

MANUAL 132

AP 2000 MOBILE

2 M BAND

This manual covers the typenumbers:

AP 2255, AP 2256, AP 2257, AP 2258

AP 2260, AP 2261, AP 2262, AP 2263

AP 2265, AP 2266, AP 2275, AP 2276

AP 2215, AP 2225.

## Contents for 2 m

	<u>drawing number</u>
Technical data	75404-4E2
<u>Technical description</u>	75204-4E2
Receiver	
Transmitter	
<u>Frequency synthesizer circuit</u>	78082-4E2
Voltage controlled oscillator	
Synthesizer mixer	
Channel code	
Division ratio and channel code	76311-4E2
<u>Tuning instruction</u>	75238-4E2
1. A. Synthesizer oscillator	
B. Phase locked loop	
C. Rx-frequency	
2. A. 21,4 MHz and 455 kHz IF	
B. RF-amplifier	
C. AF-amplifier, squelch and key circuit	
3. A. Transmitter mixer and amplifier	
B. 6 W PA-stage	
C. Transmitter frequency	
D. Modulation amplifier	
Disassembling	76218-4M2
Interior view 6 W	75389-3E2
Interior view 6 W, with p.c.	76379-3E2
Interior view 10-25 W , ext. PA	75390-3E2
Interior view 10-25 W	76358-3E2
Interior view 10-25 W, with p.c.	76381-3E2
Interior view, with ext. PA	78083-3E2
Blockschematic 6 W	77191-3E2
Blockschematic 10-25 W	76361-3E2
Blockschematic 10-25 W, ext.	75235-3E2
Standard crystal 25 kHz	75237-4E2
Standard crystal 25 kHz	77078-4E2
Standard crystal 20 kHz	77077-4E2
Standard crystal 20 kHz	77193-4E2

78085-4E2

Print boardDrawing number

B 24	Aerial switch, with ext. PA	75010-4E2
B 39	Aerial switch, with int. PA	75011-4E2
B 08	RF-amplifier	75015-4E2
B 01	IF-amplifier	75076-3E2
B 09	AF-amplifier, squelch and key	75017-3E2
B 07	Transmitter mixer and amplifier	75014-4E2
B 06	6 W PA-stage	75013-4E2
B 79	10-25 W PA-stage, int.	76307-4E2
B 02	10-25 W PA-stage, ext.	75009-4E2
B 80	Thermal protection	76328-4E2
B 57	Sense amplifier, ext. PA	75622-4E2
B 57	Sense amplifier, int. PA	76325-4E2
	Aerial filter	75016-4E2
B 10	Modulation amplifier	75018-3E2
B 17		
B 22	Synthesizer logic 25 kHz	75062-3E2
B 17		
B 22	Synthesizer logic 20 kHz	77201-3E2
B 19	Voltage controlled oscillator	75082-3E2
B 11	Synthesizer mixer and Tx-oscillator	75019-3E2
B 20	Control circuit 1 channel	75083-3E2
B 21	Control circuit 12 channel	75084-3E2
B 38	Control circuit 32 channel	75207-3E2
B 34	Extern timing for hornrelay	75169-4E2
B 81	Microphone	77127-4E2
B 23	Main wiring and motherboard 6 W	75377-2E2
B 23/ B 73	Main wiring and motherboard 6 W p.c.	77006-2E2
B 23	Main wiring and motherboard 10-25 W, int.	76334-2E2
B 23/ B 73	Main wiring and motherboard 10-25 W p.c.	76366-2E2
B 23	Main wiring and motherboard 10-25 W, ext.	75240-2E2
B 14	Installation with ext. PA	75058-2E2
B 54	Installation with int. PA	75061-2E2
	Installation with p.c.	77001-4E2
	Installation for close talk	76327-4E2

78085-4E2

## Technical data AP 2000 Series 2 m.

### General:

The equipment is homologated in several countries where the technical requirements are based on the CEPT Recommendation T/R 17.

Frequency range:	146 - 174 MHz
Principle:	Digital frequency synthesizer
Number of channels:	Max. 80
Channel spacing:	25 kHz or 20 kHz
RF-bandwidth:	Typ. 2 MHz at 1 dB reduction
Mode of operation:	Simplex, semi-duplex
Supply voltage:	12 V DC chassis negative - nom. 13,2 V. DC-DC converter available for 6 V, 12 V and 24 V chassis positive operation. A 220 V AC supply is available too.
Supply voltage variations:	10,8 V to 15,6 V
Operation temperature:	+ 25°C to + 60°C
Frequency stability:	Typ. $\pm$ 10 ppm for the above specified temperature and supply voltage variations
Loudspeaker:	External 4 $\Omega$
Microphone:	1 k $\Omega$ condenser microphone or 200 $\Omega$ dynamic close talk micro- phone with push-button
Antenna impedance:	50 $\Omega$
Power consumption:	At 13,2 V reception approx. 0,25 A transmission { 25 W approx. 5,5 A 6 W       "       2,0 A

### Receiver:

Sensitivity:	Typ. 0,4 $\mu$ V ( 1/2 E.M.F.) for 20 dB SINAD
Adjacent channel sensitivity:	Typ. 75 dB (CEPT Method)
Spurious and image rejection:	Typ. 80 dB (CEPT Method)
Intermodulation attenuation:	Typ. 71 dB (CEPT Method)
Undesired conducted power:	Typ. 0,5 nW

75404-4E2

Page 1

Deemphassis:	Following 6 dB per octave curve from 0,3 to 3 kHz within + 1- 3 dB relative level at 1000 Hz
Audio power:	3 watts into 4 $\Omega$ at 10 per cent distortion, 13,2 V supply voltage
Output for microphone:	1 mW in 300 $\Omega$
Hum and noise:	Typ. 50 dB (CEPT Method)
Function of limiter:	Less than 1 dB variation in output voltage for RF-input levels between 1 $\mu$ V and 100 mV EMF

Transmitter:

Power output:	6 W $\pm$ 0,5 dB, 10-25 W + 0,5 - 1,0 dB from + 25°C to + 60°C and supply voltages between 10,8 V and 15,6 V. With external PA: 25 W + 0 dB $\pm$ 2 dB from + 25°C to 60°C and supply voltages between 10,8 V and 15,6 V.
Spurious outputs and harmonics:	Typ. each less than 2 $\mu$ W into 50 $\Omega$
Adjacent channel power:	Typ. 80 dB below the output power
Frequency deviation:	Following 6 dB per octave curve from 0,3 to 3 kHz within + 1-3 dB relative level at 1000 Hz
Harmonic distortion:	Typ. 1 per cent at $\pm$ 3 kHz deviation and 1000 Hz modulation frequency.
Hum and noise:	Typ. 45 dB relative $\pm$ 3 kHz deviation and 1000 Hz modulation frequency (CEPT Method).

## Technical description for AP 2000 2 m

### RECEIVER (Fig. 1)

#### Aerial switch (75010-4E2 or 75011-4E2)

The aerial switch is made by a relay, while C 1, TR 1 and D 1 makes a forward power sensing circuit for the transmitter.

#### RF-amplifier and 1st mixer (75015-4E2)

The RF amplifier consists of a dual-gate Mos-transistor with several tuned circuits to give the necessary selectivity. The first mixer converts the RF-signal 147 - 174 MHz to 21,4 MHz with an oscillator injection of 168,4 - 195,4 MHz on gate 2. Matching of the mixer output impedance to the crystal filter is made by the tuned circuit L 6.

#### 21,4 MHz and 455 kHz IF (75076-3E2)

The 21,4 MHz crystal filter is followed by a dual-gate Mos-amplifier which gives approximately 20 dB gain. This stage is followed by the second mixer which converts 21,4 MHz to the low IF 455 kHz. The second mixer consists of an integrated doublebalanced transistor mixer, in which one section is used as the crystal oscillator. An emitter follower with some RC low-pass sections feeds the signal to IC 2, which is an integrated high gain amplifier/limiter and quadrature detector. The coil L 4 is the detector phase shift network. AF output is supplied by the emitter follower Q 3.

#### AF-amplifier, squelch and key circuit (75017-3E2)

The AF-signal goes through an amplifier stage Q 6 to the volume control circuit. Here, the diodes D 1, D 2 and D 3 act as an electronic attenuator regulated by the diode current. This circuit is also used for external AF-blocking and squelch. An integrated AF output amplifier is used for the 3 W loudspeaker output and here the feedback-capacitors C 6 and C 7 produce the deemphasis.

