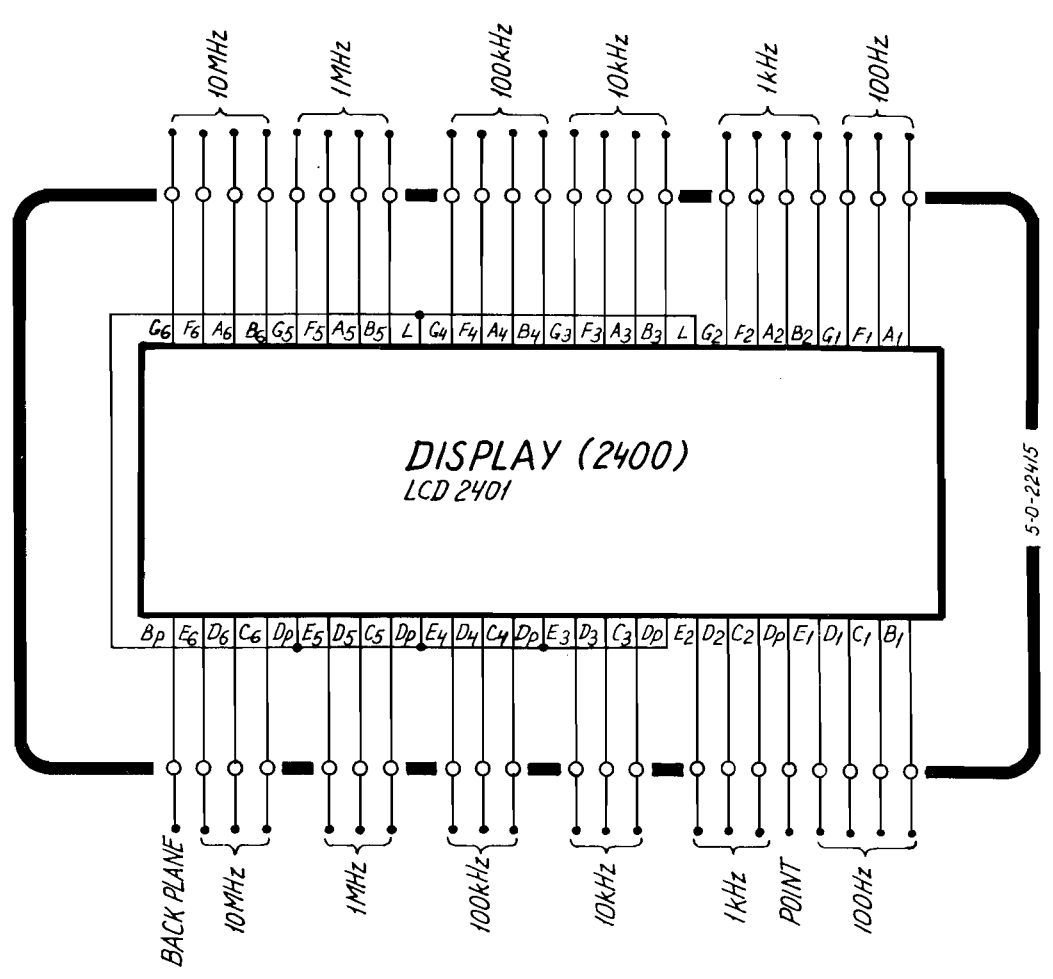
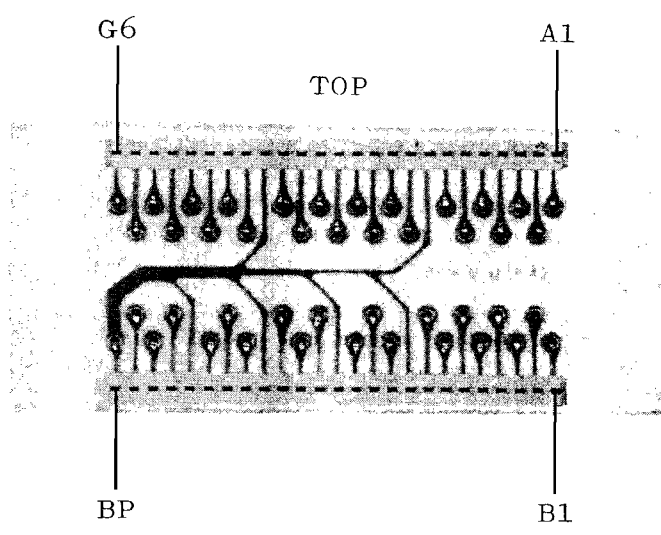
- GATE NO. 13 : SN74LS32
 17 : SN74LS32
 18 : SN74LS06
 23 : SN74LS06
 27 : SN74LS32
 28 : SN74LS08





A 51303/4
4-0-22413





A 51303/4
4-0-22415

CIRCUIT DESCRIPTION FREQUENCY CHECK S1304

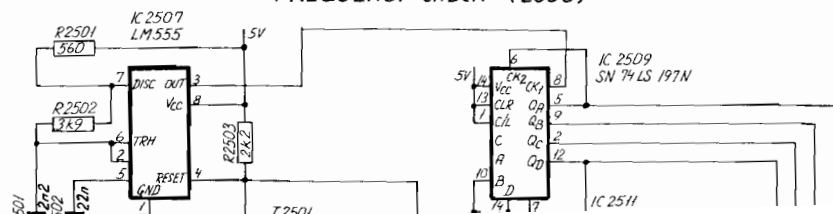
The frequency check unit receives the frequency information from the frequency control unit as six digits in BCD code. This frequency is compared to 256 programmable frequencies which are contained in 3 proms IC2508, IC2510, and IC2512. By a positive comparison a "0" at the output "5V FOR ILLEGAL FREQUENCY" will unblock the PA stage via the frequency control unit.

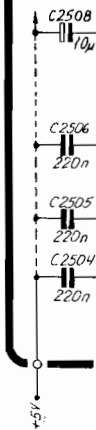
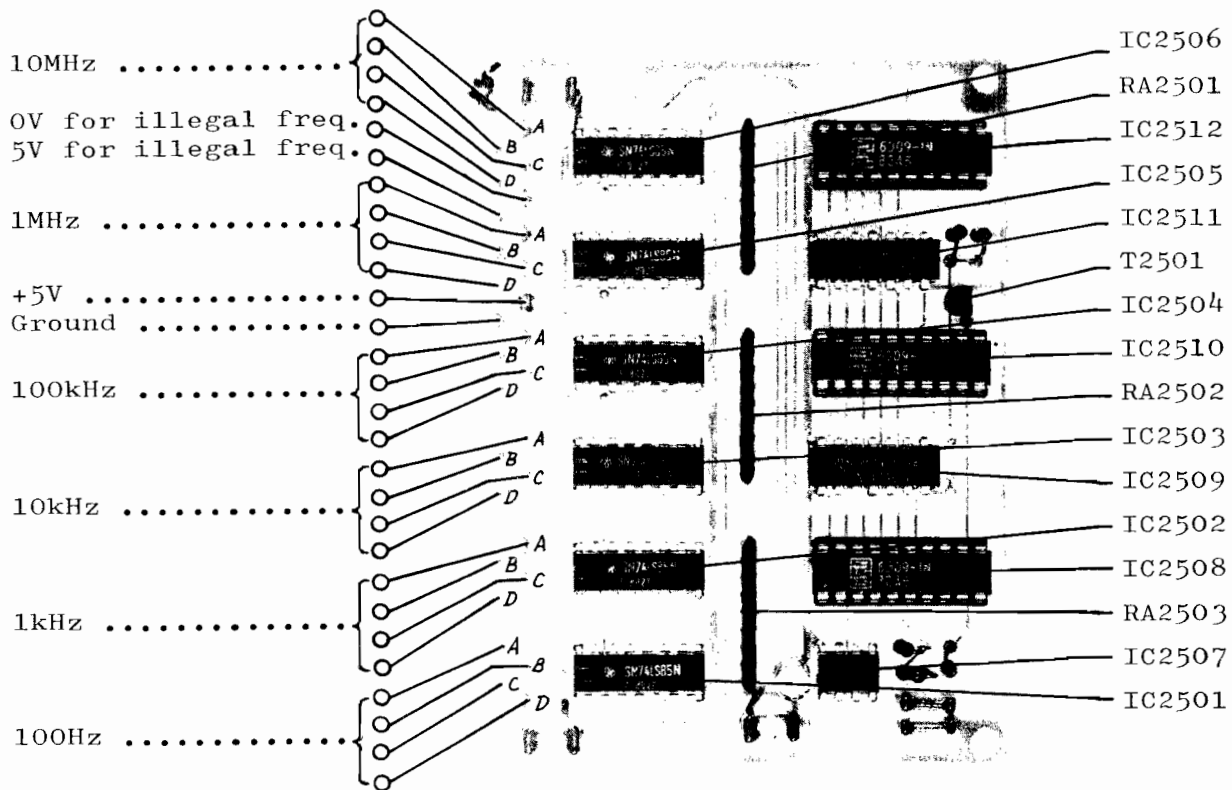
The comparison takes place in 6 comparators (IC2501 - IC2506) with the actual frequency at the B inputs and the prom outputs at the A inputs. If A = B the output "A = B out" will be "1".

When seeking for frequency coincidence, the addresses in the proms are stepped through by the counters IC2509 and IC2511. The counters receive the clock pulses from the oscillator IC2502 and it is running until an address with frequency coincidence is found. Then the oscillator is stopped when T2501 is turned on by the "1" from IC2501 pin 6.

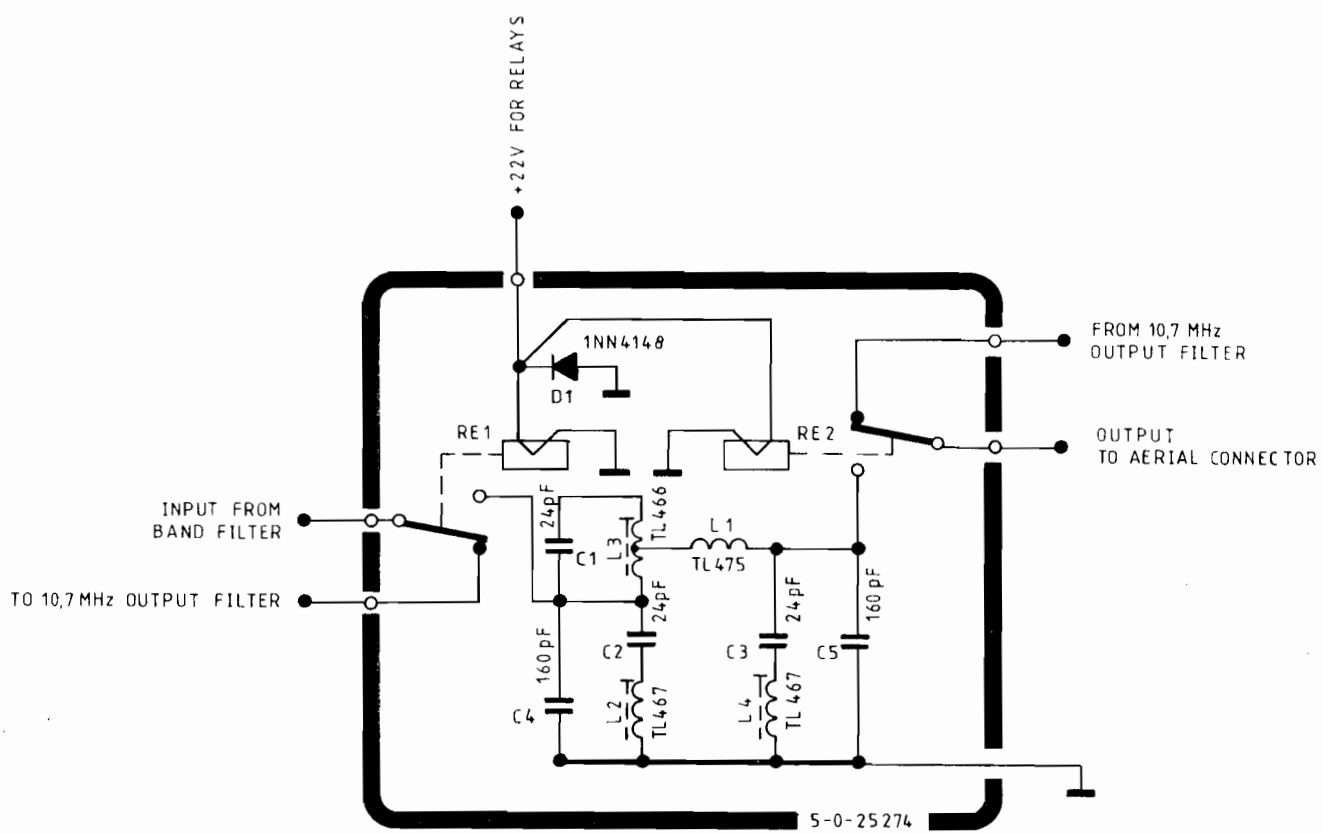
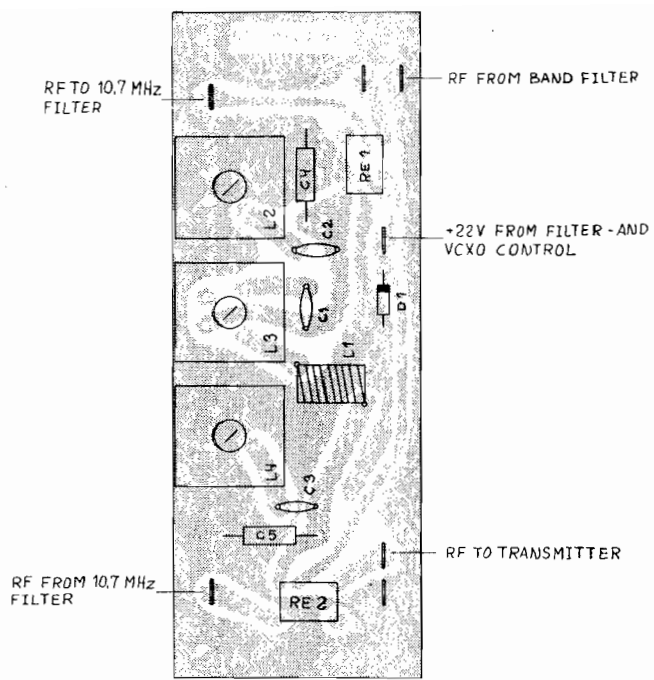
5-0-23242

FREQUENCY CHECK (2500)





