elektromekano Receiver type MR6000

1980-04

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1. TECHNICAL SPECIFICATION

GENERAL.

The ELEKTROMEKANO SSB/ISB receiver type M 76000 is a high-performance communications receiver with specifications that make it attractive to a wide spectrum of applications.

A digital frequency synthesizer is incorporated in the receiver. Frequency can be set in two ways: It can be set by means of a key board or it can be varied continuously over the entire frequency range of 10 kHz to 30 MHz by means of a single knob. Independent of the way in which the frequency is set, the receiver is always under full synthesizer control. This in connection with the highly stable standard oscillator and the digital frequency display gives the receiver an extremely high frequency stability and setting accuracy.

The receiver is provided with a noise blanker which markedly improves the reception of noise-disturbed signals.

Full solid state design ensures high reliability. Modular construction means easy maintenance.

The receiver can be delivered with a memory for selection of up to 96 channels. Frequency reception mode and AGC mode may be independently determined for each channel. The memory is operated via the key board and can be programmed and changed by the operator at will.

A remote control system is available enabling full remote control of all functions via a single telephone line.

Receiver design conforms with standard 19-inch rack dimensions.

FREQUENCY RANGE.

10 kHz to 30 MHz, in synthesized 5-Hz increments.

FREQUENCY SETTING.

The frequency is selected via a digital keyboard. Further, the frequency can be stepped up or down in steps of 5, 100 or 1000 Hz by means of a single control knob. The step tune control operates over the entire frequency range and may also be disabled if so desired.

Option:

1) MEMO96: Memory for pre-selection of 96 frequencies with corresponding modes.

FREQUENCY INDICATION.

7-digit electronic display by means of light emitting diodes (LED's), least significant digit being 10 Hz.

FREQUENCY STABILITY.

With internal standard:

Short-term stability: +/- 2×10^{-8} over 15 min.

Long-term stability : +/- 4×10^{-8}/month.

Temperature stability : +/- 1×10^{-7} from -15°C to +55°C.

Provision is made for the use of an external 1-MHz frequency standard.

MODES OF RECEPTION.

A1, A2, A2H, A3, F1 (with FD6000 FSK Unit)

Options (one is to be specified by the customer):

1) USM 230: USB (A3H, A3A, A3J) - 3 kHz

2) LSM 230: LSB (A3H, A3A, A3J) - 3 kHz

3) ISM 230: LSB/USB (A3H, A3A, A3J) and ISB (A3B) - 3 kHz

4) USM 260: USB (A3H, A3A, A3J) - 6 kHz

5) LSM 260: LSB (A3H, A3A, A3J) - 6 kHz

6) ISM 260: LSB/USB (A3H, A3A, A3J) and ISB (A3B) - 6 kHz

7) USM 227: USB (A3H, A3A, A3J) - 2.7 kHz

8) FD6000 : F1 (RTTY)

ANTENNA IMPEDANCE.

50 ohms at frequencies above 1.6 MHz

10 ohms in series with 220-560 pF below 1.6 MHz

Option:

10 ohms in series with 250 pF from 1.6 MHz to 4 MHz

ANTENNA ATTENUATOR

0 dB or 20 dB

INPUT PROTECTION.

The receiver input is protected against RF signals of up to 50 V RMS (via 50 ohms), for a period of 15 min.

INPUT SELECTIVITY.

Input selectivity is achieved by means of automatically selected fixed tuned suboctave band pass filters.

MUTING.

Receiver muting is provided to protect the receiver from local emission.

SENSITIVITY.

Freq. range	SINAD	BW	Mode	Input EMF
1.6-30 MHZ	10 dB	1 kHz	A1	- 10 dBuV
1.6-30 MHz	20 dB	8 kHz	A3	20 dBuV
1.6-30 MHz	20 dB	3 kHz	A3J	6 dBuV
0.1-1.6MHz	10 dB	1 kHz	A1	15 dBuV
0.1-1.0MHz	10 dB	2 kHz	A2H	30 dBuV
1.0-1.6MHz	10 dB	2 kHz	A2H	20 dBuV

SELECTIVITY.

A1, A2, A3, A2H, A3H, F1:

The following pass bands are standard:

"Sharp" : 0.2 kHz (-6 dB)
"Narrow" : 1 kHz (-6 dB)
"Intermediate": 2 kHz (-6 dB)
"Wide" : 8 kHz (-6 dB)

Optional - A3A, A3J, A3B:

USM 230: (-3 dB): 250 to 3000 Hz
(-60 dB): -250 to +4100 Hz

LSM 230: (-3 dB): -250 to -3000 Hz
(-60 dB): +250 to -4100 Hz

ISM 230: (-3 dB): +/-(250 to 3000) Hz
(-60 dB): +/-(-250 to 4100) Hz

USM 260: (-3 dB): 250 to +6000 Hz
(-60 dB): -250 to +7700 Hz

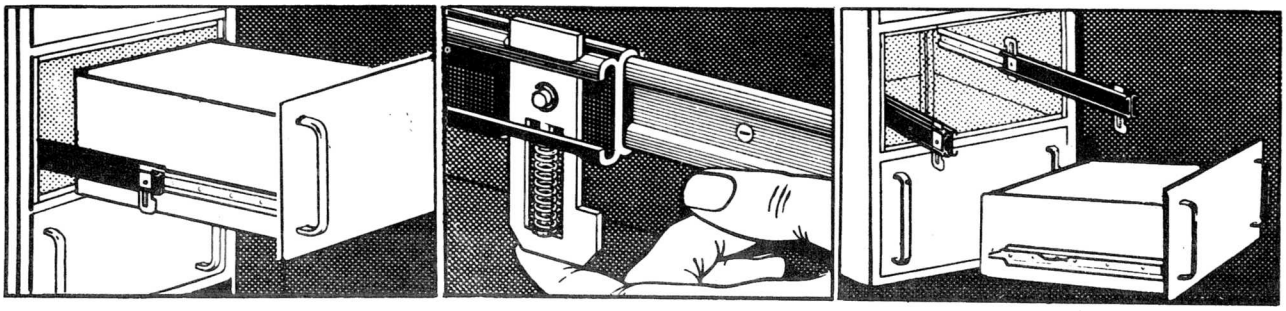
LSM 260: (-3 dB): -250 to -6000 Hz
(-60 dB): +250 to -7700 Hz

ISM 260: (-3 dB): +/-(250 to 6000) Hz
(-60 dB): +/-(-250 to 7700) Hz

USM 227: (-6 dB): 350 to 2700 Hz
(-60 dB): -500 to 3400 Hz

2. DESCRIPTION

2.1 MECHANICAL DESCRIPTION



The receiver panel-and-chassis assembly (drawing) is designed to be mounted on telescopic slides in a standard 19-inch cabinet rack.

Captive panel-mounting screws secure the cabinet rack. The telescopic slides are fitted with trigger latches that automatically and securely lock the unit in the withdrawn position when fully extended.

The projecting latches are pressed (see the drawing) to release the lock so that the drawer can be closed or completely removed from the cabinet rack.

All plugs on the rear panel should be taken out of their sockets before a drawer is removed from the cabinet.

Chassis and top cover combine to form an extremely rigid construction. The main chassis is divided into different cells for screening purposes. Each cell houses one or two modules.

The power supply and I/O filters are located behind the main chassis; each attached to its own rear panel.

The front panel is designed as a separate assembly, secured by only two screws at each side plate. If the two upper screws are removed and the two lower loosened, the front panel can be swung down for inspection of the front panel PC boards. Electrical connections to the front panel are made by flexible flat cables.

End-placed angle pieces connect the front panel to the side plates.

2.2 ELECTRICAL DESCRIPTION

2.2.1 MAIN BLOCK DIAGRAM (Diagram No. 4588)

The main block diagram is for survey purposes only and the block diagram description will be concentrated on the three sub block-diagrams.

2.2.1.a Controls (Diagram No. 4589 and 4590)

The front panel circuits encompass two categories of functions: 1) the input circuits for receiver controlling and 2) the receiver output circuits.

- Frequency Setting

  Receiving frequency is set by means of a keyboard. When a key is pressed the corresponding figure is generated in BCD form and clocked into the temporary storage register, a series to parallel register. At the same time the contents of this register are clocked into the up/down counter which acts as the working register of the synthesizer. Since the temporary store is a shift-left/shift-right register, it can clear the last digit. The outputs of the register are tristated except when a key is pressed. This means that the bus from the register to the U/D counter can be used for programming the frequency (preset memory, remote) by presenting the data in parallel form and then loading it into the U/D counter.

  These data can be changed by turning the step tune control knob. This will cause the frequency to change in 5, 100 or 1000 Hz steps dependent upon the position of the step tune control knob (pushed or pulled) and the position of the speed control (fast, normal, locked).

  Contents of the temporary register is not affected whatever is done to the U/D counter (such as preprogramming or step tuning. Thus the U/D counter can be reloaded with the previous keyed frequency stored in the temporary register by pressing the recall button.

  U/D counter output goes to the synthesizer, filter switch and display. The filter switch decodes the frequency to select the right suboctave filter. The display shows the reception frequency with 10 Hz resolution.

- Reception Mode Selection

  The mode keyboard controls modulation type and IF bandwidth. All the information is stored in a four bit code in which the two least significant bits control bandwidth and the two most significant bits - mode. Two auxiliary lines are used to determine the sideband monitored during SSB reception.

- AF Circuit

  The AF circuit consists of three blocks: 1) a line amplifier which delivers 10 mW into 600 ohms. 2) a tunable notch filter which can reject a spot frequency in the range 400 Hz to 4 kHz and 3) an AF power amplifier capable of delivering 2 W into a 4 ohm loudspeaker.

2.2.1.b Synthesizer (Diagram No. 4591)

The synthesizer generates the first and second LO signals plus an auxiliary 1.4 MHz signal for the SSB detectors.

- Standard Frequencies

The master oscillator is a 5.6 MHz oven-controlled crystal oscillator. Its output is connected to a dual mode divider where the normal division ratio is 224. Output will then be negative-going 25 kHz spikes. A signal at the 1 MHZ external standard input causes the counter to automatically change to the divide by 40 mode and to lock out the internally generated 5.6 MHz. The 25 kHz is then divided by 25 to produce a 1 kHz standard signal.

- First LO

The first LO signal is generated by subtracting the output of loop C from the output of loop A, in subtraction loop B. The second LO signal is generated in a similar way. Output frequencies of loop D and loop F are added in loop E.

Frequency setting can be written as:

$F = N_7N_6N_5M_4M_3M_2P_1P_0$

where N_7 is the 10 MHz setting

N_6 is the 1 MHz setting

P_1 is the 10 Hz setting

P_0 is the 5 Hz setting

The division ratio of the counter N will be:

$N = 780 + N_7 \times 10^2 + N_6 \times 10 + N_5$

and following the output frequency of loop A:

$F_A = 4 \times N \times 25 \text{ kHz} = N \times 100 \text{ kHz} =$

$78 \text{ MHz} + N_7N_6N_5 \times 100 \text{ kHz}$

The division ratio of the counter M is:

$M = 30000 - M_4 \times 10^2 - M_3 \times 10 - M_2$

and hence

$F_C = 0.1 \times M \times 1 \text{ kHz} = 3 \text{ MHz} - M_4M_3M_2 \times 100\text{Hz}$

In the subtraction loop F_C is subtracted from F_A so that we have:

$F_B = 78 \text{ MHz} + N_7N_6N_5 \times 100 \text{ kHz} -$

$(3 \text{ MHz} - M_4M_3M_2 \times 100 \text{ Hz})$

$= 75 \text{ MHz} + N_7N_6N_5M_4M_3M_2 \times 100 \text{ Hz}$

Because of the wide tuning range of VCOs A and B, each of the two is split into two oscillators. To avoid loop B trying to lock on to the sum sideband of loop A and C, oscillators A and B are ganged by coarse tuning B with the control voltage from A.

- Second LO

In the same way we have:

$F_F = 2940 \times 25 \text{ kHz} = 73.5 \text{ MHz}$

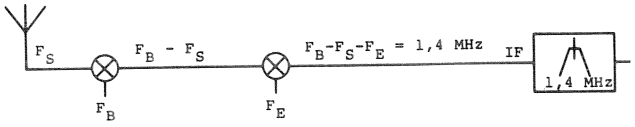
$F_D = ((20000 - P_1 \times 2 - P_0)/200) \text{ V} \times 1 \text{ kHz}$

$= 100 \text{ kHz} - P_1 \times 10 \text{ Hz} - P_0 \times 5 \text{ Hz}$

(P_0 is an integer which can be 0 or 1).

$F_E = F_D + F_F$

$= 73.6 \text{ MHz} - P_1 \times 10 \text{ Hz} - P_0 \times 5 \text{ Hz}$



Looking at this simplified block diagram of the receiver we get:

$F_S = F_B - F_E - 1.4 \text{ MHz}$

$= 75 \text{ MHz} + N_7N_6N_5M_4M_3M_2 \times 100 \text{ Hz} -$

$73.6 \text{ MHz} + P_1 \times 10 \text{ Hz}$

$+ P_0 \times 5 \text{ Hz} - 1.4 \text{ MHz}$

$= N_7N_6N_5M_4M_3M_2 \times 100 \text{ Hz} + P_1 \times 10 \text{ Hz}$

$+ P_0 \times 5 \text{ Hz}$

2.2.1.c Signal Path (Diagram No. 4592)

- RF Section

The antenna signal is first applied to a muting relay, which when energized short-circuits the receiver input. The signal is then routed through an RF protection unit to an attenuator (0 or 20 dB), controlled from the front panel. After passing through one of the 14 suboctave bandpass filters. (ranges: 10-150 kHz, 150-220 kHz, 220-340 kHz, 340-520 kHz, 520-700 kHz, 0.7-1 MHz, 1-1.6 MHz, 1.6-2.5 MHz, 2.5-4 MHz, 4-6 MHz, 6-10 MHz, 10-14 MHz, 14-20 MHz and 20-30 MHz), the signals are applied to an AGC controlled attenuator. This attenuator is inserted in the signal path for frequencies higher than 1.6 MHz, only.

- Front End

The received signal is mixed with a variable injection of 75.0100 to 104.9999 MHz to produce a signal of 75.0 MHz. This IF signal is amplified and AGC controlled before it is applied to a 75 MHz crystal filter: Bandwidth is either 10 kHz or 20 kHz dependent on whether the normal 3 kHz SSB filters or the 6 kHz SSB filters are used.

The second mixer converts the 75-MHz IF signal to the low IF signal by means of a 73.6 MHz injection signal. After further amplification the signal path is divided in two signals: One through a delay line and another to the noise blanker channel. In this channel the signal is amplified, AGC regulated and detected. This detector delivers both a peak and a mean value which are compared, and when the peak value is greater than the mean value a "one-shot" is activated to give a blanking pulse to the gate. The delay line allows blanking of the IF signal at the start of a disturbing impulse.

- Second IF

The IF signal is now split into several paths, as determined by the mode selected. Separate paths exist for USB, LSB, 8,2,1 kHz and 0.2 kHz bandwidths.

All USB, LSB and 0.2 kHz paths are open in the ISB mode. The 0.2 kHz path is used to pick off the reduced carrier. In the ISB mode the AGC is derived by the carrier. An amplifier is inserted to increase the reduced carrier to the correct level since the AGC detector is set to a selected attack level.

There are separate detectors for USB and LSB and the beat signal is taken from the standard frequency oscillator. In the CW and F1 modes the beat signal is taken from a voltage controlled oscillator and a crystal controlled oscillator, respectively.

- AF Section

The AF signal corresponding to the particular reception mode selected, is fed through a low-pass filter for attenuation of frequencies above 3 kHz.

In CW reception, the AF signal is passed through an 800 Hz bandpass filter, as well.

There are three AF Line Outputs in the MR 6000 Receiver.

They are:

1. Monitoring Line Output:
   This output is parallel with the audio signal fed to the headphone amplifier and speaker.

2. LSB Line Output:
   This output carries LSB AF signals, provided the ISB pushbutton is activated.

3. Common Line Output:
   This output provides USB AF signals when the ISB pushbutton is activated. This output line also serves as Common Line Output for all other reception modes.

2.2.2 DESCRIPTION OF CIRCUIT DIAGRAMS

2.2.2.a Frequency Keyboard

- Frequency Keying. (Ref. Desig. 4331).

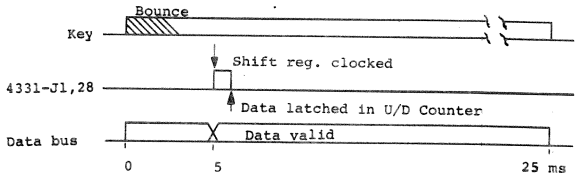
Selected-digit information of keys 1 - 9 is BCD coded in the diode matrix CR7 to CR21. It is then fed into four shift registers U6, U7, U8 and U9 (A, B, C and D register) working in the serial to parallel mode. CR25 to CR28 form an OR gate which detects the signal if any of the data lines go high, which means that a key has been pressed.

The "0" key is "OR-ed" to the others by means of CR24. When a key has been pressed, Schmitt trigger U3 will fire after a fixed delay of 5 ms, determined by R28, C11. This circuit works as an anti-bounce circuit. The output of the Schmitt trigger is fed into U5 which works as a monostable multivibrator, the output of which triggers the shift registers through an AND gate CR30, CR32 and the buffer Q8. The other input of the AND gate (J1-29) is controlled by the memory if used to lock out clock pulses to the shift registers when the keyboard is used for addressing purposes.

If the CLEAR button is pressed, U5 goes into an astable mode and freeruns at a frequency of approx. 500 Hz. Thus after 8 clock pulses the shift registers are filled with zeros. The shift registers have two sets of input ports, the "A" ports and the "B" ports. In the quiescent state the "A" ports are outputs and the "B" ports inputs controlled by the A/B input pin 11, which is held low by R20. Pin 9 "A enable" at the same time disables the A output lines (tristated). Any time a clock pulse occurs, C9 is charged through CR29. This means that the "B" lines become outputs and the "A" lines enable inputs for parallel operation. The time constant R20, C9 enables the data for a time period, while it is clocked into the U/D counter.

When the key ▶ is pressed, the monostable multivibrator U3 is triggered (15 ms). The output through CR22 triggers U5 as described earlier.

The parallel/serial input pin 13 is immediately changed for serial operation while the Ae and A/B inputs are activated through CR23. This means that when the clock pulse arrives, delayed by R28, C11, all data are transferred one step backwards while the last keyed digit is lost. The outputs from the shift registers to the U/D counter are sketched below:



- Frequency Presetting. (Ref. Desig. 4331).

It is seen that the data bus is normally tristated. When one of the frequency preset buttons is pressed, the corresponding frequency data are applied to the data bus through coding diodes CR36, CR37 (500 kHz) or CR39 through CR42 (2182 kHz). The clock pulse is obtained through diodes CR34, CR38, CR47, formed (differentiated) by C15, R48, amplified in the amplifier, Q9, Q10 and applied to the strobe line for the U/D counters. The recall key generates a clock pulse in the same way, while the outputs of the shift registers are opened. When a frequency preset pushbutton is activated, the AGC is also preset in SHORT position through diodes CR43, CR50. During power up the clear input is kept high for about 200 ms which clears the shift registers. When the clear pulses have expired a pulse is applied to J1-34, CR33 from the MODE keyboard (see below). This presets the U/D counter to 500 kHz and the AGC to SHORT.

- AGC. (Ref. Desig. 4331).

The LONG and SHORT keys set and reset the "L/S" flip-flop U1 and simultaneously set the "on/off" flip-flop U1 while the OFF key resets the "on/off" flip-flop U2. Q1, Q2, Q3 form the decoding/driving of the corresponding pushbutton lamps.

- NB/AA. (Ref. Desig. 4331).

The NB/AA toggles flip-flop U4 and their positions are indicated by the lamps DS3, DS4. C3, R10 is the power up circuit which keeps the reset input high during power up.

2.2.2.b Register Board

- U/D Counter. (Ref. Desig. 4819/1).

The U/D counter consists of U1 - U9 plus associated circuits U5, U37. When a key is pressed on the frequency keyboard the data occur in parallel form on J1, pin 1 to 22, while 23 to 27 are open-ended producing zeros on U3, U4. Briefly after the clock pulse arrives and at the time indicated, the data are latched in the counter and U3, U4 are reset.

The U/D counter chain is controlled by the step control circuits on module 4808.

Inputs are present at J2-1, clock pulses applied to the clock inputs of the FF U4 and the U/D counters U1-U9 and J2-4, U/D control signal applied to the U/D control terminals of U1-U9, U4 and U37.

If the positive clock pulses on J2-1 appear while U/D control line J2-4 is logic 1, the counters will count up. If the clock pulses appear while the U/D control line J2-4 is logic 0, the counters will count down.

The two lines J2-6 (speed control "normal" logic 0, speed control "fast" logic 1) and J2-3 (steptune knob "pushed" logic 0, steptune knob "pulled out" logic 1) control which of the counters are to be operative:

If J2-6 is logic 0 and J2-3 is logic 1 all counters U1-U9 are operative, i.e. the frequency is varied in steps of 5 Hz.

If J2-6 is logic 0 and J2-3 is logic 0, counters U3 and U4 are disabled and reset or loaded with logic 0; U1, U2 and U6-9 are operative, i.e. the frequency is varied in steps of 100 Hz.

If J2-6 is logic 1 and J2-3 is logic 0, counters U3 and U4 are disabled and reset or loaded with logic 0; U2 is disabled, U1 and U6-U9 are enabled, i.e. the frequency is varied in steps of 1000 Hz.

- AF Blanking. (Ref. Desig. 4819/1).

When a clock pulse occurs on J1-28, Q2 continues discharging C2. This brings Q1 into conduction for about one second, resulting in charging of C1. J2-7 is connected to the AF muting of the module 4808; the purpose of C1 is to produce a soft recovery of the AF channel instead of a squarewave shape.

- Filter Switch. (Ref. Desig. 4819/1).

The output of the U/D counter is fed into the A inputs of a magnitude comparator U13 - U16. The B inputs are connected to the output of a 4x11 ROM (CR5-CR35, U18, U20) programmed to the filter switch frequencies. The outputs A = B and A > B are "OR-ed" together so that the effective output is A $\geq$ B. Because the ROM operates in the dynamic mode, an oscillator is formed by U33. To avoid possible interference in the RF circuits, the oscillator is turned off when not needed. It can be turned on by the X lead which goes high when a frequency key is pressed. Further, the clock pulses from the steptune control (J2-1) are directly transferred to the output of the oscillator. The oscillator operates at about 1 kHz. If the set frequency is higher than the selected ROM (filter) frequency the output (U16 pin 5+6) will be high and the counter U17 will increase at the leading edge of the next clock pulse. After a fixed delay R29, C4 the new content of the counter will be latched in U19. The output of the counter is fed into the ROM and the next higher filter switch frequency signal will occur at the B inputs.

If A is still higher than B the cycle will repeat. If A < B the comparator output will go low, U21 is inhibited which means that U19 does not latch. Now A $\geq$ B again, and it is seen that the counter will switch between the two positions while only the higher one is latched.

The output of the latch is fed into U22, U23 which together form a 4-to-16 line decoder. The line selected equals the line in the ROM and the coding of the ROM is the lower end of the actual filter. U24, U25, U26 are drivers for the filter switch relays. Diodes CR37 to CR41 and CR67 decode F $\geq$ 1.6MHz for the step attenuator.

- Blanking. (Ref. Desig. 4819/2).

The leading zero blanking is accomplished by the OR gates CR42 to CR60. For example, a high to U35, pin 3 enables the ten MHz digit. If none of the lines A4 through B7 are high, the frequency setting is below 10 kHz and a logic 1 appears on U34, pin 4. If the setting is 30 MHz or beyond, A7 and B7 are 0 and a 1 appears on U34, pin 3. This is "OR-ed" together with CR61, CR62 and U34, pin 10 goes low if a forbidden frequency has been chosen. The OR gates CR63, CR64 and CR65, CR66 are unblocked, permitting the multivibrator to flash all the enabled digits at a frequency of approx. 1 Hz. Transistor Q4 is turned on so that C1 is charged and thereby the AF blocked.

- Memory Register. (Ref. Desig. 4819/2).

U27 to U30 serve as serial-to-parallel converter for the memory. When J6-1 is high, the outputs are disabled. The function of the peripheral circuit is described in conjunction with the memory circuit description.

2.2.2.c Display Board. (Ref. Desig. 4687).

The readout consists of seven 7-segment displays and seven drivers that decode the BCD information code. U8 to U12 are interface circuits from CMOS to TTL.

- Meter. (Ref. Desig. 4687).

U13 and U14 form a semidigital voltmeter controlling a row of 24 LED's. Full scale deflection is 2 V.

2.2.2.d Mode Keyboard. (Ref. Desig. 4332).

The mode/bandwidth information is transformed to a binary code by diodes CR1 to CR30. The coding is shown below in both decimal and binary notation.

	AM	CW	F1
Sharp	3 0011	7 0111	11 1011
Nar.	2 0010	6 0110	10 1010
Inter	1 0001	5 0101	9 1001
Wide	0 0000	4 0100	8 1000

USB	LSB	ISB
12 1100	13 1101	15 1111

Thus, the bandwidth is determined by the two last bits except in the SSB mode where it has no sense. The two first bits control the reception mode. When a key is pressed data will be present at the inputs of U1. A clock pulse is derived by diodes CR31 to CR34, formed by C1, R2 and amplified by Q3, Q4, latches the information in U1. The output is fed into U2, U6, working together as a 4-to-16 line decoder and from there to the lamp driver transistors in U7, U8 and Q1. Actuating the USB or LSB button, (besides its "binary" action) operates the RS flip-flop U4. Because of the choice of SSB mode, pin 11 and pin 1 of U1 go high and consequently open the gates U4. The output of U5 drives transistors Q13, Q14.

J1 pin 2 to 7 are the external programming inputs in conjunction with J1-1 where an external clock pulse is applied. Pin 1 is also connected to frequency keyboard to preset the mode to AM SHORT from the two preset buttons. The rest of U5 composes a Schmitt trigger. When power is turned on, C3 charges through R6 and after about one second the Schmitt trigger changes over delivering a pulse to the start up circuit on the frequency keyboard.

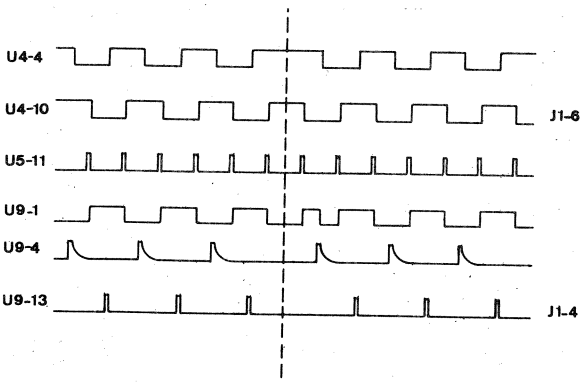
2.2.2.e AF and Linear Controls.

- Clock Generators. (Ref. Desig. 4808).

  Opto couplers U6 and U7 are connected to U4, U5 and U9 in such a way that short positive pulses appear at terminal J1-4 and the U/D control output on terminal J1-6 toggles between 0 and 1 when the step-tuning knob is turned in either direction.

  If the step-tuning knob is turned clockwise short positive pulses appear, when the U/D control signal is 1.

  If the step-tuning knob is turned counter-clockwise, short positive pulses appear when the U/D control signal is 0 (see the figure).



  These two signals are connected to the clock input and the U/D control of the U/D counter chain on the U/D register board, 4819. In this way the U/D counters are stepped up or down depending upon which direction the step tuning knob is rotated.

  The logic signals on terminals J1-8 and J1-5 determine the speed, at which the U/D counters are stepped. When the steptune knob is pulled out, J1-5 is at logic 0. This enables the "0" and "1" digit counters so that the frequency is stepped in 5 Hz steps. If the steptune knob is pushed-in, J1-5 is at logic 1 through S5 and the "0" and "1" digits are disabled and reset to "0". In this position the frequency steps 100 Hz.

  The above is true only if the speed control "fast, normal, locked" is in position "normal". If the speed control is pushed-in to position "fast" a logic 1 is applied to J1-8, also causing digit 2 to be disabled and reset. In this position the frequency is stepped in 1000 Hz steps, when the tuning knob is turned. If the speed control is pushed-in to position "locked" the clock signal is disabled and the tuning control knob can be turned without changing the frequency.

- AF Amplifier. (Ref. Desig. 4808).

  The AF signal arrives at J1-3. Q1 is the LF gate. A high at J1-1 from U/D will turn Q1 on, shortcircuiting the AF channel. A low to the muting input J2-10 will have the same effect. If the main switch is in the stand-by position, Q7 will be on and thereby disable the internal AF blanking. This is required, if the receiver is remote controlled.

  One half of U2 composes the line output amplifier which delivers 10 mW into 600 ohms.

  U1 Q2 make up the notch filter. The first half of U1 is a variable bandpass filter tuned by the variable resistance of Q2. The second half of U1 is a summing amplifier which subtracts the filtered signal from the direct signal. The filter is tuned by varying the gate potential of Q2. The band limits are set with R9 and R12 and the rejection balance with R13. If the voltage difference between the arm of R4 and the arm of R12 is too little to keep Q4 conducting, Q5 is turned on shortcircuiting the filtered signal, and the filter is off.

  The signal is fed to the output amplifier U3 through the AF gain potentiometer.

- ON/OFF Switch. (Ref. Desig. 4808).

  In the ON position, 15 V from the oven circuit is applied to the start relay through J2-1. In the OFF position, Q3 and Q7 are turned on. Q3 shortcircuits the BFO potentiometer R6 and the RF gain potentiometer R7 in case the receiver should be remotely turned on. Q7 disables the internal AF blanking, as described above.

- Meter Circuits. (Ref. Desig. 4356).

  The lower part of U2 is an amplifier which steps the AF signal up to an appropriate level. The signal is rectified by CR1 and the AF meter is calibrated by means of R33. The "S" meter is calibrated by means of R34.

2.2.2.f Standard Frequencies.

- Frequency Standard. (Ref. Desig. 4686).

  The standard oscillator is a 5.6 MHz oven controlled crystal oscillator, OCXO. The frequency can be adjusted with a mechanical trimmer on top of the OCXO and a fine adjustment of the frequency is possible by trimming R13. The OCXO is placed on the Standard Divider board, 4686.

- Standard Divider. (Ref. Desig. 4686).

  The 5.6 MHz signal from the OCXO is applied to the divide-by-4 counter U1 pin 1 and a 1.4 MHz signal appears on pin 4.

  An external 1.0 MHz signal can be applied to U7 pin 13 through P1. Pin 13 (inverting input) is biased slightly positive with respect to pin 12 (non inverting input and ground). This ensures the output, pin 1, to be low under no-signal condition. If an external signal is applied, the output will be rectified by CR5 tuning Q1 on.

By gating U8, the internal reference frequency is locked out and the external standard is applied to the divide-by-8 counter U7, pin 13. The programmable divider U2, U3, can be programmed to divide by either 5 or 7 as a function of the reference frequency (internal or external).

If the internal standard frequency is used, the division ratio is 7, but with the external standard the ratio is changed to 5, controlled by Q1 and U8 pin 11. The output of the counter consists of negative going pulses with a frequency of 25 kHz and a pulse width of 0.71 μ sec. (1.0 μ sec with external standard). The circuit U4, U5 and U6 is a divide-by-25 counter, producing positive going pulses with a frequency of 1kHz and a pulse width of 40 μ sec.

U11 is an analog switch for the SSB detector injection signal. The gate pin 3,4,5 forms an AND-gate, the output of which controls signal gate, pins 1, 2. A sample of the 1.4 MHz square wave on U1 pin 4 is sent through the switch and filtered in the low-pass filter L2, L3 and L4.

2.2.2.g Loop A

- 78-92 MHz VCO (Ref. Desig. 4524)
  92-107.9 MHz VCO (Ref. Desig. 4525)

The two VCOs are mounted on module 4530.

The VCO is a Colpitts configuration and consists of transistor Q1 and its associated components. The frequency is adjusted by variable inductor L4, variable capacitor C5 and a dc voltage applied to the double varactor diode CR2. A dc voltage of 4V to 18V controls the VCO over the entire frequency range and is used to phase lock the VCO.

The oscillator signal is taken from the collector of Q1 and fed to Q2 via capacitor C10. Q2 is the common emitter transistor in a cascade amplifier with the common base transistor, located at module 4530.

A mounting-key ("3") is riveted onto the 78-92 MHz VCO and a mounting-key ("4") is riveted onto the 92-107.9 MHz VCO. This is done to ensure that the VCOs will be mounted correctly onto module 4530.

- 78-107.9 MHz Oscillator (Ref. Desig. 4530)

VCO switches

The logic signals which determine whether the 78-92 MHz VCO or the 92-107.9 MHz VCO is active, are applied to terminals J1-4 and J1-5. The logic signals are complementary, such, that if the selected frequency is below 14.0 MHz the signal applied to J1-5 will be logic high (+12V) and the signal applied to J1-4 will be logic low (OV). When the selected frequency is above or equal to 14.0 MHz, the signal applied to J1-5 will be logic low and the signal applied to J1-4 will be logic high.

When the signal at J1-5 is logic high, diode CR1 goes off. This means that transistor Q3 sinks base current via R2 and switches Q4 on. Q4 delivers supply current to the 78-92 MHz VCO causing the VCO to go active.

If the signal at J1-5 is low the base voltage to Q3 will fall below 2.0V and Q3 will thus switch off. When Q3 is off Q4's base current falls to zero, causing Q4 to cut off, therewith turning off the 78-92 MHz VCO. The 92-107.9 MHz switch functions in the same manner.

78-107.9 MHz Amplifier

Diode CR8 is on when the 78-92 MHz VCO is active because an open-collector transistor in the output circuit of the VCO will sink current through this diode. Diode CR9 is off because the 92-107.9 MHz VCO is off. The open-collector transistor in the output circuit of the VCO is the common-emitter transistor in a cascode amplifier with Q9 as the common-base transistor. This configuration ensures a very high degree of isolation between the output of Q9 and the VCO.

The LP-filter following Q9 will reject any higher harmonics that may be present in the signal as well as transform the output impedance of the amplifier (approx. 470 ohms) to 55 ohms. The output is also loaded by R30 in series with the isolation amplifier (550 ohms), resulting in an output impedance at W35, of 50 ohms. The output signal level present on W35 can be seen on the diagram.

Loop filter

The signal on W35 is fed to module 4531 where the logical part of the 78-107.9 MHz loop is located. Phase voltage ϕ78-1, obtained at module 4531, is fed through the motherboard to J1-6 on module 4530.

The phase voltage is applied to the VCOs via "section of the loop filter" (see diagram). Diodes CR5 and CR6 change the time constant of the filter when the 78-107.9 MHz loop is in the unlocked condition. This ensures a fast settling time.

Isolation amplifier

The signal to the isolation amplifier, a cascode amplifier, is taken at W35. The LP-filter following the isolation amplifier will reject any harmonics which may be present in the signal and transform the output impedance of the amplifier (approx. 470 ohms) to 50 ohms. The signal from the LP-filter is then fed to mixer U3.

Voltage regulators

The 20.0 voltage regulator consists of integrated circuit U1 together with its associated components. The input voltage of 24V is taken at terminal J1-13. The regulated voltage is adjustable by means of variable resistor R12.

The 5V voltage regulator consists of the integrated circuit U2 together with its associated components. The input voltage of 10V is taken at terminal J1-12.

- 78-107.9 MHz Divider and Discriminator (Ref. Desig. 4531)

Divider

The 78-107.9 MHz oscillator signal from module 4530/W36 enters at J2. Q7 and U10 perform logic level translation to TTL and drive divide-by-four prescaler, U11.

The variable divider consists of three decade dividers, U12, U13, U14 and a divide-by-two flip-flop, U16. U17 and a NAND gate (a part of U15) form a "counter full" decoder and drive the strobe flip-flop, U16.

When U12 is in state 7, U13 and U14 in state 9 and U16 in state 1, i.e. when the counter is in state 1997, the output of U17 goes low, forcing the output of U15 and thereby the K input of the reset flip-flop, U16, to go high (U16-12).

As the J input of U16 (U16-11) is kept permanently high, the next clock pulse will change the state of the flip-flop and switche the Q output (U16-9) to low. This means that in state 1998 the data "N" present on the data inputs of U12, U13 and U14 are strobed into the counter. Consequently the output of the counter differs from the "counter full" state "1997" and the K input of U16 (U16-12) is restored to 0 and will remain at 0 until the next strobe cycle occurs.

At the next clock pulse the reset flip-flop U16 goes back to its starting condition and will place the counter in the "N" state, ready for a new counting sequence. The divider will therefore divide by 1999-"N".

Because the frequency entering J2 is in the range 78000 kHz to 107900 kHz, the output frequency of the divide-by-four prescaler (U11) will lie in the range 19500 kHz to 26975 kHz. This means that the variable divider must divide by an integer lying between 19500/25 = 780 and 26975/25 = 1079. Consequently, the figure appearing at the data-inputs of the variable divider will be in the range 1999 - 780 = 1219 to 1999 - 1079 = 920.

As the inputs B7A7/D6C6B6A6/D5C5B5A5 are the BCD code for the three most significant digits of the frequency setting, a code conversion is necessary. This is made by the IC's U1 - U8. The conversion scheme of the circuit is shown below.

100 kHz decade

Input		Output	
DEC	BCD	DEC	BCD
	D5C5B5A5		DCBA/U12
0	0 0 0 0	9	1001
1	0 0 0 1	8	1000
2	0 0 1 0	7	0111
3	0 0 1 1	6	0110
4	0 1 0 0	5	0101
5	0 1 0 1	4	0100
6	0 1 1 0	3	0011
7	0 1 1 1	2	0010
8	1 0 0 0	1	0001
9	1 0 0 1	0	0000

1 MHz decade

Input		Output		
DEC	BCD	DEC	BCD	CO
	D6C6B6A6		DCBA/U13	
0	0 0 0 0	1	0001	0
1	0 0 0 1	0	0000	0
2	0 0 1 0	9	1001	1
3	0 0 1 1	8	1000	1
4	0 1 0 0	7	0111	1
5	0 1 0 1	6	0110	1
6	0 1 1 0	5	0101	1
7	0 1 1 1	4	0100	1
8	1 0 0 0	3	0010	1
9	1 0 0 1	2	0010	1

10 MHz decade

Input		Output		
DEC	BCD	DEC	BCD	
N7/Co	B7A7/Co		A8/U16-15	DCBA/U14
0/0	0 0 / 0	12	1	0010
0/1	0 0 / 1	11	1	0001
1/0	0 1 / 0	11	1	0001
1/1	0 1 / 1	10	1	0000
2/0	1 0 / 0	10	1	0000
2/1	1 0 / 1	9	0	1001

U9 detects whether the frequency setting is higher than or equal or lower than 14.0 MHz to cause the VCO switching.

Phase Discriminator

The output of the variable divider is applied to the clock input of the upper half of U19, which is a leading-edge triggered D flip-flop. The reference frequency, here 25 kHz, is applied to the clock input of the other half of U19. When both flip-flops have been triggered they are reset by U20 after a short delay. The upper flip-flop enables the current generator Q2 which discharges the loop filter capacitor C9. When the lower flip-flop is triggered the current generator Q1 enables and charges C9 with an equal current to Q2. In the case the loop is locked the flip-flops are triggered simultaneously (phase coherency) and the currents will cancel.

If the divider frequency is higher than the reference frequency the upper flip-flop will stay on for a longer time than the lower one and C9 is discharged and thereby the frequency lowered until locking is obtained. C9, R14, R21 and C10 are a part of the loop filter.

The tuning voltage φ 78-1 appearing on terminal J1-3 is applied to module 4530, J1-6 via the motherboard.
The tuning voltage φ 78-2 appearing on terminal J1-5 is applied to module 4529, J1-10 via the motherboard.

2.2.2.h Loop C

- Oscillator.(Ref. Desig. 4352).

  Q4 functions in a Colpitts oscillator configuration. Source follower Q6 gives the impedance transformation and U4 translates the signal to TTL level.

- Divider.(Ref. Desig. 4352).

  The variable divider consists of dividers U8 to U12, decoder U5, U4 and reset flip-flop U3. When the counter reaches state 29998 the K input of U3 is forced high. At state 29999 the flip-flop switches, the Q output goes low and data M is strobed into the counter. As the content of the counter now differs from 29998, the K input is restored to 0, and at state 30000 the flip-flop toggles, Q goes high, and the counter starts a new cycle. It is seen that the division ratio is 3000 - M.

  The left half of U3 is coupled as a monostable multivibrator which is triggered by the reset pulse from the counter. It delivers a 1 µs pulse to the phase detector. U6 is the 10-divider.

- Phase Detector. (Ref. Desig. 4352).

  The phase detector is of the sample and hold type. Capacitor C1 is charged by the current generator Q1 and completely discharged every 1 ms by a pulse from the standard divider. The ramp is sampled with the analogue gate U2 controlled by the 1 µs pulse from the variable divider. U1, pin 4 short circuits the current generator during the sampling period to reduce the ripple on the holding capacitor C5. The voltage of C5 is sensed by Q2, a low leakage FET. The current generator Q3 maintains a constant source current in Q2 independent of the gate potential. R8, R9, C6, C7 form the loop filter.

2.2.2.i Loop B

- 75-89 MHz VCO (Ref. Desig. 4522).
  89-105 MHz VCO (Ref. Desig. 4523).

  The two VCOs are mounted on module 4529.

  The VCO is a Colpitts configuration and consists of transistor Q1 and its associated components. The frequency is adjusted by variable inductor L4, variable capacitor C5 and a dc voltage applied to the double varactor diode CR2. Varactor diode CR1 fine adjusts the frequency. A dc voltage of 4V to 18V applied to CR2, controls the VCO over the entire frequency range. A dc voltage of 4V to 18V applied to CR1, controls the VCO over a frequency range of approx. 600 kHz and is used to phase lock the VCO.

  The oscillator signal is taken from the collector of Q1 and fed to Q2 via capacitor C10. Q2 is the common emitter transistor in a cascode amplifier with the common base transsistor, located at module 4529.

  A mounting-key ("1") is riveted onto the 75-89 MHz VCO and a mounting-key ("2") is riveted onto the 92-107.9 MHz VCO. This is done to ensure that the VCOs will be mounted correctly onto module 4529.

- 75-105 MHz Oscillator (Ref. Desig. 4529).

  VCO switches.

  The logic signals which control whether the 75-89 MHz VCO or the 89-105 MHz VCO is active are applied to the terminals J1-7 and J1-8. The logic signals are complementary in such a way that if the selected frequency is lower than 14.0 MHz the signal applied to J1-7 is high (+12V) and the signal applied to J1-8 is low (OV). When the selected frequency is higher than or equal to 14.0 MHz, the signal applied to J1-7 is low and the signal applied to J1-8 is high.

  When J1-7 is high the diode CR1 is off. This means that transistor Q2 sinks base current via R2 and switches Q1 on. Q1 delivers supply current to the 75-89 MHz VCO causing the VCO to go active.

  When J1-7 is low the base voltage to Q2 is lower than 2.0V. This switches Q2 off. When Q2 is off Q1's base current becomes zero causing Q1 to cut off. When Q1 is off there is no supply current to the 75-89 MHz VCO, thus the VCO is now off. The 89-105 MHz VCO switch functions in the same way.

- 75-105 MHz Amplifier

  Diode CR7 is on when the 75-89 MHz VCO is active because an open-collector transistor in the output circuit of the VCO sinks current through this diode. Diode CR8 is off because the 89-105 MHz VCO is off. The open-collector transistor in the output circuit of the VCO is the common-emitter transistor in a cascode amplifier with Q6 as the common-base transistor.

  This ensures a very high degree of isolation between the output of Q6 and the VCO.

  The LP-filter following Q6 rejects higher harmonics from the VCO and transforms the output impedance of the amplifier (approx. 600 ohms) to 55 ohms. The output is also loaded by R28 in series with the isolation amplifier (550 ohms), resulting in an L.O. output impedance of 50 ohms. The output signal level on J2 can be seen on the diagram.

  75-105 MHz isolation amplifier.

  The signal to the 75-105 MHz isolation amplifier, which is a cascode amplifier, is taken from J2. The LP-filter following the isolation amplifier will reject harmonics in the signal and transform the output impedance of the amplifier (approx. 500 ohms) to 50 ohms. The output signal level at J3 can be seen on the diagram.

  Loop filters.

  The coarse tuning voltage Ø 78-2 is taken from the terminal J1-10 and applied to the 3.4 Hz LP-filter made up of R14 and C8. Diodes CR5 and CR6 change the time constant of the filter when the 78-107.9 MHz loop is in the unlocked condition. The voltage obtained across C8 is applied to a double tuning diode, located in the VCOs.

  The fine tuning voltage Q3 is taken from the terminal J1-9 and applied to the loop filter made up of transistor Q5 and its associated components.

  C7 serves as the integrating capacitor. The voltage obtained across C13 is applied to a tuning diode located in the VCOs.

  20.0V voltage regulator.

  The voltage regulator consists of the integrated circuit U1 together with its associated components. The input voltage of 24V is taken from terminal J1-13. The regulated voltage is adjustable by the variable resistor R12.

- Mixer, 3.8 MHz LP-filter and TTL interface (Ref. Desig. 4530).

  The mixer U3 mixes the 78-107.9 MHz signal from the isolation amplifier with the 75-105 MHz signal, obtained through W36. When the loops are in the locked condition, the mixer's difference product will lie in the range of 2.9001 MHz to 3.0 MHz. The 3.8 MHz LP-filter rejects the unwanted mixer product. The output signal is then amplified to TTL level in amplifier Q12.

- Discriminator and current pump (Ref. Desig. 4530).

  The signal from the TTL interface circuit is applied to the clock input of a leading-edge triggered D flip-flop (U5-3). The reference signal of 2.9001 MHz to 3.0 MHz is fed through W37 and applied to the clock input of the remaining section of U5 (U5-11). When both flip-flops have been triggered they will, after a short predetermined time delay, be reset by U4.

  The upper flip-flop disables transistor Q7. Q7 will, thus, enable current generator Q8 and send a positive current pulse to terminal J1-3.

  When the lower flip-flop is triggered, transistor Q5 will disable. This will consequently enable current generator Q6 and send a negative current pulse to J1-3. If the loop is locked, the flip-flops will trigger simultaneously (phase coherency) and the currents to J1-3 will cancel.

If the frequency of the 75-105 MHz signal is lower than that of the signal present in the locked condition, the frequency of the signal from the TTL interface will be higher than the reference frequency. Consequently, the upper flip-flop of U5 will stay on for a longer time than the lower flip-flop and the total current to J1-3 will be positive, thereby raising the frequency of the 75-105 MHz signal until locked condition is obtained.

2.2.2.j Loop F

- Oscillator. (Ref. Desig. 4815).

  The oscillator Q2 is a 5th overtone crystal oscillator of the Colpitts type with the crystal in the feedback path. The frequency can be fine tuned by means of the varactor diode CR2. Q3, Q4 are the buffer and output amplifiers and Q5 the TTL driver.

- Divider. (Ref. Desig. 4815).

  U6 is a divide-by-four prescaler and as the total division ratio is 2940, U3 to U5 must divide by 2940/4 = 735. As the natural division ratio of the counter is 890 (decoding 888 + 2) the programming must be 155.

- Phase Detector. (Ref. Desig. 4815).

  U1 is a RS flip-flop used as phase discriminator. It is set by the reference 25 kHz and reset by the output of the divider. The output squarewave, which has a duty cycle proportional to the phase difference, is amplified in Q1. The DC component is filtered out in the loop filter R6, R7 and R13.

2.2.2.k Loop D

- Oscillator. (Ref. Desig. 4353)

  The oscillator Q4 is a normal Colpitts with AGC regulation. Source follower Q6 gives the impedance transformation and U4 translates the signal to TTL level.

- Divider. (Ref. Desig. 4353).

  The variable divider consists of dividers U11 to U14, decoder U10, U9, and reset flip-flop U7. When the counter reaches state 24606 the J input of U7 is forced high. At state 24607 the flip-flop switches, the Q output goes low and data is strobed into the counter. As the content of the counter now differs from 24606, the J input is restored to 0, and at state 24608 the flip-flop toggles, Q goes high and the counter starts a new cycle. As the counter is pre-programmed by 4608 + P it is seen that the division ratio is 20000 - P.

  The left half of U7 is coupled as a monostable multivibrator which is triggered by the reset pulse from the counter. It delivers a 1 µs pulse to the phase detector. U3-U6 is the 200-divider.

- Phase Detector. (Ref. Desig. 4353).

  The phase detector is of the sample and hold type. Capacitor C1 is charged by the current generator Q1 and completely discharged every 1 ms by a pulse from the standard divider. The ramp is sampled with the analogue gate U2 controlled by the 1 µs pulse from the variable divider. U1, pin 4 shortcircuits the current generator during the sampling period to reduce the ripple on the holding capacitor C5. The voltage of C5 is sensed by Q2, a low leakage FET. The current generator Q3 maintains a constant source current in Q2 independent of the gate potential. R8, R9, C6, C7 form the loop filter.

2.2.2.l Loop E

- Oscillator. (Ref. Desig. 4336).

  The oscillator is similar to the one used in loop F. Q2 is the buffer amplifier and Q3 the output amplifier which drives the second mixer in the front end. A sample of the signal is taken from Q2 and fed into the differential amplifier Q5, the purpose of which is to isolate the 73.5 MHz entered on J1 from the base of Q3.

- Mixer. (Ref. Desig. 4336).

  The output of Q6 drives the balanced mixer Q8, Q9, T1, T2. The difference signal is filtered out by the resonant circuit T1, C33, C34 and interfaced to TTL by Q7.

- Phase Detector. (Ref. Desig. 4336).

  The right half of U1 makes up a one-shot device which delivers pulses to the phase detector. This arrangement is the same as described under loop F. The loop filter consists of R21, R23, R24 and R8.

2.2.2.m RF Input Protection. (Ref. Desig. 4367).

The module incorporates a muting relay, PIN diodes and a 20 dB attenuating circuit.

The muting relay K1, when energized, shorts the receiver input.

The four PIN diodes CR1, CR2, CR3 and CR4 in connection with L1 and R1 give the receiver protection both against static voltages and against excessive RF voltages from near-by transmitters. The PIN diodes act as current controlled resistors.

The 20 dB attenuator, constructed in a T-configuration, can be activated via K3 and K2 from the front panel to provide decrease in sensitivity.

2.2.2.n Suboctave Filter HF (Ref. Desig. 4354).
Suboctave Filter LF-MF (Ref. Desig. 4355).

Each PCB contains 7 bandpass filters. The change from one filter to another is provided by means of reed relays. To give low contact resistance a DC current is led through the contacts. The change automatically follows the setting of the frequency keyboard. All filters are designed to have an output impedance of 50 ohms and an input impedance of 50 ohms in the HF range. In the LF-MF range the input impedance matches that of the antenna.

2.2.2.o Step Attenuator. (Ref. Desig. 4371).

The module consists of an AGC controlled step attenuator with AGC level attack circuitry and X2 amplifier for voltages from the remote controlled manual AGC and a signal path shift.

The step attenuator is made of five single attenuators with 1, 2, 4, 8 and 16 dB attenuation, respectively. These attenuators, constructed in a T-configuration, are coupled in series and can give a total attenuation of 0-31 dB in steps of 1 dB. The attenuators are controlled by an 8 bit analog to digital converter (U_1, U_2, U_5, U_6 and U_7).

The attenuators are inserted or bypassed dependent on the states of the bits in the up/down counter (U_1 and U_2). If all bits in the U/D counter are 0 all attenuators are bypassed and the attenuation is 0 dB. If all bits are 1 all attenuators are inserted and the attenuation is 31 dB (1 + 2 + 4 + 8 + 16 dB).

One bit in the D/A converter is used for hysteresis to prevent the five attenuators from shifting with a constant AGC. All five bit-outputs are buffered to prevent that the summing point (pin 3 U8), which is compared with the AGC-voltage, is loaded.

The AGC-voltage is supplied to the comparator through U9 where the attack level can be adjusted.

To achieve an attack time of 24 ms the clock frequency, generated by ½ U7, is set to approx. 8 kHz.

To match the AGC-voltage from the remote control to the receiver line, the board incorporates an X2 amplifier (U10). The signal path shift (K1 and K2) is automatically energized so that when tuning to a frequency below 1.6 MHz the step attenuator is bypassed.

2.2.2.p Front-end. (Ref. Desig. 4528).

The front-end incorporates 1st mixer, 75 MHz IF, 2nd mixer and a noise blanker.

From the suboctave filters the antenna signal reaches a lowpass filter with f_{co} = 50 MHz and f_{co} = 75 MHz. To obtain an effective stopband attenuation, C2 and C3 are used for feedthrough capacitors.

The first mixer U1 is a double balanced diode mixer. The RF signal (0.01-30 MHz) is coupled to the DC input of the mixer. The first LO signal from the frequency synthesizer is applied to the LO amplifier via J2. To minimize the effect of higher harmonics in the LO signal and to properly terminate the mixer, a lowpass filter (with diplexer) is inserted.

The first IF amplifier Q11 is a BFR91. The use of a reactive feedback gives the required IM3 and noise figure properties. After passing a continuously variable attenuator, controlled by the AGC, the 75 MHz IF signal is amplified by a high level transistor Q12 BFR65. This transistor is driven with high current and has a resistive feedback, thus the amplifier is able to handle high signal levels.

Before being applied to the second mixer the IF signal is filtered by means of a 75 MHz crystal filter.

In the second mixer the 75 MHz IF-signal is mixed with the 2nd LO signal of 73.6 MHz, resulting in a final IF signal of 1.4 MHz. This double-converted signal is after amplification divided in two signal paths. One leads the signal through a delay-line circuit to a gate which is able to cut off the signal in the presence of a pulse. This pulse is formed in the other signal path - the noise blanker channel. This channel consists of a 1.4 MHz amplifier with separate AGC and an AM detector giving both the mean value and the peak value of the signal. These two values are compared in U61 and in the presence of a pulse, the comparator triggers a one-shot circuit. This circuit produces the blanking pulse to the gate.

2.2.2.q 2nd IF 1. (Ref. Desig. 4813).

The 2nd IF signal from the front-end reaches the selected crystal filter through a diode switch. This switch is controlled by the mode/BW selector on the front panel via diode switch drivers. A cascode amplifier follows the selected filter. Here the last transistor is common to both the 8 kHz - 2 kHz and the 1 kHz filter amplifiers. In USB and LSB modes a cascode amplifier and a LC bandpass filter are used for each channel.

The capacitive divider in the output of the filters is used for termination of the crystal filter. All amplifiers are gain-controlled by means of pin diodes. There are four outputs from board 1 (USB, LSB, 8-2-1 kHz and 0.2 kHz).

2.2.2.r 2nd IF 2. (Ref. Desig. 4814).

Circuit board 2 contains two SSB filters and their amplifiers, together with an 0.2 kHz filter and amplifiers for AM/CW and F1 modes. The cascode amplifiers are gain controlled by PIN diodes, and for 8-2-1 kHz and 0.2 kHz, the last transistor and the IC amplifier are common.

Transistor Q22 has switchable gain used for ISB mode to increase the IF gain corresponding to the partially suppressed carrier.

The AGC detector is also located on circuit board 2. This board includes a switch to select AGC for either USB, LSB or AM/CW channels. The first transistor, Q6, is an amplifier with adjustable gain (AGC threshold). Q7 functions as a detector and is followed by a L.P. filter. Q8 is a DC amplifier and Q10 is the output transistor for the AGC timing circuit on circuit board 3. Transistor Q9 is used for averaging in the AM mode (C24 is switched in or out by Q9).

In AM/CW and F1 mode the gain is unity and in ISB the gain is approx. 20 dB because AGC is derived from the carrier in ISB mode. The carrier is selected by the 0.2 kHz filter.

2.2.2.s Detectors and Mode Decoders. (Ref. Desig. 4521).

The module incorporates the detectors, beat frequency oscillators, AF bandpass filter, line amplifiers, AF lowpass filter, mode decoder and AGC shaping circuitry.

In the USB, LSB and CW/FL modes the detectors are integrated double balanced mixers. In the AM mode an integrated circuit is used as synchronous AM detector.

In the CW mode a voltage controlled BFO of the Vackar type and in the F1 mode a crystal controlled oscillator of the Colpitts type provide oscillator injection to the detectors. The beat frequency in the USB and LSB mode is taken from the standard reference oscillator.

In CW mode the detected signals are led through an active bandpass filter (U7) with a center frequency of approx. 800 Hz. The audio signals from the detectors are selected (U5 - U6) and led through an active lowpass filter to obtain the required attenuation for frequencies higher than 3 kHz.

Detector signals are also led to the line amplifiers, one for common use and one for LSB, (ISB operation) and provide up to 10 dBm output into a 600 ohm load.

From the mode keyboard the information about selected bandwidth, reception mode and AGC attack time, is applied to the mode decoder via P3-4,5, 6,7,17 and 19. This unit converts the binary coded information to a decimal code.

One part (U11) selects the desired bandwidth and the outputs are applied to the appropriate switching circuits in the 2nd IF board 1 and 2. The other part (U12 and U13) selects the desired mode to U5 and U6 where the detected signal is selected. The AGC attack time is also selected with the same decoder.

From P3-8 the AGC voltage is applied to the AGC timing circuitry via U14 and in the circuit following, the AGC hang and decay time is selected (P4-13 and P4-12) and AGC-off is effected by grounding the input to AGC voltage follower (P4-8). The AGC voltage to the IF and step attenuator is taken out at P4-10 and a delayed AGC to the front-end is taken out at P2-1.

2.2.2.t Power Supply.

- Rectifier (Ref. Desig. 4807).

  The outputs of the mains transformer (12V and 30V) are rectified by CR1 and CR2. The circuit C1, C2, CR3 and CR4 is the negative voltage rectifier and the voltage stabilizer U1 provides -5V for the receiver. CR5 and C12 supply the regulators with a 50V peak voltage.

- Start-up Circuit (Ref. Desig. 4800).

  The main power supply is turned on by applying 12-15V to either J1-6 or J1-8, the former from the remote control and the latter from the on/off switch. Transistor Q1 drives the start relay K1. S1 and S2 comprise the mains voltage switch.

- Regulators (Ref. Desig. 4800).

  The regulators are built around U1 which in turn is supplied through Q9. CR6 provides reference voltage (in conjunction with noise filter R4, C5). The 24V regulator loop consists of U1, Q4, Q6, R9 and R12. Q2, R8, R15 and R9 provide a current limitation at a level of about 2.5 A.

  15V and 15V stand-by is produced by regulators U2 and U3.

  The 8V regulator is similar to the 24V regulator.

  Q10 supplies the blower with approx. 11V.

2.2.2.u Memory. (Ref. Desig. 4373).

The memory circuit can be divided in three different major blocks:

(1) Control and dynamic address circuit U1-U6.

(2) Static address circuit U14-U21 (word selection).

(3) Memory circuit U8-U12 + U22.

(1) Control and Dynamic Address Circuit.

When the "read" or "write" pushbutton key is pressed, the flip-flop U1A is set or reset. $\overline{Q}$ high represents "read" mode, Q high, "write" mode. At the same time flip-flop U1B is reset, enabling the lamp decoder U2. Gate U5D is also enabled. Output J1 - 19/20 CP gate, goes low.

The "write" pushbutton can be disconnected by S1. In this way the memory can be used as a ROM.

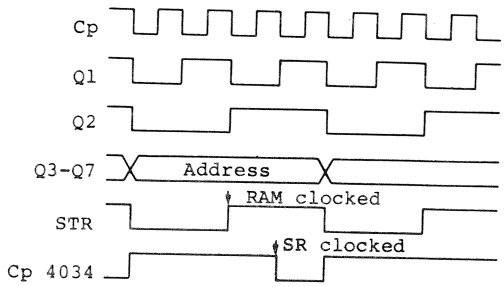
When a start pulse arrives from either address digit counter U20 or the start pulse input, latch U4A/B will change over and turn pin 3 high. This enables clock generator U5A/B while the reset input of U6 is disabled. As the required word length is 32 bits, the counting sequence must cover 32 addresses. When the counter output again shows 00000, the OR gate CR10 - CR14 will trigger the monostable multivibrator U4C/D. This causes the latch U4A/B to reset. The counter is now reset and the oscillator stopped. The output from monostable multivibrator pin 10 is differentiated by C4, R9 producing a positive-going pulse which, via CR4, is used to set U1B and thereby conclude the memory cycle.

C8, R20 is a power-up circuit which sets flip-flop U1B and latch U4A/B.

If, in a memory cycle, the "clear" pushbutton key is pressed, capacitor C2 will charge and turn the output of the Schmitt trigger U3 low. When the key is released, C2 will slowly discharge and after a delay of about half a second U3 will restore to logic 1 and deliver a set pulse to U1B.

(2) Static Address Circuit.

The static address is the address keyed from the key board. The circuit consists of the address digit counter U20, the address store U13, U14, address gate (for external addressing) and the BCD-to-binary converter U17-U21.



When an address number is keyed while in memory mode, the number is entered at the inputs of U13, in BCD form. A negative going clock pulse is applied to U13 and U20. During the time $\overline{Cp}$ is low, the number is entered into U13. On the trailing edge of $\overline{Cp}$ data is latched in U13 and address counter U20 is triggered. This action causes $\overline{Q}$ to go low. C5, R12 produces a negative-going pulse, applied to U14 and the content of U13 is duplicated into U14.

The next time a number pushbutton key is activated, the number will enter U13 and the flip-flop will clock as described. Now, however, $\overline{Q}$ goes high and no pulse is produced to clock U14.

The positive transition of $\overline{Q}$ is selected by C6, R11 and will produce a start pulse for the control circuit.

Address gate U15-U16 locks out the internal address if J2-7 is grounded. This is done if external addressing is desired. The memory cycle is then initiated by applying an auxiliary start pulse to J2-1.

Thus if internal addressing is used, the address setting can be monitored on the external addressing lines. The address in BCD format is then entered into the address converter U17-U21, where the address is converted into binary format.

(3) Memory Circuit.

This consists of interface circuit U8, U11, U12 and Q4. The memory is CMOS 3K RAM. Integrated circuits U8, U11 and U12 make the level translation from the address/control circuits (12 V) to the RAMs (3-4 V) while Q4 translated the Do back to 12 V level. The memory is made up of three 1K CMOS RAMs. Addresses are recognized by the RAMs on the negative transition of STR. To select the proper RAM, chip-selects CS1 and CS2 are used. A logic 0 on both CS1 and CS2 selects the corresponding RAM.

The memory section is powered from the oven power supply. When the circuit is powered-down all outputs to U8, U11 and U12 become logic 0. This means that none of the RAMs are selected and the drain from the "Batt" supply is extremely low. If even the oven supply disappears, CR17 goes into conduction and the battery BT1 serves as back-up supply. BT1 is a lithium battery with a no load lifetime in excess of 10 years.

2.3 INTERFACE

2.3.1 FREQUENCY CONTROL

2.3.1.a 1.4 MHz internal standard output.

(Only for receivers with 1.4 MHz internal standard). BNC connector J1 on the rear panel.

The connector delivers a 1.4 MHz frequency standard signal with the following specifications:

$$V_o = 1.5 \text{ Vpp}$$
$$R_o < 50 \text{ ohm}$$

NOTE: The connector J1 must not be loaded with a resistance lower than 5 kohm.

2.3.1.b 1.4 MHz external standard input.

(Only for receivers with 1.4 MHz internal standard). BNC connector J2 on the rear panel.

When an external 1.4 MHz frequency standard signal is applied to J2, the position of switch S1, located on module 4334, must be changed. The input specifications of J2 are as follows:

$$V_i \geq 1.5 \text{ Vpp}$$
$$R_i = 470 \text{ ohm}$$

2.3.1.c 1.0 MHz external standard input.

BNC connector J3 on the rear panel.

When an external 1.0 MHz frequency standard signal is applied to J3, the MR 6000 receiver automatically uses this signal as frequency standard instead of the internal 1.4 MHz or 5.6 MHz standard signal. The input specifications of J3 are:

Receivers with 1.4 MHz internal frequency standard:

TTl-level: $2V < V_{IH} < 5.0V$ $R_i = 1$ kohm
$0V < V_{IL} < 0.8V$

NOTE: Switch located on module 4334 must be in position "int. Std.".

Receivers with 5.6 MHz internal frequency standard:

TTL-level: $2V < V_{IH} < 5.0V$ $R_i = 470$ ohm
$0V < V_{IL} < 0.8V$

NOTE: Switch located on module 4684 or 4700 must be in position "int. Std.".

2.3.1.d 5.6 MHz internal standard output.

(Only for receivers with 5.6 MHz internal frequency standard). BNC connector J1 on the rear panel.

The connector delivers a 5.6 MHz frequency standard signal with the following specifications:

TTL-level: $2V < V_{IH} < 5.0V$ $R_o = 470$ ohm
$0V < V_{IL} < 0.8V$

2.3.1.e 5.6 MHz external standard input.

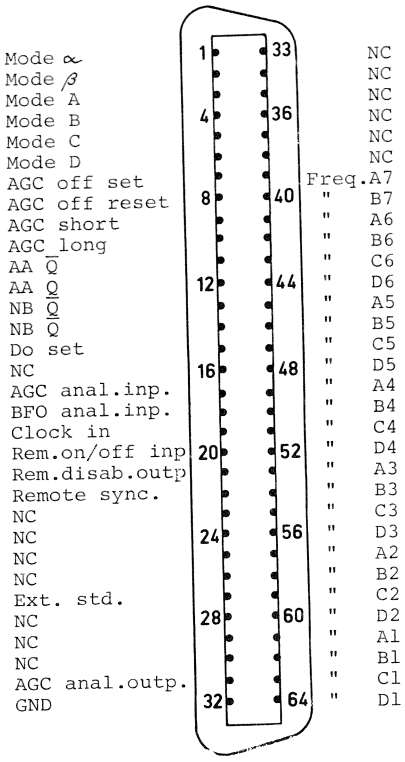
(Only for receivers with 5.6 MHz internal frequency standard). BNC connector J2 on the rear panel.

When an external 5.6 MHz frequency standard signal is applied to J2, the position of the switch S1, located on module 4684 or 4700, must be changed. The input specifications of J2 are:

TTL-level: $2V < V_{IH} < 5.0V$ $R_i = 470$ ohm
$0V < V_{IL} < 0.8V$

2.3.2 REMOTE INPUT

64-pole female connector J1 on the rear panel. (Ref. Designation: 4419).



Control signals on jack J1 allow full control of all receiver functions.

The logic inputs have the following level specifications:

"1" V_{IH} = 12V (11.5 to 12.5V)

"0" V_{IL} = 0V (0 to 1 V)

$R_i \geq 10k$

NOTE: Inclusion of a series diode for each terminal is recommended.

J1-1 to J1-6. Mode information ∝, β, A, B, C and D.

The codes of the six mode data bits are as shown in the tables, following. ("X" denotes don't care).

	AM	CW	F1
	D C B A β α	D C B A β α	D C B A β α
Sharp	0 0 1 1 x x	0 1 1 1 x x	1 0 1 1 x x
Narrow	0 0 1 0 x x	0 1 1 0 x x	1 0 1 0 x x
Intermediate	0 0 0 1 x x	0 1 0 1 x x	1 0 0 1 x x
Wide	0 0 0 0 x x	0 1 0 0 x x	1 0 0 0 x x

USB	LSB	ISB/USB	ISB/USB
D C B A β α	D C B A β α	D C B A β α	D C B A β α
1 1 0 0 0 1	1 1 0 1 1 0	1 1 1 1 0 1	1 1 1 1 1 0

NOTE: "Clock in" must be activated for every change of mode.

J1-7,8,9,10,17,31.

AGC information.

J1-7,8,9,19 AGC Data.

The AGC data are coded into 4 bits. The coding table is given here:

	AGC			
	off reset (J1-8)	off set (J1-7)	short (J1-9)	long (J1-10)
AGC off	0	1	0	0
AGC short	1	0	1	0
AGC long	1	0	0	1

J1-17 analog input.

A dc-voltage applied to this input controls the RF-gain of the receiver provided that the AGC select is in position, AGC off.

The RF-gain is inversely proportional with the applied dc-voltage.

NOTE: When AGC short or AGC long is selected, the applied dc-voltage must be zero.

Specifications:

$$0V \leq V_{in} \leq 7V$$
$$R_{in} = 10 \text{ kohm}$$

J1-31 AGC analog output.

The internal AGC voltage can be taken from this terminal independent of the AGC select. The dc-voltage is inversely proportional with the RF gain.

Specifications:

$$0V \leq V_o \leq 15V$$
$$R_o \leq 10 \text{ ohm}$$

NOTE: The terminal must not be loaded with a resistance lower than 4.7 kohm.

J1-11,12 AA $\overline{Q}$, AA Q.

The inputs control the antenna attenuator. The coding is as shown on the schema below:

Ant. att.	AA Q (J1-12)	AA $\overline{Q}$ (J1-11)
on	1	0
off	0	1

J1-13,14 NB Q, NB $\overline{Q}$

The inputs control the Noise Blanker. Coding is as shown in the table:

Noise Blanker	NB Q (J1-13)	NB $\overline{Q}$ (J1-14)
on	1	0
off	0	1

J1-18 BFO analog input.

A dc-voltage applied to this terminal control the internal BFO. The frequency of the BFO is proportional to the dc-voltage.

Specifications:

$$0V \leq V_{in} \leq 7V$$

$$R_{in} = 47 \text{ ohm}$$

J1-19 Clock in.

A positive transition on this logical input (from "0" to "1") causes the mode and frequency information to be stored in the respective registers (module 4332 and 4350). This means that each time the mode and/or frequency has to be changed, it is necessary to activate the clock input.

J1-20 Remote on/off input.

Receiver on/off control line.

"1" Receiver on.

"0" Receiver off.

J1-21 Remote disable output.

+15Vdc on this output indicates that the receiver is on and under remote control. 0V indicates that the receiver is off or locally controlled. ($R_o \sim$ 10 kohm).

J1-22 Remote sync.

A "1" applied to this input turns on the remote sync lamp on the front panel.

J1-27 Ext. Std.

This output indicates whether or not a 1.0 MHz external frequency standard is applied to the receiver.

1.0 MHz ext. Std. : 0V

std. not conn. : +12V

R_o = 27 kohm

J1-39 to 64 and J1-15 Frequency Data.

The frequency control information must be connected in parallel-BCD form (except for "D0"). The information is stored in the register (module 4819) on a positive transition of the "clock in".

The relationship between decimal figure, BCD-code and digit is shown in the following table:

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

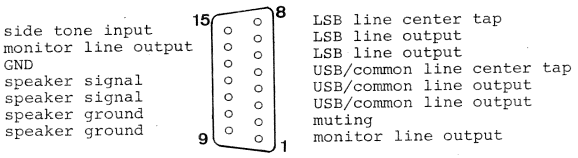
B7A7	10 MHz digit
D6C6B6A6	1 MHz digit
D5C5B5A5	100 kHz digit
D4C4B4A4	10 kHz digit
D3C3B3A3	1 kHz digit
D2C2B2A2	100 Hz digit
D1C1B1A1	10 Hz digit

D0 (J1-15) controls the 1 Hz digit (not shown on the front panel display).

"1" indicates 5 Hz
"0" indicates 0 Hz

2.3.3 AUDIO AND MUTING SIGNALS

15-pole female D-connector J2 on the rear panel. (Ref. Desig. 4817).



The input/output specifications of this connector are as follows:

Monitor line output J3 - 1,14:

Output balanced, insulated. Output resistance $<$100 ohms. Level adjustable up to 0 dbm into 600 ohms. Level adjustment may be made through an access hole on the left side of the bottom panel, near the front panel.

USB/com line output J3-3, 4, 5 and LSB line output J3-6, 7, 8:

Output is balanced, insulated; resistance = 600 ohms. Levels adjustable up to 0 dbm into 600 ohms. Level adjustments may be made through two access holes on the left side of the top panel. All line outputs allow a + 10 db nominal voltage level, before clipping.

The signals appearing at the three line outputs are functions of the selected mode, as shown in the table on the next page.

OUTPUT \ MODE	AM	F1	CW	USB	LSB	ISB/USB	ISB/LSB
USB/Com. line	sign.	sign.	sign.	USB-sign.	LSB-sign.	USB-sign.	USB-sign.
Monitor line	sign.	sign.	sign.	USB-sign.	LSB-sign.	USB-sign.	LSB-sign.
LSB line	%	%	%	%	LSB-sign.	LSB-sign.	LSB-sign.

Speaker signal J3-11, 12 and Speaker ground J3-9, 10:

2W into a total load of 4 ohms, with max. 2% distortion at 50 mW output.

Note that the two outputs are parallel connected internally.

Sidetone input J3-15. Ground J3-13.

By means of this input the internal audio power amplifier may be used for amplification of an external audio signal.

Nominal input level: 50 mVRMS.

Input resistance approx. 680 ohms.

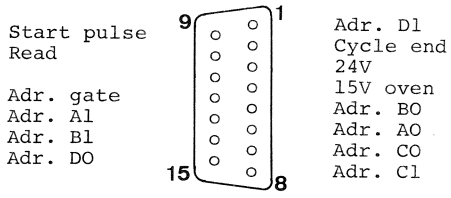
Muting J3-2. Ground J3-13.

When J3-2 is shorted to J3-13 the receiver is muted.

The OFF voltage is 24VDC. The ON current is approx. 30 mA.

2.3.4 MEMORY, EXTERNAL CONTROL

15-pin male D-connector J3 on the rear panel. (Ref. Desig. 4820).



Control signals on this connector allow external control of a built-in memory with 96 channels (frequency and mode).

The memory is controlled by a 2 digit address. The least and most significant digits, in BCD form, will appear at J3-6, 5, 7, 15 (A_0, B_0, C_0, D_0) and J3-13, 14, 8, 1 (A_1, B_1, C_1, D_1), respectively. These pins function as both output port for the internal address and as input port for an external address code, dependent on whether the address gate input J3-12 is logic 1 or logic 0. If the memory is to be externally controlled, J3-12 must be grounded. A read cycle is started by supplying a logic 1 pulse of approx. 1 ms duration to read input J3-10 and thereafter to start pulse input J3-9.

After the memory has finished its read sequence, a logic 1 pulse is supplied at the cycle end output, J3-2.

J3-6,5,7,15,13,14,8,1,12,10 have the following specifications:

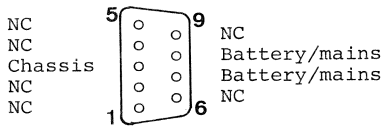
Logic 1 $10V < V_{IH} < 12V$; $R_i > 50$ kohm
Logic 0 $0V < V_{IL} < 2V$

J3-2 has output specifications:

Logic 1 $8V < V_{OH} < 12V$ $R_o < 10$ kohm
Logic 0 $0V < V_{OL} < 4V$

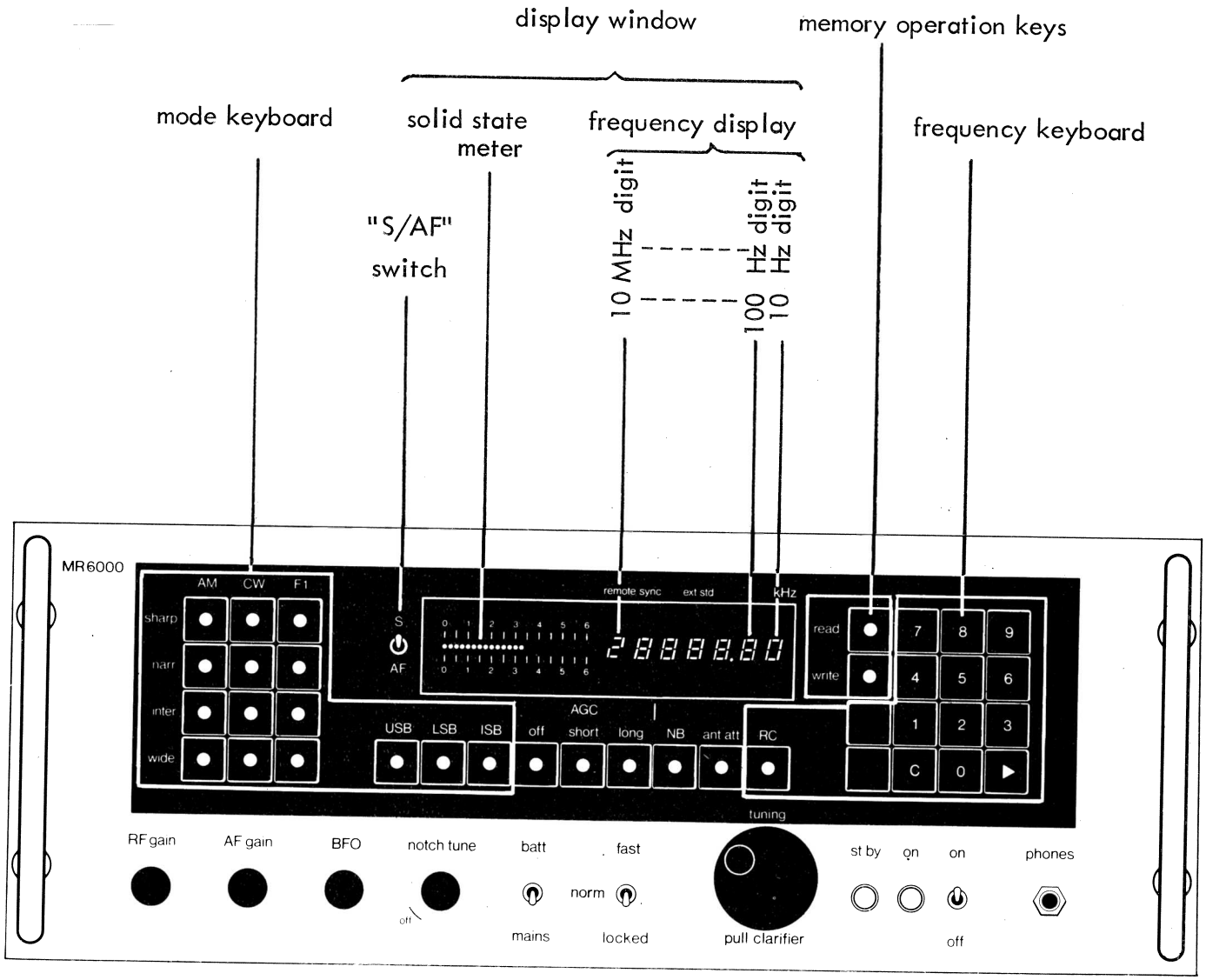
2.3.5 BATTERY/MAINS

Rear panel 9-pin male D-connector (Ref. Desig. 4800 J2 or 4377 J2).