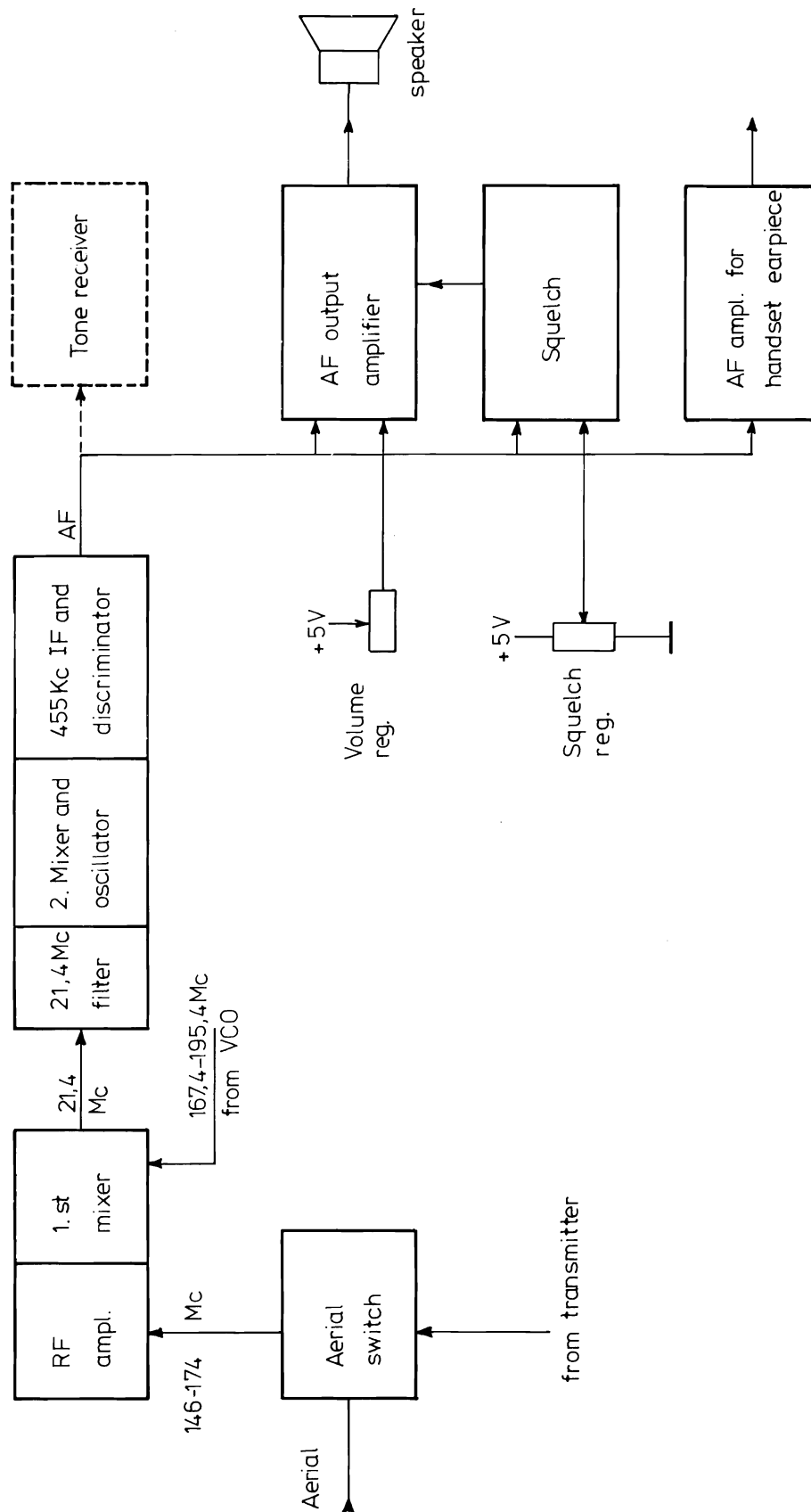


Fig. 1

Rettet:	Technical decription for AP 2000, 2 m band	Tegn.: 30-4-75	Kontr.:
		AC	
	Page: 2		
	AP-RADIOTELEFON 1/2	Tegn. nr.:	
		75204-4E2	

For the handset earpiece Q 4 and Q 5 makes an amplifier while D 15 is for blocking. The squelch circuit consists of an 8 kHz tuned amplifier Q 3 followed by a detector D 11 and D 12. With increasing noise level on the AF-input the voltage on the negative side on C 19 will decrease from + 5 V. Getting lower than the squelch reg. voltage on point 7, the amplifier IC 2 switches over to an output voltage of + 5 V and thus blocking the AF-output through the volume control circuit.

In the key control circuit Q 1 and Q 2 goes ON when the button in the handset connects point 11 to chassis, thus producing + 12 V on point 14. A positive voltage applied on point 10 will inhibit this function.

### TRANSMITTERS (Fig. 2, 3 and 4)

#### Transmitter mixer and amplifier (75014-4E2)

Because the VCO has a frequency 21,4 MHz higher than the operating Rx-frequency this signal is fed to the transmitter mixer and converted to the desired transmitting frequency. For simplex operation the necessary 21,4 MHz signal comes from a combined crystal oscillator/doubler. Thus the crystal will be 10,7 MHz. For good suppression of VCO - and 21,4 MHz injection the Tx-mixer is a balanced diode type. The three amplifier stages Q 1, Q 2 and Q 3 give further suppression of unwanted sidebands and the necessary amplification to reach an output of approx. 150 mW.

#### 6 W power amplifier (75013-4E2)

The 6 W power amplifier consists of two stages Q 1 and Q 2, where the output level can be regulated by varying the supply voltage for Q 1.

#### 10-25 W PA-stage (76307-4E2)

This power amplifier consists of three stages Q 1, Q 2 and Q 3, of which Q 1 is getting its power supply from the power sense amplifier. In this way it is possible to adjust the output power to any desired value between 10-25 W. This stage is only intended for intermittent service. It is therefore provided with "thermal shut down circuit".



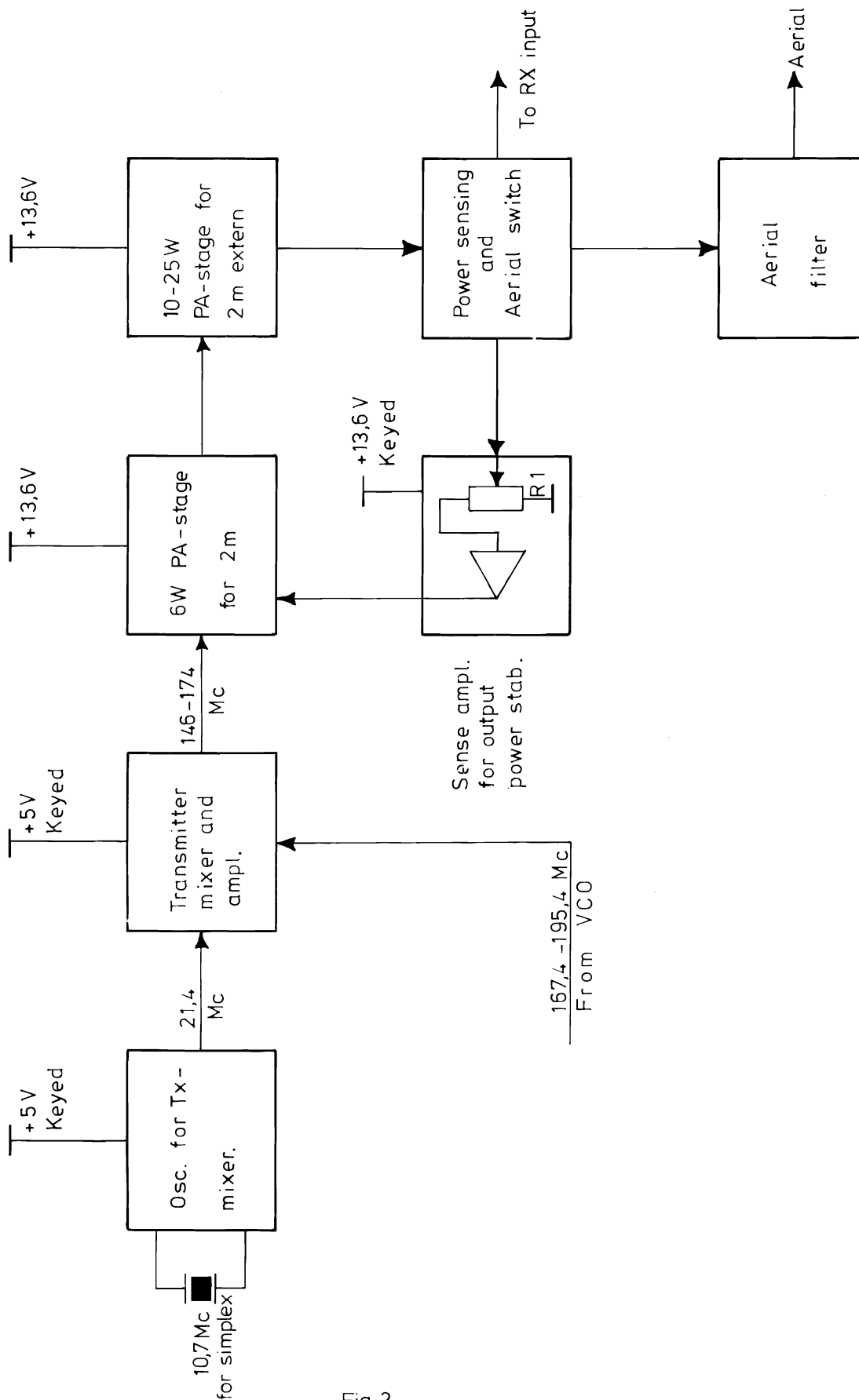
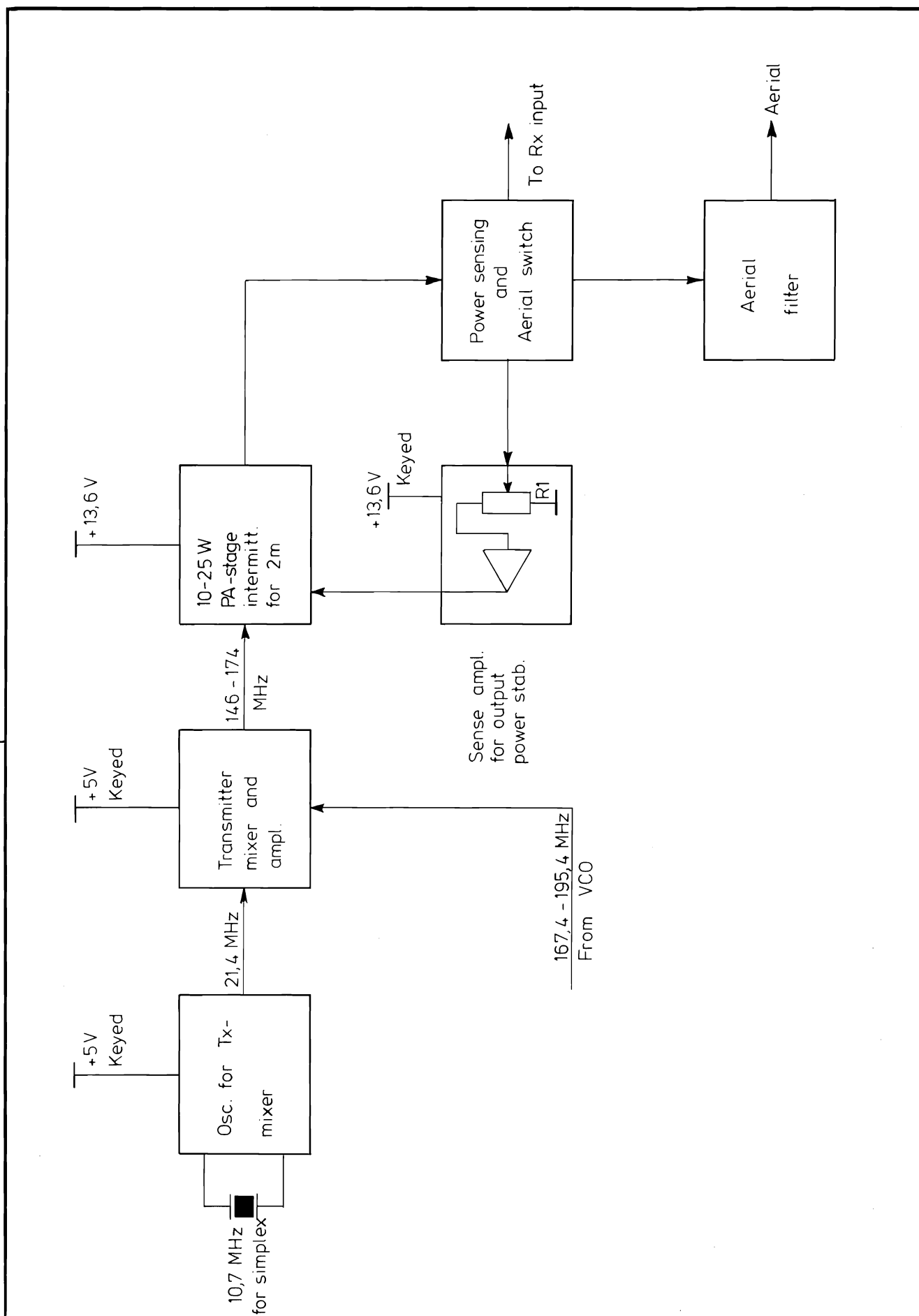