S1303/04 - I
 4-0-25274 4-6-25274

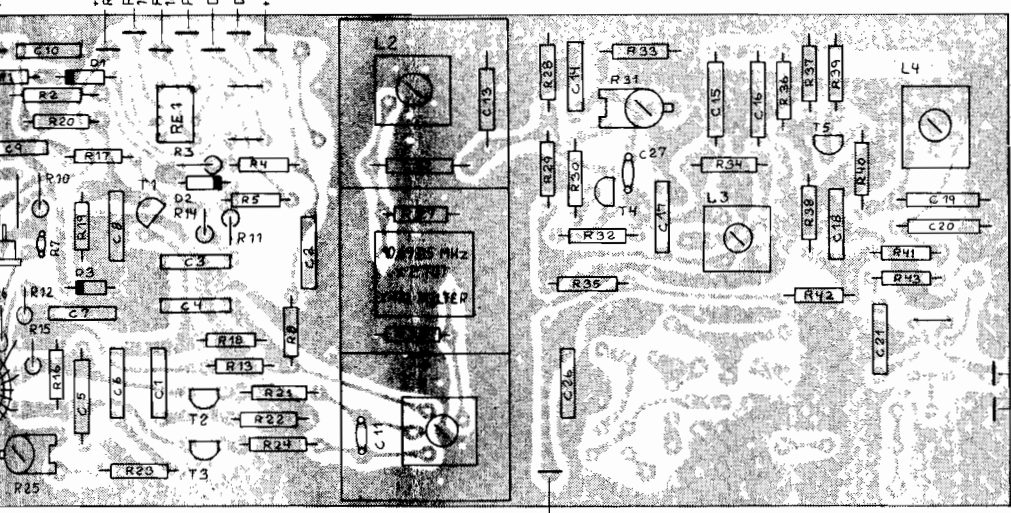


16,7 MHz OUTPUT FILTER

5-0-25274

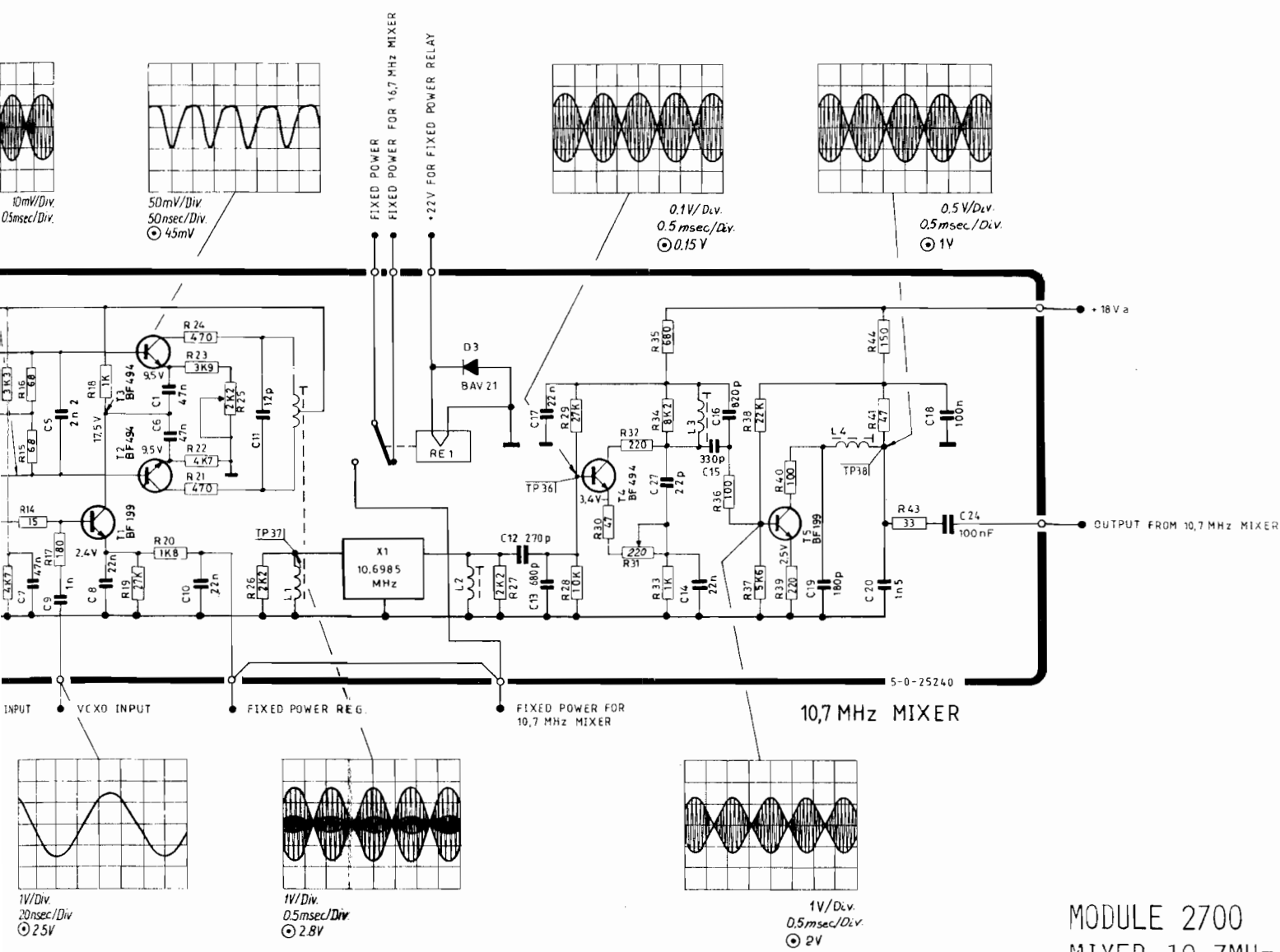
MODULE 2600
 OUTPUT FILTER 16,7 MHz

+22V FOR FIXED POWER
 RELAY: W/11/27-28
 FIXED POWER FOR
 10.7 MHz MIXER
 FIXED POWER FOR
 16.7 MHz MIXER W/17-16
 FIXED POWER W/10-27
 DRIVE LEVEL W/5/16-27
 DRIVE LEVEL W/6/16-27
 +18V d



10.7 MHz OUTPUT
 W8/16-27
 GROUND

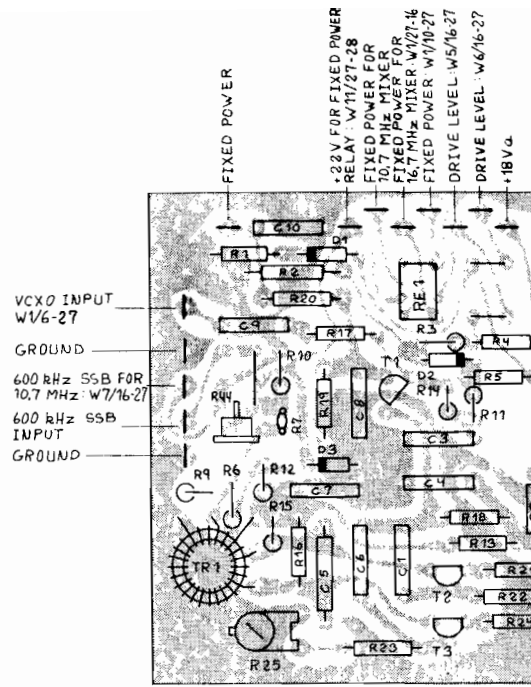
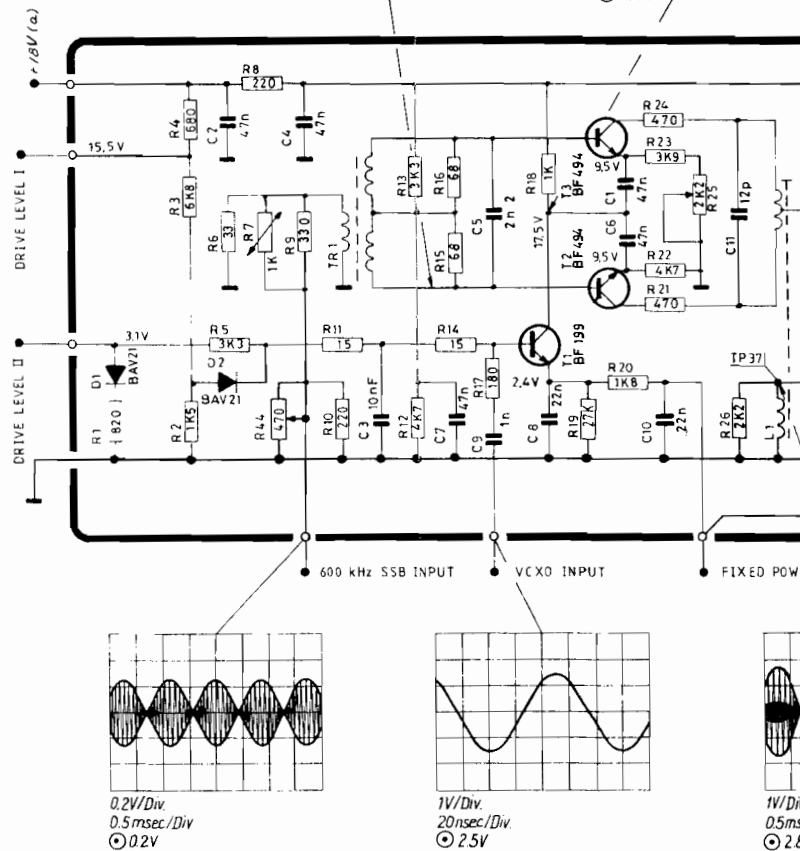
+18Vd



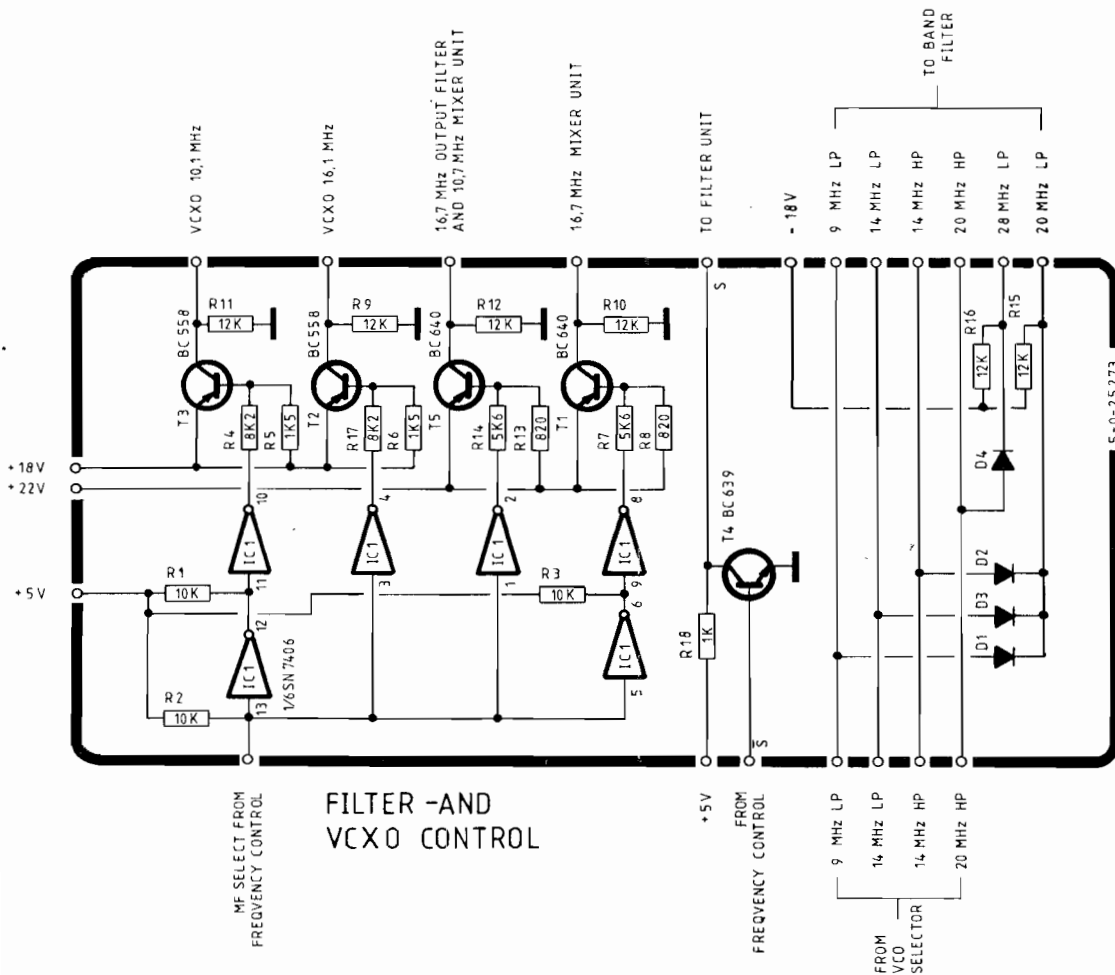
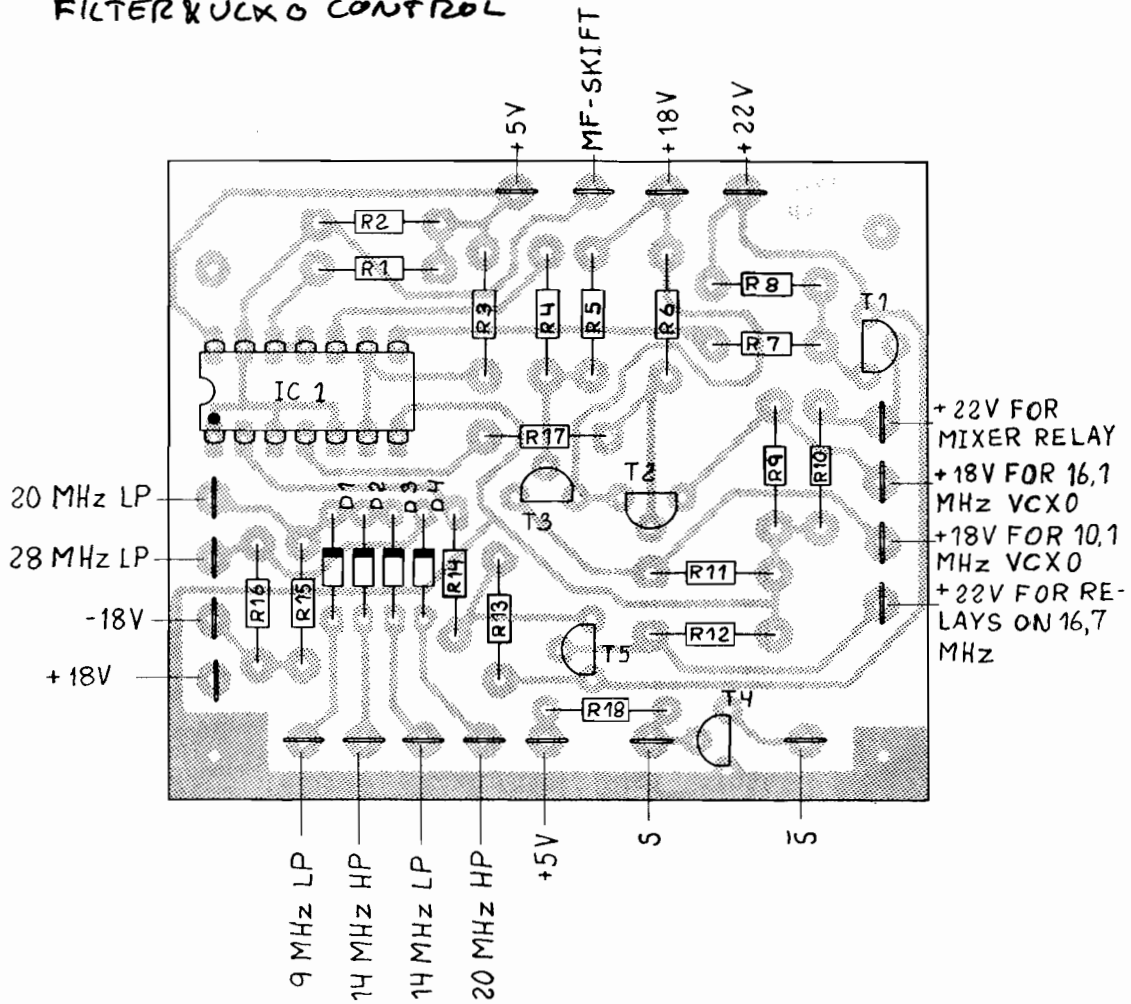
MODULE 2700
 MIXER 10.7MHz

S1303/4-I

4-6-25521 4-0-25521A



MODULE 2800
 FILTER & VCXO CONTROL



POSITION	DESCRIPTION	DATA	MANUFACTOR	TYPE	S.P. NUMB
	DIVIDER S1303/4 I	with LSB/USB SWITCH	AFD.33	PRINT NR.5-0-20886B	607545
C101	CAPACITOR MKT	10nF 10% 400V	* ERO	MKT1822-310/405	12.212
C102	CAPACITOR ELECTROLYTIC	10uF 20% 35V	* ERO	EKI 00 AA 210 I	14.512
C103	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C104	CAPACITOR CERAMIC	10nF +20/+80% 32V	FERROPERM	9/0145-9	15.900
C105	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C106	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C107	CAPACITOR CERAMIC	12pF 5% NP0 400V	FERROPERM	9/0112-9	15.575
C108	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C109	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C110	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C111	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C112	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C113	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C114	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C115	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C116	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C117	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C118	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C119	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C120	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C121	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C122	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C123	CAPACITOR POLYESTER	0.22uF 10% 100V	*ERO	MKT1822	11.075
C124	CAPACITOR POLYESTER	15nF 10% 400V	ERO	MKT1822	11.128
C125	CAPACITOR MKT	47nF 10% 250V	*ERO	MKT1822	11.101
C126	CAPACITOR POLYESTER	0.22uF 10% 100V	*ERO	MKT1822	11.075
C127	CAPACITOR POLYESTER	0.22uF 10% 100V	*ERO	MKT1822	11.075
C128	CAPACITOR ELECTROLYTIC	10uF -10%/+50% 40V	ERO	EB 00 CA 147 J	14.544
C129	CAPACITOR ELECTROLYTIC	10uF -10%/+50% 40V	ERO	EB 00 CA 147 J	14.544
C130	CAPACITOR POLYESTER	0.22uF 10% 100V	*ERO	MKT1822	11.075
C131	CAPACITOR MKT	47nF 10% 250V	*ERO	MKT1822	11.101
C132	CAPACITOR POLYESTER	0.22uF 10% 100V	*ERO	MKT1822	11.075
C133	CAPACITOR POLYESTER	0.22uF 10% 100V	*ERO	MKT1822	11.075
C134	CAPACITOR POLYESTER	0.22uF 10% 100V	*ERO	MKT1822	11.075
C135	CAPACITOR POLYESTER	0.22uF 10% 100V	*ERO	MKT1822	11.075
C136	CAPACITOR POLYSTYRENE	1.2nF 1% 160V	*PHILIPS	2222 429 81202 2222 425 41202	10.278
C137	CAPACITOR POLYSTYRENE	6.8nF 1% 63V	*PHILIPS	2222 428 86802 2222 424 46802	10.221
C138	CAPACITOR CERAMIC	68pF 5% N150	KCK	HE70S3PH680J	15.115
C139	CAPACITOR POLYESTER	0.22uF 10% 100V	*ERO	MKT1822	11.075