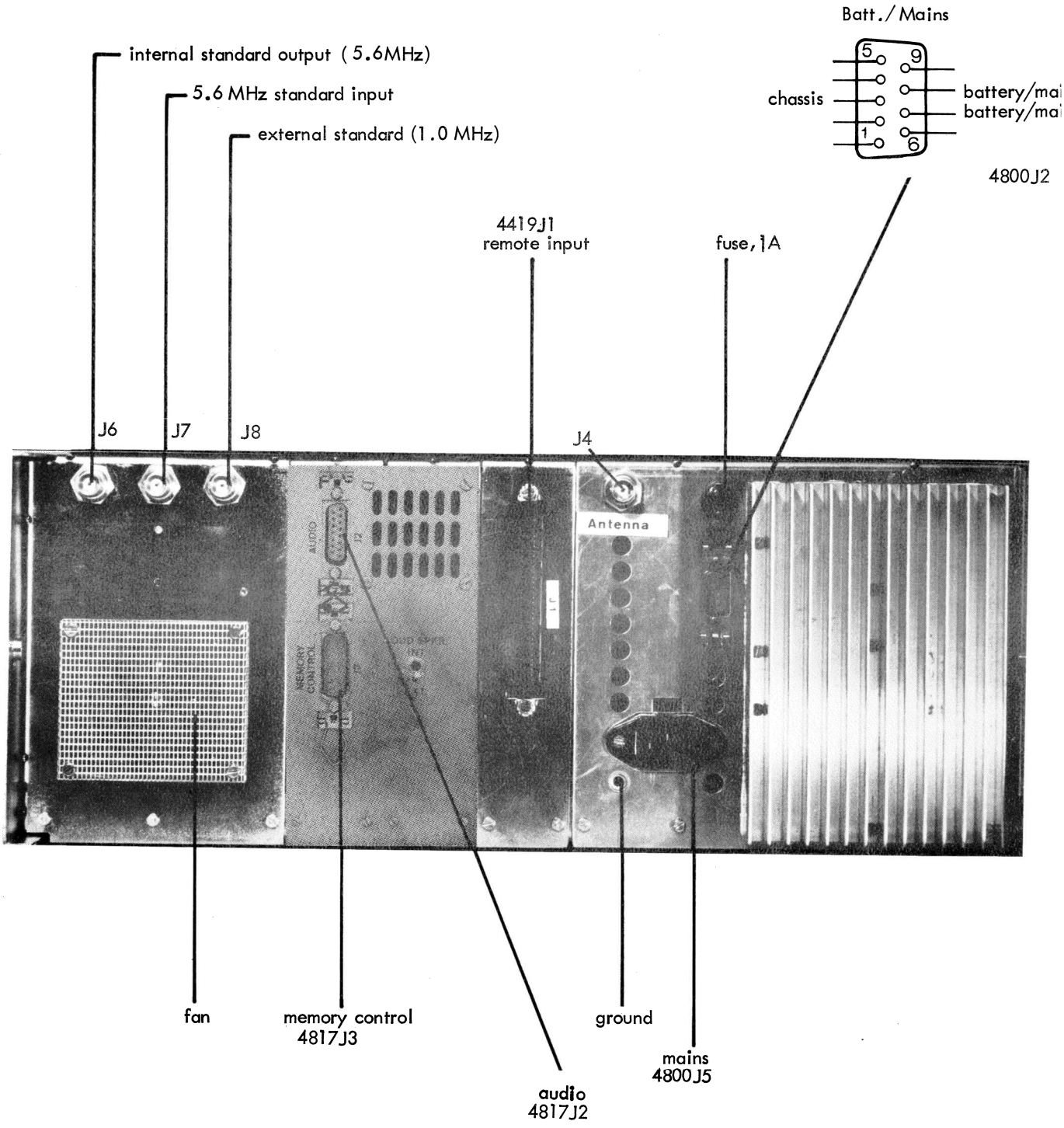


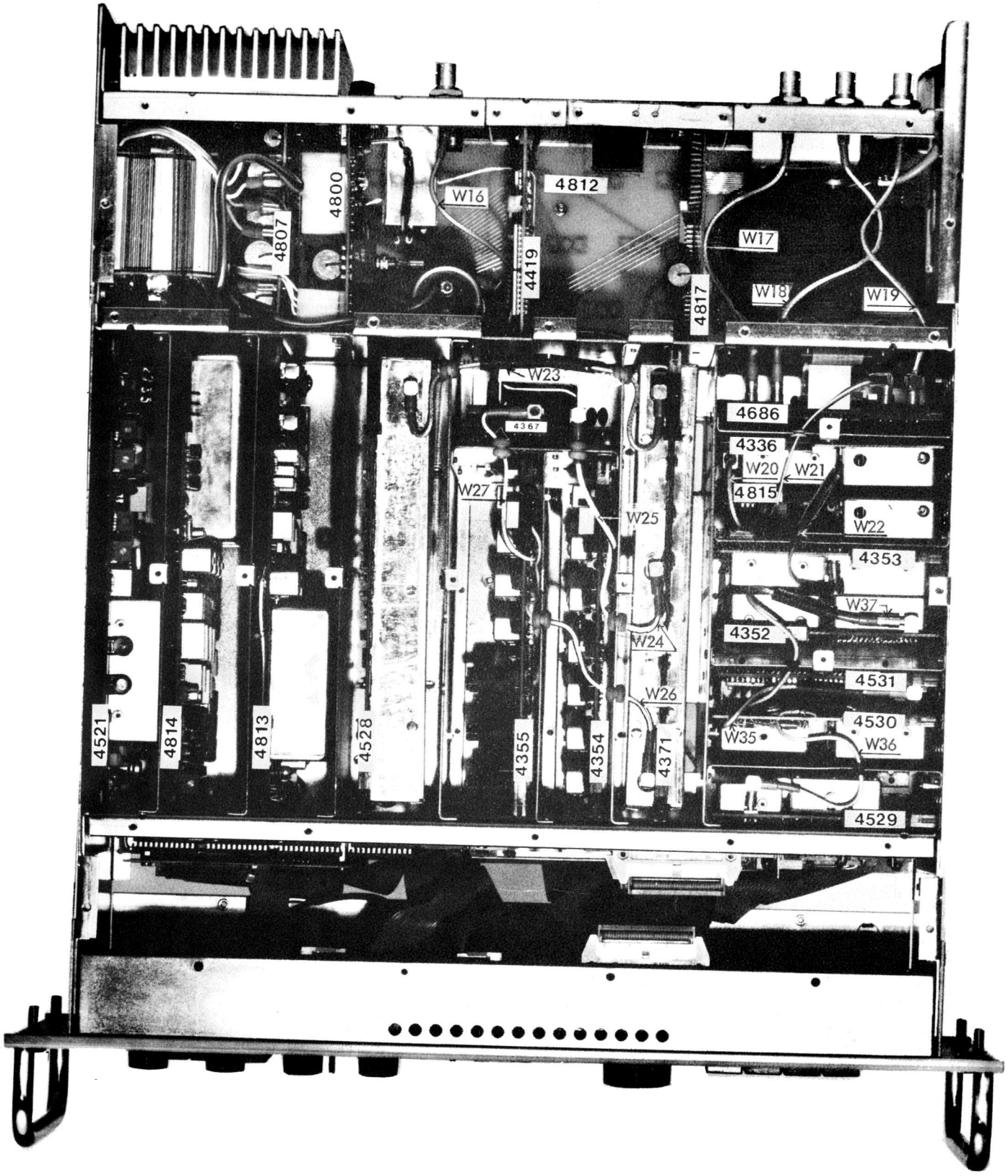
When panel front switch "batt/mains" is switched to "batt", connection between pin 7 and pin 8 is established.

The voltage/current should be limited to 48V/0.5A.

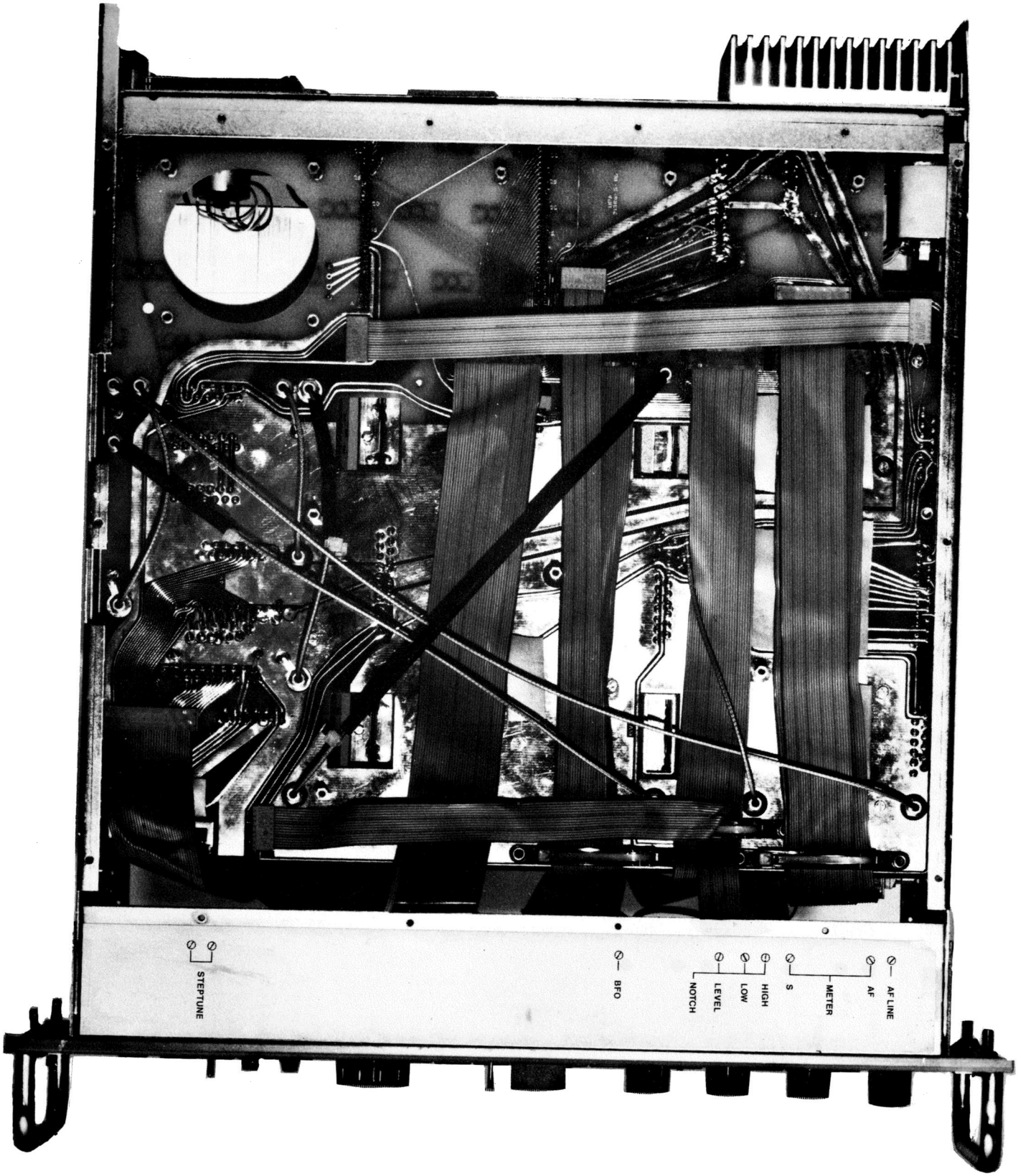

display window
memory operation keys
mode keyboard
solid state meter
frequency display
frequency keyboard
"S/AF" switch
10 MHz digit
1 MHz digit
100 kHz digit
10 kHz digit
MR6000
AM
CW
F1
sharp
narr
inter
wide
S
AF
remote sync
ext std
kHz
read
write
7
8
9
4
5
6
1
2
3
C
0
USB
LSB
ISB
AGC
off
short
long
NB
ant att
RC
tuning
RF gain
AF gain
BFO
notch tune
batt
fast
norm
mains
locked
pull clarifier
st by
on
on
off
phones

FRONT VIEW

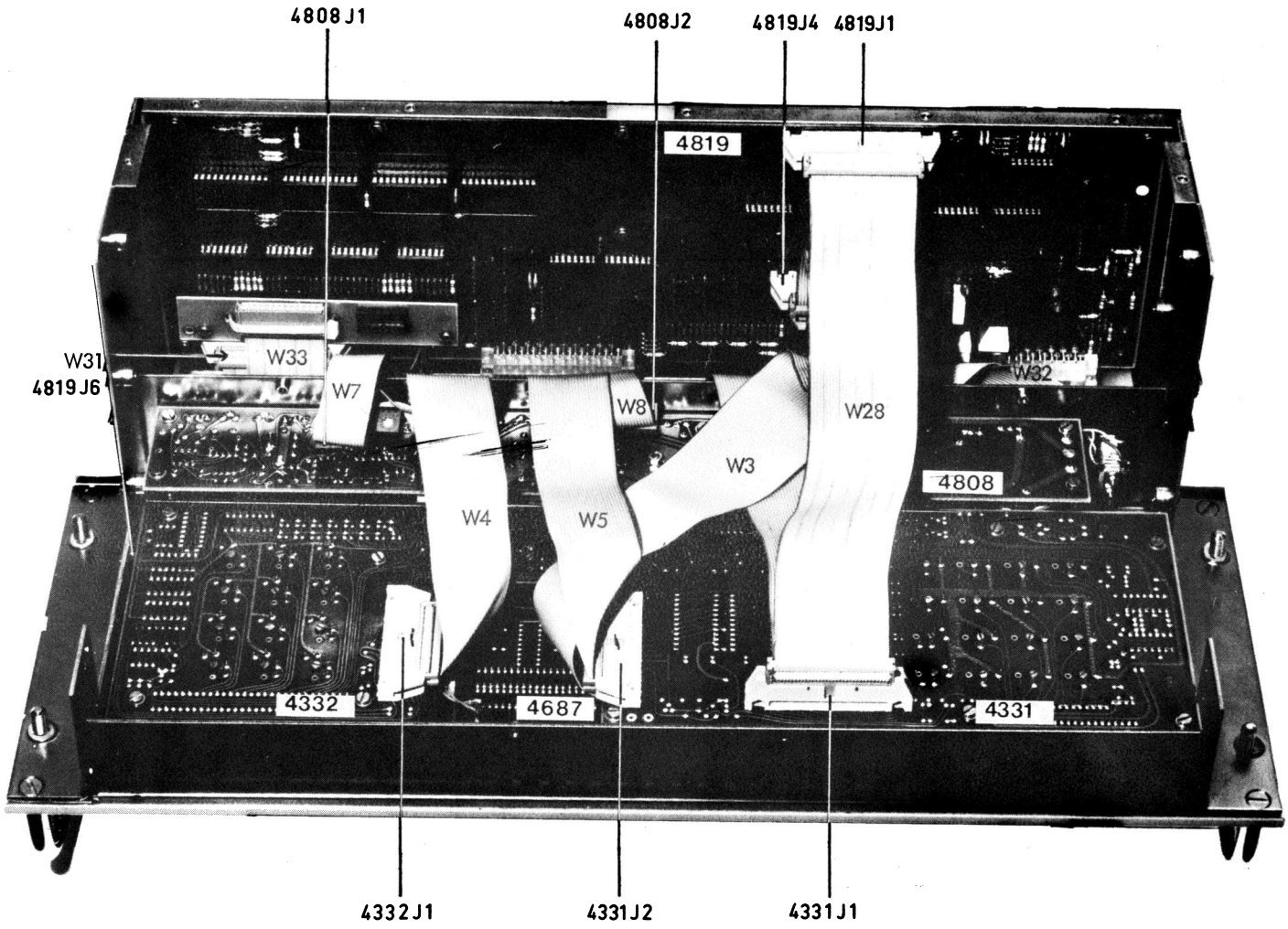

Batt./Mains
internal standard output (5.6MHz)
5.6 MHz standard input
external standard (1.0 MHz)
chassis
battery/mai
battery/mai
4800J2
4419J1
remote input
fuse, 1A
J6
J7
J8
J4
Antenna
fan
memory control
4817J3
audio
4817J2
ground
mains
4800J5


4800
4807
W16
4812
4419
W17
W18
W19
4817
W23
4367
4686
4336
W20
W21
4815
W27
W25
W22
4353
W37
4352
W24
4531
W26
4530
W35
W36
4529
4521
4814
4813
4528
4355
4354
4371

TOP VIEW



BOTTOM VIEW



FRONT PANEL, CABLE SIDE

4. INSTALLATION

Installation requirements differ according to site conditions, and each specific installation will have its own installation folder, containing full instructional drawings. The following, therefore, should be regarded as general guidance rather than specific instructions.

The overall dimensions of the equipment are given in Section 4 of the handbook and care must be taken when siting the equipment to provide sufficient front access to fit large assemblies and allow units to be withdrawn for maintenance and adjustment.

Provision must be made for running mains supply, traffic and control lines either overhead or underground, or at floor level in a duct.

Before setting into operation, check the voltage, mains frequencies and number of phases, this equipment is prepared for.

Does the voltage- or the frequency set differ from the main power, the equipment has to be modified as described in the manual.

The equipment is normally factory wired for 220V - 50 Hz, if there is not specified special main voltage/frequency when ordering.

5. OPERATING INSTRUCTIONS

5.1 GENERAL

Reference is made to the front plate photo found in subsection 3.1 of this manual.

5.2 SELECTION OF FREQUENCY

The frequency is keyed in digit by digt by means of the frequency keyboard. The last digit is the 100 Hz digit which must always be keyed.

Example: To select 12,345.6 kHz, clear the display by pushing the clear key "C" and key the frequency:

[C] [1] [2] [3] [4] [5] [6]

Key	Display
	4364.50
[C]	0.00
[1]	0.10
[2]	1.20
[3]	12.30
[4]	123.40
[5]	1234.50
[6]	12345.60

The function of the key clear is to set all digits to 0.

Example:

	12345.60
[C]	0.00

This key should always be pushed before selecting a new frequency via the keyboard.

Function of the key [▶] is to move all digits one step to the right. The least significant digit is then moved out of the display and cancelled.

Key	Display
[▶]	12345.60
[▶]	1234.50
[▶]	123.40

The key [▶] is used to correct faulty keyed digits.

Example:

The frequency 12345.6 is to be keyed. The fourth digit has, by error, been keyed as 5. By pressing [▶], the faulty digit is removed from the display. The correct digit is then entered:

[C] [1] [2] [3] [5] [▶] [4] [5] [6]

Key	Display
	4364.50
[C]	0.00
[1]	0.10
[2]	1.20
[3]	12.30
[5]	123.50
[▶]	12.30
[4]	123.40
[5]	1234.50
[6]	12345.60

The key [▶] can be used to change the frequency.

Example:

The frequency has been set to 12345.6. A change to a frequency of 12346.7 is desired:

key [▶] [▶] [6] [7] :

Of course this can be done also by keying

[C] [1] [2] [3] [4] [6] [7]

To change frequency from 12345.6 to 12356.7:

[▶] [▶] [▶] [5] [6] [7] or

[C] [1] [2] [3] [5] [6] [7]

To change frequency from 12345.6 to 12456.7:

[▶] [▶] [▶] [▶] [4] [5] [6] [7] or

[C] [1] [2] [4] [5] [6] [7]

5.2.1 STEP TUNING

To step tune the receiver throw the "fast, normal, locked" switch to "normal". The frequency can be increased or decreased respectively, by turning the knob marked "clarifier pull" clockwise or anti-clockwise. If the steptune control is pulled-out, frequency may be varied in steps of 5 Hz (lowest displayed digit is 10 Hz). If the steptune control is pushed-in, frequency may be varied in steps of 100 Hz.

Frequency may also be varied in steps of 1000 Hz if the "fast, normal, locked" switch is held in the "fast" position, when the tuning knob is turned.

Once the frequency is correct, throw the "fast, normal, locked" switch to the "locked" position. In this position the frequency can not be varied with the steptuning knob.

This control knob is used for searching: Suppose you know that a certain transmission should be found at a frequency of approx. 4210.0, but you do not know the exact frequency.

Enter the approx. known frequency via the keyboard:

[C] [4] [2] [1] [0] [0] ,

turn the steptuning knob clockwise to increase frequency. If you do not find the transmission at a frequency above 4210.0, press the button RC (Recall). This recalls the frequency initially entered via the keyboard, i.e. 4210.0. Then turn the steptuning knob anticlockwise to search below 4210.0.

The entire frequency range from 10 kHz to 29999.9 kHz may be searched by means of the step tuning knob.

5.2.2 "FAST, NORMAL, LOCKED" SWITCH

This control disables/enables the tuning knob and determines the tuning speed as explained above.

5.3 AGC CONTROL

The AGC is controlled by three pushbuttons, namely: "off", "short" and "long". When the "off" button is pressed the RF gain is fully controlled by the "RF gain" knob. The setting is indicated by light in the button selected.

If the "short" or "long" pushbutton is pressed, the AGC circuit becomes operative. In this situation the "RF gain" knob is still operative which means that the gain can be reduced using this control, but the gain cannot be increased above the level set by the AGC circuit - so if it is desired to have the RF gain fully controlled by the AGC circuit, the RF gain control must be turned fully clockwise.

5.4 "ANT ATT" RF ATTENUATOR PUSHBUTTON

This control performs a press release function: When this pushbutton shows light, a 20 dB attenuator is inserted in the input of the receiver. When light is not present, the attenuator is disabled and the receiver has full sensitivity. The insertion of the attenuator can improve the reception of signals which are disturbed by strong undesired signals due to nonlinearity in the front end. Of course the desired signal must be strong enough for reception with the now reduced sensitivity.

5.5 NOISE BLANKER

A noise blanker circuit is available. This is enabled or disabled by the "NB" pushbutton which performs a push-release function: When the lamp is lit, the noise blanker is operative.

The noise blanker circuit can remove pulse noise caused by electrical machinery located in the vicinity of the receiver.

It should be noted that the noise blanker will not always improve the reception. If a strong signal is received, the modulation depth of which is nearly 100%, insertion of the noise blanker may actually degrade reception!

5.6 MODE

Reception mode is selected on the mode keyboard with the "LSB", "USB" and "ISB" keys. The mode keyboard is arranged as a matrix with the modes AM, CW and F1 as columns and the bandwidths "sharp" (+/- 0.1 kHz), "narrow" (+/- 0.5 kHz), "intermediate" (+/- 2 kHz) and "wide" (+/- 4 kHz) as rows.

AM is normally received in position "AM" "wide".

A2, modulated CW, is normally received in mode "AM", "intermediate".

A1, CW, is normally received in mode "CW", "narrow".

F1, frequency shift, is normally received in mode "F1", "narrow".

Searching should be carried out employing a bandwidth wider than that specified above.

When the station is found, the bandwidth should be narrowed to the specified setting. Reception of noisy signals may be improved markedly by sharpening the bandwidth.

Difficulties can arise when the sharpest bandwidth is selected, because the receiver must be set very precisely. This can be overcome by the following procedure:

Actuate either the "LSB" or "USB" keys. Tune the receiver to zero beat on the signal to be received. Push "CW" "narrow" and adjust the "beat" knob for a comfortable beat tone.

SSB is received by actuating: "LSB" (lower sideband reception), "USB" (upper sideband reception) or "ISB" (independent sideband reception, i.e. reception of USB and LSB simultaneously).

Of course the operator cannot listen to both ISB transmissions at the same time. The operator can choose to listen to either sideband in the following way:

Hold the "ISB" key down and activate the LSB or USB pushbuttons.

When the "LSB" or "USB" key has been released, also release the "ISB" key. The AF output is obtained from the sideband selected. Signals will then be passed to the operators headphones or the external loudspeaker. It is important that this procedure is used, otherwise one of the sideband channels can be disconnected!

Tuning to a SSB Station: Use the "steptune" knob to coarse tune the receiver so that the speech is as far from "Donald Duck" as possible. Use the "clarifier" to remove the last Donald Duck" effect.

5.7 "AF GAIN"

AF gain is adjusted with the "AF gain" control knob. This adjustment determines the output level to the headphones or loudspeaker.

5.8 "BFO"

The "BFO" knob is used in the CW reception mode to adjust the beat note to a comfortable tone.

5.9 "NOTCH TUNE"

An undesired AF signal can be rejected by means of the "notch tune" control knob.

5.10 "BATT/MAINS" SWITCH

The "batt/mains" switch is used to select the power to the receiver from the mains or from an extrenal (optional) converter connected to a battery.

5.11 "ON/OFF" SWITCH

The "on/off" switch is the main power switch of the receiver. In the on position, the green "on" lamp lights; in the off position, the yellow "st.by" lamp lights and the crystal oven (and the memory module) is powered. These circuits can only be disconnected from the mains supply by an external switch. This should be kept in mind when the top or bottom covers are removed for service!

5.12 "PHONES"

The socket "phones" is used for connection of the operators headphones. Plugging the headphone jack into the "phones" socket will mute the loudspeaker.

5.13 "S/AF" SWITCH

The switch "S/AF" is used to display either the RF signal level or the AF level by means of the solid state meter.

In position "S" the RF signal level is displayed.

In position "AF" the AF signal level is displayed.

5.14 DISPLAY WINDOW

In the display window are the following indicators:

5.14.1 The frequency display showing the frequency setting in kHz.

5.14.2 The solid state meter indicating the signal level of either the RF or AF selected by the meter switch "S/AF".

5.14.3 "Remote Sync" which can be disregarded if the receiver is not remote controlled. If the receiver is remote controlled the lamp should be lit to indicate that the remote equipment is in synchronism with the control unit (i.e. the remote receiver is under control of the remote control system).

5.14.4 The "Ext standard" lamp which is lit if an external standard signal is applied via the appropriate input connector provided the signal level is sufficient (approx. 1 V). If the signal disappears the lamp is deenergized and the internal standard will take over the control.

5.15 MEMORY

The memory bank has a readin capacity of up to 96 different frequencies with corresponding modes and AGC settings.

Readin

When a memory readin is desired, key in:

1. WRITE on the frequency keyboard (the lamp indicator will light).

2. A two digit address (00-95). (Example: address "1" is read in a "01"). The desired frequency (shown on the display), plus desired mode and agc are hereby read into the memory.

Readout

When readout is desired, activate and key-in, respectively:

1. READ pushbutton on the frequency keyboard (the lamp indicator will light).

2. A two digit address (00-95).
   The equipment can thus be rapidly set to the previously programmed data for the relevant addresses.

The equipment is now ready for use.

6. MAINTENANCE

The receiver is properly adjusted before leaving the factory. This factory adjustment will last a considerable period of time and a complete re-alignment should never be necessary. The replacement of modules or components calls for minor adjustments, only.

Only qualified personnel equipped with adequate test equipment should be allowed to perform the adjustments.

WARNING: HIGH VOLTAGE HAZARD EXISTS WHEN THE TOP COVER IS REMOVED.

6.1 ALIGNMENT PROCEDURES

6.1.1 FREQUENCY STANDARD (Ref. Desig. 4686)

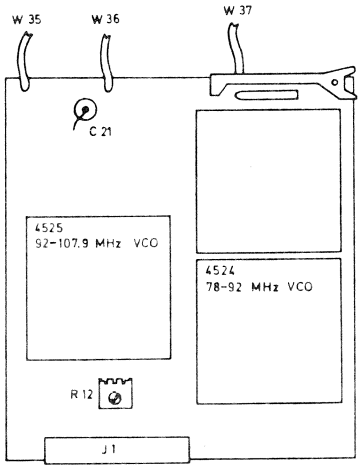
Test Equipment:

Frequency Counter. Max. frequency 105 MHz, min. sensitivity 100 V rms. Accuracy based on requirements (recommended: 1 x 10^{-8}).

Remove the front end (4528) and connect the counter to the rear coax-connector (mating 4528J2). Tune the receiver to 25000.00 kHz; the counter should now show a frequency of 100,000.00 MHz. If not, the standard frequency can be adjusted by trimming 4686R13 by means of an access hole in the top panel, marked "Std. Freq. Adj." A coarse frequency adjustment may be made by means of an access hole at the top of the oscillator placed on the 4686 P.C. Board. Be sure that the receiver has had a warm-up time of at least 30 min.

6.1.2 78-107.9 MHz OSCILLATOR (Ref. Desig. 4530)

Test equipment: DC voltmeter Ri $\geqslant$ 1 megohm.



Insert an extension board between 4530 and the motherboard. Note that the coaxial cables at the top of the module must be extended.

6.1.3 20.0V VOLTAGE REGULATOR

The 20.0V voltage is measured between feed-through capacitor C21 and terminal J1-2 (OV) and is adjusted by means of variable resistor R12.

6.1.4 78-92 MHz VCO (Ref. Desig. 4524)
92-107.9 MHz VCO (Ref. Desig. 4525)

The VCOs are checked by measuring the tuning voltage ϕ 78-1.

Connect the voltmeter between terminal J1-2 (OV) and terminal J1-6 (ϕ 78-1). The DC voltages to be measured are shown on the diagram. Voltage tolerance is +/- 0.1V.

Measurement is to be carried out with the following frequencies selected on the keyboard:

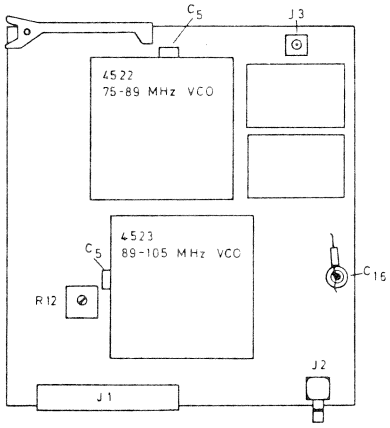
Selected frequency (kHz)	Oscillator frequency (kHz)
00.0	78000.0
13900.0	91900.0
14000.0	92000.0
29900.0	107900.0

Do not attempt VCO adjustment if the voltages fall outside of tolerance limits. The 78-107.9 MHz Oscillator module (4530) must be replaced if it does not meet the specifications given above.

If the module is replaced, the 75-105 MHz Oscillator (Ref. Designation 4529) must then be checked, too. See Section 6.2.5b.

6.1.5 75-105 MHz OSCILLATOR (Ref. Desig. 4529)

Test equipment: DC voltmeter Ri $\geqslant$ 1 megohm.



Insert an extension board between 4529 and the motherboard. Note that the coaxial cable at the top of the module must be extended.

6.1.6 20.0V VOLTAGE REGULATOR

The 20.0V voltage is measured between feed-through capacitor C16 and terminal J1-2 (/V) and is adjusted by means of variable resistor R12.

6.1.7 75-89 MHz VCO (Ref. Desig. 4522)
89-105 MHz VCO (Ref. Desig. 4523)

Before checking the VCOs, the 78-107.9 MHz Oscillator must be checked (See Section 6.1.2).

The measured tuning voltage ϕ 78-1 on the 78-107.9 MHz Oscillator must have the same value as the coarse tuning voltage ϕ 78-2 applied to the 75-105 MHz Oscillator (4529), measurable between terminal J1-2 (OV) and J1-10 (ϕ 78-2). If the two voltage levels are not identical, an error is present and the adjustments described in this section cannot be carried out.

The VCOs are checked by measuring the fine tuning voltage ϕ 3.

Connect the voltmeter between terminal J1-2 (OV) and terminal J1-9 (ϕ3). The DC voltages to be measured are shown on the diagram. Measurement is carried out with the following frequencies selected on the keyboard:

kHz	kHz
00.0	99.9
2000.0	2099.9
4000.0	4099.9
6000.0	6099.9
8000.0	8099.9
10000.0	10099.9
12000.0	12099.9
13900.0	13999.9

If the measured voltages fall outside the specified tolerance limits, the 75-89 MHz VCO (4522) must be adjusted by means of variable capacitor C5 and the DC voltage must be measured once again at all the frequencies listed above.

If it is not possible to obtain DC voltages within the specified tolerance limits, the 75-105 MHz Oscillator module (Ref. Designation 4529) must be replaced.

To check the 89-105 MHz VCO (4523), the DC voltage should be measured with the following frequencies selected on the keyboard:

kHz	kHz
14000.0	14099.9
16000.0	16099.9
18000.0	18099.9
20000.0	20099.9
22000.0	22099.9
24000.0	24099.9
26000.0	26099.9
28000.0	28099.9
29900.0	29999.9

In the same way as described above, the 89-105 MHz VCO (4523) can be adjusted by means of variable capacitor C5 if the measured DC voltages fall outside the specified tolerance limits. Remember that the DC voltage must be measured once again at all the frequencies listed above.

If it is not possible to obtain DC voltages within the specified tolerance limits, the 75-105 MHz Oscillator module (Ref. Designation 4529) must be replaced.

6.1.8 73.5 MHz LOOP (Ref. Desig. 4815)

Test equipment: Voltmeter Ri $\geqslant$ 1 Mohm

Preliminary procedures and alignment.

Connect the voltmeter between TP 1 (see Component Location) and ground. Adjust the trimmer (C13) to a reading on the voltmeter of 4.5 - 5.5 Volt. Be sure that the receiver has been connected to the mains for at least ½ hour.

6.1.9 73.6 MHz LOOP (Ref. Desig. 4336)

Test equipment:
Voltmeter Ri $\geqslant$ 1 Mohm.
Oscilloscope BW > 100 MHz (e.g. Tektronix 465).

Preliminary procedures and alignment.

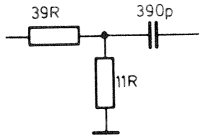
Connect the voltmeter between TP1 (see Component Location) and ground. Adjust the trimmer (C9) for voltmeter reading of 4-5 Volt. Be sure that the receiver has had a warming up period of at least ½ hour.

To adjust the output level, place the front-end (4528) on the extender card and measure the level of the 73.6 MHz signal on the coax-connector J3-4528 by means of the oscilloscope.

The level should be 1.5 Vpp +/- 0.3 V. This value can be obtained by adjusting R16 on the 73.6 MHz card (Ref. Desig. 4336).

6.1.10 SUBOCTAVE FILTER HF (Ref. Desig. 4354)
SUBOCTAVE FILTER LF-MF (Ref. Desig. 4355)
SUBOCTAVE FILTER HF MARINE
(Ref. Desig. 4359)

Test equipment:
Dummy Antenna:



Spectrum Analyzer with Tracking Generator.
(E.g. HP 141 T with 8553 B, 8552 B and 8443 B).

Preliminary procedures and alignment.

Each suboctave filter card is connected via coax-cables to the RF Input Protection card and to the Step Attenuator card (Ref. Desig. 4371) respectively. Place one of the filter cards on the extender card and connect the tracking generator to the antenna coax-connector at the rear panel. Transfer the filter output coax-cable from the step attenuator to the input of the analyzer. After proper adjustment of the analyzer, start the alignment procedures by selecting a frequency on the key-board in one of the following frequency ranges:

30 MHz	> f $\geqslant$	20 MHz
20 MHz	> f $\geqslant$	14 MHz
14 MHZ	> f $\geqslant$	10 MHz
10 MHz	> f $\geqslant$	6 MHz
6 MHz	> f $\geqslant$	4 MHz
4 MHz	> f $\geqslant$	2.5 MHz
2.5 MHz	> f $\geqslant$	1.6 MHz

Filters for the frequency ranges mentioned above are found on 4354. Antenna impedance is 50 ohms.

Filters for the following frequencies are found on board 4355:

1.6 MHz	> f $\geqslant$	1.0 MHz
1.0 MHz	> f $\geqslant$	0.7 MHz
0.7 MHz	> f $\geqslant$	0.52 MHz
0.52 MHz	> f $\geqslant$	0.34 MHz
0.34 MHz	> f $\geqslant$	0.22 MHz
0.22 MHz	> f $\geqslant$	0.15 MHz
0.15 MHz	> f $\geqslant$	0.01 MHz

Antenna impedance here is 10 ohms in series with 390 pF.

The bandwidth of the filters is proportional to the inductance of the parallel coils (i.e. L19 and L21 on card 4354) and is inversely proportional to the inductance of the series coils (i.e. L20 on card 4354).

After proper adjustment, maximum insertion loss is 2-3 dB in the bandpass and 3-4 dB at the frequency range limits.

6.1.11 FRONT-END (Ref. Desig. 4528)

Test equipment:
Spectrum Analyzer (e.g. HP 141 T with 8553 B and 8552 B).
RF Signal Generator (e.g. HP 8640 B or eq.).
Pulse generator (e.g. HP 8012 B).

Preliminary procedures and alignment.

Remove IF board 4813 and connect the spectrum analyzer to the IF board's now exposed coaxial-connector counterpart. Set the analyzer for a center frequency of 1.4 MHz.
Connect the RF signal generator to the antenna input coax at the rear panel. Select a frequency on the key-board and set the generator to the same frequency.

Adjust L61 and L66 for maximum amplitude on the analyzer. Be sure not to drive the front-end into limitation (recommended input: 40 dBuV EMF). Check that the gain in the front-end is min. 19 dB.

Reinsert IF board 4813 and set AGC to OFF. Connect a cable from the pulse generator to the antenna coax-connector. With a short pulse (i.e. 0.1 µsec) and a pulse amplitude of approx. 300 mV and a repetetion-frequency of approx. 300 Hz, adjust R109 and R110 for minimum impulse noise in the loudspeaker.

6.1.12 2ND IF 1 (Ref. Desig. 4813)

Test equipment:
Spectrum Analyzer with Tracking Generator (e.g. HP 141 T with 8553 B, 8552 B and 8443 B).

Preliminary procedures and alignment.

The input of the spectrum analyzer shall be connected to 4813 P3-2,4 and 6 via 150 pF capacitors and the tracking generator output to 4813 P1. Set the analyzer to sweep over a range of 10 kHz around 1.4 MHz.

Set the receiver in position AM WIDE AND AGC OFF. The output from the tracking generator shall be set to approx. -90 dBm. Place the 2nd IF 1 board (Ref. Desig. 4813) on the extender card. Peak the signal by trimming L12, L8 and L9. Adjust L7 for minimum ripple. It might be so that L8 and L9 again have to be realigned.

Set the receiver in position AM INTER and adjust L11 for minimum ripple. Set the receiver in position AM NARR and adjust L15 for minimum ripple. In position AM SHARP adjust L18 for maximum transfer and minimum ripple. In position USB adjust L2 and in LSB mode adjust L5 for maximum transfer and minimum ripple.

6.1.13 2ND IF 2. (Ref. Desig. 4814)

Test equipment:
Spectrum Analyzer with Tracking Generator (e.g. HP 141 T with 8553 B, 8552 B and 8443 B).
RF Signal Generator (e.g. HP 8640 B).
Oscilloscope (e.g. Tektronix 465).

Preliminary procedures and adjustment.

Place the board on the extender card and retain the test set-up in 6.1.14.

Set the receiver in position USB and adjust L1 for minimum ripple. In position LSB adjust L3 for minimum ripple. In position AM SHARP adjust L8 for minimum ripple. Check that the IF gain in position ISB for the signal through the 200 Hz filter is increased approx. 18 dB.

Remove the analyzer and tracking generator and connect the RF signal generator set to 1.4 MHz to 4813 P1. Output, approx. 10 mV. Connect the oscilloscope to 4329 P2-6 and adjust R38 to a reading of 150 mVpp.

6.1.14 DETECTORS AND MODE-DECODER (Ref. Desig 4521)

Test equipment: RF Signal Generator (HP 8640 B or equivalent).
Frequency Counter (HP 5383 A or equivalent)
Oscilloscope (Tektronix 465 or equivalent)

Couple the output of the RF signal generator to the receiver's coaxial antenna connector. RF generator's setting: frequency, 1.400 MHz; output level 1 mV.

Insert the print-board extender card into print-board 4521's socket and mount print board 4521 onto the extender card.

Adjust coil L2 and capacitor C41 for symmetrical beat note variation for rotation of the BFO control knob (both sides of mid-position).

Connect the frequency counter to the receiver's audio output at the receiver's loudspeaker terminals and check that full (both directions) rotation of the receiver's BFO control knob produces a beat note deviation greater than 3 kHz.

Now set the receiver to mode F1. Adjust C52 for a 1.5 kHz indication on the frequency counter. (BFO source: crystal Y 1, 1.4015 MHz).

Connect the oscilloscope in parallel with the frequency counter (at the loudspeaker terminals) and place the receiver in CW mode.

Adjust the receiver's AF gain for a suitable oscilloscope indication and adjust the BFO to a frequency of approximately 800 Hz. Do not disturb the AF gain setting for the adjustments that follow.

Set the receiver to USB mode and tune the receiver to 1.401 MHz. Adjust R13 so that the oscilloscope display voltage level is identical with that in CW mode.

Place the receiver in LSB mode and set the RF signal generator to a frequency of 1.399 MHz. Adjust R2 for an oscilloscope voltage display level equal to that achieved in the adjustments described above.

Now connect the oscilloscope to LINE OUTPUT on print 4817-J2, pins 3 and 4 (receiver rear panel) and in parallel with a 600 ohm load.

Select USB mode and set the RF signal generator to a frequency of 1.401 MHz. Adjust R80 for maxiumum output as indicated on the oscilloscope and adjust R92 for an output indication of 0 dB (2.2 V p-p).

Tune the receiver to 1.399 MHz, ISB mode (AGC, OFF). Adjust the receiver RF gain control knob for a reading of 150 mV p-p as measured by the oscilloscope at print 4521, P2-12.

Adjust R64 for maximum oscilloscope indication, as measured at print 4817-J2, pins 6 and 7, parallel loaded with 600 ohms.
Adjust R76 for an oscilloscope indication of 0 dBm (2.2 V p-p).

6.1.15 AF AND LINEAR CONTROLS (Ref. Desig. 4808)

Test equipment:
RF Signal Generator (HP 8640 B or equivalent).
Oscilloscope (Tektronix 465 or equivalent).

Preliminary procedures and alignment.

Connect the RF generator to the connector mating 4813 P1. Set the generator to 1.40 MHz, output approx. 10 mV and 30% AM. Connect the oscilloscope to 4817-J2, 9 and 11 (across the loudspeaker). Modulate the generator with 4 kHz and adjust R9 for a notch. Be sure that the notch tune knob is in the clockwise position. R9 is marked NOTCH HIGH at the bottom of the receiver. Modulate the generator with 400 Hz and adjust R12 for a notch. The notch tune knob now near (20 degrees) the anticlockwise position. R12 is marked NOTCH LOW. Modulate the generator with 1.5 kHz. Seek out the notch and adjust R13 for minimum output. Repeat the procedure for alignment of the notch.

With the receiver in position USB and AGC SHORT adjust R30 for a reading on the oscilloscope of 2.8 Vpp. The oscilloscope is to be connected to 4817-J2, 1 and 14 and the oscilloscope input clamped with 600 ohms. The RF generator shall be set to 1.399 MHz; output approx. 10 mV, unmodulated. R30 is marked 'AF Line' at the bottom of the receiver.

Insert module 4813 into the receiver. Connect the RF generator to the antenna input and set the generator to 10 MHz output 10 mV EMF. Set the receiver to 10000.00 and AM, WIDE and AGC SHORT.

Adjust R34 (marked METER-S) to a reading on the LED-meter of 3.5 units. Check that the switch on the front panel marked S/AF is in the S position.

To adjust the meter reading in the AF position, remove the RF generator. Do not disturb receiver setting. Adjust R33 for full scale on the LED-meter.

6.1.16 STEP ATTENUATOR (Ref. Desig. 4371)

Test equipment:
RF Signal Generator (HP 8640 B or equivalent).
Voltmeter Rl $\geqslant$ 20 kohm/V.

Preliminary procedures and alignment.

Place the board on the extender card. Connect the RF generator to the antenna input. Set the generator to 10 MHz 30% AM modulated with 1 kHz output 40 dBuV, EMF. The receiver shall be set to 10000.00 on the frequency keyboard and the mode selector to AM, WIDE and AGC SHORT. Begin the procedure by turning R110 fully clockwise. Connect the voltmeter between U3 pin 12 and chassis. The reading will be approx. 4.5 V. Now slowly turn the potentiometer. Stop the first time the voltmeter reading drops to a low voltage (approx. 0.3 V).

6.2 PREVENTIVE MAINTENANCE

To ensure a long MTBF (mean time between failure) follow the instructions given below.

The dust filter should be cleaned at least once a month and the blower checked for unobstructed rotation. All lamps shall be renewed every year: use the same or equivalent types, as described in the parts list.

Fuse replacement also requires that the new one is the same type as described in the parts list.

REMOVE MAINS VOLTAGE TO THE RECEIVER BEFORE REMOVING ANY CARDS TO AVOID DAMAGE TO THE RECEIVER.

Air circulation of the receiver must not be obstructed. Check the standard frequency oscillator every half year and adjust when specifications are exceeded.

The battery in the memory card (Ref. Desig. 4373) should be changed every 5 years. This change can be performed in two ways: With the mains still connected, no information is lost. With the mains disconnected, all information is lost and it will be necessary to reprogram the memory.

7. TROUBLE SHOOTING

TABLE OF CONTENTS

7.1 GENERAL

The object of this section is to enable a skilled technician to find and replace faulty modules.

7.1.1 WARNINGS

A WHEN THE TOPCOVERS ARE REMOVED HIGH VOLTAGES ARE EXPOSED!

B Most modules contain CMOS devices, which might be damaged due to electrostatic charges. Therefore the following precautions should be taken, when handling the modules:

The receiver and the test equipment should be arranged on a working table with a conductive surface.

Positive connection should be established between the chassis of the receiver and the test equipment.

All-metal tools should be used.

Before handling a module, touch an earth-grounded surface.

Before removing or inserting a module, remove power cord from the mains receptacle.

When carrying a module, do not touch conductive parts on the module.

If soldering is necessary, use a low voltage soldering iron with earth-grounded tip.

C When the modules are connected through extender cards, please remember to establish the coaxial connections through the devices in the extender card kit intended for this purpose.

7.1.2 NECESSARY TEST EQUIPMENT

- General purpose frequency counter, 125 MHz
- Dual-trace storage oscilloscope, 100 MHz
- 50 ohm feed-through BNC connector
- Kit of extender cards, B&W stock No. 430471 (or 430501) for both receivers and transmitters).

7.1.3 SPECIAL TEST METHODS AND TERMS

- When the term 1.4 vpp, 50 ohm is given, the level of the signal should be measured with an oscilloscope connected to the output terminal in question through the 50 ohm feed-through BNC connector.
- When logic 0 or logic 1 appear in the text it shall be taken as the logic levels 0 and 1 for C-MOS logic circuits:

  logic 0 lies within the range 0V to 3.5V
  logic 1 lies within the range 8V to 12V
- When the term "positive pulse" is given, it shall be understood as a short transition from 0 to 1 and back again, to 0.
- When the term "negative pulse" is given, it shall be understood as a short transition from 1 to 0 and back again, to 1.
- By a "pulse train" shall be understood a finite number of "positive" or "negative" pulses.
- To display a single positive pulse on the storage oscilloscope, the trigger must trig on the positive going slope.
- To display a single negative pulse on the storage oscilloscope, the trigger must trig on the negative going slope.

7.1.4 TEST PROCEDURES

1 Check that all cables are connected.

2 Find the symptoms in section 7.2, that most resemble the actual symptoms.

3 Perform the recommended tests in the sequence in which they are listed for that particular symptom in Section 7.2.

- If one or more outputs for a particular module are found faulty, that module shall be considered faulty and changed, provided that the inputs are correct.
- If one or more inputs to a particular module are found faulty, branching shall be made to the module that functions as source for the faulty input. The necessary information in this regard is given in the section-items 7.3 - 7.6, where the tests for each and every module are given. Information may, otherwise, be deduced from the interconnection tables in the diagram section of Section 9 in this manual.
- When a fault is detected, the cables carrying the signal in question should be checked for open or short circuits.

7.2 GUIDE TO TROUBLE SHOOTING

The following table presents symptoms, lists of recommended actions and references to the relevant section dealing with the proposed test.

SYMPTOM	LIST OF RECOMMENDED ACTIONS	REFER TO PARAGRAPH
No light in the display and/ or push buttons when the receiver is switched on	1) Check power cord 2) Check fuses 3) Check that the receiver is set to the correct mains voltage on module 4800 4) Check module 4807 5) Check module 4800	 7.6.3 7.6.4
Light lacking in one or more lamps that should show light	1) Check the lamps and replace as required	
The indicator lamps do not light or the wrong lamps light, when one of the following pushbuttons is pressed: AGC-off-long-short, NB or ANT att.	1) Check the lamp(s) 2) Check module 4331 3) Check module 4332	 7.5.1 7.5.2
The indicator lamps do not light or the wrong lamps light, when one of the mode-pushbuttons is pressed.	1) Check the lamp(s) 2) Check module 4332	 7.5.2
Indicator lamp "Read" or "Write" does not light, when the read or write pushbuttons are pressed.	1) Check that the memory options have been installed and are operative. 2) Check module 4331 3) Check module 4373	 7.5.1 7.5.6
The frequency keyed is not displayed correctly on the display	1) Check module 4331 2) Check module 4350 3) Check module 4687	7.5.1 7.5.4 7.5.5
The frequency displayed does not change correctly, when the step tune control is turned (clockwise or anti-clockwise)	1) Check module 4353 2) Check module 4350 3) Check module 4687	7.5.3 7.5.4 7.5.5
The receiver does not tune to the frequency keyed, though the frequency is correctly displayed	1) Check the synthesizer	7.4
Poor sensitivity in certain frequency ranges (The frequency is correctly displayed)	1) Check module 4350 2) Check signal path 3) Check synthesizer	7.5.4 7.3 7.4

SYMPTOM	LIST OF RECOMMENDED ACTIONS	REFER TO PARAGRAPH
Poor sensitivity in certain modes or no beat note in CW or F1	1) Check module 4521 2) Check module 4325 3) Check module 4322 4) Check module 4350 5) Check module 4332	7.3 7.3 7.3 7.5.4 7.5.2
The AGC does not function in accordance with the AGC setting	1) Check module 4331 2) Check module 4521 3) Check module 4350	7.5.1 7.3 7.5.4
The memory does not function correctly: A written setting can't be read, the setting changes, when a write cycle is executed, the read setting is not identical to the setting written in one or more memory addresses or other memory malfunctions	1) Check that the memory option is installed 2) Check module 4331 3) Check module 4550 4) Check module 4373	 7.5.1 7.5.4 7.5.6
When remote control is connected: The receiver does not follow the settings on the remote control unit; the remote control units function properly; the interconnection cables are properly positioned; the receiver is switched off.	1) Disconnect the interconnection cable from remote control unit and switch on the receiver 2) Check filter card 4419 for open circuits and short circuits 3) Check module 4331 4) Check module 4332 5) Check module 4350 6) Check module 4687	 7.5.1 7.5.2 7.5.4 7.5.5
The symptom does not fall within any of the here-given categories	1) Check signal path 2) Check synthesizer 3) Check control logic 4) Call the service department, B&W Elektronik	7.3 7.4 7.5

7.3 SIGNAL PATH

7.3.1 GENERAL

Remove the front end, 4528, and check the Local Oscillator signals generated by the synthesizer:

- 1st L.O.Connector mating 4528J2:
  V ≈ 1.4 Vpp/50 ohm, f = f-selected +75 MHz
- 2nd L.O. Connector mating 4528J3:
  V ≈ 1.4 Vpp/50 ohm, f = 73.6 MHz
- If the signals are not as here described, refer to Section 7.4.

Connect the 5.6 MHz internal standard signal from rear panel BNC-connector J1 to the antenna input. Tune the receiver to 5,600.00 kHz.

Check the signal at connector P3 of module 4371.

- Antenna attenuator : off
- AGC : off
- RF gain CW : V ≈ 600 mV_{pp}
- RF gain CCW : V ≈ 30 mV_{pp}

If the signals are present refer to Section 7.3.6.

7.3.2 MODULE 4818, RF INPUT PROTECTION

The signal path from the antenna input to the front end (4528) is examined (Block Diagram 4466).

With the receiver tuned as in 7.3.1, check the signals at the connectors P2 and J1-3.

- Ant. att. off : V ≈ 1 Vpp, J1-3 : app. 11 Vdc
- Ant. att. on : V ≈ 200 mV_{pp}, J1-3 : app. 1Vdc

If no signal is present, check coax-cable W16 between the antenna input and 4818.

If the receiver is tuned to a frequency below 1.6 MHz the RF signal will be present at P3.

The muting relay can be activated by grounding terminal 4817, J2-2.

- Receiver muted, J1-1 : approx. 0.5 V
- Receiver not muted, J1-1 : 24V

7.3.3 MODULE 4355, SUBOCTAVE FILTER LF-MF

Check the filter input controls J1-3 to J1-9, by selecting a frequency in each frequency-band. The control should be "0" when the filter is ON; if not, refer to 4819, J5-10 to J5-16.

7.3.4 MODULE 4354, SUBOCTAVE FILTER HF

Check the filter input controls J1-3 to J1-9, by selecting a frequency in each frequency-band. The control voltage should be "0" when the filter is ON, if not, refer to 4819, J5-3 to J5-9. The filter attenuation is approx. 3 dB.

With the receiver tuned as described in 7.3.1, check the signal at connector W24.

- Ant. att. : off
- V ≈ 600 mV_{pp}, f = 5,600.00 kHz.

7.3.5 MODULE 4371, STEP ATTENUATOR

Check the signal at connector P3.

- Ant. att. : off AGC: off
- RF-gain CW : V ≈ 600 mV_{pp}
- RF-gain CCW: V ≈ 30 mV_{pp}

The amplitude should increase as a function of the RF-gain adjustment.

Check the steering information.

	J1-9	J1-10
- Tune frequency > 1.6 MHz	"0"	"1"
- Tune frequency < 1.6 MHz	"1"	"0"
- If faulty, refer to:	4819J5-1	4819J5-2

7.3.6 MODULE 4328, FRONT END

Check the signal path from the front end to the loudspeaker. Tune receiver as described in section-item 7.3.1.

Check the output of the front end (Remove module 4813 and test the signal level at coax-connector P1, Motherboard 4812).

- Ant. att.: on
- AGC : off V ≈ 2 V_{pp}
- RF-gain : fully clockwise f = 1,400.00 kHz

If no signal is present, check:

- J1 - 1: +15 Vdc
- J1 - 8: - 5 Vdc

7.3.7 MODULE 4813, 2ND IF 1

Attach an extender card to the module.

- AGC : off RF-gain: fully clockwise
- Bandwidth : "sharp", Ant. att.: on

In modes AM, CW, F1, ISB/USB and ISB/LSB a signal should appear on terminal P3-8: V ≈ 3.5 V_{pp}.

Adjust the RF-gain until a non-clipped sinus signal appears on P3-6. V ≈ 2.5 V_{pp}. No signal will be present in the modes: AM, CW, F1/"sharp" and in USB, LSB, ISB/LSB and ISB/USB.

With the RF-gain fully clockwise and in the modes USB, ISB/USB, ISB/LSB the voltage at P3-4 should be V ≈ 1.5 V_{pp}.

The voltage at P3-2 should be V ≈ 1.5 V_{pp} in the modes LSB, ISB/USB and ISB/LSB.

Check the mode shift steering information at P2-4, 5,6,10,14,18,20. Logic 1 should be present on the terminal for the associated function. If faulty, refer to 4521 P3-9, 4521 P4-11, 4521 P3-10,11,14, 18,20.

7.3.8 MODULE 4814, 2nd IF 2

Attach an extender card to the module. With AGC off and ANT. att on, adjust the RF-gain until a non-clipped sinus signal is present at P3-8, V≈3 V_{pp}. The signal is present in all modes but USB and LSB. The signal is also present at P3-6, but the amplitude is V≈300 mV_{pp}.

Tune the receiver to 5599.00 kHz; a signal should appear at P3-10 in USB, ISB/USB and ISB/LSB. With the RF-gain, adjust the signal amplitude to V≈3 V_{pp}, non-clipped sinus.

The AGC-voltage at P1-3 is approx. 12 Vdc with the RF-gain fully clockwise, AGC, off. If the receiver is tuned as described in section-item 7.3.1, the voltage is 4-5 Vdc, AGC, on.

Input terminal	When faulty, branch to output terminal	Input condition
P1-4	4813 P2-4 4521 P3-9	logic 1 in sharp/ISB
P1-10	4521 P3-12	logic 1 in USB, logic 0 in all other modes
P1-12	4813 P2-12 4521 P3-13	logic 1 in USB, ISB/USB, ISB/LSB. logic 0 in all other modes
P1-14	4813 P2-14 4521 P3-14	logic 1 in ISB/LSB, LSB. logic 0 in all other modes
P1-19	4521 P4-9	logic 1 in AM, logic 0 in all other modes

7.3.9 MODULE 4521, DETECTORS AND MODE DECODERS

Attach an extender card to the module.
AGC: on; Mode: F1, P3-15: V≈100 mV_{pp}.
The frequency is normally 1500 Hz. In the CW-mode, the amplitude is approx. 75 mV_{pp} and the frequency can be continuously adjusted with the BFO-control.

Tune the receiver to f = 5,599.00 kHz. Mode: USB; AGC: on. Check P3-15: V≈75 mV_{pp}, f = 1000 Hz. Mode: ISB/USB. AGC: off. Check P3-15: f = 1000 Hz. The amplitude can be adjusted with the RF-gain.

Tune the receiver to f = 5,001.00 kHz; Mode: LSB; AGC: on. Check P3-15: V≈75 mV_{pp}, f = 1000 Hz. Mode: ISB/LSB, AGC: off. Check P3-15: f = 1000 Hz. The amplitude can be adjusted with the RF-gain.

The signal from the Common Line Amplifier P4-5,6,7 is similar to the signals measured at P3-15 except in the ISB/LSB mode, where no signal will be present. The level is approx. 2 V_{pp}/600 ohm.

The LSB Line Amplifier, P4-2,3,4, is active in LSB and ISB/LSB; signal level is approx. 2V_{pp}.

The voltage at P4-2 is a non-linear function of the BFO-adjustment, 0< V <6.8 Vdc.

The voltage at P4-10 can be adjusted from approx. 1.5V to 12V with the RF-gain, AGC: off.

Input terminal	Upon faulty input, branch to:	Input condition
P3-8	4814P1-7	logic 1 for AGC off
P4-8	4819J6-10 4331J2-20	logic 1 for AGC off
P4-12	4819J6-14 4331J2-14	logic 0 for AGC short
P4-13	4819J6-12 4331J2-16	logic 0 for AGC long

The steering information to the Mode Decoder can be checked at terminals P3-7, 6,5,4 with the designation "1", "2", "4", "8".

	AM	CW	F1	If faulty refer to
	"1","2","4","8"	"1","2","4","8"	"1","2","4","8"	
Sharp	0 0 1 1	0 1 1 1	1 0 1 1	
Narrow	0 0 1 0	0 1 1 0	1 0 1 0	4332J1-11 4332J1-12 4332J1-13 4332J1-14
Inter	0 0 0 1	0 1 0 1	1 0 0 1	
Wide	0 0 0 0	0 1 0 0	1 0 0 0	

	USB	LSB	ISB/USB	ISB/LSB	If faulty, refer to:
	"1","2","4","8"	"1","2","4","8"	"1","2","4","8"	"1","2","4","8"	
	1 1 0 0	1 1 0 1	1 1 1 1	1 1 1 1	4332J1-11 4332J1-12 4332J1-13 4332J1-14
P3-17	0	1	0	1	4332J1-9
P3-19	1	0	1	0	4332J1-8

The decoded information is shown in the following charts:

Terminal	Wide	Intermediate	Narrow	Sharp
P3-11	1	0	0	0
P3-20	0	0	0	0
P3-18	0	1	0	0
P3-10	0	0	1	0
P3-9	0	0	0	1
P4-11	0	0	0	0
P4-9	AM: 1 CW/F1: 0	AM: 1 CW/F1: 0	AM: 1 CW/F1: 0	AM: 1 CW/F1: 0

Terminal	USB	LSB	ISB/USB	ISB/LSB
P3-13	1	0	1	1
P3-14	0	1	1	1
P3-12	1	1	0	0
P4-11	1	1	1	1

7.3.10 MODULE 4808, AF AND LINEAR CONTROLS

The connectors on 4808, AF and Linear Controls, are not directly accessible and the signals must be measured on connectors placed outside the print board.

The loudspeaker-output (J2-4) can be checked at terminal 4817J1-23; maximum level is $8V_{pp}/4$ ohm.

The Monitor Line output (J2-13,15) is checked at terminal 4817 J2-1,14., $V \approx 2V_{pp}/600$ ohm.

The AF-blocking (J1-1) is "1", for approx. 0.5 sec., when the frequency keyboard is activated. The signal is accessible on 4819J2-7. The RF-gain voltage (J1-15) can be adjusted between approx. 0.5V and 7.5V, checked at 4371J1-2.

The receiver can be muted by grounding terminal 4818J2-2. This will cause the AF-amplifier input to be short-circuited and the muting relay (on 4818) to be activated.

The BFO control voltage (J1-2) can be checked at 4521P4-1. The voltage should lie between 0V and 6.8 Vdc.

The AGC voltage (J1-11) is shown on the solid state meter; voltage level for full scale is approx. 5V and can be adjusted with R34. The level can be checked on the Display, 4687J2-3. Logic functions check of this module is described in section-item 7.5.3.

7.4 SYNTHESIZER

1. Local Oscillator (LO) checks.

The checks must be carried out in the order given below.

7.4.1 MODULE 4529, 75-105 MHz OSCILLATOR

	Connector	Signal definition	Recommended action
7.4.1.1	J2	$V \approx 1.4V_{pp}/50$ ohm f = f selected +75 MHz Note frequency steps ≧ 100 Hz	Place the module on an extender card. Use a coax-cable extender for cable W36 between J3 and module 4530 If fulfilled for all f-selected, the modules 4529, 4530, 4531 and 4532 will function
7.4.1.2	J3	$V \approx 1.4V_{pp}/50$ ohm f ≈ f-selected +75 MHz ±1 MHz	Disconnect coax-cable W36 (runs to module 4530) (Loop B unlocked, refer to Block Diagram Synthesizer)
7.4.1.3	J1-13	+24 Vdc	Use an extender card. If faulty, check interconnections and Power Supply (module 4800
7.4.1.4	J1-7 J1-8	f-selected <14.0 MHz: 12 Vdc / 0V ≧14.0 MHz: 0V / 12 Vdc	Use an extender card If faulty, refer to module 4531
7.4.1.5	J1-10 (ø78-2)	f-selected kHz 10.00 4Vdc 13900.00 18Vdc 14000.00 4Vdc 29900.00 18Vdc	Use an extender card. If faulty, branch to module 4530
7.4.1.6	J1-9 (ø3)	f-selected kHz xxx00.00 7-12Vdc xxx99.90 8-13.5Vdc	Remember that coax-cable W36 (from module 4530) must be reconnected to J3

7.4.1.7 Decision:

If only 7.4.1.1, 7.4.1.2 and 7.4.1.6 show fault, replace module 4529.

7.4.2 MODULE 4530, 78-107.9 MHz OSCILLATOR

	Connector	Signal definition	Recommended action
7.4.2.1	W35	V≈1.2 V_{pp} f = 78.0 MHz +$N_7N_6N_5$00.0 MHz ($N_7N_6N_5$ are the three most significant digits on the display)	Use an extender coax-cable and a T-pad.
7.4.2.2	W37	V≈4 $_{pp}$ pulses f = 3,000.0 kHz for f-selected = xxx00.00kHz f = 2,900.1 kHz for f-selected = xxx99.90kHz	Disconnect coax-cable W37 from module 4552 and measure the signal at that module, connector P2 If faulty, branch to module 4352
7.4.2.3	J1-12 J1-13	+8 Vdc +24Vdc	Use an extender card. If faulty, check interconnections and Power Supply (Module 4800)
7.4.2.4	J1-4 J1-5	f-selected <14.0 MHz: 0V / 12 Vdc ≤14.0 MHz: ≈12 Vdc / 0V	Use an extender card If in error, refer to module 4531
7.4.2.5	J1-6 (ø78-1)	f-selected kHz 10.00 4Vdc 13900.00 18Vdc 14000.00 4Vdc 29900.00 18Vdc ± 0.2V	Use an extender card Remember that the three coax-cables (W35, W36 and W37) must be connected.
7.4.2.6	J1-3 (ø3)	f-selected kHz xxx00.00 7-12Vdc xxx99.90 8-13.5Vdc	Use an extender card.

7.4.2.7 Decision:

If the specifications in 7.4.2.1 or 7.4.2.5 are not met, replace module 4530.

7.4.3 MODULE 4531, 78-107.9 MHz DIVIDER AND DISCRIMINATOR

	Connector	Signal definition	Recommended action
7.4.3.1	J2	V≈1.2 V_{pp} f = 78.0 MHz + $N_7N_6N_5$ 00.0 kHz (N_7 N_6 N_5 are the three most significant digits on the display)	Use an extender coax-cable and a T-pad.
7.4.3.2	J1-7(D5) J1-8(C5) J1-9(B5) J1-11(A5) J1-12(D6) J1-13(C6) J1-14(B6) J1-15(A6) J1-16(B7) J1-17(A7)	Display digit weight freq. 5th 100 kHz 6th 1 MHz 7th 10 MHz BCD-coded frequency information from module 4350, J4 BCD-code decimal DCBA 0000 0 0001 1 0010 2 0011 3 0100 4 0101 5 0110 6 0111 7 1000 8 1001 9 "0"≈0V; "1"≈12 Vdc	Use an extender card; select different frequencies and check the codes If faulty, refer to module 4350, J4
7.4.3.3	J1-1 J1-20 J1-21	-5 Vdc +8 Vdc +24Vdc	Use an extender card. If not fulfilled, check interconnections and Power Supply (module 4800)
7.4.3.4	J1-5 (ø78-2) J1-3 (ø78-1)	f-selected kHz 10.00 4Vdc 13900.00 18Vdc 14000.00 4Vdc 29900.00 18Vdc ± 0.2V	Use an extender card
7.4.3.5	J1-18	f-selected $<$14.0 MHz: 12 Vdc / 0V $\geq$14.0 MHz: 0V / 12 Vdc	Use an extender card If faulty, replace module 4531
7.4.3.6	J3	V≈4V_{pp} pulses f = 25 kHz	Remove the module and check the signal at coax-connector mating J3 If faulty, refer to module 4815

7.4.3.7 Decision:

If only 7.4.3.1 and 7.4.3.4 reveal faulty, replace module 4531

7.4.4 MODULE 4352, 30 MHz LOOP

	Connector	Signal definition	Recommended action
7.4.4.1	P2	V≈4V_{pp} pulses f-select f-P2 (kHz) (kHz) xxx00.00 3.000.0 xxx77.70 2.922.3 xxx99.90 2.900.1	Disconnect coax cable W32 (runs from module 4530) and measure the signal at P2
7.4.4.2	P1	V≈4P_{pp} pulses f = 1 kHz	Remove the module and check the signal at the coax-connector mating P1. Note that it is difficult for a frequency counter to trigger on this signal because of the very narrow pulses. If faulty, branch to module 4686 (4700)
7.4.4.3	J1-20 J1-21	+8 Vdc +24Vdc	Use an extender card. If faulty, investigate interconnections and Power Supply (module 4800)
7.4.4.4	J1-7(D2) J1-8(C2) J1-9(B2) J1-10(A2) J1-11(D3) J1-12(C3) J1-13(B3) J1-14(A3) J1-15(D4) J1-16(C4) J1-17(B4) J1-18(A4)	Display digit weight freq. 2nd 100 Hz 3rd 1 kHz 4th 10 kHz BCD-code frequency information from module 4350, J4 BCD-code decimal DCBA 0000 0 0001 1 0010 2 0011 3 0100 4 0101 5 0110 6 0111 7 1000 8 1001 9 "0"≈0V, "1" ≈+12 Vdc	Use an extender card. Select different frequencies and check the codes. If faulty, refer to module 4819 J4

7.4.4.5 Decision:

If only 7.4.4.1 reveals fault, replace module 4352.

2. Local Oscillator Signal Checks.

The checks must be carried out in the order given below.

7.4.5 MODULE 4336, 73.6 MHz LOOP

	Connector	Signal definition	Recommended action
7.4.5.1	P2	V ≈ 1.4 V_{pp}/50 ohm f = 73.6 MHz to 73.599905 MHz in steps of 5 Hz	Place the module on an extender card. Use a coax-cable extender for cable W20 between J1 and module 4815 The 5 Hz steps are controlled by operating the "clarifier" on the front panel.
7.4.5.2	J1	V ≈ 80-150 mV_{pp}/50 ohm f = 73.5 MHz	Disconnect coax-cable W20 between J1 and module 4815 and measure the signal from module 4815. If faulty, branch to module 4815.
7.4.5.3	W22	V ≈ 4 V_{pp} pulses f = 100.000 kHz to 99.905 kHz in steps of 5 Hz	Disconnect coax-cable W22 connected to module 4353, P2, and measure the signal at P2. The 5Hz steps are controlled by activating the "clarifier" on the front panel. If faulty, refer to module 4353
7.4.5.4	P1-13 P1-12	+24 Vdc + 8 Vdc	Mount the module onto an extender card. If faulty, investigate interconnections and Power Supply (module 4800)

7.4.5.5 Decision:

If only 7.4.5.1 reveals fault, change module 4336.

7.4.6 MODULE 4815, 73.5 MHz LOOP

	Connector	Signal definition	Recommended action
7.4.6.1	W20	V ≈ 80-150 m V_{pp}/50 ohm f = 73.5 MHz	Disconnect coax-cable W20 from module 4336 and measure the signal at the cable-connector
7.4.6.2	W21	V ≈ 4 V_{pp} pulses f = 25 kHz	Disconnect coax-cable W21 at either module 4686 or 4700, R4 and measure the signal at P4. If faulty, refer to module 4686 or 4700
7.4.6.3	P1-13 P1-12	V = 24 Vdc V = 8 Vdc	Mount the module onto an extender card. If faulty, examine interconnections and Power Supply (module 4800)
7.4.6.4	P2	V ≈ 4 V_{pp} pulses f = 25 kHz	Mount the module onto an extender card

7.4.6.5 Decision:

If only 7.4.6.1 and/or 7.4.6.4 reveal fault, change module 4815.

7.4.7 MODULE 4353, 20 MHZ LOOP

	Connector	Signal definition	Recommended action
7.4.7.1	P2	V≈4V_{pp} pulses f = 100.000 kHz to 99.905 kHz in steps of 5 Hz	Disconnect coax-cable W22 (runs from module 4336) and measure the signal at P2. The 5 Hz steps are checked by activating the "clarifier" on the front panel.
7.4.7.2	P1	V≈4 V_{pp} pulses f = 1 kHz	Remove the module and measure the signal at the coax-connector mating P1. If faulty, branch to module 4686 or 4700.
7.4.7.3	J1-13 J1-12	+24 Vdc + 8 Vdc	Mount the module onto an extender card. If faulty, examine interconnections and Power Supply (module 4800).
7.4.7.4	J1-11 J1-10 J1-9 J1-8	A1 B1 C1 D1 10 Hz digit BCD-coded frequency information from module 4819	Mount the module onto an extender card. The 10 Hz-digit is controlled by activating the "clarifier" on the front panel. If code does not correspond with the front panel display, refer to module 4819.
7.4.7.5	J1-7	DO 5 Hz frequency information from module 4819 DO = "1": LSD = 5 Hz DO = "0": LSD = 0 Hz Note that the digit can't be seen on the front panel display	Mount the module onto an extender card. DO shifts between "0" and "1" when the "clarifier" is operated. If faulty, refer to module 4819.

7.4.7.6 Decision:

If only 7.4.7.1 reveals fault, change module 4353.

7.4.8 MODULE 4686 (4700), STANDARD DIVIDER

Be sure that the switch int/ext Std. on the PCB is in the right position.

	Connector	Signal definition	Recommended action
7.4.8.1	P3	V≈4 V_{pp} pulses f = 25 kHz	Disconnect coax-cable W21 coming from module 4815 and measure the signal at P3.
7.4.8.2	P4	V≈4 V_{pp} f = 5.6 MHz	Disconnect coax-cable W19. Signal only present if switch on PCB is in int.std. position. If faulty, change module 4686 (4700).
7.4.8.3	P1 P2	f = 1.0 MHz f = 5.6 MHz Normally TTL-level but equals ext. std. specifications. See paragraph 2.3, Interface, for correct specification	Only used if external frequency standard is applied to MR 6000. Disconnect coax-cables W17 (1.0 MHz) or W18 (5.6 MHz) and measure signal at cable connector. If faulty, control ext. std. system.
7.4.8.4	P5	V≈4 V_{pp} pulses f = 25 kHz	Used in certain versions, only. Place the module on an ext. card.
7.4.8.5	P6	V≈1.2 V_{pp} f = 1.4 MHz	Use an extender card. Signal present only in USB, LSB and ISB modes.
7.4.8.6	P7 P8	V≈4 V_{pp} f = 1 kHz	Use an extender card. Note that it is difficult for an oscilloscope and a frequency counter to trigger on the signal because of the very narrow pulses.
7.4.8.7	J1-1 J1-12 J1-13 J1-10 J1-11	-5 Vdc +8 Vdc +8 Vdc +15 Vdc independent of +24 Vdc the mains on/off switch	Use an extender card. If faulty, investigate interconnections and Power Supply (4800).
7.4.8.8	J1-3	If 1.0 MHz ext.std. is used: 0 Vdc If not: 12 Vdc	Use an extender card.
7.4.8.9	J1-4	If 1.0 MHz ext.std. is used: 0 Vdc If not: 5 Vdc	Use an extender card. Note that pull-up resistor is placed on Display module (4687). If faulty, check module 4687. If no error present on 4687, change 4686 (4700).
7.4.8.10	J1-4 J1-7	Both are at +12 Vdc in the USB, LSB and ISB modes, only.	Use an extender card. If faulty, refer to module 4332.

7.4.8.11 Decision:

If one or several of the following stages are faulty, replace module 4686 (4700), only.

7.4.8.1, 7.4.8.4, 7.4.8.5, 7.4.8.6 and 7.4.8.8.

7.5 CONTROL LOGIC

7.5.1 MODULE 4331, FREQUENCY SELECTING KEYBOARD

Check the input condition according to the following table.

Input 4331	In presence of faulty input, branch to	Input Condition
J1-29	4373J1-19 4819J1-29 4819J6-1	"CP gate": normally logic 0. Single positive pulses or pulse trains appear when a digit pushbutton, clear or (▷) is pressed. During the execution of a memory cycle the terminal is forced logic 0.
J1-33	4419J1-1315 4819J1-33 4373J1-5 4819J6-34 4332J1-1	"Clock in": normally logic 0. Pulses appear, when a memory cycle is executed or if the remote control is in operation.
J1-34	4332J1-19 4819J1-34	"FR1": normally logic 0. Approximately 1 second after the receiver is switched on, a short 12V-pulse is given.
J2-1	4373J1-1 4373J1-13	"Write lamp": normally logic 0. During the execution of a write cycle in the memory: 1.
J2-2	4373J1-3	"Read lamp": normally logic 0. Logic 1 only during the time a read cycle is executed by the memory.
J2-8	4332J1-17 4373J1-10 4819J6-9 4419J1-B26	"AGC off-set": normally logic 0. Might be logic 1 when the memory executes a write cycle or if the receiver is under remote control.
J2-10	4819J6-11 4419J1-B24	"AGC short set": normally logic o. Might be logic 1 when the memory executes a write cycle or if the receiver is under remote control.
J2-12	4819J6-13 4419J1-B13	"AGC long set": normally logic 0. Might be logic 1 when the memory executes a read or write cycle or if the receiver is under remote control.
J2-13	4419J1-B22	"AA reset": normally logic 0. Might be logic 1 if the receiver is remote controlled.
J2-15	4419J1-B21	"AA set": normally logic 0. Might be logic 1 when the receiver is remote controlled.
J2-17	4419J1-B20	"NB set": normally logic 0. Might be logic 1 when the receiver is remote controlled.
J2-19	4419J1-B19	"NB reset": normally logic 0. Might be logic 1 when the receiver is remote controlled.
J2-23	Regulator board	24V dc
J2-25	Mother board	0V dc/ground
J2-26	4819J6-15	"AGC off reset": normally logic 0, might be logic 1 during memory read execution or if the receiver is remote controlled.

Test output of clock generator

Keying-in "0", "1", "2", "4", "8", "500" or "2182" should cause a single positive pulse to appear at J1-28 and J1-29, (normally logic 0).

Keying in "0", "1", "2", "4", "8", "500" or "2182" should cause a single negative pulse to appear at J1-31, (normally logic 1).

Pressing "clear" should cause a pulse train to appear at J1-28, J1-29 and J1-31.