Fig. 2

Rettet:	10-25 W ext. Technical description for AP 2000, 2m band	Tegn.: 30-4-75 E.H.	Kontr.:
		Page: 4	
	AP-RADIOTELEFON 2m	Tegn. nr.:	
		75 204-4E 2	



Rettet:	Technical description for AP 2000, 2m band 10-25 W PA	Tegn.: 23- 6-78	Kontr.:
		AMC	
		Stykl. nr.:	Page: 5
		Tegn. nr.:	75205 - 4E2
		AP-RADIOTELEFON A/s	

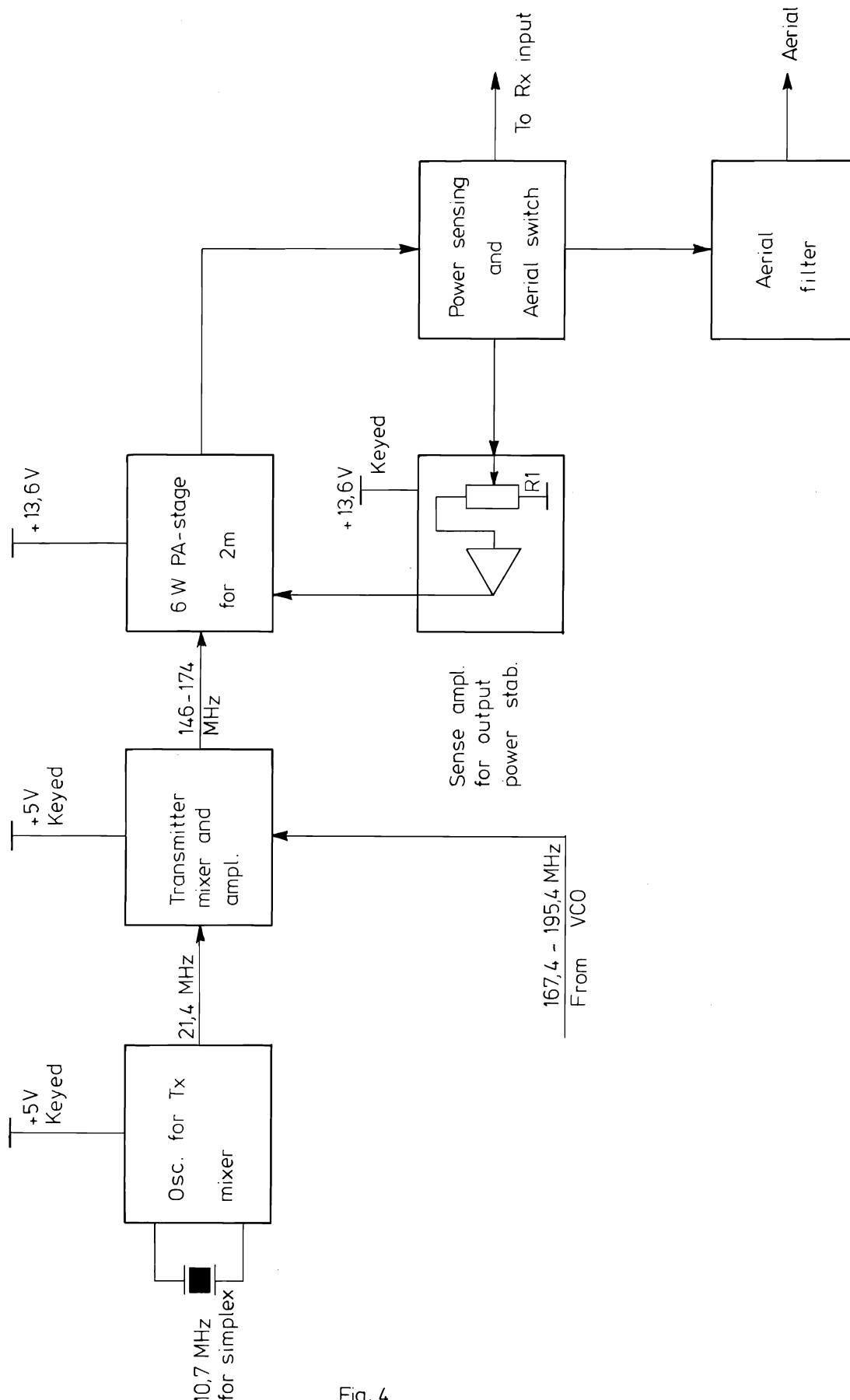


Fig. 4

Rettet:	Technical description for AP 2000, 2 m band 6W PA-stage		Tegn.: 27- 6- 78 AMC	Kontr.:
			Stykl. nr.:	Page: 6
	AP-RADIOTELEFON A/s		Tegn. nr.:	
			75204 - 4E2	

#### 10-25 W power cassette (75009-4E2)

This consists only of one stage Q 1, here as well the output goes through a forward powersensing circuit, making it possible to adjust the output power by means of a potentiometer located on print board B 24.

This stage is intended for continuous service and therefore it is located in an external cassette in order to get sufficient cooling.