POSITION	DESCRIPTION	DATA	MANUFACTOR	TYPE	S.P. NUMB
D101	DIODE ZENER	12V 5% 0.4W BZX79C12	*PHILIPS	BZX79C12	26.554
D102	DIODE	BAW62	PHILIPS	BAW62	25.350
IC101	INTEGRATED CIRCUIT	74LS192N	*TEXAS	74LS192N	34.079
IC102	INTEGRATED CIRCUIT	74LS192N	*TEXAS	74LS192N	34.079
IC103	INTEGRATED CIRCUIT	74LS192N	*TEXAS	74LS192N	34.079
IC104	INTEGRATED CIRCUIT	74LS192N	*TEXAS	74LS192N	34.079
IC105	INTEGRATED CIRCUIT	74LS192N	*TEXAS	74LS192N	34.079
IC106	INTEGRATED CIRCUIT	MC4044P	MOTOROLA	MC4044P	31.240
IC107	INTEGRATED CIRCUIT	SN74LS390N	*MOTOROLA	74LS390N	34.271
IC108	INTEGRATED CIRCUIT	74LS20N	TEXAS	74LS20N	33.563
IC109	TRIPLE 3-INPUT NOR GATES	SN74LS27N	*SIGNETICS	SN74LS27N	33.584
IC110	INTEGRATED CIRCUIT	74LS109N	* TEXAS	SN74LS109AN	33.831
IC111	INTEGRATED CIRCUIT	SN74LS390N	*MOTOROLA	74LS390N	34.271
IC112	INTEGRATED CIRCUIT	SN74LS390N	*MOTOROLA	74LS390N	34.271
IC113	INTEGRATED CIRCUIT	MC4044P	MOTOROLA	MC4044P	31.240
IC114	INTEGRATED CIRCUIT	7410N	*TEXAS	SN7410N	33.533
IC115	INTEGRATED CIRCUIT	SN74LS290N	* MOTOROLA	SN74LS290N	34.251
L101	COIL	TL235	S.P. RADIO	6-0-21558A	400235
L102	COIL	TL255	S.P. RADIO	6-0-21578A	400255
R101	RESISTOR	15 KOHM 5% 0.33W	PHILIPS	2322 181 53153	01.229
R102	RESISTOR	15 KOHM 5% 0.33W	PHILIPS	2322 181 53153	01.229
R103	RESISTOR	560 OHM 5% 0.33W	PHILIPS	2322 181 53561	01.193
R104	RESISTOR	15 KOHM 5% 0.33W	PHILIPS	2322 181 53153	01.229
R105	RESISTOR	560 OHM 5% 0.33W	PHILIPS	2322 181 53561	01.193
R106	RESISTOR	5.6 KOHM 5% 0.33W	PHILIPS	2322 181 53562	01.218
R107	RESISTOR	1.8 KOHM 5% 0.33W	PHILIPS	2322 181 53182	01.206
R108	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R109	RESISTOR	1.8 KOHM 5% 0.33W	PHILIPS	2322 181 53182	01.206
R110	RESISTOR	820 OHM 5% 0.33W	PHILIPS	2322 181 53821	01.197
R111	RESISTOR	220 OHM 5% 0.33W	PHILIPS	2322 181 53221	01.183
R112	RESISTOR	2 KOHM 10%	BOURNS	3299W-1-202	07.755
R113	RESISTOR	820 OHM 5% 0.33W	PHILIPS	2322 181 53821	01.197
R114	RESISTOR	470 OHM 5% 0.33W	PHILIPS	2322 181 53471	01.191
R115	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R116	RESISTOR	1.2 KOHM 5% 0.33W	PHILIPS	2322 181 53122	01.202
R117	RESISTOR	2.2 KOHM 5% 0.33W	PHILIPS	2322 181 53222	01.208
R118	RESISTOR	560 OHM 5% 0.33W	PHILIPS	2322 181 53561	01.193
R119	RESISTOR	22 KOHM 5% 0.33W	PHILIPS	2322 181 53223	01.233
R120	RESISTOR	270 OHM 5% 0.33W	PHILIPS	2322 181 33271	01.685
R121	RESISTOR	1.8 KOHM 5% 0.33W	PHILIPS	2322 181 53182	01.206
R122	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R123	RESISTOR	220 OHM 5% 0.33W	PHILIPS	2322 181 33221	01.683
R124	RESISTOR	2.2 KOHM 5% 0.33W	PHILIPS	2322 181 53222	01.208
R125	RESISTOR	1 KOHM 5% 0.33W	PHILIPS	2322 181 53102	01.200

S1303/4-I 3/87

POSITION	DESCRIPTION		MANUFACTURER	TYPE	S.P. NUMBER
R126			BEYSCHLAG	MBD207	03.183
R127	RESISTOR	680 OHM 5% 0.33W	PHILIPS	2322 181 53681	01.195
R128	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53123	01.227
R129	RESISTOR	6.8 KOHM 5% 0.33W	PHILIPS	2322 181 53682	01.220
R130	RESISTOR	180 OHM 5% 0.33W	PHILIPS	2322 181 53181	01.181
R132	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R133	RESISTOR	390 OHM 5% 0.33W	PHILIPS	2322 181 53391	01.189
R134	RESISTOR	2.2 KOHM 5% 0.33W	PHILIPS	2322 181 53222	01.208
R135	RESISTOR	1.2 KOHM 5% 0.33W	PHILIPS	2322 181 53122	01.202
R136	RESISTOR	10. KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
T101	TRANSISTOR	2N2369A	*MOTOROLA	2N2369A	28.315
T102	TRANSISTOR	2N2369A	*MOTOROLA	2N2369A	28.315
T103	TRANSISTOR	BF199	PHILIPS	BF199	28.179
T104	TRANSISTOR	2N2369A	*MOTOROLA	2N2369A	28.315
T105	TRANSISTOR	BF199	PHILIPS	BF199	28.179
T106	TRANSISTOR	BF494	PHILIPS	BF494	28.201
X101	TCXO 10 MHZ (1001	+1ppm at 0 to+60 CELC	*NDK	TCXO 10.0MHZ C1001	41.025

b		LOOP 1 FILTER & +18V SUPPLY UNIT S13XX/R11XX			1/2	
Symbol	Description			Manufact.		
R201	Resistor	1 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13102
R202	Resistor	82 ohm	$\pm 5\%$	0,33W	Philips	2322 181 13829
R204	Resistor	820 ohm	$\pm 5\%$	0,33W	Philips	2322 181 13821
R205	Resistor	2,2 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13222
R206	Resistor	12 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13123
R207	Resistor	1,2 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13122
R208	Resistor	3,3 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13332
R209	Preset potmeter cermet	2,2 Kohm	$\pm 10\%$	0,5W	Philips	2322 482 22222
R210	Resistor	10 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13103
R212	Resistor	10 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13103
R213	Resistor	10 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13103
R214	Preset potmeter cermet	2,2 Kohm	$\pm 10\%$	0,5W	Philips	2322 482 22222
R215	Resistor	3,3 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13332
R216	Resistor	1,5 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13152
R217	Resistor	10 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13103
R218	Resistor	3,3 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13332
R219	Resistor	2,7 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13272
R220	Resistor	560 ohm	$\pm 5\%$	0,33W	Philips	2322 181 13561
R221	Resistor	5,9 Kohm	$\pm 1\%$	0,25W	Vitrohm	471-0
R222	Resistor	22 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13223
R223	Resistor	150 ohm	$\pm 5\%$	0,33W	Philips	2322 181 13151
R224	Resistor	2,7 Mohm	$\pm 5\%$	0,33W	Philips	2322 181 13275
R225	Resistor	4,7 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13472
R226	Resistor	2,2 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13222
R227	Resistor	5,9 Kohm	$\pm 1\%$	0,25W	Vitrohm	471-0
R228	Resistor	5,9 Kohm	$\pm 1\%$	0,25W	Vitrohm	471-0
R229	Resistor	140 Kohm	$\pm 1\%$	0,25W	Vitrohm	471-0
	S13XX only					
R203	Resistor	270 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13274
R211	Resistor	15 ohm	$\pm 5\%$	0,33W	Philips	2322 181 13159
	R11XX only					
R203	Resistor	150 Kohm	$\pm 5\%$	0,33W	Philips	2322 181 13154
R211	Resistor	10 ohm	$\pm 5\%$	0,33W	Philips	2322 181 13109

d		LOOP 1 FILTER & +18V SUPPLY UNIT S13XX/R11XX			2/2	
Symbol	Description			Manufact.		
C201	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
C202	Capacitor electrolytic	10uF	20%	35V	ERO	EK100AA210F
C203	Capacitor electrolytic	10uF	20%	35V	ERO	EK100AA210F
C204	Capacitor electrolytic	10uF	20%	35V	ERO	EK100AA210F
C205	Capacitor electrolytic	10uF	20%	40V	ERO	EB
C206	Capacitor electrolytic	10uF	20%	35V	ERO	EK100AA210F
C207	Capacitor polycarbonate	470nF	+10%	100V	Philips	2222 344 21474
C208	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
C209	Capacitor polystyrene	39nF	+1,25%	63V	Plessey	KS1.39
C210	Capacitor electrolytic	10uF	20%	35V	ERO	EK100AA210F
C211	Capacitor polyester	6,8uF	+10%	100V	Philips	2222 344 25685
C212	Capacitor ceramic	220pF	+20%	400V	Ferroperm	9/0129,9
C213	Capacitor ceramic	220nF	+20%	400V	Ferroperm	9/0129,9
C214	Capacitor polyester	330nF	+5%	63V	ERO	MKT1822
C215	Capacitor polyester	150nF	+20%	100V	ERO	MKT1822
C216	Capacitor polyester	220nF	+20%	100V	ERO	MKT1822
C217	Capacitor polyester	220nF	+20%	100V	ERO	MKT1822
C218	Capacitor polyester	220nF	+20%	100V	ERO	MKT1822
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	Integrated circuit				National	LM308N
IC202	Integrated circuit				National	LM308N

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P.NUMBE	
	VCO UNIT R11XX	MODULE 12/1200	ESPERA	PRINT NR.5-0-247000	605540
C1	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C2	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C3	CAPACITOR CERAMIC	3.3pF +- .25pF NPO 400V	FERROPERM	9/0112,9	15.521
C4	CAPACITOR CERAMIC	3.3pF +- .25pF NPO 400V	FERROPERM	9/0112,9	15.521
C5	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C6	CAPACITOR TANTALUM	3.3uF 20% 35V	ERO	ETP-20	14.080
C7	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C8	CAPACITOR POLYSTYRENE	160pF 1% 630V	*PHILIPS	2222 431 81601 2222 427 41601	10.406
C9	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C10	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C11	CAPACITOR MKT	1nF 10% 400V	SIEMENS	B32510-D6102-K000	11.360
C12	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C13	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C14	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C15	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C16	CAPACITOR ELECTROLYTIC	10uF 20% 35V	* ERO	EKI 00 AA 210 F	14.512
C17	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C18	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C19	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C20	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C21	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C22	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C23	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C24	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C25	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C26	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C27	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C28	CAPACITOR TANTAL	10uF 20% 25V	ERO	ETPW-3F	14.145
C29	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C30	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C31	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C32	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C33	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C34	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C35	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C36	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C37	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C38	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C39	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290
C40	CAPACITOR MKT	10nF 10% 250V	SIEMENS	B32510-D3103-K000	11.290

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

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

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

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

S1303/4-I 3/87

HARMONIC FILTER UNIT R1119 & R1120

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

HARMONIC FILTER UNIT R1119 & R1120

<i>Symbol</i>	<i>Description</i>			<i>Manufact.</i>	
C1341	Capacitor ceramic	2.2 pF ± 0.25 pF	250V	Ferroperm	9/C112.9
C1342	Capacitor ceramic	10 nF -20/+80%	50V	Ferroperm	HE 70 SJ YF 103Z
C1343	Capacitor ceramic	10 nF -20/+80%	50V	Ferroperm	HE 70 SJ YF 103Z
C1344	Capacitor ceramic	10 nF -20/+80%	50V	Ferroperm	HE 70 SJ YF 103Z
C1345	Capacitor ceramic	10 nF -20/+80%	50V	Ferroperm	HE 70 SJ YF 103Z
C1346	Capacitor ceramic	10 nF -20/+80%	50V	Ferroperm	HE 70 SJ YF 103Z
C1347	Capacitor ceramic	10 nF -20/+80%	50V	Ferroperm	HE 70 SJ YF 103Z
C1348	Capacitor ceramic	10 nF -20/+80%	50V	Ferroperm	HE 70 SJ YF 103Z
C1349	Capacitor electrolytic	10 uF +20%	35V	Roederstein	EKI 00 AA 210F
C1350	Capacitor ceramic	8.2 pF ± 0.25 pF	400V	Ferroperm	9/C112.9
D1301	Diode silicon			Philips	IN4448
D1302	Diode silicon			Philips	IN4448
D1303	Diode silicon			Philips	IN4448
D1304	Diode silicon			Philips	IN4448
D1305	Diode silicon			Philips	IN4448
D1306	Diode silicon			Philips	IN4448
D1307	Diode silicon			Philips	IN4448
D1308	Diode silicon			Philips	IN4448
D1309	Diode silicon			Philips	IN4448
D1310	Diode silicon			Philips	IN4448
D1311	Diode silicon			Philips	IN4448
D1312	Diode silicon			Philips	IN4448
D1313	Diode switch			Telefunken	BA243
D1314	Diode switch			Telefunken	BA243
D1315	Diode switch			Telefunken	BA243
D1316	Diode switch			Telefunken	BA243
D1317	Diode switch			Telefunken	BA243
D1318	Diode switch			Telefunken	BA243
D1319	Diode switch			Telefunken	BA243
D1320	Diode switch			Telefunken	BA243
D1321	Diode switch			Telefunken	BA243
D1322	Diode switch			Telefunken	BA243
D1323	Diode switch			Telefunken	BA243

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HARMONIC FILTER R1119 & R1120

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

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HARMONIC FILTER R1119 & R1120

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

c	LOOP 1 MIXER S130X		MODULE 500		1/1
Symbol	Description		Manufact.		
R501	Resistor	3.3 ohm \pm 5%	0.33W	Philips	2322 211 13338
R502	Resistor	3.3Kohm \pm 5%	0.33W	Philips	2322 211 13332
R503	Resistor	15Kohm \pm 5%	0.33W	Philips	2322 211 13153
R504	Resistor	2.2Kohm \pm 5%	0.33W	Philips	2322 211 13222
R505	Resistor	270 ohm \pm 5%	0.33W	Philips	2322 211 13271
R506	Resistor	100 ohm \pm 5%	0.33W	Philips	2322 211 13101
R507	Resistor	10 ohm \pm 5%	0.33W	Philips	2322 211 13109
R508	Resistor	330 ohm \pm 5%	0.33W	Philips	2322 211 13331
R509	Resistor	2.7Kohm \pm 5%	0.33W	Philips	2322 211 13272
R510	Resistor	680 ohm \pm 5%	0.33W	Philips	2322 211 13681
R511	Resistor	390 ohm \pm 5%	0.33W	Philips	2322 211 13391
R512	Resistor	470 ohm \pm 5%	0.33W	Philips	2322 211 13471
R513	Resistor	27Kohm \pm 5%	0.33W	Philips	2322 211 13273
R514	Resistor	2.7Kohm \pm 5%	0.33W	Philips	2322 211 13272
R515	Resistor	560 ohm \pm 5%	0.33W	Philips	2322 211 13569
R516	Resistor	47 ohm \pm 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 \pm 2%	100V	Philips	2222 638 34479
C508	Capacitor polyester	100nF \pm 20%	100V	Philips	2222 344 24104
C509	Capacitor ceramic	10nF -20/+80%	32V	Ferroperm	9/0145.9
C510	Capacitor ceramic	100pF \pm 2%	100V	Philips	2222 638 34101
C511	Capacitor polystyrene	180pF \pm 1%	500V	Philips	2222 427 41801
C512	Capacitor ceramic	33pF \pm 2%	100V	Philips	2222 638 34339
C513	Capacitor ceramic	56pF \pm 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 \pm 20%	100V	Philips	2222 344 24104
L501	Coil			S.P.	TL059
L502	Coil	12uH \pm 5%		Kaschke	220/5
L503	Coil	12uH \pm 5%		Kaschke	220/5
TR501	Transformer			S.P.	TL198
T501	Transistor			Philips	BF199
T502	Transistor			Philips	BF199
IC501	Integrated circuit			N.S.	LM3053

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P. NUMBER	
	VCO & LOOP 2 FILTER	MODULE 6/600	AFD.33	5-0-20971F S1303/1-11	607478
C1	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C2	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ERO	EKI 00 AA 210 F M9	14.512
C3	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C4	CAPACITOR CERAMIC	33P 2% N150	PHILIPS	2222 683 34339	15.082
C5	CAPACITOR MKT	0.68uF 10% 100V	ERO*	MKT1822	11.078
C6	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C7	CAPACITOR MKT	0.47uF 10% 100V	ERO*	MKT1822	11.077
C8	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C9	CAPACITOR CERAMIC	56pF 5% N33 25V	FERROPERM	9/0213-8	15.775
C10	CAPACITOR POLYSTYRENE	51pF 1% 630V	*PHILIPS	2222 431 85109	10.393
C11	CAPACITOR CERAMIC	8.2pF +-0.5pF NPO 400V	FERROPERM	9/0112-9	15.563
C12	CAPACITOR CERAMIC	10nF -20/+80% 32V	FERROPERM	9/0145-9	15.900
C13	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ERO	EKI 00 AA 210 F M9	14.512
C14	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C15	CAPACITOR ELECTROLYTIC	10uF 20% 35VDC	ERO	EKI 00 AA 210 F M9	14.512
C16	CAPACITOR POLYSTYRENE	220pF 1% 630VDC	PHILIPS	2222 431 82201	10.409
C17	CAPACITOR STYROFLEX	47pF 2.5% 160V	SIEMENS	B31063-B1470-H000	10.168
C18	CAPACITOR CERAMIC	16pF 5% N150	*KCK	HE40S3PH160J	15.057
C19	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C20	CAPACITOR CERAMIC	33pF 5% N150 50VDC	NKE	DT 350 758S PH 330 J 50V FLAT PACK	15.092
D1	DIODE	BB139 QUINT	ITT	BB139 QUINTET	26.140
D2	DIODE	BB139 QUINT	ITT	BB139 QUINTET	26.140
D3	DIODE	BB139 QUINT	ITT	BB139 QUINTET	26.140
D4	DIODE	BB139 QUINT	ITT	BB139 QUINTET	26.140
D5	DIODE	1N4148 HIGH SPEED	ITT	1N4148 CARTON	25.131
D6	DIODE	1N4148 HIGH SPEED	ITT	1N4148 CARTON	25.131
IC1	INTEGRATED CIRCUIT	LM308N	NATIONAL	LM308N	31.045
R1	RESISTOR MF	2k7 OHM 5% 0.4W	PHILIPS	2322 181 53272	01.210
R2	RESISTOR MF	22k OHM 5% 0.4W	PHILIPS	2322 181 53223	01.233
R3	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183
R4	RESISTOR	2.7 MOHM 5% 0.33W	PHILIPS	2322 181 33275	01.785
R5	RESISTOR	4.7 KOHM 5% 0.33W	PHILIPS	2322 181 33472	01.716
R6	RESISTOR MF	220k OHM 5% 0.4W	PHILIPS	2322 181 53224	01.258
R7	RESISTOR MF	18k OHM 5% 0.4W	* PHILIPS	2322 181 53183	01.231
R8	RESISTOR NTC	4k7 OHMS 10% .75W	SIEMENS	Q63016-K4004-K47	07.280
R9	RESISTOR	180 KOHM 5% 0.33W	PHILIPS	2322 181 33184	01.756
R10	RESISTOR MF	15k OHM 5% 0.4W	* PHILIPS	2322 181 53153	01.229