Pressing "clear" should also cause logic 1 to appear at J2-4 as long as the pushbutton is pressed. (Otherwise logic 0).

Test keyboard encoder outputs

Test the outputs according to the following table:

Press in	Output terminals 4331 J2-9	J2-7	J2-5	J2-3
"0"	0	0	0	0
"1"	0	0	0	1
"2"	0	0	1	0
"3"	0	0	1	1
"4"	0	1	0	0
"5"	0	1	0	1
"6"	0	1	1	0
"7"	0	1	1	1
"8"	1	0	0	0
"9"	1	0	0	1

Test the temporary frequency register outputs according to the table.

Output Terminal 4331	Press-in, both "clear" and "1" simultaneously	Press-in, both "clear" and "2" simultaneously	Press-in, both "clear" and "4" simultaneously	Press-in, both "clear" and "8" simultaneously	Press-in "500"	Press-in "2182"
J1-1	1	0	0	0	0	0
-3	1	0	0	0	0	0
-7	1	0	0	0	1	1
-11	1	0	0	0	0	0
-15	1	0	0	0	0	0
-19	1	0	0	0	0	0
-2	0	1	0	0	0	0
-4	0	1	0	0	0	1
-8	0	1	0	0	0	0
-12	0	1	0	0	0	0
-16	0	1	0	0	0	1
-20	0	1	0	0	0	0
-5	0	0	1	0	0	0
-9	0	0	1	0	1	0
-13	0	0	1	0	0	0
-17	0	0	1	0	0	0
-21	0	0	1	0	0	0
-6	0	0	0	1	0	0
-10	0	0	0	1	0	0
-14	0	0	0	1	0	1
-18	0	0	0	1	0	0
-22	0	0	0	1	0	0
Display	11111.10	22222.20	4444.40	8888.80	500.00	2182.00

Test AGC outputs according to the following table:

Press-in	Output terminals 4331			
	J2-16	J2-14	J2-20	J2-18
"Short" then "off"	1	0	1	0
"long"	0	1	0	1
"off"	0	1	1	0
"short"	1	0	0	1

Test NB output

J2-22 Shall change from 0 to 1 or visa versa each time the "NB" button is pressed. The NB lamp should light, when the output is logic 1.

Test AA output

J2-11 Shall change from 0 to 1 or visa versa each time the button "AA" is pressed. The AA lamp should light, when the output is logic 1.

Test "WRITE" button

J1-32 Shall be logic 1, when the "write" pushbutton is pressed - otherwise 0.

Test "READ" button

J1-30 Shall be logic 1, when the "read" pushbutton is pressed - otherwise 0.

7.5.2 MODULE 4332, MODE SELECTOR KEYBOARD

Check that the input conditions to the module are as follows:

Input Terminal	Upon faulty input branch to	Input condition
J1-1	4331J1-33 4819J6-34 4373J1-5 4419J1-B15	"Clock in line": normally logic 0. A single positive pulse is given, when a read cycle is executed by the memory, or when one of the pushbuttons "500", "2182" is actuated. A pulse train will be present if the receiver is under remote control.
J1-2	4819J6-27 4419J1-B32	Normally logic 0, but 1 if the "USB" button is actuated. It might be logic 1 during the execution of a read-cycle in the memory and if the receiver is under remote control.
J1-3	4819J6-25 4419J1-B21	"B": normally logic 0, logic 1 if the "LSB" button is actuated. It might be logic 1, during the execution of a read cycle in the memory or if the receiver is remote controlled.
J1-4	4819J6-23 4419J1-B30	"A": normally logic 0. It might be logic 1, during the execution of a read cycle in the memory or if the receiver is remote controlled.
J1-5	4819J6-21 4419J1-B29	"B": normally logic 0. It might be logic 1, during the execution of a read cycle in the memory or if the receiver is remote controlled.
J1-6	4819J6-19 4419J1-B28	"C": normally logic 0. It might be logic 1, during the execution of a read cycle in the memory or if the receiver is remote controlled.
J1-7	4819J6-17 4419J1-B27	"D": normally logic 0. It might be logic 1, during the execution of a read cycle in the memory or if the receiver is under remote control.
J1-18	4331J2-24	"AGC off lamp": logic 1 if AGC off has been pushed, logic 0 if AGC "short" or AGC "long" has been actuated.
J1-23/24		Ground
J1-25/26	Regulator board	24V dc

Test of mode register output

Press-in	Output 4332					
	J1-11	J1-12	J1-13	J1-14	J1-18	J1-19
"AM WIDE"	0	0	0	0	0	0
"AM nt"	1	0	0	0	0	0
"AM narr"	0	1	0	0	0	0
"AM sharp"	1	1	0	0	0	0
"CW WIDE"	0	0	1	0	0	0
"CW int"	1	0	1	0	0	0
"CW narr"	1	1	1	0	0	0
"CW sharp"	1	1	1	0	0	0
"F1 wide"	0	0	0	1	0	0
"F1 int"	1	0	0	1	0	0
"F1 narr"	0	1	0	1	0	0
"F2 sharp"	1	1	0	1	0	0
"USB"	0	0	1	1	0	1
"LSB"	1	0	1	1	1	0
Simult. ISB and USB	1	1	1	1	0	1
ISB and LSB	1	1	1	1	1	0

Test of AGC "off" set:

12 V shall be measured on J1-17, when the AGC "off" pushbutton is actuated; otherwise 0V.

Test of start pulse

Throw the mains switch to "off" for a period of several seconds. Throw the mains switch to "on": After 0.5 - 1 seconds, a short positive pulse should appear at terminal J1-19.

7.5.3 MODULE 4808, AF/LINEAR CONTROL

This section deals only with the digital logic functions of this module (for the analog part refer to Section 7.3.10).

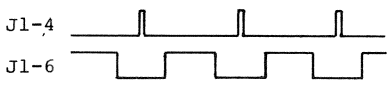
Check the inputs in accordance with the following table:

Input 4808	Upon faulty input, branch to	Input condition
J2-2	Regulator Board	15 V dc
J2-9	" "	24V

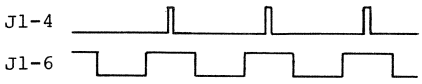
Check the outputs from J1-4 and J1-6:

Set switch, "fast, normal, locked" to "normal". Connect a dual trace storage oscilloscope, one channel to J1-4, the other to J1-6.

When the step tune knob is turned anti-clockwise, the positive pulses on J1-4 should appear when the level on J1-6 is logic 0:



When the step tune knob is turned clockwise, the positive pulses on J1-4 should appear when the level on J1-6 is logic 1:



Check J2-3

Logic 1, if the step tune knob is pressed-in.
Logic 0, if the step tune knob is drawn-out.

Switch off the receiver.
Logic 0, regardless of whether the step tune knob is pressed in or drawn out.
Switch on the receiver.

Check J2-6

Logic 1, if the switch "fast, normal, locked" is thrown to "normal" or "locked".

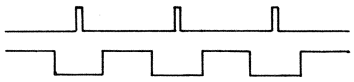
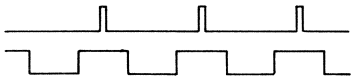
Logic 0, if the switch is thrown to "fast".

7.5.4 MODULE 4819, REGISTER BOARD

Check the inputs to J1 in accordance with the following table:

Input 4819	Upon faulty input branch to	Press-in (C) and hold	Press-in (C) (6) (9) simultaneously and hold	Press-in (C) (5) simultaneously and hold	Press-in (C) (8) (2) simultaneously and hold
J1-1	4331J1-1 / 4419J1-A7	0	1	1	0
J1-2	4331J1-2 / 4419J1-A8	0	1	0	1
J1-3	4331J1-3 / 4419J1-A9	0	1	1	0
J1-4	4331J1-4 / 4419J1-A10	0	1	0	1
J1-5	4331J1-5 / 4419J1-A11	0	1	1	0
J1-6	4331J1-6 / 4419J1-A12	0	1	0	1
J1-7	4331J1-7 / 4419J1-A13	0	1	1	0
J1-8	4331J1-8 / 4419J1-A14	0	1	0	1
J1-9	4331J1-9 / 4419J1-A15	0	1	1	0
J1-10	4331J1-10 / 4419J1-A16	0	1	0	1
J1-11	4331J1-11 / 4419J1-A17	0	1	1	0
J1-12	4331J1-12 / 4419J1-A18	0	1	0	1
J1-13	4331J1-13 / 4419J1-A19	0	1	1	0
J1-14	4331J1-14 / 4419J1-A20	0	1	0	1
J1-15	4331J1-15 / 4419J1-A21	0	1	1	0
J1-16	4331J1-16 / 4419J1-A22	0	1	0	1
J1-17	4331J1-17 / 4419J1-A23	0	1	1	0
J1-18	4331J1-18 / 4419J1-A24	0	1	0	1
J1-19	4331J1-19 / 4419J1-A25	0	1	1	0
J1-20	4331J1-20 / 4419J1-A26	0	1	0	1
J1-21	4331J1-21 / 4419J1-A27	0	1	1	0
J1-22	4331J1-22 / 4419J1-A28	0	1	0	1
J1-23	4331J1-23 / 4419J1-A29	0	0	0	0
J1-24	4331J1-24 / 4419J1-A30	0	0	0	0
J1-25	4331J1-25 / 4419J1-A31	0	0	0	0
J1-26	4331J1-26 / 4419J1-A32	0	0	0	0
J1-27	4331J1-27 / 4419J1-B18	0	0	0	0
J1-28	4331J1-28	pulse train	pulse train	pulse train	pulse train

Check the following inputs to J2 in accordance with the following table:

Input 4819	Upon faulty input, branch to	Input Condition
J2-1 J2-4	4808J1-4 4808J1-6	Set switch "fast, normal, locked" to "normal". Connect a dual trace storage oscilloscope, one channel to J2-1, the other to J2-4. When the step tune knob is turned counter-clockwise, the positive pulses on J2-1 should appear when the level on J2-4 is logic 0: J2-1 J2-4  When the step tune knob is turned clockwise, the positive pulses on J2-1 should appear when the level on J2-4 is 1: J2-1 J2-4 
J2-2	ground	ground
J2-3	4808J1-5	Logic 1, if the step tune knob is pressed-in; otherwise logic 0.
J2-6	4808J1-8	If the switch "fast, normal, locked" is in positions "normal" or "locked", then logic 0. In position "fast", then logic 1.
J2-12	Regulator Board	9 V dc
J2-13	Regulator Board	24 V dc

Test input to J3

Input 4819	Upon faulty input, branch to	Input Condition
J3-28	4686J1-4	"Ext. st": If an external standard has been connected: < 0.5V, otherwise > 4V.

Test input to J5

Input 4819	Upon faulty input, branch to	Input Condition
J5-18	Regulator Board	15 V dc

Check inputs to J6

Input 4819	Upon faulty input, branch to	Input Condition
J6-1	4373J1-19 4331J1-29	"CP gate": Normally logic 1; logic 0 if a Read or Write cycle is executed by the memory
J6-2	4373J1-21	"CP 4034": Normally logic 1. 32 pulses should appear, if a Read or Write cycle is executed by the memory
J6-3	4373J1-14	"Data in". Normally logic 0. If a Read cycle is executed by the memory, a 32-bit word is serially transmitted to the terminal. For further details see module 4373, test of Read Cycle
J6-4	4373J1-7	Normally logic 0. A short positive pulse appears when (C) then (write) is actuated
J6-6	4373J1-9	$\overline{R/W}$: Logic 1 if "write" has been actuated $\overline{R/W}$: Logic 0 if "read" has been actuated
J6-10	4331J1-20 4521P4-8	"Input A": Logic 1, if AGC "off" has been actuated; logic 0 if AGC "long" or AGC "short" has been actuated
J6-12	4331J2-16 4521P4-13	"Output B": 1, if AGC "short" has been actuated 0, if AGC "long" has been actuated
J6-14	4331J2-14 4521P4-12	"Input C": 0, if AGC "short" has been actuated 1, if AGC "long" has been actuated
J6-16	4331J2-18	"Input D": 0, if AGC "off" has been actuated 1, if AGC "short" or AGC "long" has been actuated
J6-18	4332J1-14 4521P3-4	Inputs should be according to table given for module 4332, "test of mode register"
J6-20	4332J1-13 4521P3-5	
J6-22	4332J1-12 4521P3-6	
J6-24	4331J1-11 4521P3-7	
J6-26	4332J1-9 4521P3-17	
J6-28	4332J1-8,10 4521P3-19	

Test of AF blocking circuit

If a key is actuated on the frequency keyboard, a positive pulse should appear at J2-7.

If the frequency is set to 9.9 kHz, J2-7 holds at logic 1.

Test of U/D counter register

Output Terminals 4819	Press-in C pushbutton	Press-in C , then turn clarifier one step counter-clock-wise	Press-in C , 6 and 9 simult. Release C before 6 and 9	Press-in C and 5 simult. Release C before 5	Press-in C , 8 , 2 simult. Release C before 8 and 2
display	flickering 0.00	19.999.99	flickering 3 . 0	15555.50	2----.-0
J3-1 J4-7	0	0	1	1	0
J3-2 J4-8	0	1	1	0	1
J3-3 J4-9	0	1	1	1	0
J3-4 J4-10	0	0	1	0	1
J3-5 J4-11	0	0	1	1	0
J3-6 J4-12	0	1	1	0	1
J3-7 J4-13	0	1	1	1	0
J3-8 J4-14	0	0	1	0	1
J3-9 J4-15	0	0	1	1	0
J3-10 J4-16	0	1	1	0	1
J3-11 J4-17	0	1	1	1	0
J3-12 J4-18	0	0	1	0	1
J3-13 J4-19	0	0	1	1	0
J3-14 J4-20	0	1	1	0	1
J3-15 J4-21	0	1	1	1	0
J3-16 J4-22	0	0	1	0	1
J3-17 J4-23	0	0	1	1	0
J3-18 J4-24	0	1	1	0	1
J3-19 J4-25	0	1	1	1	0
J3-20 J4-26	0	0	1	0	1
J3-21 J4-27	0	0	1	1	0
J3-22 J4-28	0	1	1	0	1

Key in frequency, 10.000.00 and by means of the clarifier control step slowly up and down - through the following sequence.

Outputs terminals 4819	----------step up----------→										
J3-23 J4-29	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	1 1	1 1	0
J3-24 J4-30	0 0	0 0	0 0	0 0	1 1	1 1	1 1	1 1	0 0	0 0	0
J3-25 J4-31	0 0	0 0	1 1	1 1	0 0	0 0	1 1	1 1	0 0	0 0	0
J3-26 J4-32	0 0	1 1	0 0	1 1	0 0	1 1	0 0	1 1	0 0	1 1	0
J3-27	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0
Display, 1st digit front right	0	1	2	3	4	5	6	7	8	0	0
	←----------step down----------										

Test of blanking circuit

Output terminal 4819	Set frequency in kHz to					
	33333.3	11111.1	1111.1	111.1	11.1	9.9
J4-1	pulsed	0	0	1	1	1
J4-2	pulsed	0	0	0	1	1
J4-3	pulsed	0	0	0	0	pulsed
J4-4	pulsed	0	0	0	0	pulsed
J4-5	pulsed	0	1	1	1	1
Display	33333.30 flickering	11111.10	1111.10 leading zeros should be blanked	111.10	11.10	09.90 flickering

Test of 5V regulator

J4-34 : 5 V dc
J4-33 : ground
J4-6 : "Ext. standard": If an external standard has been connected <0.5 V; otherwise >4 V.

Test of suboctave filter decoder

Output terminal 4819	Set frequency to: 10-150k	150-220k	220-340k	340-520	520-7Mk	0.7-1M	1-1.6M	1.6-25M	2.5-4M	4-6M	6-10M	10-14M	14-20M	20-30M
J5-1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
J5-2	0	0	0	0	0	0	0	1	1	1	1	1	1	1
J5-3	1	1	1	1	1	1	1	1	1	1	1	1	1	0
J5-4	1	1	1	1	1	1	1	1	1	1	1	1	0	1
J5-5	1	1	1	1	1	1	1	1	1	1	1	0	1	1
J5-6	1	1	1	1	1	1	1	1	1	1	0	1	1	1
J5-7	1	1	1	1	1	1	1	1	1	0	1	1	1	1
J5-8	1	1	1	1	1	1	1	1	0	1	1	1	1	1
J5-9	1	1	1	1	1	1	1	0	1	1	1	1	1	1
J5-10	1	1	1	1	1	1	0	1	1	1	1	1	1	1
J5-11	1	1	1	1	1	0	1	1	1	1	1	1	1	1
J5-12	1	1	1	1	0	1	1	1	1	1	1	1	1	1
J5-13	1	1	1	0	1	1	1	1	1	1	1	1	1	1
J5-14	1	1	0	1	1	1	1	1	1	1	1	1	1	1
J5-15	1	0	1	1	1	1	1	1	1	1	1	1	1	1
J5-16	0	1	1	1	1	1	1	1	1	1	1	1	1	1

7.5.5 MODULE 4687, DISPLAY

Check BCD coded inputs to the display board by actuating [C] and [N] simultaneously. Release [C] before [N] . ([N] is a digit key on the frequency keyboard):

Input 4687	Upon faulty input, branch to	N 0	1	2	3	4	5	6	7	8	9	Name	
J1-7	4819J4-7	0	1	0	1	0	1	0	1	0	1	A7	digit 7
-8	-8	0	0	1	1	0	0	1	1	0	0	B7	from right
-9	-9	0	1	0	1	0	1	0	1	0	1	A6	digit 6
-10	-10	0	0	1	1	0	0	1	1	0	0	B6	from
-11	-11	0	0	0	0	1	1	1	1	0	0	C6	right
-12	-12	0	0	0	0	0	0	0	0	1	1	D6	
-13	-13	0	1	0	1	0	1	0	1	0	1	A5	digit 5
-14	-14	0	0	1	1	0	0	1	1	0	0	B5	from
-15	-15	0	0	0	0	1	1	1	1	0	0	C5	right
-16	-16	0	0	0	0	0	0	0	0	1	1	D5	
-17	-17	0	1	0	1	0	1	0	1	0	1	A4	digit 4
-18	-18	0	0	1	1	0	0	1	1	0	0	B4	from
-19	-19	0	0	0	0	1	1	1	1	0	0	C4	right
-20	-20	0	0	0	0	0	0	0	0	1	1	D4	
-21	-21	0	1	0	1	0	1	0	1	0	1	A3	digit 3
-22	-22	0	0	1	1	0	0	1	1	0	0	B3	from
-23	-23	0	0	0	0	1	1	1	1	0	0	C3	right
-24	-24	0	0	0	0	0	0	0	0	1	1	D3	
-25	-25	0	1	0	1	0	1	0	1	0	1	A2	digit 2
-26	-26	0	0	1	1	0	0	1	1	0	0	B2	from
-27	-27	0	0	0	0	1	1	1	1	0	0	C2	right
-28	-28	0	0	0	0	0	0	0	0	1	1	D2	
Output: display ->		0.00	11.111.10	22.222.20	33.333.30	44.444.40	15.555.50	26.666.60	37.777.70	8.888.80	19.999.90		

It shall be possible, with the clarifier, to step up and down through all states in the sequence given in the table:

Input 4687	Upon faulty input, branch to	Initially press-in 10000.0 then step up / then step down 0	1	2	3	4	5	6	7	8	9	Designation
J1-29	4819J4-29	0	1	0	1	0	1	0	1	0	1	A1
-30	-30	0	0	1	1	0	0	1	1	0	0	B1
-31	-31	0	0	0	0	1	1	1	1	0	0	C1
-32	-32	0	0	0	0	0	0	0	0	1	1	D1
Output-> digit 1 from right		0	1	2	3	4	5	6	7	8	9	

Test of blanking inputs

Input 4687	Upon faulty input, branch to	Set frequency in kHz to 33333.3	11111.1	1111.1	111.1	11.1	9.9
J1-1	4819J4-1	pulsed	0	0	1	1	1
-2	-2	-	0	0	0	1	1
-3	-3	-	0	0	0	0	pulsed
-4	-4	-	0	0	0	0	-
-5	-5	-	0	1	1	1	1
Output display		33333.30	11111.10	1111.10	111.10	11.10	09.00
			leading zeros blanked				

Test of miscellaneous functions

Input 4687	Upon faulty input, branch to	
J1-6	4819J4-6	"Ext. Standard" if an extern standard has been connected <0.5V : the LED "EXT STD" will light. Otherwise >4V and the LED "EXT STD" should not light.
J1-33	4819J4-33	ground
-34	-34	+ 5V dc
J2-1		If a remote control is connected and the mains switch is set to: off 12V - the LED "remote on" should light. Otherwise: 0V and the LED "remote on" should not light.
J2-2		15V dc
J2-3		Set AGC to "off", meter switch to "S". Turn RF control fully clockwise < 0.8V Only the first LED in the LED display should light. Turn RF control fully counterclockwise > 8.5V All LED's in the display should light.

7.5.6 MODULE 4373

Check input condition in accordance with the following table, note that S1 should be in position "write enable".

Input 4373	Upon faulty input, branch to	Input Conditions
J1-2	4331J1-30	"Read" : Normally logic 0. When the "Read" pushbutton is actuated: logic 1.
J1-4	4331J1-32	"Write": Normally logic 0. When the "Read" pushbutton is actuated: logic 1.
J1-6	4331J2-4	"Clear": Normally logic 0. When the "C" pushbutton is actuated: logic 1.
J1-10	4819J6-9 4331J2-8 4332J1-17 4419J1-B26	"Data in": Normally logic 0. If a Read or Write cycle is executed with the memory, a 32-bit data word is transmitted to the terminal at a rate of approx. 10 k-bit per second. The pattern of the 32-bit word is dependent upon the frequency, mode and AGC setting of the receiver at the moment the Read or Write cycle is started. The 32-bit word starts the moment the last digit in the memory address has been keyed-in. For further details please refer to 4373, test of Write cycle.
J1-11/12		Ground, 0 V
J1-16	Regulator Board	24 V DC
J1-17	Regulator Board	15 V DC
J1-18	4331J1-31	"$\overline{CP}$": Normally logic 1. If a digit key is pushed, a short negative pulse should appear. If "C" is actuated, a pulse train should be recognized
J1-23	4331J2-5	"Addr. B": Normally logic 0. Logic 1 when "2", "3", "6" or "7" are actuated. Logic 0 when "0", "1", "4", "5", "8" or "9" are actuated.
J1-24	4331J2-3	"Addr. A": Normally logic 0. Logic 1 when "1", "3", "5", "7" or "9" are actuated. Logic 0 when "0", "2", "4", "6" or "8" are actuated.
J1-25	4331J2-9	"Addr. D": Normally logic 0. Logic 1 when "8" or "9" are actuated. Logic 0 when "0", "1", "2", "3", "4", "5", "6" or "7" are actuated.
J1-26	4331J2-7	"Addr. C". Normally logoc 0. Logic 1 when "4", "5", "6" or "7" are actuated. Logic 0 when "0", "1", "2", "3", "8" or "9" are actuated.
J2-1	4817J1-B26	Normally logic 0. If the memory is externally controlled, a short positive pulse may appear.
J2-7	4817J1-B25	Normally logic 1 (Logic 0 if ext. control of memory).
J2-8 J2-9 J2-10 J2-11 J2-12 J2-13 J2-14 J2-15	4817J1-A29 -B29 -A30 -B30 -A31 -B32 -A32 -B31	Input terminals for memory address. When the memory is externally controlled. (J2-7 then 0, causing the normal address register to be disabled); otherwise, the address word appears. (See test following).

Check that the patterns on the scope (timing and amplitude) match those shown in the figure.

If the patterns present at J1-21/22, J1-5 and J1-19/20 are correct but those at J1-10 are incorrect, begin by seeking a fault in module 4819.

Test of Read cycle

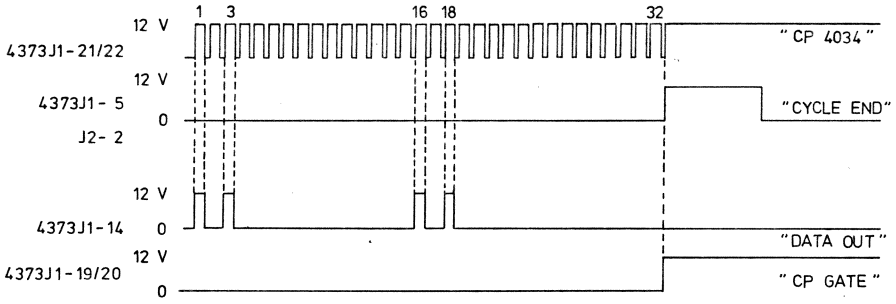
Actuate the [500] pushbutton.

Actuate "Write", "0""0" pushbuttons.

Connect a dual trace storage oscilloscope:

One probe permanently to J1-22, the other probe to J1-5, J1-14 and J1-19/20, in turn.
Connect J1-18 to the oscilloscope trigger input, set for triggering on the leading edge of the trigger signal. Actuate "Read", "0". Erase the screen on the oscilloscope, then actuate "0".

The following patterns should appear on the screen.



Check, that the pictures on the scope (timing and amplitude) match those shown in the figure.

Test of output J2

J2-2	Check that the "cycle end" pulse is available also on J2-2 (same as J1-5).
J2-4	24 V dc
J2-5	Ground
J2-6	15 V

Test of battery

Disconnect the power cord to the receiver, check that the voltage across the battery is > 2 V.

7.6 MISCELLANEOUS

7.6.1 MODULE 4817, I/O FILTER

Check that all connections from J1 to J2 and J3 are in accordance with diagram 4817.

7.6.2 MODULE 4419, REMOTE INPUT FILTER

Check that all connections from J2 to J1 are in accordance with diagram 4419.

7.6.3 4807 RECTIFIER

The connectors of Rectifier 4807 and Power Regulator 4800 are not directly accessible. The bottom plate must be removed to provide access to these connectors.

Test of asynchronous outputs

Output terminal 4373	Designation	Press-in then "Read" and release	Press-in then "Clear" and release	Press-in then "Write" and release	Press-in "Clear" and release
J1-1	WRITE Lamp	0	0	1	0
J1-3	READ Lamp	1	0	0	0
J1-9	R/W	0	0	1	1
J1-15	R/W	1	1	0	0
J1-19/20	CP gate	0	1	0	1

Test of strobe output

A short positive pulse should be recognized on terminals J1-7/8, when the "read" or "write" pushbutton is actuated, provided that the clear button is actuated first.
Otherwise the output is logic 0.

Test of address register outputs

Output terminal 4373	Designation	"Read" "0""0" measure	Press-in given sequence: "Read" "1""2" measure	"Read" "2""4" measure	"Read" "4""8" measure	"Read" "8""1" measure
J2-7	Addr. gate	1	1	1	1	1
J2-8	B0	0	1	0	0	0
J2-9	A1	0	1	0	0	0
J2-10	A0	0	0	0	0	1
J2-11	B1	0	0	1	0	0
J2-12	C0	0	0	1	0	0
J2-13	C1	0	0	0	1	0
J2-14	D0	0	0	0	1	0
J2-15	D1	0	0	0	0	1

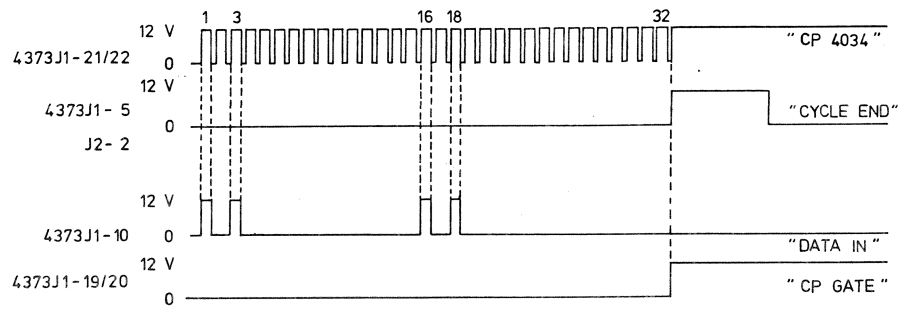
Test of Write cycle

Connect a dual trace oscilloscope as follows:

Connect one probe (for duration of this test) to J1-22; connect the second probe to J1-5, J1-10 and J1-19/20, in turn. Connect J1-18 to the oscilloscope trigger and set for triggering on the leading edge of the trigger signal.

Actuate "Write" and "0" pushbuttons. Erase the screen on the oscilloscope and then actuate "0".

The following patterns should now appear on the screen.



With the main supply at nominal voltage, the supply voltages are as follows:

	Std. by		Power on	
	Voltage V dc	Ripple V pp max	Voltage V dc	Ripple V pp max
J7-13	-5V	10mV	-5V	10mV
J7-10,11,12	14-16V	1V	11-13V	1.8V
J7-7,8,9	35-41V	2V	28-31V	3.0

The signal at J7-2 is an AC voltage with a minimum peak-to-peak amplitude of 30V.
Maximum complex signal value (including DC component): 60V.

7.6.4 4800 VOLTAGE REGULATOR

The unregulated voltages J1-20,21, J1-18,19 and J1-4 are as described in Section-item 7.6.3.

	Std. by		Power on	
	Voltage V dc	Ripple V pp max	Voltage V dc	Ripple V pp max
J1-1	15V	10mV	15V	10mV
J1-2	15V	-	15V	-
J1-5	24V	10mV	24V	10mV
J1-12,13	0V	-	24V	10mV
J1-14	0V	-	11-12V	2V
J1-15	15V	10mV	15V	10mV
J1-16,17	0V	-	8V	10mV

The start input J1-8 is 0 V in Std. by, and 15 V in Power on. If not so, refer to 4356J2-1.

SECTION 8. PARTS LISTS AND COMPONENT SPECIFICATIONS.

8.1. Parts Lists.

This section gives for each module all components used. The parts lists are arranged in order of module (= diagram) numbers. The components are identified by their DRA code numbers.

For complete identification of the components reference should be made to Section 8.2. in which specifications are given for all components used in the equipment in order of DRA code numbers.

TO ORDER SPARE PARTS, please refer to DRA code numbers.

PARTS LIST (1979-12-06) Frequency Selecting Keyboard Ref. Desig. 4331
Page 1 (1) MR 6000 Diag. No. 4331

Ref. Desig.	DRA Code
C1	209767
C2	209767
C3	209775
C4	367642
C5	209775
C6	357642
C7	357650
C8	357626
C9	358959
C10	209783
C11	202967
C12	209767
C13	
C14	357634
C15	357650
CR1	228087
CR2	228087
CR3	228087
CR4	228087
CR5	228087
CR6	228087
CR7	228087
CR8	228087
CR9	228087
CR10	228087
CR11	228087
CR12	228087
CR13	228087
CR14	228087
CR15	228087
CR16	228087
CR17	228087
CR18	228087
CR19	228087
CR20	228087
CR21	228087
CR22	228087
CR23	228087
CR24	228087
CR25	228087
CR26	228087
CR27	228087
CR28	228087
CR29	228087
CR30	228087
CR31	228087
CR32	228087
CR33	228087
CR34	228087
CR35	432741
CR36	228087
CR37	228087
CR38	228087
CR39	228087
CR40	228087
CR41	228087
CR42	228087
CR43	228087
CR44	228087
CR45	228087
CR46	228087
CR47	228087
CR48	228087
CR49	432741
CR50	228087
CR51	228087
CR52	228087
CR53	228087
CR54	228087
CR55	228087
DS1	367613
DS2	367613
DS3	367613
DS4	367613
DS5	367613
DS6	367613
J1	362689
J2	358991
Q1	273899
Q2	273899
Q3	273899
Q4	369454
Q5	273899
Q6	273899
Q7	273899
Q8	273899
Q9	273899
Q10	359157
R1	240761
R2	367621
R3	240761
R4	240761
R5	240761
R6	367621
R7	240435
R8	240761
R9	240761
R10	240869
R11	240761
R12	240397
R13	367621
R14	240761
R15	240869
R16	240761
R17	240761
R18	240761
R19	240877
R20	240745
R21	
R22	240761
R23	240761
R24	
R25	240761
R26	240761
R27	240761
R28	240745
R29	
R30	
R31	328626
R32	240745
R33	328626
R34	240648
R35	240761
R36	240761
R37	240761
R38	240761
R39	
R40	240761
R41	240761
R42	240761
R43	240761
R44	240761
R45	240761
R46	240222
R47	240745
R48	240745
R49	240680
R50	240567
R51	240680
R52	240834
R53	240680
R54	240400
R55	240400
R56	240567
R57	240567
R58	240567
R59	240567
R60	240567
S1	359114
S2	359114
S3	359114
S4	359114
S5	359114
S6	359114
S7	359106
S8	359106
S9	359106
S10	359106
S11	359106
S12	359106
S13	359106
S14	359106
S15	359106
S16	359106
S17	359106
S18	359106
S19	359106
S20	359106
S21	359106
U1	354899
U2	354775
U3	367672
U4	354899
U5	354996
U6	354937
U7	354937
U8	354937
U9	354937

PARTS LIST (1979-12-05) Mode Selecting Keyboard Ref. Desig. 4332
Page 1 (1) MR 6000 - 01 Diag. No. 4332

Ref. Desig.	DRA Code
C1	357642
C2	209767
C3	209767
C4	393959
C5	357642
CR1	228087
CR2	228087
CR3	228087
CR4	228087
CR5	228087
CR6	228087
CR7	228087
CR8	228087
CR9	228087
CR10	228087
CR11	228087
CR12	228087
CR13	228087
CR14	228087
CR15	228087
CR16	228087
CR17	228087
CR18	228087
CR19	228087
CR20	228087
CR21	228087
CR22	228087
CR23	228087
CR24	228087
CR25	228087
CR26	228087
CR27	228087
CR28	228087
CR29	228087
CR30	228087
CR31	228087
CR32	228087
CR33	228087
CR34	228087
CR35	432741
CR36	228087
CR37	228087
CR38	228087
CR39	228087
CR40	228087
CR41	432741
CR42	228087
DS1	367613
DS2	367613
DS3	367613
DS4	367613
DS5	367613
DS6	367613
DS7	367613
DS8	367613
DS9	367613
DS10	367613
DS11	367613
DS12	367613
DS13	367613
DS14	367613
DS15	367613
DS16	367613
J1	358991
Q1	369454
Q2	369454
Q3	359157
Q4	273899
R1	240567
R2	240680
R3	240451
R4	372196
R5	240869
R6	240745
R7	240745
R8	240745
R9	240834
R10	240680
R11	240680
R12	240567
R13	240680
R14	240680
R15	367621
R16	367621
R17	240761
R18	241229
S1	359114
S2	359114
S3	359114
S4	359114
S5	359114
S6	359114
S7	359114
S8	359114
S9	359114
S10	359114
S11	359114
S12	359114
S13	359114
S14	359114
S15	359114
S16	359114
U1	354961
U2	354902
U3	354775
U4	354775
U5	367672
U6	354902
U7	389595
U8	389595

PARTS LIST (1979-12-05)
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30 MHz Loop
MR 6000/SE 6000 - 01

Ref. Desig. 4352
Diag. No. 4352

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	202967	J1	358584	R20	328545		
C2				R21	240478		
C3	357642			R22	240400		
C4	209767			R23	323470		
C5	367850			R24	240583		
C6	202991	L1	355933				
C7	357642	L2	355933				
C8	357642	L3	362042				
C9	357545	L4	355933				
C10	357642	L5	355933				
C11	357642	L6	355933	U1	362131		
C12	357421			U2	354821		
C13	357529			U3	362077		
C14	357642			U4	362158		
C15				U5	371076		
C16				U6	369802		
C17		P1	361399	U7	362085		
C18	357642	P2	361399	U8	227447		
C19	357642			U9	369802		
C20	209767			U10	369802		
C21	202967			U11	369802		
C22	357642			U12	227617		
C23	357626			U13	355011		
C24	399906	Q1	273627	U14	355011		
C25	399906	Q2	362050				
C26	357634	Q3	273635				
C27	358959	Q4	357901				
C28	358959	Q5					
C29	358959	Q6	357901				
C30	358959	Q7	273899				
C31	358959	Q8	273899				
C32	358959						
C33	358959						
C34	358959						
C35	358959						
C36	358959						
C37	358959	R1	240222				
C38	358959	R2	240516				
C39	358959	R3	240419				
C40	358959	R4	240478				
C41	209783	R5	240567				
C42	357634	R6	240583				
		R7	240567				
		R8	372137				
		R9	357693				
		R10	240745				
CR1	228087	R11	240400				
CR2	228087	R12	240281				
CR3	362034	R13	240869				
CR4	362301	R14	240281				
CR5	228087	R15	240869				
CR6	228087	R16	240478				
CR7	228087	R17					
		R18					
		R19	240583				

PARTS LIST (1979-12-05)
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73.6 MHz Loop
MR 6000 - 01

Ref. Desig. 4336
Diag. No. 4336

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357642	L1	357723	R19	240400		
C2	209805	L2		R20	240427		
C3	357642	L3		R21	240516		
C4	202991	L4	357790	R22	240567		
C5	209791	L5	357731	R23	240400		
C6	357642	L6	357766	R24	240478		
C7	357642	L7	357774	R25	240516		
C8	357642	L8	357782	R26	240400		
C9	357685	L9	361364	R27	240354		
C10	357669	L10	212717	R28	240516		
C11	357677	L11	357723	R29	361313		
C12	357626			R30	240540		
C13	357596			R31	240184		
C14	357642			R32	240346		
C15	357626			R33	240540		
C16	357626			R34	240583		
C17	357642	P1	357847	R35	240400		
C18	357502	P2	361399	R36	240583		
C19	357537			R37	240567		
C20	357561			R38	240370		
C21				R39	361321		
C22	357634			R40	240400		
C23	357634						
C24	357634	Q1	357901				
C25	357596	Q2	357804				
C26	202991	Q3	357804				
C27	357626	Q4	273899				
C28	202991	Q5	357804	T1	364541		
C29	357456	Q6	357804	T2	364568		
C30	357626	Q7	273899				
C31	357642	Q8	357901				
C32	357626	Q9	357901				
C33	361348						
C34	361348						
C35	361356			U1	227404		
		R1	240117				
		R2	240222				
		R3	240761				
CR1	228834	R4	240702	W22	364479		
CR2	357936	R5	240222				
		R6	240435				
		R7	357693				
		R8	357693				
		R9	240486	Y1	357928		
		R10	240486				
J1	361399	R11	240400				
		R12	240184				
		R13	240400				
		R14	240508				
		R15	240486				
		R16	357715				
		R17	240354				
		R18	240400				

PARTS LIST (1979-12-05)
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20 MHz Loop
MR 6000 - 01

Ref. Desig. 4353
Diag. No. 4353

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	202967	L3	362042	U1	362131		
C2	357642	L4	355933	U2	354821		
C3	357642	L5	355933	U3	227455		
C4	209767	L6	355933	U4	227455		
C5	367850	L7		U5	227536		
C6	357626	L8	355933	U6	227501		
C7	357626	L9		U7	362077		
C8	357642			U8	362085		
C9	357596			U9	362158		
C10	357642			U10	371076		
C11	357642			U11	362166		
C12	357545			U12	362166		
C13	357596	P1	358665	U13	362166		
C14	357642	P2	361399	U14	362166		
C15	357642			U15	355011		
C16	357642						
C17	209767						
C18	357642						
C19	357642						
C20	357642	Q1	273627				
C21	357642	Q2	362050				
C22	357626	Q3	273635				
C23	209805	Q4	357901				
C24	357642	Q5	273635				
C25	363340	Q6	357901				
C26	363340	Q7	273899				
C27	363340	Q8	274070				
C28	363340						
C29	363340						
C30	209783						
		R1	240222				
		R2	240516				
		R3	240419				
CR1	228087	R4	240478				
CR2	228087	R5	240567				
CR3	362034	R6	240648				
CR4	357936	R7	240567				
CR5	228087	R8	240745				
CR6	228087	R9	240745				
CR7	373443	R10	240745				
CR8	228087	R11	240281				
		R12	240281				
		R13	240869				
		R14	240281				
		R15	240869				
		R16	240478				
J1	357847	R17	240613				
		R18	240745				
		R19	240281				
		R20	240451				
		R21	240400				
L1	355933						
L2	355933						

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Suboctave Filter HF
MR 6000

Ref. Desig. 4354
Diag. No. 4354

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357529	CR1	359742	L28	392294		
C2	202967			L29	392294		
C3	357650			L30	392294		
C4	358959						
C5	357650						
C6	202967						
C7	357529	K1	359521				
C8	358959	K2	359521				
C9	358959	K3	359521	P1	357847		
C10	358959	K4	359521				
C11	358959	K5	359521				
C12	358959	K6	359521				
C13	358959	K7	359521				
C14	358959	K8	359521				
C15	209643	K9	359521	R1	240362		
C16	209600	K10	359521	R2	240605		
C17	209643	K11	359521	R3	240605		
C18	359602	K12	359521	R4	240451		
C19	359610	K13	359521	R5	240451		
C20	359629	K14	359521	R6	323470		
C21	359637			R7	240249		
C22	359645						
C23	359610						
C24	359653						
C25	389684						
C26	359653	L1	359750				
C27	359645	L2	359769				
C28	357553	L3	359777	W24	375233		
C29	357596	L4	359785	W25	375225		
C30	357561	L5	359793				
C31	357545	L6	359807				
C32	357561	L7	359815				
C33	357545	L8	359823				
C34	357545	L9	359831				
C35	357545	L10	359858				
C36		L11	359866				
C37	357650	L12	359874				
C38	357642	L13	359882				
C39	357642	L14	359890				
C40	357642	L15	359904				
C41	357642	L16	359912				
C42	357642	L17	359920				
C43	357642	L18	359939				
C44	357642	L19	359947				
C45	357642	L20	359955				
C46	363340	L21	359963				
C47	363340	L22	364045				
C48	363340	L23	363308				
C49	363340	L24	392294				
C50	363340	L25	392294				
C51	363340	L26	392294				
C52	363340	L27	392294				

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Suboctave Filter LF-MF
MR 6000

Ref. Desig. 4355
Diag. No. 4355

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	202967	CR1	359742	L27	392294		
C2	357650			L28	392294		
C3	202967			L29	392294		
C4	357529			L30	392294		
C5	357545						
C6	357529						
C7	357529	K1	359521				
C8	357529	K2	359521				
C9	357529	K3	359521				
C10	357529	K4	359521	P1	367847		
C11	357650	K5	359521				
C12	202967	K6	359521				
C13	202967	K7	359521				
C14	363340	K8	359521				
C15	359661	K9	359521				
C16	359696	K10	359521	R1	240362		
C17	359602	K11	359521	R2	240605		
C18	359726	K12	359521	R3	240605		
C19	359637	K13	359521	R4	359572		
C20	359262	K14	359521	R5	240354		
C21	359637			R6	240273		
C22	359734			R7	240281		
C23	359637			R8	240397		
C24	359718			R9	240419		
C25	359637			R10	359580		
C26	209643	L1	359971	R11	240451		
C27	359637	L2	359998	R12	240451		
C28	209643	L3	361003				
C29	359637	L4	361011				
C30	357650	L5	361038				
C31	357650	L6	361046				
C32	209600	L7	361054				
C33	209805	L8	361062	T1	361208		
C34	357626	L9	361070				
C35	357626	L10	361089				
C36	357626	L11	361097				
C37	357626	L12	361100				
C38	357626	L13	361119				
C39	357626	L14	361127	W26	375136		
C40	357626	L15	361135	W27	361437		
C41	357626	L16	361143				
C42	357626	L17	361151				
C43	357626	L18	361178				
C44	357626	L19	361186				
C45	357626	L20	361194				
C46	357626	L21	364045				
C47	357626	L22	364045				
C48	363340	L23	392294				
C49	363340	L24	392294				
C50	357634	L25	392294				
C51	357634	L26	392294				

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Step Attenuator
MR 6000

Ref. Desig. 4371
Diag. No. 4371

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	202991	C56	209791	L1	363308	R1	434043
C2	202991	C57	209791	L2	363308	R2	434043
C3	202991	C58	209791	L3	363308	R3	434051
C4	363103	C59	209791	L4	363308	R4	434051
C5	363103	C60	209791	L5	363308	R5	432814
C6	209570	C61	209791	L6	363308	R6	
C7	202991	C62	209791	L7	363308	R7	240397
C8	202991	C63	209791	L8	363308	R8	240397
C9	202991	C64	358959	L9	363308	R9	240397
C10	363103	C65	358959	L10	363308	R10	240397
C11	363103	C66	358959	L11	363308	R11	240516
C12	209570	C67	358959	L12	363308	R12	240435
C13	202991	C68	358959	L13	363308	R13	240435
C14	202991	C69	357650	L14	363308	R14	240281
C15	202991	C70	357634	L15	363308	R15	240419
C16	363103	C71	358959	L16	363308	R16	240184
C17	363103	C72	358959	L17	363308	R17	432806
C18	209570	C73	358959	L18	363308	R18	
C19	202991			L19	363308	R19	432806
C20	202991			L20	363308	R20	
C21	202991			L21	363308	R21	432946
C22	363103			L22	363308	R22	
C23	363103			L23	363308	R23	240397
C24	209570	CR1	358614	L24	357723	R24	240397
C25	202991	CR2	358614	L25	363294	R25	240397
C26	202991	CR3	358614	L26	357723	R26	240397
C27	202991	CR4	358614	L27	357723	R27	240516
C28	363103	CR5	358614			R28	240435
C29	363103	CR6	358614			R29	240435
C30	209570	CR7	358614			R30	240281
C31	202991	CR8	358614	P1	361399	R31	240419
C32	202967	CR9	358614	P2	361399	R32	240184
C33	209775	CR10	358614	P3	361399	R33	432822
C34	357650	CR11	358614			R34	
C35	209775	CR12	358614			R35	432822
C36	209503	CR13	358614	Q1	359149	R36	
C37		CR14	358614	Q2	359149	R37	432830
C38	344273	CR15	358614	Q3	359149	R38	
C39	375322	CR16	358614	Q4	359149	R39	240397
C40	362670	CR17	358614	Q5	359149	R40	240397
C41	357596	CR18	358614	Q6	359149	R41	240397
C42	358959	CR19	358614	Q7	359149	R42	240397
C43	357596	CR20	358614	Q8	359149	R43	240516
C44	359246	CR21	228087	Q9	359149	R44	240435
C45	202967	CR22	363758	Q10	359149	R45	240435
C46	202991			Q11	359149	R46	240281
C47	202991			Q12	359149	R47	240419
C48	202991			Q13	359149	R48	240184
C49	202991			Q14	359149	R49	432849
C50	202991	J1	358584	Q15	359149	R50	
C51	357650			Q16	359149	R51	432849
C52	209805			Q17	359149	R52	
C53	359246					R53	432857
C54	209791	K1	359521			R54	240621
C55	209791	K2	359521			R55	240397

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MR 6000

Ref. Desig. 4371
Diag. No. 4371

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
R56	240397	R111	240567				
R57	240397	R112	240230				
R58	240397	R113	240621				
R59	240516	R114	240680				
R60	240435	R115					
R61	240435	R116	240222				
R62	240281	R117	240222				
R63	240419	R118	240567				
R64	240184	R119	249621				
R65	432865						
R66							
R67	432865						
R68							
R69	432873						
R70							
R71	240397	U1	365858				
R72	240397	U2	365858				
R73	240397	U3	433535				
R74	240397	U4	362085				
R75	240516	U5	365874				
R76	240435	U6	320129				
R77	240435	U7	434833				
R78	240281	U8	362174				
R79	240419	U9	362174				
R80	240184	U10	362174				
R81	240621	U11	373753				
R82	240621						
R83	240451						
R84	240567						
R85	240621						
R86	240605						
R87	240494						
R88	240346						
R89	240311						
R90	240605						
R91	432938						
R92							
R93	371963						
R94	432911						
R95	432903						
R96							
R97	432881						
R98							
R99	349674						
R100	240567						
R101	365831						
R102	240605						
R103	240621						
R104	240621						
R105	240605						
R106	240451						
R107	240451						
R108	240745						
R109	240702						
R110	365963						

PARTS LIST (1980-03-19) Memory Ref. Desig. 4373
Page 1 (1) MR 6000 - 01 Diag. No. 4373

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
BT1	391921	R1	363537	U14	354961		
		R2	240761	U15	354821		
		R3	241288	U16	354821		
		R4	240567	U17	367737		
C1	358959	R5	363537	U18	367737		
C2	380792	R6	240761	U19	367737		
C3	358959	R7	240761	U20	354899		
C4	357642	R8	240761	U21	367737		
C5	358959	R9	240761	U22	362654		
C6	357642	R10	240761				
C7	209767	R11	240761				
C8	209791	R12	240761				
C9	358959	R13	328626				
C10	440477	R14	328626				
C11		R15					
C12	209724	R16	240745				
C13		R17	240761				
C14	357642	R18	240478				
		R19	240516				
		R20	240869				
		R21	328626				
CR1	228087	R22	240761				
CR2	228087	R23	240621				
CR3	228087	R24	240567				
CR4	228087	R25	240567				
CR5	228087	R26					
CR6	228087	R27	240567				
CR7	228087	R28	240567				
CR8	228087	R29	240680				
CR9	432741	R30	240567				
CR10	228087	R31	240400				
CR11	228087						
CR12	228087						
CR13	228087						
CR14	228087						
CR15	228834						
CR16	228087	S1	359416				
CR17	228087						
CR18							
CR19	228087						
		U1	354899				
		U2	355054				
J1	358991	U3	367672				
J2	366099	U4	354775				
		U5	354775				
		U6	354880				
		U7					
		U8	355011				
Q1	273899	U9	362654				
Q2	273899	U10	352654				
Q3		U11	355011				
Q4	273899	U12	355003				
Q5	369454	U13	354961				

PARTS LIST (1978-11-17) Remote input filters Ref. Desig. 4419
Page 1 (1) MR 6000 Diag. No. 4419

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357626	L1	357723				
C2	357626	L2	357723				
C3	357626	L3	357723				
C4	357626	L4	357723				
C5	357626	L5	372927				
C6	357626	L6	372927				
C7	357626	L7	372927				
C8	357626	L8	372927				
C9	257626	L9	372927				
C10	357626	L10	372927				
C11	357626	L11	372927				
C12	357626	L12	372927				
C13	357626						
C14	357626						
C15	357626						
C16	357626						
C17	357626	R1	364614				
C18	357626	R2	364614				
C19	357626	R3	364614				
C20	357626	R4					
C21	357626	R5	364614				
C22	357626	R6	240567				
C23	357626	R7	240567				
C24	357626	R8	240567				
C25	357626	R9	240567				
C26	357626	R10	240567				
C27	357626						
C28	357626						
C29	357626						
C30	357626						
C31	357626						
C32	357626						
C33	357626						
C34	357626						
C35	357626						
C36	357626						
C37	357626						
C38	357626						
C39	357626						
C40	357626						
C41	357626						
C42	357626						
C43	357626						
C44	357626						
C45	357626						
C47	357626						
C48	357626						
C49	357626						
J1	364711						
J2	372498						

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Ref. Desig. 4521
Diag. No. 4521

Ref. Desig.	DRA Code
C1	357642
C2	357642
C3	357405
C4	357626
C5	357626
C6	357626
C7	209767
C8	357642
C9	357642
C10	357405
C11	357626
C12	357626
C13	357626
C14	209767
C15	393959
C16	393959
C17	393959
C18	357642
C19	357642
C20	202967
C21	202967
C22	369470
C23	357642
C24	357405
C25	357626
C26	357626
C27	357626
C28	209767
C29	269791
C30	363081
C31	209775
C32	209554
C33	357650
C34	344273
C35	209554
C36	373176
C37	209503
C38	371092
C39	442593
C40	209546
C41	368067
C42	205028
C43	371092
C44	209767
C45	203513
C46	209570
C47	368652
C48	359610
C49	209805
C50	209538
C51	357480
C52	361518
C53	209805
C54	362670
C55	209805
C56	362670
C57	209805
C58	209805
C59	367877
C60	367877
C61	367958
C62	203513
C63	368652
C64	357650
C65	209570
C66	208086
C67	208086
C68	357650
C69	357650
C70	203165
C71	357650
C72	357650
C73	357650
C74	357650
C75	357650
C76	357650
C77	357650
C78	209805
CR1	361488
CR2	361488
CR3	361488
CR4	361488
CR5	361488
CR6	361488
CR7	228087
CR8	228087
CR9	228087
CR10	228087
CR11	228087
CR12	228087
CR13	228087
CR14	228087
CR15	228087
CR16	228087
CR17	228087
CR18	228788
CR19	362301
CR20	228087
CR21	228087
CR22	228087
CR23	228087
CR24	228834
CR25	228834
CR26	228796
CR27	228834
CR28	228834
CR29	228796
CR30	432733
CR31	228087
CR32	228087
CR33	228087
CR34	228087
CR35	228087
CR36	228087
CR37	228087
CR38	228087
CR39	228087
CR40	228087
CR41	228087
CR42	228087
CR43	228087
CR44	228087
CR45	228087
CR46	228087
CR47	228087
CR48	228087
CR49	228087
CR50	228087
CR51	228087
CR52	372595
CR53	432741
CR54	228087
L1	368660
L2	361496
L3	368660
L4	368660
L5	362921
L6	368660
L7	368660
P1	361399
P2	357847
P3	358584
P4	357847
Q1	359157
Q2	389730
Q3	389730
Q4	359157
Q5	389730
Q6	389730
Q7	273899
Q8	359157
Q9	273899
Q10	359157
Q11	273899
Q12	273899
Q13	273899
Q14	273899
Q15	273899
Q16	273899
Q17	273899
Q18	273899
Q19	273899
Q20	273899
Q21	273899
R1	240427
R2	391980
R3	240494
R4	240494
R5	240400
R6	240451
R7	240451
R8	240451
R9	240451
R10	240540
R11	359580
R12	240427
R13	391980
R14	240494
R15	240494
R16	240400
R17	240451
R18	240451
R19	240451
R20	240451
R21	240540
R22	359580
R23	240427
R24	240400
R25	240443
R26	240427
R27	391980
R28	240494
R29	240494
R30	240400
R31	240451
R32	240451
R33	240451
R34	240451
R35	240540
R36	359580
R37	240451

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Ref. Desig. 4521
Diag. No. 4521

Ref. Desig.	DRA Code
R39	240745
R40	240745
R41	240222
R42	361534
R43	240656
R44	240621
R45	240621
R46	240656
R47	240745
R48	240745
R49	240346
R50	240524
R51	240656
R52	240346
R53	240230
R54	240796
R55	240524
R56	240745
R57	240680
R58	324221
R59	240869
R60	240222
R61	240419
R62	240680
R63	240680
R64	365963
R65	240567
R66	240257
R67	240702
R68	240230
R69	240230
R70	240427
R71	240427
R72	240427
R73	240427
R74	240230
R75	345776
R77	240419
R78	240680
R79	240680
R80	365963
R81	240567
R82	240257
R83	240702
R84	240230
R85	240230
R86	240427
R87	240427
R88	240427
R89	240427
R90	240230
R91	345776
R93	240222
R94	240648
R95	240451
R96	240648
R97	240400
R98	371432
R99	371432
R100	371432
R101	359319
R102	359319
R103	240451
R104	240451
R105	240451
R106	240745
R107	240745
R108	240745
R109	240745
R110	240478
R111	324167
R112	361534
R113	240400
R114	240680
R115	240737
R116	240400
R117	328596
R118	328626
R119	240621
R120	240745
R121	240745
R122	240680
R123	365831
R124	324167
R125	240745
R126	240532
R127	240737
R128	366870
R129	240621
R130	366889
R131	240621
R132	240737
R133	240400
R134	240559
R135	240621
R136	240400
R137	240745
R138	240230
R139	391980
R140	240486
T1	362859
T2	362859
U1	361585
U2	361585
U3	361569
U4	361585
U5	354821
U6	354821
U7	357707
U8	357707
U9	357707
U10	357707
U11	354902
U12	354902
U13	367745
U14	354821
U15	357707
Y1	

Ref. Desig. 4521
Diag. No. 4521

Ref. Desig.	DRA Code

PARTS LIST (79-12-10)
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75-89 MHz VCO
SE 6000/MR 6000 - 01

Ref. Desig. 4522
Diag. No. 4522

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	385530						
C2	358959						
C3	399922						
C4	357448						
C5	372250						
C6							
C7	405485						
C8	358959						
C9	405485						
C10	385549						
C11	405523						
C12	358959						
C13	358959						
C14	363049						
CR1	386065						
CR2	405531						
L1	355933						
L2	355933						
L3	355933						
L4	405566						
Q1	405477						
Q2	405477						
R1	359394						
R2	349623						
R3	349623						
R4	376361						
R5	391085						
R6	349658						

PARTS LIST (79-12-10)
Page 1 (1)

89-105 MHz VCO
SE 6000/MR 6000 - 01

Ref. Desig. 4523
Diag. No. 4523

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	385530						
C2	358959						
C3	399922						
C4	357448						
C5	372250						
C6							
C7	405485						
C8	358959						
C9	405485						
C10	385549						
C11	405523						
C12	358959						
C13	358959						
C14	363049						
CR1	386065						
CR2	405531						
L1	355933						
L2	355933						
L3	355933						
L4	405558						
R1	359319						
R2	349623						
R3	349623						
R4	376361						
R5	391085						
R6	349658						
Q1	405477						
Q2	405477						

PARTS LIST (79-12-11)
Page 1 (1)

78-92 MHz VCO
SE 6000/MR 6000 - 01

Ref. Desig. 4524
Diag. No. 4524

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1							
C2	358959						
C3	399922						
C4	357448						
C5	372250						
C6	357383						
C7	405485						
C8	358959						
C9	405485						
C10	385549						
C11	405523						
C12	358959						
C13	358959						
C14							
CR1							
CR2	405531						
L1							
L2	355933						
L3	355933						
L4	405566						
R1	405604						
R2	349623						
R3	349623						
R4	376361						
R5	391085						
R6	349658						
Q1	405477						
Q2	405477						

PARTS LIST (1979-12-11)
Page 1 (1)

92-107.9 MHz VCO
SE 6000/MR 6000 - 01

Ref. Desig. 4525
Diag. No. 4525

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1							
C2	358959						
C3	399922						
C4	357448						
C5	372250						
C6	357383						
C7	405485						
C8	358959						
C9	405485						
C10	385549						
C11	405523						
C12	358959						
C13	358959						
C14							
CR1							
CR2	405531						
L1							
L2	355933						
L3	355933						
L4	405558						
R1	359319						
R2	349623						
R3	349623						
R4	376361						
R5	391085						
R6	349658						
Q1	405477						
Q2	405477						

PARTS LIST (1979-08-28)
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Front End 230/227
MR6000

Ref. Desig.4528
Diag. No. 4528

Ref. Desig.	DRA Code
C1	357553
C2	363065
C3	363049
C4	357499
C5	357480
C6	357529
C7	357448
C8	357472
C9	357383
C10	
C11	357529
C12	357529
C13	358959
C14	357421
C15	357634
C16	357642
C17	357634
C18	209783
C19	357642
C20	358959
C21	357634
C22	358959
C23	357642
C24	358959
C25	358959
C26	357642
C27	357650
C28	357510
C29	202797
C30	357634
C31	358959
C32	357642
C33	357642
C34	389951
C35	
C36	
C37	
C38	
C39	
C40	
C41	202797
C42	357510
C43	357502
C44	357545
C45	357502
C46	393959
C47	357634
C48	357634
C49	393959
C50	209791
C51	393959
C52	393959
C53	357472
C54	393959
C55	393959
C56	393959
C57	357650
C58	
C59	
C60	
C61	
C62	
C63	
C64	
C65	
C66	
C67	
C68	
C69	
C70	
C71	
C72	
C73	
C74	
C75	
C76	
C77	
C78	
C79	
C80	
C81	
C82	
C83	
C84	
C85	
C86	
C87	
C88	
C89	
C90	
C91	
C92	
C93	
C94	
C95	
C96	
C97	
C98	
C99	
C100	
C101	
C102	
C103	
C104	
C105	
C106	
C107	
C108	
C109	
C201	
C202	
C203	
C204	
C205	363073
C206	363073
C207	363073
C208	357642
C209	357634
C210	209805
CR11	362484
CR12	362484
CR13	362484
CR14	362484
CR15	228826
CR61	372595
CR62	358592
CR63	358592
CR64	228087
CR65	228087
CR66	228087
CR67	228087
CR68	228087
CR69	358614
CR70	358614
CR71	358614
CR72	358614
CR73	358614
CR74	358614
CR75	358614
CR76	358614
CR77	228826
CR78	228788
CR79	363324
CR80	361488
F1	363367
K61	359521
L1	394092
L2	363278
L3	363278
L4	357782
L5	394335
L6	394084
L7	394084
L8	406589
L9	406597
L10	
L11	394335
L12	394335
L13	394106
L14	392294
L15	392294
L16	392294
L17	394343
L18	393967
L41	393967
L42	363421
L43	363421
L44	371912
L45	393975
L46	393975
L61	363480
L62	363308
L63	363308
L64	363308
L66	363480
L67	389609
L68	393975
L69	393975
L70	362468
L201	357758
L202	357758
L203	357758
L204	357758
L205	357758
L206	357758
L207	357758
P201	361399
P202	361399
P203	358584
Q11	362506
Q12	362492
Q13	273899
Q41	362506
Q61	385972
Q62	357804
Q63	273635
Q64	359157
Q65	273899
Q66	273899
Q67	357804

PARTS LIST (1979-08-28)
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Front End 230/227
MR6000

Ref. Desig. 4528
Diag. No. 4528

Ref. Desig.	DRA Code
R1	240184
R2	240184
R11	240222
R12	240222
R13	240192
R14	240567
R15	240567
R16	240168
R17	328545
R18	240249
R19	364002
R20	240222
R21	240184
R22	240184
R23	240184
R24	240184
R25	240222
R26	240389
R27	359580
R28	240389
R29	240419
R30	240346
R31	240389
R32	240230
R33	364037
R34	240168
R35	240338
R36	240338
R37	240486
R38	240249
R39	
R40	
R41	240184
R42	240184
R43	240184
R44	240494
R45	240419
R46	240311
R47	240281
R48	394602
R49	328245
R61	240443
R62	240222
R63	240281
R64	240222
R65	240435
R66	240583
R67	240419
R68	240222
R69	240389
R70	365823
R71	361992
R72	240311
R73	240311
R74	364002
R75	240338
R76	240567
R77	240567
R78	240621
R79	363227
R80	240621
R81	240850
R82	240451
R83	240222
R84	240362
R85	240494
R86	359572
R87	240427
R88	240869
R89	240869
R90	363057
R91	240745
R92	240222
R93	240400
R94	240567
R95	240222
R96	240222
R97	240222
R98	240222
R99	328545
R100	328545
R101	240222
R102	240222
R103	240346
R104	240346
R105	240222
R106	240222
R107	240222
R108	240222
R109	376310
R110	394289
R111	240419
R112	240184
R113	240184
R114	240494
R115	240419
R116	240346
R117	240281
R118	364037
R119	328545
R120	240222
R121	240281
R122	240222
T61	363472
T62	363472
T201	394262
T202	394254
U1	362522
U41	362522
U61	363359
W23	394246

PARTS LIST (1978-11-03)
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PCB W/Comp
75-105 MHz
MR 6000
SE 6000

Ref. Desig. 4529
Diag. no. 4529

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	385115	Q1	359157				
C2	385115	Q2	273899				
C3	202991	Q3	359157				
C4	209805	Q4	273899				
C5	357561	Q5	273635				
C6	202991	Q6	405477				
C7	357650	Q7	405477				
C8	209503	Q8	405477				
C9	405485						
C10	405612						
C11	357448						
C12	357448	R1	240680				
C13	358959	R2	240680				
C14	358959	R3	240451				
C15	358959	R4	240621				
C16	405485	R5	240680				
C17	358959	R6	240680				
C18	385549	R7	240451				
C19	357464	R8	240621				
C20	358959	R9	240532				
C21	358959	R10	240109				
C22	358959	R11	240583				
C23	358959	R12	363227				
C24	357383	R13	240524				
C25	357472	R14	240745				
C26	358959	R15	240346				
		R16	240451				
		R17	405442				
		R18	405450				
		R19	240583				
CR1	228087	R20	376531				
CR2	372595	R21	377287				
CR3	228087	R22	240710				
CR4	372595	R23	367826				
CR5	228087	R24	240621				
CR6	228087	R25	405590				
CR7	358614	R26	240621				
CR8	358614	R27	240710				
		R28	349488				
		R29	368547				
J1	357847	R30	377635				
J2	361399	R31	364185				
J3	358665						
		U1	373532				
L1	357766						
L2	266523	W40	396877				
L3	363278						
L4	405493						
L5	405493						
L6	357782						

PARTS LIST (1978-08-25)
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PCB W/Comp
78-108 MHz
MR 6000
SE 6000

Ref. Desig. 4530
Diag. no. 4530

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357634	L1	372889	R26	240621		
C2	357634	L2	357782	R27	349488		
C3	202991	L3	405493	R28	240621		
C4	209805	L4	405493	R29	240710		
C5	357561	L5	357782	R30	349488		
C6	202991	L6	357820	R31	368547		
C7	362670			R32	377635		
C8	209767			R33	364185		
C9	209767			R34	405442		
C10	393959	Q1	273899	R35	349488		
C11	358959	Q2	359157	R36	405450		
C12	358959	Q3	273899	R37	240303		
C13	405485	Q4	359157	R38	240117		
C14	358959	Q5	273635	R39	240419		
C15	357383	Q6	273635	R40	240427		
C16	357472	Q7	273627	R41	240427		
C17	358959	Q8	273627	R42	240389		
C18	358959	Q9	405477	R43	240222		
C19	358959	Q10	405477	R44	240516		
C20	358959	Q11	405477	R45	240516		
C21	405485	Q12	357804				
C22	358959						
C23	357383						
C24	357472			U1	373532		
C25	405469	R1	240680	U2	375349		
C26	405469	R2	240680	U3	362522		
C27	358959	R3	240451	U4	362158		
C28	358959	R4	240621	U5	365874		
C29	357561	R5	240680				
C30	393959	R6	240680				
C31	357642	R7	240451				
C32	393959	R8	240621	W35	396958		
		R9	240532	W36	396931		
		R10	240109	W37	398713		
CR1	228087	R11	240583				
CR2	372595	R12	363227				
CR3	228087	R13	240524				
CR4	372595	R14	240621				
CR5	228087	R15	328588				
CR6	228087	R16	240680				
CR7	359742	R17	240559				
CR8	358614	R18	240524				
CR9	358614	R19	240559				
		R20	240680				
		R21	240524				
		R22	240567				
		R23	377287				
		R24	240710				
J1	357847	R25	367826				

PARTS LIST (1978-05-22)
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Interconnection
Diagram
MR 6000

Ref. Desig.4675
Diag. No. 4675

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
B1	373702						
DS1	373982						
DS2	373990						
J3	220345						
R1	260206						
R2							
R3							
R4	367966						
R5	373060						
R6	367966						
R7	367966						
S1	376248						
S2	376248						
S3	376922						
S4	376248						
T1	373672						
T2	373680						
W16	378240						
W17	378259						
W18	378267						
W19	378275						

PARTS LIST (1979-07-30)
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PCB W/Comp.
78-108 MHz Divider
MR 6000
SE 6000

Ref. Desig. 4531
Diag. No. 4531

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357596	Q1	359157	U13	369802		
C2	358959	Q2	273899	U14	369802		
C3	202967	Q3	369454	U15	362158		
C4	357650	Q4	399914	U16	357898		
C5	202967	Q5	273899	U17	371076		
C6	202967	Q6	357901	U18	362085		
C7	357596	Q7	357901	U19	365874		
C8	357650			U20	362158		
C9	373176						
C10	367650						
C11	399906	R1	240400				
C12	209724	R2	240478				
C13	357596	R3	240400				
C14	357650	R4	240478				
C15	357383	R5	240745				
C16	357642	R6	240745				
C17	358959	R7	240400				
C18	358959	R8	240370				
C19	358959	R9	240400				
C20	358959	R10	240516				
C21	358959	R11	240478				
C22	358959	R12	240478				
C23	358959	R13	240370				
C24	358959	R14	240745				
C25	358959	R15	240451				
C26	358959	R16	240222				
C27	357634	R17	240451				
C28	358959	R18	240400				
C29	358959	R19	240206				
C30	357634	R20	240281				
		R21	361542				
		R22	240702				
		R23	240346				
CR1	228087	R24	240117				
CR2	228087						
CR3	228087						
CR4	228087						
CR5	362727						
CR6	228834						
		U1	355003				
		U2	405418				
J1	358584	U3	354872				
J2	361399	U4	355003				
J3	361399	U5	355011				
		U6	405418				
		U7	405418				
		U8	355003				
L1	320021	U9	405418				
L2	320021	U10	362158				
L3		U11	362077				
L4	363308	U12	227617				

PARTS LIST (1979-08-15)
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Standard Divider OCXO
MR 6000

Ref. Desig. 4686
Diag. No. 4686

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357642	Q1	273899				
C2	357642	Q2	273899				
C3	209767	Q3	273899				
C4	209767	Q4	359157				
C5	357642						
C6	209767						
C7	386480						
C8	209538	R1	240346				
C9	386480	R2	328626				
C10	385514	R3	240516				
C11	202967	R4	240745				
C12	202991	R5	240567				
C13	391956	R6	240648				
C14	202991	R7	328626				
C15	202991	R8	240516				
C16	391956	R9	240346				
C17	391956	R10	240427				
C18	391956	R11	240648				
C19	202967	R12	240648				
		R13	396133				
		R14	240184				
		R15	240346				
CR1	228087	R16	240745				
CR2	228087	R17	240745				
CR3	228087	R18	240869				
CR4	228087	R19	240451				
CR5	228087						
CR6	432741	R21	240370				
		R22	240257				
		R23	242357				
J1	357847						
		S1	359416				
L1	359289						
L2	359289						
L3	359289	U1	442933				
L4	364223	U2	362166				
L5	363294	U3	365874				
L6	363294	U4	365874				
		U5	362166				
		U6	362166				
		U7	362093				
P1	358665	U8	227404				
P2	358665	U9	362085				
P3	358665	U10	378291				
P4	358665	U11	354821				
P5	361399	U12	375349				
P6	361399						
P7	361399						
P8	361399						
		Y1	442925				

PARTS LIST (1979-07-30)
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PCB W/Comp.
78-108 MHz Divider
MR 6000
SE 6000

Ref. Desig. 4531
Diag. No. 4531

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357596	Q1	359157	U13	369802		
C2	358959	Q2	273899	U14	369802		
C3	202967	Q3	369454	U15	362158		
C4	357650	Q4	399914	U16	357898		
C5	202967	Q5	273899	U17	371076		
C6	202967	Q6	357901	U18	362085		
C7	357596	Q7	357901	U19	365874		
C8	357650			U20	362158		
C9	373176						
C10	367650						
C11	399906	R1	240400				
C12	209724	R2	240478				
C13	357596	R3	240400				
C14	357650	R4	240478				
C15	357383	R5	240745				
C16	357642	R6	240745				
C17	358959	R7	240400				
C18	358959	R8	240370				
C19	358959	R9	240400				
C20	358959	R10	240516				
C21	358959	R11	240478				
C22	358959	R12	240478				
C23	358959	R13	240370				
C24	358959	R14	240745				
C25	358959	R15	240451				
C26	358959	R16	240222				
C27	357634	R17	240451				
C28	358959	R18	240400				
C29	358959	R19	240206				
C30	357634	R20	240281				
		R21	361542				
		R22	240702				
		R23	240346				
CR1	228087	R24	240117				
CR2	228087						
CR3	228087						
CR4	228087						
CR5	362727						
CR6	228834						
		U1	355003				
		U2	405418				
J1	358584	U3	354872				
J2	361399	U4	355003				
J3	361399	U5	355011				
		U6	405418				
		U7	405418				
		U8	355003				
L1	320021	U9	405418				
L2	320021	U10	362158				
L3		U11	362077				
L4	363308	U12	227617				

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Standard Divider OCXO
MR 6000

Ref. Desig. 4686
Diag. No. 4686

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357642	Q1	273899				
C2	357642	Q2	273899				
C3	209767	Q3	273899				
C4	209767	Q4	359157				
C5	357642						
C6	209767						
C7	386480						
C8	209538	R1	240346				
C9	386480	R2	328626				
C10	385514	R3	240516				
C11	202967	R4	240745				
C12	202991	R5	240567				
C13	391956	R6	240648				
C14	202991	R7	328626				
C15	202991	R8	240516				
C16	391956	R9	240346				
C17	391956	R10	240427				
C18	391956	R11	240648				
C19	202967	R12	240648				
		R13	396133				
		R14	240184				
		R15	240346				
CR1	228087	R16	240745				
CR2	228087	R17	240745				
CR3	228087	R18	240869				
CR4	228087	R19	240451				
CR5	228087						
CR6	432741	R21	240370				
		R22	240257				
		R23	242357				
J1	357847						
		S1	359416				
L1	359289						
L2	359289						
L3	359289	U1	442933				
L4	364223	U2	362166				
L5	363294	U3	365874				
L6	363294	U4	365874				
		U5	362166				
		U6	362166				
		U7	362093				
P1	358665	U8	227404				
P2	358665	U9	362085				
P3	358665	U10	378291				
P4	358665	U11	354821				
P5	361399	U12	375349				
P6	361399						
P7	361399						
P8	361399						
		Y1	442925				

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Display
MR 6000 FM 6001

Ref. Desig. 4687
Diag. No. 4687

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	391956	U15	443166				
		U16	443166				
		U17	443166				
		U18	443166				
CR1	362573	U19	443166				
CR2	362573	U20	443166				
CR3	362573	U21	362565				
CR4	371548	U22	362565				
CR5	371548						
CR6	371521						
CR7	228141						
CR8	228141	W30	379158				
J1	261270						
J2	261270						
J3	261270						
Q1	273899						
R1	240869						
R2	240664						
R3	240567						
R4	240567						
R5	240281						
R6	240869						
R7	240664						
R8	361550						
R9	240664						
R10	240745						
R11	240281						
R12	240281						
R13	240400						
R14	328626						
U1	443174						
U2	443174						
U3	443174						
U4	443174						
U5	443174						
U6	443174						
U7	443174						
U8	355011						
U9	355011						
U10	355011						
U11	355011						
U12	355011						
U13	355003						
U14	443166						

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Power Regulator Board
MR 6000 - 01

Ref. Desig. 4800
Diag. No. 4800

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	328022	R4	240680				
C2	202967	R5	240567				
C3	203572	R6	240427				
C4	375322	R7	240567				
C5	209805	R8	240419				
C6	209805	R9	373257				
C7	209724	R10	240494				
C8	375322	R11	240559				
C9	209805	R12	240648				
C10	209759	R13	324191				
		R14	368636				
		R15	240605				
		R16	243450				
CR1	228087	R17	240419				
CR2	228087	R18	373257				
CR3	373249	R19	240524				
CR4	228141	R20	240567				
CR5	228141	R21	365963				
CR6	228842	R22	240532				
CR7	228141	R23	242314				
CR8	228141	R24	240427				
F1	262692	S1	371718				
		S2	371696				
J1	358584						
J2	373273	U1	357707				
J3	372013	U2	362115				
J4	369276	U3	362115				
K1	442534						
Q1	273899						
Q2	273899						
Q3	273899						
Q4	273503						
Q5	273503						
Q6	273554						
Q7	273554						
Q8	273899						
Q9	273503						
Q10	273570						
R1	240680						
R2	240680						
R3	240648						

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Rectifier
MR 6000

Ref. Desig. 4807
Diag. No. 4807

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	440051						
C2	440051						
C3	209422						
C4	209422						
C5	209422						
C6	209422						
C7	209422						
C8	209422						
C9	209422						
C10	209422						
C11							
C12	203572						
CR1	371491						
CR2	371505						
CR3	228141						
CR4	228141						
CR5	228141						
J1	369276						
J2	369276						
J3	369276						
J4	369276						
J5	369276						
J6	369276						
J7	357847						
U1	390526						

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AF and Linear Controls
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Ref. Desig. 4808
Diag. No. 4808

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	209791	J1	369322	R37	241202		
C2	391956	J2	369322	R38	240451		
C3	391956	J3		R39	240443		
C4	391956			R40	241202		
C5	209767			R41	240621		
C6	209791			R42	240710		
C7	209775	Q1	273899	R43	359165		
C8	362670	Q2	357901	R44	361321		
C9	393959	Q3	273899	R45	361321		
C10	328022	Q4	273635	R46	240443		
C11	380792	Q5	273899	R47	359165		
C12		Q6	359157	R48	240745		
C13		Q7	273899	R49	240745		
C14	203629	Q8		R50	240680		
C15	358959			R51	240680		
C16	393959			R52	240400		
C17	209767			R53	362840		
C18	202967			R54	240850		
C19	202967	R1	240680	R55	328626		
C20	209767	R2	240621	R56	240745		
C21	209805	R3	240567	R57	240621		
C22	209791	R4	240591	R58	240745		
C23	358959	R5	357693	R59	240389		
C24	358959	R6	240761	R60	240761		
C25	359246	R7	240567				
C26	357626	R8	324183				
C27	390224	R9	362840				
C28	209783	R10	240621	T1	362859		
C29	209805	R11	240516				
		R12	362840				
		R13	359165				
		R14	240664	U1	357707		
		R15	328596	U2	357707		
		R16	240478	U3	443964		
CR1	228087	R17	324183	U4	367672		
CR2	228869	R18	240222	U5	367672		
CR3	228087	R19	240095	U6	354791		
CR4	228087	R20	240516	U7	391344		
CR5	228850	R21	240311	U8	362115		
CR6	228087	R22	240680				
CR7	228087	R23	240095				
CR8	228087	R24	240680				
CR9	372595	R25	361542				
CR10	228087	R26	240583				
CR11	228087	R27	240397				
CR12	228087	R28	240583				
CR13	228087	R29	240680				
CR14	228087	R30	362840				
CR15	228087	R31	240478				
CR16	228087	R32	240680				
CR17	228796	R33	361550				
		R34	362840				
		R35	240451				
		R36	240516				