#### Output power stabilizing (75622-4E2 and 76325-4E2)

From the power-sensing circuit a DC voltage proportional to the forward power is led to an amplifier. Here it is compared to a zener-voltage, and if it is greater than this threshold level, the amplifier IC 1 will give less base-current for Q 1, and thus reduce the voltage for driver transistor Q 1 in the 6 W stage. This will act in the following manner:

For low supply voltages (~11 V) the output power will increase with increasing supply voltage, and when the output reaches the desired value it will be constant for further increase in supply voltage. The output level is adjustable with R 1 on B 57 for internal PA-stages and with R 2 on B 24 for external PA-stage. Note that the oscillator for Tx-mixer, the transmitter mixer and amplifier, and sense amplifier have keyed supply lines, while the final transistor in the 6 W stage and the 10-25 W external stage are supplied independent of the key. In the 10-25 W internal PA-stage the last two transistors are supplied independent of the key.

#### Aerial filter (75016-4E2)

The aerial filter is a low-pass filter for suppression of the harmonics from the transmitter.

#### Modulation amplifier (75018-3E2)

The modulation amplifier has a preamplifier Q 1 for the most sensitive input (input 1). Using the less sensitive input 2, the mic. switch terminal shall have + 5 V so that Q 1 will be blocked via D 3 and D 4 will be conducting for the input signal to IC 1. For selective tone transmission the tone Tx input is used while Q 1 is blocked via D 2. D 5 is used for blocking of the modulation amplifier while receiving in simplex mode. IC 1 and

the first part of IC 2 work as a compressor/amplifier to limit the maximum output AF-voltage. When using a variable gain type amplifier as IC 1 it is possible to avoid the distortion at high AF-levels, which occurs in a conventional clipper-circuit. The other amplifier in IC 2 is used as a 3 kHz active low-pass filter. A tuning diode in the VCO is used for modulation.

## FREQUENCY SYNTHESIZER CIRCUIT

### Basic phase lock loop operation

A simple phase locked loop consists of 3 elements, a phase comparator, a filter and the VCO (Fig. 1).

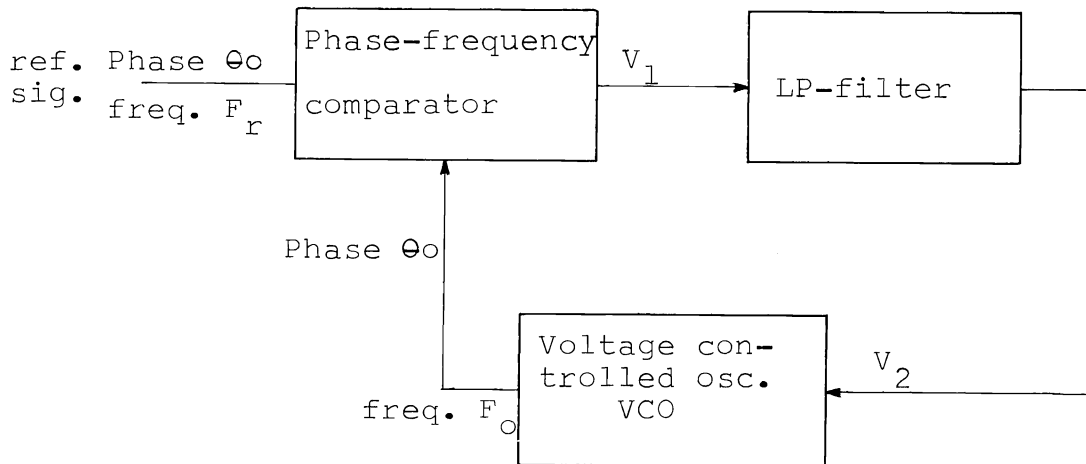


Fig. 1 Basic phase locked loop

### Phase-frequency comparator

If the VCO-frequency  $F_o = F_r$ , the comparator gives out a DC-level proportional to the phase difference between  $F_o$  and  $F_r$  (Fig. 2). We have  $V_1 = K_1 \times (\theta_r - \theta_o)$  where  $K_1$  is a constant. When there is a frequency difference between  $F_o$  and  $F_r$ ,  $V_1$  will be low for  $F_o$  greater than  $F_r$  and high for  $F_o$  less than  $F_r$ .

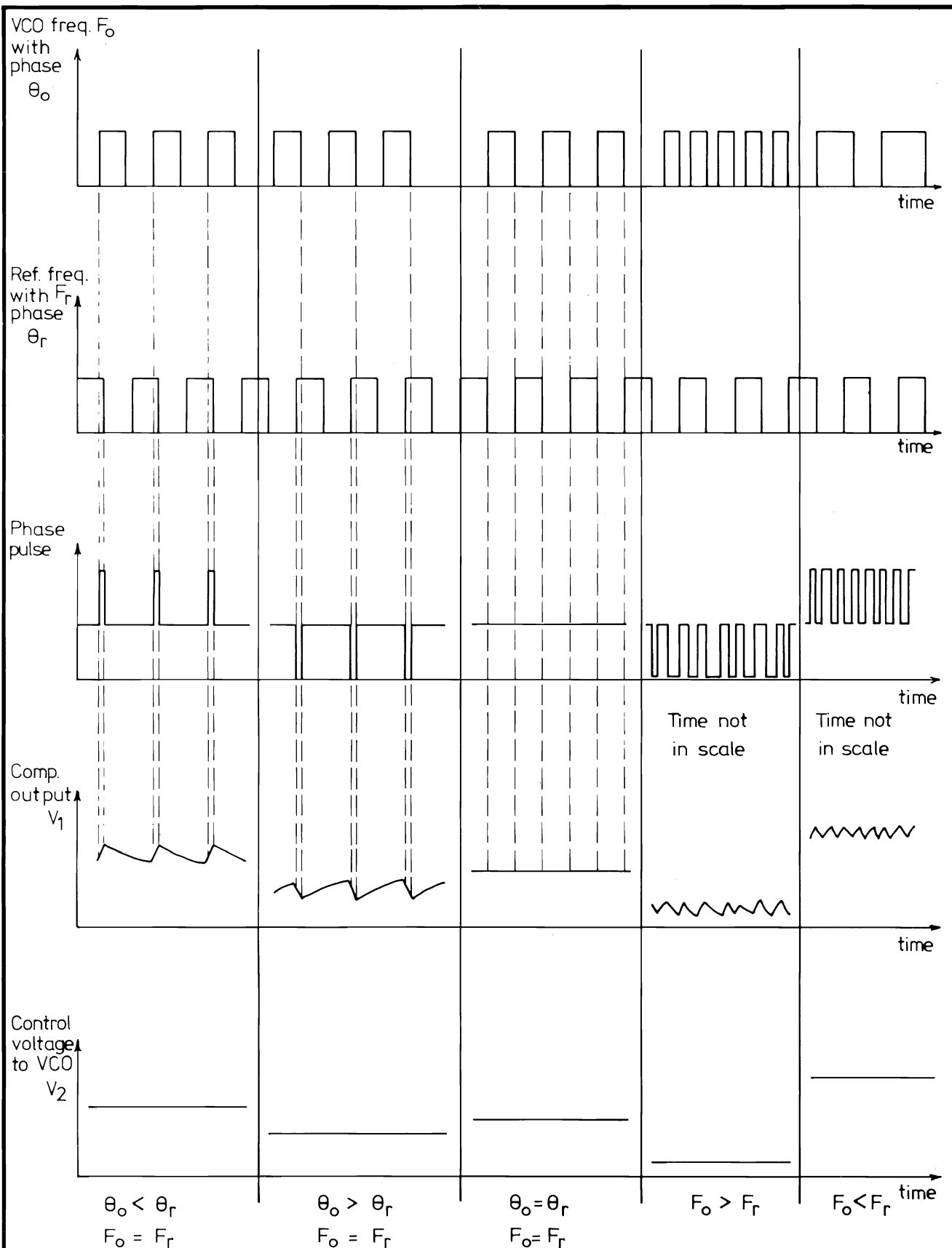
### Voltage controlled oscillator

This can be LC-oscillator whose frequency is controlled with a varicap.  $F_o = K_2 \times V_1$  where  $K_2$  is a constant.

### LP-filter

This filter removes the ripple on  $V_1$  (Fig. 2) and determines the dynamic behaviour (stability, step response) of the loop.

Let us consider a situation where the loop is out of lock and  $F_o$  is greater than  $F_r$ . The comparator output voltage  $V_1$  will contain the normal ripple with frequency  $F_r$  and a beat note,



SIMPLIFIED OPERATION of frequency and phase comparator.

Fig. 2

Rettet:       	Figure for synthesizer description  <b>AP-RADIOTELEFON 1/2</b>	Tegn.: 30-6-78 AC  Page: 2  Tegn. nr.: 78082-4E2	Kontr.:    
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but the mean DC level ( $=V_2$  after the filter) will be low (Fig. 2). Thus the VCO frequency will decrease and the phase difference will assume a level for  $V_2$  sufficient to hold the VCO frequency in lock with  $F_r$ . If the tuning of the VCO is changed (such as by varying the value of the tuning capacitor) the frequency  $F_o$  from the VCO will attempt to change. This will result in a change in phase angle between  $F_o$  and  $F_r$ , resulting in a change in DC-level of  $V_1$  which will act to maintain frequency lock. In this way tuning of the VCO will change the ripple and the DC-level on  $V_1$  but as lock is maintained  $F_o$  will be equal  $F_r$ .