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P. NUMBER	
R11	RESISTOR	680 OHM 5% 0.33W	PHILIPS	2322 181 33681	01.695
R12	RESISTOR	180 OHM 5% 0.33W	PHILIPS	2322 181 33181	01.681
R13	RESISTOR MF	33k OHM 5% 0.4W	PHILIPS	2322 181 53333	01.237
R14	RESISTOR MF	1k5 OHM 5% 0.4W	* PHILIPS	2322 181 53152	01.204
R15	RESISTOR MF	100k OHM 5% 0.4W	PHILIPS	2322 181 53104	01.250
R16	RESISTOR MF	5.6k OHM 5% 0.4W	* PHILIPS	2322 181 53562	01.218
R17	RESISTOR MF	18k OHM 5% 0.4W	* PHILIPS	2322 181 53183	01.231
R18	RESISTOR MF	10k OHM 5% 0.4W	PHILIPS	2322 181 53103	01.225
R19	RESISTOR	390 OHM 5% 0.33W	PHILIPS	2322 181 33391	01.689
R20	RESISTOR MF	39k OHM 5% 0.4W	* PHILIPS	2322 181 53393	01.239
R21	RESISTOR MF	5.6k OHM 5% 0.4W	* PHILIPS	2322 181 53562	01.218
R22	RESISTOR MF	560 OHM 5% 0.4W	* PHILIPS	2322 181 53561	01.193
R23	RESISTOR MF	150 OHM 5% 0.4W	* PHILIPS	2322 181 53151	01.179
R24	RESISTOR MF	560 OHM 5% 0.4W	* PHILIPS	2322 181 53561	01.193
R25	RESISTOR	5.6 KOHM 5% 0.33W	PHILIPS	2322 181 33562	01.718
R26	RESISTOR	680 OHM 5% 0.33W	PHILIPS	2322 181 33681	01.695
R27	RESISTOR MF	15k OHM 5% 0.4W	* PHILIPS	2322 181 53153	01.229
R28	RESISTOR MF	33k OHM 5% 0.4W	PHILIPS	2322 181 53333	01.237
R29	RESISTOR MF	100k OHM 5% 0.4W	PHILIPS	2322 181 53104	01.250
R30	RESISTOR	180 OHM 5% 0.33W	PHILIPS	2322 181 33181	01.681
R31	RESISTOR MF	1k5 OHM 5% 0.4W	* PHILIPS	2322 181 53152	01.204
R32	RESISTOR NTC	4k7 OHMS 10% .75W	SIEMENS	Q63016-K4004-K47	07.280
T1	TRANSISTOR JFET	TIS88A3 T0-92	MOTORPLA	TM 00 044-3	29.737
T2	TRANSISTOR	BF199	PHILIPS	BF199	28.179
T3	TRANSISTOR	BC558	PHILIPS	BC558	28.097
T4	TRANSISTOR JFET	TIS88A3 T0-92	MOTORPLA	TM 00 044-3	29.737
L1	COIL	TL257	S.P.RADIO	6-0-21580	400257
L2	COIL 16.1 MHz VCO	TL476	AFD.31	6-0-25289	400476
X1	CRYSTAL	10097.6 kHz	NDK	C1010	39.833
X2	CRYSTAL	16097.6 kHz	DANTRONIC	C1062A	39.848

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P.NUMBE	
VCO SELECTOR FOR S1303/I MODULE 7/700		AFD. 33	PRINT NR.5-0-22472D	607484	
C1	CAPACITOR MKT	100nF 10% 100V	*SIEMENS	B32520-A1104-K	11.219
C2	CAPACITOR MKT	100nF 10% 100V	*SIEMENS	B32520-A1104-K	11.219
C3	CAPACITOR MKT	100nF 10% 100V	*SIEMENS	B32520-A1104-K	11.219
C4	CAPACITOR MKT	100nF 10% 100V	*SIEMENS	B32520-A1104-K	11.219
C5	CAPACITOR MKT	100nF 10% 100V	*SIEMENS	B32520-A1104-K	11.219
C6	CAPACITOR CERAMIC	10nF -20/+80% 50V	*KCK	HE70SJYF103Z	15.170
C7	CAPACITOR CERAMIC	10nF -20/+80% 50V	*KCK	HE70SJYF103Z	15.170
C8	CAPACITOR CERAMIC	10nF -20/+80% 50V	*KCK	HE70SJYF103Z	15.170
C9	CAPACITOR CERAMIC	10nF -20/+80% 50V	*KCK	HE70SJYF103Z	15.170
C10	CAPACITOR CERAMIC	10nF -20/+80% 50V	*KCK	HE70SJYF103Z	15.170
C11	CAPACITOR ELECTROLYTIC	10uF 20% 35V	*ERO	EKI 00 AA 210 F	14.512
C12	CAPACITOR CERAMIC	10nF -20/+80% 50V	*KCK	HE70SJYF103Z	15.170
C13	CAPACITOR ELECTROLYTIC	10uF 20% 35V	*ERO	EKI 00 AA 210 F	14.512
C14	CAPACITOR ELECTROLYTIC	10uF 20% 35V	*ERO	EKI 00 AA 210 F	14.512
C15	CAPACITOR CERAMIC	10nF -20/+80% 50V	*KCK	HE70SJYF103Z	15.170
D1	DIODE Ge	AA143	ITT	AA143	25.265
EJ BRUGES,BANDLAGT KLM					
D2	DIODE SCHOTTKY	BAT 43	THOMSON-CSF	BAT43	27.600
D3	DIODE SCHOTTKY	BAT 43	THOMSON-CSF	BAT43	27.600
D4	DIODE SCHOTTKY	BAT 43	THOMSON-CSF	BAT43	27.600
D5	DIODE SCHOTTKY	BAT 43	THOMSON-CSF	BAT43	27.600
D6	DIODE	1N4148	* ITT	1N4148	25.131
D7	DIODE	1N4148	* ITT	1N4148	25.131
D8	DIODE	1N4148	* ITT	1N4148	25.131
D9	DIODE	1N4148	* ITT	1N4148	25.131
D10	DIODE	1N4148	* ITT	1N4148	25.131
D11	DIODE	1N4148	* ITT	1N4148	25.131
D12	DIODE	1N4148	* ITT	1N4148	25.131
D13	DIODE	1N4148	* ITT	1N4148	25.131
D14	DIODE	1N4148	* ITT	1N4148	25.131
IC1	INTEGRATED CIRCUIT	7407N	TEXAS	7407N	33.524
IC2	PROM	IC702 S1303/I 13EC		S1303/OPT/I	700984
IC3	INTEGRATED CIRCUIT	MC14515BCP	MOTOROLA	MC14515BCP	33.390
IC4	1-OF-8 DECODER/DEMULTIPL	SN74LS138N	*MOTOROLA	SN74LS138N	33.917
IC5	INTEGRATED CIRCUIT	7407N	TEXAS	7407N	33.524
R1	RESISTOR	1 KOHM 5% 0.33W	PHILIPS	2322 181 53102	01.200
R2	RESISTOR	1 KOHM 5% 0.33W	PHILIPS	2322 181 53102	01.200
R3	RESISTOR	1 KOHM 5% 0.33W	PHILIPS	2322 181 53102	01.200
R4	RESISTOR	1 KOHM 5% 0.33W	PHILIPS	2322 181 53102	01.200
R5	RESISTOR	1 KOHM 5% 0.33W	PHILIPS	2322 181 53102	01.200
R6	RESISTOR	18 KOHM 5% 0.33W	PHILIPS	2322 181 53183	01.231

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P.NUMBE	
R7	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 33103	01.725
R8	RESISTOR	820 OHM 5% 0.33W	PHILIPS	2322 181 33821	01.697
R20	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R21	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R23	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R24	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R25	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R26	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R27	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R28	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R29	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R30	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R31	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R32	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R33	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 33103	01.725
R34	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 33103	01.725
R35	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 33103	01.725
R36	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 33103	01.725
R37	RESISTOR	3.9 KOHM 5% 0.33W	PHILIPS	2322 181 53392	01.214
R38	RESISTOR	33 KOHM 5% 0.33W	PHILIPS	2322 181 33333	01.737
R39	RESISTOR	100 KOHM 5% 0.33W	PHILIPS	2322 181 33104	01.750
R40	RESISTOR	100 KOHM 5% 0.33W	PHILIPS	2322 181 33104	01.750
R41	RESISTOR	100 KOHM 5% 0.33W	PHILIPS	2322 181 53104	01.250
R42	RESISTOR	100 KOHM 5% 0.33W	PHILIPS	2322 181 53104	01.250
R43	RESISTOR	1 KOHM 5% 0.33W	PHILIPS	2322 181 33102	01.700
R44	RESISTOR	5.6 KOHM 5% 0.33W	PHILIPS	2322 181 33562	01.718
R45	RESISTOR	33 KOHM 5% 0.33W	PHILIPS	2322 181 33333	01.737
R46	RESISTOR	33 KOHM 5% 0.33W	PHILIPS	2322 181 33333	01.737
R47	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R48	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R49	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R50	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R51	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R52	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R53	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R54	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R55	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R56	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R57	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R58	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R59	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R60	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R61	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R62	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P.NUMBER
R63	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R64	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R65	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R66	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R67	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R68	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R69	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R70	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R71	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R72	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R73	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R74	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R75	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R76	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R77	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R78	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R79	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R80	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R81	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R82	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R83	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R84	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R85	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R86	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R87	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R88	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R89	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R90	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
R91	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 33123	01.727
RA1	RESISTOR ARRAY	8x10 KOHM 10% 0.125W	* MATUSHITA	R88 103J	08.630
T1	TRANSISTOR	BC548B	* PHILIPS	BC548B	28.076
T2	TRANSISTOR	BC639	* PHILIPS	BC639	28.120
T3	TRANSISTOR	BC548B	* PHILIPS	BC548B	28.076
T4	TRANSISTOR	BC548B	* PHILIPS	BC548B	28.076
T5	TRANSISTOR	BC558B	* PHILIPS	BC558B	28.100
T10	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T11	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T12	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T13	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T14	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T15	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T16	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T17	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T18	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P.NUMBER
T19	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T20	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T21	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T22	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T23	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T24	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T25	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T26	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T27	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052
T28	TRANSISTOR	BC328-25	* PHILIPS	BC328-25	28.052

INPUT FILTER S1302/S1303/S1304 Module 900

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

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
C936	Capacitor Polyester 100nF $\pm 20\%$ 100V	PHILIPS	2222 344 24104
C937	Capacitor Polyester 100nF $\pm 20\%$ 100V	PHILIPS	2222 344 24104
D901	Diode Silkon Not In S1302	PHILIPS	BAV21

B MODE SWITCH S1303/S1304 Module 1000							1/4
Symbol	Description			Manufact.			
R1001	Resistor	10 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13103
R1002	Resistor	22 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13223
R1003	Resistor	330 ohm	$\pm 5\%$	1,15W	PHILIPS	2322	214 13331
R1004	Resistor	18 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13183
R1005	Resistor	10 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13103
R1006	Resistor	6,8 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13682
R1007	Resistor	3,9 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13392
R1008	Resistor	3,9 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13392
R1009	Resistor	10 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13103
R1010	Resistor	5,6 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13562
R1011	Resistor	68 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13683
R1012	Resistor	15 ohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13150
R1013	Resistor	68 ohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13680
R1014	Resistor	18 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13183
R1015	Resistor	4,7 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13472
R1016	Resistor	10 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13103
R1017	Resistor	15 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13153
R1018	Resistor	10 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13103
R1019	Resistor	15 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13153
R1020	Resistor	18 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13183
R1021	Resistor	3,3 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13332
R1022	Resistor	270 ohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13271
R1023	Resistor	820 ohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13821
R1024	Resistor	0,2 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13222
R1025	Resistor	680 ohm	$\pm 5\%$	0,33W	PHILIPS	2322	181 53681
R1026	Resistor	22 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13223
R1027	Resistor	15 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13153
R1028	Resistor	22 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13223
R1029	Resistor	18 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13183
R1030	Resistor	10 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13103
R1031	Resistor	3,9 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13392
R1032	Resistor	18 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13183
R1033	Resistor	8,2 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13822
R1034	Resistor	22 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13223
R1035	Resistor	22 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13223
R1036	Resistor	22 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13223
R1037	Resistor	100 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 33104
R1038	Resistor	4,7 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13472
R1039	Resistor	8,2 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13822
R1040	Resistor	22 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13223
R1041	Resistor	47 kohm	$\pm 5\%$	0,33W	PHILIPS	2322	211 13473

Symbol	Description	Manufact.	
R1042	Resistor 22 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13103
R1043	Resistor 10 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13103
R1044	Resistor 10 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13103
R1045	Resistor 3,3 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13332
R1046	Resistor 22 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13223
R1047	Resistor 3,3 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13332 [†]
R1048	Resistor 270 ohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13271
R1049	Resistor 22 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13223
R1050	Resistor 270 ohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13271
R1051	Resistor 10 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13103
R1052	Resistor 820 ohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13821
R1053	Resistor 82,5 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 58253
R1054	Resistor 680 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 33684
R1055	Resistor 15 ohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13150
R1056	Resistor 15 ohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13150
R1057	Resistor 39,2 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 53923
R1058	Resistor 1,5 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13152
R1059	Resistor 39,2 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 53923
R1060	Resistor 10 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13103
R1061	Resistor 47 kohm $\pm 5\%$ 0,33W	PHILIPS	2322 211 13473
C1001	Not used		
C1002	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE705SYF103Z
C1003	Capacitor Polyester $\pm 20\%$ 400V	PHILIPS	2322 344 54103
C1004	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1005	Capacitor Polyetylen 0,22uF $\pm 10\%$ 100V	SIEMENS	B32511-D1224-D
C1006	Capacitor Polyester 100nF $\pm 10\%$ 100V	PHILIPS	2322 344 25104
C1007	Capacitor Polyetylen 0,22uF $\pm 10\%$ 100V	SIEMENS	B32511-D1224-D
C1008	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SYF103Z
C1009	Capacitor Electrolyt 470uF -10/+50% 25V	ERO	EBO0GD347E
C1010	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1011	Capacitor Electrolyt 4,7uF $\pm 20\%$ 50V	ERO	EK100AA147H
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 $\pm 20\%$ 50V	ERO	EK100AA147H
C1019	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z
C1020	Capacitor Ceramic 10nF -20/+80% 50V	KCK	HE70SJYF103Z

MODE SWITCH S1303/S1304 Module 1000

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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

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
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

a		SSB GENERATOR S130X			MODULE 1100		1/4
Symbol	Description				Manufact.		
R1101	Resistor	6K8	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13682
R1102	Resistor	1K0	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13102
R1103	Resistor	220	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13221
R1104	Resistor	1K0	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13102
R1105	Resistor	1K0	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13102
R1106	Resistor	1K0	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13102
R1107	Resistor	1K0	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13102
R1108	Resistor	6K8	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13682
R1109	Potentiometer	22K	ohm		cermet.	Philips	2322 482 20223
R1110	Resistor	5K6	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13562
R1111	Resistor	12K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13123
R1112	Resistor	2K2	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13222
R1113	Resistor	2K2	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13222
R1114	Resistor	2K2	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13222
R1115	Resistor	2K2	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13222
R1116	Resistor	68	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13689
R1117	Resistor	150	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13151
R1118	Resistor	15K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13153
R1119	Resistor	47K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13473
R1120	Resistor	47K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13473
R1121	Resistor	47	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13479
R1122	Resistor	47	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13479
R1123	Resistor	390	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13391
R1124	Resistor	47K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13473
R1125	Potentiometer	100	ohm		cermet	Philips	2322 482 20101
R1126	Resistor	330	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13331
R1127	Resistor	330	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13331
R1128	Resistor	470	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13471
R1129	Resistor	47K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13473
R1130	Resistor	150	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13151
R1131	Resistor	2K2	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13222
R1132	Resistor	18K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13183
R1133	Resistor	56K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13563
R1134	Resistor	100	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13101
R1135	Resistor	1K0	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13102
R1136	Resistor	1K0	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13102
R1137	Resistor	22K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13223
R1138	Resistor	68K	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13683
R1139	Resistor	1K5	ohm	$\pm 5\%$	0.33W	Philips	2322 211 13152
R1140	Resistor NTC	1K0	ohm	$\pm 5\%$	0.5W	Philips	2322 642 12102

a		SSB GENERATOR S130X		MODULE 1100		2/4
Symbol	Description			Manufact.		
R1141	Resistor	1K0 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13102
R1142	Resistor	150 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13151
R1143	Resistor	330 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13331
R1144	Resistor	2K7 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13272
R1145	Resistor	1K8 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13182
R1146	Resistor	2K2 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13222
R1147	Resistor	1K5 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13152
R1148	Resistor	15K ohm	$\pm 5\%$	0.33W	Philips	2322 211 13153
R1149	Potentiometer	100 ohm		cermet	Philips	2322 482 20101
R1150	Resistor	47 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13479
R1151	Resistor	220 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13221
R1152	Resistor	270 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13271
R1153	Resistor	26K7 ohm	$\pm 1\%$	0.4W	Philips	2322 151 52673
R1154	Resistor	26K7 ohm	$\pm 1\%$	0.4W	Philips	2322 151 52673
R1155	Resistor	8K2 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13822
R1156	Resistor	1K8 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13182
R1157	Resistor	560 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13561
R1158	Potentiometer	470 ohm		cermet	Philips	2322 482 20471
R1159	Resistor	560 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13561
R1160	Resistor	120 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13121
R1161	Resistor	150 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13151
R1162	Resistor	150 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13151
R1163	Resistor	150 ohm	$\pm 5\%$	0.33W	Philips	2322 211 13151
C1101	Capacitor Electrolyt	4u7F	$\pm 20\%$	50V	ROE	EK100AA147H
C1102	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1103	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1104	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1105	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1106	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1107	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1108	Capacitor polystyrene	1n2F	$\pm 5\%$	125V	Philips	2222 425 21202
C1109	Capacitor polystyrene	4n7F	$\pm 5\%$	63V	Philips	2222 424 24702
C1110	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1111	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1112	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1113	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1114	Capacitor polystyrene	1n0F	$\pm 5\%$	125V	Philips	2222 425 21002
C1115	Capacitor polyester	100nF	$\pm 20\%$	100V	Philips	2222 344 24104
C1116	Capacitor electrolyt	100uF-10/+50%		25V	ROE	EKMOOCC310E