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Motherboard
MR 6000

Ref. Desig. 4812
Diag. No. 4812

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	209767	W11	376957				
C2	357634	W12	376965				
C3	357634	W13	376973				
C4	357634	W14	376981				
C5	357634	W15	377007				
C6	357634						
C7	357634	W28	372765				
C8	357634						
C9	357634	W31	372773				
C10	357634	W32	372781				
C11	357634	W33	380423				
C12	357634	W34	387673				
C13	357634						
C14	357634						
P1	359505						
P2	359505						
P3	359505						
P4	359505						
P5	359505						
P6	359505						
P7	359505						
P8	359505						
P9	359505						
P10	359505						
P11	359505						
P12	359505						
P13	359505						
P14	359505						
P15	359505						
P16	359505						
P17	359513						
P18	359513						
P19	359513						
P20	359513						
P21	359513						
P22	359513						
P23	359513						
P24	359513						
P25	359513						
P26	376639						
P27	376639						
W4	372803						
W5	372811						
W6	372838						
W7	372846						
W8	372854						
W9	376930						
W10	376949						

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Motherboard
MR 6000

Ref. Desig. 4812
Diag. No. 4812

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	209767	W11	376957				
C2	357634	W12	376965				
C3	357634	W13	376973				
C4	357634	W14	376981				
C5	357634	W15	377007				
C6	357634						
C7	357634	W28	372765				
C8	357634						
C9	357634	W31	372773				
C10	357634	W32	372781				
C11	357634	W33	380423				
C12	357634	W34	387673				
C13	357634						
C14	357634						
P1	359505						
P2	359505						
P3	359505						
P4	359505						
P5	359505						
P6	359505						
P7	359505						
P8	359505						
P9	359505						
P10	359505						
P11	359505						
P12	359505						
P13	359505						
P14	359505						
P15	359505						
P16	359505						
P17	359513						
P18	359513						
P19	359513						
P20	359513						
P21	359513						
P22	359513						
P23	359513						
P24	359513						
P25	359513						
P26	376639						
P27	376639						
W4	372803						
W5	372811						
W6	372838						
W7	372846						
W8	372854						
W9	376930						
W10	376949						

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Ref. Desig. 4813
Diag. No. 4813

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	202967	C57	202967	FL1	361631	Q13	359157
C2		C58	359653	FL2	361658	Q14	273899
C3	357642	C59	373176	FL3	361666	Q15	273899
C4		C60	359653			Q16	273503
C5		C61	373176			Q17	389730
C6	202967	C62	358959			Q18	359157
C7	357642	C63	357650			Q19	273899
C8	209503	C64	357650			Q20	273899
C9	202967	C65	357650	J1	358584	Q21	389730
C10	202967	C66	357650	J2	357847	Q22	273899
C11	202967	C67	357650			Q23	273899
C12		C68	357650			Q24	389730
C13	357642	C69	357650			Q25	357901
C14	202967	C70	357650			Q26	273899
C15		C71	357650			Q27	357901
C16		C72	357650	L1	368660	Q28	273899
C17	357642	C73	357650	L2	361674		
C18	209546	C74	357650	L3			
C19	202967	C75	357642	L4	368660		
C20	202967	C76	357650	L5	361674		
C21	209503			L6			
C22	209546			L7	361704		
C23	202967			L8	361690	R1	240567
C24	357626			L9	361690	R2	240737
C25	357391			L10	368660	R3	240400
C26		CR1	358592	L11	361704	R4	240680
C27	359637	CR2	358592	L12	361712	R5	240451
C28	359653	CR3	228087	L13	368660	R6	240141
C29	209503	CR4	228087	L14	368660	R7	240664
C30	202967	CR5	228087	L15	361704	R8	240680
C31	357642	CR6	228087	L16	368660	R9	240680
C32	202967	CR7	358592	L17	368660	R10	240222
C33	209546	CR8	358592	L18	361674	R11	240400
C34	357642	CR9	228087	L19		R12	
C35	202967	CR10	228087			R13	240567
C36	202967	CR11	228087			R14	240737
C37	202967	CR12	228087			R15	240680
C38	209546	CR13	228087			R16	240400
C39	202967	CR14	358592			R17	240451
C40	202967	CR15	358592	P1	361399	R18	240400
C41	359661	CR16	228087			R19	240737
C42	203165	CR17	228087			R20	240680
C43	357642	CR18	228087			R21	240141
C44	357642	CR19	228087			R22	240222
C45	209546	CR20	228087	Q1	359157	R23	240451
C46	202967	CR21	228087	Q2	273899	R24	240419
C47	209546	CR22	228087	Q3	389730	R25	240680
C48	359599	CR23	228087	Q4	357901	R26	240737
C49		CR24	228087	Q5	273899	R27	240621
C50	203203	CR25	228087	Q6	359157	R28	240400
C51	202967	CR26	358592	Q7	273899	R29	
C52	202967	CR27	358592	Q8	357901	R30	240664
C53	209503	CR28	228087	Q9	389730	R31	240222
C54	202967	CR29	228087	Q10	273899	R32	240141
C55	202967			Q11	389730	R33	240141
C56	357626			Q12	357901	R34	240680

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Ref. Desig. 4813
Diag. No. 4813

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
R35	328618						
R36	240737						
R37	240400						
R38	240567						
R39	240680						
R40	240451						
R41	240737						
R42	240141						
R43	240400						
R44	240648						
R45	240451						
R46	240419						
R47	240737						
R48	240737						
R49	240400						
R50	240567						
R51	240680						
R52	240451						
R53	328545						
R54	324221						
R55	240648						
R56	240648						
R57	240451						
R58	240419						
R59	240737						
R60	240141						
R61	240680						
R62	240141						
R63	240141						
R64	240222						
R65	240737						
R66	240400						
R67	240621						
R68							
R69	240680						
R70	240680						
R71	240400						
R72	240400						
R73	240400						
R74	240400						
R75	240400						
R76	240400						
R77	240400						
R78	240389						
R79	240680						
R80	240737						
R81	240400						

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Ref. Desig. 4814
Diag. No. 4814

Ref. Desig.	DRA Code
C1	209791
C2	357626
C3	357642
C4	358924
C5	202967
C6	358932
C7	358940
C8	209791
C9	357626
C10	202967
C11	202967
C12	202967
C13	209503
C14	358924
C15	202967
C16	358932
C17	357642
C18	357626
C19	357642
C20	358940
C21	202967
C22	202967
C23	202967
C24	209503
C25	209503
C26	209791
C27	357642
C28	358959
C29	358959
C30	357650
C31	202967
C32	357626
C33	209791
C34	202967
C35	209503
C36	358932
C37	357642
C38	357642
C39	202967
C40	202967
C41	357642
C42	358932
C43	202967
C44	357642
C45	357626
C46	202967
C47	359734
C48	209503
C49	203165
C50	202967
C51	358959
C52	357642
C53	202967
C54	202967
C55	357650
C56	357650
C57	
C58	
C59	357650
C60	357650
C61	357650
C62	
C63	357650
C64	357650
C65	357650
C66	357650
C67	202967
C68	202967
CR1	228087
CR2	358592
CR3	358592
CR4	228087
CR5	228087
CR6	358592
CR7	358592
CR8	228087
CR9	228087
CR10	228087
CR11	228087
CR12	228087
CR13	358592
CR14	358592
CR15	228087
CR16	228087
FL1	
FL2	
FL3	361763
L1	361704
L2	425672
L3	361704
L4	425672
L5	359009
L6	372927
L7	372927
L8	361704
L9	363308
L10	368660
L11	368660
P1	358584
P2	357847
P3	357847
Q1	389730
Q2	357901
Q3	273899
Q4	357901
Q5	273899
Q6	273899
Q7	273899
Q8	273899
Q9	273899
Q10	359157
Q11	273899
Q12	389730
Q13	273899
Q14	273899
Q15	273899
Q16	273899
Q17	273899
Q18	273899
Q19	273503
Q20	273899
Q21	357901
Q22	357901
Q23	273899
Q24	389730
Q25	273899
Q26	273899
Q27	273899
Q28	273899
Q29	389730
R1	240397
R2	Fac.sel.
R3	240443
R4	240443
R5	240141
R6	240516
R7	240680
R8	240737
R9	240680
R10	240400
R11	240222
R12	328588
R13	Fac.sel.
R14	240397
R15	240443
R16	240443
R17	240141
R18	240516
R19	240680
R20	240737
R21	240680
R22	240400
R23	240222
R24	328588
R25	240567
R26	328626
R27	240524
R28	240362
R29	240680
R30	240524
R31	240702
R32	240702
R33	240613
R34	240745
R35	240524
R36	240621
R37	240621
R38	362239
R39	240680
R40	240451
R41	240567
R42	240737
R43	240680
R44	240745
R45	240648
R46	240141
R47	240737
R48	240737
R49	240737
R50	240745
R51	240745
R52	240397
R53	240737
R54	240478
R55	240400
R56	240222
R57	240818
R58	240443
R59	Fac.sel.
R60	240354
R61	240680
R62	240141
R63	240443
R64	372137

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Ref. Desig. 4814
Diag. No. 4814

Ref. Desig.	DRA Code
R65	240664
R66	240222
R67	328588
R68	240230
R69	240354
R70	240745
R71	361542
R72	240621
R73	240478
R74	240478
R75	240478
R76	240745
R77	240737
R78	240451
R79	240680
R80	240737
R81	240745
R82	240141
R83	240400
R84	240400
R85	
R86	
R87	240400
R88	240400
R89	240400
R90	
R91	240400
R92	240400
R93	240400
R94	240400
R95	328588
U1	358886
U2	358886
U3	358886
U4	354821

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Ref. Desig. 4814
Diag. No. 4814

Ref. Desig.	DRA Code
C1	209791
C2	357626
C3	357642
C4	358924
C5	202967
C6	358932
C7	358940
C8	209791
C9	357626
C10	202967
C11	202967
C12	202967
C13	209503
C14	358924
C15	202967
C16	358932
C17	357642
C18	357626
C19	357642
C20	358940
C21	202967
C22	202967
C23	202967
C24	209503
C25	209503
C26	209791
C27	357642
C28	358959
C29	358959
C30	357650
C31	202967
C32	357626
C33	209791
C34	202967
C35	209503
C36	358932
C37	357642
C38	357642
C39	202967
C40	202967
C41	357642
C42	358932
C43	202967
C44	357642
C45	357626
C46	202967
C47	359734
C48	209503
C49	203165
C50	202967
C51	358959
C52	357642
C53	202967
C54	202967
C55	357650
C56	357650
C57	
C58	
C59	357650
C60	357650
C61	357650
C62	
C63	357650
C64	357650
C65	357650
C66	357650
C67	202967
C68	202967
CR1	228087
CR2	358592
CR3	358592
CR4	228087
CR5	228087
CR6	358592
CR7	358592
CR8	228087
CR9	228087
CR10	228087
CR11	228087
CR12	228087
CR13	358592
CR14	358592
CR15	228087
CR16	228087
FL1	
FL2	
FL3	361763
L1	361704
L2	425672
L3	361704
L4	425672
L5	359009
L6	372927
L7	372927
L8	361704
L9	363308
L10	368660
L11	368660
P1	358584
P2	357847
P3	357847
Q1	389730
Q2	357901
Q3	273899
Q4	357901
Q5	273899
Q6	273899
Q7	273899
Q8	273899
Q9	273899
Q10	359157
Q11	273899
Q12	389730
Q13	273899
Q14	273899
Q15	273899
Q16	273899
Q17	273899
Q18	273899
Q19	273503
Q20	273899
Q21	357901
Q22	357901
Q23	273899
Q24	389730
Q25	273899
Q26	273899
Q27	273899
Q28	273899
Q29	389730
R1	240397
R2	Fac.sel.
R3	240443
R4	240443
R5	240141
R6	240516
R7	240680
R8	240737
R9	240680
R10	240400
R11	240222
R12	328588
R13	Fac.sel.
R14	240397
R15	240443
R16	240443
R17	240141
R18	240516
R19	240680
R20	240737
R21	240680
R22	240400
R23	240222
R24	328588
R25	240567
R26	328626
R27	240524
R28	240362
R29	240680
R30	240524
R31	240702
R32	240702
R33	240613
R34	240745
R35	240524
R36	240621
R37	240621
R38	362239
R39	240680
R40	240451
R41	240567
R42	240737
R43	240680
R44	240745
R45	240648
R46	240141
R47	240737
R48	240737
R49	240737
R50	240745
R51	240745
R52	240397
R53	240737
R54	240478
R55	240400
R56	240222
R57	240818
R58	240443
R59	Fac.sel.
R60	240354
R61	240680
R62	240141
R63	240443
R64	372137

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Ref. Desig. 4814
Diag. No. 4814

Ref. Desig.	DRA Code
R65	240664
R66	240222
R67	328588
R68	240230
R69	240354
R70	240745
R71	361542
R72	240621
R73	240478
R74	240478
R75	240478
R76	240745
R77	240737
R78	240451
R79	240680
R80	240737
R81	240745
R82	240141
R83	240400
R84	240400
R85	
R86	
R87	240400
R88	240400
R89	240400
R90	
R91	240400
R92	240400
R93	240400
R94	240400
R95	328588
U1	358886
U2	358886
U3	358886
U4	354821

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73.5 MHz Loop
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Ref. Desig. 4815
Diag. No. 4815

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357642	L8		R33			
C2	209805	L9		R34			
C3	357642			R35			
C4	202991			R36	240249		
C5	209791			R37	240176		
C6	357642			R38	240125		
C7	209570	P1	358747	R39	240400		
C8	357634	P2	358584				
C9	209805						
C10	209554						
C11	357642						
C12	357642						
C13	357685						
C14	357669	Q1	273899	U1	227404		
C15	357677	Q2	357901	U2	227536		
C16	357626	Q3	357804	U3	369802		
C17	357626	Q4	357804	U4	369802		
C18	357626	Q5	273562	U5	369802		
C19	357642	Q6		U6	357898		
C20	357626						
C21	357642						
C22	357626						
C23	357642						
C24	357626			W20	378208		
C25	357626	R1	240117	W21	364487		
C26		R2					
C27		R3	371866				
C28	357545	R4	240427				
C29		R5	240567				
C30		R6	240451	Y1	358681		
C31	361356	R7	324175				
		R8	240761				
		R9	240702				
		R10	240222				
		R11	240435				
		R12	357693				
CR1	228834	R13	357693				
CR2	357936	R14	240486				
		R15	240486				
		R16	240400				
		R17	240184				
		R18	240400				
		R19	240508				
J1	261270	R20	240486				
		R21	240400				
		R22	240184				
		R23	240354				
		R24	240516				
		R25	240400				
L1	357723	R26	240400				
L2		R27	240184				
L3		R28	241342				
L4	357790	R29	240516				
L5	357731	R30	324205				
L6	357766	R31					
L7	357731	R32					

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Ref. Desig. 4817
Diag. No. 4817

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	357650	L12	363308				
C2	357650	L13	363308				
C3	357650	L14	363308				
C4	357650						
C5	357650						
C6	357650						
C7	357650						
C8	357650	LS1	219835				
C9	357650						
C10	357650						
C11	357650						
C12	357650	R1	240567				
C13	357650	R2	240567				
C14	357650	R3	240567				
C15	357650	R4	240567				
C16	357650	R5	240567				
C17	202835	R6	240567				
C18	357634	R7	240567				
C19	357634	R8	240567				
C20	357634	R9	240567				
C21	357634	R10	240567				
C22	357634						
C23	357634						
C24	357634						
C25	357634						
C26	357634	S1	376248				
C27	357634						
C28	357634						
C29	357634						
C30	357634						
C31	357634						
C32	357634						
C33	203610						
J1	364711						
J2	368016						
J3	368008						
L1	363308						
L2	363308						
L3	363308						
L4	363308						
L5	363308						
L6	363308						
L7	363308						
L8	363308						
L9	212806						
L10	363308						
L11	363308						

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Ref. Desig. 4818
Diag. No. 4818

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	209708	Q1	359157				
C2	209708						
C3	359246						
C4	359246						
C5	359246						
C6	358959	R1	240745				
C7	359246	R2	452017				
C8	357650	R3					
C9	358959	R4	452017				
C10	357626	R5					
C11	357626	R6	452025				
C12	357626	R7					
		R8	240451				
		R9	240745				
		R10	240621				
		R11					
		R12	240745				
CR1	362484	R13	240761				
CR2	362484						
CR3	362484						
CR4	362484						
CR5	228141						
CR6	228141						
		U1	373753				
J1	357847						
K1	371742 24V						
K2	359521						
K3	359521						
K4	371742 – 373311 12V						
L1	366021						
L2	392294						
L3	392294						
L4	392294						
L5	392294						
L6	364045						
P1	358665						
P2	361399						
P3	361399						

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Ref. Desig. 4819
Diag. No. 4819

Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
C1	209805	CR34	228087	J1	362689	R35	240680
C2	209805	CR35		J2	357847	R36	328626
C3		CR36	228087	J3	362689	R37	328626
C4	357642	CR37	228087	J4	362689	R38	328626
C5	209554	CR38	228087	J5	358584	R39	328626
C6	393959	CR39	228087	J6	362697	R40	328626
C7	209767	CR40	228087			R41	328626
C8	209767	CR41	228087			R42	328626
C9	209767	CR42	228087			R43	
C10		CR43	228087			R44	328626
C11	202991	CR44	228087			R45	240567
C12	357642	CR45	228087	Q1	359157	R46	328626
C13	358959	CR46	228087	Q2	273899	R47	240680
C14	358959	CR47	228087	Q3		R48	
C15	358959	CR48	228087	Q4	359157	R49	240869
C16		CR49	228087	Q5	369454	R50	240745
C17	202991	CR50	228087			R51	240680
C18	357448	CR51	228087			R52	240567
		CR52	228087			R53	240745
		CR53	228087			R54	240745
		CR54	228087			R55	328626
		CR55	228087	R1	240761	R56	240745
CR1	228087	CR56	228087	R2	240222	R57	
CR2	228087	CR57	228087	R3	240745	R58	240400
CR3	228087	CR58	228087	R4	328626	R59	241377
CR4	228087	CR59	228087	R5	240761	R60	240869
CR5		CR60	228087	R6	240680	R61	240567
CR6	228087	CR61	228087	R7	363537	R62	328626
CR7	228087	CR62	228087	R8	363537	R63	240222
CR8	228087	CR63	228087	R9	363537	R64	240249
CR9	228087	CR64	228087	R10	363537	R65	328626
CR10	228087	CR65	228087	R11	328626	R66	328626
CR11	228087	CR66	228087	R12	328626		
CR12	228087	CR67	228087	R13	328626		
CR13	228087	CR68	228087	R14	328626	U1	354910
CR14	228087	CR69		R15	328626	U2	354910
CR15	228087	CR70	228087	R16	328626	U3	354910
CR16	228087	CR71	228087	R17	328626	U4	354899
CR17	228087	CR72	228087	R18	328626	U5	354775
CR18	228087	CR73	228087	R19	328626	U6	354910
CR19	228087	CR74	228087	R20	328626	U7	354910
CR20	228087	CR75	228087	R21	328626	U8	354910
CR21	228087	CR76	228087	R22	328626	U9	354910
CR22	228087	CR77	228087	R23	328626	U10	355011
CR23	228087	CR78	228087	R24	328626	U11	355011
CR24	228087	CR79	228087	R25	328626	U12	354953
CR25	228087	CR80	228087	R26	328626	U13	364983
CR26	228087	CR81	228087	R27	240761	U14	364983
CR27	228087	CR82	228087	R28	328626	U15	364983
CR28	228087	CR83	432741	R29	240451	U16	364983
CR29	228087	CR84	228087	R30		U17	354910
CR30	228087	CR85	228087	R31	328626	U18	354902
CR31	228087	CR86	228087	R32	328626	U19	354961
CR32	228087	CR87	228087	R33	328626	U20	354902
CR33		CR88	228087	R34	328626	U21	367672

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Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code	Ref. Desig.	DRA Code
U22	354902						
U23	354902						
U24	389595						
U25	389595						
U26	389595						
U27	354937						
U28	354937						
U29	354937						
U30	354937						
U31	362085						
U32	367672						
U33	367672						
U34	354775						
U35	354872						
U36	355011						
U37	367745						

SECTION 8.2. COMPONENT SPECIFICATIONS.

The following list gives specifications on all components used in the equipment. The specifications are given in order of DRA code numbers.

The following classification letters (CL LTR) are used:

A: Subassembly, repairable
B: Blower
BT: Batteries
C: Capacitor
CB: Circuit Breaker
CR: Diode, Zener Diode, Rectifier
DS: Indicator, Control Lamp, Buzzer
F: Fuse
FL: Filter
J: Coaxial Connector, Plug and Socket
K: Relay
L: Coil, Inductor, HF Transformer
LS: Loud Speaker
M: Meter
MK: Microphone, Telephone, Handset
P: Connector (other than Coax), Plug and Socket
Q: Transistor
R: Resistor
RT: Thermistor, NTC/PTC Resistors
RV: Voltage sensitive Resistor
S: Switch
T: Transformer (except HF Transformer)
TB: Terminal-Strip and Stand Off
U: Integrated Circuit
V: Valve
W: Cable Assembly
XDS: Control Lamp Holder
XF: Fuse Holder
XK: Relay Socket
XQ: Transistor Socket
XU: Socket for integrated Circuit
XV: Socket for Valve
XY: Socket for Crystal Unit
Y: Crystal

TO ORDER SPARE PARTS: Please refer to DRA code numbers (Section 8.1.)

COMPONENT SPECIFICATION (80-04) RECEIVER TYPE MR 6000

DRA code	CL LTR	Description	Specification	MFR code	MFR
202797	C	Semivar. Plastic Foil	18P	222280905003	Philips
202835	C	Polyester Metaliz	U1 10% 250 V	222234189104	Philips
202967	C	Polycarb. MET.DIN44112	U1 10% 100 V	222234421104	Philips
202975	C	Polycarb. MET.DIN44112	1U 10% 100 V	222234421105	Philips
202991	C	Polycarb. MET.DIN44112	U22 10% 100 V	222234421224	Philips
203041	C	Polyester Metaliz	U1 10% 400 V	222234159104	Philips
203165	C	Polystyrene Ext. Foil	1N5 2% 125 V	222242531502	Philips
203203	C	Polystyrene Ext. Foil	1N8 1% 125 V	222242541802	Philips
203513	C	Polystyrene Ext. Foil	1N8 1% 500 V	222242741802	Philips
203572	C	Electrolytic Long Life	22U -10+50% 64 V	PEG124MA220	Rifa
203610	C	Electrolytic Long Life	1000U -10+50% 16 V	PEG124GG410	Rifa
203629	C	Electrolytic Long Life	220U -10+50% 25 V	PEG124HD322	Rifa
204625	C	Ceramic Tubular NPO	33P 5% 250 V	9/0112.3	Ferroperm
205028	C	Ceramic Tubular N 750	33P 5% 250 V	9/0121.3	Ferroperm
205346	C	Ceramic Disc. HI-K	1N 20% 400 V	9/0129.9	Ferroperm
205486	C	Ceramic Disc Barr Lay	47N -20+80% 30 V	9/0145.9	Ferroperm
205524	C	Ceramic Plate HI-K	1N 20% 40 V	9/0129.8	Ferroperm
207969	C	Polystyrene Foil	5N 5% 30 V	HS10A	Suflex
208086	C	Polycarbonate Metaliz	4U7 10% 634	SN1106 MPC	Suflex
208655	C	Electrolytic	4700U 63 V	EAL3-0635L4M7EF	Tobias Jensen
209295	C	Ceramic Plate HI-K	8N2 20% 40 V	9/0138.8	Ferroperm
209325	C	Electrolytic Long Life	100U -10+50% 16 V	PEG124GA310	Rifa
209392	C	Electrolytic Long Life	470U -10+50% 64 V	PEG124ML347	Rifa
209422	C	Electrolytic Long Life	1000U -10+50% 25 V	PEG124HJ410	Rifa
209503	C	Polycarb. MET.DIN44112	U47 10% 100 V	222234421474	Philips
209538	C	Polystyrene Ext. Foil	100P 1% 500 V	222242741001	Philips
209546	C	Polystyrene Ext. Foil	1N 1% 125 V	222242541002	Philips
209554	C	Polycarb. MET.DIN44112	10N 10% 250 V	222234441103	Philips
209570	C	Polycarb. MET.DIN44112	47N 10% 250 V	222234441473	Philips
209600	C	Polystyrene Ext. Foil	470P 1% 250 V	222242644701	Philips
209619	C	Polystyrene Ext. Foil	510P 1% 250 V	222242645101	Philips
209635	C	Polyester Metaliz	47N 10% 250 V	222234245473	Philips
209643	C	Polystyrene Ext. Foil	820P 1% 125 V	222242548201	Philips
209678	C	Polycarb. MET.DIN44112	U1 10% 400 V	222234451104	Philips
209708	C	Polycarb. MET.DIN44112	U1 10% 630 V	222234461104	Philips
209724	C	Tantalum Dry Epoxydip	47U -20+50% 6.3 V	0678-901-210	Bosch
209759	C	Tantalum Dry Epoxydip	22U -20+50% 16 V	0678-901-218	Bosch
209767	C	Tantalum Dry Epoxydip	15U -20+50% 20 V	0678-901-221	Bosch
209775	C	Tantalum Dry Epoxydip	U47 -20+50% 35 V	0678-901-234	Bosch
209783	C	Tantalum Dry Epoxydip	1U -20+50% 35 V	0678-901-236	Bosch
209791	C	Tantalum Dry Epoxydip	2U2 -20+50% 35 V	0678-901-238	Bosch
209805	C	Tantalum Dry Epoxydip	6U8 -20+50% 35 V	0678-901-241	Bosch
209821	C	Tantalum Dry Epoxydip	15U -20+50% 3 V	TAG15/3	ITT
212717	L	Choke Coil	1MO 10% 0.12 A	1583/49	Prahn
212806	L	Choke Coil	80U 10% 1.0 A	B82501-C-C13	Siemens
214612	CR	Diode B. B60C800SI	SI Power	B60C800SI	AEG
219835	LS	Loudspeaker	4 ohm	E20MT	Peerless
220345	P	Jack Female	SPDT	J19	Bulgin
227404	U	IC Digital SN7400N	QUAD 2INP NAND	SN7400N	Texas Instruments
227420	U	IC Digital SN7420N	DUAL 4INP NAND	SN7420N	Texas Instruments
227447	U	IC Digital SN7473N	Dual JK HS FF	SN7473N	Texas Instruments
227455	U	IC Digital SN7490N	Decade Counter	SN7490N	Texas Instruments
227501	U	IC Digital SN74H20N	Dual 4inp nand	SN74H20N	Texas Instruments
227536	U	IC Digital SN74H72N	JK MS FF	SN74H72N	Texas Instruments
227617	U	IC Digital SN74196N	Decade W Preset	SN74196N-N8280A	Texas Instruments
228079	CR	Diode BAV10	SI SIGNAL	BAV10	
228087	CR	Diode BAX13	SI Signal	BAX13	Philips
228141	CR	Diode SI Power	X BYX10	1N4007	Philips
228788	CR	Diode ZPD10	Zener	ZPD10	Philips
228796	CR	Diode ZPD12		ZPD12-BZX61/C12	Philips
228826	CR	Diode ZPD3.3	Zener	ZPD3.3	Philips
228834	CR	Diode ZPD4.7	Zener	ZPD4.7	Philips
228842	CR	Diode ZPD5.6	Zener	ZPD5.6	Philips
228869	CR	Diode ZPD7.5	Zener	ZPD7.5	Philips
240095	R	Carbon Film IEC-CR 25	4R7 5% 1/4 W	232210133478	Philips
240109	R	Carbon Film IEC-CR 25	10R 5% 1/4 W	232210133109	Philips
240117	R	Carbon Film IEC-CR 25	18R 5% 1/4 W	232210133189	Philips
240125	R	Carbon Film IEC-CR 25	22R 5% 1/4 W	232210133229	Philips
240141	R	Carbon Film IEC-CR 25	27R 5% 1/4 W	232210133279	Philips
240168	R	Carbon Film IEC-CR 25	33R 5% 1/4 W	232210133339	Philips

DRA code	CL LTR	Description	Specification	MFR code	MFR
240176	R	Carbon Film IEC-CR 25	43R 5% 1/4 W	232210133439	Philips
240184	R	Carbon Film IEC-CR 25	47R 5% 1/4 W	232210133479	Philips
240192	R	Carbon Film IEC-CR 25	51R 5% 1/4 W	232210133519	Philips
240206	R	Carbon Film IEC-CR 25	56R 5% 1/4 W	232210133569	Philips
240222	R	Carbon Film IEC-CR 25	100R 5% 1/4 W	232210133101	Philips
240230	R	Carbon Film IEC-CR 25	120R 5% 1/4 W	232210133121	Philips
240249	R	Carbon Film IEC-CR 25	150R 5% 1/4 W	232210133151	Philips
240257	R	Carbon Film IEC-CR 25	180R 5% 1/4 W	232210133181	Philips
240265	R	Carbon Film IEC-CR 25	200R 5% 1/4 W	232210133201	Philips
240273	R	Carbon Film IEC-CR 25	240R 5% 1/4 W	232210133241	Philips
240281	R	Carbon Film IEC-CR 25	270R 5% 1/4 W	232210133271	Philips
240303	R	Carbon Film IEC-CR 25	300R 5% 1/4 W	232210133301	Philips
240311	R	Carbon Film IEC-CR 25	330R 5% 1/4 W	232210133331	Philips
240338	R	Carbon Film IEC-CR 25	390R 5% 1/4 W	232210133391	Philips
240346	R	Carbon Film IEC-CR 25	470R 5% 1/4 W	232210133471	Philips
240354	R	Carbon Film IEC-CR 25	510R 5% 1/4 W	232210133511	Philips
240362	R	Carbon Film IEC-CR 25	560R 5% 1/4 W	232210133561	Philips
240370	R	Carbon Film IEC-CR 25	620R 5% 1/4 W	232210133621	Philips
240389	R	Carbon Film IEC-CR 25	680R 5% 1/4 W	232210133681	Philips
240397	R	Carbon Film IEC-CR 25	820R 5% 1/4 W	232210133821	Philips
240400	R	Carbon Film IEC-CR 25	1K 5% 1/4 W	232210133102	Philips
240419	R	Carbon Film IEC-CR 25	1K2 5% 1/4 W	232210133122	Philips
240427	R	Carbon Film IEC-CR 25	1K5 5% 1/4 W	232210133152	Philips
240435	R	Carbon Film IEC-CR 25	1K8 5% 1/4 W	232210133182	Philips
240443	R	Carbon Film IEC-CR 25	2K 5% 1/4 W	232210133202	Philips
240451	R	Carbon Film IEC-CR 25	2K2 5% 1/4 W	232210133222	Philips
240478	R	Carbon Film IEC-CR 25	2K7 5% 1/4 W	232210133272	Philips
240486	R	Carbon Film IEC-CR 25	3K3 5% 1/4 W	232210133332	Philips
240494	R	Carbon Film IEC-CR 25	3K9 5% 1/4 W	232210133392	Philips
240508	R	Carbon Film IEC-CR 25	4K3 5% 1/4 W	232210133432	Philips
240516	R	Carbon Film IEC-CR 25	4K7 5% 1/4 W	232210133472	Philips
240524	R	Carbon Film IEC-CR 25	5K6 5% 1/4 W	232210133562	Philips
240532	R	Carbon Film IEC-CR 25	6K2 5% 1/4 W	232210133622	Philips
240540	R	Carbon Film IEC-CR 25	6K8 5% 1/4 W	232210133682	Philips
240559	R	Carbon Film IEC-CR 25	8K2 5% 1/4 W	232210133822	Philips
240567	R	Carbon Film IEC-CR 25	10K 5% 1/4 W	232210133103	Philips
240583	R	Carbon Film IEC-CR 25	12K 5% 1/4 W	232210133123	Philips
240605	R	Carbon Film IEC-CR 25	15K 5% 1/4 W	232210133153	Philips
240613	R	Carbon Film IEC-CR 25	18K 5% 1/4 W	232210133183	Philips
240621	R	Carbon Film IEC-CR 25	22K 5% 1/4 W	232210133223	Philips
240648	R	Carbon Film IEC-CR 25	27K 5% 1/4 W	232210133273	Philips
240656	R	Carbon Film IEC-CR 25	33K 5% 1/4 W	232210133333	Philips
240664	R	Carbon Film IEC-CR 25	39K 5% 1/4 W	232210133393	Philips
240680	R	Carbon Film IEC-CR 25	47K 5% 1/4 W	232210133473	Philips
240702	R	Carbon Film IEC-CR 25	56K 5% 1/4 W	232210133563	Philips
240710	R	Carbon Film IEC-CR 25	68K 5% 1/4 W	232210133683	Philips
240737	R	Carbon Film IEC-CR 25	82K 5% 1/4 W	232210133823	Philips
240745	R	Carbon Film IEC-CR 25	100K 5% 1/4 W	232210133104	Philips
240761	R	Carbon Film IEC-CR 25	120K 5% 1/4 W	232210133124	Philips
240796	R	Carbon Film IEC-CR 25	200K 5% 1/4 W	232210133204	Philips
240818	R	Carbon Film IEC-CR 25	240K 5% 1/4 W	232210133244	Philips
240834	R	Carbon Film IEC-CR 25	470K 5% 1/4 W	232210133474	Philips
240869	R	Carbon Film IEC-CR 25	1M 5% 1/4 W	232210133105	Philips
240877	R	Carbon Film IEC-CR 25	5M6 5% 1/4 W	232210133565	Philips
241148	R	Carbon Film IEC-CR 37	47R 5% 1/2 W	232221213479	Philips
241202	R	Carbon Film IEC-CR 37	100R 5% 1/2 W	232221213101	Philips
241229	R	Carbon Film IEC-CR 37	120R 5% 1/2 W	232221213121	Philips
241288	R	Carbon Film IEC-CR 37	220R 5% 1/2 W	232221213220	Philips
241342	R	Carbon Film IEC-CR 37	390R 5% 1/2 W	232221213391	Philips
242314	R	Carbon Film IEC-CR 68	3R3 5% 1 W	232221413338	Philips
242357	R	Carbon Film IEC-CR 68	120R 5% 1 W	232221413121	Philips
242403	R	Carbon Film IEC-CR 68	560R 5% 1 W	232221413561	Philips
243418	R	Wirewound	47R 5% 3 W	W21	Welwyn
262692	F	Fuse 20 x 5 mm	0.63A TT	70107	Siba
266604	L	Choke Coil	68U 10% 202 mA	58/10/0058/10	Painton
273503	Q	Transistor 2N2102	TO 5 EBC NPN	2N2102	RCA
273554	Q	Transistor 2N3055	TO 3 BEC NPN	2N3055	RCA
273562	Q	Transistor 2N3866	TO 39 EBC NPN	2N3866	RCA
273570	Q	Transistor 2N4036	TO 5 EBC PNP	2N4036	RCA
273627	Q	Transistor 2N5087	TO 92 EBC PNP	2N5087	RCA

DRA code	CL LTR	Description	Specification	MFR code	MFR
273635	Q	Transistor 2N5089	TO 92 EBC NPN	2N5089	Motorola
273899	Q	Transistor BC171B	TO 92 EBC NPN	BC171B-BC107B	
274070	Q	Transistor BF JFET N	TO 72 SDGH	BFW11	Philips
320021	L	Choke Coil	10U 10% 380 mA	58/10/0053/10	Painton
320129	U	IC Digital SN74L20N	Dual 4INP NAND	SN74L20N	Texas Instruments
323470	R	Carbon Film IEC-CR 25	75R 5% 1/4 W	232210133759	Philips
324167	R	Carbon Film IEC-CR 25	300K 5% 1/4 W	232210133304	Philips
324175	R	Carbon Film IEC-CR 25	36K 5% 1/4 W	232210133363	Philips
324183	R	Carbon Film IEC-CR 25	30K 5% 1/4 W	232210133303	Philips
324191	R	Carbon Film IEC-CR 25	7K5 5% 1/4 W	232210133752	Philips
324205	R	Carbon Film IEC-CR 25	5K1 5% 1/4 W	232210133512	Philips
324221	R	Carbon Film IEC-CR 25	2K4 5% 1/4 W	232210133242	Philips
328022	C	Tantalum Dry Epoxydip	100U -20+50% 3 V	0678-901-206	Bosch
328545	R	Carbon Film IEC-CR 25	220R 5% 1/4 W	232210133221	Philips
328588	R	Carbon Film IEC-CR 25	3K6 5% 1/4 W	232210133362	Philips
328596	R	Carbon Film IEC-CR 25	24K 5% 1/4 W	232210133243	Philips
328626	R	Carbon Film IEC-CR 25	220K 5% 1/4 W	232210133224	Philips
328634	R	Carbon Film IEC-CR 25	4M7 10% 1/4 W	232210132475	Philips
328677	R	Carbon Film IEC-CR 37	180R 5% 1/2 W	2322212131 81	Philips
343471	U	IC Digital SN7413N	Schmitt Trigger	SN7413N	Texas Instruments
344273	C	Polycarb. MET.DIN44112	22N 10% 250 V	222234441223	Philips
345776	R	Carbon Film IEC-CR 25	1K3 5% 1/4 W	232210133132	Philips
349011	CR	Diode MA2404R RFD	Light Emitt.	MA2404R	Mitsumi
349488	R	Metal Film	475R 1% 1/4 W	471	Vitrohm
349623	R	Metal Film	10K 1% 1/4 W	471	Vitrohm
349658	R	Metal Film	3K92 1% 1/4 W	471	Vitrohm
349879	C	Polycarb. MET.DIN44112	U1 10% 250 V	222234441104	Philips
354279	CR	Diode ZPD6.2	Zener	ZPD6.2	
354775	U	IC Digital C/MOS Ser.40	Quad 2inp nand	CD4011AE	RCA
354821	U	IC Digital C/MOS Ser.40	Quad Analog SW	CD4066AE	RCA
354872	U	IC Digital C/MOS Ser.40	Trip 3inp nand	CD4023AE	RCA
354880	U	IC Digital C/MOS Ser.40	7stage counter	CD4024AE	RCA
354899	U	IC Digital C/MOS Ser.40	Dual JK FF	CD4027AE	RCA
354902	U	IC Digital C/MOS Ser.40	BCD TO DEC DECO	CD4028AE	RCA
354910	U	IC Digital C/MOS Ser.40	U/D Counter	CD4029AE	RCA
354929	U	IC Digital C/MOS Ser.40	Quad EX OR	CD4030AE	RCA
354937	U	IC Digital C/MOS Ser.40	8bit P/S A/S SR	CD4034AE	RCA
354953	U	IC Digital C/MOS Ser.40	Quad I/C Buffer	CD4041AE	RCA
354961	U	IC Digital C/MOS Ser.40	Quad D Latch	CD4042AE	RCA
354996	U	IC Digital C/MOS Ser.40	Mono/Ast Multi	CD4047AE	RCA
355003	U	IC Digital C/MOS Ser.40	Hex Buf/Con Inv	CD4049AE	RCA
355011	U	IC Digital C/MOS Ser.40	Hex Buf/Con	CD4050AE	RCA
355054	U	IC Digital C/MOS Ser.40	Quad 2inp and	CD4081BE	RCA
355933	L	Choke Coil	6U8 10%	IM-2	Dale
357383	C	Ceramic Plate N 150	3P9 0.25% 63 V	222264233398	Philips
357391	C	Ceramic Plate N 150	4P7 0.25% 63 V	222264233478	Philips
357405	C	Ceramic Plate N 150	5P6 0.25% 63 V	222264233568	Philips
357421	C	Ceramic Plate N 150	8P2 0.25% 63 V	222264233828	Philips
357448	C	Ceramic Plate N 150	10P 2% 63 V	222264234109	Philips
357456	C	Ceramic Plate N 150	12P 2% 63 V	222264234129	Philips
357464	C	Ceramic Plate N 150	15P 2% 63 V	222264234159	Philips
357472	C	Ceramic Plate N 150	18P 2% 63 V	222264234189	Philips
357480	C	Ceramic Plate N 150	22P 3% 63 V	222264234229	Philips
357499	C	Ceramic Plate N 150	27P 2% 63 V	222264234279	Philips
357502	C	Ceramic Plate N 150	33P 2% 63 V	222264234339	Philips
357510	C	Ceramic Plate N 150	33P 2% 63 V	222264234399	Philips
357529	C	Ceramic Plate N 150	47P 2% 63 V	222264234479	Philips
377537	C	Ceramic Plate N 150	56P 2% 63 V	222264234569	Philips
357545	C	Ceramic Plate N 150	68P 2% 63 V	222264234689	Philips
357553	C	Ceramic Plate N 150	82P 2% 63 V	222264234829	Philips
357561	C	Ceramic Plate N 150	100P 2% 63 V	222264234101	Philips
357596	C	Ceramic Plate N 150	150P 2% 63 V	222264234151	Philips
357626	C	Ceramic Plate HI-K	4N7 -20+50% 100 V	222264006472	Philips
357634	C	Ceramic Plate HI-K	2N2 10% 100 V	222263006222	Philips
357642	C	Ceramic Plate HI-K	10N -20+50% 100 V	222264006103	Philips
357650	C	Ceramic Plate HI-K	22N 40 V	EDRU 5	CRL/Werk
357669	C	Ceramic Plate N 750	8P2 0.25% 500 V	222265057828	Philips
357677	C	Ceramic Plate N 750	15P 0.25% 500 V	222265058159	Philips
357685	C	Variable Single Air	1/6P Tubular	R-TRIKO122-09SD	Stettner
357693	R	Carbon Film IEC-CR 25	150K 5% 1/4 W	232210133154	Philips

DRA code	CL LTR	Description	Specification	MFR code	MFR
357707	U	IC Linear SN72558P	Operational Amp.	SN72558P	Texas Instruments
357715	R	Semivariable Cermet	1K 10%	3386P-1-102TO-5	Bourns
357723	L	Choke Coil	100U 5%	IM-4	Dale
357731	L	Choke Coil	22U 10%	IM-4	Dale
357758	L	Choke Coil	4U7 10%	IM-4	Dale
357766	L	Choke Coil	U68 5%	IM-4	Dale
357774	L	Choke Coil	15U 10%	IM-4	Dale
357782	L	Choke Coil	U15 20%	IM-4	Dale
357790	L	Choke Coil	OU23	87-5839A-01	Stettner
357804	Q	Transistor BFX89	TO 72 NPN	BFX89	
357820	L	Choke Coil	2U2 10%	IM-2	Dale
357847	P	Connector DIN41617	13-cond. Male	09010132661	Texas Instruments
357898	U	IC Digital 74S112	Dual JK FF	74S112	Texas Instruments
357901	Q	Transistor E310 JFET N	TO 106 A	E310	Siliconix
357928	Y	Crystal 73.6 MHz	4T21401	4T21401	EMK
357936	CR	Diode BB105B	SI Capacity	12-BB105B	
358584	P	Connector DIN41617	21-cond. Male	09010212667	Harting Wilhelm
358592	CR	Diode BA379	Pin Diode	BA379	Siemens
358606	Q	Transistor 2N4416A	JFET TO 72	2N4416A	
358614	CR	Diode BA182	SI Switch	BA182	Philips
358665	J	Coax Connector	SMB 50 ohm	82SMB-50-0-1	Suhner
358681	Y	Crystal 73.5 MHz		4T21402	EMK
358886	U	IC Linear LM733	Video Amp.	LM733CH	National Semico
358916	J	Coax Connector	SMB 50 ohm	16SMB-50-1-3C	Suhner
358924	C	Polystyrene Ext. Foil	620P 1% 125 V	222242646201	Philips
358932	C	Polystyrene Ext. Foil	200P 1% 500 V	222242742001	Philips
358940	C	Polystyrene Ext. Foil	2N2 1% 125 V	222242542202	Philips
358959	C	Ceramic Plate	1N0 10% 100 V	222263006102	Philips
358991	P	Connector	26-cond. Male	3429-1002R Angl	3MC
359009	L	Choke Coil	150U 5%	IM-4	Dale
359106	S	Push Button Reed Sw.	SPST-NO NON ILL	R060910/9	Fr. Electronics
359114	S	Push Button Reed Sw.	SPST-NO ILLUM.	RSM-621AL	Fr. Electronics
359149	Q	Transistor BC171B	TO-92 NPN	BC171B	ITT
359157	Q	Transistor BC251	TO-92 PNP	BC251	ITT
359165	R	Semivariable Cermet	10K 10%	3386H-1-103TO-5	Bourns
359246	C	Tantalum Dry Epoxydip	10U -20+50% 35 V	0678-901-242	Bosch
359262	C	Polystyrene Ext. Foil	2N7 1% 125 V	222242542702	Philips
359289	L	Choke Coil	220U 5%	IM-4	
359319	R	Metal Film	13K3 1% 1/4 W	471	Vitrohm
359394	R	Metal Film	17K8 1% 1/4 W	471	Vitrohm
359416	S	Dip Switch	Printed Circuit	09 40000 03	Secme
359432	Q	Transistor BD262	SOT-32	BD262	Philips
359440	Q	Transistor BD263	SOT-32	BD263	Philips
359505	P	Connector DIN41617	13-cond. Female	09010132867	Harting Wilhelm
359513	P	Connector DIN41617	21-cond. Female	09010212867	Harting Wilhelm
359521	K	Relay, Reed Dip	2000R 1X Make	R4783-2 15V	Electrol Inc.
359572	R	Carbon Film IEC-CR 25	110R 5% 1/4 W	2322101331111	Philips
359580	R	Carbon Film IEC-CR 25	1K1 5% 1/4 W	2322101331/2	Philips
359599	C	Polystyrene Ext. Foil	390P 1% 250 V	222242643901	Philips
359602	C	Polystyrene Ext. Foil	430P 1% 250 V	222242644301	Philips
359610	C	Polystyrene Ext. Foil	300P 1% 500 V	222242743001	Philips
359629	C	Polystyrene Ext. Foil	560P 1% 125 V	222242545601	Philips
359637	C	Polystyrene Ext. Foil	360P 1% 250 V	222242643601	Philips
359645	C	Polystyrene Ext. Foil	160P 1% 500 V	222242741601	Philips
359653	C	Polystyrene Ext. Foil	330P 1% 250 V	222242643301	Philips
359661	C	Polystyrene Ext. Foil	680P 1% 125 V	222242546801	Philips
359688	C	Polystyrene Ext. Foil	270P 1% 500 V	222242742701	Philips
359696	C	Polystyrene Ext. Foil	1N6 1% 125 V	222242641602	Philips
359718	C	Polystyrene Ext. Foil	1N3 1% 125 V	222242541302	Philips
359726	C	Polystyrene Ext. Foil	3N3 1% 125 V	222242543302	Philips
359734	C	Polystyrene Ext. Foil	750P 1% 125 V	222242547501	Philips
359742	CR	Diode ZPD15	Zener	ZPD15	ITT
359750	L	Coil	MR6000	EMK 4T21573	EMK
359769	L	Coil	MR6000	EMK 4T21574	EMK
359777	L	Coil	MR6000	EMK 4T21575	EMK
359785	L	Coil	MR6000	EMK 4T21576	EMK
359793	L	Coil	MR6000	EMK 4T21577	EMK
359807	L	Coil	MR6000	EMK 4T21578	EMK
359815	L	Coil	MR6000	EMK 4T21579	EMK
359823	L	Coil	MR6000	EMK 4T21580	EMK

COMPONENT SPECIFICATION (80-04)

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DRA	CL	Description	Specification	MFR code	MFR
359831	L	Coil	MR6000	EMK 4T21581	EMK
359858	L	Coil	MR6000	EMK 4T21582	EMK
359866	L	Coil	MR6000	EMK 4T21583	EMK
359874	L	Coil	MR6000	EMK 4T21584	EMK
359882	L	Coil	MR6000	EMK 4T21585	EMK
359890	L	Coil	MR6000	EMK 4T21586	EMK
359904	L	Coil	MR6000	EMK 4T21587	EMK
359912	L	Coil	MR6000	EMK 4T21588	EMK
359920	L	Coil	MR6000	EMK 4T21589	EMK
359939	L	Coil	MR6000	EMK 4T21590	EMK
359947	L	Coil	MR6000	EMK 4T21591	EMK
359955	L	Coil	MR6000	EMK 4T21592	EMK
359963	L	Coil	MR6000	EMK 4T21593	EMK
359971	L	Coil	MR6000	EMK 4T21594	EMK
359998	L	Coil	MR6000	EMK 4T21595	EMK
361003	L	Coil	MR6000	EMK 4T21596	EMK
361011	L	Coil	MR6000	EMK 4T21597	EMK
361038	L	Coil	MR6000	EMK 4T21598	EMK
361046	L	Coil	MR6000	EMK 5T21599	EMK
361054	L	Coil	MR6000	EMK 4T21600	EMK
361062	L	Coil	MR6000	EMK 4T21601	EMK
361070	L	Coil	MR6000	EMK 4T21602	EMK
361089	L	Coil	MR6000	EMK 4T21603	EMK
361097	L	Coil	MR6000	EMK 4T21604	EMK
361100	L	Coil		EMK 4T21605	EMK
361119	L	Coil		EMK 4T21606	EMK
361127	L	Coil	MR6000	EMK 4T21607	EMK
361135	L	Coil	MR6000	EMK 4T21608	EMK
361143	L	Coil	MR6000	EMK 4T21609	EMK
361151	L	Coil	MR6000	EMK 4T21610	EMK
361178	L	Coil	MR6000	EMK 4T21611	EMK
361186	L	Coil	MR6000	EMK 4T21612	EMK
361194	L	Coil	MR6000	EMK 4T21613	EMK
361208	T	Trafo MR6000	F/PCB21405	EMK 4T21614	EMK
361313	R	Carbon Film IEC-CR 25	430K 5% 1/4 W	232210133434	Philips
361321	R	Carbon Film IEC-CR 25	750R 5% 1/4 W	232210133751	Philips
361348	C	Polystyrene Ext. Foil	10N 1% 125 V	222242541003	Philips
361356	C	Ceramic Plate N 750	2P2	222265057228	Philips
361364	L	Choke Coil	U22 5%	IM-4	Dale
361399	J	Coax Connector		85SMB-50-0-1	Suhner
361437	W	Coaxial Cable Assembly	MR6000 PCB21405	EMK 4T21514	EMK
361488	CR	Diode ZPD3.9	Zener	ZPD3.9	ITT
361496	L	Coil	MR6000	EMK 4T21501	EMK
361518	C	Semivar Teflon	12-75P	0095902075	Poul Dau & Co.
361534	R	Carbon Film IEC-CR 25	16K 5% 1/4 W	232210133163	Philips
361542	R	Carbon Film IEC-CR 25	1K6 5% 1/4 W	232210133162	Philips
361550	R	Semivariable Cermet	100K 10%	3386H-1-104	Bourns
361569	U	IC Linear TBA120AS	FM-ZE-AMP DEMOD	TBA120AS	Siemens
361585	U	IC Linear MC1496G	MULT.MOD.DETEC	MC1496G	Motorola
361593	Y	Crystal	1400 kHz	4T21635	EMK
361631	FL	Crystal Filter	1.4 MHz DSB 8 kHz	SNG 4T21391	EMK
361658	FL	Crystal Filter	1.4 MHz DSB 2 kHz	SNG 4T21392	EMK
361666	FL	Crystal Filter	1.4 MHz DSB 1 kHz	4T21393	EMK
361674	L	Coil	MR6000	EMK 4T21500	EMK
361682	L	Coil	MR6000	EMK 4T21502	EMK
361690	L	Coil	MR6000	EMK 4T21503	EMK
361704	L	Coil	MR6000	EMK 4T21504	EMK
361712	L	Coil	MR6000	EMK 4T21505	EMK
361763	FL	Crystal Filter	1.4 MHz DSB 0.2 kHz	SNG 4T21394	EMK
361801	FL	Crystal Filter	1.4 MHz USB 3 kHz	SNG 4T21396	EMK
361828	FL	Crystal Filter	1.4 MHz LSB 3 kHz	SNG 21395	EMK
361976	P	Connector	9-cond. Female	5-85928-7	AMP
361992	R	Carbon Film IEC-CR 25	68R 5% 1/4 W	232210133689	Philips
362034	CR	Diode MLED500	LED	MLED500	Motorola
362042	L	Coil	1UO6	87-5839D-01	Stettner
362050	Q	Transistor 2N4117	JFET TO 72	2N4117	
362077	U	IC Digital SN74S113N	Dual JK FF	SN74S113N	ITT
362085	U	IC Linear UGH7805393	Voltage Reg. 5 V	UGH7805393	Fairchild
362093	U	IC Linear SN72720N	Comperator Dual	SN72720N	Texas Instruments
362115	U	IC Linear UGH7815393	Voltage Reg. 15 V	UGH7815393	Fairchild

DRA code	CL LTR	Description	Specification	MFR code	MFR
362131	U	IC Digital SN7406N	HEX INV BUFF	SN7406N	Texas Instruments
362158	U	IC Digital SN74S00N	QUAD 2INP NAND	SN74S00N	Texas Instruments
362166	U	IC Digital SN74lS197N	Bin. Count W PRS	SN741S197N	Texas Instruments
362174	U	IC Linear CA3130	Operational Amp.	CA3130	RCA
362182	RT	PTC Disc.	60 grade C	P330-D1	Siemens
362239	R	Semivariable Cermet	1K 10%	3386H-1-102TO-5	Bourns
362247	W	Cable Assembly	FlStandard	AMP 4T21624	EMK
362301	CR	Diode BB209	Varactor	BB209	Siemens
362328	CR	Diode MBD101	Schottky	MBD101	Motorola
362336	U	IC Linear CA6741T	OP-AMP	CA6741T	RCA
362344	U	IC Hybrid IE500	Double Bal Mix.	IE500	Mini Circuit Lab.
362468	L	Delay Line	2-7USEC 1000R	LAE100 10PRC	LCC
362484	CR	Diode UM9401	PIN Diode	UM9401	Unitrade USA
362492	Q	Transistor BFR65	SOT48	BFR65	Philips
362506	Q	Transistor BFR91	SOT37	BFR91	Philips
362514	Q	Transistor 2N5109	TO39	2N5109	RCA
362522	U	IC Hybrid SRA1	Double Bal Mix	SRA1	Mini Circuit Lab.
362530	U	IC Hybrid SRA3H	Double Bal Mix	SRA3H	Mini Circuit Lab.
362557	U	IC Linear TBA810A	LF Power Amp	TBA810A	AEG
362565	U	IC Linear UAA180	LED Driver	UAA180	Siemens
362573	CR	Diode LD468	LED Row	LD468	Siemens
362646	R	Semivariable Cermet	200R 10%	984	Dale
362654	U	IC Digital C/MOS	IK RAM	IM6518	Intersil
362662	U	IC Display	Hexadecimal	TIL311	Texas Instruments
362670	C	Tantalum Dry Epoxydip	47U -20+50% 20 V	ETQ5	ERO
362689	P	Connector	34-cond. Male	3431-2002STRAIG	3MC
362700	P	Connector	26-cond. Female	609-2601	Ansley
362727	CR	Diode ZPD13	Zener	ZPD13	ITT
362816	C	Polystyrene Ext. Foil	3N 1% 125V	222242543002	Philips
362840	R	Semivariable Cermet	50K 10%	3386H-1-503TO-5	Bourns
362859	T	Transformer	Linie600-600 ohm	TD2418	Transduktor
362867	C	Polycarbonate Metaliz	15N 10% 250 V	222234444153	Philips
362875	U	IC Linear OPB730	Reflektiv Trans	OPB730	Optron
362913	R	Carbon Film IEC-CR 25	15R 5% 1/4 W	232210133159	Philips
362921	L	Choke Coil	33U 20%	IM-4	Dale
362980	Q	Transistor MJE3055	90-05LF Pow NPN	MJE3055	Motorola
363022	R	Semivariable Cermet	500R 10%	984	Dale
363030	R	Carbon Film IEC-CR 25	12R 5% 1/4 W	232210133129	Philips
363049	C	Ceramic Feed Through	100P 5% 250 V	9-121.5 N750	Ferroperm
363057	R	Carbon Film IEC-CR 25	2M2 5% 1/4 W	232210133225	Philips
363065	C	Ceramic Feed Through	120P 5% 250 V	9-121.5	Ferroperm
363073	C	Ceramic Feed Through	1N 5% 250 V	9-0133.5	Ferroperm
363081	C	Tantalum Dry Epoxydip	U1 -20+50% 35 V	0678-901-230	Bosch
363103	C	Tantalum Dry Epoxydip	U22 -20+50% 35 V	0678-901-232	Bosch
363200	C	Semivar. Tubular Ceram.	2-10P	5750/V.P.C.	Bros. Jackson
363227	R	Semivariable Cermet	10K 10% 1/2 W	3386P-1-103	Bourns
363251	R	Carbon Film IEC-CR 25	39R 5% 1/4 W	232210133399	Philips
363278	L	Choke Coil	U33 20%	IM-4	Dale
363286	L	Choke Coil	10U 10%	IM-4	Dale
363294	L	Choke Coil	47U 5%	IM-4	Dale
363308	L	Choke Coil	470U	432205704710	Philips
363316	L	Choke Coil	U1	432205701070	Philips
363324	CR	Diode ZPD5.1	Zener	ZPD5.1	ITT
363340	C	Ceramic Plate HI-K	1N2 10% 100 V	222263003122	Philips
363359	U	IC Linear LM319H	Voltage Comp.	LM319H	National Semico
363367	FL	Crystal Filter	75 MHz BW 12 kHz	4T21399	EMK
363421	L	Coil MR6000T21668	F/PCB21497	EMK 4T21668	EMK
363456	L	Coil MR6000T21670	F/PCB21497	EMK 4T21670	EMK
363472	T	Transformer	F/PCB21497	EMK 4T21672	EMK
363480	L	Coil MR6000T21666	F/PCB21497	EMK 4T21666	EMK
363537	R	Resistor Network	220K X 9	4310R-101-224	Bourns
363758	CR	Diode MBD701	HOT-CARRIER	MBD701	Motorola
364002	R	Carbon Film IEC-CR 25	1R 5% 1/4 W	232210133108	Philips
364010	R	Carbon Film IEC-CR 25	2R7 5% 1/4 W	232210133278	Philips
364029	R	Carbon Film IEC-CR 25	2R2 5% 1/4 W	232210133228	Philips
364037	R	Carbon Film IEC-CR 25	3R3 5% 1/4 W	232210133338	Philips
364045	L	Choke Coil	10M 5% 68 mA	MS90540-2500-76	Amphenol
364096	R	Metal Film	13R3 1% 1/4 W	471	Vitrohm
364185	R	Metal Film	59R 1% 1/4 W	471	Vitrohm
364215	L	Choke Coil	1U 10%	IM-4	Dale

DRA code	CL LTR	Description	Specification	MFR code	MFR
364223	L	Choke Coil	68U 5%	IM-4	Dale
364479	W	Coaxial Cable Assembly	MR6000	EMK 4T21513	EMK
364487	W	Coaxial Cable Assembly	MR6000	EMK 4T21512	EMK
364541	T	Transformer	PCB21332T1	EMK 4T21722	EMK
364568	T	Transformer	PCB21332T2	EMK 4T21723	EMK
364584	U	IC Linear MC1550G	RF	MC1550G	Motorola
364711	P	Connector	64-cond. Male	G06D64A4BEBL702	ITT
364959	Y	Crystal	1.4015 MHz	SNG 4T21731	EMK
364983	U	IC Digital C/MOS Ser.40	4-bit comp.	CD4063AE	RCA
365823	R	Carbon Film IEC-CR 25	6R8 5% 1/4 W	232210133688	Philips
365831	R	Carbon Film IEC-CR 25	680K	232210133684	Philips
365858	U	IC Digital SN74191N	UP/DOWN Counter	SN74191N	Texas Instruments
365866	U	IC Digital SN7404	HEX Inverter	SN7404N	Texas Instruments
365874	U	IC Digital SN741S74N	Dual D-FF	SN741S74N	Texas Instruments
365963	R	Semivariable Cermet	5K 10%	3386H-1-502TO-5	Bourns
366021	L	Coil	MR6000 PCB21427	4T21799	EMK
366765	P	Connector	26-cond. Solder	609-2603	Ansley
366773	P	Connector	34-cond. Female	609-3401	Ansley
366781	P	Connector	34-cond. Solder	609-3403	Ansley
366870	R	Carbon Film IEC-CR 25	390K 5% 1/4 W	232210133394	Philips
366889	R	Carbon Film IEC-CR 25	180K 5% 1/4 W	232210133184	Philips
367613	DS	Lamp Incandesc. BI-PIN	12 V 0.06 A	OL-1099BPE	Oshino Elec. Lamp
367621	R	Wirewound	180R 5% 1.5 W	KP 290-1	Vitrohm
367672	U	IC Digital C/MOS Ser.40	SM Trig nand GT	CD4093BE	RCA
367737	U	IC Digital C/MOS Ser.40	4bit Full Adder	CD4008AE	RCA
367745	U	IC Digital C/MOS Ser.40	Exclusiv or GT	CD4070BE	RCA
367826	R	Metal Film	2K49 1% 1/4 W	471	Vitrohm
367850	C	Polystyrene Ext. Foil	3N3 1% 63 V	222242443302	Philips
367877	C	Polystyrene Ext. Foil	30N 1% 63 V	222242443003	Philips
367958	C	Polystyrene Ext. Foil	15N 1% 63 V	222242441503	Philips
367966	R	Potentiom Cermet	50K	3852A-202-503A	Bourns
367974	R	Potentiom Cermet	200K	3852A-641-204A	Bourns
368008	P	Connector	15-cond. Male	DA15P-1AON	Cannon
368016	P	Connector	15-cond. Female	DA15S-1AON	Cannon
368024	J	Coax Connector	SMS	52-009-3702	Sealectro
368032	P	Connector	16-cond. Male	2P16-1	Augat
368067	C	Semivar. Tubular Ceram	2-15P	5890/H.P.C.	Bros. Jackson
368202	J	Coax Connector		24-BNC-50-2-2C	Suhner
368512	P	Connector D Access	Lock Plug 9-cond.	D110277	Cannon
368547	R	Metal Film	1K78 1% 1/4 W	471	Vitrohm
368636	R	Semivariable Cermet	2K 10%	3386H-1-202TO-5	Bourns
368652	C	Polystyrene Ext. Foil	510P 1% 250 V	222242645101	Philips
368660	L	Choke Coil	1M	1582	Ferroperm
369276	J	Connector	TAB F/PCB 2.8 mm	12610213011	Espa
369314	P	Connector	16 pin Plug	2P16-1	Augat
369322	P	Connector	16 pin dual inline	516-AG 11D	Augat
369454	Q	Transistor MPS-A13	TO 92 NPN	MPS-A13	Motorola
369470	C	Polystyrene Ext. Foil	4N7 1% 63 V	222242444702	Philips
369802	U	IC Digital SN74L SL96N	Decade Counter	SN74LS196N	Texas Instruments
371076	U	IC Digital SN74S133N	13 inp nand	SN74S133N	Texas Instruments
371092	C	Polystyrene Ext. Foil	2N 1% 63 V	222242442002	Philips
371432	R	Metal Film	9K09 1% 1/4 W	471	Vitrohm
371491	CR	Diode R. MDA970-1	SI Power	MDA970-1	Motorola
371505	CR	Diode R. MDA970-2	SI Power	MDA970-2	Motorola
371513	U	IC Linear MC7908CP	Voltage Reg.-8V	MC7908CP	Motorola
371521	CR	Diode LED MLED50	Led Red MLED50	MLED50	Motorola
371548	CR	Diode LED MLED455	Led Red MLED455	MLED455	Motorola
371556	U	IC Digital 5082-7340	Led Disp 4x7Matr.	5082-7340	Hewlet Packard
371688	P	Mains Conn. W/Filter		FN322-3/01	Schaffner
371696	S	Rotary Switch	3POS 2SECT	S022.3331.028	Poul Dau og Co.
371742	K	Relay	800R 1XCHG	14A01W1.3P24VDC	
371866	R	Wirewound	33R 5% 3 W	W21	Welwyn
371912	L	Coil MR6000T21959	F/PCB21497	4T21959	EMK
371963	R	Carbon Film IEC-CR25	62K 5% 1/4 W	232210133623	Philips
372013	J	Connector	8-Cond. Male	09-65-1081	Molex
372137	R	Carbon Film IEC-CR 25	20K 5% 1/4 W	232210133203	Philips
372250	C	Semivar. Air Coax	1-10P	AT 8052	Tekelec Airtr.
372382	Q	Transistor 2N5245	JFET	2N5245	National Semico
372595	CR	Diode BZX75C1V4	Zener Diode	BZX75C1V4	
372765	W	Flatcable Assembly	MR6000 34-Cond.	4T21991	EMK

DRA code	CL LTR	Description	Specification	MFR code	MFR
372773	W	Flatcable Assembly	MR6000 34-Cond.	4T21992	EMK
372781	W	Flatcable Assembly	MR6000 34-Cond.	4T21993	EMK
372803	W	Flatcable Assembly	MR6000 26-Cond.	4T21994	EMK
372811	W	Flatcable Assembly	MR6000 26-Cond.	4T21995	EMK
372838	W	Flatcable Assembly	MR6000 16-Cond.	4T21995	EMK
372846	W	Flatcable Assembly	MR6000 16-Cond.	4T21997	EMK
372854	W	Flatcable Assembly	MR6000 16-Cond.	4T21998	EMK
372889	L	Choke Coil	5U6	IM-4	Dale
372927	L	Choke Coil	68U	IM-2	Dale
372986	L	Coil MR6000T21965	F/PCB21497	EMK 4T21965	EMK
372994	T	Trafo MR6000T21950	F/PCB21497	EMK 4T21950	EMK
373060	R	Potentiom Cermet	10K	P13V LOI L AL	Sfernice
373176	C	Polystyrene Ext. Foil	5N1 1% 63 V	222242445102	Philips
373192	Q	Transistor 2N5245	JFET	2N5245	National Semico
373249	CR	Diode ZPD33	Zener	ZPD33	ITT
373257	R	Wirewound	OR56 5% 3 W	KP 292-1	Vitrohm
373273	P	Connector D	9-cond. Male ANG	DE-9P-IAON	ITT
373281	P	Connector Post	10-cond. Male	6-140988-1	AMP
373303	P	Connector Post	4-cond. Male	5-140988-4	AMP
373311	K	Relay	12V 1XCHG	REL14 AO-1W5.2P	
373338	S	Toggle Switch	2PDT 2A 250 V	5466A2V	APR
373370	XF	Fuseholder 5X20	PCB Mount	RP498005	Wickmann
373389	XF	Fuseholder		RP498057	Wickmann
373443	CR	Diode ZPD20	Zener	ZPD20	ITT
373532	U	IC Linear CA723CT	Voltage Reg	Ca723CT	RCA
373672	T	Transformer	2X 110 V / 2X 15 V	SU 39A-9946	
373680	T	Transformer	2X 110 V / 15-30 V	SU 60B-9953	
373702	B	Blower	6-16 VDC	69-11	Bühler
373753	U	IC Linear LM78L15	Voltage REG-15 V	LM78L15 ACZ	National Semico
373982	XDS	Lampholder	T4.6	1.02157.011/14	Rafi
373990	XDS	Lampholder	T4.6	1.02157.011/15	Rafi
375136	W	Coaxial Cable Assembly	MR6000 PCB21405	EMK 4T22043	EMK
375225	W	Coaxial Cable Assembly	MR6000 PCB21377	EMK 4T22047	EMK
375233	W	Coaxial Cable Assembly	MR6000 PCB21377	EMK 4T22048	EMK
375284	J	Coax Connector		11-SMB-50-2-10C	Suhner
375292	J	Coax Connector		16-SMB-50-2-10C	Suhner
375306	J	Coax Connector		86-SMC-50-2-2	Suhner
375322	C	Polyethylene Phthalat	470N 10% 100 V	B32561-A1474-K	Siemens
375349	U	IC Linear LM78L05	Voltage Reg.05V	LM78L05	National Semico
376248	S	Toggle Switch	SPDT	5636A-9	APR
376264	P	Connector	40Contacts	740-AG-4D	Augat
376310	R	Semivariable Cermet	200R 10%	3386P-1-201TO-5	Bourns
376361	R	Metal Film	825R 1% 1/4 W	471	Vitrohm
376531	R	Metal Film	511R 1% 1/4 W	471	Vitrohm
376639	P	Connector	64-cond. Female	GO6D64A3BBB1702	ITT
376825	L	Coil	MR6000/21415-16	4T22125	EMK
376833	L	Coil	MR6000/21415-16	4T22126	EMK
376922	S	Toggle Switch	SPDT M-0-M 250 V	5637 A3	APR
376930	W	Coaxial Cable Assembly	MR6000 PCB21386	4T22127	EMK
376949	W	Coaxial Cable Assembly	MR6000 PCB21386	4T22128	EMK
376957	W	Coaxial Cable Assembly	MR6000 PCB21386	4T22129	EMK
376965	W	Coaxial Cable Assembly	MR6000 PCB21386	4T22130	EMK
376973	W	Coaxial Cable Assembly	MR6000 PCB21386	4T22131	EMK
376981	W	Coaxial Cable Assembly	MR6000 PCB21386	4T22132	EMK
377007	W	Coaxial Cable Assembly	MR6000 PCB21386	4T22133	EMK
377287	R	Metal Film	2K26 1% 1/4 W	471	Vitrohm
377384	T	Transformer	MR6000 PCB21415	EMK T1 4T22153	EMK
377635	R	Metal Film	1K1 1% 1/4 W	471	Vitrohm
377651	W	Coaxial Cable Assembly	MR6000 PCB21416	EMK 4T22161	EMK
377678	W	Coaxial Cable Assembly	MR6000 PCB21416	EMK 4T22160	EMK
377848	DS	Lamp Telefon	12 V 0.04 A	1.90100.012	Rafi
378194	W	Coaxial Cable Assembly	MR6000	EMK T22189	EMK
378208	W	Coaxial Cable Assembly	MR6000	EMK T22190	EMK
378240	W	Coaxial Cable Assembly	MR6000 OT21807	EMK W16 4T22197	EMK
378259	W	Coaxial Cable Assembly	MR6000 OT21988	EMK W17 4T22198	EMK
378267	W	Coaxial Cable Assembly	MR6000 OT21988	EMK W18 4T22199	EMK
378275	W	Coaxial Cable Assembly	MR6000 OT21988	EMK W19 4T22200	EMK
378291	U	IC Linear LM78L12	Voltage Reg-12V	LM78L12	National Semico
378518	P	Connector	Housing 4 pole	1-87025-3	AMP
378526	P	Connector	Housing 6 pole	1-87025-7	AMP

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DRA code	CL LTR	Description	Specification	MFR code	MFR
378534	P	Connector	Recpt F/Housing	87026-2	AMP
379158	W	Flatcable Assembly	MR6000/22259/23057	4T22261	EMK
379972	W	Coaxial Cable Assembly	MR6000/21416	4T22306	EMK
380415	L	Choke Coil	8OU 0,5A	9V 1201 221	Aladdin
380423	W	Flatcable Assembly	MR6000 26-Cond.	4T22235	EMK
380792	C	Polyester Metaliz	47N 20% 63 V	MKS2 MIN	Wima
385115	C	Ceramic Plate HI-K	2N2 10% 100 V	222263002222	Philips
385123	C	Ceramic Plate HI-K	4N7 10% 100 V	222263002472	Philips
385514	C	Ceramic Plate N150	100P 2% 100 V	222263234101	Philips
385549	C	Ceramic Plate P100	1P 0.25% 100 V	222263203108	Philips
385565	C	Ceramic Plate N150	4.7P 10% 100 V	222263233478	Philips
385581	C	Ceramic Plate N150	12P 2% 100 V	222263234129	Philips
385646	C	Ceramic Plate P100	2.7P o.25% 100 V	222263203278	Philips
385972	Q	Transistor BSX19	TO 18 NPN	BSX19	Philips
386065	CR	Diode BB105G	Varactor	BB105G	Philips
386480	C	Ceramic Plate N150	56P 2% 63 V	222263234569	Philips
387673	W	Flatcable Assembly	MR6000 PCB21414	EMK 4T22421	EMK
389587	L	Choke Coil	47OU 10%	IM-2	Dale
389595	U	IC Digital ULN2002N	NPN Darlingtons	ULN2002N	Philips
389609	L	Choke Coil	47U 10%	IM-2	Dale
389684	C	Polystyrene Ext. Foil	240P 1% 250 V	222242722401	Philips
389730	Q	Transistor E300	JFET	E300	Siliconix
389951	C	Ceramic Chip	47P 10% 50 V	50R15N470KP	Johanson
390224	C	Ceramic Plate	ON47 10% 100 V	222263006471	Philips
390526	U	IC Linear LM320T-5.0	Voltage Reg. -5	LM320T	National Semico
391085	R	Metal Film	237R 1% 1/4 W	471	Vitrohm
391093	R	Semivariable Cermet	20K	3386P-1-203	Bourns
391921	BT	Battery	3V Lithium	LO-32	Mallory
391956	C	Polyester Metaliz	OUO22M 63V		Wima
391980	R	Semivariable Cermet	2K 10%	3386P-1-202	Bourns
392294	L	Choke Coil	1OU 10%	IM-2	Dale
393959	C	Ceramic Chip Module A	U1 20% 50 V	2120Z5UO50R104M	Varadyne
393967	L	Choke Coil	U15 10%	IM-2	Dale
393975	L	Choke Coil	5U6 10%	IM-2	Dale
394084	L	Coil	MR6000	EMK 4T22720	EMK
394092	L	Coil	MR6000	EMK 4T22721	EMK
394106	L	Coil	MR6000	EMK 4T22722	EMK
394203	L	Choke Coil	1OU 10%	IM-2	Dale
394238	J	Coax Connector	50 Ohm Angle	71Z-0-2-20	Suhner
394254	T	Transformer	MR6000	EMK 4T22664	EMK
394289	R	Semivariable Cermet	500R	3386P-1-501-T05	Bourns
394335	L	Choke Coil	U1 10%	IM-2	Dale
394343	L	Choke Coil	1U 10%	IM-2	Dale
394602	R	Carbon Film IEC-CR25	5R6 5% 1/4 W	2322101335 68	Philips
396133	R	Semivariable Cermet	10K 10%	3006P-1-103	Bourns
396877	W	Coaxial Cable Assembly	MR6000 22724	EMK 4T22747	EMK
396931	W	Coaxial Cable Assembly	MR6000	EMK 4T22750	EMK
396958	W	Coaxial Cable Assembly	MR6000	EMK 4T22751	EMK
388713	W	Coaxial Cable Assembly	MR6000 PC22725	EMK 4T22748	EMK
399906	C	Tantalum Dry	22U 5 25 V	TSP22S25	Telefunken
399914	Q	Transistor J309 JFET N	TO-92	J309	Siliconix
399922	C	Ceramic Plate	120P 10% 500 V	222265503121	Philips
405418	U	IC Digital C/MOS Ser.40	Quad 2inp nand	CD40118	RCA
405442	R	Metal Film	715R 1% 1/4 W	471	Vitrohm
405450	R	Metal Film	226R 1% 1/4 W	471	Vitrohm
405469	C	Ceramic Plate HI-K	820P 10% 500 V	222265503821	Philips
405477	Q	Transistor BF 480	SOT37 NPN	BF480	Philips
405485	C	Ceramic Feed Through	1N -20/+50% 30 V	Lubk.6.5-1 D 4000	Stettner
405493	L	Choke Coil	OU47 5%	IM-4	Dale
405507	C	Ceramic Plate HI-K	180P 10% 500 V	222265503181	Philips
405515	C	Semivar Air	0.8-10P	AT5271	Tekelec - Airtr.
405523	C	Ceramic Plate N750	82P 2% 100 V	222263858829	Philips
405531	CR	Diode BB204B	Varactor	BB204B	Siemens
405558	L	Coil	MR6000	EMK 4T22763	EMK
405566	L	Coil	MR6000	EMK 4T22764	EMK
405590	R	Metal Film	619R 1% 1/4 W	471	Vitrohm
405604	R	Metal Film	16K2 1% 1/4 W	471	Vitrohm
405612	C	Tantalum Dry	4U7 10% 25 V	TSP4.7 K25	AEG
432741	CR	Diode BZX79-B13	Zener Diode	BZX79-B13	Philips
433535	U	IC Digital SN74LS04	Positive NAND G	SN74LS04	Texas Instruments

COMPONENT SPECIFICATION (80-04) RECEIVER TYPE MR 6000

DRA code	CL LTR	Description	Specification	MFR code	MFR
434833	U	IC Digital SN74LSl3N	Schmitt Trigger	SN74LSl3N	Texas Instruments
442534	K	Relay	10.6-17.7	RR21002 Ll	Kaco
442593	C	Ceramic Tubular N330	160P 2% 400 V	9/0118.3	Ferroperm
442917	Y	Crystal Osc. TCXO	5.6 MHz TCXO	TCXO Hz TCXO	
442925	Y	Crystal Osc. OCXO	5.6 MHz	FS5953-7l-02	Cathodeon
442933	U	IC Digital SN74LS393	DUAL BIN. COUNT.	SN74LS393	Texas Instruments
443166	U	IC Digital MAN3620A	Led Disp. Orange	MAN3620A	Monsanto
443174	U	IC Digital F9374PC	7SEG DEC COM A	F9374PC	Fairchild
443247	S	Microswitch	SPDT 5A/250V	E6l-10A	Cherry
443255	U	IC Hybrid OPB814	OPTO INTR.SW	OPB814	Optron
443263	T	Transformer	MR6000-01 10704	10704	Induperm

4813P2, 2nd IF (80-09)

Pin No.	Connected to
1	GND
2	GND
3	4814P1-3 4521P4-10 4808J1-11 4371J1-1 4419J1-B11
4	4814P1-4 4521P3-9
5	4521P4-11
6	4814P1-6 4521P3-10
7	GND
8	GND
9	GND
10	4814P1-9 4521P3-11
11	GND
12	4814P1-12 4521P3-13
13	GND
14	4814P1-14 4521 P3-14
15	GND
16	GND
17	GND
18	4814P1-18 4521P3-18
19	4521P2-1 4528P1-2
20	4814P1-20 4521P3-20
21	24 V

4813P3, 2nd IF

Pin No.	Connected to
1	GND
2	4814P2-2
3	GND
4	4814P2-4
5	GND
6	4814P2-6
7	GND
8	4814P2-8
9	GND
10	4814P2-10
11	GND
12	GND
13	GND

4815P1, 73.5 MHz Osc. (80-09)

Pin No.	Connected to
1	n.c.
2	GND
3	GND
4	GND
5	GND
6	GND
7	GND
8	GND
9	10 V
10	10 V
11	10 V
12	10 V
13	24 V

4814P1, 2nd IF2

Pin No.	Connected to
1	GND
2	GND
3	4813P2-3 4521P4-10 4808J1-11 4371J1-1 4419J1-B11
4	4813P2-4 4521P3-9
5	n.c.
6	4813P2-6 4521P3-10
7	4521P3-8
8	n.c.
9	4813P2-10 4521P3-11
10	4521P3-12
11	n.c.
12	4813P2-12 4521P3-13
13	n.c.
14	4813P2-14 4521P3-14
15	n.c.
16	n.c.
17	n.c.
18	4813P2-18 4521P3-18
19	4521P4-9
20	4813P2-20 4521P3-20

4814P2, 2nd IF2 (80-09)

Pin No.	Connected to
1	GND
2	4813P3-2
3	GND
4	4813P3-4
5	GND
6	4813P3-6
7	GND
8	4813P3-8
9	GND
10	4813P3-10
11	GND
12	24 V
13	24 V

4814P3, 2nd IF2

Pin No.	Connected to
1	GND
2	GND
3	GND
4	GND
5	GND
6	4521P2-6
7	GND
8	4521P2-8
9	GND
10	4521P2-10
11	GND
12	4521P2-12
13	GND

4521P2, Detectors and Mode Decoder (80-09)

Pin No.	Connected to
1	4813P2-19 4528P1-2
2	4528P1-8
3	GND
4	GND
5	GND
6	4814P3-6
7	GND
8	4814P3-8
9	GND
10	4814P3-10
11	GND
12	4814P3-12
13	GND

4521P3, Detectors and Mode Decoder

Pin No.	Connected to
1	GND
2	GND
3	n.c.
4	4819J6-18 4332J1-14 4334J1-6
5	4819J6-20 4332J1-13 4334J1-7
6	4819J6-22 4332J1-12
7	4819J6-24 4332J1-11
8	4814P1-7
9	4814P1-4 4322P2-4
10	4814P1-6 4322P2-6
11	4814P1-9 4322P2-10
12	4814P1-10
13	4814P1-12 4322P2-12
14	4814P1-14 4322P2-14
15	4356J1-3
16	n.c.
17	4819J6-26 4332J1-9
18	4814P1-18 4813P2-18
19	4819J6-28 4332J1-8,10
20	4814P1-20
21	24 V

4521P4, Detectors and Mode Decoder (80-09)

Pin No.	Connected to
1	4808J1-2 4371J1-3 4419J1-B16
2	4817J1-18
3	4817J1-19
4	4817J1-17
5	4817J1-B14
6	4817J1-B16
7	4817J1-B15
8	4819J6-10 4331J2-20
9	4814P1-19
10	4813P2-3 4814P1-3 4808J1-11 4371J1-1 4419J1-B11
11	4813P2-5
12	4819J6-14 4331J2-14
13	4819J6-12 4331J2-16

4331J1, Freq. Selecting Keyboard

Pin No.	Connected to
1	4419J1-A7 4819J1-1
2	4419J1-A8 4819J1-2
3	4419J1-A9 4819J1-3
4	4419J1-A10 4819J1-4
5	4419J1-A11 4819J1-5
6	4419J1-A12 4819J1-6
7	4419J1-A13 4819J1-7
8	4419J1-A14 4819J1-8
9	4419J1-A15 4819J1-9
10	4419J1-A16 4819J1-10
11	4419J1-A17 4819J1-11
12	4419J1-A18 4819J1-12
13	4419J1-A19 4819J1-13
14	4419J1-A20 4819J1-14
15	4419J1-A21 4819J1-15
16	4419J1-A22 4819J1-16
17	4419J1-A23 4819J1-17
18	4419J1-A24 4819J1-18
19	4419J1-A25 4819J1-19
20	4419J1-A26 4819J1-20
21	4419J1-A27 4819J1-21
22	4419J1-A28 4819J1-22
23	4419J1-A29 4819J1-23
24	4419J1-A30 4819J1-24
25	4419J1-A31 4819J1-25
26	4419J1-A32 4819J1-26
27	4419J1-B18 4819J1-27
28	4819J1-28
29	4373J1-19 4819J1-29 4819J6-1
30	4373J1-2 4819J1-30
31	4373J1-18 4819J1-31
32	4373J1-4 4819J1-32
33	4419J1-B15 4819J1-33 4373J1-5 4819J6-34 4332J1-1
34	4332J1-19 4819J1-34

4331J2, Freq. Selecting Keyboard (80-09)

Pin No.	Connected to
1	4373J1-1 4373J1-13
2	4373J1-3
3	4373J1-24
4	4373J1-6
5	4373J1-23
6	4818J1-3
7	4373J1-26
8	4332J1-17 4373J1-10 4819J6-9 4419J1-B26
9	4373J1-25
10	4819J6-11 4419J1-B24
11	n.c.
12	4819J6-13 4419J1-B23
13	4419J1-B22
14	4819J6-14 4521P4-12
15	4419J1-B21
16	4819J6-12 4521P4-13 4419J1-B22
17	4419J1-B20
18	4819J6-16
19	4419J1-B19
20	4819J6-10 4521P4-8
21	n.c.
22	4528P1-4
23	24 V
24	4332J1-18
25	GND
26	4819J6-15 4419J1-B25

4332J1, Mode Selecting Keyboard (80-09)

Pin No.	Connected to
1	4331J1-33 4819J6-34 4373J1-5 4419J1-B15
2	4819J6-27 4419J1-B32
3	4819J6-25 4419J1-B31
4	4819J6-23 4419J1-B30
5	4819J6-21 4419J1-B29
6	4819J6-19 4419J1-B28
7	4819J6-17 4419J1-B27
8	4819J6-28 4521P3-19
9	4819J6-26 4521P3-17
10	4819J6-28 4521P3-19
11	4819J6-24 4521P3-7
12	4819J6-22 4521P3-6
13	4819J6-20 4521P3-5
14	4819J6-18 4521P3-4
15	n.c.
16	n.c.
17	4331J2-8 4819J6-9 4373J1-10 4419J1-26
18	4331J2-24
19	4331J1-34 4819J1-34
20	n.c.
21	n.c.
22	n.c.
23	GND
24	GND
25	24 V
26	24 V

4686J1, Standard Divider (80-09)

Pin No.	Connected to
1	-5 V
2	GND
3	4808J2-5 4371J1-5,6 4419J1-B12
4	4376J1-28
5	n.c.
6	4521P3-4 4813J1-14 4819J6-18
7	4521P3-5 4813J1-13 4819J6-20
8	n.c.
9	4800J1-3 (GND) 4373J2-11
10	4800J1-1 4373J1-17 4808J2-2
11	4800J1-5
12	10 V
13	24 V

4336P1, 73.6 MHz Osc.