### A multichannel synthesizer (Fig. 3)

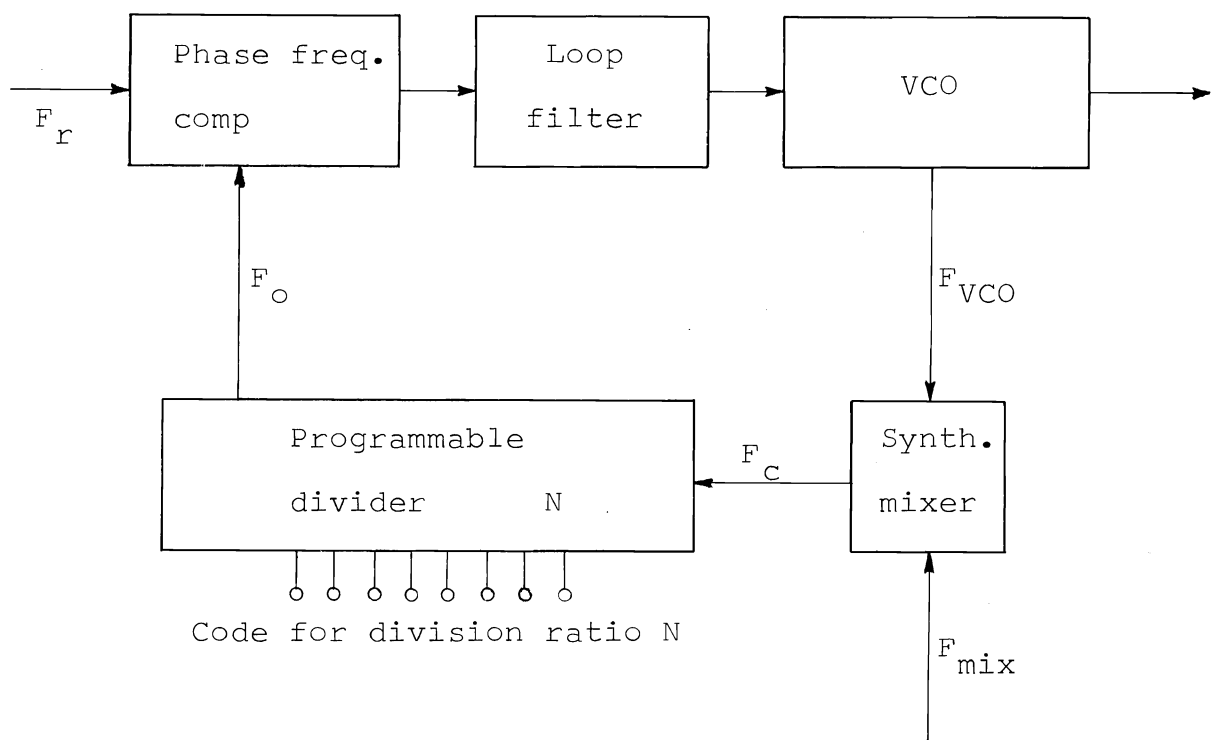


Fig. 3 Synthesizer loop

To build a multichannel synthesizer we have to add some more components (Fig. 3) but the basic function is the same. Here the VCO frequency is converted to a lower frequency  $F_c$  suitable for the digital divider.  $F_c = F_{vco} - F_{mix}$  (1). When the loop is in lock the incoming frequencies  $F_r$  and  $F_o$  are equal, but they can have a phase difference.  $F_o = F_r$  (2). The programmable divider divides frequency  $F_c$  with a number  $N$ , which can be selected by a binary code.  $F_c = N \times F_o$  (3).



Combining equations (1), (2) and (3) give

$$F_{vco} = F_{mix} + N \times F_r \quad (4).$$

By changing the division ratio  $N$  we can get a lot of VCO-frequencies with the spacing  $F_r$ , and the stability depends only on  $F_{mix}$  and  $F_r$  which can be crystal oscillators.

#### The synthesizer circuit in AP 2000 (Fig. 4)

##### Synthesizer logic (75062-3E2 25 kHz and 77201-3E2 20 kHz)

The 25 (20) kHz reference frequency is produced by dividing a 400 (320) kHz crystal oscillator (X 1 and Q 4) by 16 in the counter IC 6.

The input signal to the programmable divider is amplified in Q 1 and Q 2, while the two gates from IC 1 shape the waveform to narrow pulses. IC 2 and IC 3 from the programmable divider, where the division ratio  $N$  is the Binary number on the eight channel code lines. The numbers on the code lines correspond to the binary value of each line. In this way a division ratio  $N = 168$  will have a channel code:

Number on code line	128	64	32	16	8	4	2	1
Binary value	128	64	32	16	8	4	2	1
Code for $N = 168$	1	0	1	0	1	0	0	0

where 0 means 0 V and 1 means + 5 V.

The two cascaded counters IC 2 and IC 3 count down from 168. When the counters reach zero a borrow pulse is generated and used to preset the number 168, thus starting a new count cycle. The very narrow borrow pulses with a repetition rate of 25 (20) kHz are used as input to the frequency-phase comparator IC 4. The comparator input voltage  $V_1$  (Fig. 2) can be seen on a test point TP 1. To suppress the 25 (20) kHz ripple on the comparator output voltage Q 3 is connected as an active lowpass filter. IC 5 is for DC-amplification.

##### Voltage controlled oscillator (75082-3E2)

The transistor Q 1 is used to switch between two loop filters. When Q 1 is 'ON' the slow filter R 1, R 3 and C 2 are in function while R 1, R 2 and C 1 give the loop a fast step response for Q 1 'OFF'. The fast loop filter is only used in connection

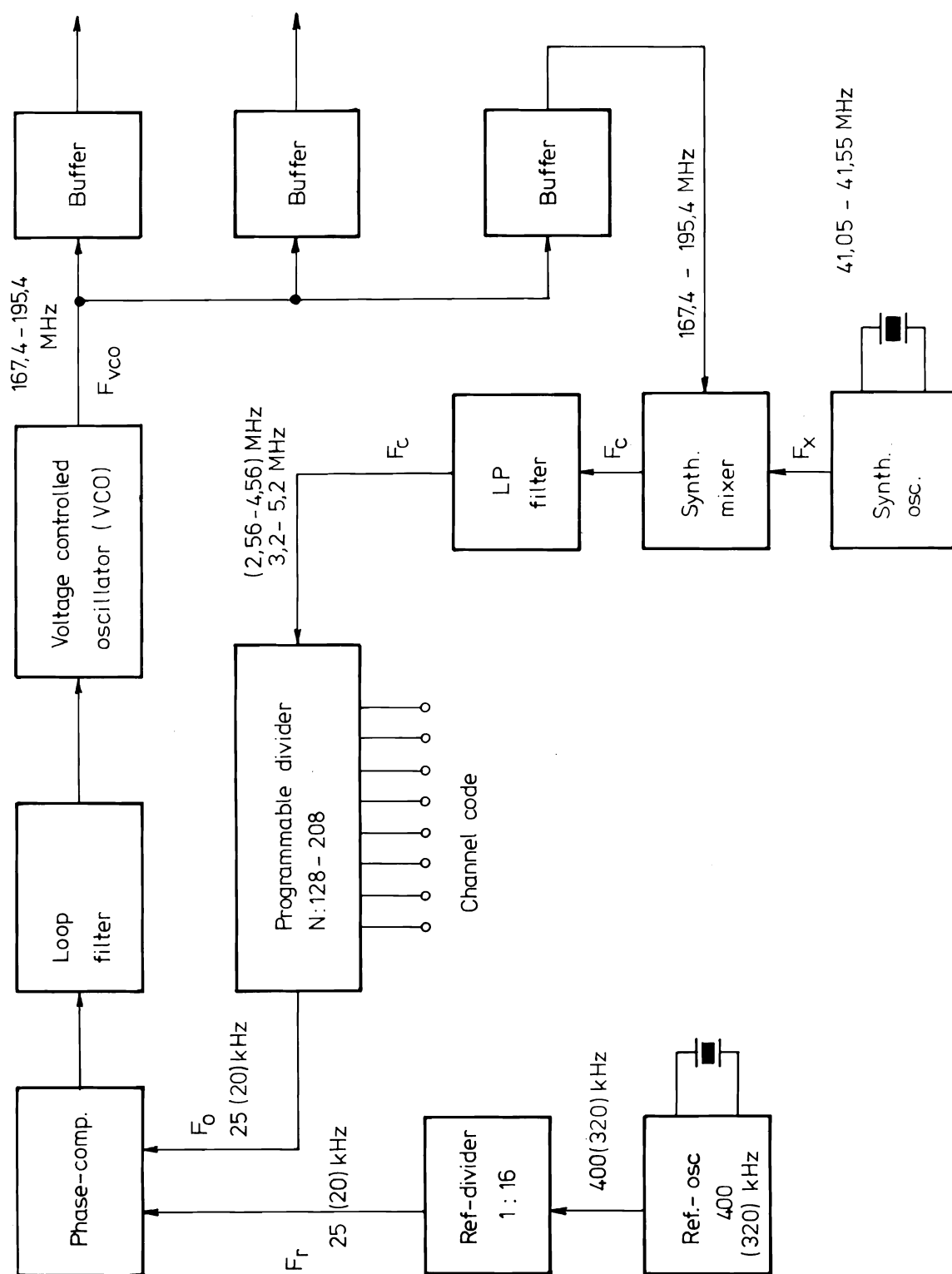


Fig. 4

Rettet:	Figure for synthesizer description	Tegn.: 30-6-78 AC	Kontr.:
		Page: 5	
		AP-RADIOTELEFON ¼	Tegn. nr.: 78082-4E2

with automatic channel scanning. Diode D 1 is used to clamp the control voltage thus preventing too great VCO frequency excursions when the loop is out of lock. The frequency of oscillator Q 2 is controlled by tuning diode D 2 while diode D 3 is for modulation. Transistors Q 3 to Q 7 make the three output buffers with ferrite core transformers L 3 to L 5.