SSB GENERATOR S1302/3/4

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

SSB GENERATOR S1302/3/4

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<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
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

f		MICROPHONE AMPLIFIER S130X		MODULE 1200	1/3
Symbol	Description			Manufact.	
R1201	Preset pot.meter, cermet 1Kohm $\pm 20\%$ 0,5W			Philips	2322 482 20102
R1202	Resistor	560 ohm $\pm 5\%$	1,6 W	Philips	2322 191 35601
R1203	Resistor	1Kohm $\pm 5\%$	0,33W	Philips	2322 211 13102
R1204	Resistor	2,7Kohm $\pm 5\%$	0,33W	Philips	2322 211 13272
R1205	Resistor	2,7Kohm $\pm 5\%$	0,33W	Philips	2322 211 13272
R1206	Resistor	180 ohm $\pm 5\%$	0,33W	Philips	2322 211 13181
R1207	Resistor	150 ohm $\pm 5\%$	0,33W	Philips	2322 211 13151
R1208	Resistor	5,6Kohm $\pm 5\%$	0,33W	Philips	2322 211 13562
R1209	Resistor	100Kohm $\pm 5\%$	0,33W	Philips	2322 211 13104
R1211	Resistor	820 ohm $\pm 5\%$	0,33W	Philips	2322 211 13821
R1212	Resistor	100Kohm $\pm 5\%$	0,33W	Philips	2322 211 13104
R1213	Resistor	220Kohm $\pm 5\%$	0,33W	Philips	2322 211 13224
R1214	Resistor	4,7Kohm $\pm 5\%$	0,33W	Philips	2322 211 13472
R1215	Resistor	4,7Kohm $\pm 5\%$	0,33W	Philips	2322 211 13472
R1216	Resistor	390 ohm $\pm 5\%$	0,33W	Philips	2322 211 13391
R1217	Resistor	10Kohm $\pm 5\%$	0,33W	Philips	2322 211 13103
R1218	Resistor	4,7Kohm $\pm 5\%$	0,33W	Philips	2322 211 13472
R1219	Resistor	10Kohm $\pm 5\%$	0,33W	Philips	2322 211 13103
R1220	Resistor	1Kohm $\pm 5\%$	0,33W	Philips	2322 211 13102
R1221	Resistor	470 ohm $\pm 5\%$	0,33W	Philips	2322 211 13471
R1222	Resistor	2,2Kohm $\pm 5\%$	0,33W	Philips	2322 211 13222
R1223	Resistor	220Kohm $\pm 5\%$	0,33W	Philips	2322 211 13224
R1224	Preset potmeter, cermet 100Kohm $\pm 20\%$ 0,5W			Philips	2322 482 20104
R1225	Resistor	1Kohm $\pm 5\%$	0,33W	Philips	2322 211 13102
R1226	Resistor	10Kohm $\pm 5\%$	0,33W	Philips	2322 211 13103
R1227	Resistor	4,53Kohm $\pm 1\%$	0,33W	Philips	2322 151 54533
R1228	Resistor	4,53Kohm $\pm 1\%$	0,33W	Philips	2322 151 54533
R1229	Resistor	100Kohm $\pm 5\%$	0,33W	Philips	2322 211 13104
R1230	Resistor	1Kohm $\pm 5\%$	0,33W	Philips	2322 211 13102
R1231	Resistor	2,2Kohm $\pm 5\%$	0,33W	Philips	2322 211 13222
R1232	Preset potmeter cermet 470 ohm $\pm 20\%$ 0,5W			Philips	2322 482 20471
R1233	Resistor	47Kohm $\pm 5\%$	0,33W	Philips	2322 211 13473
R1234	Resistor	47Kohm $\pm 5\%$	0,33W	Philips	2322 211 13473
R1235	Resistor	2,2Kohm $\pm 5\%$	0,33W	Philips	2322 211 13222
R1236	Resistor	1Kohm $\pm 5\%$	0,33W	Philips	2322 211 13102
R1237	Resistor	1Kohm $\pm 5\%$	0,33W	Philips	2322 211 13102
R1238	Resistor	3,9Kohm $\pm 5\%$	0,33W	Philips	2322 211 13392
R1239	Resistor	2,2Kohm $\pm 5\%$	0,33W	Philips	2322 211 13222
R1240	Resistor	2,2Kohm $\pm 5\%$	0,33W	Philips	2322 211 13222

e		MICROPHONE AMPLIFIER S130X		Module 1200 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	EK100AA233D
C1202	Capacitor electrolytic	4,7uF	20% 50V	ROE	EK100AA147H
C1203	Capacitor electrolytic	0,22uF	20% 50V	ROE	EK100AA022H
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	EK100AA147H
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	EK100AA147H
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	EK100AA147H
C1217	Capacitor electrolytic	4,7uF	20% 50V	ROE	EK100AA147H
C1218	Capacitor electrolytic	10uF	20% 35V	ROE	EK100AA210F
C1219	Capacitor polyester	47nF	+10% 250V	Philips	2222 344 41473
C1220	Capacitor electrolytic	4,7uF	20% 50V	ROE	EK100AA147H
C1221	Capacitor electrolytic	4,7uF	20% 50V	ROE	EK100AA147H
C1222	Capacitor electrolytic	4,7uF	20% 50V	ROE	EK100AA147H
C1223	Capacitor polyester	68nF	+10% 250V	Philips	2222 344 41683
C1224	Capacitor electrolytic	4,7uF	20% 50V	ROE	EK100AA147H
C1225	Capacitor electrolytic	4,7uF	20% 50V	ROE	EK100AA147H
C1226	Capacitor electrolytic	4,7uF	20% 50V	ROE	EK100AA147H
C1227	Capacitor polyester	220nF	+20% 100V	Philips	2322 344 24224
L1201	Coil			S.P.	TL 219

c	MICROPHONE AMPLIFIER S130X			Module 1200	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 $\pm 5\%$	0.4W	Philips	BZX79 C5V1
D1202	Diode, zener	5.1V $\pm 5\%$	0.4W	Philips	BZX79 C5V1
D1203	Diode, silicon			Philips	BAV 21
D1204	Diode, zener	7.5V $\pm 5\%$	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

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

Symbol	Description	Manufact.	
C1314	Capacitor polyester 0,1uF $\pm 10\%$ 100V	SIEMENS	B32510-D1104K
C1315	Capacitor polyester 0,1uF $\pm 10\%$ 100V	SIEMENS	B32510-D1104K
L1301	Coil 6uH $\pm 5\%$	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

POSITION	DESCRIPTION	MODULE	MANUFACTOR	TYPE	S.P. NUMBER
	OUTPUT FILTER 21.4MHZ	MODULE 14/1400	AFD.33	PRINT NR 5-0-22749	607465
C1	CAPACITOR POLYSTYRENE	100pF 1% 630V	ESPERA *PHILIPS	5-0-22749 2222 431 81001 2222 427 41001	107161 10.400
C2	CAPACITOR CERAMIC	15P 400V N150 5%	*FERROPERM	9/011679	16.115
C3	CAPACITOR CERAMIC	39P N150 5%	KCK	HE50S3PH390J	15.090
C4	CAPACITOR CERAMIC	39P N150 5%	KCK	HE50S3PH390J	15.090
C5	CAPACITOR POLYSTYRENE	160pF 1% 630V	*PHILIPS	2222 431 81601 2222 427 41601	10.406
L1	SPOLE 16.7MHz BS TL467		AFD.31	6-0-25283	400467
L2	SPOLE	TL227	S.P.RADIO	6-0-22757	400227
L3	SPOLE	TL226	S.P.RADIO	6-0-22756	400226
L4	SPOLE	TL225	S.P.RADIO	6-0-22755	400225

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POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P.NUMB	
	BAND FILTER S1303/1,11	MODULE 15/1500	AFD.33	5-0-25197A	625197
C1	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C2	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C3	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C4	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	NKE	DT 350 758L F 103 Z 50V FLAT PACK	15.170
C5	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	NKE	DT 350 758L F 103 Z 50V FLAT PACK	15.170
C6	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C7	CAPACITOR CERAMIC	75pF 5% 50V	KCK	HE70SJPH750J	15.122
C8	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C9	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C10	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C11	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C12	CAPACITOR CERAMIC	120pF 5% 50V N150	KCK	HE80SJPH121J	15.142
C13	CAPACITOR CERAMIC	180pF 5% N150 50VDC	KCK	RT-HE95-SK PH 181 J AMMO PACK	15.149
C14	CAPACITOR CERAMIC	120pF 5% 50V N150	KCK	HE80SJPH121J	15.142
C15	CAPACITOR CERAMIC	68pF 5% N150 50VDC	KCK	RT-HE70-SK PH 680 J AMMO PACK	15.115
C16	CAPACITOR CERAMIC	33pF 5% N150 50VDC	NKE	DT 350 758S PH 330 J 50V FLAT PACK	15.092
C17	CAPACITOR CERAMIC	47pF 5% N150 50VDC	KCK	RT-HE60-SK PH 470 J AMMO PACK	15.100
C18	CAPACITOR MKT	470nF 10% 63V	ERO*	MKT1822-447/065	11.048
C19	CAPACITOR MKT	470nF 10% 63V	ERO*	MKT1822-447/065	11.048
C20	CAPACITOR CERAMIC	47pF 5% N150 50VDC	KCK	RT-HE60-SK PH 470 J AMMO PACK	15.100
C21	CAPACITOR CERAMIC	20pF 5% N150 50VDC	KCK	RT-HE40 SM PH 200 J AMMO PACK	15.065
C22	CAPACITOR CERAMIC	36pF 5% N150 50VDC	KCK	RT-HE50-SK-PH 360 J AMMO PACK	15.088
C23	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C24	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C25	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	NKE	DT 350 758L F 103 Z 50V FLAT PACK	15.170
C26	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C27	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C28	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C29	CAPACITOR CERAMIC	56pF 5% N150 50VDC	KCK	RT-HE60-SK PH 560 J AMMO PACK	15.113
C30	CAPACITOR CERAMIC	68pF 5% N150 50VDC	KCK	RT-HE70-SK PH 680 J	15.115

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P.NUMB	
C31	CAPACITOR CERAMIC	100 PF 5% N150 50VDC	KCK	AMMO PACK RT-HE80-SK PH 101 J	15.133
C32	CAPACITOR CERAMIC	75pF 5% 50V	KCK	AMMO PACK HE70SJPH750J	15.122
C33	CAPACITOR CERAMIC	68pF 5% N150 50VDC	KCK	RT-HE70-SK PH 680 J AMMO PACK	15.115
C34	CAPACITOR CERAMIC	91pF 5% 50V N150	KCK	HE70SJPH910J	15.128
C35	CAPACITOR CERAMIC	47pF 5% N150 50VDC	KCK	RT-HE60-SK PH 470 J AMMO PACK	15.100
C36	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C37	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C38	CAPACITOR CERAMIC	12P 5% N150 100V	KCK	HH50SBPH120J	15.045
C39	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	NKE	DT 350 758L F 103 Z 50V FLAT PACK	15.170
C40	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C41	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C42	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	NKE	DT 350 758L F 103 Z 50V FLAT PACK	15.170
C43	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	NKE	DT 350 758L F 103 Z 50V FLAT PACK	15.170
C44	CAPACITOR CERAMIC	36pF 5% N150 50VDC	KCK	RT-HE50-SK-PH 360 J AMMO PACK	15.088
C45	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C46	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C47	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C48	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C49	CAPACITOR CERAMIC	18pF 5% N150 50VDC	NKE	DT 340 758S PH 180 J 50V FLAT PACK	15.061
C50	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C51	CAPACITOR CERAMIC	56pF 5% N150 50VDC	KCK	RT-HE60-SK PH 560 J AMMO PACK	15.113
C52	CAPACITOR CERAMIC	110pF 5% 50V N150	KCK	HE80SJPH111J	15.139
C53	CAPACITOR CERAMIC	56pF 5% N150 50VDC	KCK	RT-HE60-SK PH 560 J AMMO PACK	15.113
C54	CAPACITOR CERAMIC	5p6F +/-0.5pF N150 50VDC	KCK	RT-HE40-SK PH 056 D AMMO PACK	15.013
C55	CAPACITOR CERAMIC	13pF 5% 50VDC N150	KCK	HE40 S3PH 130 J	15.050
C56	CAPACITOR CERAMIC	6p8F +/-0.5pF N150 50VDC	NKE	DT 330 758S PH 688 D 50V FLAT PACK	15.020
C57	CAPACITOR CERAMIC	20pF 5% N150 50VDC	KCK	RT HE40 SM PH 200 J AMMO PACK	15.065
C58	CAPACITOR CERAMIC	5p6F +/-0.5pF N150 50VDC	KCK	RT-HE40-SK PH 056 D AMMO PACK	15.013
C59	CAPACITOR CERAMIC	27pF 5% N150 50VDC	KCK	RT-HE50-SK PH 270 J	15.076

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P. NUMBER
C60	CAPACITOR CERAMIC	20PF 5% N150 50VDC	KCK	AMMO PACK RT HEAD SM PH 200 J	15.065
C61	CAPACITOR CERAMIC	6P8F +-0.5PF N150 50VDC	NKE	AMMO PACK DT 330 758S PH 6R8 D 50V	15.020
C62	CAPACITOR CERAMIC	36PF 5% N150 50VDC	KCK	FLAT PACK RT-HE50-SK-PH 360 J	15.088
C63	CAPACITOR CERAMIC	27PF 5% N150 50VDC	KCK	AMMO PACK RT-HE50-SK PH 270 J	15.076
D1	DIODE SWITCH	BA243	TFK	AMMO PACK BA243	25.386
D2	DIODE SWITCH	BA243	TFK	BA243	25.386
D3	DIODE SWITCH	BA243	TFK	BA243	25.386
D4	DIODE SWITCH	BA243	TFK	BA243	25.386
D5	DIODE SWITCH	BA243	TFK	BA243	25.386
D6	DIODE SWITCH	BA243	TFK	BA243	25.386
D7	DIODE SWITCH	BA243	TFK	BA243	25.386
D8	DIODE SWITCH	BA243	TFK	BA243	25.386
D9	DIODE SWITCH	BA243	TFK	BA243	25.386
D10	DIODE SWITCH	BA243	TFK	BA243	25.386
D11	DIODE SWITCH	BA243	TFK	BA243	25.386
D12	DIODE SWITCH	BA243	TFK	BA243	25.386
D13	DIODE SWITCH	BA243	TFK	BA243	25.386
D14	DIODE SWITCH	BA243	TFK	BA243	25.386
D15	DIODE SWITCH	BA243	TFK	BA243	25.386
D16	DIODE SWITCH	BA243	TFK	BA243	25.386
D17	DIODE SWITCH	BA243	TFK	BA243	25.386
D18	DIODE SWITCH	BA243	TFK	BA243	25.386
D19	DIODE SWITCH	BA243	TFK	BA243	25.386
D20	DIODE SWITCH	BA243	TFK	BA243	25.386
L16	CHOKE	1uH 10% 4425-6K	AIRCO	4425-6K	20.121
R1	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R2	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183
R3	RESISTOR MF	120 OHM 5% 0.4W	* PHILIPS	2322 181 53121	01.177
R4	RESISTOR MF	39 OHM 5% 0.4W	* PHILIPS	2322 181 53399	01.164
R5	RESISTOR MF	27 OHM 5% 0.4W	PHILIPS	2322 181 53279	01.160
R6	RESISTOR	120 OHM 5% 0.5W	DRALORIC	LCA 0411-120R 5%	01.378
R7	RESISTOR MF	10 OHM 5% 0.4W	PHILIPS	2322 181 53109	01.150
R8	RESISTOR MF	100k OHM 5% 0.4W	PHILIPS	2322 181 53104	01.250
R9	RESISTOR MF	100k OHM 5% 0.4W	PHILIPS	2322 181 53104	01.250
R10	RESISTOR MF	390 OHM 5% 0.4W	PHILIPS	2322 181 53391	01.189
R11	RESISTOR MF	390 OHM 5% 0.4W	PHILIPS	2322 181 53391	01.189
R12	RESISTOR MF	1k5 OHM 5% 0.4W	* PHILIPS	2322 181 53152	01.204
R13	RESISTOR MF	1k5 OHM 5% 0.4W	* PHILIPS	2322 181 53152	01.204
R14	RESISTOR MF	390 OHM 5% 0.4W	PHILIPS	2322 181 53391	01.189