Pin No.	Connected to
1	GND
2	GND
3	GND
4	GND
5	GND
6	GND
7	GND
8	GND
9	n.c.
10	10 V
11	n.c.
12	10 V
13	24 V

4819J1, Register Board (80-09)

Pin No.	Connected to
1	4331J1-1 4419J1-A7
2	4331J1-2 4419J1-A8
3	4331J1-3 4419J1-A9
4	4331J1-4 4419J1-A10
5	4331J1-5 4419J1-A11
6	4331J1-6 4419J1-A12
7	4331J1-7 4419J1-A13
8	4331J1-8 4419J1-A14
9	4331J1-9 4419J1-A15
10	4331J1-10 4419J1-A16
11	4331J1-11 4419J1-A17
12	4331J1-12 4419J1-A18
13	4331J1-13 4419J1-A19
14	4331J1-14 4419J1-A20
15	4331J1-15 4419J1-A21
16	4331J1-16 4419J1-A22
17	4331J1-17 4419J1-A23
18	4331J1-18 4419J1-A24
19	4331J1-19 4419J1-A25
20	4331J1-20 4419J1-A26
21	4331J1-21 4419J1-A27
22	4331J1-22 4419J1-A28
23	4331J1-23 4419J1-A29
24	4331J1-24 4419J1-A30
25	4331J1-25 4419J1-A31
26	4331J1-26 4419J1-A32
27	4331J1-27 4419J1-B18
28	4331J1-28
29	4331J1-29 4373J1-19
30	4331J1-30 4373J1-2
31	4331J1-31 4373J1-18
32	4331J1-32 4373J1-4
33	4331J1-33 4419J1-B15 4373J1-5 4332J1-1
34	4331J1-34 4332J1-19

4819J2, Register Board (80-09)

Pin No.	Connected to
1	4808J1-4
2	GND
3	4808J1-5
4	4808J1-6
5	n.c.
6	4808J1-9,8
7	4808J1-1,7
8	n.c.
9	n.c.
10	n.c.
11	n.c.
12	10 V
13	24 V

4819J3, Register Board (80-09)

Pin No.	Connected to
1	4531J1-17
2	4531J1-16
3	4531J1-15
4	4531J1-14
5	4531J1-13
6	4531J1-12
7	4531J1-11
8	4531J1-9
9	4531J1-8
10	4531J1-7
11	4352J1-18
12	4352J1-17
13	4352J1-16
14	4352J1-15,19
15	4352J1-14
16	4352J1-13
17	4352J1-12
18	4352J1-11
19	4352J1-10
20	4352J1-9
21	4352J1-8
22	4352J1-7
23	4353J1-11
24	4353J1-10
25	4353J1-9
26	4353J1-8
27	4353J1-7
28	4686J1-4
29	24 V
30	24 V
31	24 V
32	24 V
33	GND
34	GND

4819J4, Register Board (80-09)

Pin No.	Connected to
1	4687J1-1
2	4687J1-2
3	4687J1-3
4	4687J1-4
5	4687J1-5
6	4687J1-6
7	4687J1-7
8	4687J1-8
9	4687J1-9
10	4687J1-10
11	4687J1-11
12	4687J1-12
13	4687J1-13
14	4687J1-14
15	4687J1-15
16	4687J1-16
17	4687J1-17
18	4687J1-18
19	4687J1-19
20	4687J1-20
21	4687J1-21
22	4687J1-22
23	4687J1-23
24	4687J1-24
25	4687J1-25
26	4687J1-26
27	4687J1-27
28	4687J1-28
29	4687J1-29
30	4687J1-30
31	4687J1-31
32	4687J1-32
33	4687J1-33
34	4687J1-34

4819J5, Register Board (80-09)

Pin No.	Connected to
1	4371J1-9
2	4371J1-10 4818J1-12
3	4354P1-9 or 4359P1-9
4	4354P1-8 or 4359P1-8
5	4354P1-7 or 4359P1-7
6	4354P1-6 or 4359P1-6
7	4354P1-5 or 4359P1-5
8	4354P1-4 or 4359P1-4
9	4354P1-3 or 4359P1-3
10	4355P1-9
11	4355P1-8
12	4355P1-7
13	4355P1-6
14	4355P1-5
15	4355P1-4
16	4355P1-3
17	GND
18	15 V
19	GND
20	GND
21	GND

4819J6, Register Board (80-09)

Pin No.	Connected to
1	4373J1-19 4331J1-29
2	4373J1-21
3	4373J1-14
4	4373J1-7
5	n.c.
6	4373J1-9
7	4373J1-9
8	4373J1-9
9	4331J2-8 4332J1-17 4373J1-10 4419J1-B26
10	4331J2-20 4521P4-8
11	4331J2-10 4419J1-B24
12	4331J2-16 4521P4-13
13	4331J2-12 4419J1-B23
14	4331J2-14 4521P4-12
15	4331J2-26 4419J1-B25
16	4331J2-18
17	4332J1-7 4419J1-B27
18	4332J1-14 4521P3-4
19	4332J1-6 4419J1-B28
20	4332J1-13 4521P3-5
21	4332J1-5 4419J1-B29
22	4332J1-12 4521P3-6
23	4332J1-4 4419J1-B30
24	4332J1-11 4521P3-7
25	4332J1-3 4419J1-B31
26	4332J1-9 4521P3-17
27	4332J1-2 4419J1-B32
28	4332J1-8,10 4521P3-19
29	n.c.
30	n.c.
31	n.c.
32	n.c.
33	n.c.
34	4332J1-1 4373J1-5 4331J1-33 4419J1-B15

4352J1, 30 MHz Loop (80-09)

Pin No.	Connected to
1	n.c.
2	GND
3	GND
4	GND
5	GND
6	n.c.
7	4819J3-22
8	4819J3-21
9	4819J3-20
10	4819J3-19
11	4819J3-18
12	4819J3-17
13	4819J3-16
14	4819J3-15
15	4819J3-14
16	4819J3-13
17	4819J3-12
18	4819J3-11
19	4819J3-14
20	10 V
21	24 V

4353J1, 20 MHz Loop

Pin No.	Connected to
1	GND
2	GND
3	GND
4	n.c.
5	n.c.
6	n.c.
7	4819J3-27
8	4819J3-26
9	4819J3-25
10	4819J3-24
11	4819J3-23
12	10 V
13	24 V

4354P1, Suboctave Filters HF (80-09)

Pin No.	Connected to
1	GND
2	GND
3	4819J5-9
4	4819J5-8
5	4819J5-7
6	4819J5-6
7	4819J5-5
8	4819J5-4
9	4819J5-3
10	GND
11	GND
12	GND
13	24 V

4355P1, Suboctave Filters LF MF

Pin No.	Connected to
1	GND
2	GND
3	4819J5-16
4	4819J5-15
5	4819J5-14
6	4819J5-13
7	4819J5-12
8	4819J5-11
9	4819J5-10
10	GND
11	GND
12	GND
13	24 V

4808J1, AF and Linear Controls (80-09)

Pin No.	Connected to
1	4819J2-7
2	4521P4-1 4371J1-3 4419J1-B16
3	4521P3-15
4	4819J2-1
5	4819J2-3
6	4819J2-4
7	4819J2-7
8	4819J2-6
9	4819J2-6
10	n.c.
11	4371J1-1 4419J1-B11 4813P2-3 4814P1-3 4521P4-10
12	GND
13	n.c.
14	GND
15	4371J1-2 4419J1-B17
16	GND

4808J2, AF and Linear Controls

Pin No.	Connected to
1	4800J1-6
2	4686J1-10 4373J1-17 4800J1-1
3	4419J1-B14 4800J1-8
4	4419J1-AB4 4817J1-AB23
5	4334J1-3 4371J1-5,6 4419J1-B12
6	4419J1-AB5 4817J1-AB24
7	4817J1-AB20
8	n.c.
9	24 V
10	4367J1-1 4817J1-AB13
11	GND
12	n.c.
13	4419J1-AB3 4817J1-AB22
14	4800J1-9
15	4419J1-AB2 4817J1-AB21
16	4800J1-7

4818J1, RF Input Protector (80-09)

Pin No.	Connected to
1	4817J1-AB13 4808J2-10
2	GND
3	4331J2-6
4	GND
5	GND
6	GND
7	GND
8	GND
9	GND
10	GND
11	GND
12	4371J1-10 4819J5-2
13	24 V

4530J1, 78-108 MHz Osc. (80-09)

Pin No.	Connected to
1	GND
2	GND
3	4529J1-9
4	4531J1-18 4529J1-8
5	4531J1-19 4529J1-7
6	4531J1-3
7	4531J1-5 4529J1-6,10
8	4531J1-6 4529J1-3,5
9	4531J1-6 4529J1-3,5
10	4531J1-6 4529J1-3,5
11	4531J1-6 4529J1-3,5
12	10 V
13	24 V

4529J1, 75-105 MHz Osc.

Pin No.	Connected to
1	GND
2	GND
3	4530J1-9,11 4531J1-6
4	n.c.
5	4530J1-9,11 4531J1-6
6	4530J1-7 4531J1-5
7	4530J1-5 4531J1-19
8	4530J1-4 4531J1-18
9	4530J1-3
10	4530J1-7 4531J1-5
11	n.c.
12	10 V
13	24 V

4371J1, Step Attenuator (80-09)

Pin No.	Connected to
1	4808J1-11 4419J1-B11 4322P2-3 4325P1-3 4521P4-10
2	4808J1-15 4419J1-B17
3	4808J1-2 4521P4-1 4415J1-B16
4	n.c.
5	4419J1-B12 4356J2-5
6	4686J1-3
7	GND
8	15 V
9	4819J5-1
10	4819J5-2 4818J1-[illegible]
11	n.c.
12	10 V
13	24 V
14	24 V
15	GND
16	GND
17	GND
18	GND
19	GND
20	GND
21	GND

4528P1, Front End

Pin No.	Connected to
1	15 V
2	4813P2-19 4521P2-1
3	4813P1
4	4331J2-22
5	n.c.
6	n.c.
7	15 V
8	-5 V
9	GND
10	GND
11	GND
12	GND
13	GND
14	GND
15	GND
16	GND
17	GND
18	GND
19	GND
20	GND
21	GND

4373J1, Memory (80-09)

Pin No.	Connected to
1	4331J2-1 4373J1-13
2	4331J1-30
3	4331J2-2
4	4331J1-32
5	4819J6-34 4331J1-33 4332J1-1 4419J1-B15
6	4331J2-4
7	4819J6-4
8	n.c.
9	4819J6-6,7,8
10	4819J6-9 4331J2-8 4332J1-17 4419J1-B26
11	GND
12	n.c.
13	4331J2-1 4373J1-1
14	4819J6-3
15	n.c.
16	24 V
17	15 V std by
18	4331J1-31
19	4331J1-29 4819J6-1
20	n.c.
21	4819J6-2
22	n.c.
23	4331J2-5
24	4331J2-3
25	4331J2-9
26	4331J2-7

4531J1, 78-108 MHz Divider (80-09)

Pin No.	Connected to
1	n.c.
2	GND
3	4530J1-6
4	GND
5	4530J1-7 4529J1-6,10
6	4530J1-10 4529J1-3,5,GND
7	4530J3-10
8	4530J3-9
9	4819J3-8
10	n.c.
11	4819J3-7
12	4819J3-6
13	4819J3-5
14	4819J3-4
15	4819J3-3
16	4819J3-2
17	4819J3-1
18	4529J1-8 4530J1-4
19	4530J1-5 4529J1-7
20	10 V
21	24 V

4800J1, Voltage Regulators (80-09)

Pin No.	Connected to
1	4686J1-10 4373J1-17 4808J2-2
2	4419J1-B13
3	4686J1-9 (GND)
4	n.c.
5	4686J1-11
6	4808J2-1
7	4808J2-16
8	4808J2-3 4419J1-B14
9	4808J2-14
10	GND
11	GND
12	24 V
13	24 V
14	15 V
15	15 V
16	10 V
17	10 V
18	4807J7-12
19	4807J7-12
20	4807J7-7,8,9
21	4807J7-7,8,9

4807J7, Rectifier

Pin No.	Connected to
1	GND
2	GND
3	GND
4	GND
5	GND
6	GND
7	4800J1-20,21
8	4800J1-20,21
9	4800J1-20,21
10	n.c.
11	n.c.
12	4800J1-18,19
13	-5 V

4419J1A, Remote Input Filter (80-09)

Pin No.	Connected to
1	
2	4808J2-15 4817J1-AB21
3	4808J2-13 4817J1-AB22
4	4808J2-4 4817J1-AB23
5	4808J2-6 4817J1-AB24
6	GND
7	4331J1-1 4819J1-1
8	4331J1-2 4819J1-2
9	4331J1-3 4819J1-3
10	4331J1-4 4819J1-4
11	4331J1-5 4819J1-5
12	4331J1-6 4819J1-6
13	4331J1-7 4819J1-7
14	4331J1-8 4819J1-8
15	4331J1-9 4819J1-9
16	4331J1-10 4819J1-10
17	4331J1-11 4819J1-11
18	4331J1-12 4819J1-12
19	4331J1-13 4819J1-13
20	4331J1-14 4819J1-14
21	4331J1-15 4819J1-15
22	4331J1-16 4819J1-16
23	4331J1-17 4819J1-17
24	4331J1-18 4819J1-18
25	4331J1-19 4819J1-19
26	4331J1-20 4819J1-20
27	4331J1-21 4819J1-21
28	4331J1-22 4819J1-22
29	4331J1-23 4819J1-23
30	4331J1-24 4819J1-24
31	4331J1-25 4819J1-25
32	4331J1-26 4819J1-26

4419J1B, Remote Input Filter (80-09)

Pin No.	Connected to				
1					
2	4808J2-15	4817J1-AB21			
3	4808J2-13	4817J1-AB22			
4	4808J2-4	4817J1-AB23			
5	4808J2-6	4817J1-AB24			
6	GND				
7	GND				
8	GND				
9	GND				
10	GND				
11	4813P2-3	4814P1-3	4521P4-10	4808J1-11	4371J1-1
12	4808J2-5	4371J1-5,6	4334J1-3		
13	4800J1-2				
14	4808J2-3	4800J1-8			
15	4331J1-33	4819J1-33	4332J1-1	4373J1-5	4350J6-34
16	4521P4-1	4808J1-2	4371J1-3		
17	4356J1-15	4371J1-2			
18	4331J1-27	4819J1-27			
19	4331J2-19				
20	4331J2-17				
21	4331J2-15				
22	4331J2-16				
23	4331J2-12	4819J6-13			
24	4331J2-10	4819J6-11			
25	4331J2-26	4819J6-15			
26	4331J2-8	4819J6-9	4813J1-17	4373J1-10	
27	4332J1-7	4819J6-17			
28	4332J1-6	4819J6-19			
29	4332J1-5	4819J6-21			
30	4332J1-4	4819J6-23			
31	4332J1-3	4819J6-25			
32	4332J1-2	4819J6-27			

4817J1A, I/O Filters (80-09)

Pin No.	Connected to			
1	n.c.			
2	n.c.			
3	n.c.			
4	n.c.			
5	n.c.			
6	n.c.			
7	4817J1-B7			
8	4817J1-B8			
9	4817J1-B9			
10	4817J1-B10			
11	4817J1-B11	GND		
12	4817J1-B12	10 V		
13	4817J1-B13	4818J1-1	4808J2-10	
14	4817J1-B14	4521P4-5		
15	4817J1-B15	4521P4-7		
16	4817J1-B16	4521P4-6		
17	4817J1-B17	4521P4-4		
18	4817J1-B18	4521P4-2		
19	4817J1-B19	4521P4-3		
20	4817J1-B20			
21	4817J1-B21	4419J1-AB2		
22	4817J1-B22	4419J1-AB3		
23	4817J1-B23	4419J1-AB4		
24	4817J1-B24	4419J1-AB5		
25		4419J1-AB6		
26	4373J2-2			
27	4373J2-4			
28	4373J2-6			
29	4373J2-8			
30	4373J2-10			
31	4373J2-12			
32	4373J2-14			

4817J1B, I/O Filters (80-09)

Pin No.	Connected to			
1	n.c.			
2	n.c.			
3	n.c.			
4	n.c.			
5	n.c.			
6	n.c.			
7	4817J1-A7			
8	4817J1-A8			
9	4817J1-A9			
10	4817J1-A10			
11	4817J1.A11	GND		
12	4817J1-A12	10 V		
13	4817J1-A13	4818J1-1	4808J2-10	
14	4817J1-A14	4818J1-5		
15	4817J1-A15	4818J1-7		
16	4817J1-A16	4521P4-6		
17	4817J1-A17	4521P4-4		
18	4817J1-A18	4521P4-2		
19	4817J1-A19	4521P4-3		
20	4817J1-A20			
21	4817J1-A21	4419J1-AB2		
22	4817J1-A22	4419J1-AB3		
23	4817J1-A23	4419J1-AB4		
24	4817J1-A24	4419J1-AB5		
25	4373J2-7			
26	4373J2-1			
27	4373J2-3			
28	4373J2-5			
29	4373J2-9			
30	4373J2-11			
31	4373J2-15			
32	4373J2-13			

4687J1, Display (80-09)

Pin No.	Connected to
1	4819J4-1
2	4819J4-2
3	4819J4-3
4	4819J4-4
5	4819J4-5
6	4819J4-6
7	4819J4-7
8	4819J4-8
9	4819J4-9
10	4819J4-10
11	4819J4-11
12	4819J4-12
13	4819J4-13
14	4819J4-14
15	4819J4-15
16	4819J4-16
17	4819J4-17
18	4819J4-18
19	4819J4-19
20	4819J4-20
21	4819J4-21
22	4819J4-22
23	4819J4-23
24	4819J4-24
25	4819J4-25
26	4819J4-26
27	4819J4-27
28	4819J4-28
29	4819J4-29
30	4819J4-30
31	4819J4-31
32	4819J4-32
33	4819J4-33
34	4819J4-34

Testskema MR 6000-01

No: 10458-18

--- Svøb:
-X- Mekanisk eftersyn.
-X- Kontrol af spændinger 24V + 24,0 VDC 15V + 15,1 VDC
-X- Kontrol af spændinger 5V ÷ 5,1 VDC 8 V + 8,0 VDC Blower loaded 11,8 VD

Frontplade funktioner:

-X- Kontrol af Keyboard.
-X- Kontrol af Modeboard.
--- Kontrol af Memory.
-X- Kontrol af informationer til 20MHz loop 30MHz loop og modedecoder
-X- Kontrol af filterskift
--- Kontrol af Steptune + clarifier just. af niveau

Synthesizer:

-X- Kontrol af IKHz og 25 KHz syle.
--- Kontrol af ext standard funktioner.
-X- Kontrol af 5,6MHz til bagplade og1,4 MHz til mode decoder
-X- Kontrol af 20MHz loop.
-X- Kontrol af 73,5MHz OSC, Sp. testpunkt 1 + 5,0 VDC
--- Kontrol af 73,5MHz OSC, output ÷ ----dbm
-X- Kontrol af 73,6MHz OSC, Sp.testpunkt 1 + 5,0 VDC
--- Kontrol af 73,6MHz OSC, output +----dbm
--- Kontrol af 73,6MHz OSC, clarifier (frekvens)
--- Kontrol af 25 KHz fra 75,5 MHz osc.
-X- Kontrol af 30 MHz loop
--- Kontrol af steptune (frekvens)
-X- Kontrol af 78-108 MHz OSC 78- 1 lave Vco H ____VDC L ----VDC Vco H ____VDC høje L ____VDC
-X- Kontrol af 75-105 MHz OSC 3xx00,KHz ---VDC højeste----VDC
-X- Kontrol af 75-105 MHz OSC 3xx99,9 KHz laveste ---VDC højeste --VDC
-X- Kontrol af 75-105 MHz frekvens + ----Hz output +----dbm

Modtagerdel:

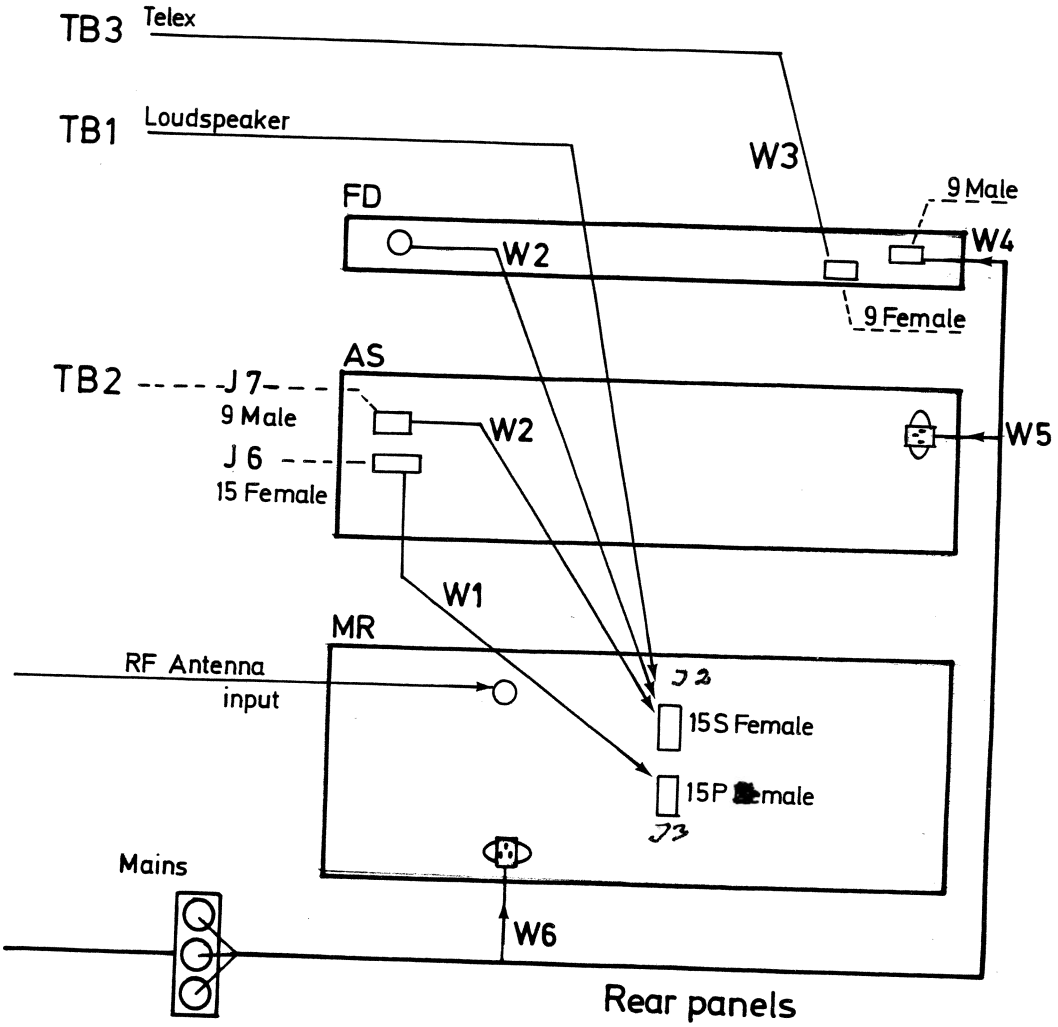
-X- I MF 75 MHz filterkurve forstærkning ----db båndbrede 3ab -----KHz
-X-II MF 1,4 MHz filterkurve forstærkning W--- I--- N--- S--- U--- L---db
-X-II MF 1,4 MHz output til detector 140 mV
-X- BFO frekvens +÷ ---- KHz
--- Lowpassfilter top ----Hz
-X- F 1 frekvens ----Hz
--- LF output AM --- W USB ---W LSB ---W
-X- LF output lineudgang (USB) ---db LSB ---db AGC off= ___db
-X- LF output monitor lineudgang ---db
--- Notch filter 400 Hz --- 2 KHz --- 4 KHz ---
-X- Step. att. skift ved 38 dbµV
-X- Ant. att. ----db
--- Noise blanker ----db
-X- Muting
--- Sidetone
-X- AGC regulering, ændring af LF output ----db
-X- Justering af S og AF meter
--- LF output 2W ------% distortion) ved 198 VAC
-X- Kontrol af test højttaler + phone jack
--- Intermodulation ----db

Efter langtidsprøve

--- Ref sp. 73,5 MHz ----VDC
--- Ref sp. 73,6 MHz ----VDC
--- Frekvens kontrol + % ----Hz
--- Varme timer
--- Muting
--- St.by
--- BFO
--- FI
--- LF ----W 2,0% distortion 198 V.
---- ISB
--- RB.

dato:

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROV



REV STATUS OF SHEETS	REV LTR SHEET NO.											

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075.

ANGLES

LIN. DIM.

MATERIAL

DR. 821020	P.S.C
CH.	
AP.	
AP.	

FIRST ANGLE PROJECTION

Dansk Radio AS

TITLE

CABINET FOR
MR 6000, AS 6000, FD 6000

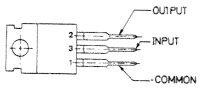
SIZE	CODE IDENT NO.	DRAWING NO.
A 4		4931

SCALE

SHEET 1 OF

MC 7908 CP

TO-220 PACKAGE
(TOP VIEW)



U1

Note 1:

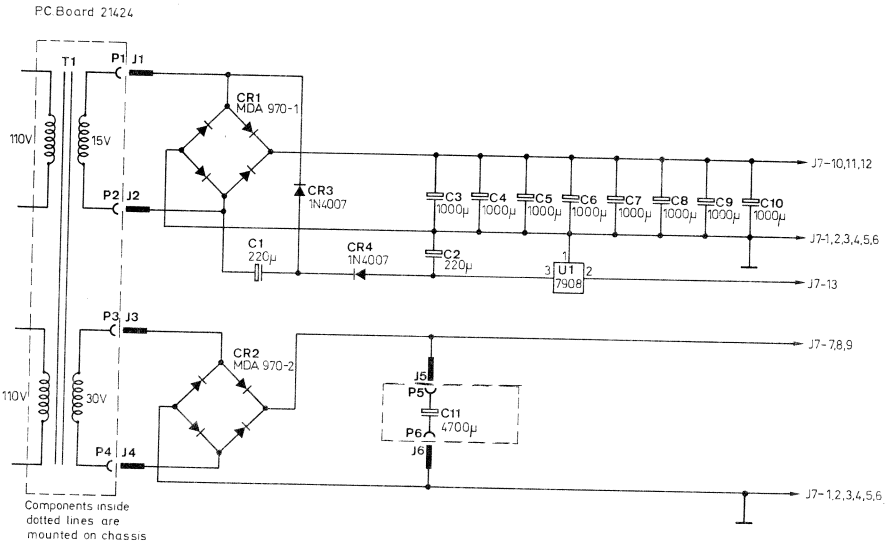
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

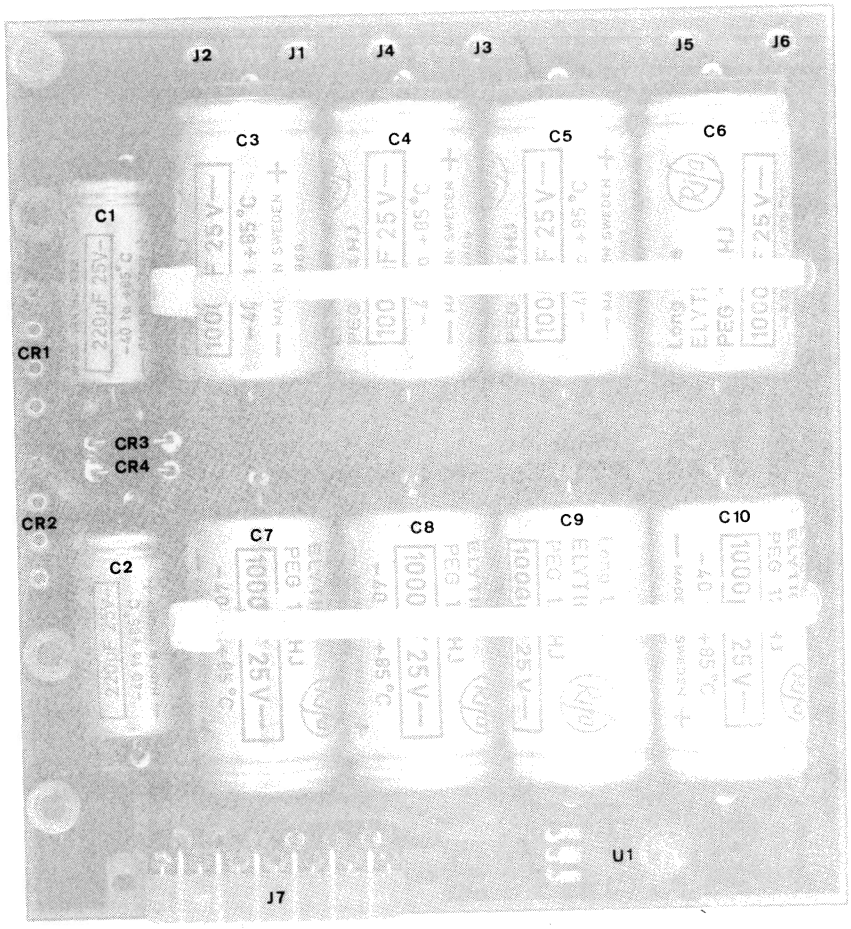
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



5

Rectifier

Ref. Designation 4379



RECTIFIER

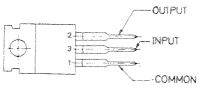
(Ref. Desig. 4379)

Component Location

1978-02

7905

TO-220 PACKAGE
(TOP VIEW)



U1

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

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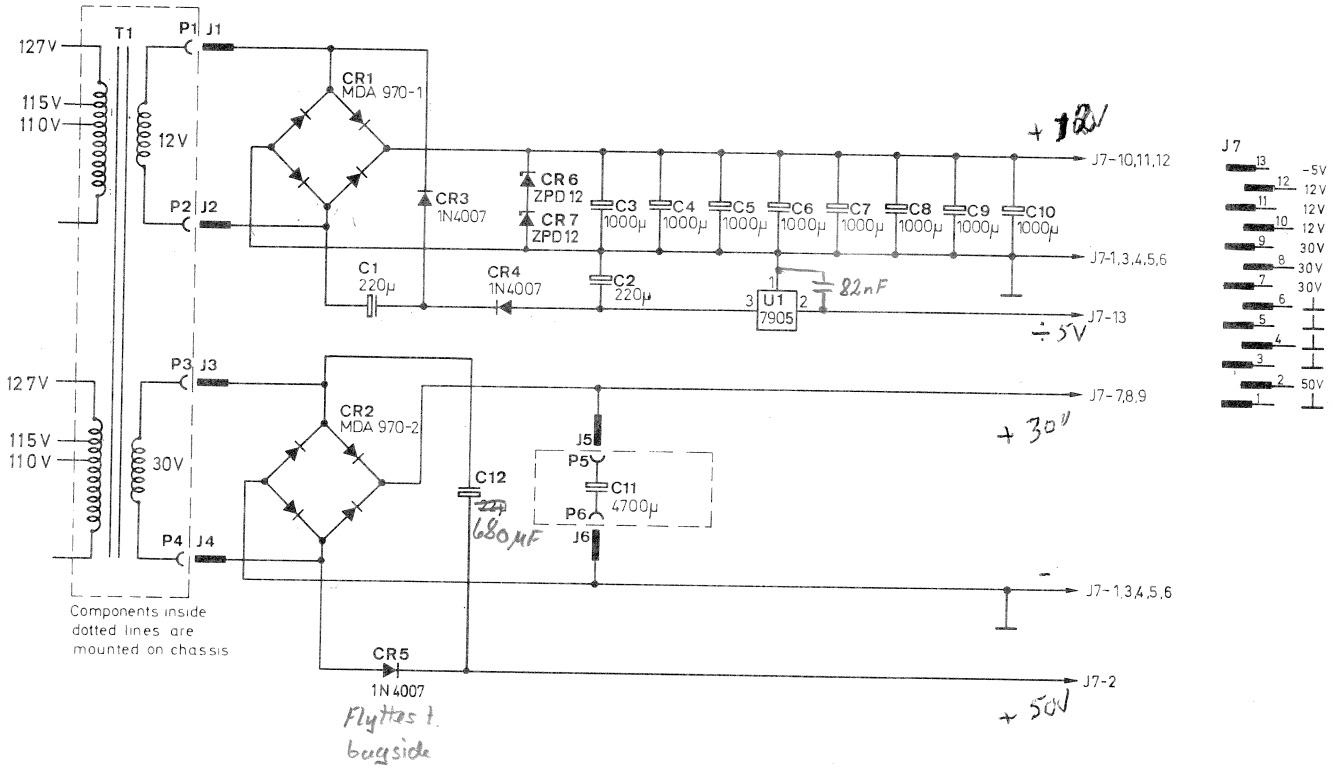
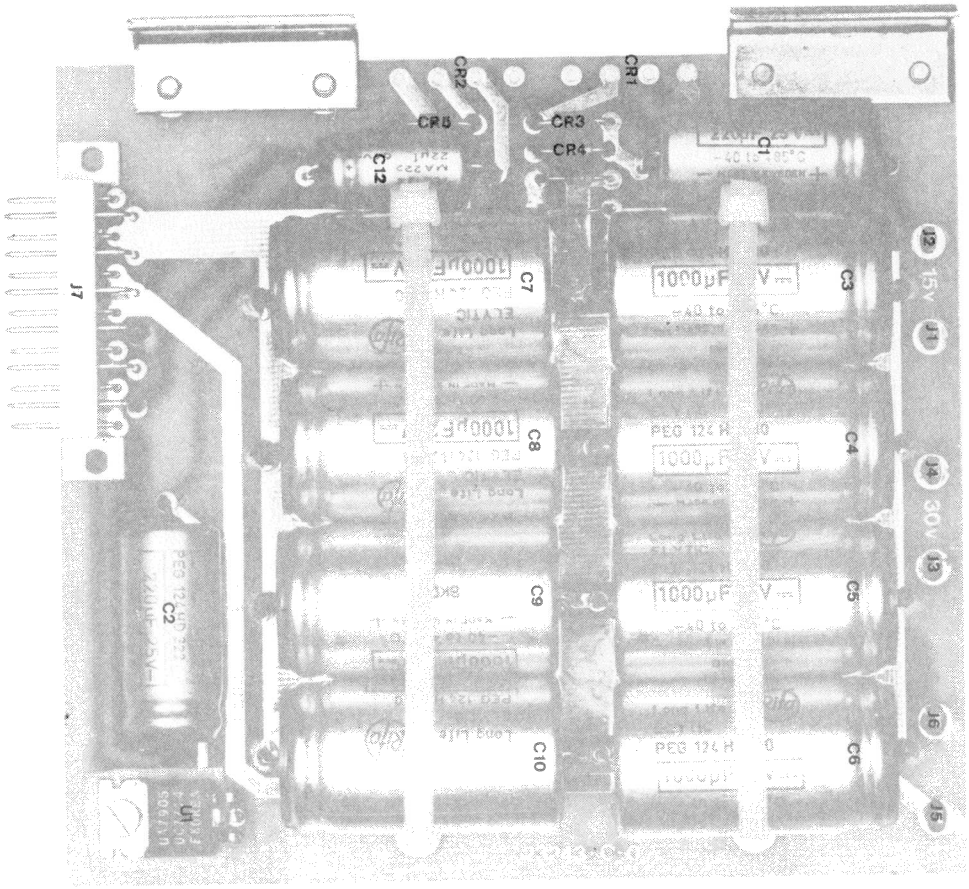
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

PCB: 23243



RECTIFIER
(Ref. Desig. 4807)



RECTIFIER

(Ref. Desig. 4807)

Component Location

1980-04

Note 1:

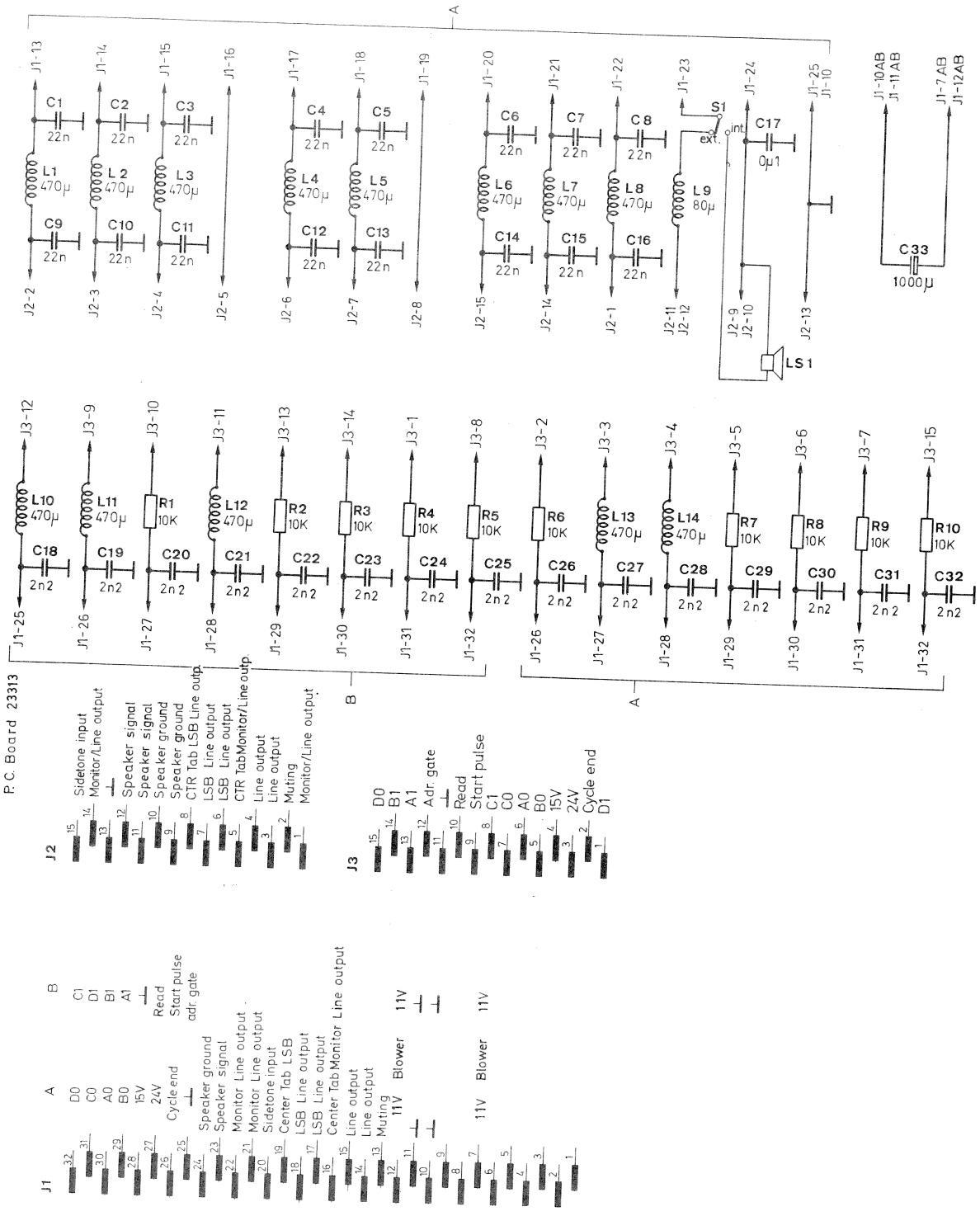
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

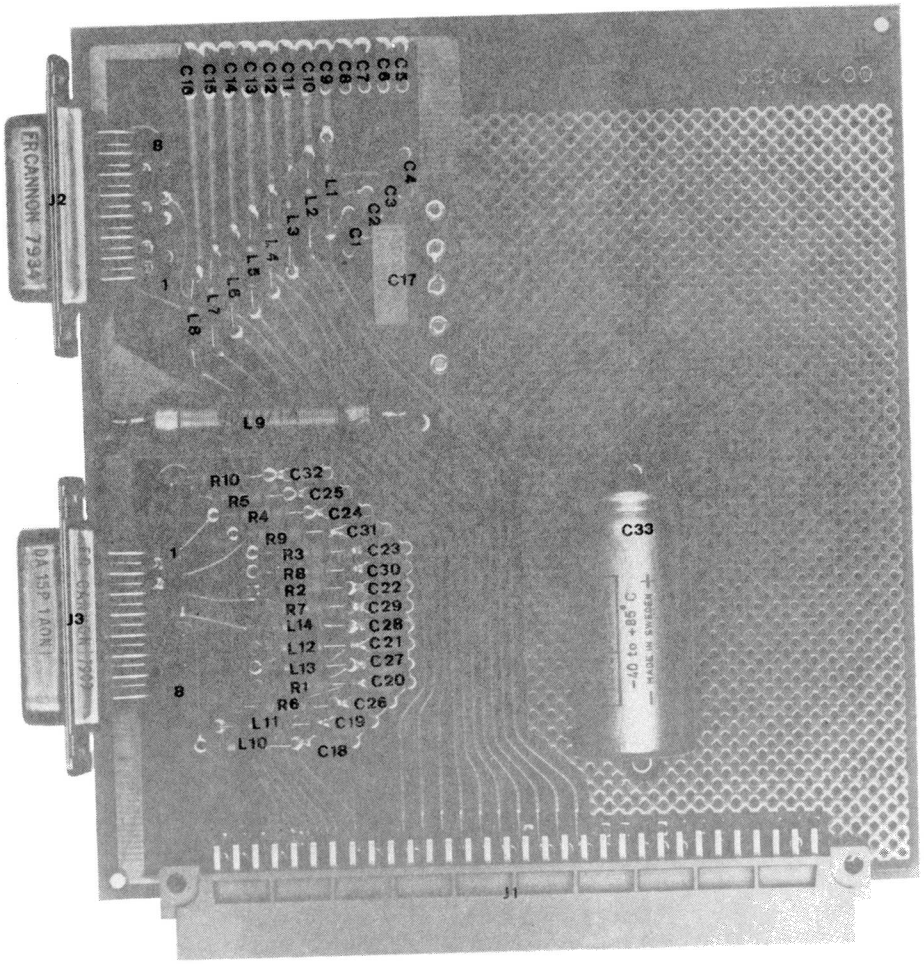
The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



I / O FILTERS
(Ref. Desig. 4817)



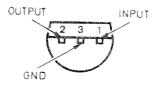
I / O FILTERS

(Ref. Desig. 4817)

Component Location

1980-04

78 L 15



BOTTOM VIEW

U1

Note 1:

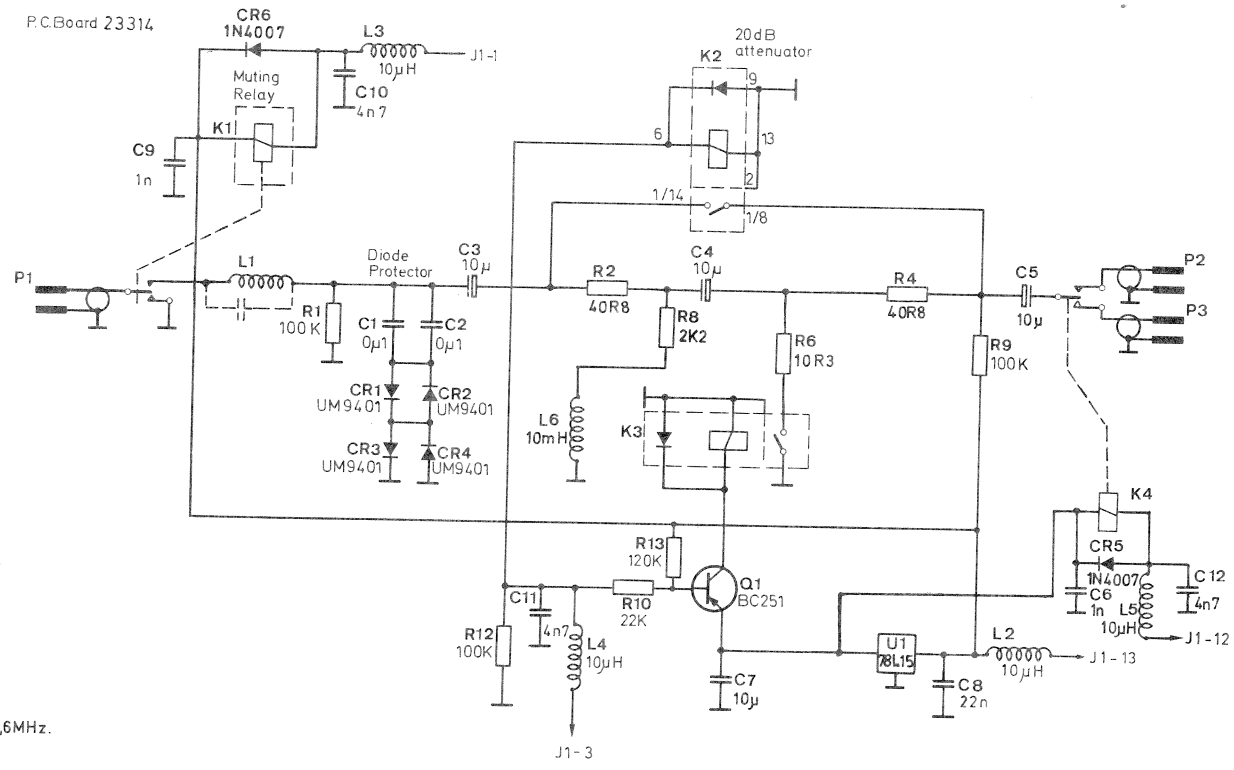
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

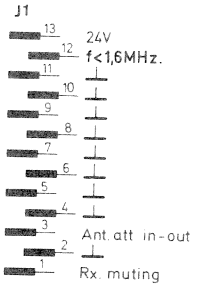
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

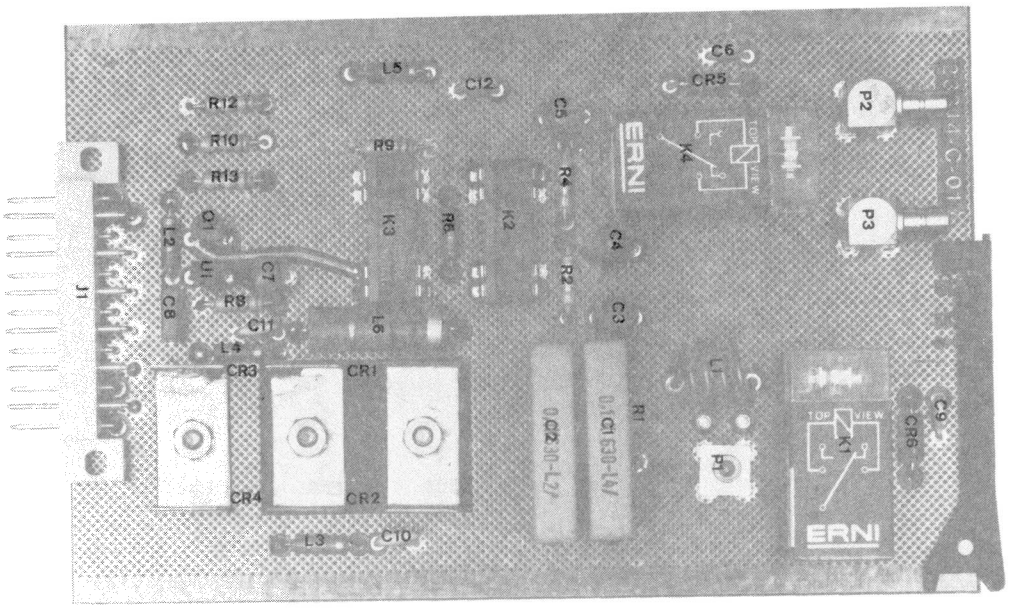
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).





RF INPUT PROTECTION
(Ref. Desig. 4818)



RF INPUT PROTECTION

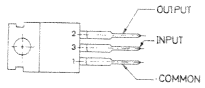
(Ref. Desig. 4818)

Component Location

1980-04

7905

TO-220 PACKAGE
(TOP VIEW)



U1

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

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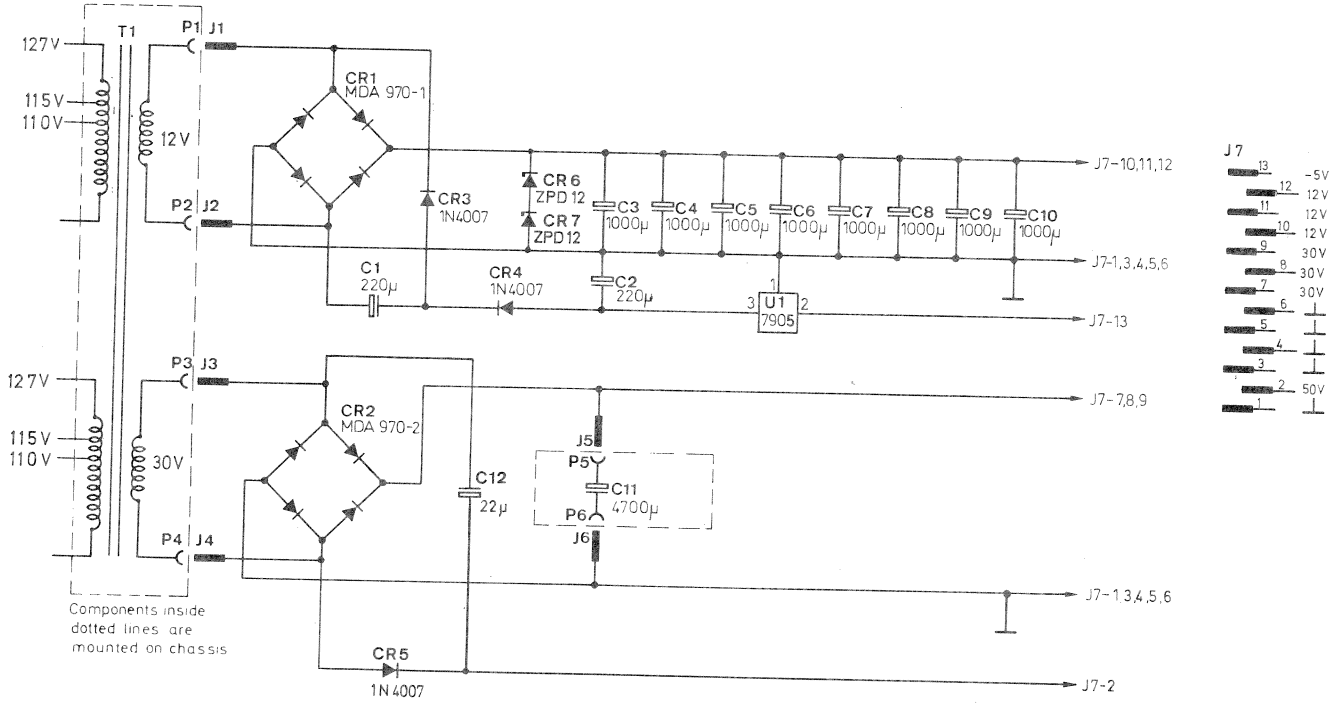
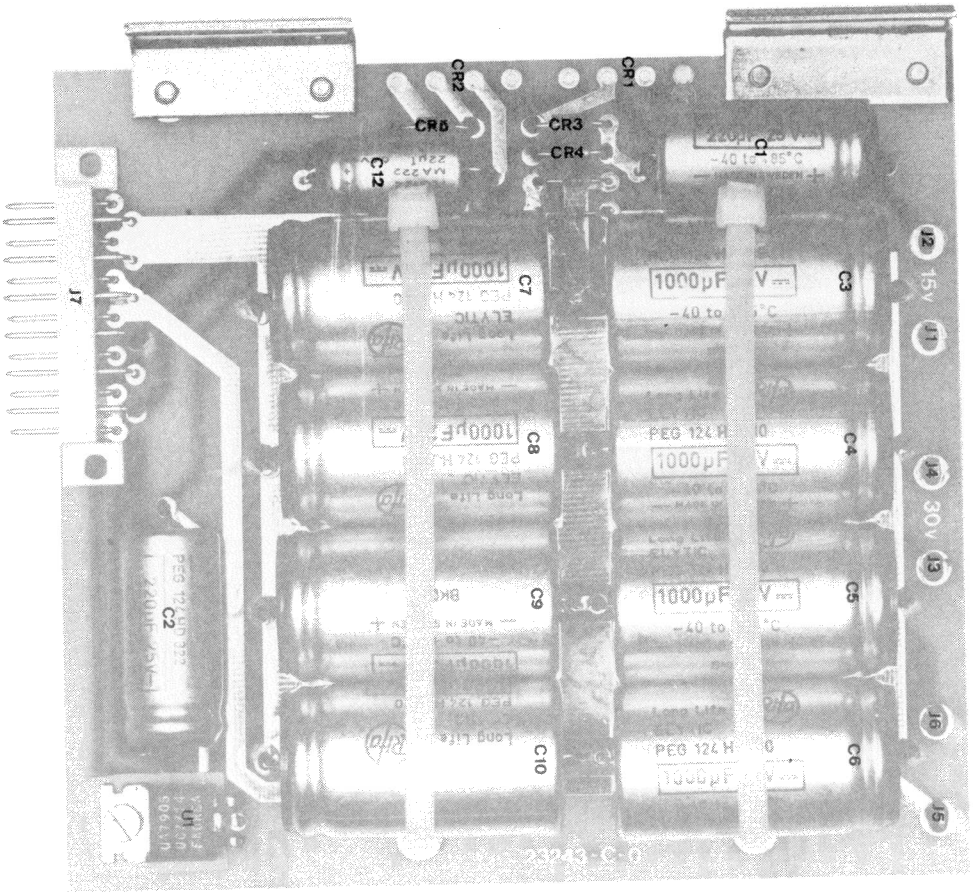
The inductance units are indicated by means of the international prefixes μ, and m, (μH, and mH).

PCB: 23243



RECTIFIER
(Ref. Desig. 4807)



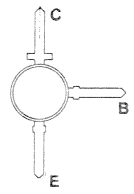
RECTIFIER

(Ref. Desig. 4807)

Component Location

1980-04

BF 480



Q1–Q2

Note 1:

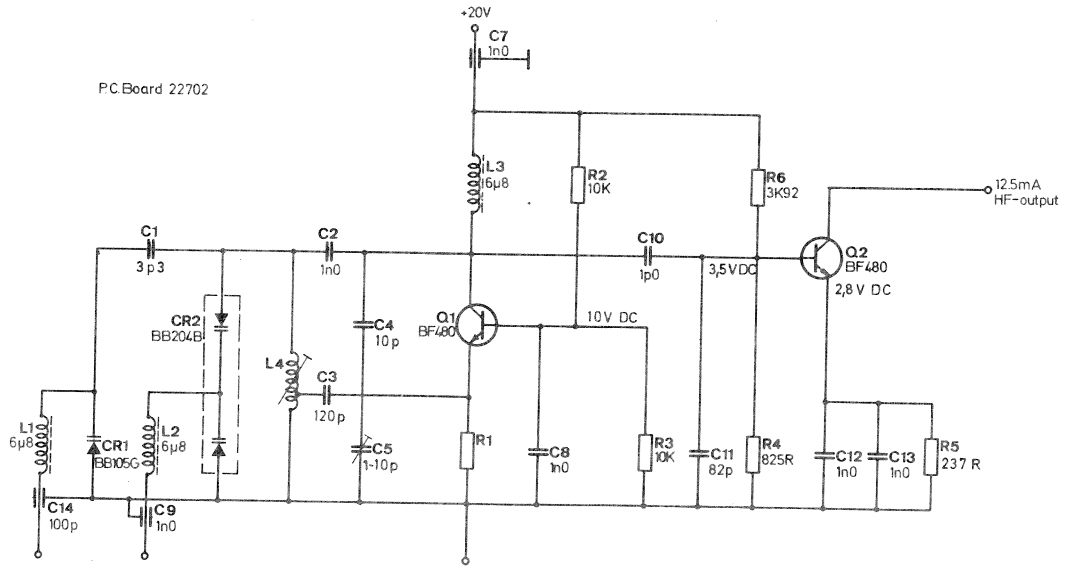
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

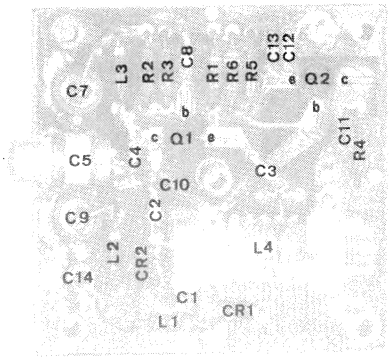
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



Diag. 4522 75-89MHz VCO: L4: 405566 R1 = 17K8
Diag. 4523 89-105MHz VCO: L4: 405558 R1 = 13K3

75 - 89 MHz VCO / 89 - 105 MHz VCO
(Ref. Desig. 4522 / 4523)

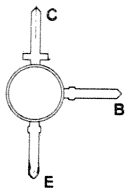


PCB 22728
PCB 22729

75 - 89 MHz VCO / 89 - 105 MHz VCO
(Ref. Desig. 4522 / 4523)
Component Location

1980-04

BF 480



Q1–Q2

Note 1:

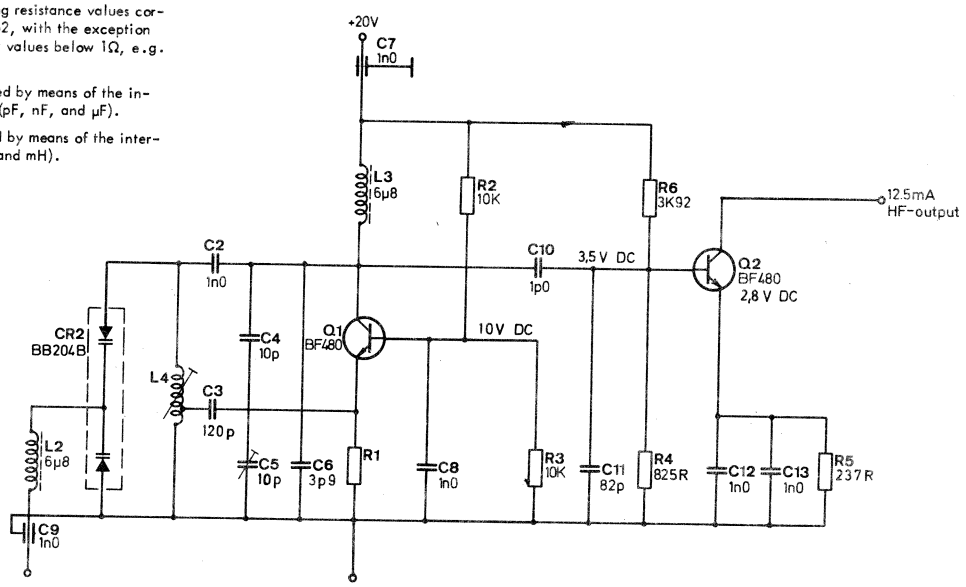
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

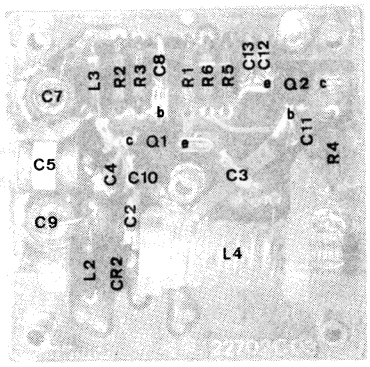
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



Diag. 4524 78-92MHz VCO: L4: 405566 **R1 = 16 K 2**
Diag. 4525 92-107.9MHz VCO:L4: 405558 **R1 = 13 K 3**

P.C.Board 22702

78 - 92 MHz VCO / 92 - 107.9 MHz VCO
(Ref. Desig. 4524 / 4525)

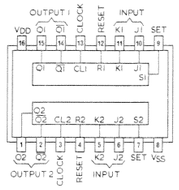


PCB 22730
PCB 22731

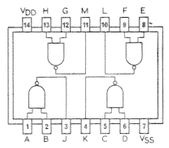
78 - 92 MHz VCO / 92 - 107.9 MHz VCO
(Ref. Desig. 4524 / 4525)
Component Location

1978-02

CD 4027 AE



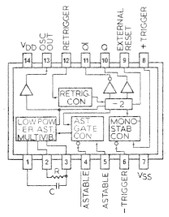
CD 4011 AE



U1–U4

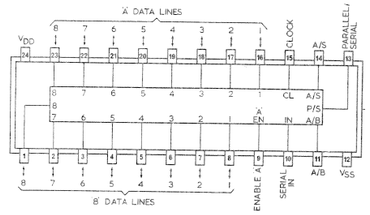
U2–U3

CD 4047 AE



U5

CD 4034 AE



U6–U7–U8–U9

Note 1:

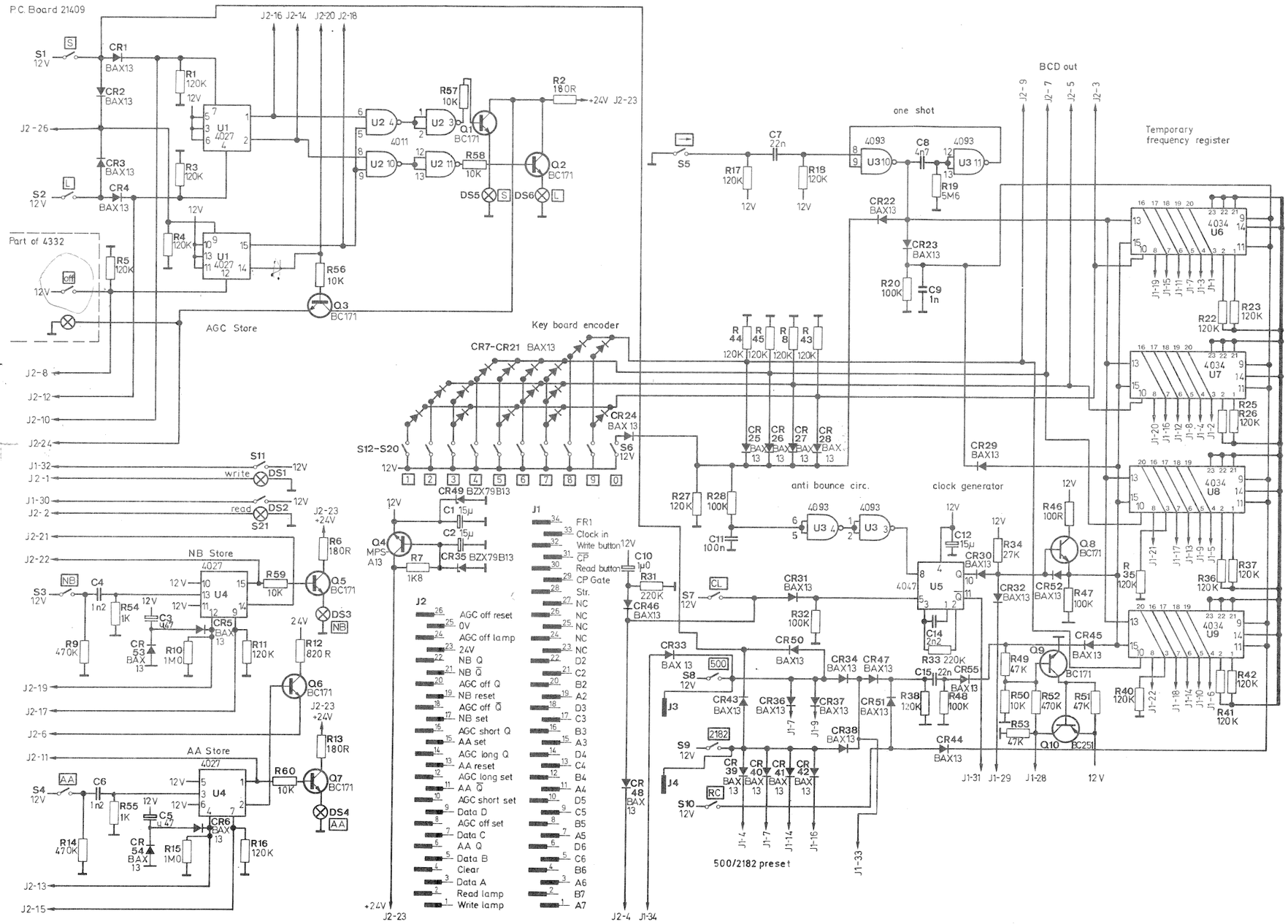
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

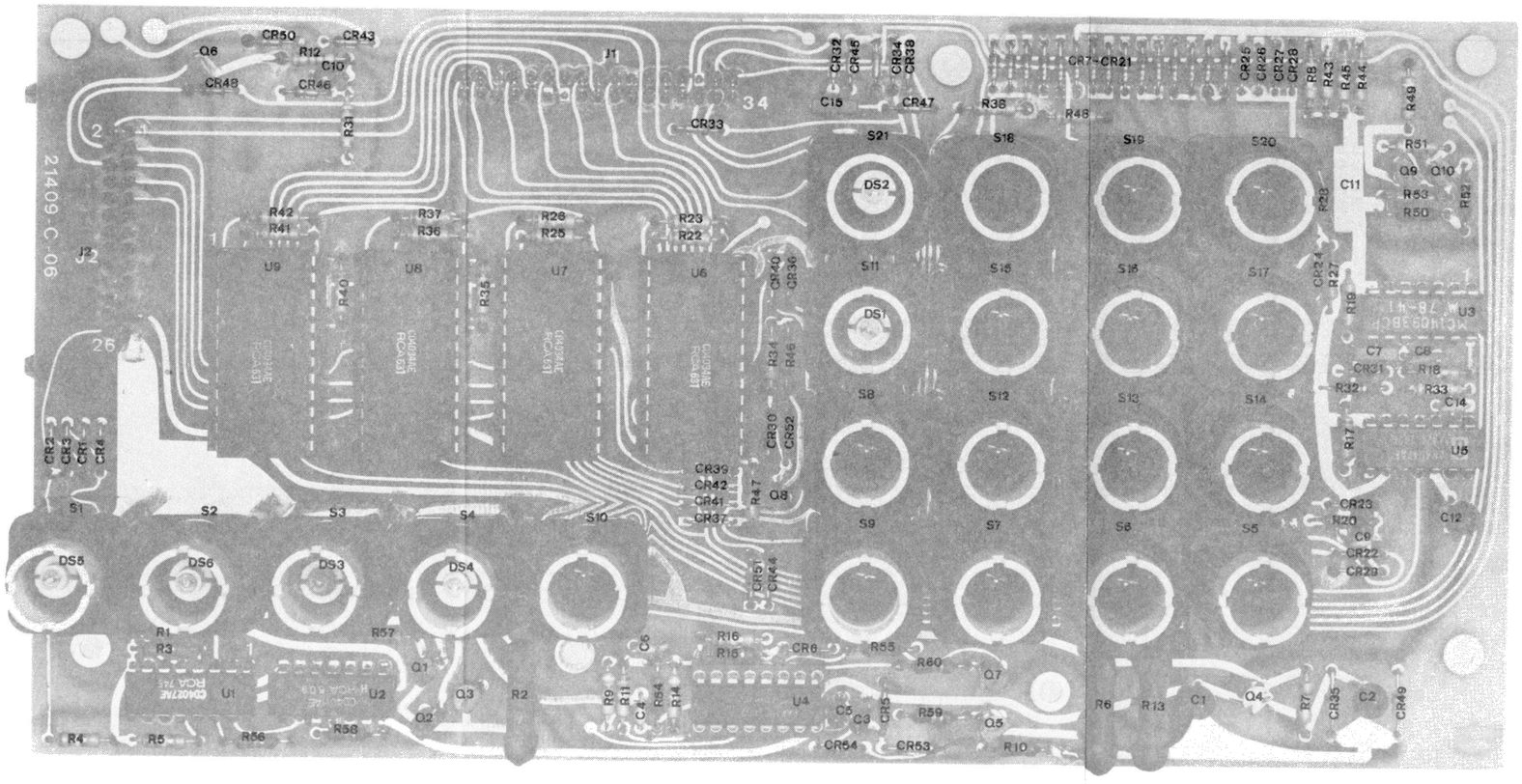
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



FM 6001 MR 6000 DIAG No. 4331 / 1980-04

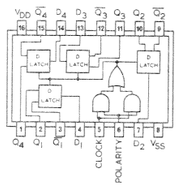
FREQUENCY SELECTING KEYBOARD (Ref. Desig. 4331)



FREQUENCY SELECTING
KEYBOARD
(Ref. Desig. 4331)

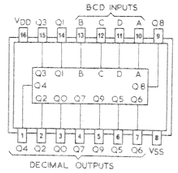
Print nr. 21410

CD 4042 AE



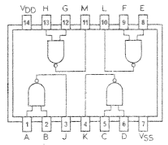
U1

CD 4028 AE



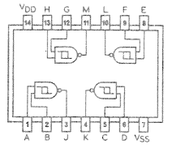
U2 – U6

CD 4011 AE



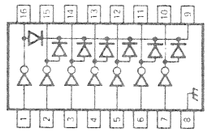
U3 – U4

CD 4093



U5

ULN 2002 N



U7 – U8

Note 1:

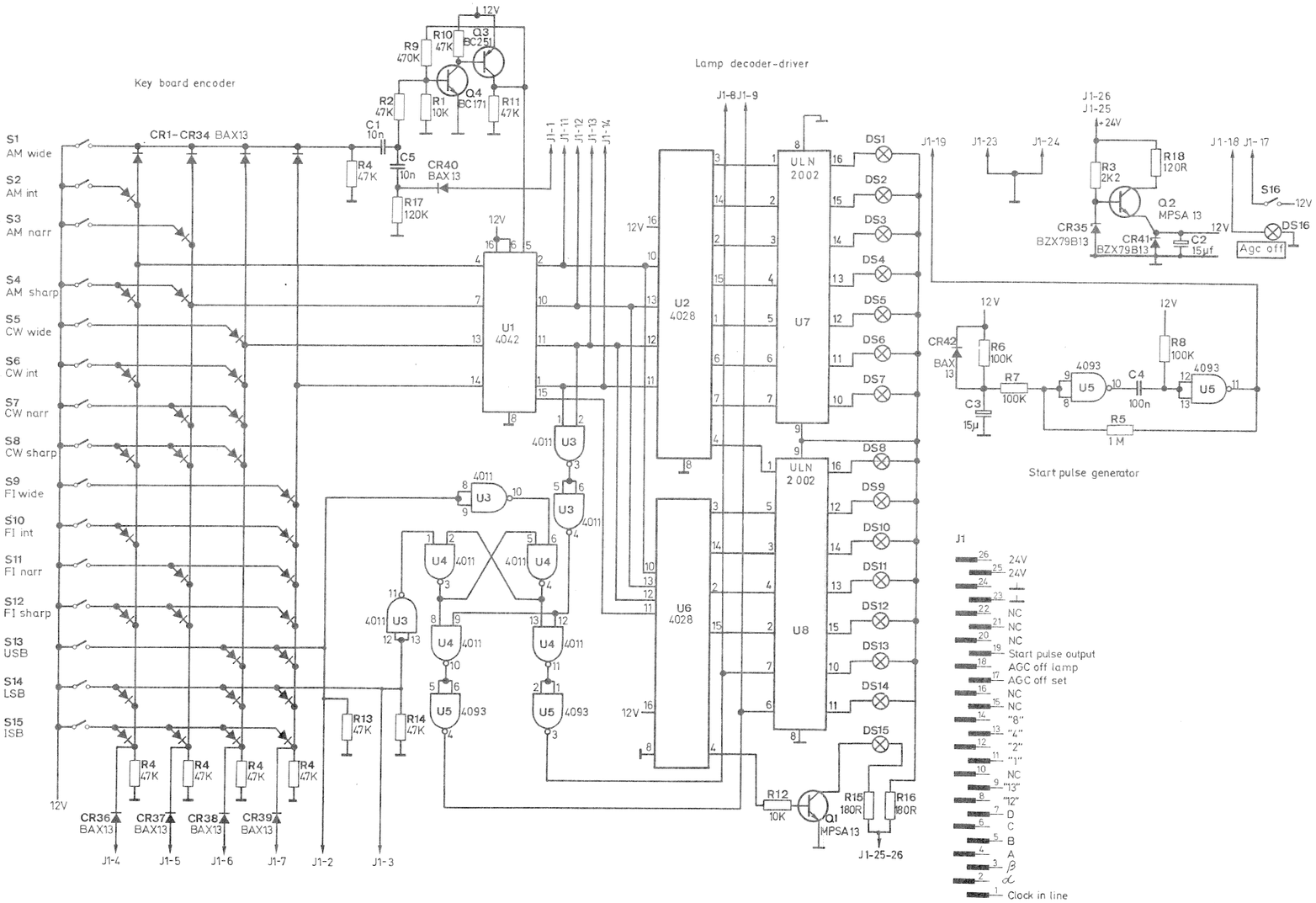
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

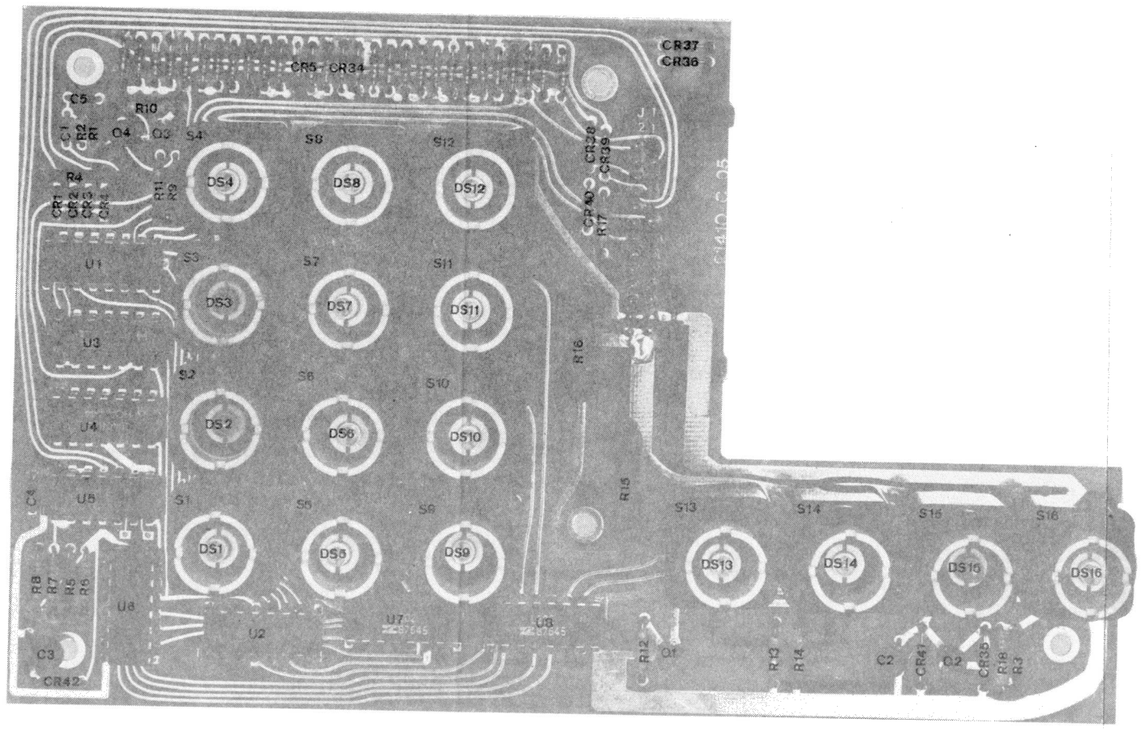
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



FM 6001 MR 6000 DIAG No. 4332 / 1980-04

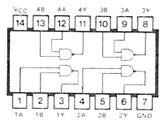
MODE SELECTING KEYBOARD

(Ref. Desig. 4332)



MODE SELECTING
KEYBOARD
(Ref. Desig. 4332)
Component Location

SN 7400 N



U 1

Note 1:

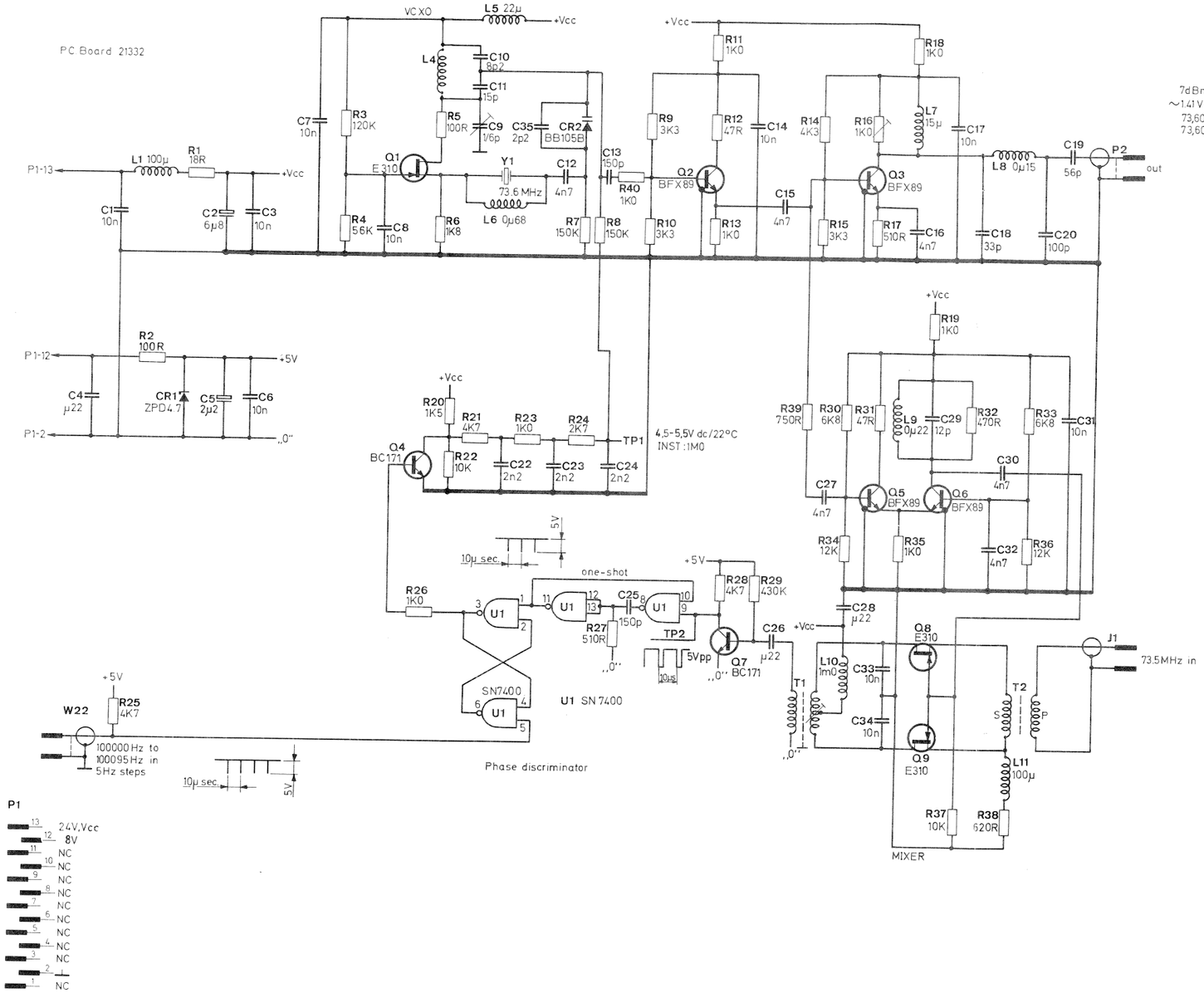
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

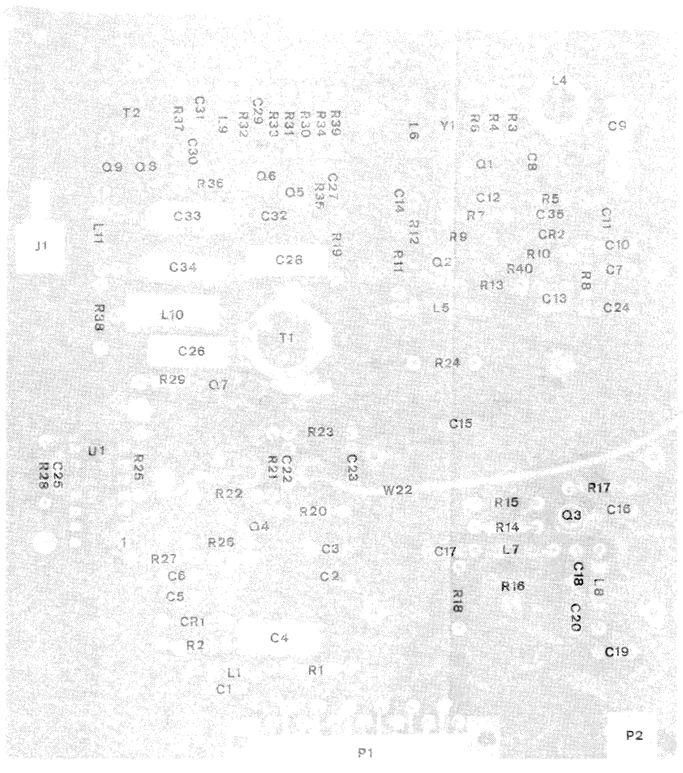
The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

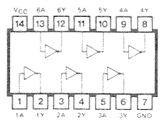


73.6 MHz LOOP
(Ref. Desig. 4336)



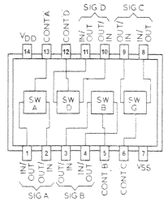
73.6 MHz LOOP
(Ref. Desig. 4336)
Component Location

SN 7406 N



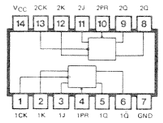
U1

CD 4066 AE



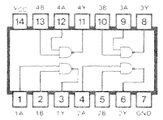
U 2

SN 74 S 113 N



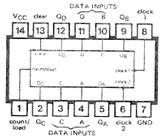
U 3

SN 74 S 00 N



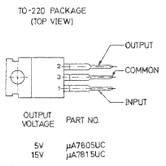
U 4

SN 74 196 – SN 74LS 196



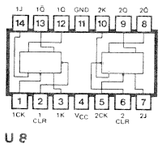
U 6 – U 9 – U 10 – U 11
U 12

7805



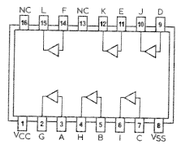
U 7

SN 7473 N



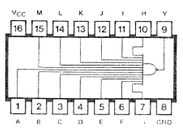
U 8

CD 4050 AE



U 13 – U 14

SN 74 S 133 N



U 5

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

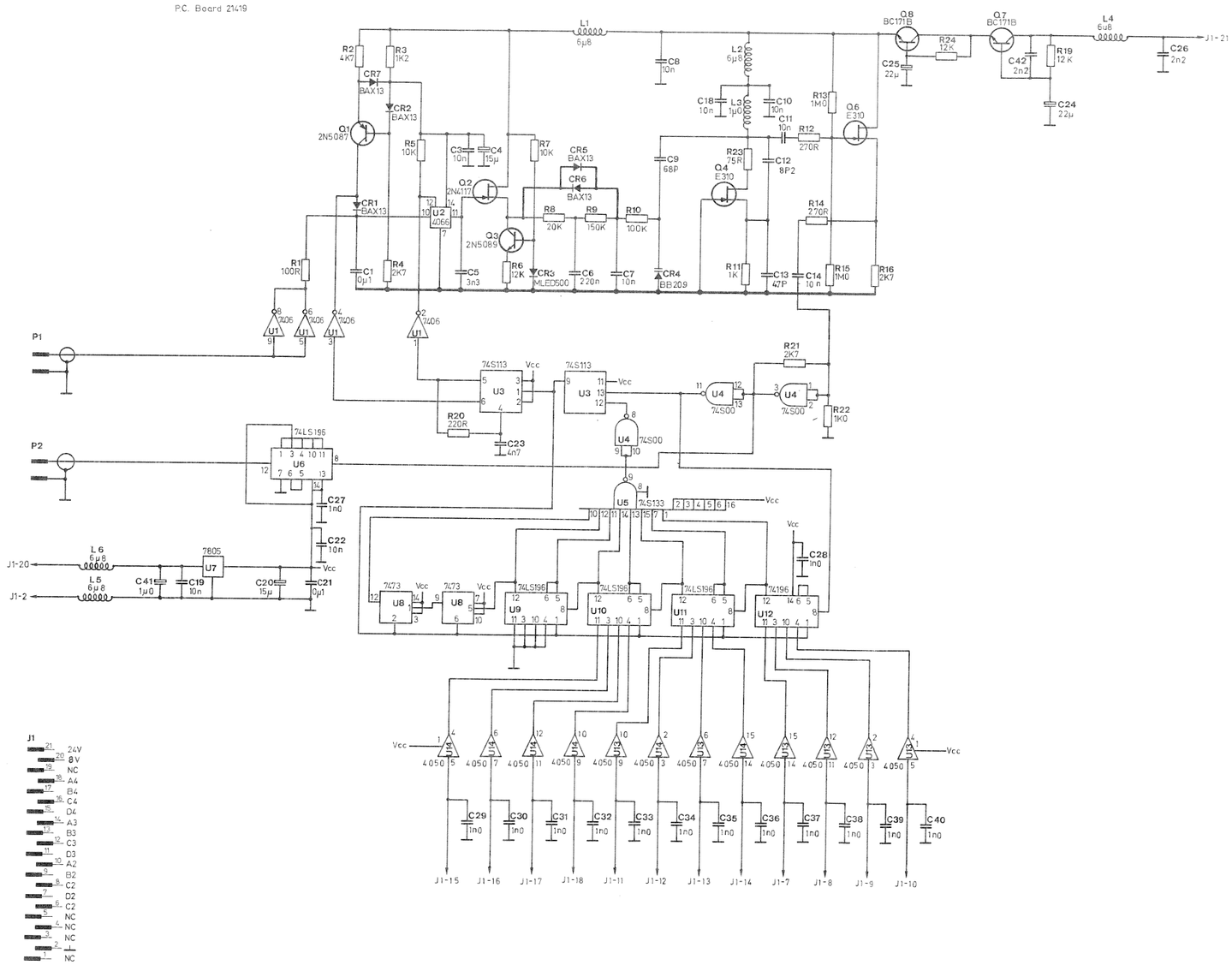
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

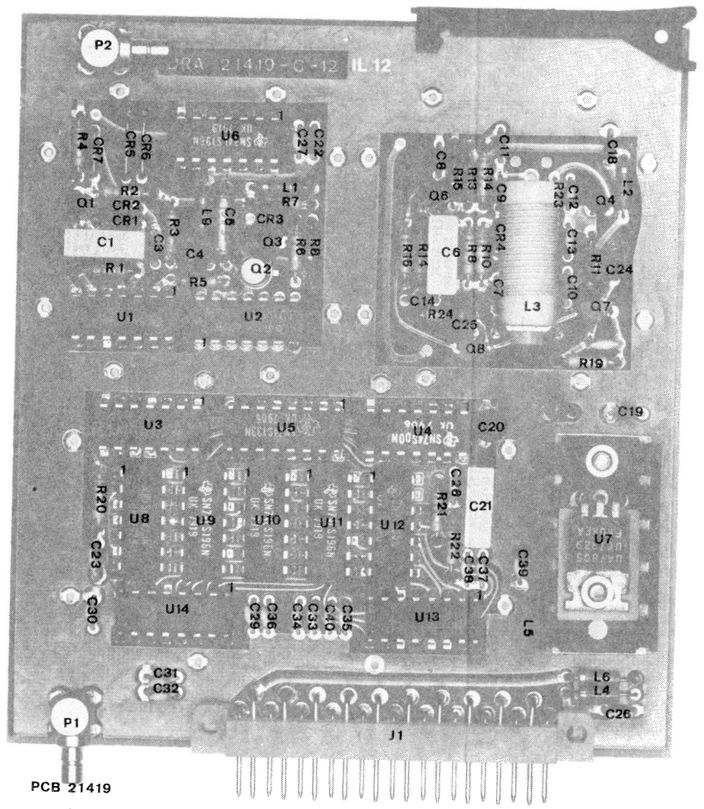
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

P.C. Board 21419

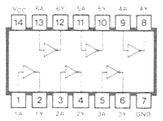


30 MHz LOOP
(Ref. Desig. 4352)



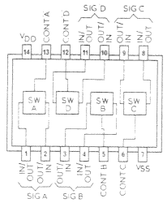
30 MHz LOOP
(Ref. Desig. 4352)
Component Location

SN 7406N



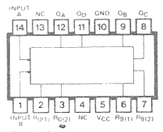
U 1

CD 4066 AE



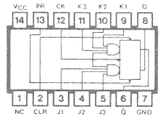
U 2

SN 7490N



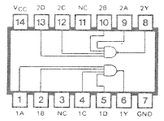
U 3 – U 4

SN 74H72N



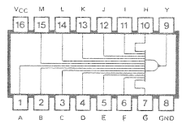
U 5

SN 74H20N



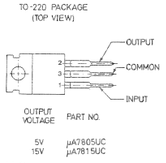
U 6

SN 74S133N



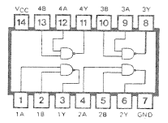
U 10

µA 7805 UC



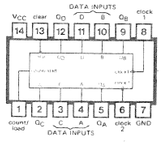
U 8

SN 74S00N



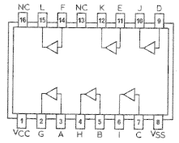
U 9

SN 74 LS 197



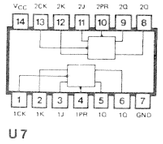
U 11 – U 12 – U 13 – U 14

CD 4050



U 15

SN 74 S 113 N



U 7

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

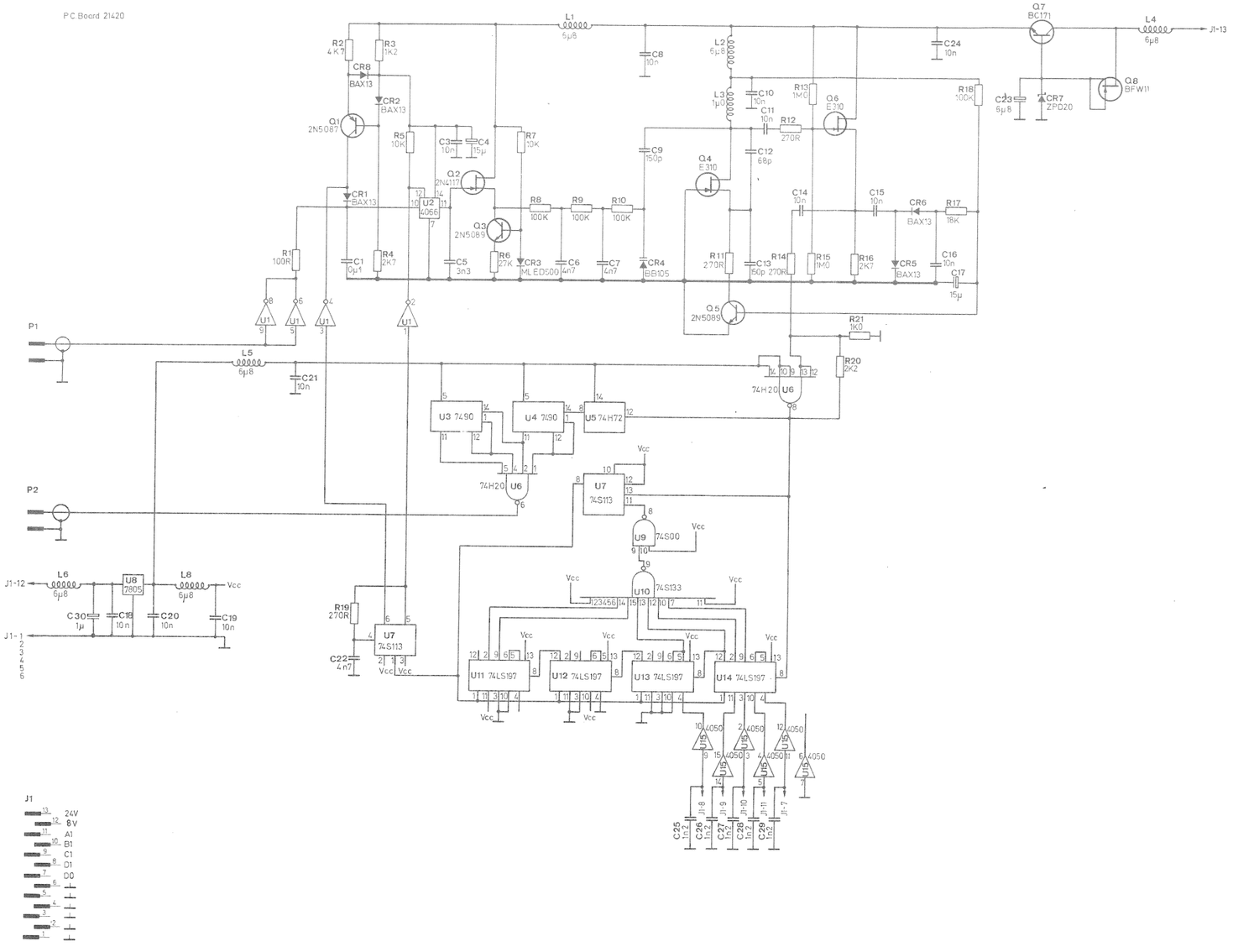
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

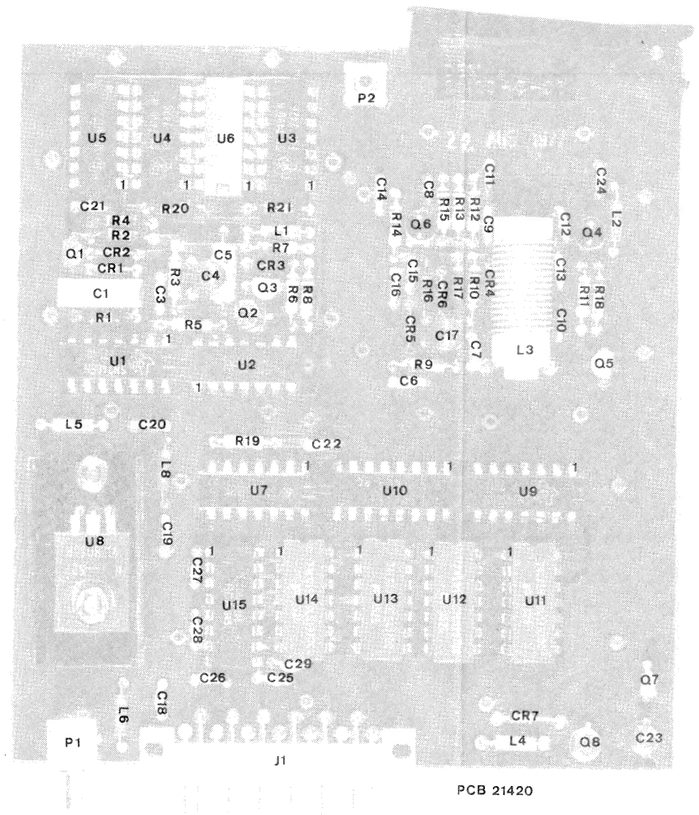
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

P.C.Board 21420



MR 6000 DIAG No. 4353 / 1980-04

20 MHz LOOP
(Ref. Desig. 4353)



20 MHz LOOP
(Ref. Desig. 4353)
Component Location

Note 1:

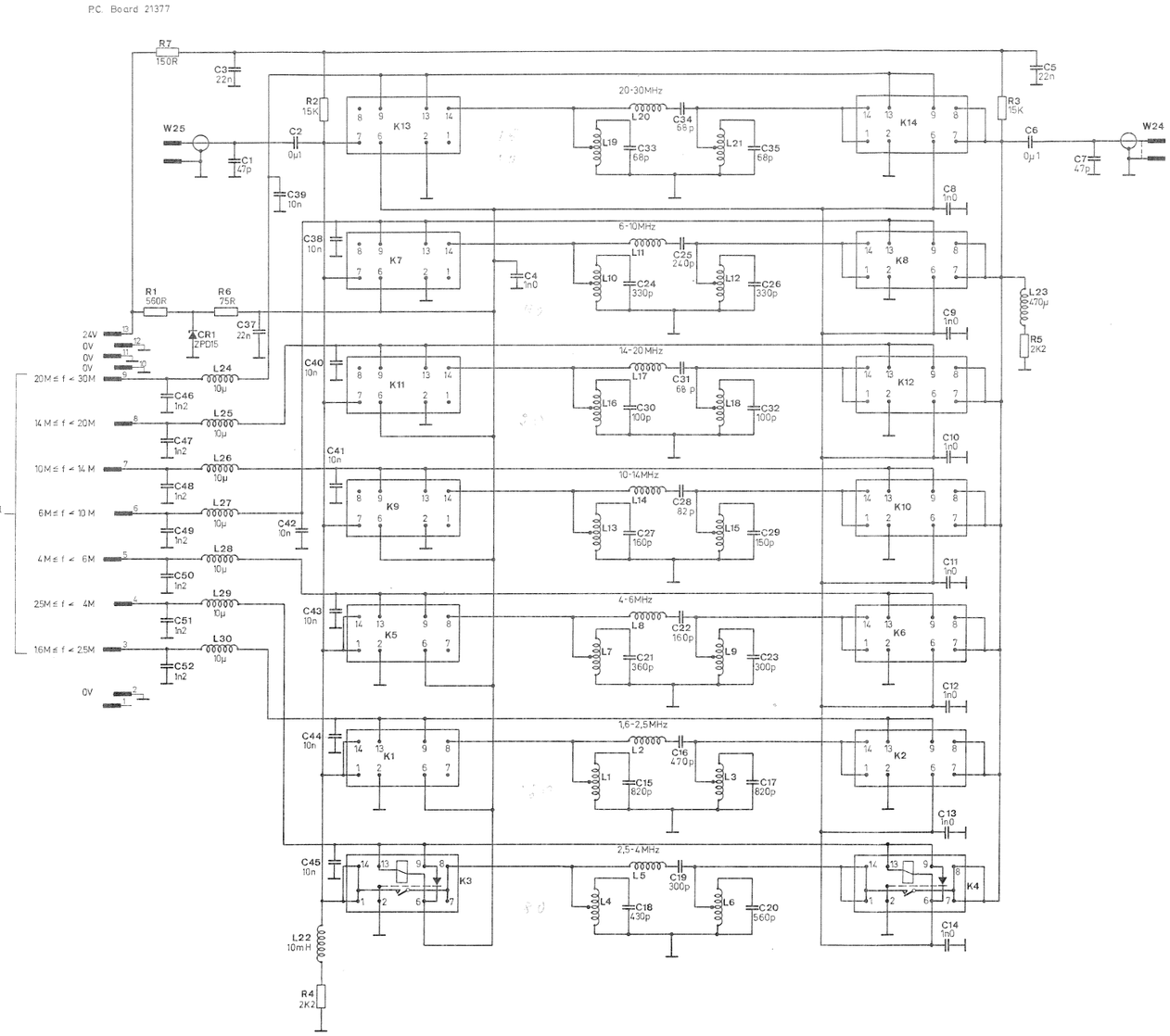
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

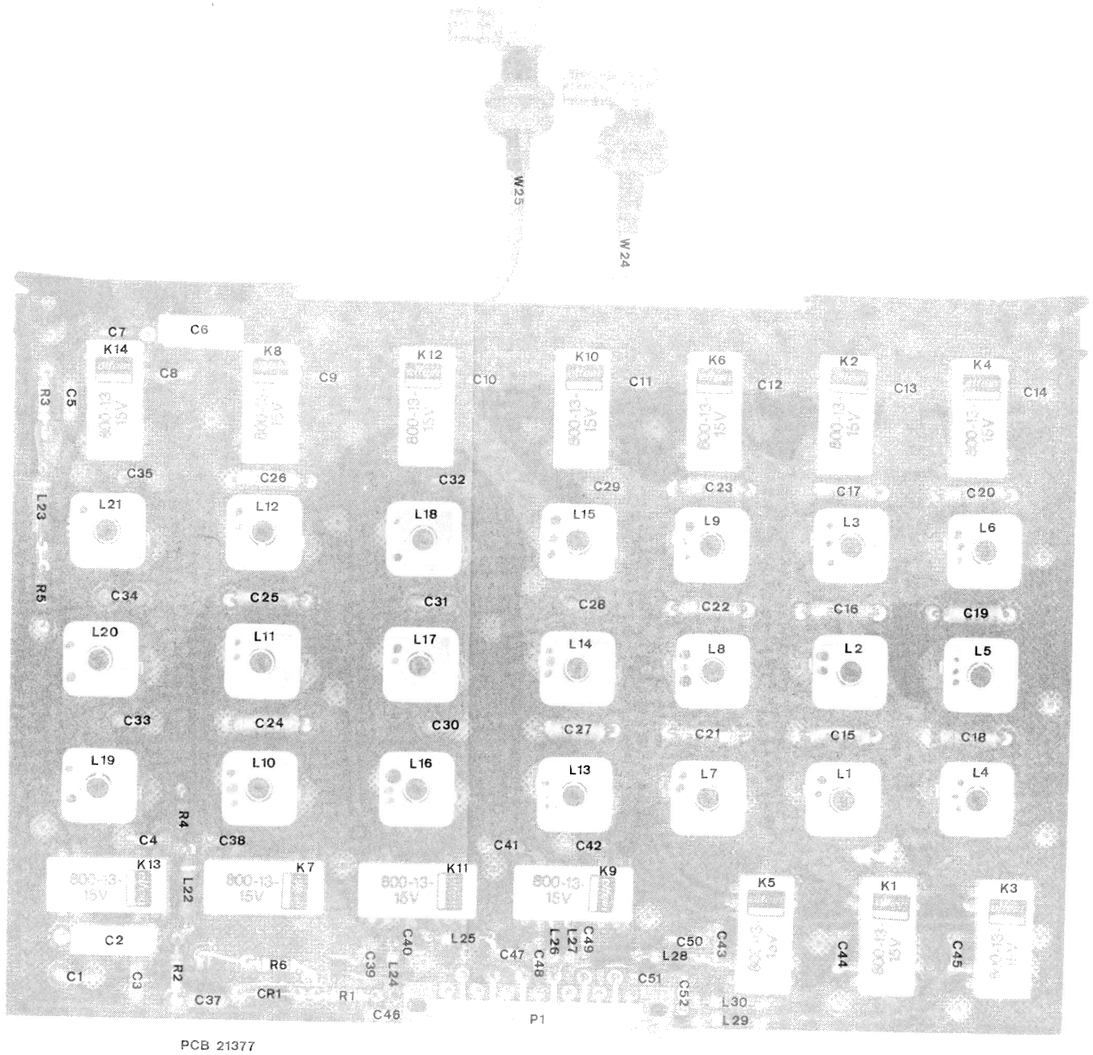
The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and μ, (pF, nF, and μF).

The inductance units are indicated by means of the international prefixes μ, and m, (μH, and mH).



SUBOCTAVE FILTER HF
(Ref. Desig. 4354)



PCB 21377

SUBOCTAVE FILTER HF

(Ref. Desig. 4354)

Component Location

1980-04

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

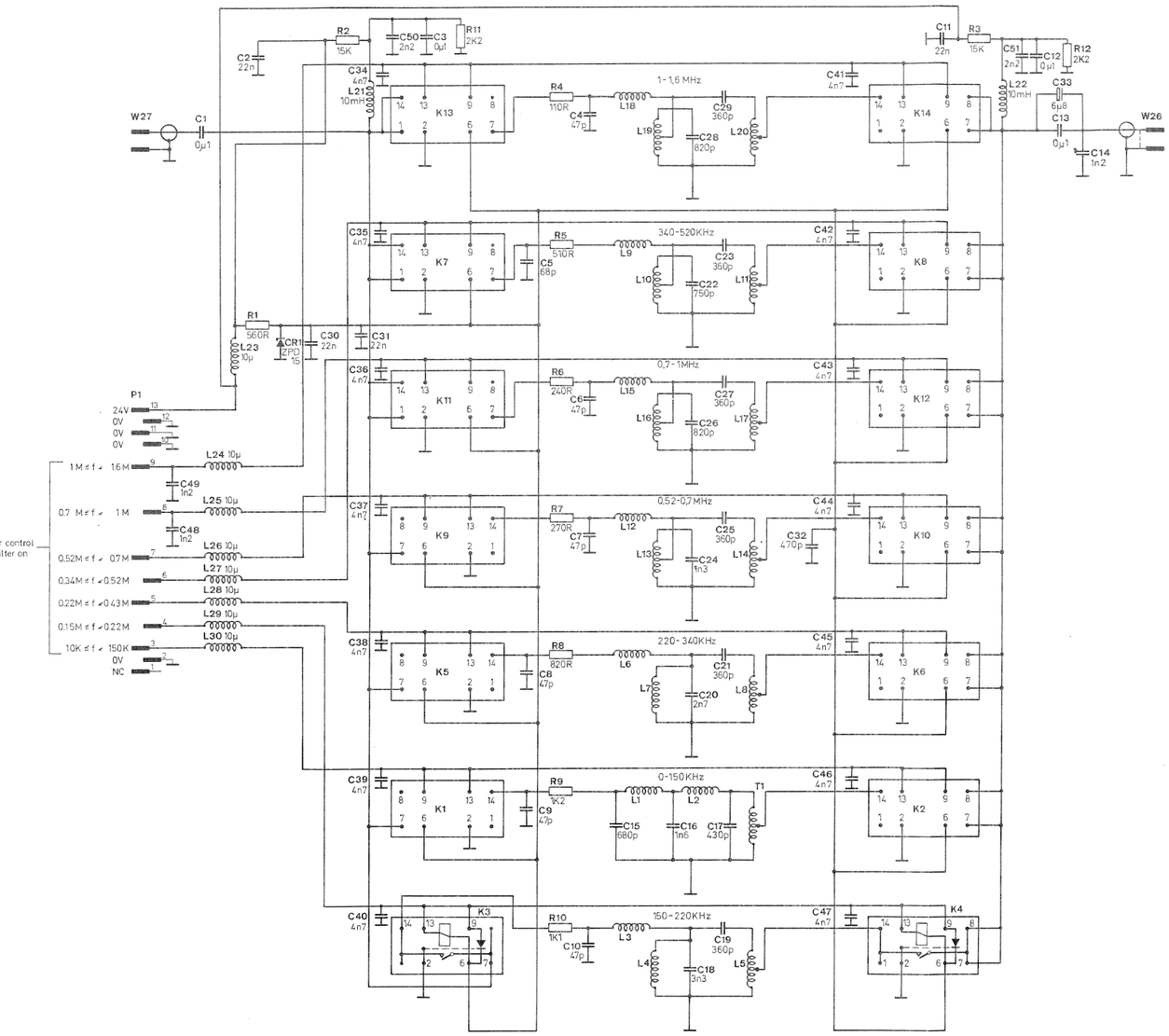
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

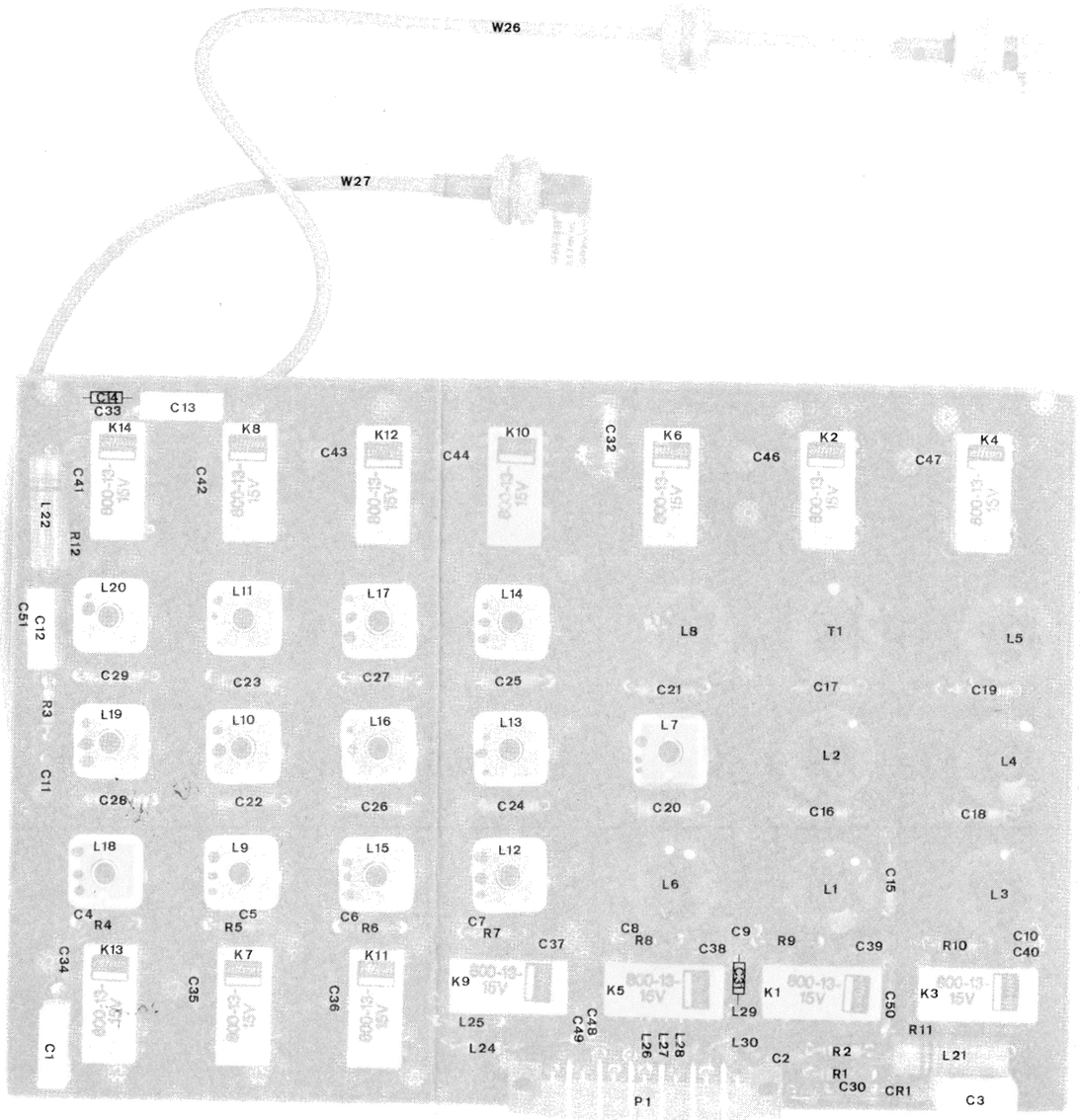
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

P.C. Board 21405



SUBOCTAVE FILTER LF-MF
(Ref. Desig. 4355)

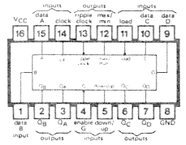


PCB 21405

SUBOCTAVE FILTER LF - MF
(Ref. Desig. 4355)
Component Location

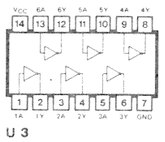
1980-04

SN 74 LS 191N



U 1 – U 2

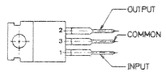
SN 74 LS 04N



U 3

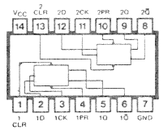
7805

TO-220 PACKAGE
(TOP VIEW)



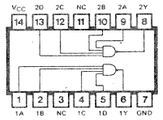
U 4

SN 74 LS 74 N



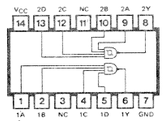
U 5

SN 74 LS 20N



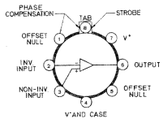
U 6

SN 74 LS 13N



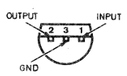
U 7

CA 3130



U 8 – U 9 – U 10

78 L 15



BOTTOM VIEW

U 11

Note 1:

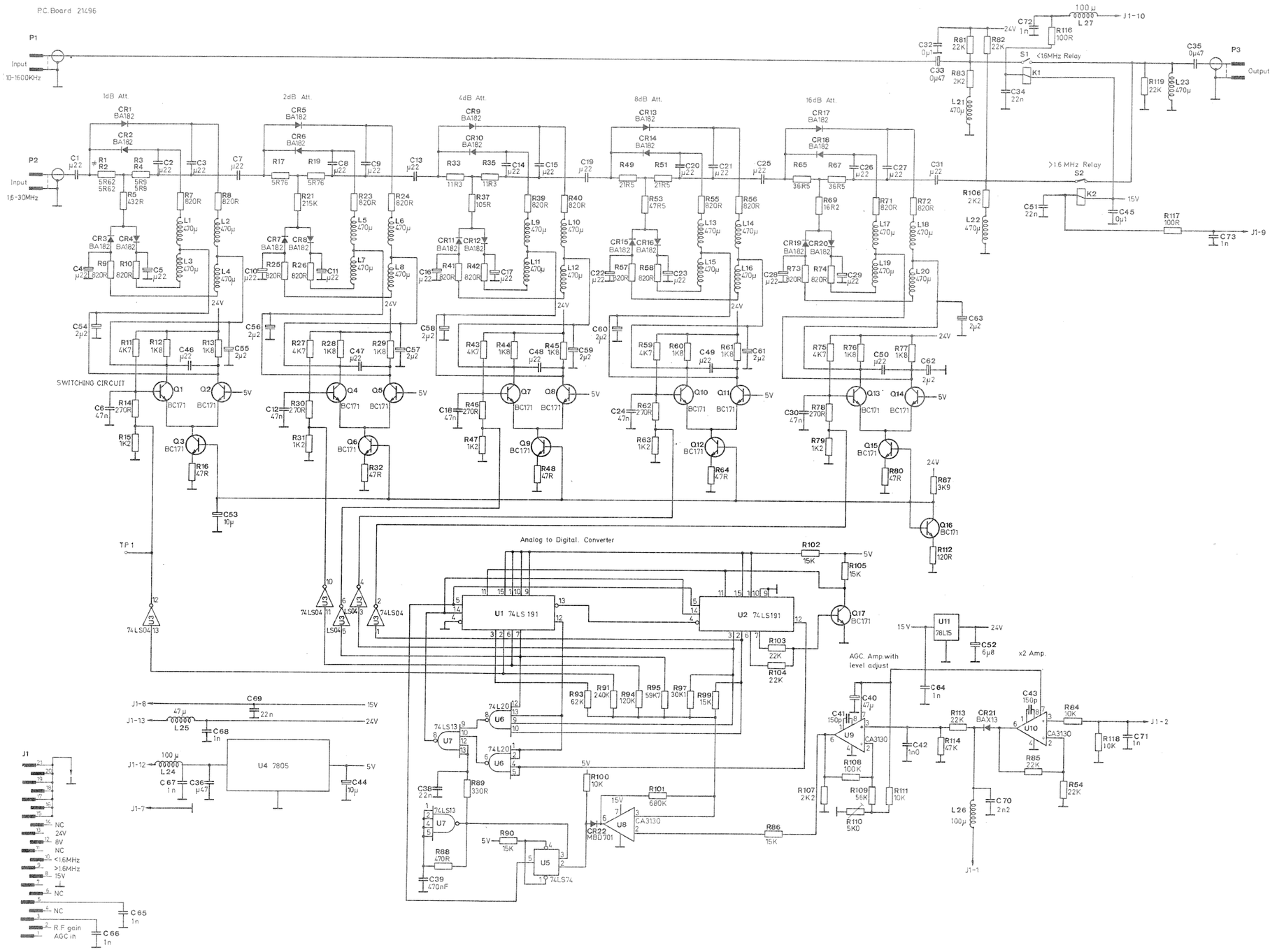
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code-system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

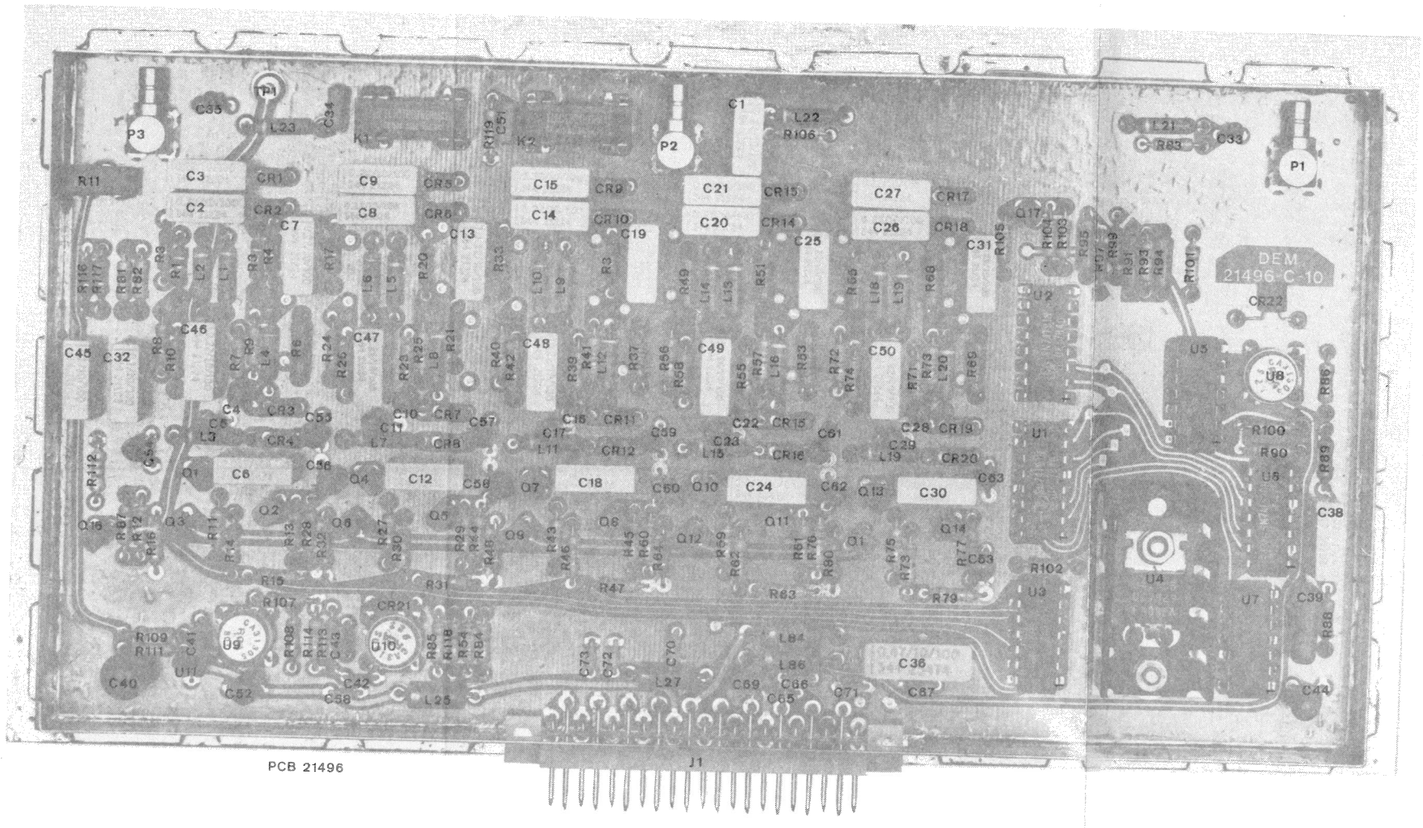
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



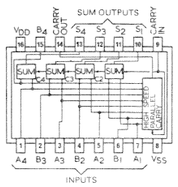
MR 6000 DIAG No. 4371 / 1980-04

STEP ATTENUATOR
(Ref. Desig. 4371)



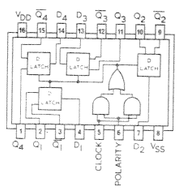
STEP ATTENUATOR
(Ref. Desig. 4371)
Component Location

CD4008



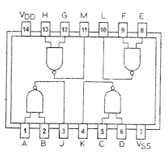
U17–U18–U19–U21

CD4042



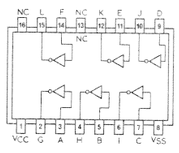
U13–U14

CD4011



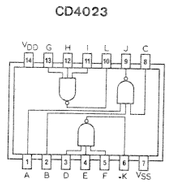
U4–U5

CD4049



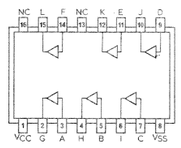
U12

CD4023



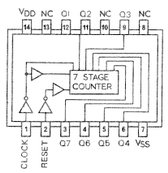
U7

CD4050



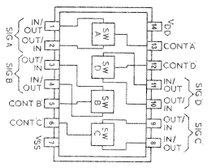
U11–U8

CD4024



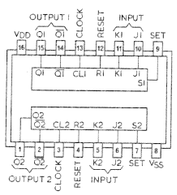
U6

CD4066



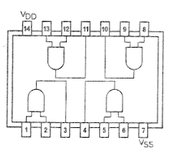
U15–U16

CD4027



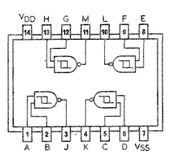
U1–U20

CD4081



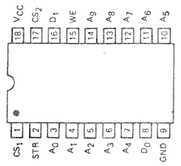
U2

CD4093

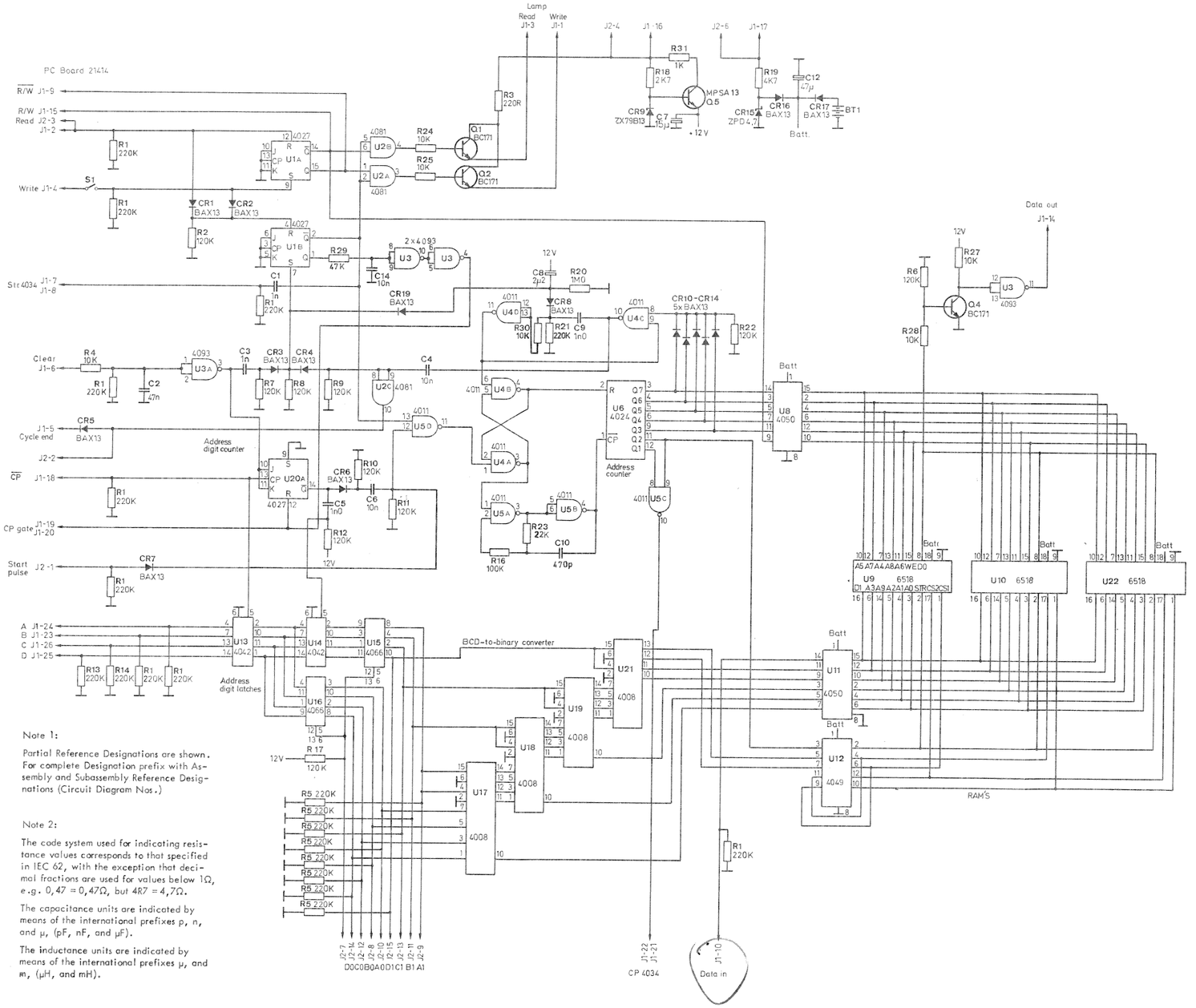


U3

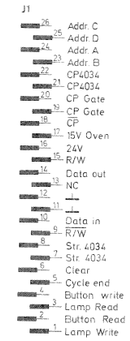
IM6518



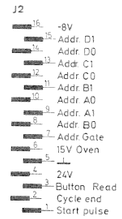
U9–U10–U22



J1



J2



Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

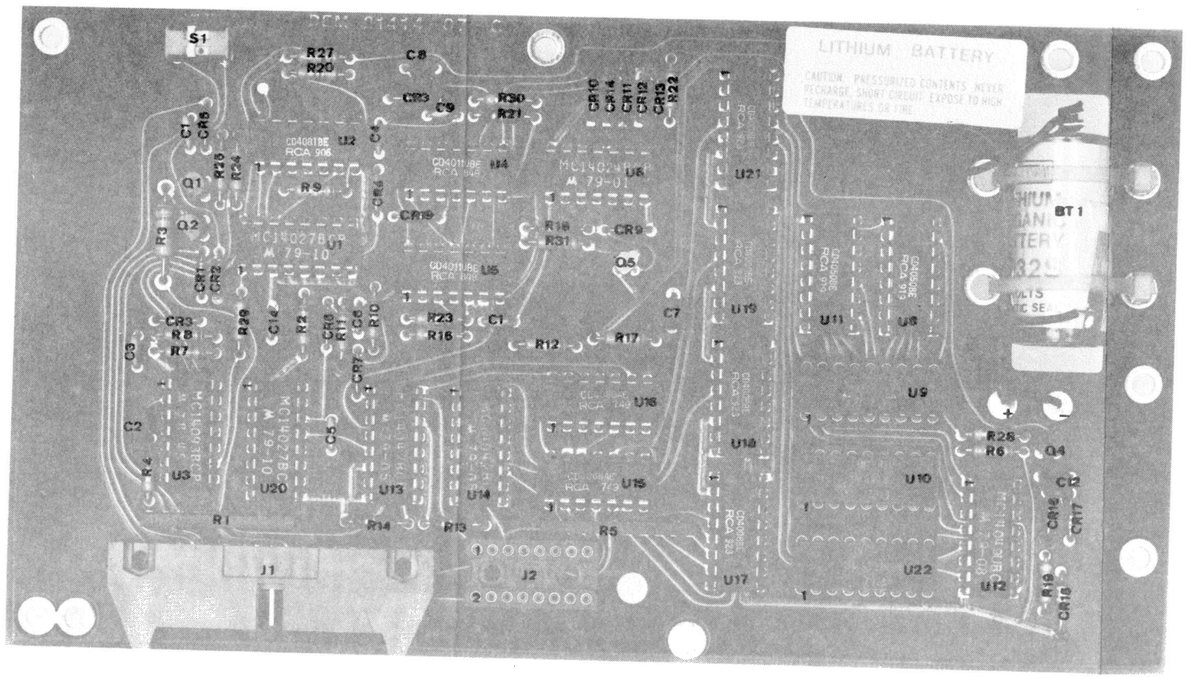
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and μ, (pF, nF, and μF).

The inductance units are indicated by means of the international prefixes μ, and m, (μH, and mH).

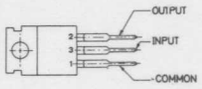
MEMORY
(Ref. Desig. 4373)



MEMORY
(Ref. Desig. 4373)
Component Location

MC 7908 CP

TO-220 PACKAGE
(TOP VIEW)



U1

Note 1:

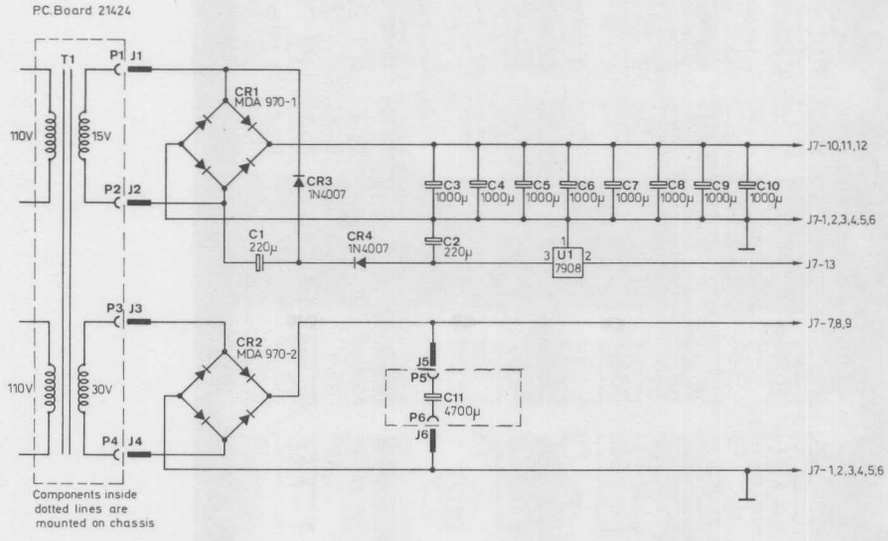
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

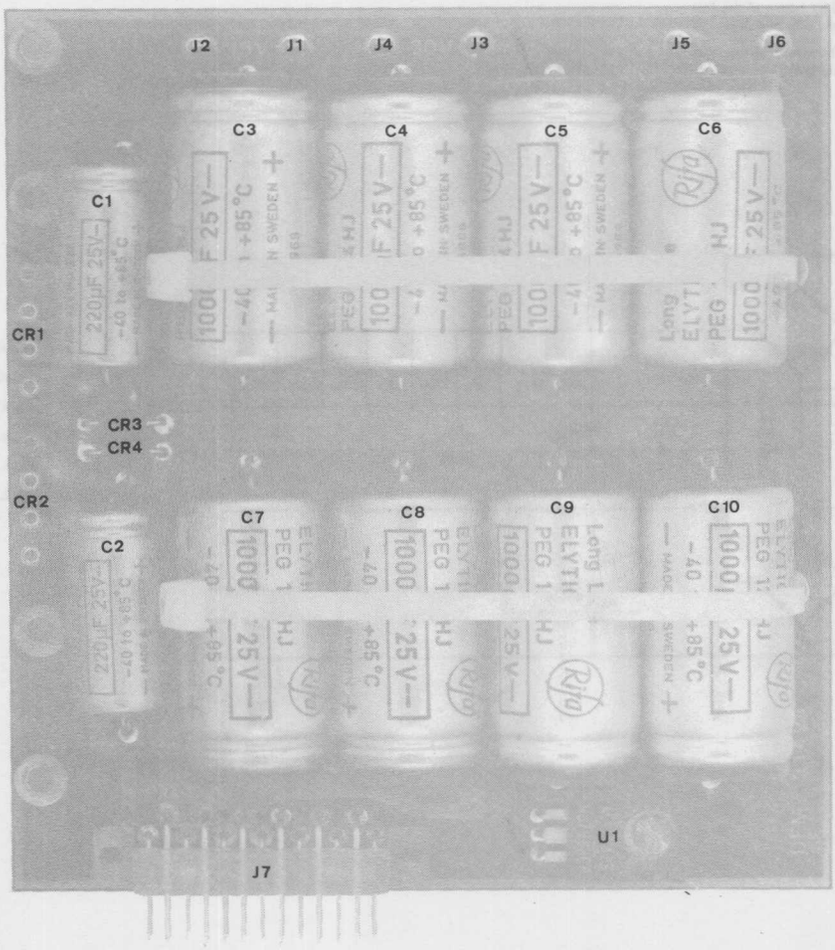
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



Rectifier

MR 6000 DIAG No. 4379 / 1978-02

Ref. Designation 4379



RECTIFIER

(Ref. Desig. 4379)

Component Location

1978-02

Note 1:

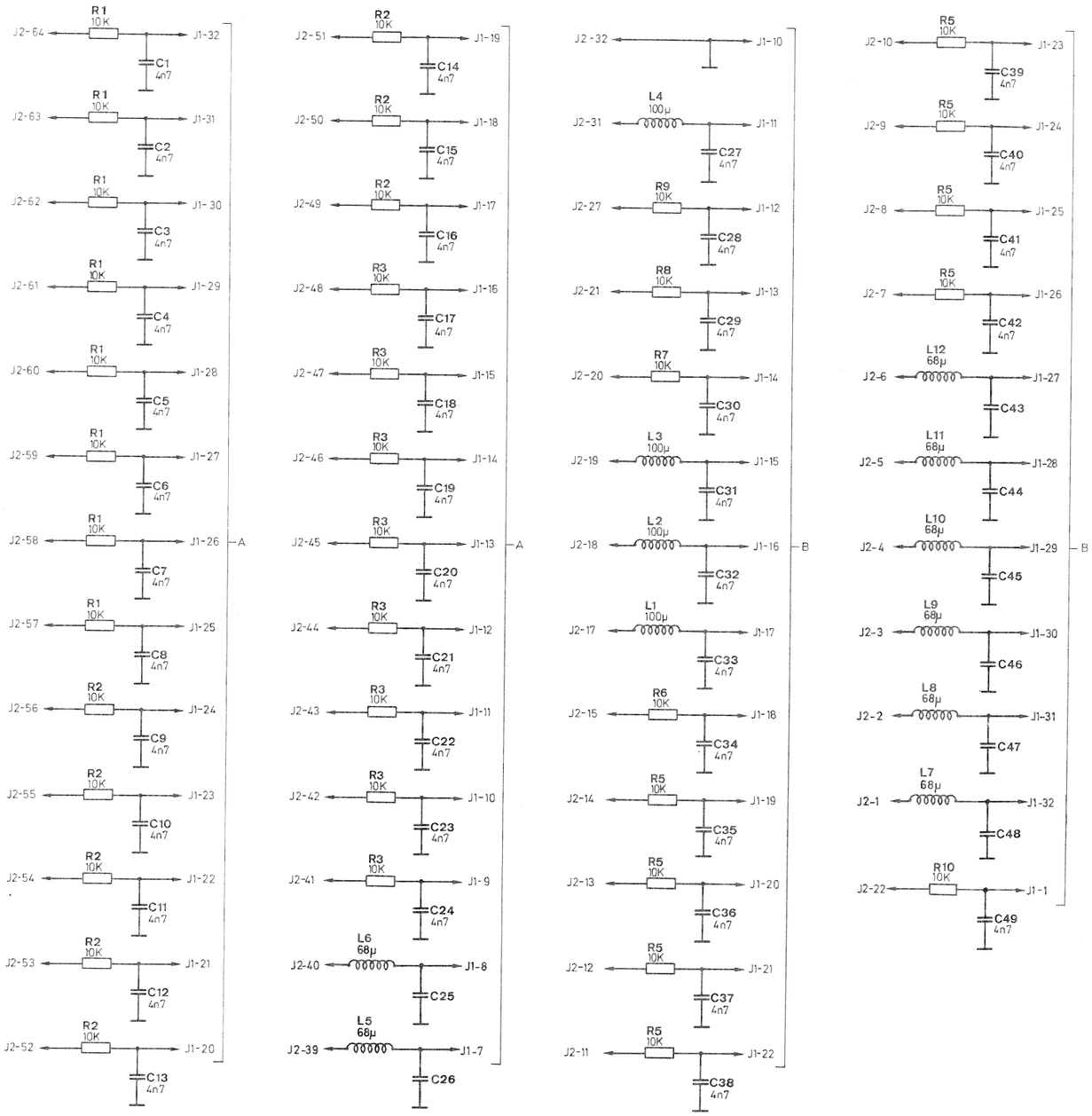
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



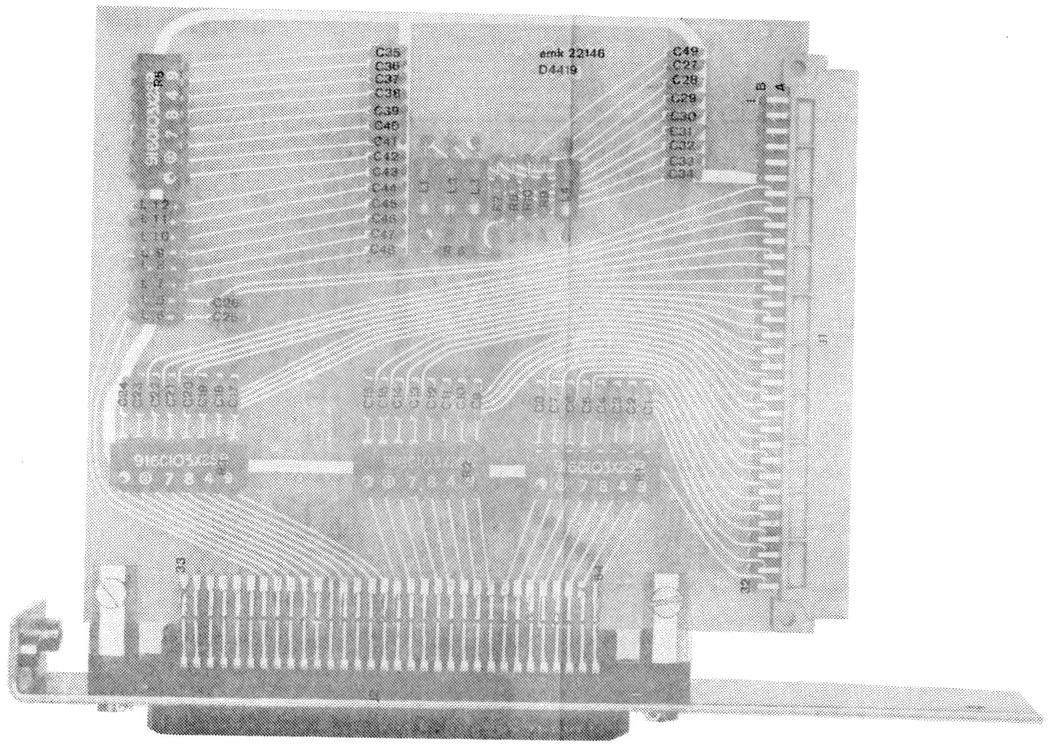
J1

	A	B
32	D1	Mode α
31	C1	Mode β
30	B1	Mode A
29	A1	Mode B
28	D2	Mode C
27	C2	Mode D
26	B2	AGC off set
25	A2	AGC off reset
24	D3	AGC short
23	C3	AGC long
22	B3	AA reset
21	A3	AA set
20	D4	NB set
19	C4	NB reset
18	B4	Set D0
17	A4	AGC analog inp.
16	D5	BFO analog inp.
15	C5	Clock in
14	B5	Remote on/off inp.
13	A5	Remote disable outp.
12	D6	Ext. std. outp.
11	C6	AGC analog outp.
10	B6	GND
9	A6	GND
8	B7	GND
7	A7	GND
6		GND
5		NC
4		NC
3		NC
2		NC
1		Remote Sync

J2

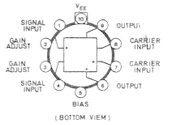
64	D1	GND
63	C1	AGC analog outp.
62	B1	NC
61	A1	NC
60	D2	NC
59	C2	Ext. std. outp.
58	B2	NC
57	A2	NC
56	D3	NC
55	C3	NC
54	B3	Remote Sync
53	A3	Remote disable outp.
52	D4	Remote on/off inp.
51	C4	Clock in
50	B4	BFO analog inp.
49	A4	AGC analog inp.
48	D5	NC
47	C5	D0 set
46	B5	NB reset
45	A5	NB set
44	D6	AA set
43	C6	AA reset
42	B6	AGC long
41	A6	AGC short
40	B7	AGC off reset
39	A7	AGC off set
38	NC	Mode D
37	NC	Mode C
36	NC	Mode B
35	NC	Mode A
34	NC	Mode β
33	NC	Mode α

REMOTE INPUT FILTERS
(Ref. Desig. 4419)



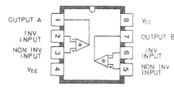
REMOTE INPUT FILTERS
(Ref. Desig. 4419)
Component Location

MC1496G



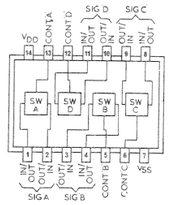
U1–U4–U13

1458



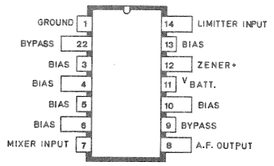
U2–U5–U12–U14–U15

CD 4066AE



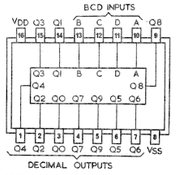
U3–U7–U11

TBA120AS



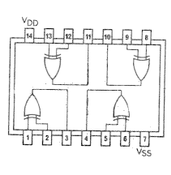
U6

CD 4028AE



U8–U10

CD 4070 BE



U9

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

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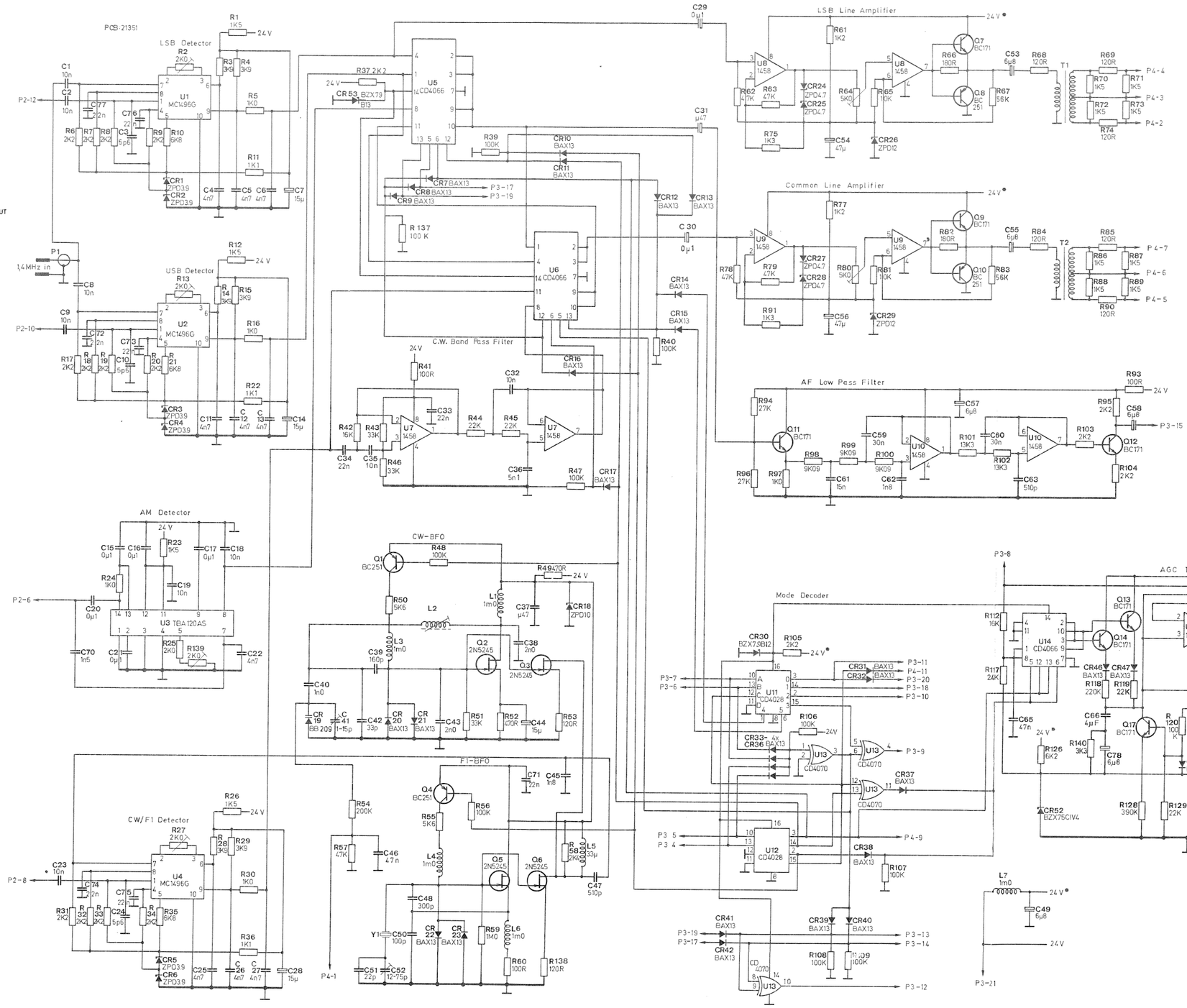
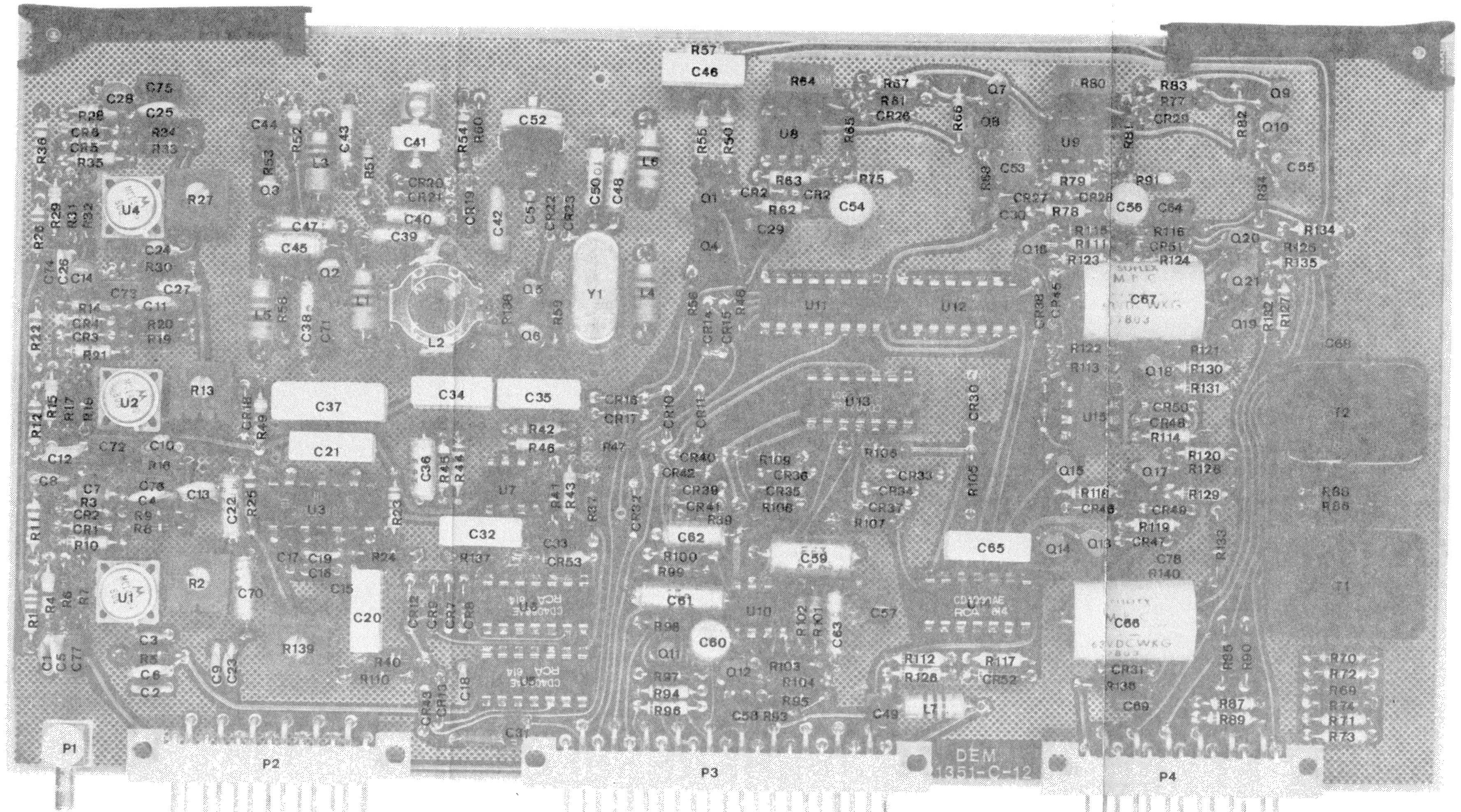
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