#### Synthesizer mixer (75019-3E2)

In the synthesizer mixer Q 1 is a 40 MHz oscillator with third overtone crystal X 1. This frequency is fed via L 1 to the mixer transistor Q 2. The VCO-signal goes through the dual gate Mos-transistor buffer Q 4 which gives high backward isolation but no amplification. Reaching the base of Q 2 the VCO-signal is mixed with the fourth harmonic of the 40 MHz to give an output signal of 3,2 - 5,2 MHz. DR 1 and DR 2 are part of a 10 MHz low-pass filter connected to the amplifier stage Q 3.

#### Channel code

From the blockschematic of the synthesizer circuit (Fig. 4) we have:

$$F_{VCO} = 4 F + N \times 0,025 (0,020) \text{ MHz where } 128 \leq N \leq 208$$

The VCO frequency lies 21,4 MHz above the receiver frequency leading to:

$$\text{Receiver frequency } F_m = 4 F_x + N \cdot 0,025 (0,020) - 21,4 \text{ MHz (5).}$$

Here N is the division ratio and  $F_x$  is the synthesizer mixer crystal.

DIVISION RATIO AND CHANNEL CODE

The division ratio N corresponds to the 8 - bit channel code in this way.

Bit number	8	7	6	5	4	3	2	1
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Value of each bit	128	64	32	16	8	4	2	1
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Example: channel code = 1 1 0 0 0 0 0 1

$$N = 193 = 128 + 64 + 0 + 0 + 0 + 0 + 0 + 1$$

Logic 1 = +5 Volts.   Logic 0 = 0 Volts

Div. ratio	Channel code								
N	128	64	32	16	8	4	2	1	
128	1	0	0	0	0	0	0	0	
129	1	0	0	0	0	0	0	1	
130	1	0	0	0	0	0	1	0	
131	1	0	0	0	0	0	1	1	
132	1	0	0	0	0	1	0	0	
133	1	0	0	0	0	1	0	1	
134	1	0	0	0	0	1	1	0	
135	1	0	0	0	0	1	1	1	
136	1	0	0	0	1	0	0	0	
137	1	0	0	0	1	0	0	1	
138	1	0	0	0	1	0	1	0	
139	1	0	0	0	1	0	1	1	
140	1	0	0	0	1	1	0	0	
141	1	0	0	0	1	1	0	1	
142	1	0	0	0	1	1	1	0	
143	1	0	0	0	1	1	1	1	
144	1	0	0	1	0	0	0	0	
145	1	0	0	1	0	0	0	1	
146	1	0	0	1	0	0	1	0	
147	1	0	0	1	0	0	1	1	
148	1	0	0	1	0	1	0	0	
149	1	0	0	1	0	1	0	1	
150	1	0	0	1	0	1	1	0	
151	1	0	0	1	0	1	1	1	
152	1	0	0	1	1	0	0	0	
153	1	0	0	1	1	0	0	1	
154	1	0	0	1	1	0	1	0	
155	1	0	0	1	1	0	1	1	
156	1	0	0	1	1	1	0	0	
157	1	0	0	1	1	1	0	1	
158	1	0	0	1	1	1	1	0	
159	1	0	0	1	1	1	1	1	
160	1	0	1	0	0	0	0	0	
161	1	0	1	0	0	0	0	1	
162	1	0	1	0	0	0	1	0	
163	1	0	1	0	0	0	1	1	
164	1	0	1	0	0	1	0	0	
165	1	0	1	0	0	1	0	1	
166	1	0	1	0	0	1	1	0	
167	1	0	1	0	0	1	1	1	

Div. ratio	Channel code								
N	128	64	32	16	8	4	2	1	
168	1	0	1	0	1	0	0	0	
169	1	0	1	0	1	0	0	1	
170	1	0	1	0	1	0	1	0	
171	1	0	1	0	1	0	1	1	
172	1	0	1	0	1	1	0	0	
173	1	0	1	0	1	1	0	1	
174	1	0	1	0	1	1	1	0	
175	1	0	1	0	1	1	1	1	
176	1	0	1	1	0	0	0	0	
177	1	0	1	1	0	0	0	1	
178	1	0	1	1	0	0	1	0	
179	1	0	1	1	0	0	1	1	
180	1	0	1	1	0	1	0	0	
181	1	0	1	1	0	1	0	1	
182	1	0	1	1	0	1	1	0	
183	1	0	1	1	0	1	1	1	
184	1	0	1	1	1	0	0	0	
185	1	0	1	1	1	0	0	1	
186	1	0	1	1	1	0	1	0	
187	1	0	1	1	1	0	1	1	
188	1	0	1	1	1	1	0	0	
189	1	0	1	1	1	1	0	1	
190	1	0	1	1	1	1	1	0	
191	1	0	1	1	1	1	1	1	
192	1	1	0	0	0	0	0	0	
193	1	1	0	0	0	0	0	1	
194	1	1	0	0	0	0	1	0	
195	1	1	0	0	0	0	1	1	
196	1	1	0	0	0	1	0	0	
197	1	1	0	0	0	1	0	1	
198	1	1	0	0	0	1	1	0	
199	1	1	0	0	0	1	1	1	
200	1	1	0	0	1	0	0	0	
201	1	1	0	0	1	0	0	1	
202	1	1	0	0	1	0	1	0	
203	1	1	0	0	1	0	1	1	
204	1	1	0	0	1	1	0	0	
205	1	1	0	0	1	1	0	1	
206	1	1	0	0	1	1	1	0	
207	1	1	0	0	1	1	1	1	
208	1	1	0	1	0	0	0	0	

## Tuning instructions for AP 2000 2 m

### 1. Tuning of the synthesizer circuit

#### A. Synthesizer oscillator

Connect a high input resistance DC-voltmeter to TP 1 on print board B 11. By tuning coil L 1 to max. a reading of approx. 3 V should be obtained. The coil L 2 is later used for frequency adjustment.

#### B. Phase locked loop

If the set contains more than one channel, turn the channel selector to a channel with frequency in the middle of the used band. Check the channel code with a voltmeter on points 1, 2 .....64, 128 on print board B 17. Computation of the channel code is contained in the technical description of the synthesizer circuit. Note that there are two types of VCO, one for the range 146 - 160 MHz and the other for Rx-frequencies 160 - 174 MHz, and check that the right type is used for the desired frequency range. The marking is noted on the VCO-diagram. Connect the voltmeter to point 1 on the VCO print board and an oscilloscope (sensitivity 1 V/div.) to test point TP 1 on the logic print (print board B 17). Adjust the VCO trimmer until the loop goes in lock. The loop is in lock when a stable 25 (20) kHz ripple sawtooth is appearing on the scope, and the voltage on the voltmeter increases while turning the VCO trimmer clockwise. Adjust the VCO so that the loop voltage is 3 V. This loop voltage corresponds to min. 25 (20) kHz ripple on TP 1. For multichannel sets, turn the channel selector to the lowest and highest frequency and check that the loop still goes in lock. Considering a set with the max. possible bandwidth 2 MHz, the loop voltage shall lie between 2 and 4 V going from the lowest channel to the highest in such a manner that increasing voltage corresponds to increasing frequency.

C. Rx-frequency

Select the mid-frequency channel and connect a 200 MHz counter to the VCO-output point 5 . The reading will be Rx-frequency + 21,4 MHz and for fine tuning of the Rx-frequency, use coil L 2 on synthesizer mixer print board B 11.

2. Tuning of the receiver

A. 21,4 MHz and 455 kHz IF (print board B 01)

Connect a 21,4 MHz sweep generator (a 10,7 MHz sweep generator normally contains sufficient second harmonics to be used on 21,4 MHz) to point TP 1 on the RF and mixer print board B 08 and the (DC) probe on point TP 1 on the IF print board B 01. Adjust L 6 (print B 08) and L 1 (print B 01) for minimum ripple. L2 is tuned to max. amplitude while L 3 is tuned to best possible symmetry. Use the lowest possible input level to prevent limiting in the second mixer. Connect the probe to the AF output from the detector (a suitable point is pin 1 on the amplifier print B 09) and adjust L 4 in the IF to max. discriminator slope and the best linearity.

B. RF amplifier and mixer (print board B 08)

With the voltmeter on TP 2 (print board B 08) C 17 and C 18 are adjusted to max. deflection (approx. 1 V DC). With the signal generator connected to the receiver input C 2, C 3, C 6, C 9 and C 10 are now tuned to give optimum sensitivity.