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P. NUMBER
R15	RESISTOR MF	390 OHM 5% 0.4W	PHILIPS	2322 181 53391	01.189
R16	RESISTOR MF	1k5 OHM 5% 0.4W	* PHILIPS	2322 181 53152	01.204
R17	RESISTOR MF	1k5 OHM 5% 0.4W	* PHILIPS	2322 181 53152	01.204
R18	RESISTOR MF	240 OHM 5% 0.4W	* PHILIPS	2322 181 53241	01.184
R19	RESISTOR MF	100 OHM 5% 0.4W	PHILIPS	2322 181 53101	01.175
R20	RESISTOR MF	68 OHM 5% 0.4W	* PHILIPS	2322 181 53689	01.170
R21	RESISTOR MF	68 OHM 5% 0.4W	* PHILIPS	2322 181 53689	01.170
R22	RESISTOR MF	200 OHM 5% 0.4W	* PHILIPS	2322 181 53201	01.182
R23	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R24	RESISTOR MF	390 OHM 5% 0.4W	PHILIPS	2322 181 53391	01.189
R25	RESISTOR MF	100 OHM 5% 0.4W	PHILIPS	2322 181 53101	01.175
R26	RESISTOR MF	100 OHM 5% 0.4W	PHILIPS	2322 181 53101	01.175
R27	RESISTOR MF	390 OHM 5% 0.4W	PHILIPS	2322 181 53391	01.189
R28	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R29	RESISTOR MF	1k0 OHM 5% 0.4W	PHILIPS	2322 181 53102	01.200
R30	RESISTOR MF	1k0 OHM 5% 0.4W	PHILIPS	2322 181 53102	01.200
R31	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R32	RESISTOR MF	39 OHM 5% 0.4W	* PHILIPS	2322 181 53399	01.164
R33	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R34	RESISTOR	2.2 KOHM 5% 0.33W	PHILIPS	2322 181 33222	01.708
R35	RESISTOR	1.2 KOHM 5% 0.33W	PHILIPS	2322 181 33122	01.702
R36	RESISTOR MF	270 OHM 5% 0.4W	PHILIPS	2322 181 53271	01.185
R37	RESISTOR MF	12 OHM 5% 0.4W	PHILIPS	2322 181 53129	01.152
R38	RESISTOR MF	27 OHM 5% 0.4W	PHILIPS	2322 181 53279	01.160
R39	RESISTOR MF	560 OHM 5% 0.4W	* PHILIPS	2322 181 53561	01.193
R40	RESISTOR MF	150 OHM 5% 0.4W	* PHILIPS	2322 181 53151	01.172
R41	POTENTIOMETER TRIMMING	100 OHM 10% 0.5W	PHILIPS*	2322 482 22101	07.644
T1	TRANSISTOR RF	BFW17A PNP TO-39	SGS	BFW17A	29.151
T2	TRANSISTOR RF	BFW17A PNP TO-39	SGS	BFW17A	29.151
T3	TRANSISTOR RF	BFW17A PNP TO-39	SGS	BFW17A	29.151
T4	TRANSISTOR RF	BFW17A PNP TO-39	SGS	BFW17A	29.151
L1	SPOLE 14MHz LP-FILTER	TL478	AFD.31	6-0-25298	400478
L2	SPOLE 14MHz LP-FILTER	TL479	AFD.31	6-0-25299	400479
L3	SPOLE 14MHz LP TL464	TL464	AFD.31	6-0-25280	400464
L4	SPOLE 9MHz LP-FILTER	TL477	AFD.31	6-0-25297	400477
L5	SPOLE 9MHz LP TL463	TL463	AFD.31	6-0-25279	400463
L6	SPOLE 9MHz LP TL463	TL463	AFD.31	6-0-25279	400463
L7	COIL	TL242	S.P. RADIO	6-0-21565	400242
L8	COIL	TL242	S.P. RADIO	6-0-21565	400242
L9	SPOLE 1-6-20MHz LP-FILT.	TL482	AFD.31	6-0-25302	400482
L10	SPOLE 1-6-20MHz LP-FILT.	TL483	AFD.31	6-0-25303	400483
L11	SPOLE 1-6-20MHz LP-FILT.	TL484	AFD.31	6-0-25304	400484
L12	SPOLE 20-28MHz LP-FILT.	TL481	AFD.31	6-0-25301	400481
L13	SPOLE 20-28MHz LP-FILT.	TL480	AFD.31	6-0-25300	400480

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P. NUM
L14	SPOLE 28MHz LP TL465		AFD.31	6-0-25281	400465
L15	SPOLE	TL227	S.P.RADIO	6-0-22757	400227
TR1	TRANSFORMER	TL249	S.P.RADIO	6-0-21572	400249
TR2	TRANSFORMER	TL285	S.P.RADIO	6-0-22758	400285

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POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P. NUM
	MIXER 16.7MHz S1303/1,11	MODULE 16/1600	AFD.33	5-0-25240A	625240
C1	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C2	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C3	CAPACITOR POLYSTYRENE	0.01uF 400V 20%	ERO	MKT1822	11.126
C4	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C5	CAPACITOR POLYSTYRENE	2.2nF 1% 160V	*PHILIPS	2222 429 82202	10.284
C6	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C7	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C8	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C9	CAPACITOR MKT	1000pF 10% 400VDC	PHILIPS*	2222 369 55102	12.410
C10	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C11	CAPACITOR CERAMIC	5p6F +/-0.5pF N150 50VDC	KCK	RT-HE40-SK PH 056 D AMMO PACK	15.013
C12	CAPACITOR POLYSTYRENE	160pF 1% 630V	*PHILIPS	2222 431 81601	10.406
C13	CAPACITOR POLYSTYRENE	430pF 1% 630VDC	PHILIPS	2222 431 84301	10.428
C14	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C15	CAPACITOR POLYSTYRENE	200pF 1% 630V	*PHILIPS	2222 431 82001	10.408
C16	CAPACITOR POLYSTYRENE	510pF 1% 630V	*PHILIPS	2222 431 85101	10.431
C17	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C18	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C19	CAPACITOR POLYSTYRENE	110pF 1% 630V	*PHILIPS	2222 431 81101	10.402
C20	CAPACITOR POLYSTYRENE	910pF 1% 250V	*PHILIPS	2222 430 89101	10.349
C21	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C22	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C23	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C24	CAPACITOR CERAMIC	10nF -20/+80% CL2 50VDC	NKE	DT 350 758L F 103 Z 50V FLAT PACK	15.170
C25	CAPACITOR MKT	100nF 10% 100VDC	ERO	MKT 1818-410/01 5-6	11.180
C26	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C27	CAPACITOR CERAMIC	15pF 5% NPO 500VDC	NKE	DT 360 758L CH 150 J 500V FLAT PACK	15.590
D1	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	PHILIPS	BAV21	25.340
D2	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	PHILIPS	BAV21	25.340
D3	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	PHILIPS	BAV21	25.340
R1	RESISTOR MF	820 OHM 5% 0.4W	PHILIPS	2322 181 53821	01.197
R2	RESISTOR MF	1k5 OHM 5% 0.4W	* PHILIPS	2322 181 53152	01.204
R3	RESISTOR	6.8 KOHM 5% 0.33W	PHILIPS	2322 181 33682	01.720
R4	RESISTOR MF	680 OHM 5% 0.4W	PHILIPS	2322 181 53681	01.195
R5	RESISTOR MF	3k3 OHM 5% 0.4W	PHILIPS	2322 181 53332	01.212
R6	RESISTOR	33 OHM 5% 0.33W	PHILIPS	2322 181 33339	01.662
R7	RESISTOR NTC	1k OHM 10% .5W	PHILIPS*	2322 642 62102	07.270
R8	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P.NUMBER
R9	RESISTOR	330 OHM 5% 0.33W	PHILIPS	2322 181 33331	01.687
R10	RESISTOR	150 OHM 5% 0.33W	PHILIPS	2322 181 33151	01.679
R11	RESISTOR	15 OHM 5% 0.33W	PHILIPS	2322 181 33159	01.654
R12	RESISTOR	4.7 KOHM 5% 0.33W	PHILIPS	2322 181 33472	01.715
R13	RESISTOR MF	3k3 OHM 5% 0.4W	PHILIPS	2322 181 53332	01.212
R14	RESISTOR	15 OHM 5% 0.33W	PHILIPS	2322 181 33159	01.654
R15	RESISTOR	68 OHM 5% 0.33W	PHILIPS	2322 181 33689	01.670
R16	RESISTOR MF	68 OHM 5% 0.4W	* PHILIPS	2322 181 53689	01.170
R17	RESISTOR MF	180 OHM 5% 0.4W	PHILIPS	2322 181 53181	01.181
R18	RESISTOR MF	1k0 OHM 5% 0.4W	PHILIPS	2322 181 53102	01.200
R19	RESISTOR MF	27k OHM 5% 0.4W	* PHILIPS	2322 181 53273	01.235
R20	RESISTOR MF	1k8 OHM 5% 0.4W	PHILIPS	2322 181 53182	01.206
R21	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R22	RESISTOR MF	4k7 OHM 5% 0.4W	PHILIPS	2322 181 53472	01.216
R23	RESISTOR MF	3.9k OHM 5% 0.4W	* PHILIPS	2322 181 53392	01.214
R24	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R25	POTENTIOMETER TRIMMING	2.2 KOHM 10% 0.5W	PHILIPS	2322 482 22222	07.665
R26	RESISTOR MF	2k2 OHM 5% 0.4W	PHILIPS	2322 181 53222	01.208
R27	RESISTOR MF	2k2 OHM 5% 0.4W	PHILIPS	2322 181 53222	01.208
R28	RESISTOR MF	10k OHM 5% 0.4W	PHILIPS	2322 181 53103	01.225
R29	RESISTOR MF	27k OHM 5% 0.4W	* PHILIPS	2322 181 53273	01.235
R30	RESISTOR MF	47 OHM 5% 0.4W	* PHILIPS	2322 181 53479	01.166
R31	PRESET CERMET	220 OHM 20% 0.5W	AB	HC10 200 150 220 20%	07.709
R32	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183
R33	RESISTOR MF	1k0 OHM 5% 0.4W	PHILIPS	2322 181 53102	01.200
R34	RESISTOR MF	8k2 OHM 5% 0.4W	PHILIPS	2322 181 53822	01.222
R35	RESISTOR MF	680 OHM 5% 0.4W	PHILIPS	2322 181 53681	01.195
R36	RESISTOR MF	100 OHM 5% 0.4W	PHILIPS	2322 181 53101	01.175
R37	RESISTOR MF	5.6k OHM 5% 0.4W	* PHILIPS	2322 181 53562	01.218
R38	RESISTOR MF	22k OHM 5% 0.4W	PHILIPS	2322 181 53223	01.233
R39	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183
R40	RESISTOR MF	100 OHM 5% 0.4W	PHILIPS	2322 181 53101	01.175
R41	RESISTOR MF	47 OHM 5% 0.4W	* PHILIPS	2322 181 53479	01.166
R42	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183
R43	RESISTOR MF	33 OHM 5% 0.4W	PHILIPS	2322 181 53339	01.162
R44	RESISTOR PMF	150 OHM 5% 1.6W	PHILIPS	2322 191 31501	04.179
R45	RESISTOR MF	18 OHM 5% 0.4W	* PHILIPS	2322 181 53189	01.156
R46	RESISTOR	120 OHM 5% 0.33W	PHILIPS	2322 181 33121	01.677
R47	RESISTOR	120 OHM 5% 0.33W	PHILIPS	2322 181 33121	01.677
R48	RESISTOR	330 OHM 5% 0.33W	PHILIPS	2322 181 33331	01.687
RE1	RELAY	24VDC 1SH. 2A	OUC	OUC-S-124D	21.329
RE2	RELAY	24VDC 2SH. 2A	*ZETTLER	AZ 820-2C-24DE aS	21.327
RE3	RELAY	24VDC 1SH. 2A	OUC	OUC-S-124D	21.329
T1	TRANSISTOR	BF199	PHILIPS	BF199	28.179

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P.NUMBER
T2	TRANSISTOR RF	BF494 PNP T0-92	PHILIPS	BF494	28.201
T3	TRANSISTOR RF	BF494 PNP T0-92	PHILIPS	BF494	28.201
T4	TRANSISTOR RF	BF494 PNP T0-92	PHILIPS	BF494	28.201
T5	TRANSISTOR	BF199	PHILIPS	BF199	28.179
T6	TRANSISTOR RF	BFW17A PNP T0-39	SGS	BFW17A	29.151
X1	X-TAL FILTER	16.6985MHZ BW=9kHz	NDK	C1061A	39.852
L1	SPOLE 1"st 16,7MHz	TL471	AFD.31	6-0-25284	400471
L2	SPOLE 2"nd 16,7MHz	TL472	AFD.31	6-0-25285	400472
L3	SPOLE MIXER 1"st 16,7MHz	TL473	AFD.31	6-0-25286	400473
L4	SPOLE MIXER 2"nd 16,7MHz	TL474	AFD.31	6-0-25287	400474
TR1	TRANSFORMER	TL266	S.P.RADIO	6-0-21887	400266
TR2	TRANSFORMER	TL256	S.P.RADIO	6-0-21579	400256

d		A2H - OSCILLATOR & DELAY UNIT S130X		Module 1800		1/2
Symbol	Description			Manufact.		
R1801	Resistor 1kohm \pm 5%	0.33W	Philips	2322	211	13102
R1802	Resistor 100kohm \pm 5%	0.33W	Philips	2322	211	13104
R1803	Resistor 39kohm \pm 5%	0.33W	Philips	2322	211	13393
R1804	Resistor 4.7kohm \pm 5%	0.33W	Philips	2322	211	13472
R1805	Resistor 33kohm \pm 5%	0.33W	Philips	2322	211	13333
R1806	Preset pot.meter 1kohm \pm 20%	0.5W	Philips	2322	482	20102
R1807	Resistor 1kohm \pm 5%	0.33W	Philips	2322	211	13102
R1808	Resistor 2.2kohm \pm 5%	0.33W	Philips	2322	211	13222
R1809	Resistor 56kohm \pm 5%	0.33W	Philips	2322	211	13563
R1810	Resistor 120kohm \pm 5%	0.33W	Philips	2322	211	13124
R1811	Resistor 10kohm \pm 5%	0.33W	Philips	2322	211	13103
R1812	Resistor 3.9kohm \pm 5%	0.33W	Philips	2322	211	13392
R1813	Resistor 10kohm \pm 5%	0.33W	Philips	2322	211	13103
R1814	Resistor 56kohm \pm 5%	0.33W	Philips	2322	211	13563
R1815	Resistor 10kohm \pm 5%	0.33W	Philips	2322	211	13103
R1816	Resistor 10kohm \pm 5%	0.33W	Philips	2322	211	13103
R1817	Resistor 3.9kohm \pm 5%	0.33W	Philips	2322	211	13392
R1818	Resistor 56kohm \pm 5%	0.33W	Philips	2322	211	13563
R1819	Preset pot.meter 100kohm \pm 20%	0.5W	Philips	2322	482	20104
R1820	Resistor 56kohm \pm 5%	0.33W	Philips	2322	211	13563
R1821	Resistor 3.9kohm \pm 5%	0.33W	Philips	2322	211	13392
R1822	Resistor 10kohm \pm 5%	0.33W	Philips	2322	211	13103
R1823	Resistor 10kohm \pm 5%	0.33W	Philips	2322	211	13103
R1824	Resistor 56kohm \pm 5%	0.33W	Philips	2322	211	13563
R1825	Resistor 10kohm \pm 5%	0.33W	Philips	2322	211	13103
R1826	Resistor 10kohm \pm 5%	0.33W	Philips	2322	211	13103
R1827	Resistor 3.9kohm \pm 5%	0.33W	Philips	2322	211	13392
C1801	Capacitor electrolytic 10uF 20%	35V	ROE	EKI00AA	210F	
C1802	Capacitor electrolytic 10uF 20%	35V	ROE	EKI00AA	210F	
C1803	Capacitor electrolytic 4.7uF 20%	50V	ROE	EKI00AA	147H	
C1804	Capacitor polystyrene 56nF \pm 1%	63V	Philips	2222	444	45603
C1805	Capacitor electrolytic 4.7uF 20%	50V	ROE	EKI00AA	147H	
C1806	Capacitor electrolytic 4.7uF 20%	50V	ROE	EKI00AA	147H	
C1807	Capacitor polyester 100nF \pm 10%	100V	Philips	2222	344	25104
C1808	Capacitor polyester 220nF \pm 10%	400V	Philips	2222	344	25224
C1809	Capacitor polyester 220nF \pm 10%	100V	Philips	2222	344	25224
C1810	Capacitor polyester 10nF \pm 20%	400V	Philips	2222	344	54103