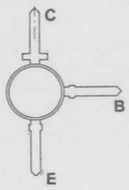


DETECTORS AND MODE DECORDER
(Ref. Desig. 4521)



DETECTORS AND MODE DECORDER
(Ref. Desig. 4521)
Component Location

BF 480



Q1–Q2

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

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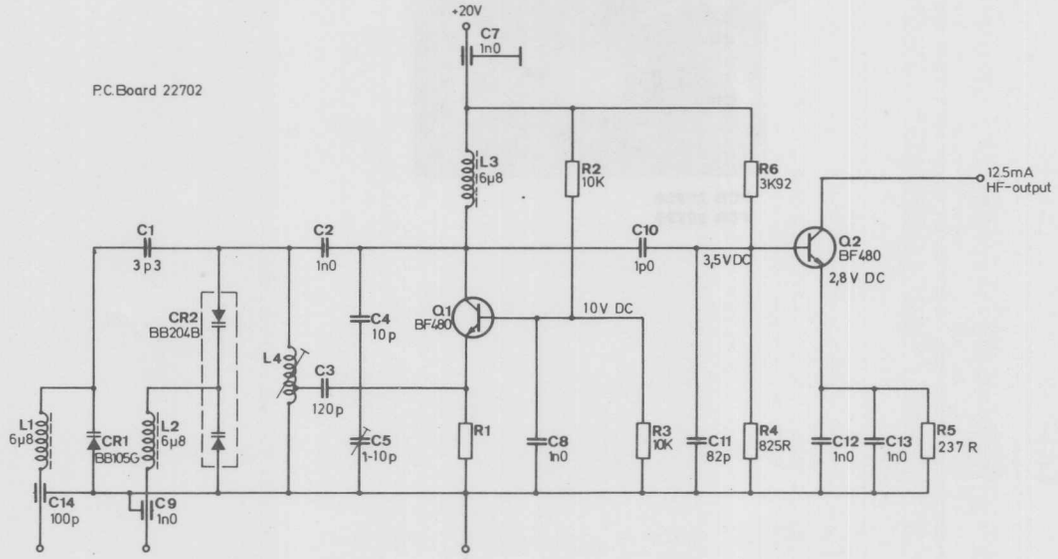
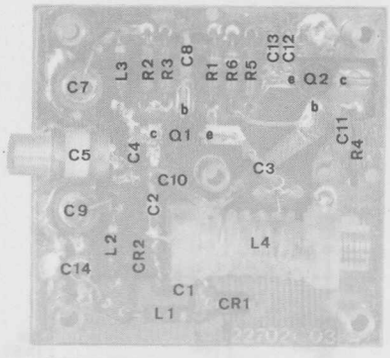
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



Diag. 4522 75-89MHz VCO: L4: 405566 R1 = 17K8
Diag. 4523 89-105MHz VCO: L4: 405558 R1 = 13K3

75 - 89 MHz VCO / 89 - 105 MHz VCO
(Ref. Desig. 4522 / 4523)

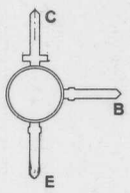


PCB 22728
PCB 22729

75 - 89 MHz VCO / 89 - 105 MHz VCO
(Ref. Desig. 4522 / 4523)
Component Location

1980-04

BF 480



Q1–Q2

Note 1:

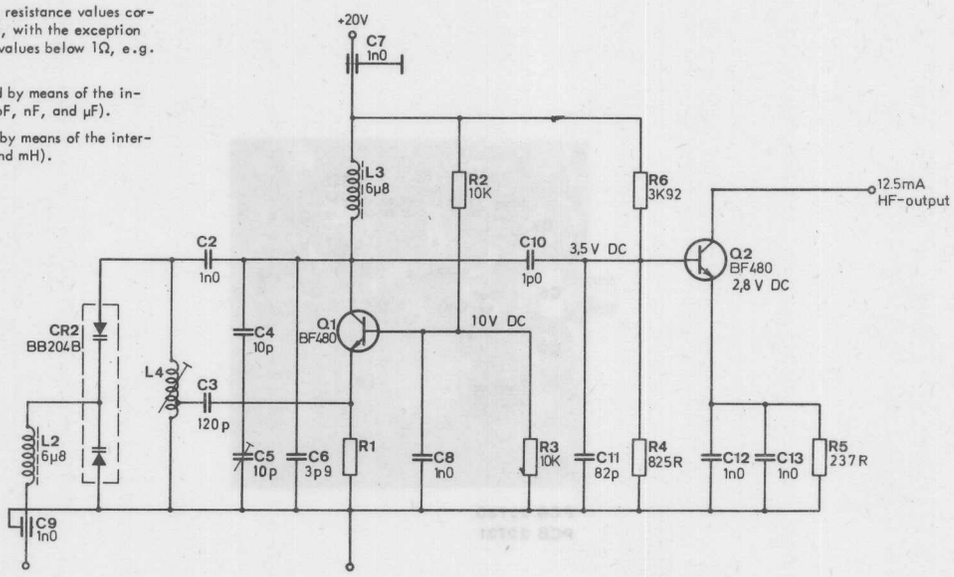
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

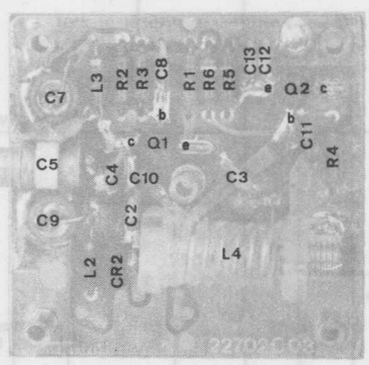
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



Diag. 4524 78-92MHz VCO: L4: 405566 R1 = 16K2
Diag. 4525 92-107.9MHz VCO:L4: 405558 R1 = 13K3

P.C.Board 22702

78 - 92 MHz VCO / 92 - 107.9 MHz VCO
(Ref. Desig. 4524 / 4525)

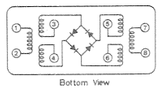


PCB 22730
PCB 22731

78 - 92 MHz VCO / 92 - 107.9 MHz VCO
(Ref. Desig. 4524 / 4525)
Component Location

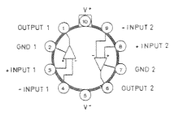
1978-02

SRA 1



U1–U2

LM 319 H



U 3

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

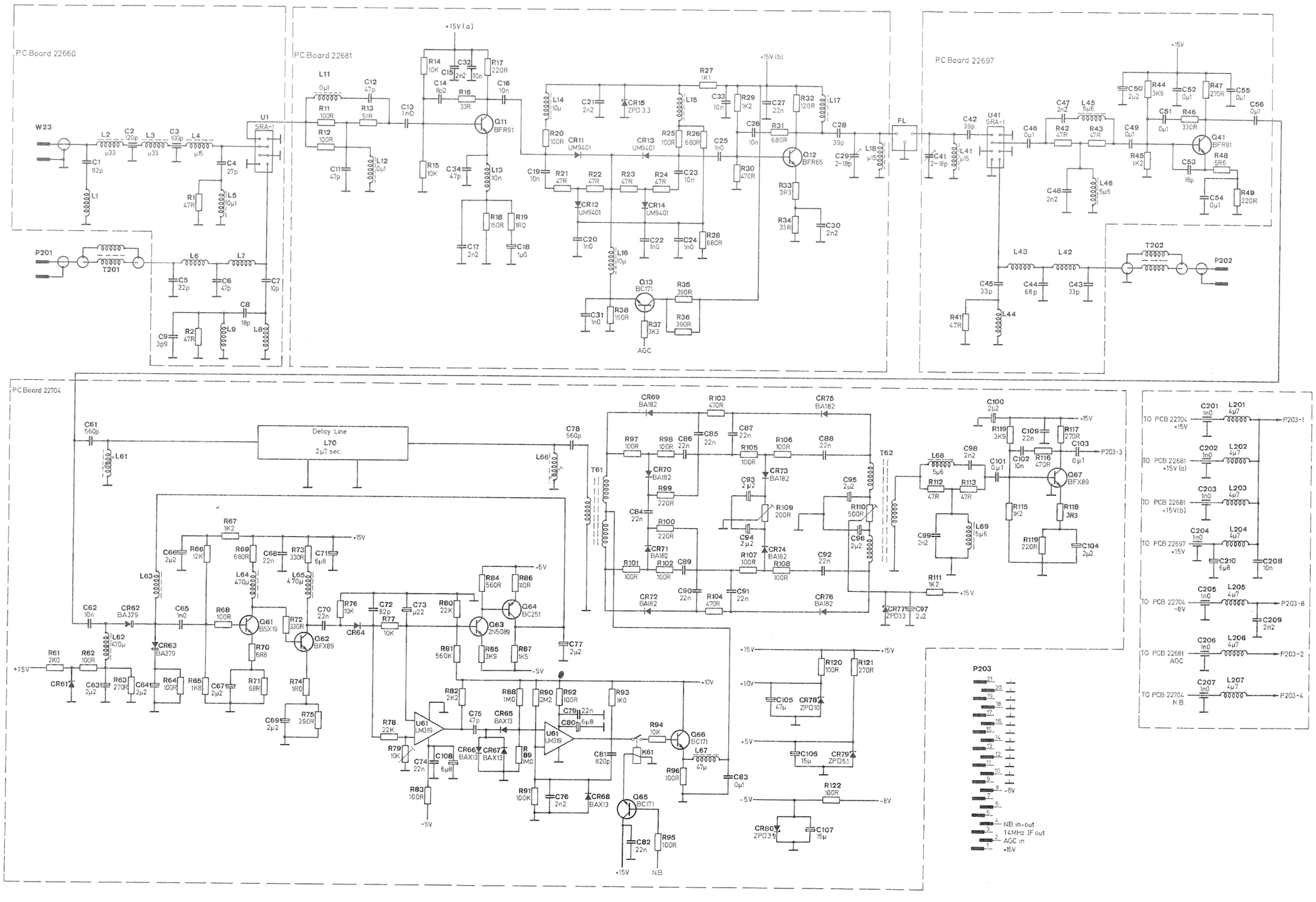
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

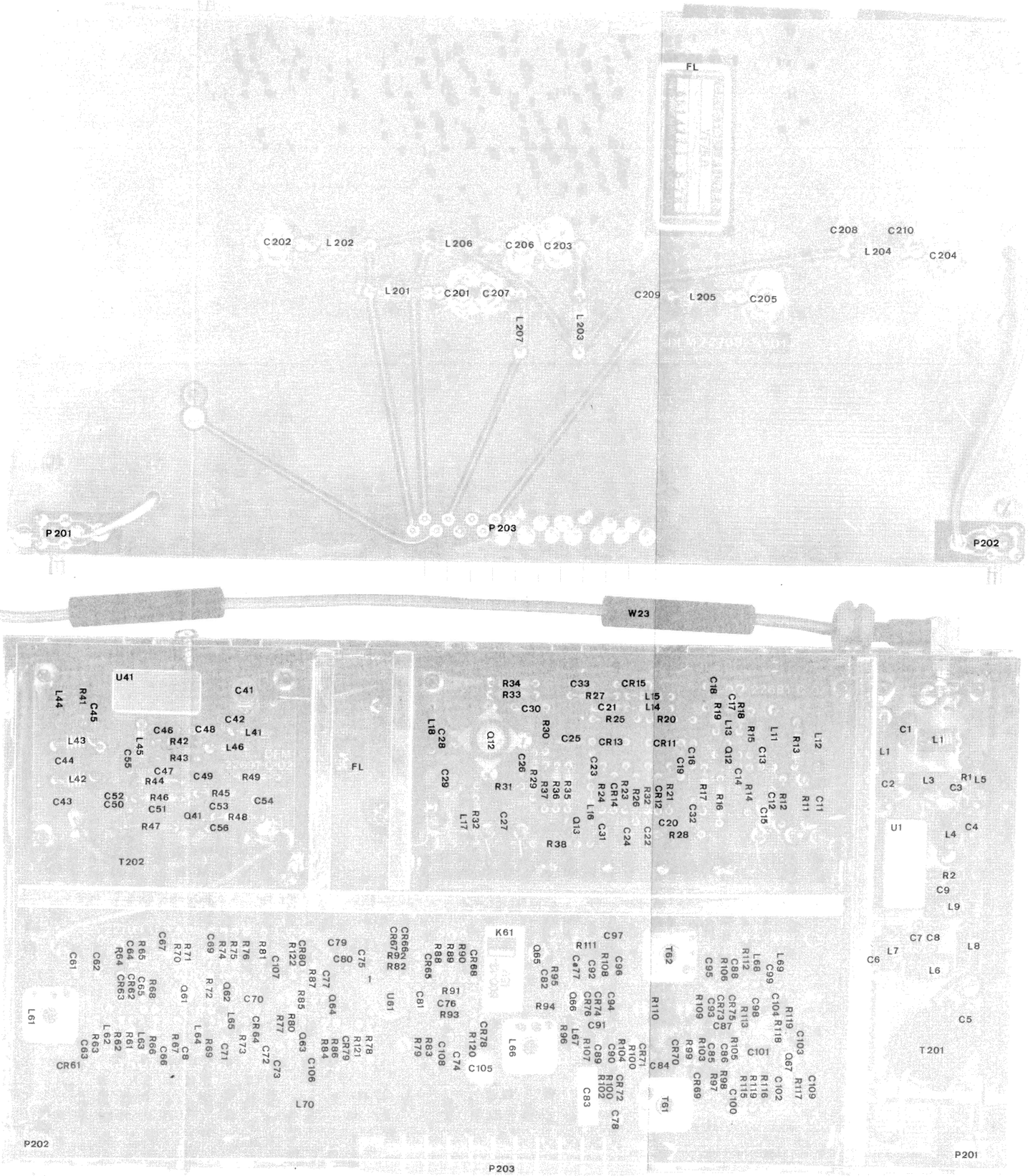
Note 3:

In option USM230, LSM230, ISM230, USM227 a 10 kHz crystal filter is used.

In option ISM260 a 20 kHz crystal filter is used.



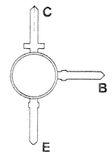
FRONT-END
(Ref. Desig. 4528)



FRONT-END
(Ref. Desig. 4528)
Component Location

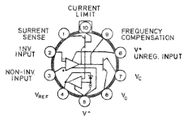
1980-04

BF 480



Q6-Q7-Q8

CA 723 CT



U1

Note 1:

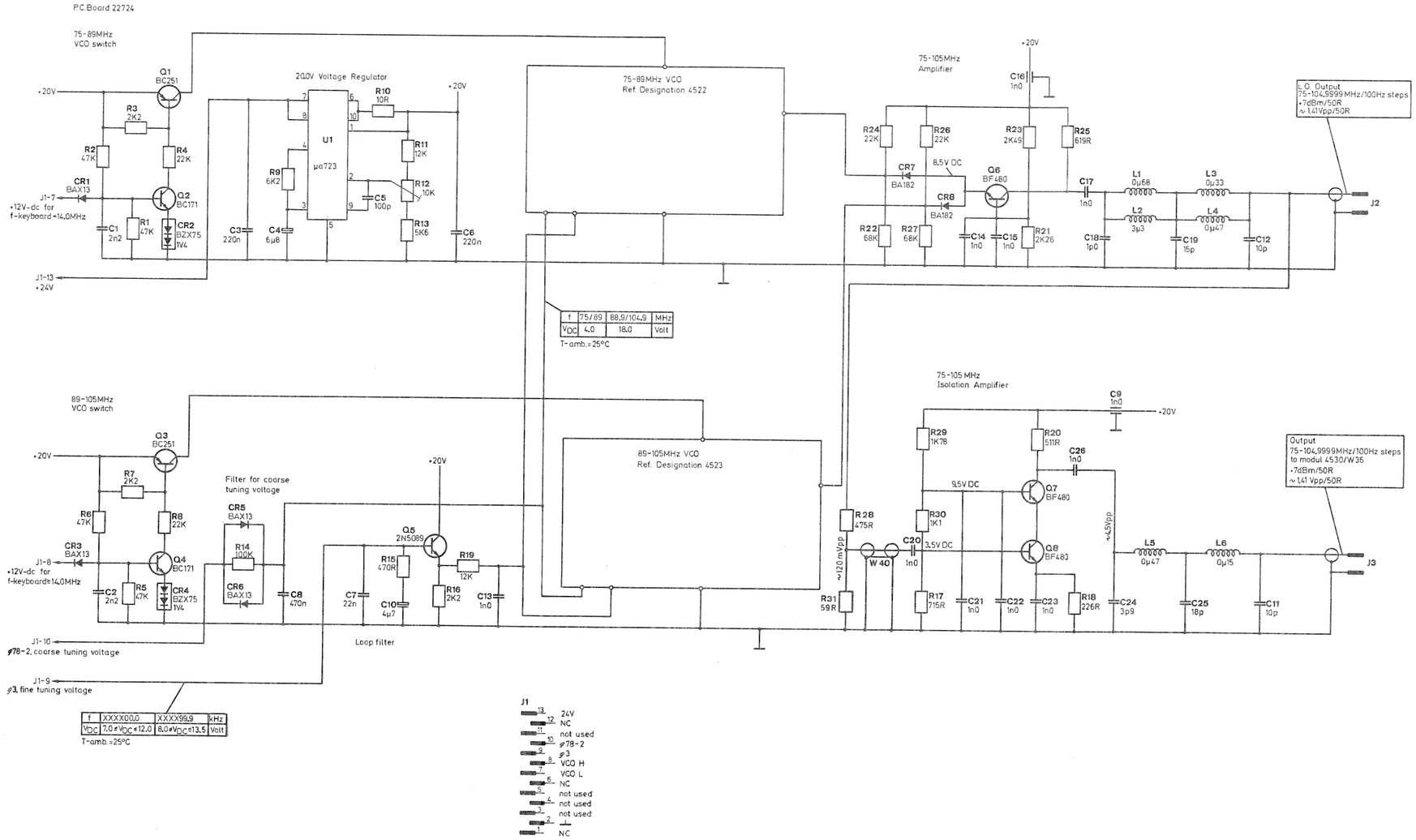
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

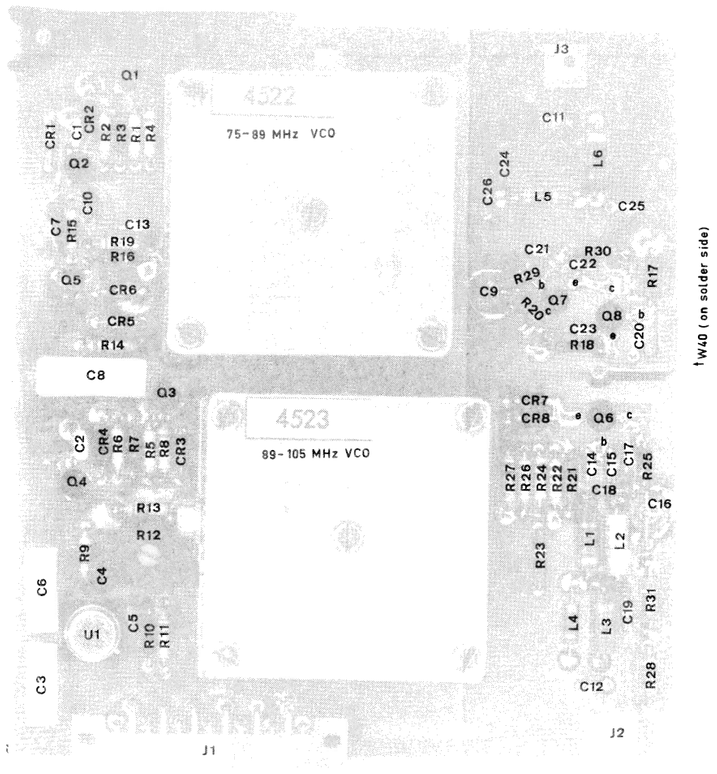
The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



75 - 105 MHz OSCILLATOR
(Ref. Desig. 4529)

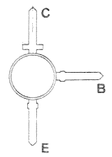


PCB 22724

75 - 105 MHz OSCILLATOR
(Ref. Desig. 4529)
Component Location

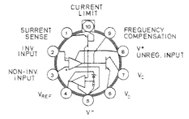
1980-04

BF 480



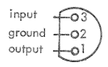
Q9 - Q10 - Q11

CA 723 CT



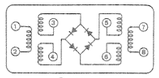
U1

LM 78 L05



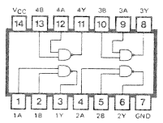
U2

SRA1



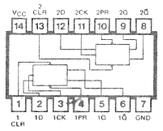
U3

74S00



U4

74LS74



U5

Note 1:

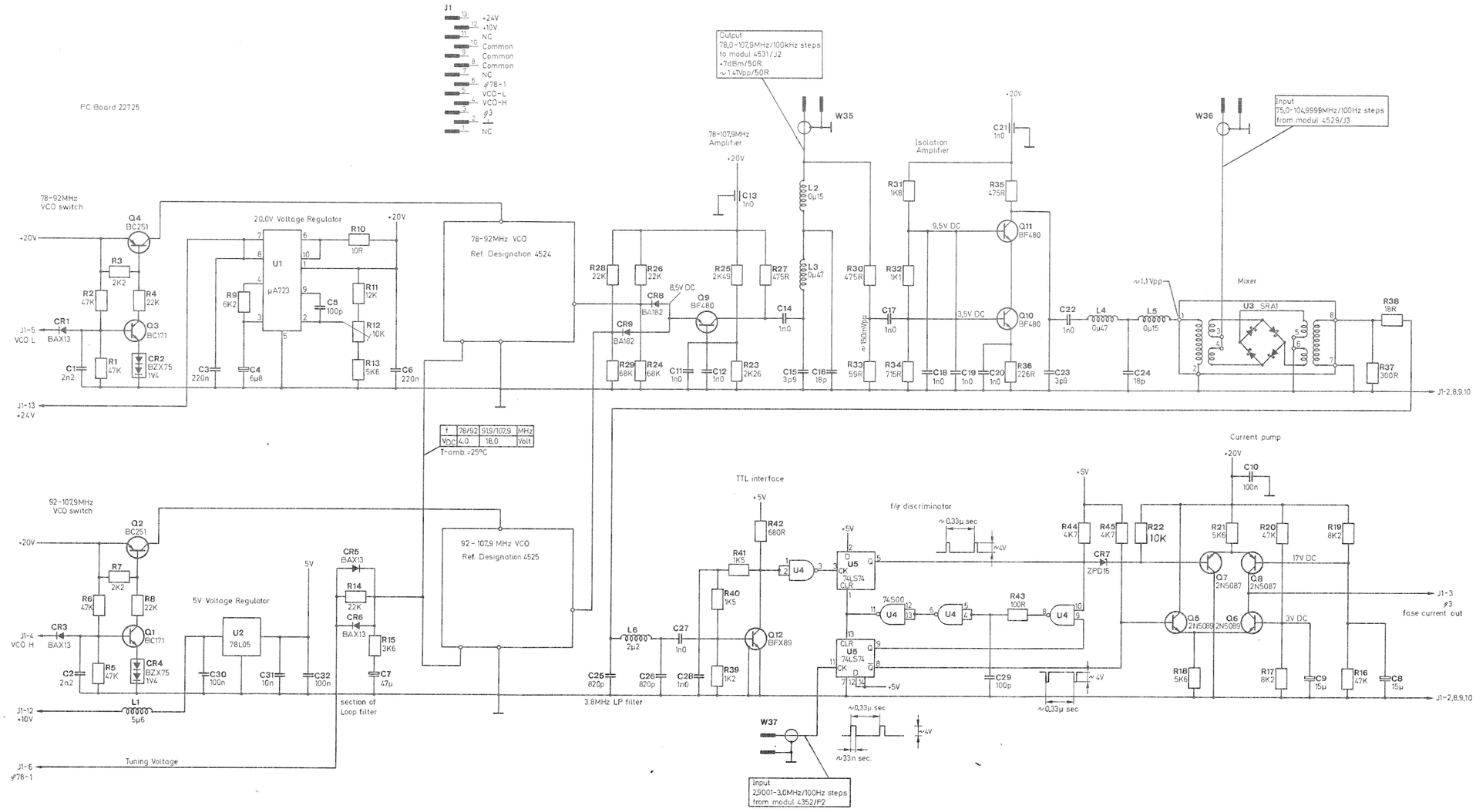
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

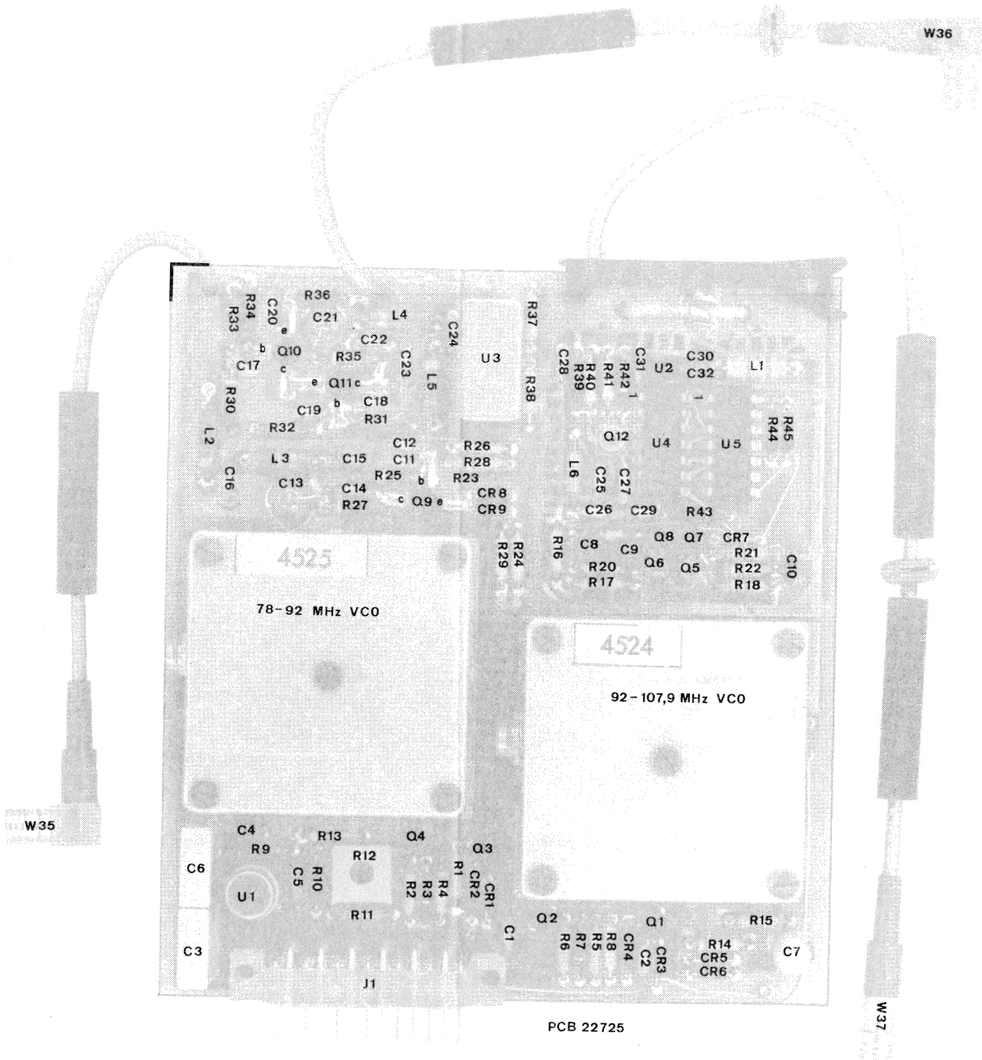
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



MR 6000 SE 6000 DIAG No. 4530 / 1980-04

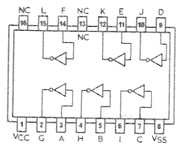
78 - 107.9 MHz OSCILLATOR
(Ref. Desig. 4530)



78 - 107.9 MHz OSCILLATOR
(Ref. Desig. 4530)
Component Location

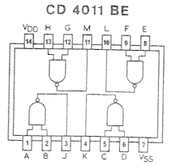
1980-04

CD 4049 AE



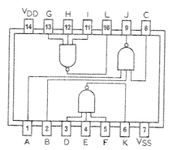
U1–U4–U8

CD 4011 BE



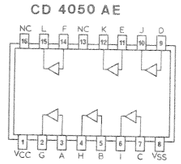
U2–U6–U7–U9

CD 4023 AE



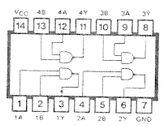
U3

CD 4050 AE



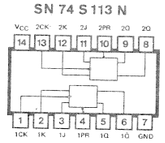
U5

SN 74S00 N



U10–U15–U20

SN 74 S 113 N

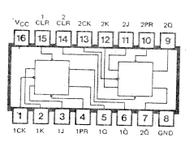


U11

74196
SN 74 LS 196 N

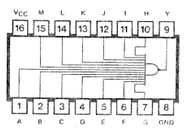
U12–U13–U14

SN 74 S 112 N



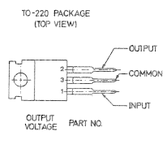
U 16

SN 74 S 133 N



U 17

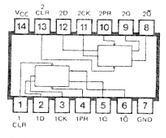
µA 7805 UC



OUTPUT VOLTAGE	PART NO.
5V	µA7805UC
15V	µA7815UC

U 18

SN 74 LS 74 N



U 19

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

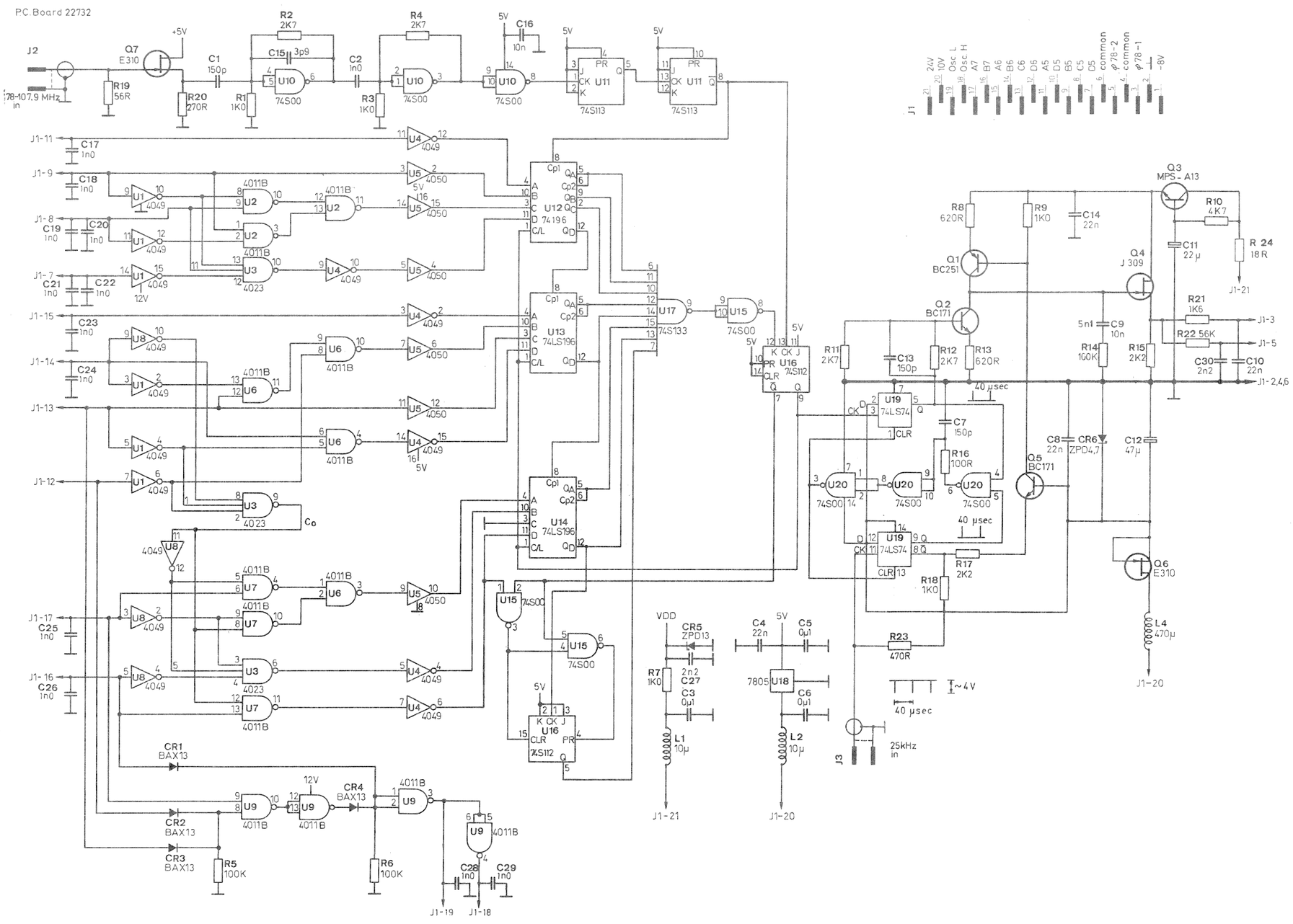
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

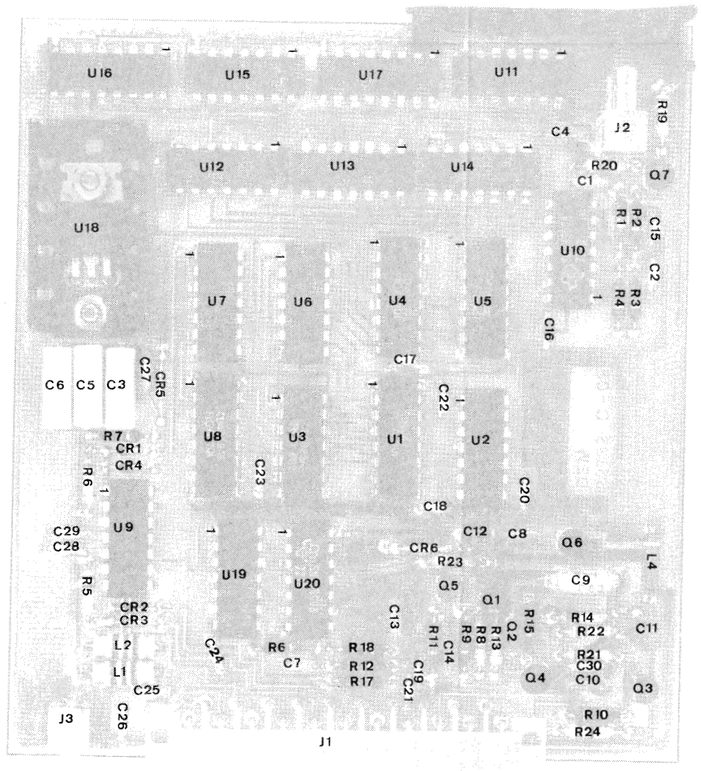
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

P.C. Board 22732



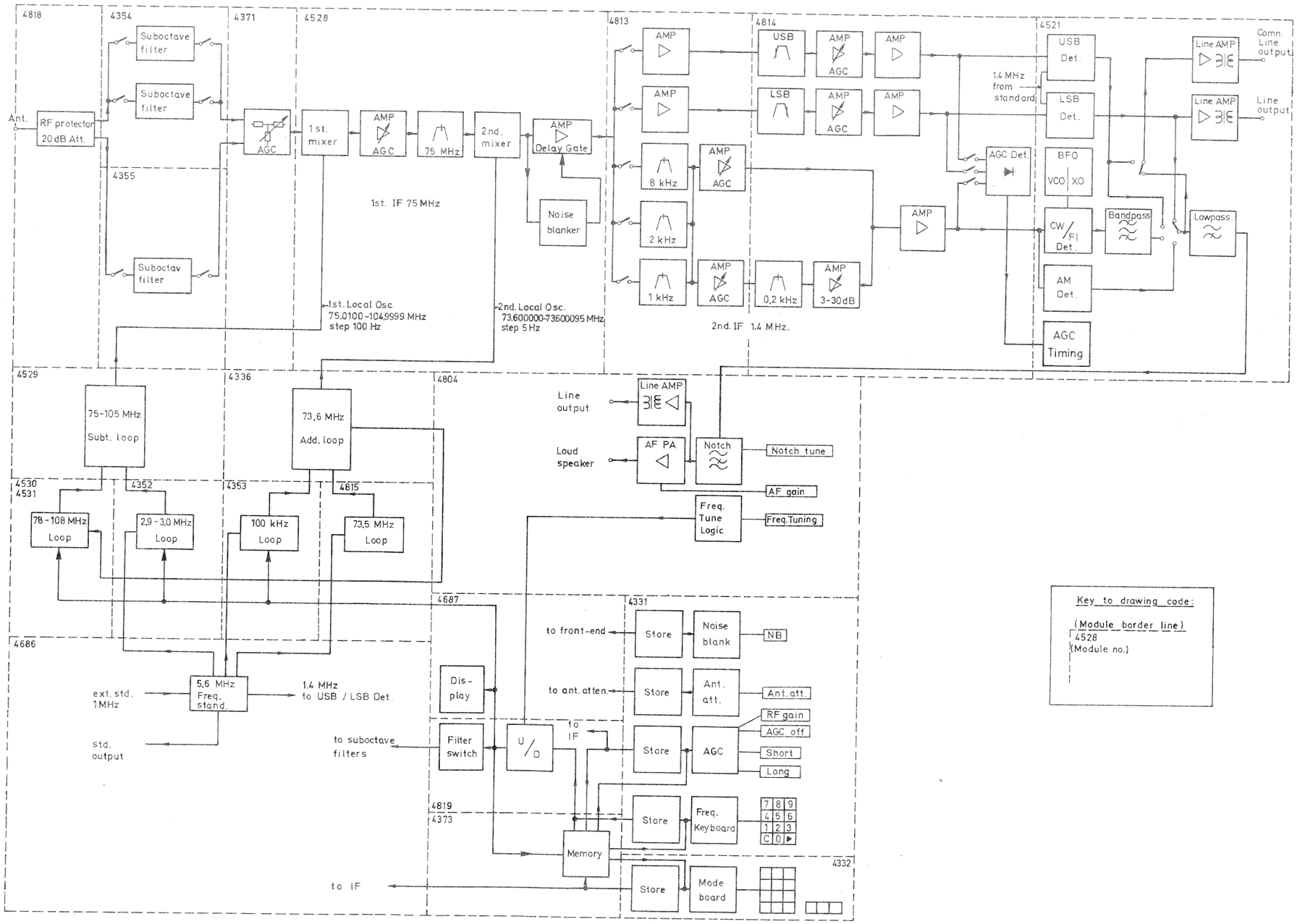
MR 6000 SE 6000 DIAG No. 4531 / 1980-04

78 - 107.9 MHz DIVIDER AND DISCRIMINATOR
(Ref. Desig. 4531)



PCB 22732

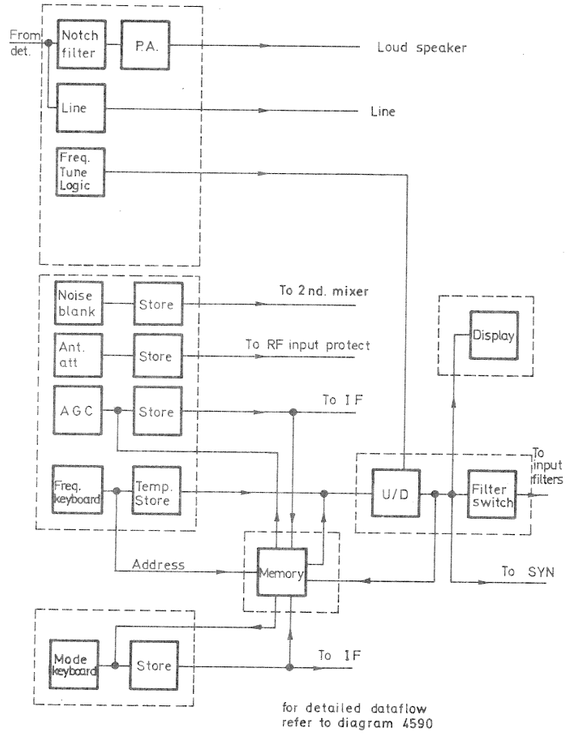
78 - 107,9 MHz DIVIDER AND DISCRIMINATOR
(Ref. Desig. 4531)
Component Location



Key to drawing code:

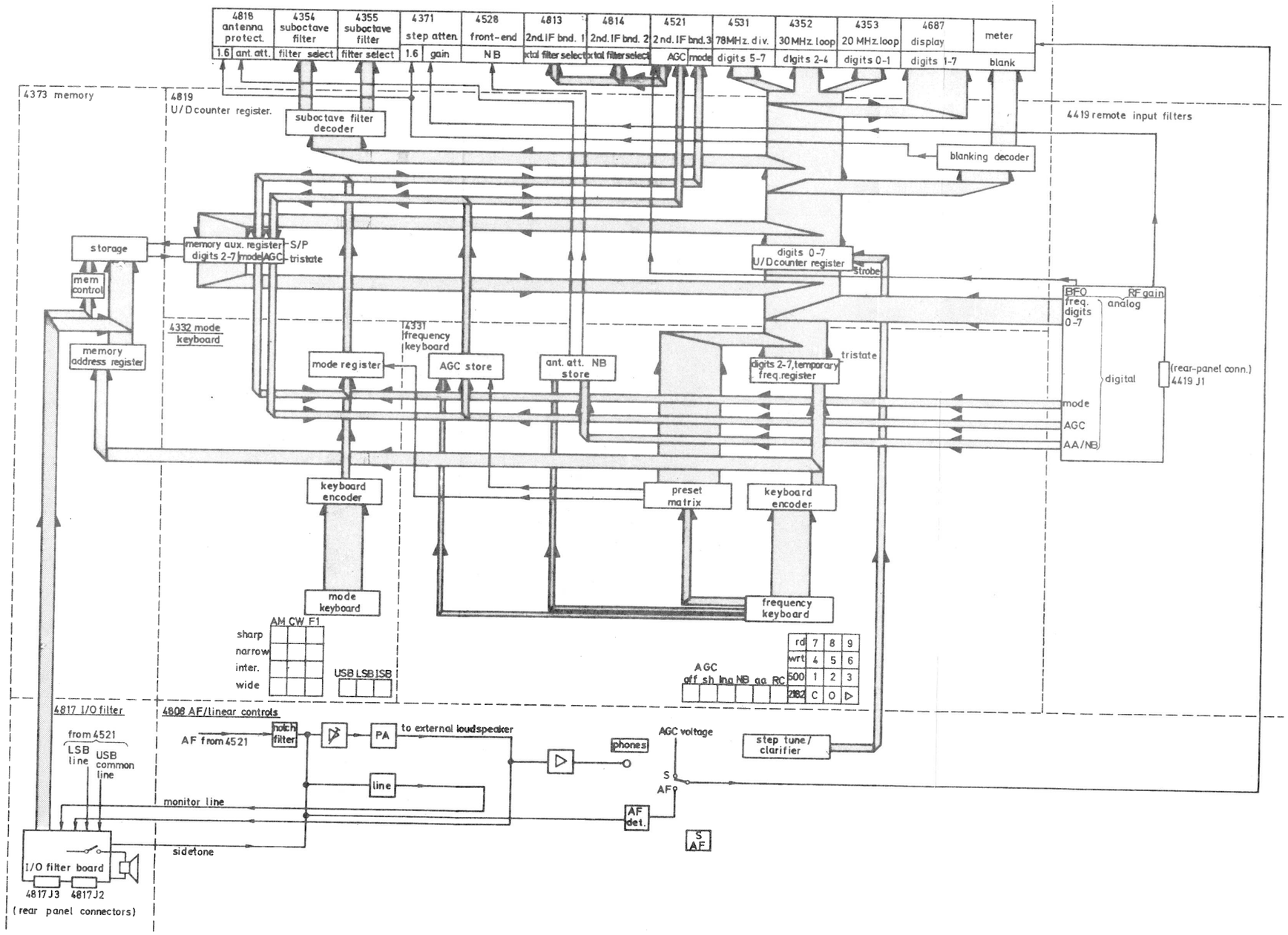
(Module border line)
4528
(Module no.)

RECEIVER MR 6000
BLOCK DIAGRAM - MAIN



MR 6000 DIAG No. 4589 / 1980-04

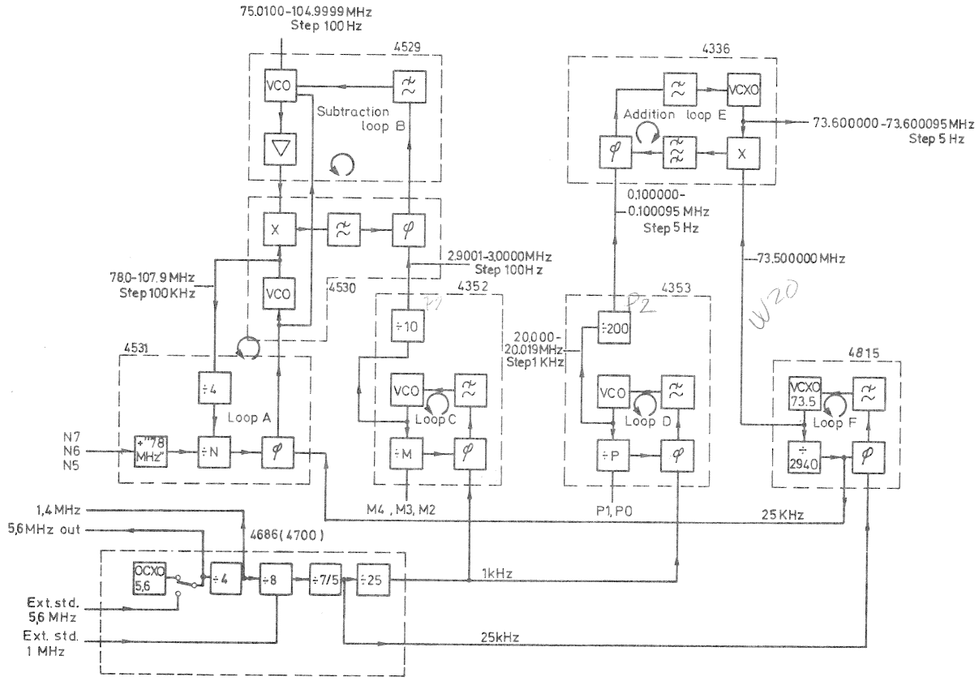
RECEIVER MR 6000
BLOCK DIAGRAM - CONTROLS



MR 6000 DIAG No. 4590 / 1980-04

RECEIVER MR 6000

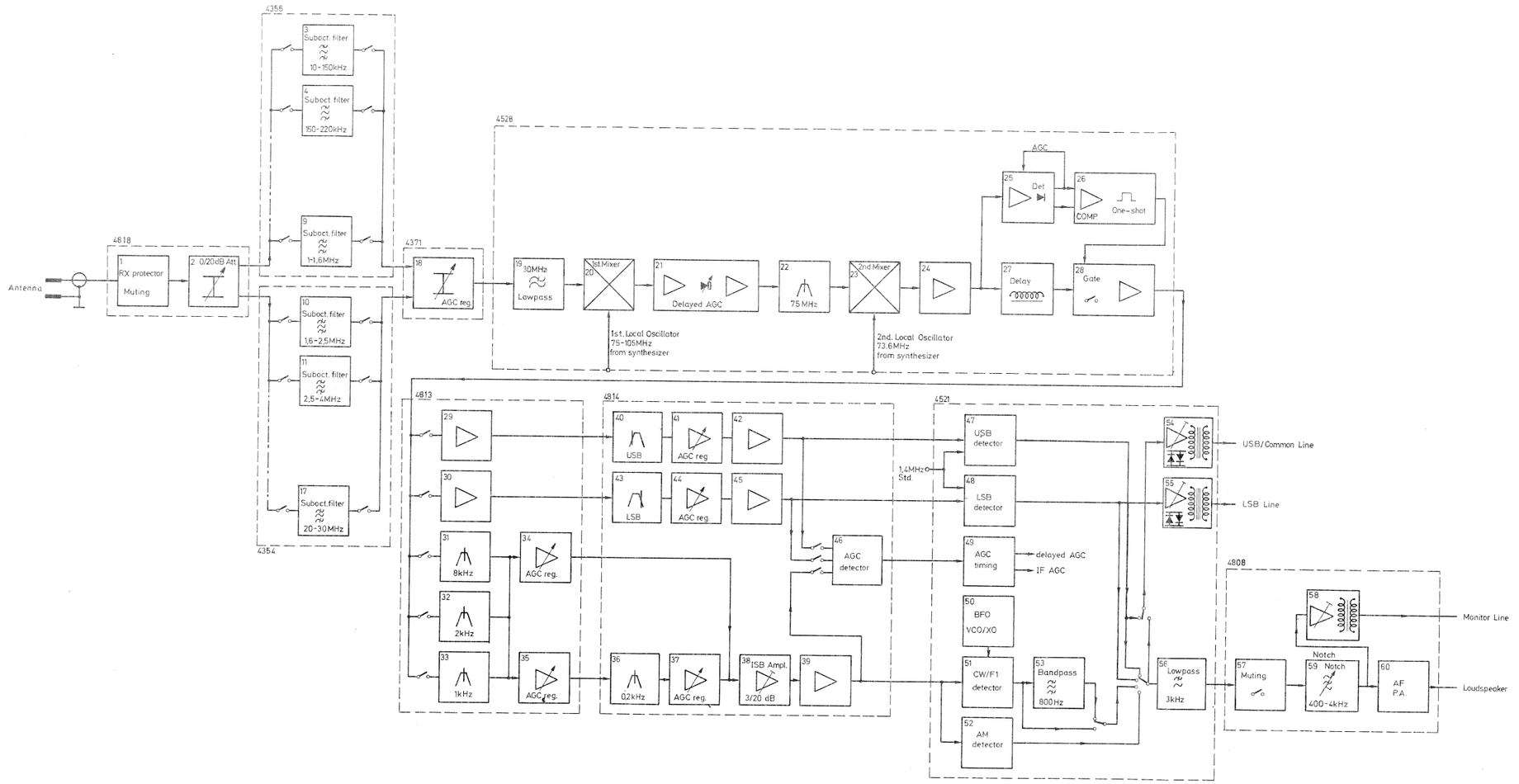
EXPANDED BLOCK DIAGRAM OF CONTROL CIRCUITS



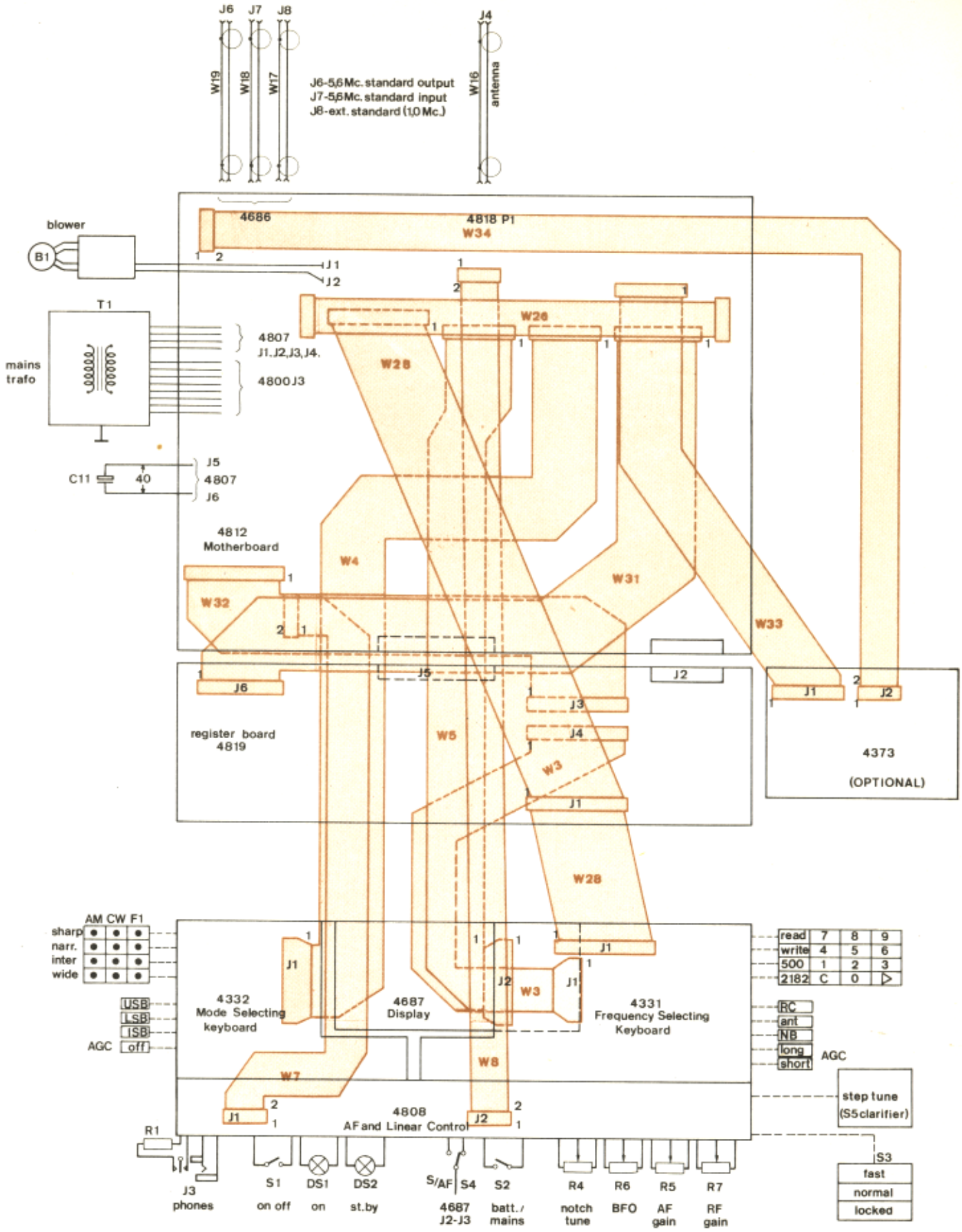
MR 6000 DIAG No. 4591 / 1980-04

RECEIVER MR 6000

BLOCK DIAGRAM - SYNTHESIZER



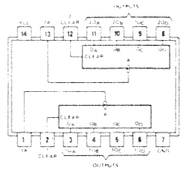
RECEIVER MR 6000
BLOCK DIAGRAM - SIGNAL PATH



INTERCONNECTION

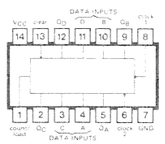
(Ref. Desig. 4675)

SN 74 LS 393



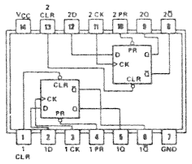
U1

SN 74 LS 197



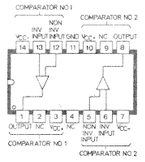
U2

SN 74 LS 74



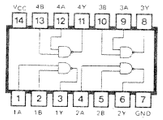
U3 - U4

TL 720



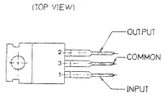
U7

SN 7400



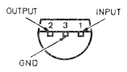
U8

7805



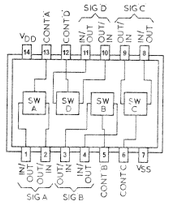
U9

78 L 12



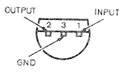
U10

CD 4066



U11

78 L 05



U12

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

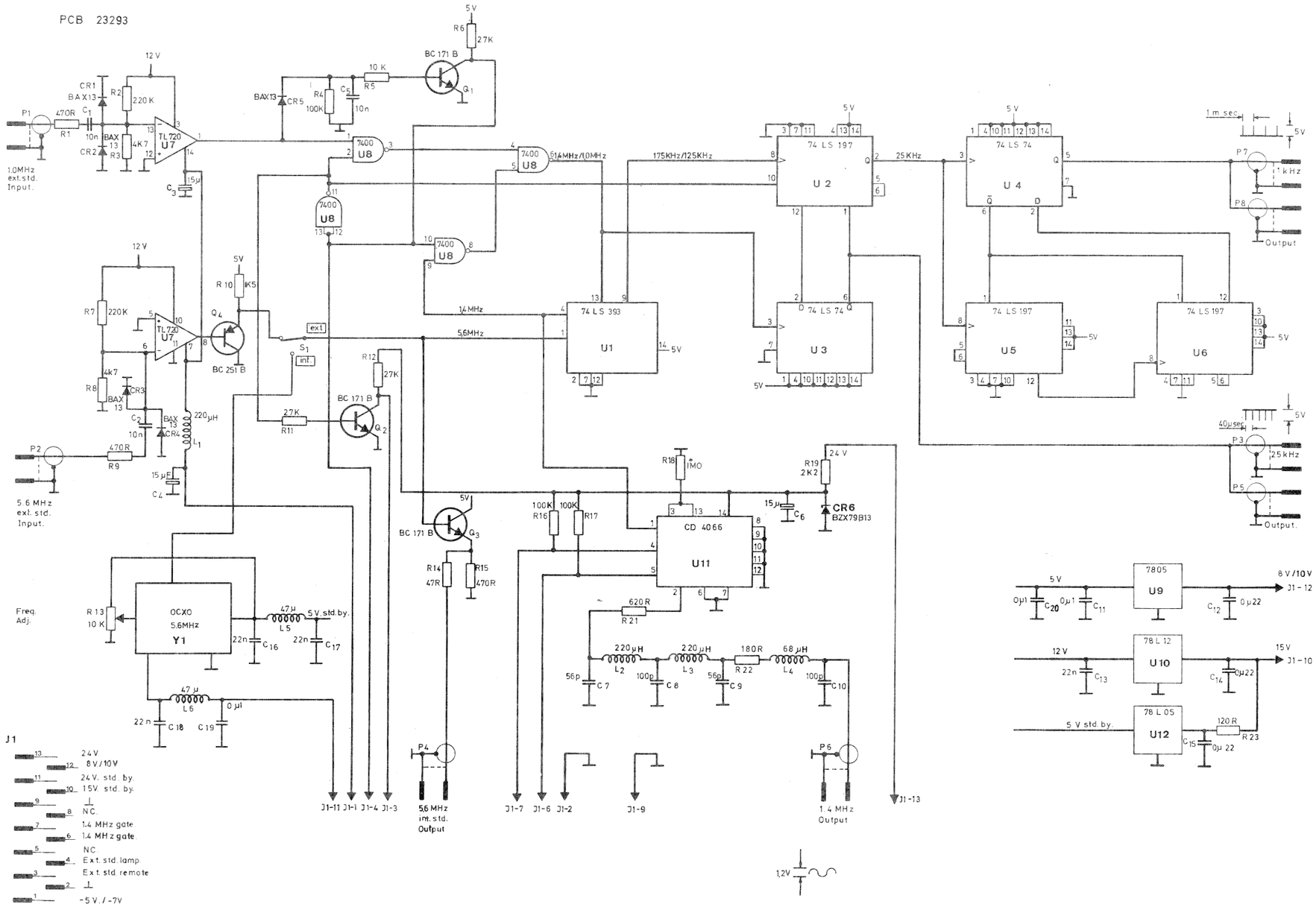
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

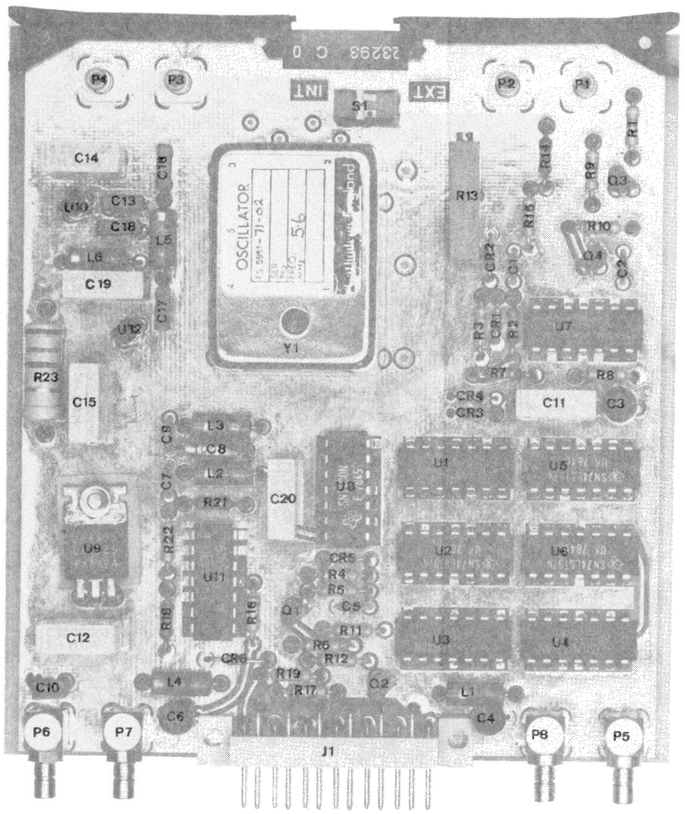
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

PCB 23293



MR 6000 DIAG No. 4686 / 1980-04

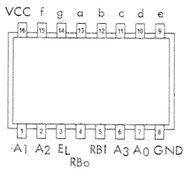
STANDARD DIVIDER
(Ref. Desig. 4686)



STANDARD DIVIDER
(Ref. Desig. 4686)
Component Location

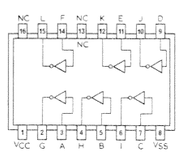
1980-04

9374



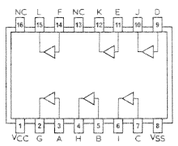
U1–U7

CD 4049



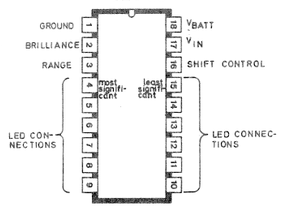
U13

CD4050



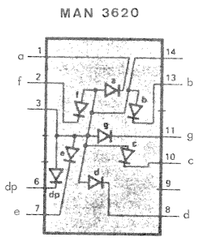
U8–U12

UAA180

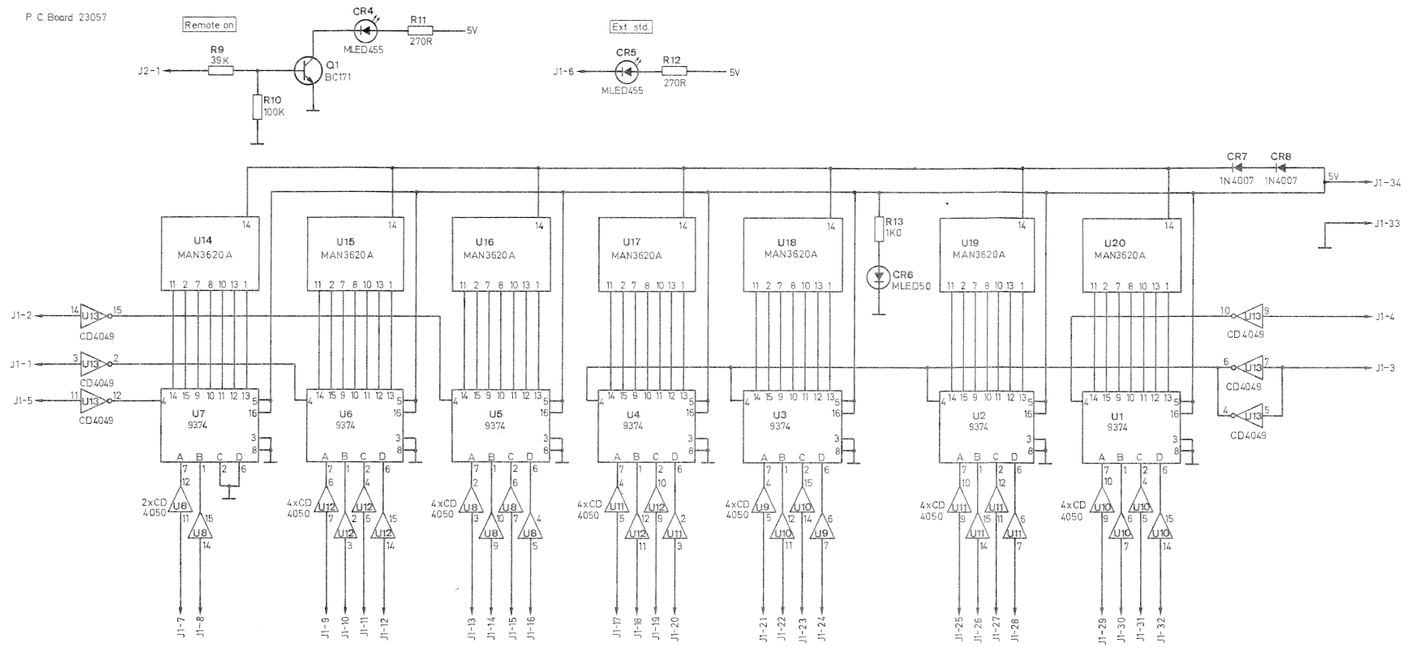


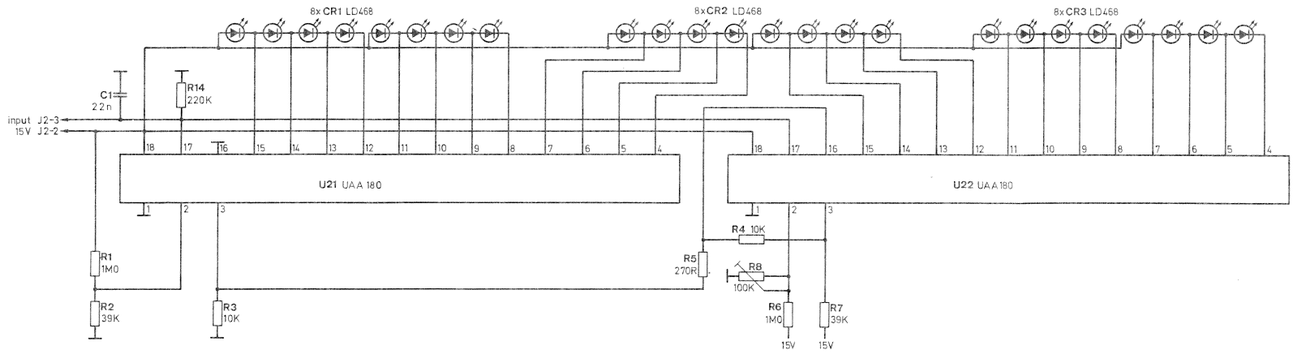
U21 – U22

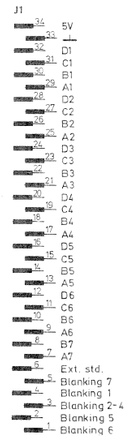
MAN 3620



U14 – U20







Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

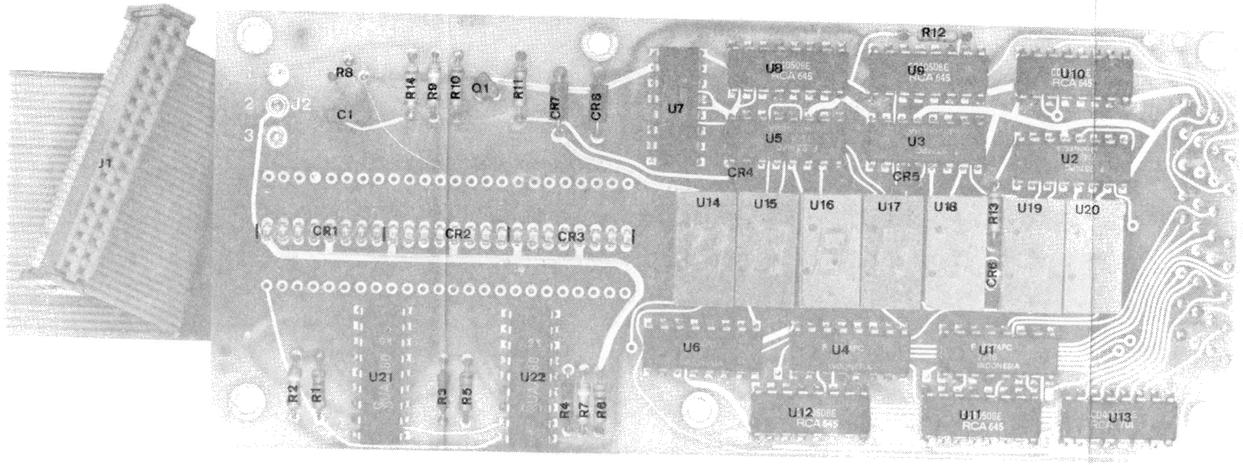
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

DISPLAY
(Ref. Desig. 4687)



DISPLAY
(Ref. Desig. 4687)
Component Location

1458

U 1

7815 UC

TO-220 PACKAGE (TOP VIEW)

U 2 – U 3

Note 1:

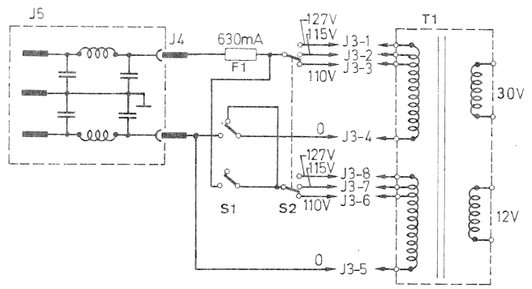
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

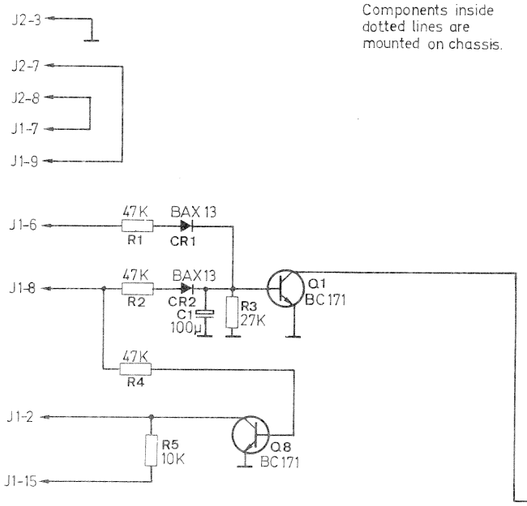
The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

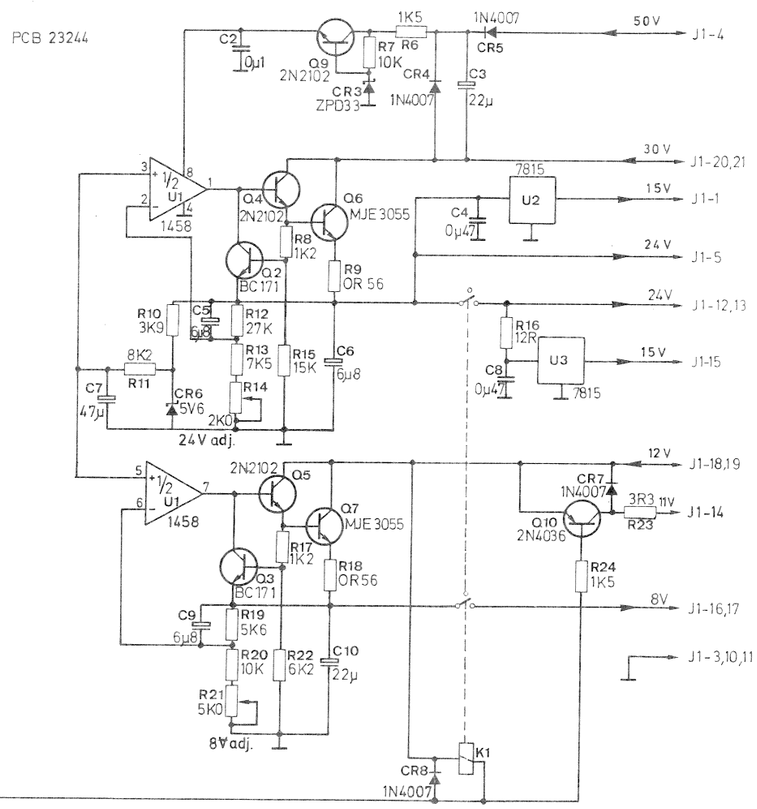
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).



Components inside dotted lines are mounted on chassis.