C. AF-amplifier, squelch and key circuit (print board B 09)

Adjust the output level for the handset earpiece to 60 mV with potmeter R 31. (3,5 kHz dev., 1 kHz modulation).

D. Alternative method for tuning of Rx front IF without a sweep generator

Adjust C 17 and C 18 as desired under 'B'. Connect the RF-signal generator output to TP 1 in the RF-amplifier and use the horizontal deflection voltage from an oscilloscope for modulation (FM) of the generator.

Now the IF can be tuned as previously described. By connecting the signal generator output to the aerial input, all the capacitors in the RF-amplifier and mixer can be tuned to max. deflection with the probe on TP 1 in the IF amplifier.

### 3. Tuning of the transmitter

#### A. Transmitter mixer and amplifier (print board B 07)

The transmitter shall be keyed. The oscillator injection to the transmitter mixer is tuned with L 1 (print B 07) to max. DC-voltage on TP 1. Turn the capacitors C 2, C 6, C 11, C 13 and C 18 to max. capacitance. Connect the voltmeter to the can of transistor Q 2 (can is connected to emitter) and tune C 2 and C 6 to max. reading. Remove the cable from the transmitter-amplifier output (pin 4) and replace it with a wattmeter (50 ohms, range 1 W). Now tune C 11, C 13 and C 18 and readjust C 2 and C 6 to get max. output power (approx. 150 mW). When  $x\text{-tal} = 10,7$  MHz, C 24 is removed. When  $x\text{-tal} > 10,7$  MHz, C 22 is removed. When  $x\text{-tal} < 10,7$  MHz, both capacitors are used.

#### B. 6 W PA-stage (print board B 06)

Turn the potmeter R 1 (print board B 57) counter-clockwise to get the output power stabilization out of function. Connect a wattmeter (50 ohm, 10 or 50 W) to the test installation output and set the supply voltage to 12,0 V. Now tune all the trimmers in the PA-stage to max. output power and finish with a fine adjustment of C 18 on the transmitter amplifier print B 07. Increase the supply voltage to 13,2 V and turn the potmeter R 1 clockwise until the output power is decreased to the desired value.

#### C. 10-25 W PA-stage (print board B 79)

Turn the potmeter R 1 (print board B 57) counterclockwise to get the power stabilization out of function. Now connect a RF-wattmeter (50 ohm - 50 W) to the transmitter output, and set the supply voltage to 12,0 V.

Now tune all the trimmers in the PA-stage to max. output power and finish with a fine adjustment of C 18 on the transmitter amplifier print board B 07. Then turn the potmeter R 1 clockwise until the output power is decreased to the desired value.

D. 10-25 W external power cassette (print board B 02)

First of all the 6 W PA-stage in the radio unit must be tuned according to the above procedure. Then push the radio unit into the power cassette. Connect a RF-wattmeter to the transmitter output and adjust C 1, C 2, C 5 and C 6 to max. output with a supply voltage of 12,0 V. Be certain that the regulation circuit is out of function. Then increase the supply voltage to 13,2 V and adjust R 2 to the desired output power level. For a 25 W set the power level might drop for supply voltages below 13,2 V, but above it should be held constant on 25 W.

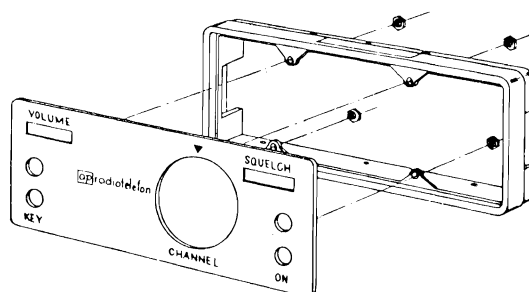
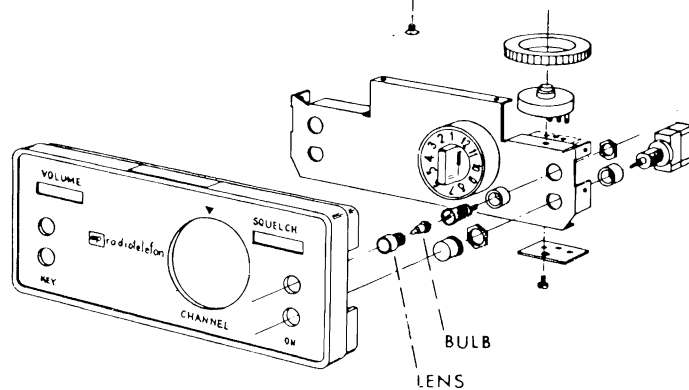
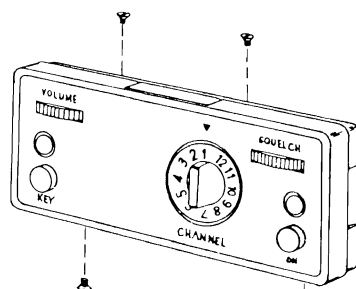
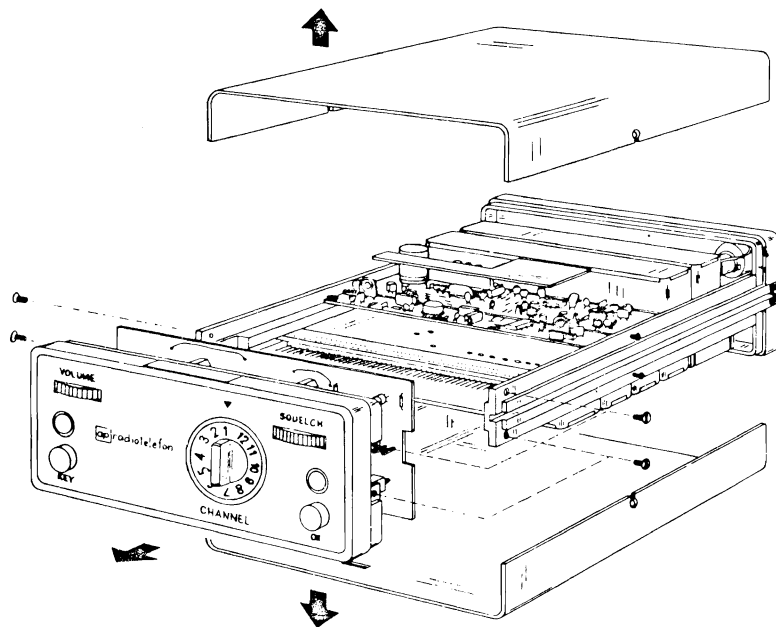
E. Transmitter frequency

Connect a frequency counter to a wattmeter with attenuated output and adjust the transmitter frequency with the capacitor C 29 in the Tx-oscillator (print board B11).

F. Modulation amplifier (print board B 10)

Connect a modulation meter to the transmitter and a tone generator to the microphone input 1. The generator must have a low output impedance. Turn the 3 potentiometers to centre position and set the generator to 1000 Hz. With an input level of 20 mV, potmeter R 27 is adjusted to give  $\pm 5$  kHz deviation on the modulation meter. Decrease the input level to 2 mV and adjust potmeter R 3 to a deviation of  $\pm 3$  kHz. Repeat the procedure to check and fine adjust R 27 and R 3 if necessary. IF the station is equipped with a handset, R 27 is adjusted to  $\pm 5$  kHz with an input level (1000 Hz) of 4 V. When the level is decreased to 400 mV R 28 is set to give a deviation of  $\pm 3$  kHz.





Rettet: 29-11-76 H.J.