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
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

a		POWER SWITCH S1303/04	Module 2000	1/1
Symbol	Description		Manufact.	
R2001	Resistor	1 kohm $\pm 5\%$	0,5 W PHILIPS	2322 212 13102
R2002	Resistor	1 kohm $\pm 5\%$	0,5 W PHILIPS	2322 212 13102
R2003	Resistor	1 kohm $\pm 5\%$	0,5 W PHILIPS	2322 212 13102
R2004	Resistor	10 kohm $\pm 5\%$	0,33W PHILIPS	2322 211 13103
R2005	Resistor	10 kohm $\pm 5\%$	0,33W PHILIPS	2322 211 13103
R2006	Resistor	33 kohm $\pm 5\%$	0,33W PHILIPS	2322 211 13333
R2007	Resistor	10 kohm $\pm 5\%$	0,33W PHILIPS	2322 211 13103
R2008	Resistor	3,6 kohm $\pm 5\%$	0,33W PHILIPS	2322 211 13362
P2001	Potmeter	4,7 kohm $\pm 5\%$	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

a		FREQUENCY CONTROL S1303/04		Module 2100		1/4
Symbol	Description				Manufact.	
R2101	Resistor	100 kohm	+5%	0,33W	Philips	2322 211 13104
R2102	Resistor	47 kohm	+5%	0,33W	Philips	2322 211 13473
R2103	Resistor	100 kohm	+5%	0,33W	Philips	2322 211 13104
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	560 ohm	+5%	0,33W	Philips	2322 211 13561
R2122	Resistor	82 kohm	+5%	0,33W	Philips	2322 211 13823
R2123	Resistor	33 kohm	+5%	0,33W	Philips	2322 211 13333
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	2,2 kohm	+5%	0,33W	Philips	2322 211 13222
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	12 kohm	+5%	0,33W	Philips	2322 211 13123
R2133	Resistor	10 kohm	+5%	0,33W	Philips	2322 211 13103
R2134	Resistor	47 kohm	+5%	0,33W	Philips	2322 211 13473
R2135	Resistor	560 ohm	+5%	0,33W	Philips	2322 211 13561
R2136	Resistor	5,6 ohm	+5%	0,33W	Philips	2322 211 13568
R2137	Resistor	10 kohm	+5%	0,33W	Philips	2322 211 13103
R2138	Resistor	22 kohm	+5%	0,33W	Philips	2322 211 13223
R2139	Resistor	100 kohm	+5%	0,33W	Philips	2322 211 13104
R2140	Resistor	15 kohm	+5%	0,33W	Philips	2322 211 13153

a		FREQUENCY CONTROL S1303/04		Module 2100		2/4
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	27 kohm	+5%	0,33W	Philips	2322 211 13273
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
R2153	Resistor	100 kohm	+5%	0,33W	Philips	2322 211 13104
R2154	Resistor	82 kohm	+5%	0,33W	Philips	2322 211 13823
RA2101	Resistor Array	8x10 kohm	+5%	0,125W	ITT	VR8 10 kohm +5%
RA2102	Resistor Array	8x10 kohm	+5%	0,125W	ITT	VR8 10 kohm +5%
RA2103	Resistor Array	8x10 kohm	+5%	0,125W	ITT	VR8 10 kohm +5%
RA2104	Resistor Array	8x10 kohm	+5%	0,125W	ITT	VR8 10 kohm +5%
RA2105	Resistor Array	7x10 kohm	+5%	0,125W	ITT	VR7 10 kohm +5%
C2101	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
C2102	Capacitor electrolytic	10uF	+20%	35V	ERO	EK100AA210F
C2105	Capacitor electrolytic	2,2uF	+20%	50V	ERO	EK100AA122H
C2106	Capacitor polyetylen	4,7nF	+10%	400V	Siemens	B32510-D6472K
C2107	Capacitor polyester	10nF	+20%	100V	Philips	222 344 24103
C2108	Capacitor polyester	220nF	+10%	100V	Siemens	B32511-D1224-K
C2109	Capacitor electrolutic	2,2uF	+20%	50V	ERO	EK100AA122H
C2110	Capacitor electrolytic	10uF	+20%	35V	Siemens	EK100AA210F
C2111	Capacitor electrolytic	33uF	+20%	16V	ERO	EK100AA233D
C2112	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
C2113	Capacitor electrolytic	47uF	+20%	10V	ERO	EK100AA247C
C2114	Capacitor electrolytic	1uF	+20%	50V	ERO	EK100AA110H
C2115	Capacitor electrolytic	10uF	+20%	35V	ERO	EK100AA210F
C2116	Capacitor polyester	1nF	+10%	400V	Siemens	B32510-D6102-K
C2117	Capacitor polyester	0,22uF	+20%	100V	Philips	222 344 24224
C2118	Capacitor electrolytic	10uF	+20%	35V	ERO	EK100AA210F
C2119	Capacitor electrolytic	22uF	+20%	25V	ERO	EK100AA222E
C2120	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
C2121	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z
C2122	Capacitor ceramic	10nF	-20/+80%	50V	KCK	HE70SJYF103Z

Symbol	Description	Manufact.	
C2123	Capacitor electrolytic 4,7uF +20%	50V ERO	EK100AA147H
C2124	Capacitor polyester 220nF +10%	100V Siemens	B32510-D1104-K
C2125	Capacitor polyester 220nF +10%	100V Siemens	B32510-D1104-K
C2126	Capacitor polyester 220nF +10%	100V Siemens	B32510-D1104-K
C2127	Capacitor polyester 220nF +10%	100V Siemens	B32510-D1104-K
C2128	Capacitor electrolytic 10uF +20%	35V ERO	EK100AA210F
C2129	Capacitor polyester 220nF +10%	100V Siemens	B32510-D1104-K
C2130	Capacitor polyester 220nF +10%	100V Siemens	B32510-D1104-K
D2101	Diode silicon	Philips	1N4148
D2102	Diode silicon	Philips	1N4148
D2103	Diode germanium	ITT	AA143
D2104	Diode germanium	ITT	AA143
D2105	Diode silicon	Philips	BZX79C5V1
D2106	Diode silicon	Philips	1N4148
D2107	Diode silicon	Philips	BZX79C18
D2108	Diode silicon	Philips	1N4148
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

<i>Symbol</i>	<i>Description</i>	<i>Manufact.</i>	
IC2123	Integrated circuit	Texas	SN74LS86N
IC2124	Integrated circuit	Texas	SN74LS123N
IC2125	Integrated circuit	Motorola	MC14013BCP
IC2126	Integrated circuit	Texas	SN74LS109AN
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
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
T2114	Transistor	Philips	BC548B

POSITION	DESCRIPTION	MODULE	MANUFACTOR	TYPE	S.P. NUMB
	KEYBOARD S1303	MODULE 23/2300	ESPERA	PRINT NR 5-0-22413	607567
R2301	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2302	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2303	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2304	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2305	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2306	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2307	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2308	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2309	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2310	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2311	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2312	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
S2301	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2302	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2303	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2304	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2305	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2306	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2307	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2308	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2309	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2310	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2311	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600
S2312	SWITCH	ED/SP	ITT JEAURENAUD	ED/SP	43.600

POSITION	DESCRIPTION	MODULE	MANUFACTOR	TYPE	S.P. NUMB
	DISPLAY UNIT	MODULE 24/2400	ESPERA	PRINT NR 5-0-22415	607574
J2401	PLUG (female)	25 POLE	*AMP	0-0643124-1	78.074
J2402	PLUG (female)	25 POLE	*AMP	0-0643124-1	78.074
LA2401	LAMP	15V 0.037A	OSHING	BASS-0L6003MB	45.032
LCD2401	DISPLAY	6 DIG. 7SEGMENT LCD	*HAMLIN	153.420 3918-365-920	25.701

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a		FREQUENCY CHECK S1304 Module 2500			1/1	
Symbol	Description			Manufact.		
R2501	Resistor	560 ohm	$\pm 5\%$	0,33W	PHILIPS	2322 211 13561
R2502	Resistor	3,9 kohm	$\pm 5\%$	0,33W	PHILIPS	2322 211 13392
R2503	Resistor	2,2 kohm	$\pm 5\%$	0,33W	PHILIPS	2322 211 13222
R2504	Resistor	4,7 kohm	$\pm 5\%$	0,33W	PHILIPS	2322 211 13472
R2505	Resistor	4,7 kohm	$\pm 5\%$	0,33W	PHILIPS	2322 211 13472
RA2501	Resistor Array	8X10 kohm	$\pm 5\%$	0,125W	ITT	VR8 8X10 kohm
RA2502	Resistor Array	8X10 kohm	$\pm 5\%$	0,125W	ITT	VR8 8X10 kohm
RA2503	Resistor Array	8X10 kohm	$\pm 5\%$	0,125W	ITT	VR8 8X10 kohm
C2501	Capacitor Polyetylen	2n2F	$\pm 10\%$	400V	SIEMENS	B32510-D6222-K
C2502	Capacitor Polyetylen	22nF	$\pm 10\%$	250V	SIEMENS	B32510-D3223-K
C2504	Capacitor Polyetylen	0,22uF	$\pm 10\%$	100V	SIEMENS	B32510-D1224-K
C2505	Capacitor Polyetylen	0,22uF	$\pm 10\%$	100V	SIEMENS	B32510-D1224-K
C2506	Capacitor Polyetylen	0,22uF	$\pm 10\%$	100V	SIEMENS	B32510-D1224-K
C2508	Capacitor Electrolyt	1ouF	$\pm 20\%$	35V	ERO	EKI00AA210F
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

POSITION	DESCRIPTION		MANUFACTOR	TYPE	S.P. NUMBE
	OUTPUT FILTER 16.7MHz	MODULE 26/2600	AFD.33	S-0-25274	625274
C1	CAPACITOR CERAMIC	24P 5% N150 63V	FERROPERM	9/0116.8	15.810
C2	CAPACITOR CERAMIC	24P 5% N150 63V	FERROPERM	9/0116.8	15.810
C3	CAPACITOR CERAMIC	24P 5% N150 63V	FERROPERM	9/0116.8	15.810
C4	CAPACITOR POLYSTYRENE	160pF 1% 630V	*PHILIPS	2222 431 81601	10.406
C5	CAPACITOR POLYSTYRENE	160pF 1% 630V	*PHILIPS	2222 427 41601	10.406
D1	DIODE	1N4148	* ITT	1N4148	25.131
L1	SPOLE 16.7MHz OUTPUTFIL.	TL475	AFD.31	6-0-25288	400475
L2	SPOLE 16.7MHz BS TL467		AFD.31	6-0-25283	400467
L3	SPOLE 16.7MHz BS TL466		AFD.31	6-0-25282	400466
L4	SPOLE 16.7MHz BS TL467		AFD.31	6-0-25283	400467
RE1	RELAY	24VDC 1SH. 2A	OUC	OUC-S-124D	21.329
RE2	RELAY	24VDC 1SH. 2A	OUC	OUC-S-124D	21.329

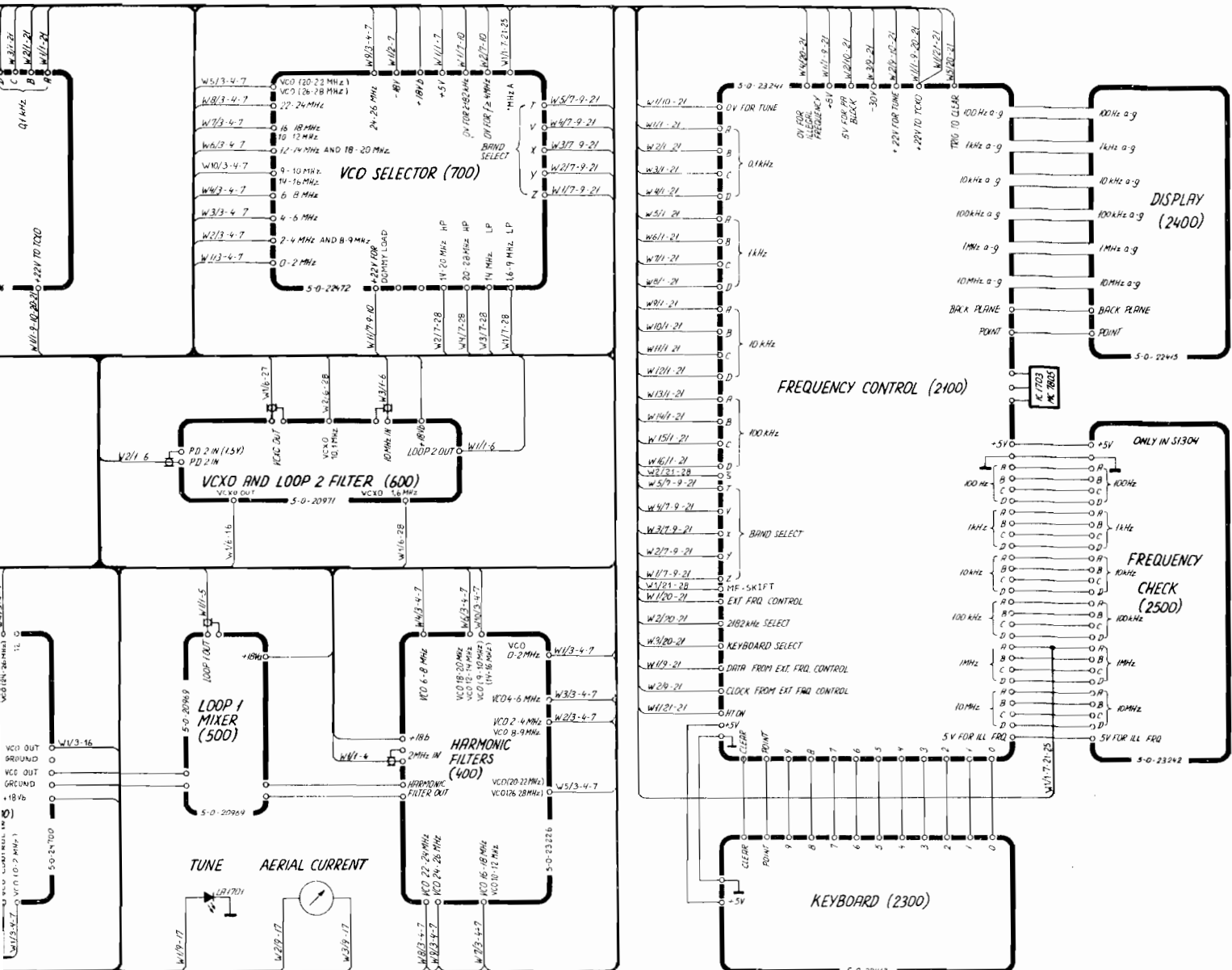
S1303/4-I 3/87

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P. NUMBER	
	MIXER 10.7MHz S1303/1,11	MODULE 27/2700	AFD.33	5-0-25240A	624930
C1	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C2	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C3	CAPACITOR POLYSTYRENE	0.01uF 400V 20%	ERO	MKT1822	11.126
C4	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C5	CAPACITOR POLYSTYRENE	2.2nF 1% 160V	*PHILIPS	2222 429 82202	10.284
C6	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C7	CAPACITOR MKT	47nF 10% 250V	ERO*	MKT1822	11.101
C8	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C9	CAPACITOR MKT	1000pF 10% 400VDC	PHILIPS*	2222 369 55102	12.410
C10	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C11	CAPACITOR CERAMIC	12pF 5% NPO 500VDC	NKE	DT 350 758L CH 120 J 500V	15.575
C12	CAPACITOR POLYSTYRENE	270pF 1% 630V	*PHILIPS	2222 431 82701	10.411
C13	CAPACITOR POLYESTERENE	680pF 1% 250V	*PHILIPS	2222 430 86801	10.346
C14	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C15	CAPACITOR POLYSTYRENE	330pF 1% 630VDC	PHILIPS	2222 431 83301	10.416
C16	CAPACITOR POLYSTYRENE	820pF 1% 250VDC	PHILIPS	2222 430 88201	10.348
C17	CAPACITOR MKT	22nF 10% 400V	ERO*	MKT1822	11.130
C18	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C19	CAPACITOR POLYSTYRENE	180pF 1% 630VDC	PHILIPS	2222 431 81801	10.407
C20	CAPACITOR POLYSTYRENE	1.5nF 1% 160V	*PHILIPS	2222 429 81502	10.280
C21	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C26	CAPACITOR POLYESTER	0.1uF 10% 100V	ERO*	MKT1822	11.073
C27	CAPACITOR CERAMIC	22P 10% N150 400V	FERROPERM	9/0116,9	16.121
D1	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	PHILIPS	BAV21	25.340
D2	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	PHILIPS	BAV21	25.340
D3	DIODE GENERAL PURPOSE	BAV21 200V/0.25A	PHILIPS	BAV21	25.340
R1	RESISTOR MF	820 OHM 5% 0.4W	PHILIPS	2322 181 53821	01.197
R2	RESISTOR MF	1k5 OHM 5% 0.4W	* PHILIPS	2322 181 53152	01.204
R3	RESISTOR	6.8 KOHM 5% 0.33W	PHILIPS	2322 181 33682	01.720
R4	RESISTOR MF	680 OHM 5% 0.4W	PHILIPS	2322 181 53681	01.195
R5	RESISTOR MF	3k3 OHM 5% 0.4W	PHILIPS	2322 181 53332	01.212
R6	RESISTOR	33 OHM 5% 0.33W	PHILIPS	2322 181 33339	01.662
R7	RESISTOR NTC	1k OHM 10% .5W	PHILIPS*	2322 642 62102	07.270
R8	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183
R9	RESISTOR	330 OHM 5% 0.33W	PHILIPS	2322 181 33331	01.687
R10	RESISTOR	220 OHM 5% 0.33W	PHILIPS	2322 181 33221	01.683
R11	RESISTOR	15 OHM 5% 0.33W	PHILIPS	2322 181 33159	01.654
R12	RESISTOR	4.7 KOHM 5% 0.33W	PHILIPS	2322 181 33472	01.716
R13	RESISTOR MF	3k3 OHM 5% 0.4W	PHILIPS	2322 181 53332	01.212
R14	RESISTOR	15 OHM 5% 0.33W	PHILIPS	2322 181 33159	01.654