J1

21	30V
20	30V
19	12V
18	12V
17	8V
16	8V
15	15V
14	11V Blower
13	24V
12	24V
11	⊥
10	⊥
9	BATT / MAINS
8	START
7	BATT / MAINS
6	START
5	24V OVEN
4	50V
3	⊥
2	START
1	15V std. by

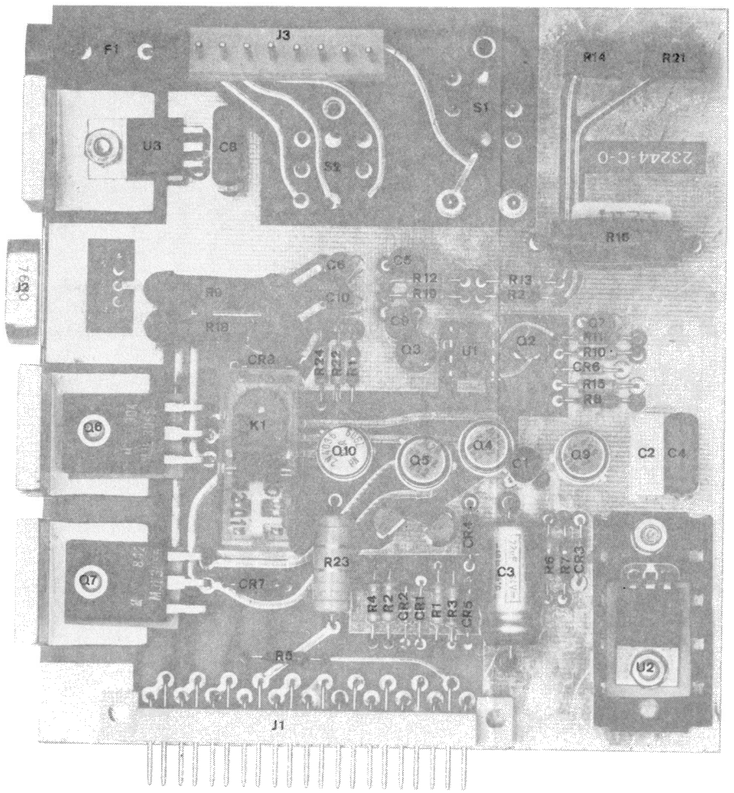
J2

1	NC
2	BATT / MAINS
3	BATT / MAINS
4	NC
5	NC
6	NC
7	⊥
8	NC
9	NC

J3

1	127V B
2	115V B
3	110V B
4	0V B
5	0V A
6	110V A
7	115V A
8	127V A

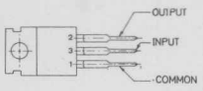
VOLTAGE REGULATOR
(Ref. Desig. 4800)



VOLTAGE REGULATOR
(Ref. Desig. 4800)
Component Location

7905

TO-220 PACKAGE
(TOP VIEW)



U1

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

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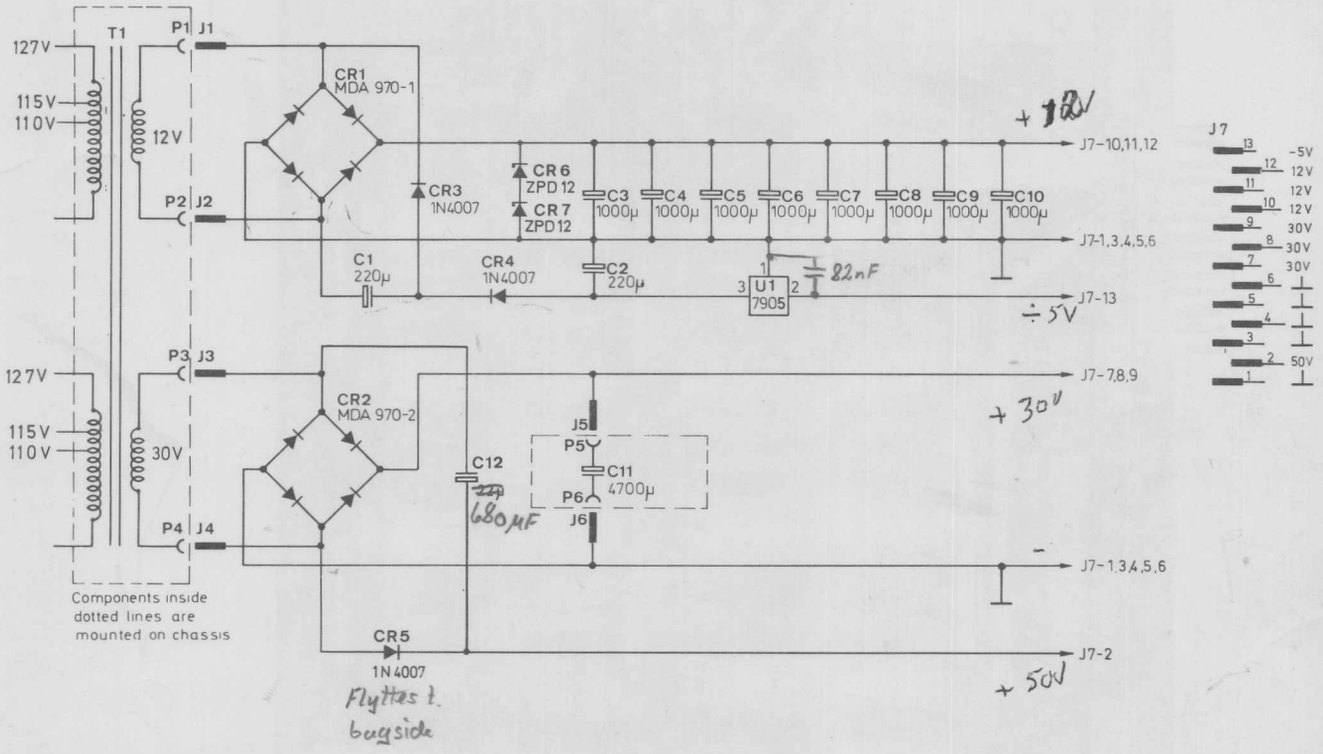
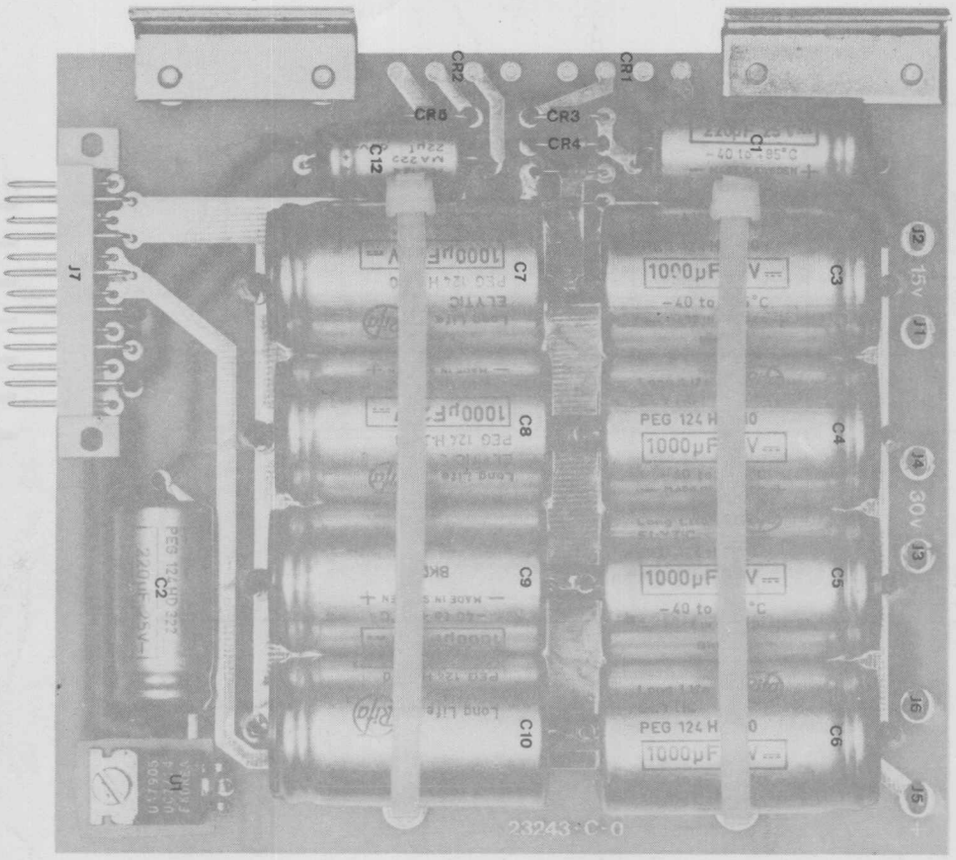
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

PCB: 23243



RECTIFIER
(Ref. Desig. 4807)



RECTIFIER

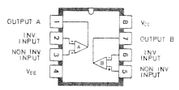
(Ref. Desig. 4807)

Component Location

1980-04

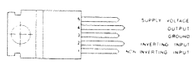
Print nr **23295**

1458



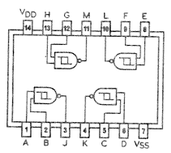
U1 - U2

TDA 2002



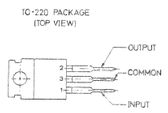
U3

CD 4093



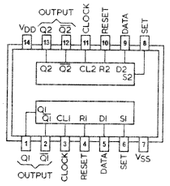
U4 - U5

7812



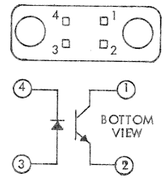
U7

CD 4013



U9

OBP 814



U16 - U17

Note 1:

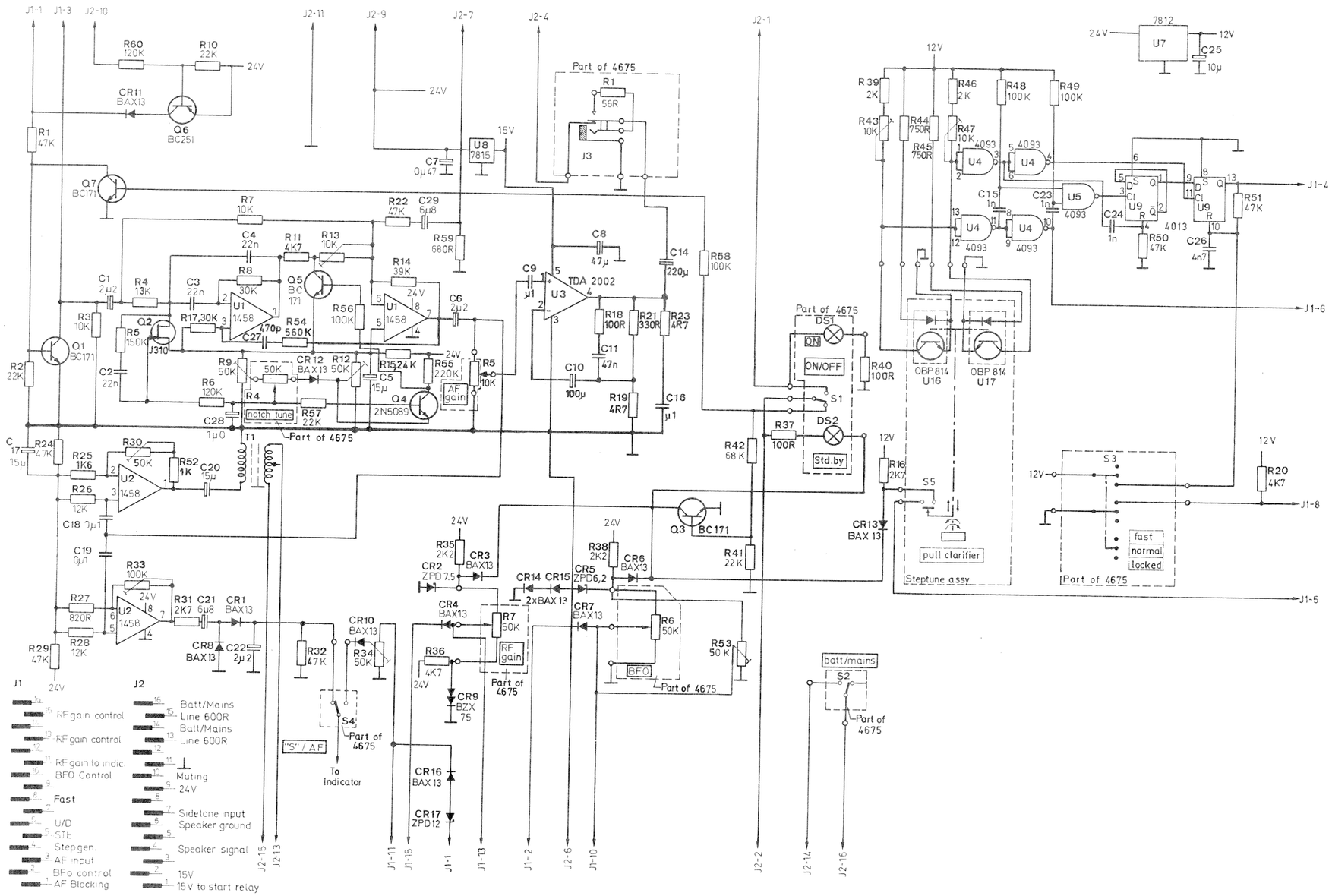
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

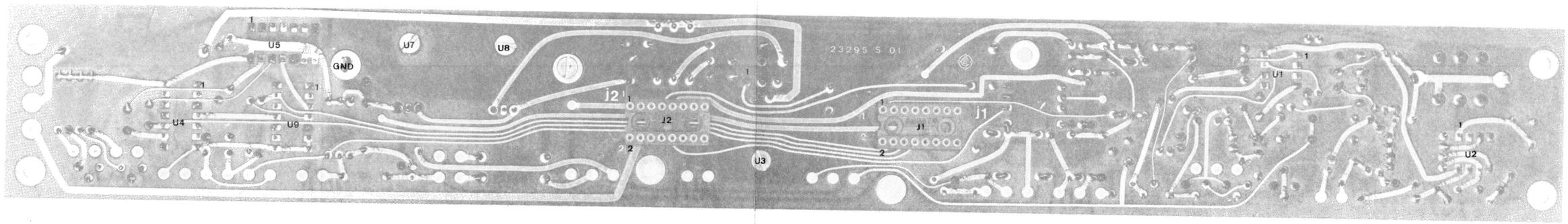
The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

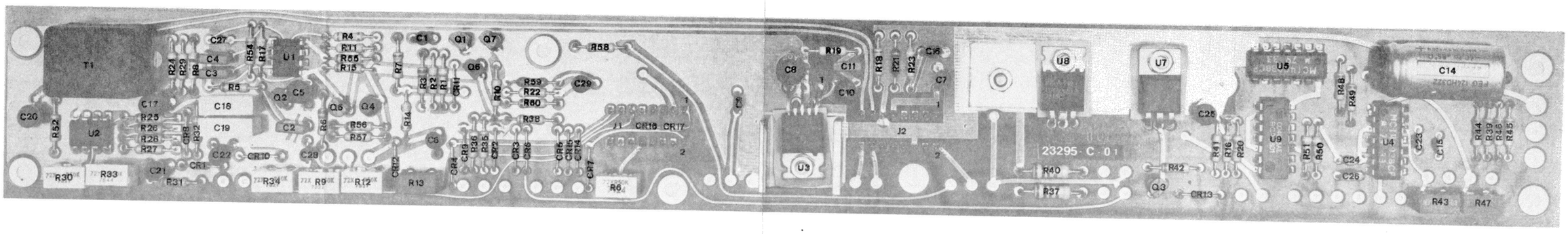
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

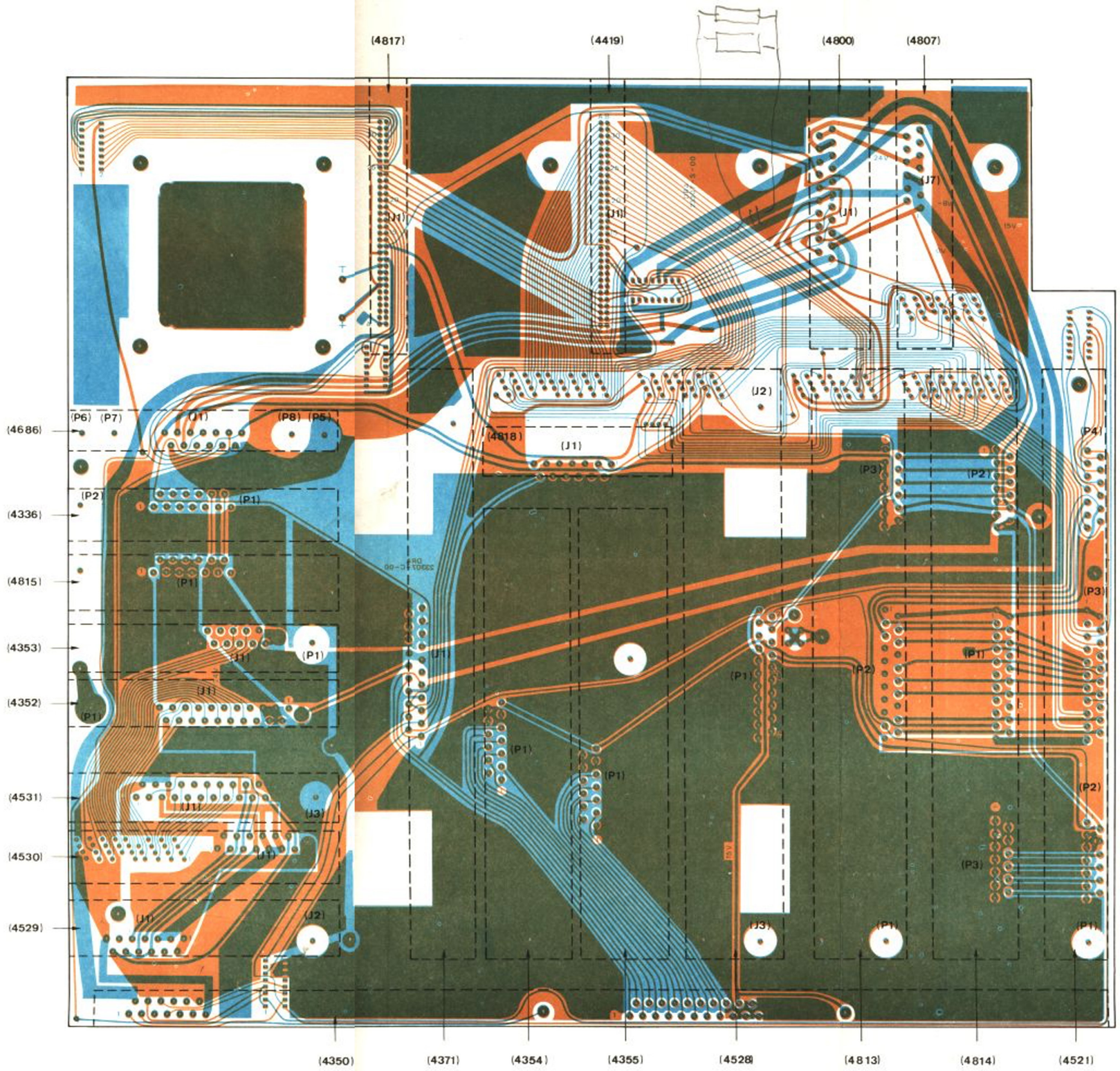


AF AND LINEAR CONTROLS
(Ref. Desig. 4808)

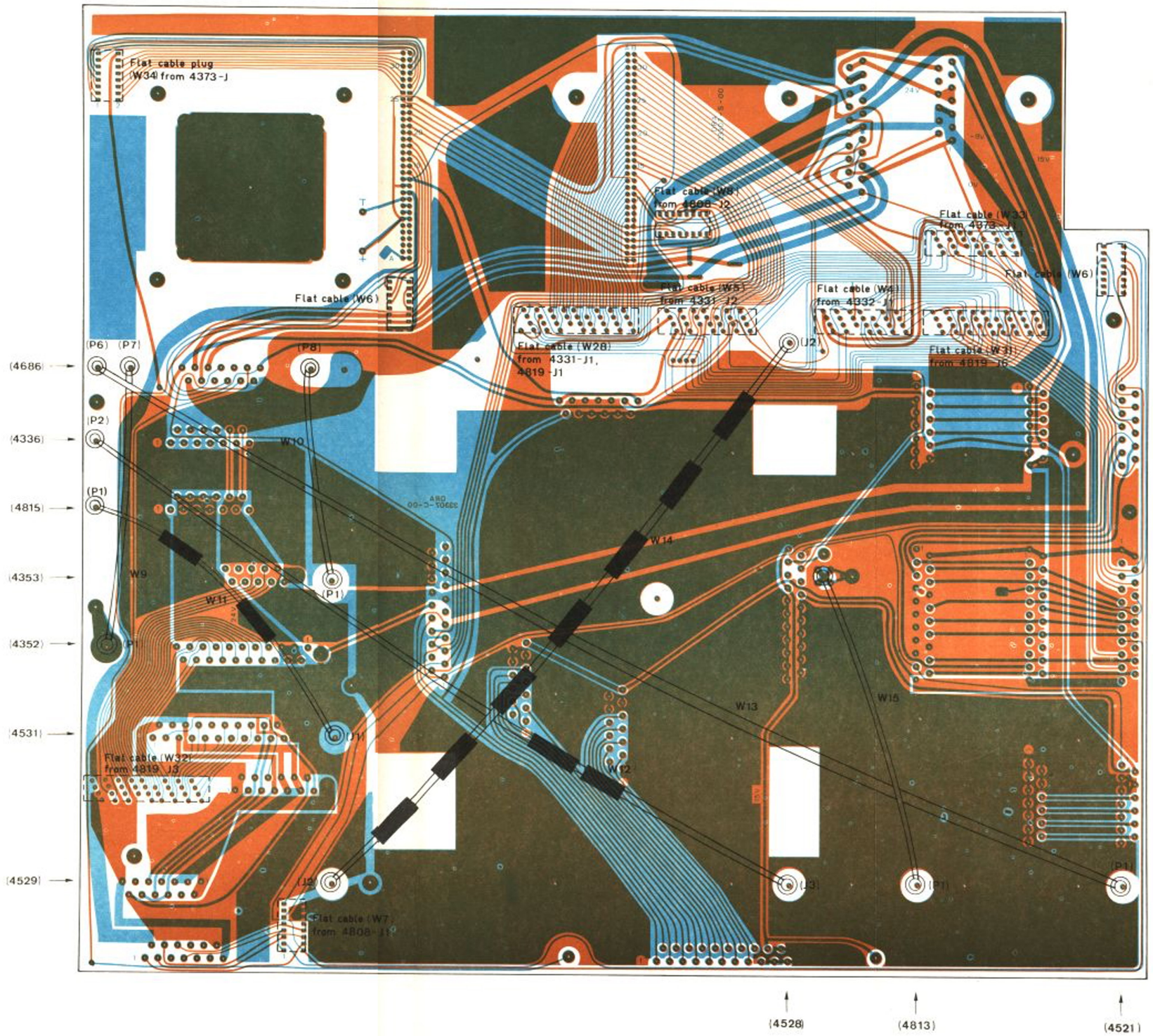




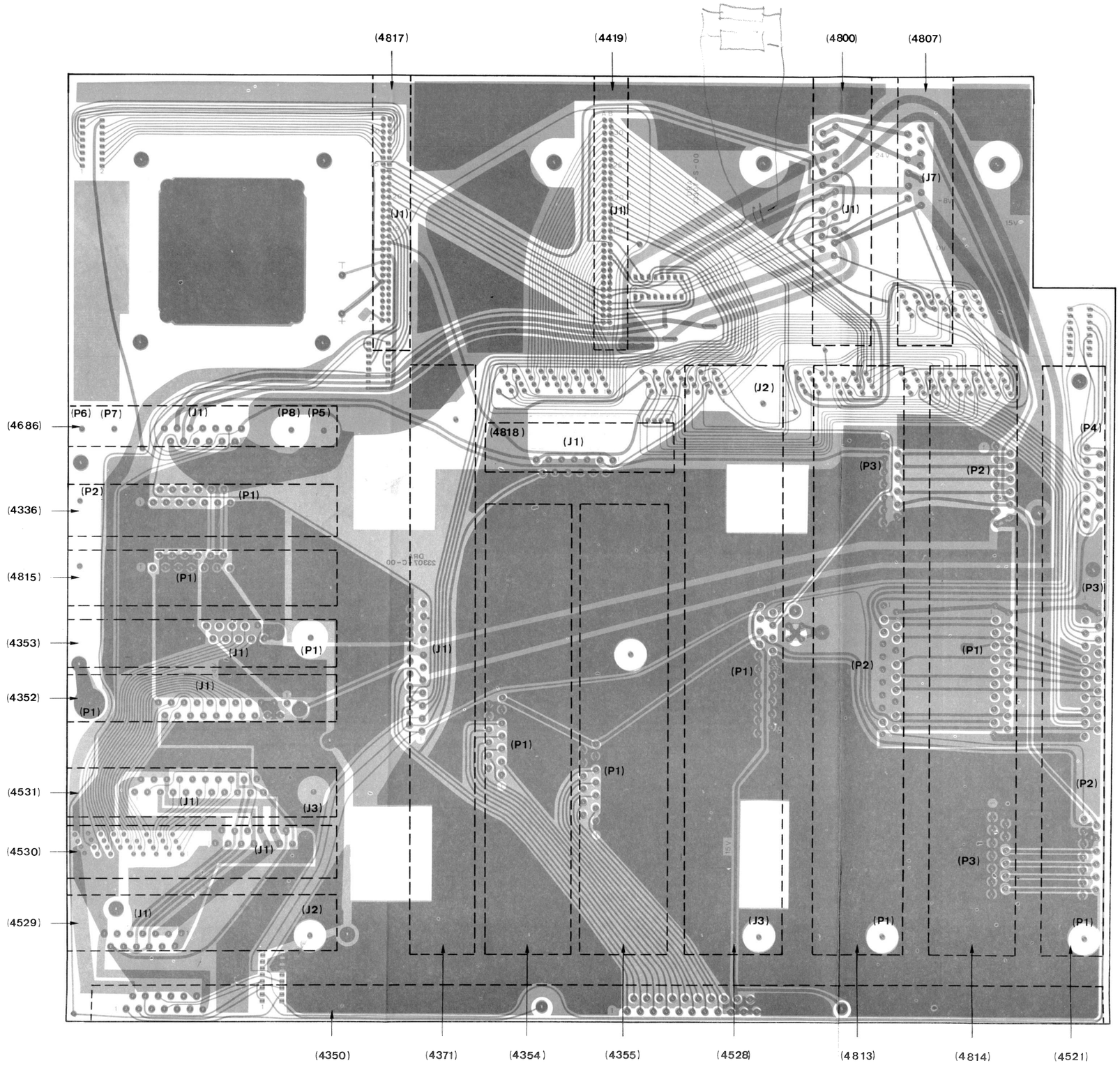
AF AND LINEAR CONTROLS
(Ref. Desig. 4808
Component Location



MOTHERBOARD
CONNECTORS
(Ref. Desig. 4812)



MOTHERBOARD
CABLES
(Ref Desig. 4812



MOTHERBOARD
CONNECTORS
(Ref. Desig. 4812)

Note 1:

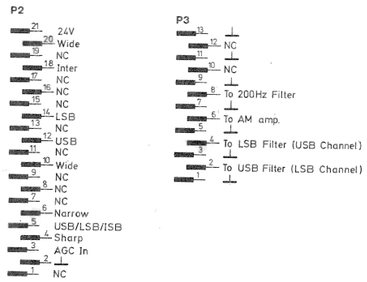
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

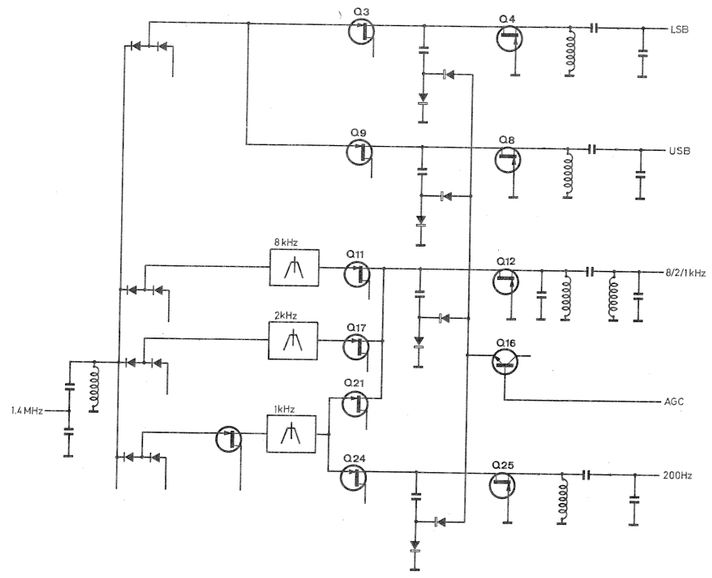
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

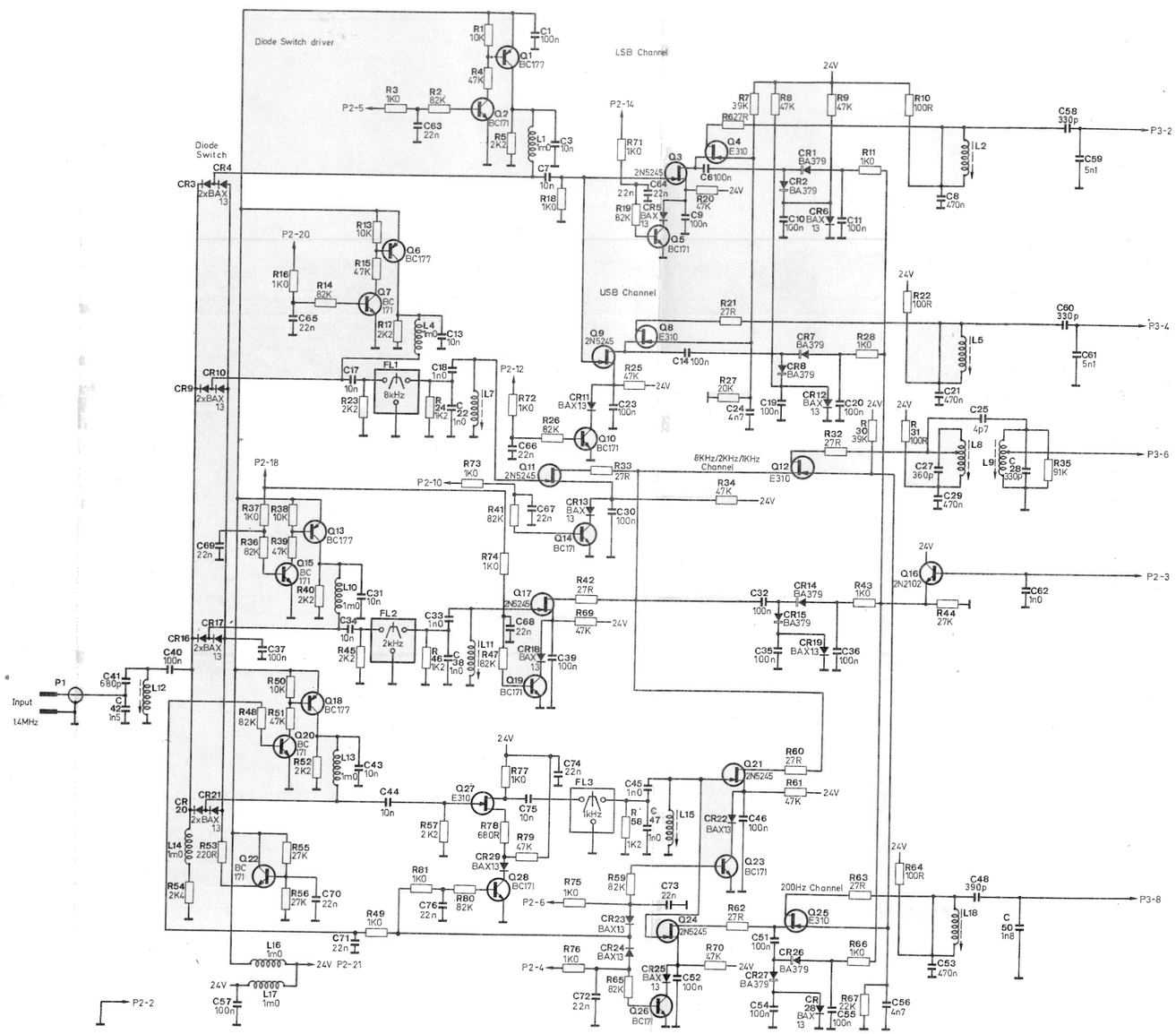
The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

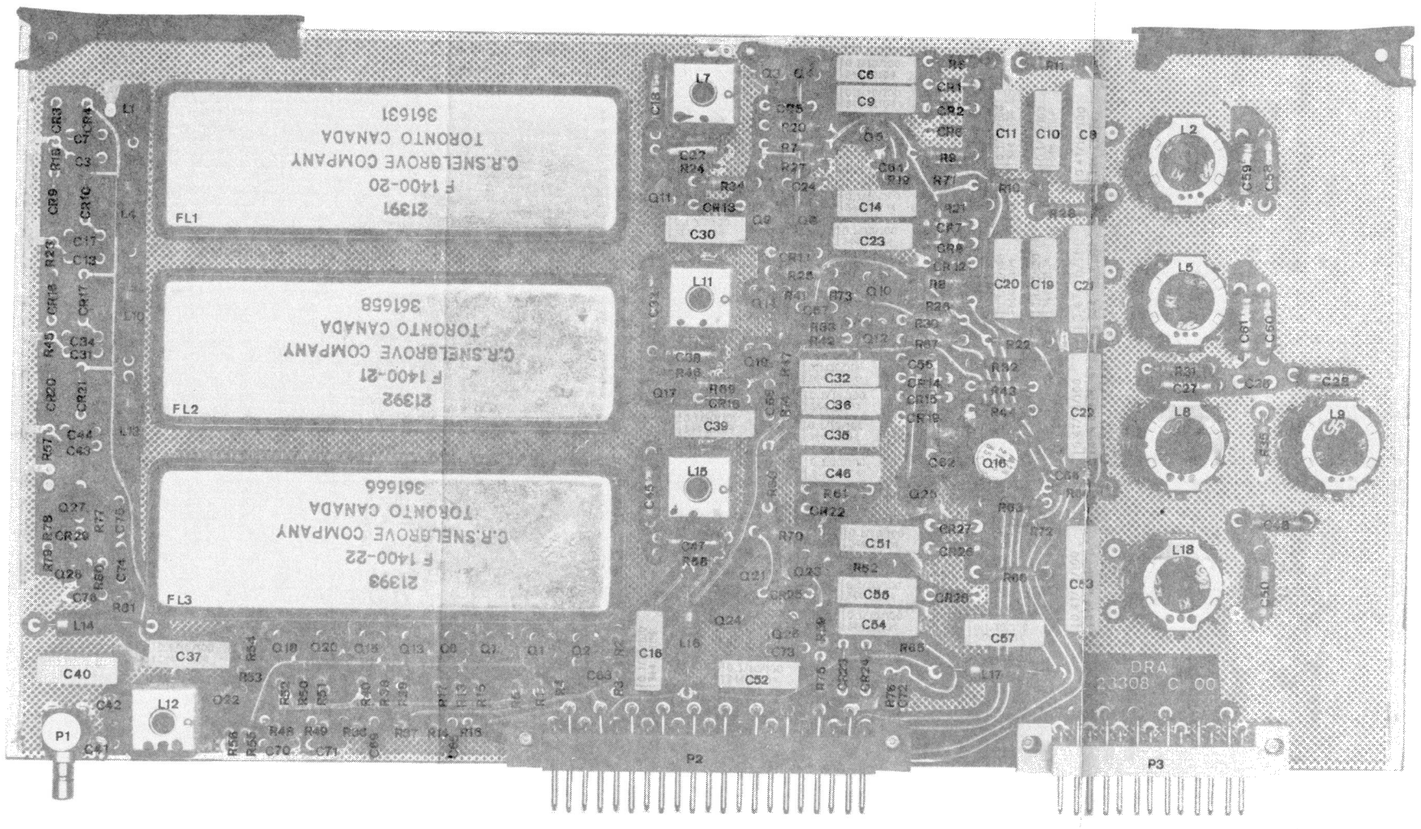




P.C.Board 23308

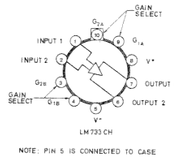


2nd IF 1
(Ref. Desig. 4813)



2nd IF 1
(Ref. Desig. 4813)
Component Location

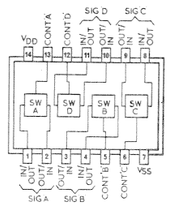
LM 733 CH



NOTE: PIN 5 IS CONNECTED TO CASE

U1–U2–U3

CD 4066 AE



U 4

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

Note 3:

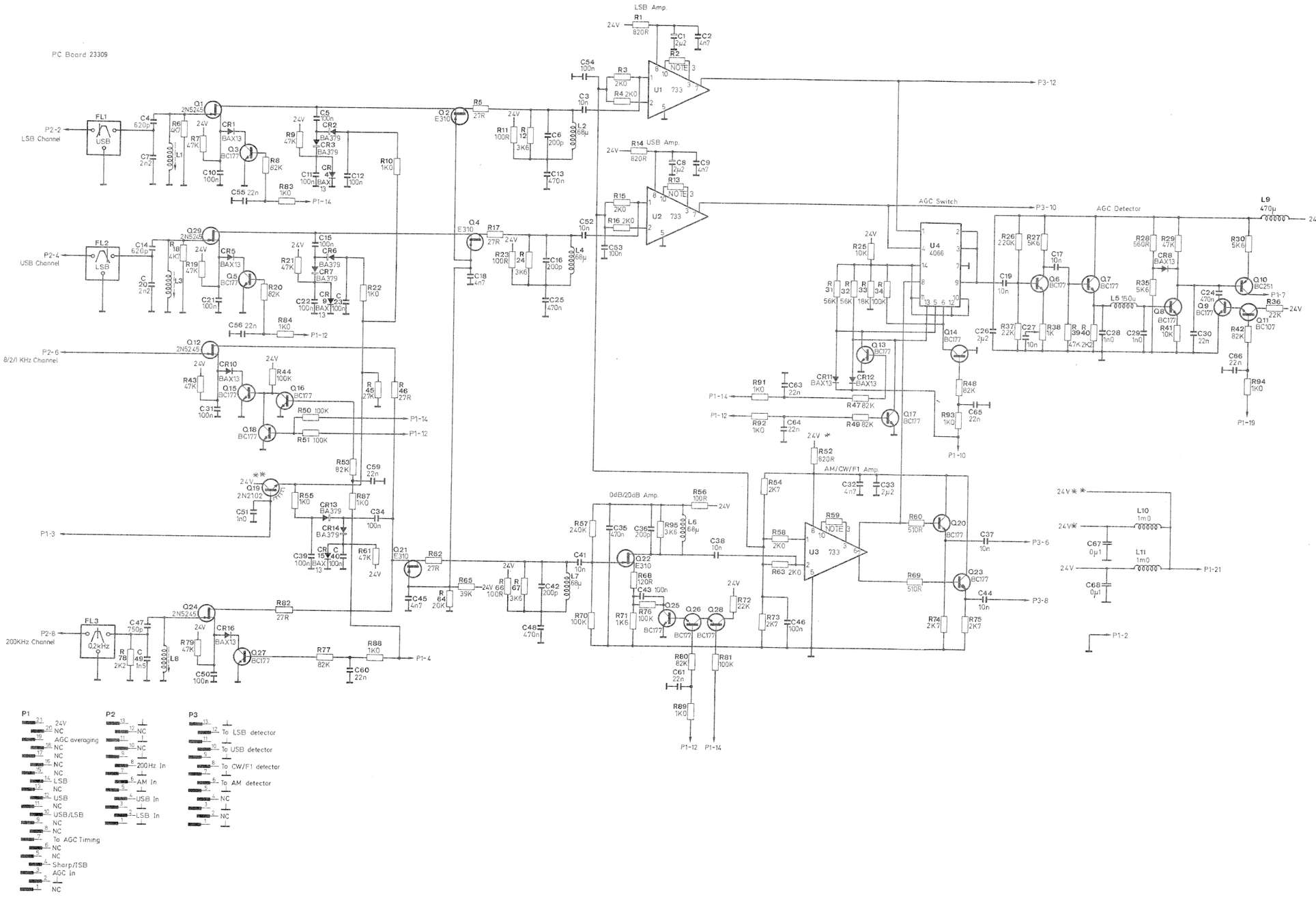
In option USM230 the PCB is not equipped with FL1. FL2 is a 3 kHz crystal filter.

In option LSM230 the PCB is not equipped with FL2. FL1 is a 3 kHz crystal filter.

In option ISM230 FL1 and FL2 is 3 kHz crystal filters.

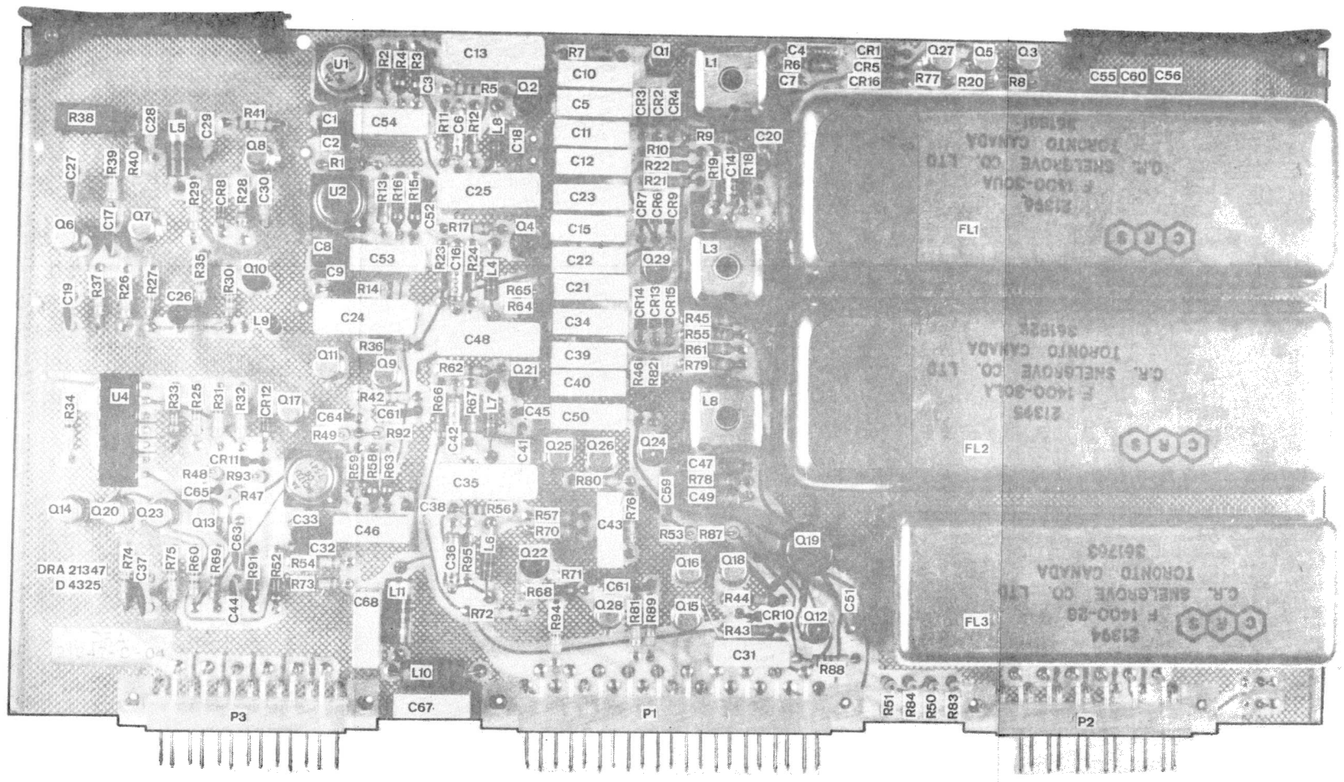
In option ISM260 FL1 and FL2 is 6 kHz crystal filters.

In option USM227 the PCB is not equipped with FL1. FL2 is a 2,7 kHz crystal filter.



MR 6000 DIAG No. 4814 / 1980-04

2nd IF 2
(Ref. Desig. 4814)



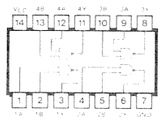
2nd IF 2

(Ref. Desig. 4814)

Component Location

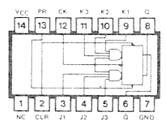
1980-04

SN 7400 N



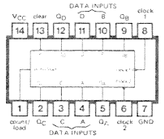
U 1

SN 74 H 72 N



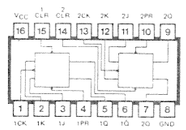
U 2

SN 74196 N



U 3 – U 4 – U 5

SN 74 S 112 N



U 6

Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

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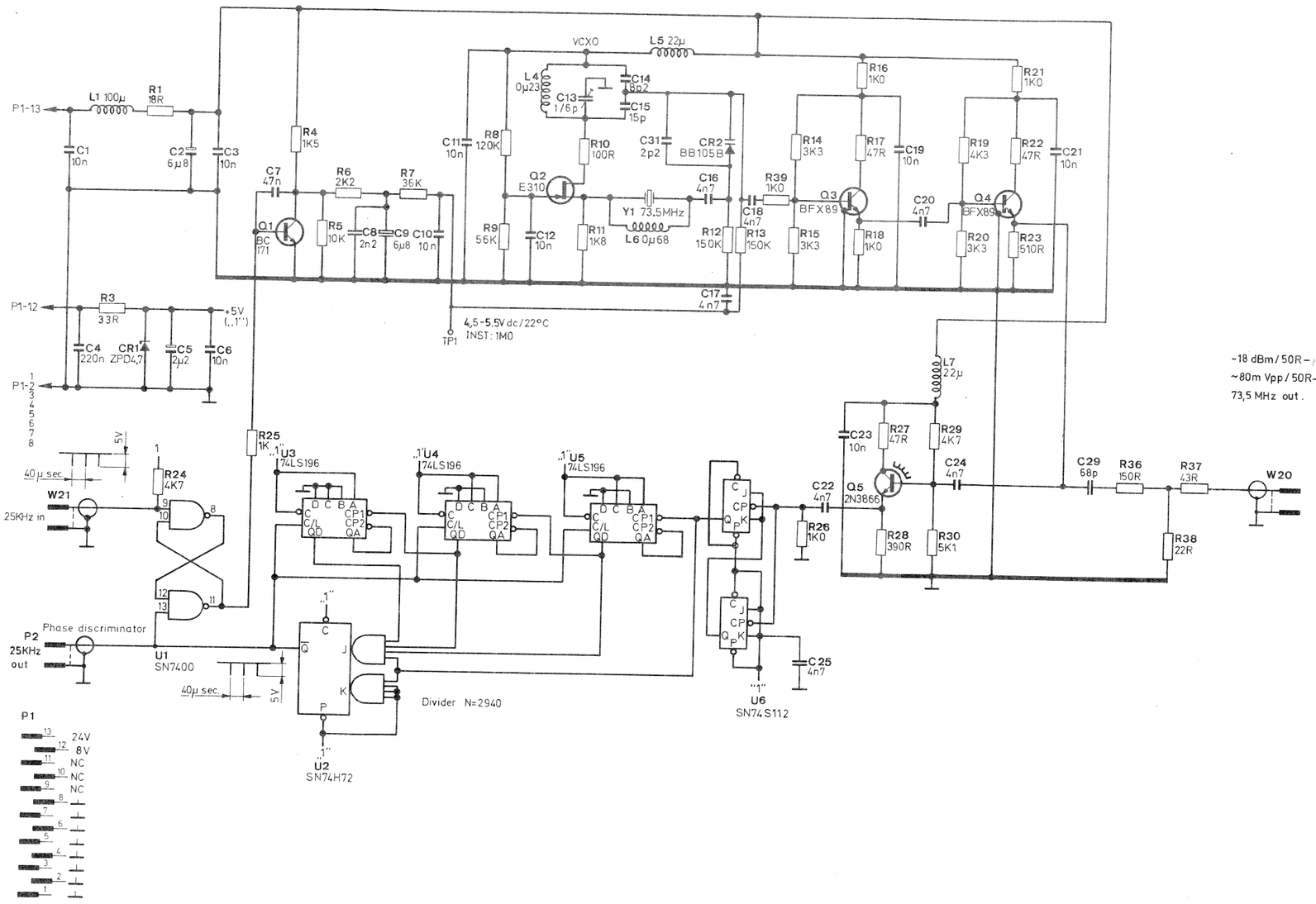
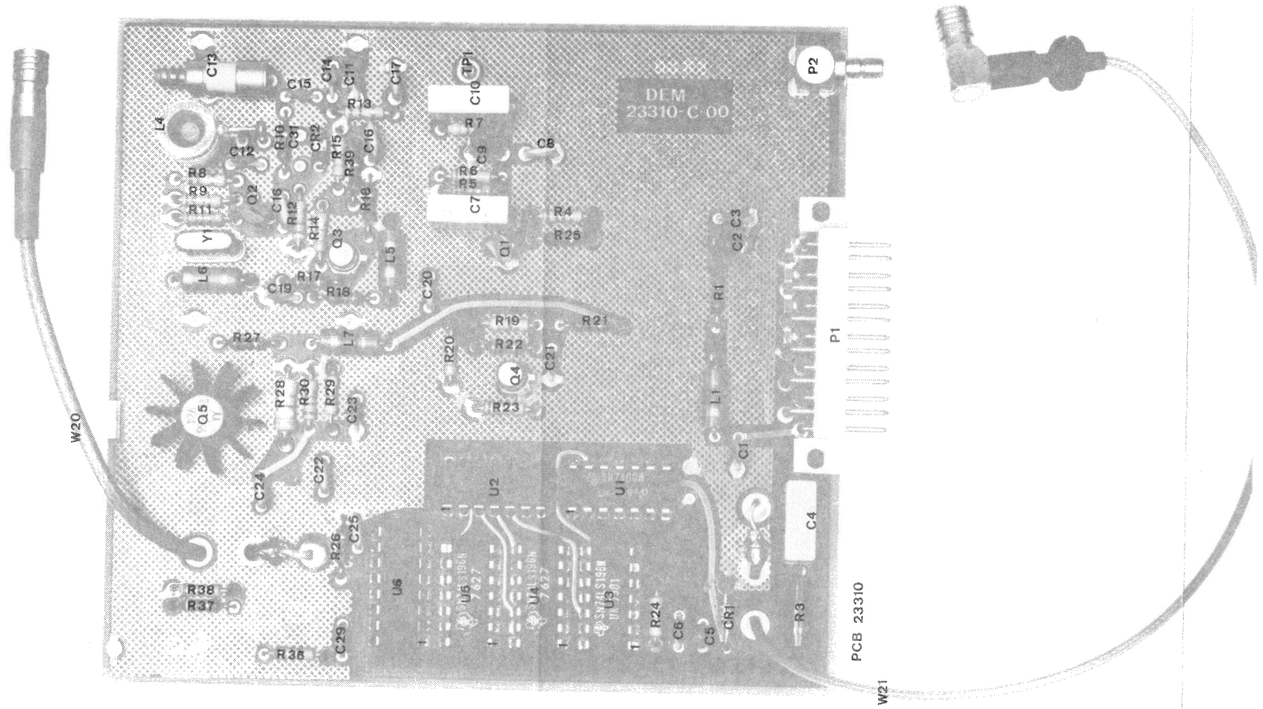
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).

PCB 23310



-18 dBm / 50R – -13,7 dBm / 50R
~80m Vpp / 50R - 130mVpp / 50R
73,5 MHz out.

73.5 MHz LOOP
(Ref. Desig. 4815)



73.5 MHz LOOP
(Ref. Desig. 4815)
Component Location

Note 1:

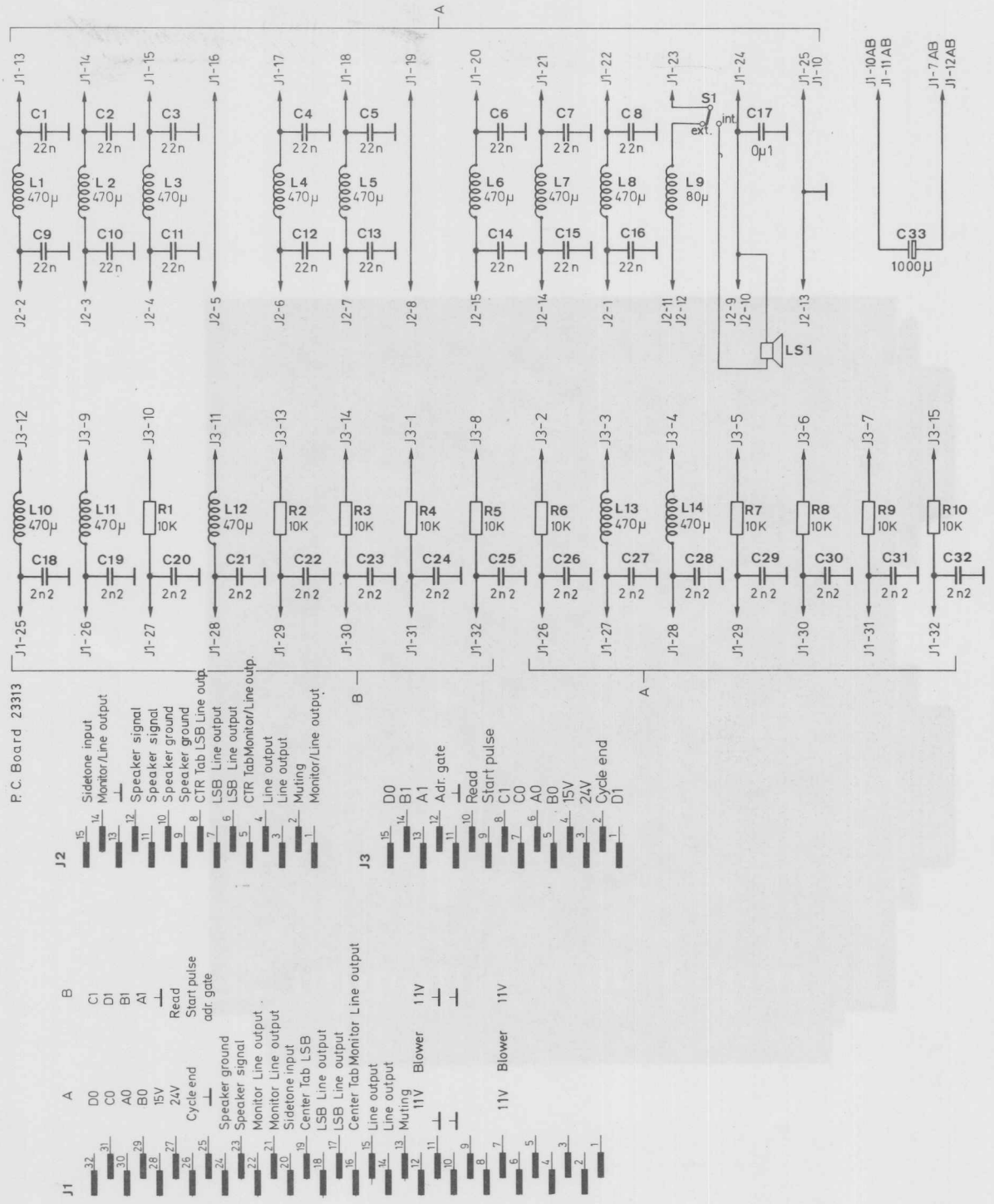
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and μ, (pF, nF, and μF).

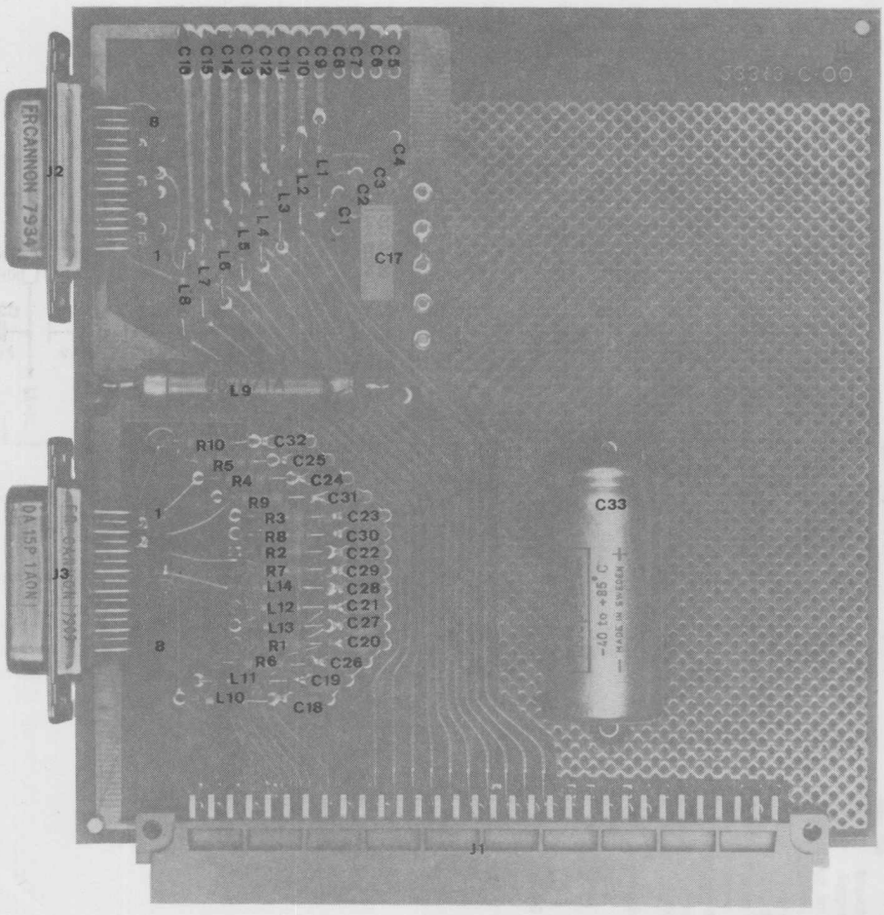
The inductance units are indicated by means of the international prefixes μ, and m, (μH, and mH).



MR 6000 DIAG No. 4817 / 1980-04

I / O FILTERS

(Ref. Desig. 4817)



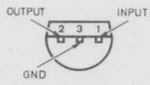
I / O FILTERS

(Ref. Desig. 4817)

Component Location

1980-04

78 L 15



BOTTOM VIEW

U1

Note 1:

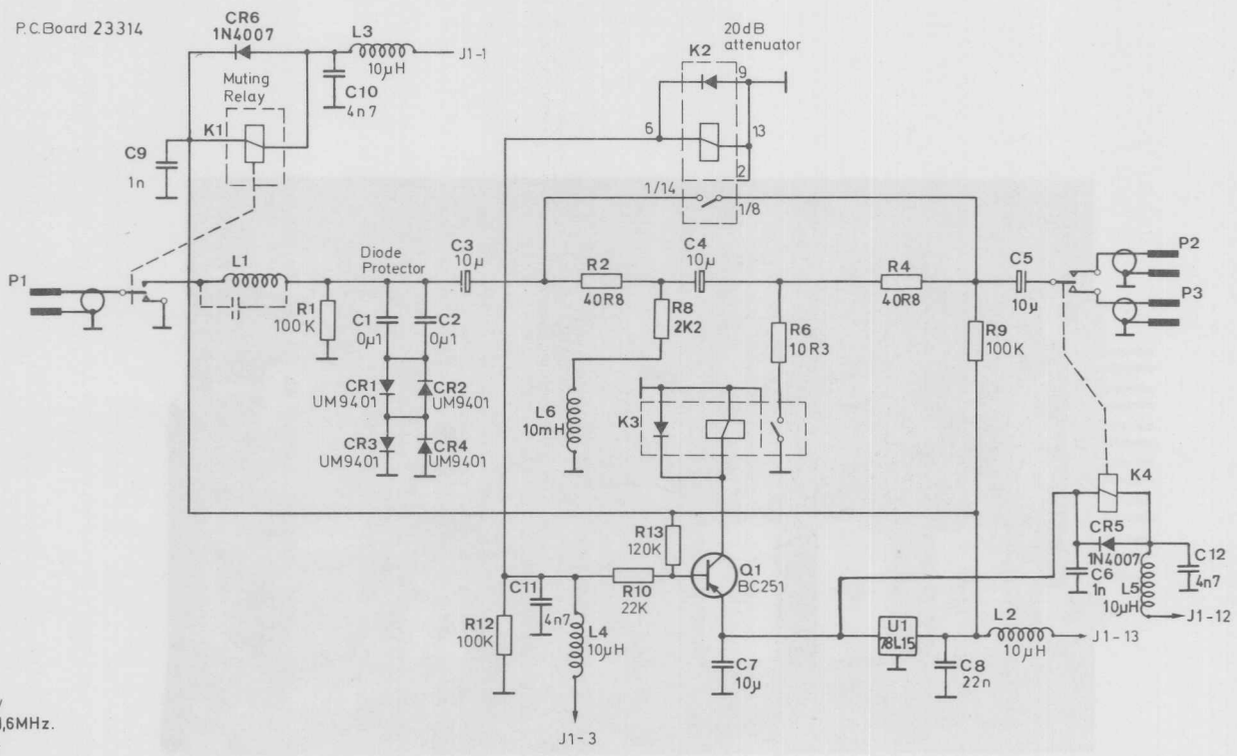
Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

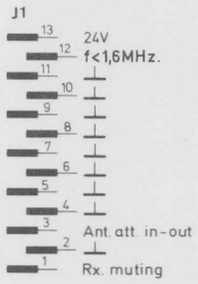
Note 2:

The code system used for indicating resistance values corresponds to that specified in IEC 62, with the exception that decimal fractions are used for values below 1Ω, e.g. 0,47 = 0,47Ω, but 4R7 = 4,7Ω.

The capacitance units are indicated by means of the international prefixes p, n, and µ, (pF, nF, and µF).

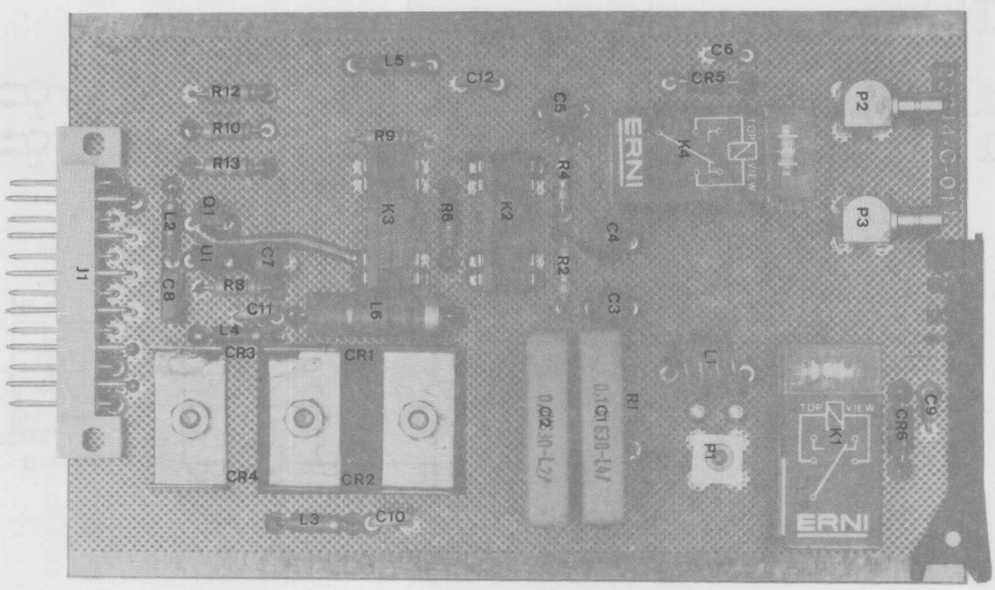
The inductance units are indicated by means of the international prefixes µ, and m, (µH, and mH).





RF INPUT PROTECTION

(Ref. Desig. 4818)



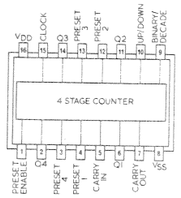
RF INPUT PROTECTION

(Ref. Desig. 4818)

Component Location

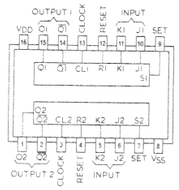
1980-04

CD 4029AE



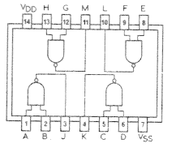
U1–U2–U3–U6–
U7–U8–U9–U17

CD 4027AE



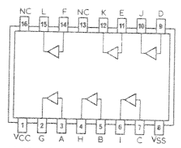
U 4

CD 4011AE



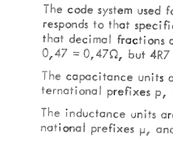
U 5–U21

CD 4050AE



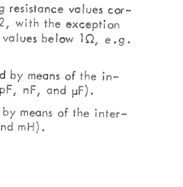
U 10–U11

CD4041AE



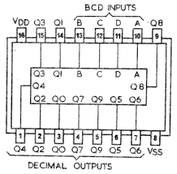
U 12

CD 4063 AE



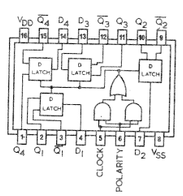
U13–U14–U15–U16

CD 4028AE



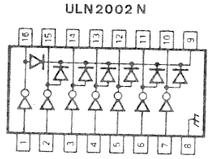
U18–U20–U22–U23

CD 4042 AE



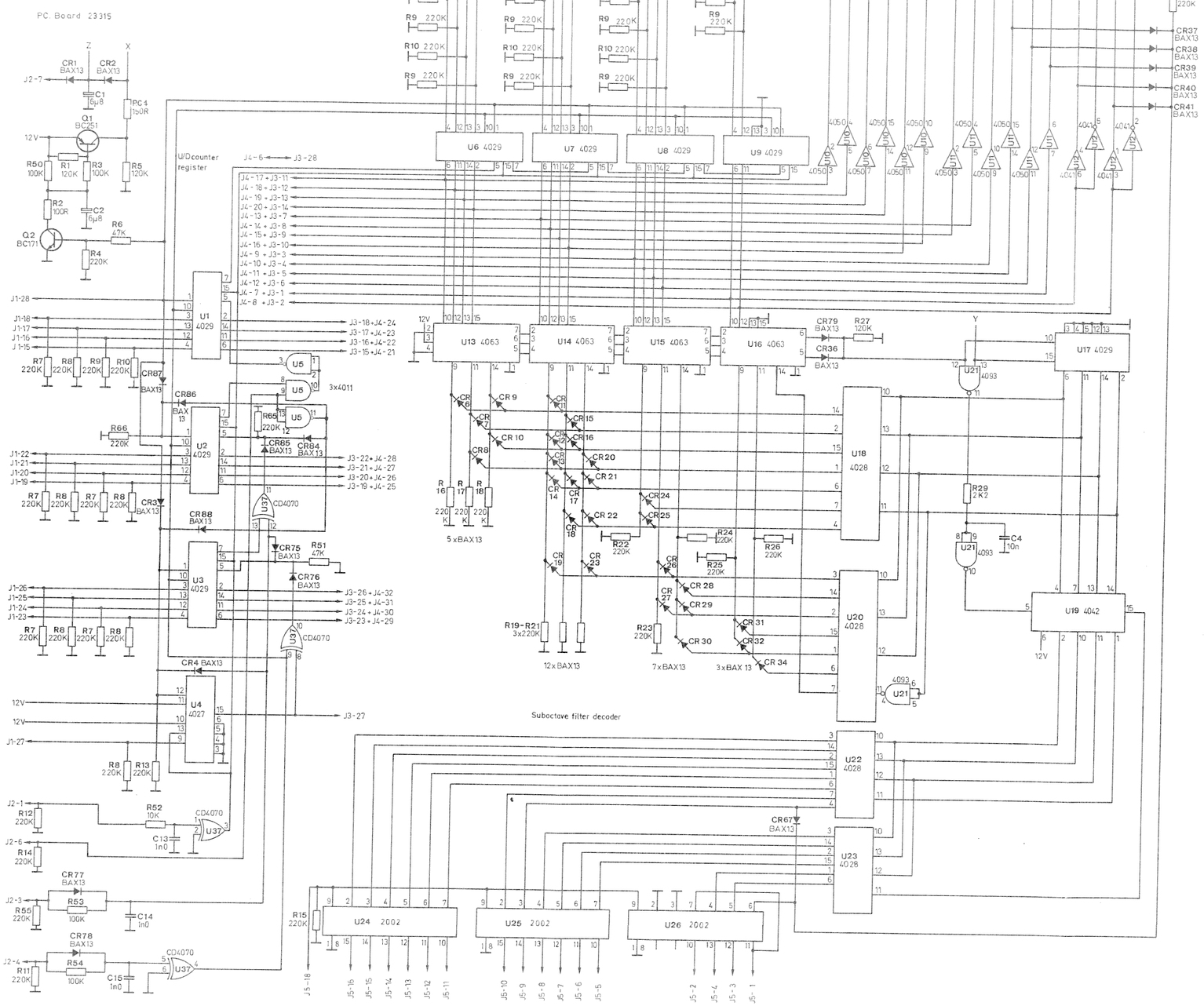
U 19

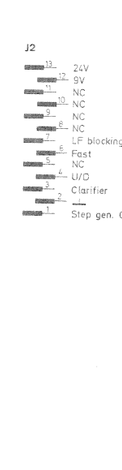
ULN2002 N

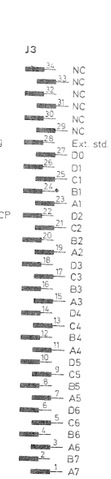


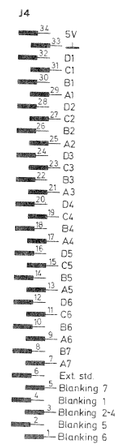
U 24–U25–U26

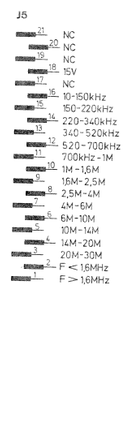
PC. Board 23315

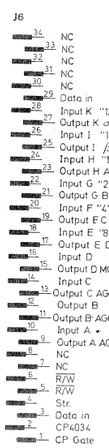












Note 1:

Partial Reference Designations are shown. For complete Designation prefix with Assembly and Subassembly Reference Designations (Circuit Diagram Nos.)

Note 2:

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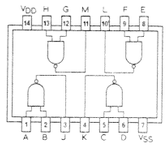
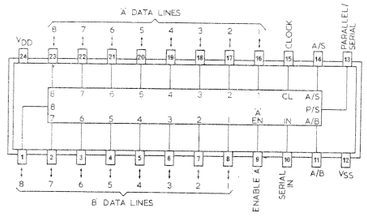
REGISTER BOARD
PART 1 OF 2
(Ref. Desig. 4819)

CD 4011 AE



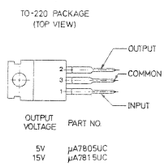
U 21 – U 32 – U 33 – U 34

CD 4034 AE



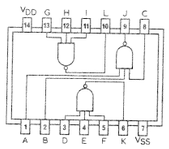
U 27 – U 28 – U 29 – U 30

μA7805UC



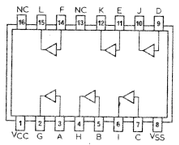
U 31

CD 4023 AE



U 35

CD 4050 AE



U 36

Note 1:

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Note 2:

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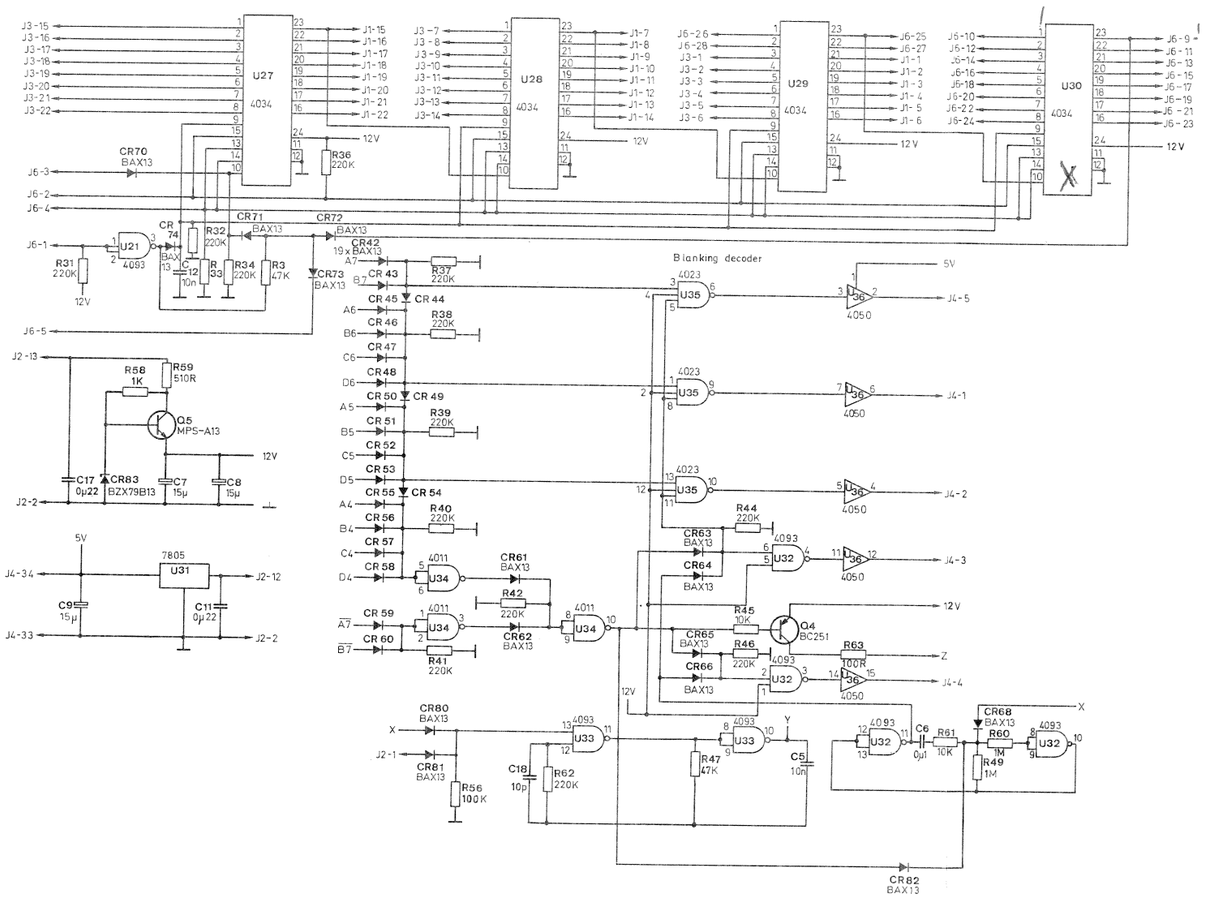
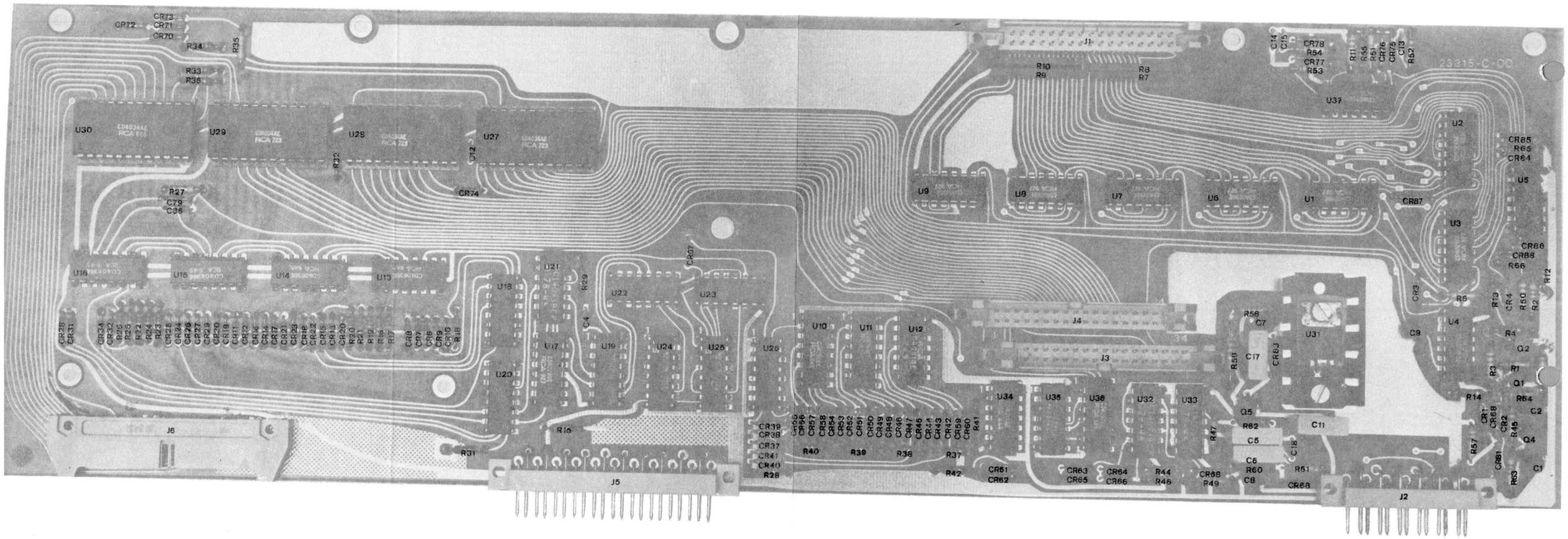
Memory auxiliary register



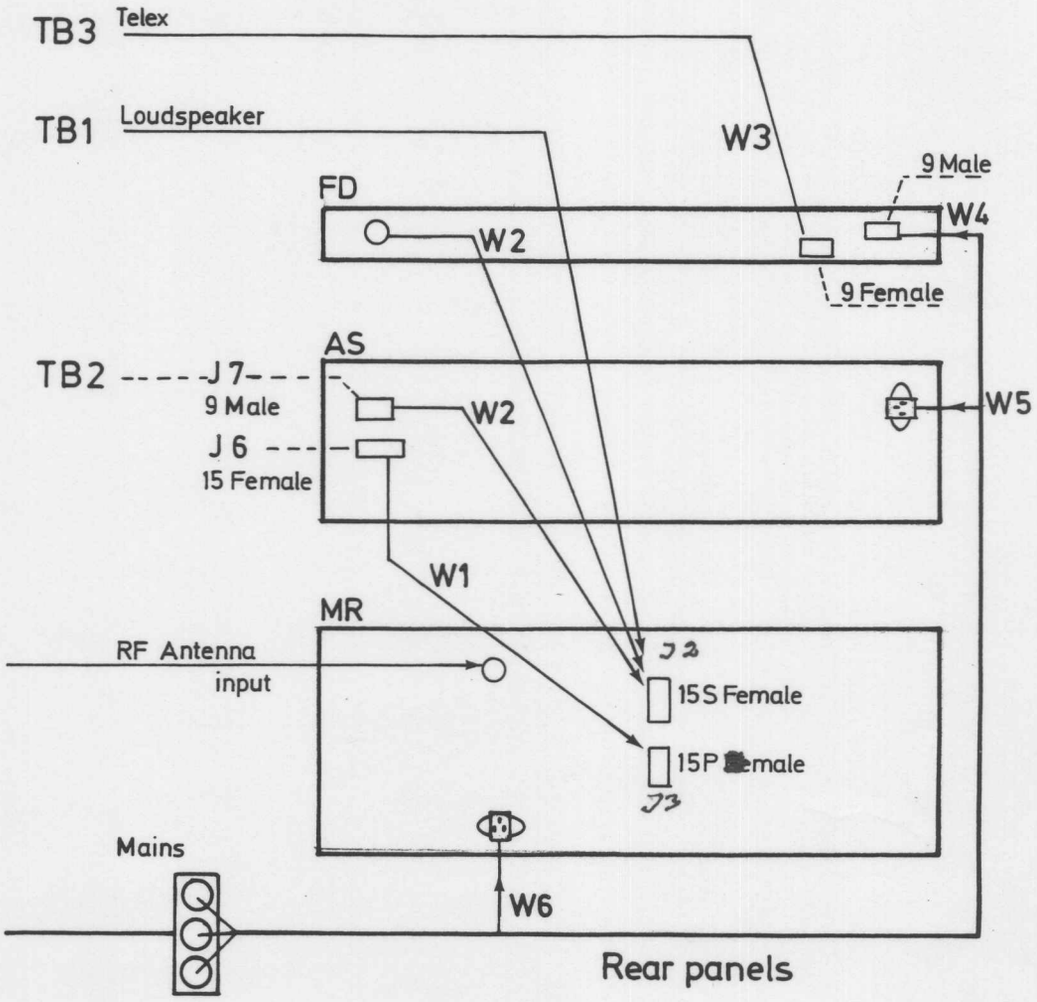
REGISTER BOARD
PART 2 OF 2
(Ref. Desig. 4819)



REGISTER BOARD
(Ref. Desig. 4819)
Component Location

1980-04

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVAL



REV STATUS OF SHEETS	REV. LTR SHEET NO.												

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETRES AND TOLERANCES ARE IN ACCORDANCE WITH DS 2075.

ANGLES

LIN. DIM.

MATERIAL

Dansk Radio AS

DR.	821020	P.S.C
CH.		
AP.		
AP.		

TITLE

CABINET FOR
MR 6000, AS 6000, FD 6000

FIRST ANGLE PROJECTION

SIZE	CODE IDENT NO.	DRAWING NO.
A 4		4931
SCALE		SHEET 1 OF

5650 J & K, Diaprint 01-54 44 22