POSITION	DESCRIPTION	MANUFACTOR	TYPE	S.P. NUMBER	
R15	RESISTOR	68 OHM 5% 0.33W	PHILIPS	2322 181 33689	01.670
R16	RESISTOR MF	68 OHM 5% 0.4W	* PHILIPS	2322 181 53689	01.170
R17	RESISTOR MF	180 OHM 5% 0.4W	PHILIPS	2322 181 53181	01.181
R18	RESISTOR MF	1k0 OHM 5% 0.4W	PHILIPS	2322 181 53102	01.200
R19	RESISTOR MF	27k OHM 5% 0.4W	* PHILIPS	2322 181 53273	01.235
R20	RESISTOR MF	1k8 OHM 5% 0.4W	PHILIPS	2322 181 53182	01.206
R21	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R22	RESISTOR MF	4k7 OHM 5% 0.4W	PHILIPS	2322 181 53472	01.216
R23	RESISTOR MF	3.9k OHM 5% 0.4W	* PHILIPS	2322 181 53392	01.214
R24	RESISTOR MF	470 OHM 5% 0.4W	PHILIPS	2322 181 53471	01.191
R25	POTENTIOMETER TRIMMING	2.2 KOHM 10% 0.5W	PHILIPS	2322 482 22222	07.665
R26	RESISTOR MF	2k2 OHM 5% 0.4W	PHILIPS	2322 181 53222	01.208
R27	RESISTOR MF	2k2 OHM 5% 0.4W	PHILIPS	2322 181 53222	01.208
R28	RESISTOR MF	10k OHM 5% 0.4W	PHILIPS	2322 181 53103	01.225
R29	RESISTOR MF	27k OHM 5% 0.4W	* PHILIPS	2322 181 53273	01.235
R30	RESISTOR MF	47 OHM 5% 0.4W	* PHILIPS	2322 181 53479	01.166
R31	PRESET CERMET	220 OHM 20% 0.5W	AB	HC10 200 150 220 20%	07.709
R32	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183
R33	RESISTOR MF	1k0 OHM 5% 0.4W	PHILIPS	2322 181 53102	01.200
R34	RESISTOR MF	8k2 OHM 5% 0.4W	PHILIPS	2322 181 53822	01.222
R35	RESISTOR MF	680 OHM 5% 0.4W	PHILIPS	2322 181 53681	01.195
R36	RESISTOR MF	100 OHM 5% 0.4W	PHILIPS	2322 181 53101	01.175
R37	RESISTOR MF	5.6k OHM 5% 0.4W	* PHILIPS	2322 181 53562	01.218
R38	RESISTOR MF	22k OHM 5% 0.4W	PHILIPS	2322 181 53223	01.233
R39	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183
R40	RESISTOR MF	100 OHM 5% 0.4W	PHILIPS	2322 181 53101	01.175
R41	RESISTOR MF	47 OHM 5% 0.4W	* PHILIPS	2322 181 53479	01.166
R42	RESISTOR MF	220 OHM 5% 0.4W	PHILIPS	2322 181 53221	01.183
R43	RESISTOR MF	33 OHM 5% 0.4W	PHILIPS	2322 181 53339	01.162
R44	RESISTOR	470 OHM 20% 0.3W	NOBLE	TM8-KH1-15	07.760
RE1	RELAY	24VDC 1SH. 2A	OUC	OUC-S-124D	21.329
T1	TRANSISTOR	BF199	PHILIPS	BF199	28.179
T2	TRANSISTOR RF	BF494 PNP T0-92	PHILIPS	BF494	28.201
T3	TRANSISTOR RF	BF494 PNP T0-92	PHILIPS	BF494	28.201
T4	TRANSISTOR RF	BF494 PNP T0-92	PHILIPS	BF494	28.201
T5	TRANSISTOR	BF199	PHILIPS	BF199	28.179
L1	COIL	TL264	S.P.RADIO	6-0-21888	40.0264
L2	COIL	TL265	S.P.RADIO	6-0-21886	40.0265
L3	COIL	TL254	S.P.RADIO	6-0-21577A	40.0254
L4	COIL	TL255	S.P.RADIO	6-0-21578A	40.0255
TR1	TRANSFORMER	TL266	S.P.RADIO	6-0-21887	40.0266
X1	10.6985MHz BW=9kHz		NDK	C1063	39.854

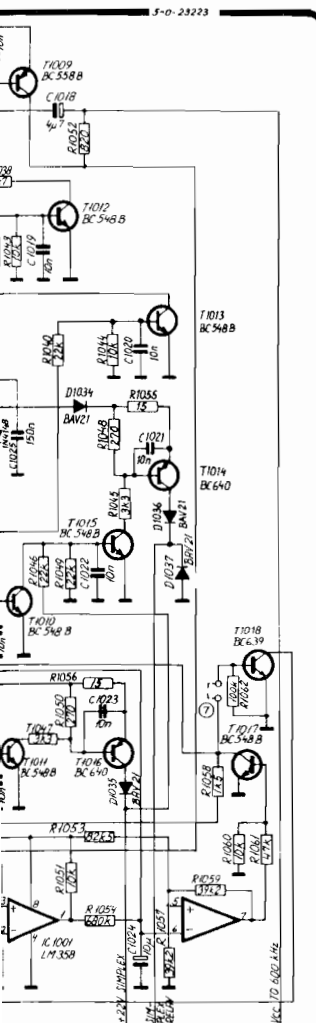
POSITION	DESCRIPTION	MANUFACTURER	TYPE	S.P. NUMBER	
	FILTER & VCXO CONTROL	MODULE 28/2800	AFD.33	PRINT NR. 5-0-25273	625273
D1	DIODE	1N4148	* ITT	1N4148	25.131
D2	DIODE	1N4148	* ITT	1N4148	25.131
D3	DIODE	1N4148	* ITT	1N4148	25.131
D4	DIODE	1N4148	* ITT	1N4148	25.131
IC1	INTEGRATED CIRCUIT	7406N	TEXAS	7406N	33.521
R1	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R2	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R3	RESISTOR	10 KOHM 5% 0.33W	PHILIPS	2322 181 53103	01.225
R4	RESISTOR	8.2 KOHM 5% 0.33W	PHILIPS	2322 181 53822	01.222
R5	RESISTOR	1.5 KOHM 5% 0.33W	PHILIPS	2322 181 53152	01.204
R6	RESISTOR	1.5 KOHM 5% 0.33W	PHILIPS	2322 181 53152	01.204
R7	RESISTOR	5.6 KOHM 5% 0.33W	PHILIPS	2322 181 53562	01.218
R8	RESISTOR	820 OHM 5% 0.33W	PHILIPS	2322 181 53821	01.197
R9	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 53123	01.227
R10	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 53123	01.227
R11	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 53123	01.227
R12	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 53123	01.227
R13	RESISTOR	820 OHM 5% 0.33W	PHILIPS	2322 181 53821	01.197
R14	RESISTOR	5.6 KOHM 5% 0.33W	PHILIPS	2322 181 53562	01.218
R15	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 53123	01.227
R16	RESISTOR	12 KOHM 5% 0.33W	PHILIPS	2322 181 53123	01.227
R17	RESISTOR	8.2 KOHM 5% 0.33W	PHILIPS	2322 181 53822	01.222
R18	RESISTOR	1 KOHM 5% 0.33W	PHILIPS	2322 181 53102	01.200
T1	TRANSISTOR	BC640	PHILIPS	BC640	28.124
T2	TRANSISTOR	BC558	* MOTOROLA	BC558	28.095
T3	TRANSISTOR	BC558	* MOTOROLA	BC558	28.095
T4	TRANSISTOR	BC639	* PHILIPS	BC639	28.120
T5	TRANSISTOR	BC640	PHILIPS	BC640	28.124

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MICROPHONE	13 T	35 CLOCK FROM EXT FRQ CONTROL
RELAY	14 V	36 AERIAL METER 1
VCC	15 X	37 AERIAL METER 2
	16 Y	38 HF TO MICROTELEPHONE
	17 Z	39 OPEN TX
	18 22V FOR TUNE	40 22V FOR DUMMY LOAD
TELEX	19 TO TUNE LAMP	41 GROUND FOR MIC AND TELEX
TELEX	20 TRANSMITTER START	42 +22V SIMPLEX
BLEY	21 PA BLOCK	43 HF TO LOUDSPEAKER
	22 DRIVE LEVEL 1	44 HANDSET KEY
FROM EXT FRQ CONTROL	23 DRIVE LEVEL 2	45 5-BIT
HT ON	24 HT ON	46 +22V 10 TCXO

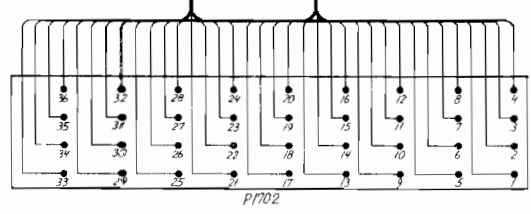
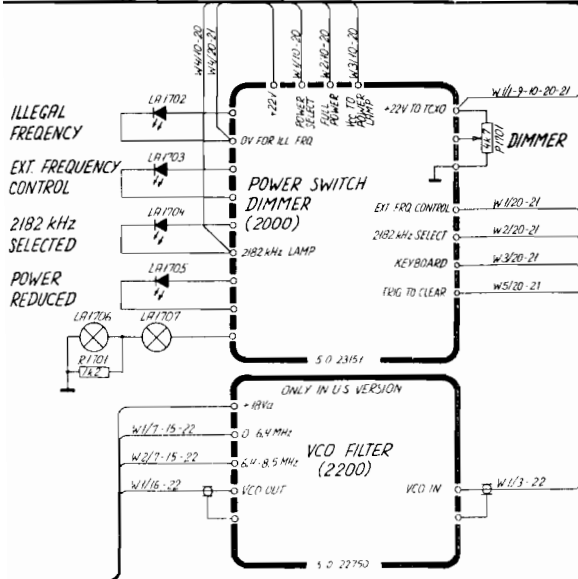
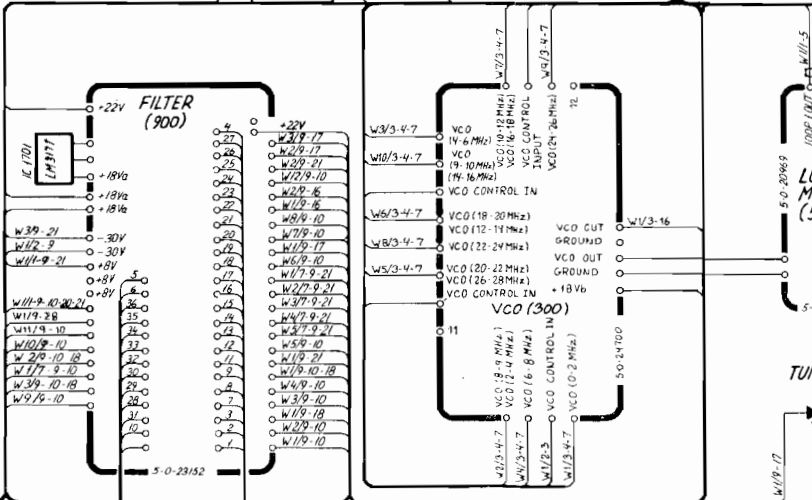
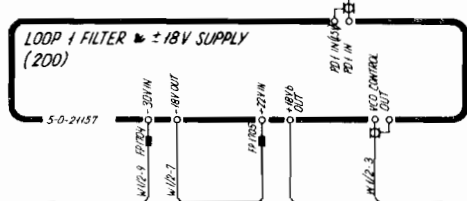
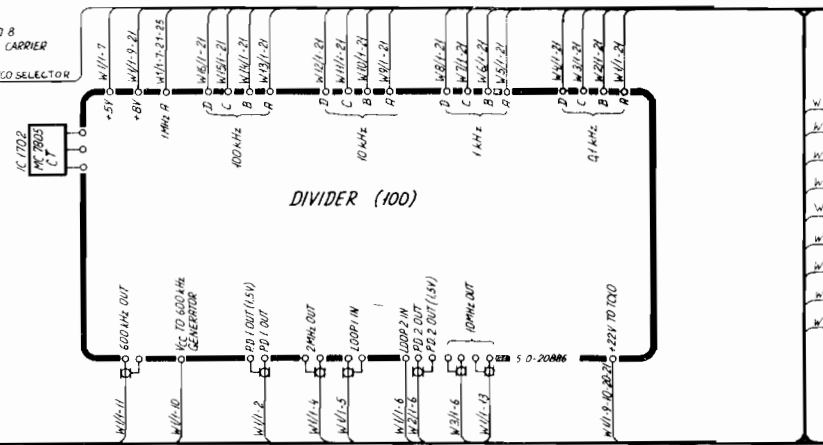
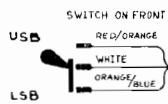
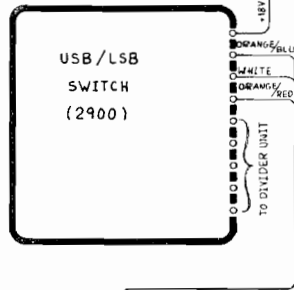
MAIN SCHEMATIC DIAGRAM
FOR
SAILOR EXCITER S1303/S1304
WITH OPTION I



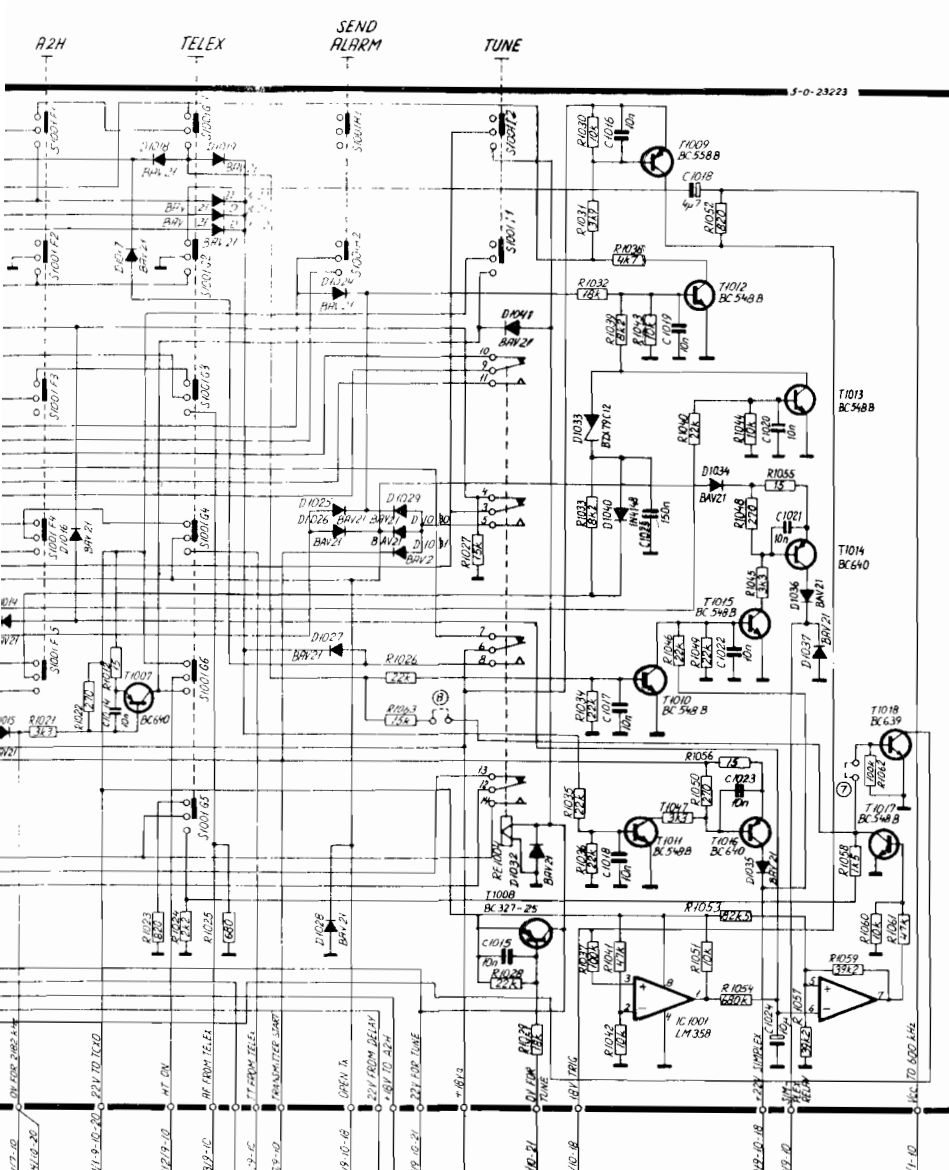
2182 kHz FIXED

MODE SELECTED	DIXIDE MOUNTED
A3H	D1002, D1004
A3J	D1007
VIA MODE SWITCH	D1009

- ALARM SIGNAL IS SEND IN A3J
- ALARM SIGNAL IS SEND IN A3H
- A3J CAN NOT BE SEND ABOVE 4MHz
- A3H CAN NOT BE SEND
- A3J CAN NOT BE SEND
- A3H CAN NOT BE SEND
- INSERT THE STRAPS 7 AND 8 TO PREVENT CONTINUOUS CARRIER IN PARTERX MODE.
-



- | | |
|-------------------------------|----------------|
| 1 2F FROM MICROPHONE | 13 T |
| 2 SIMPLEX RELAY | 14 V |
| 3 RX BLOCK | 15 X |
| 4 - 22V | 16 Y |
| 5 - 8V | 17 Z |
| 6 - 45V | 18 22V FOR TX |
| 7 PE FROM TELEX | 19 TO TUNE W |
| 8 TT FROM TELEX | 20 TRANSMITTER |
| 9 22V FROM KEY | 21 PR BLOCK |
| 10 GROUND | 22 DRIVE EYE |
| 11 DATA FROM EXT. FRQ CONTROL | 23 DRIVE LEVEL |
| 12 TX FROM RX | 24 HT ON |



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 A3J } CAN NOT BE SEND ABOVE 4MHz
- ④ A3H }
- ⑤ A3A } CAN NOT BE SEND
- ⑥ A3H }
- ⑦ INSERT THE STRAPS 7 AND 8 TO PREVENT CONTINUOUS CARRIER IN MARITX MODE.
- ⑧