Disassembling of AP 2000

AP-RADIOTELEFON 1/2

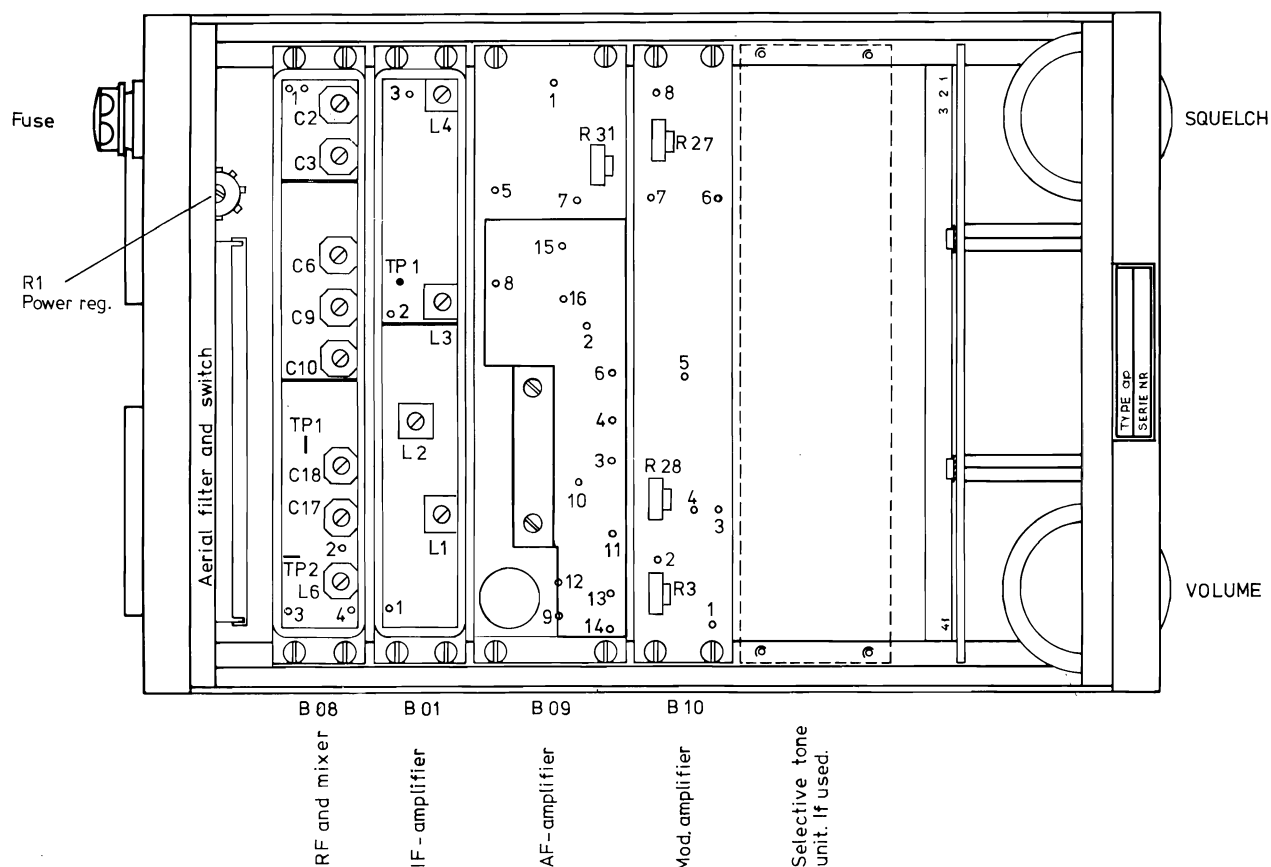
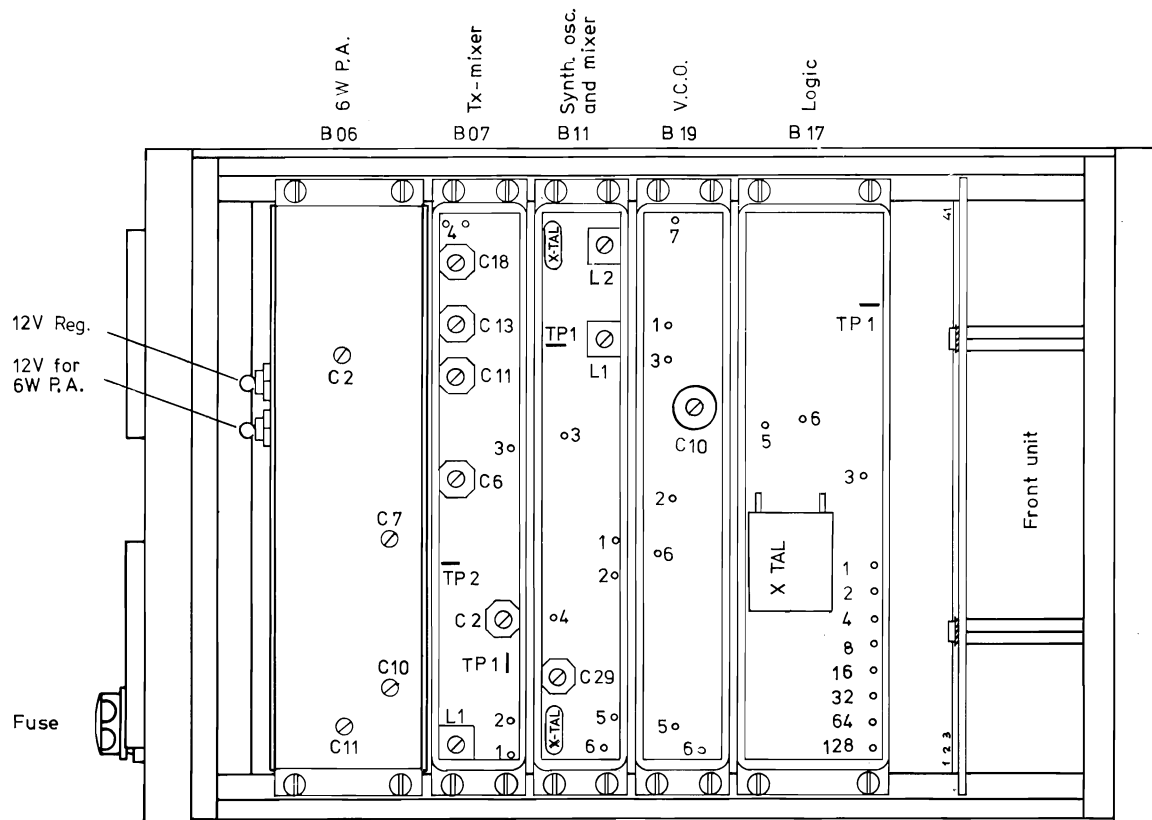
Tegn.: 10-8-76  
AC

Kontr.:

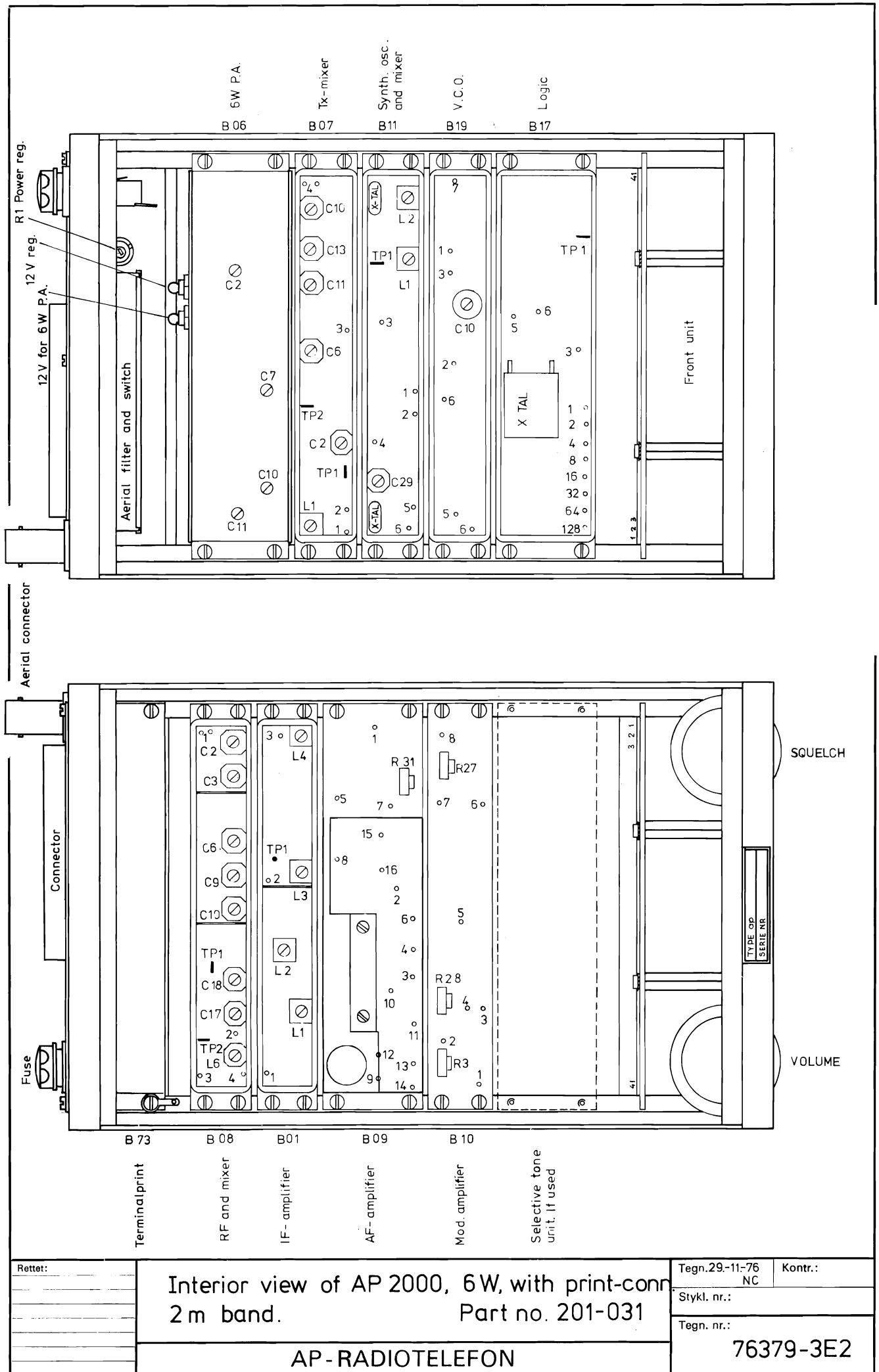
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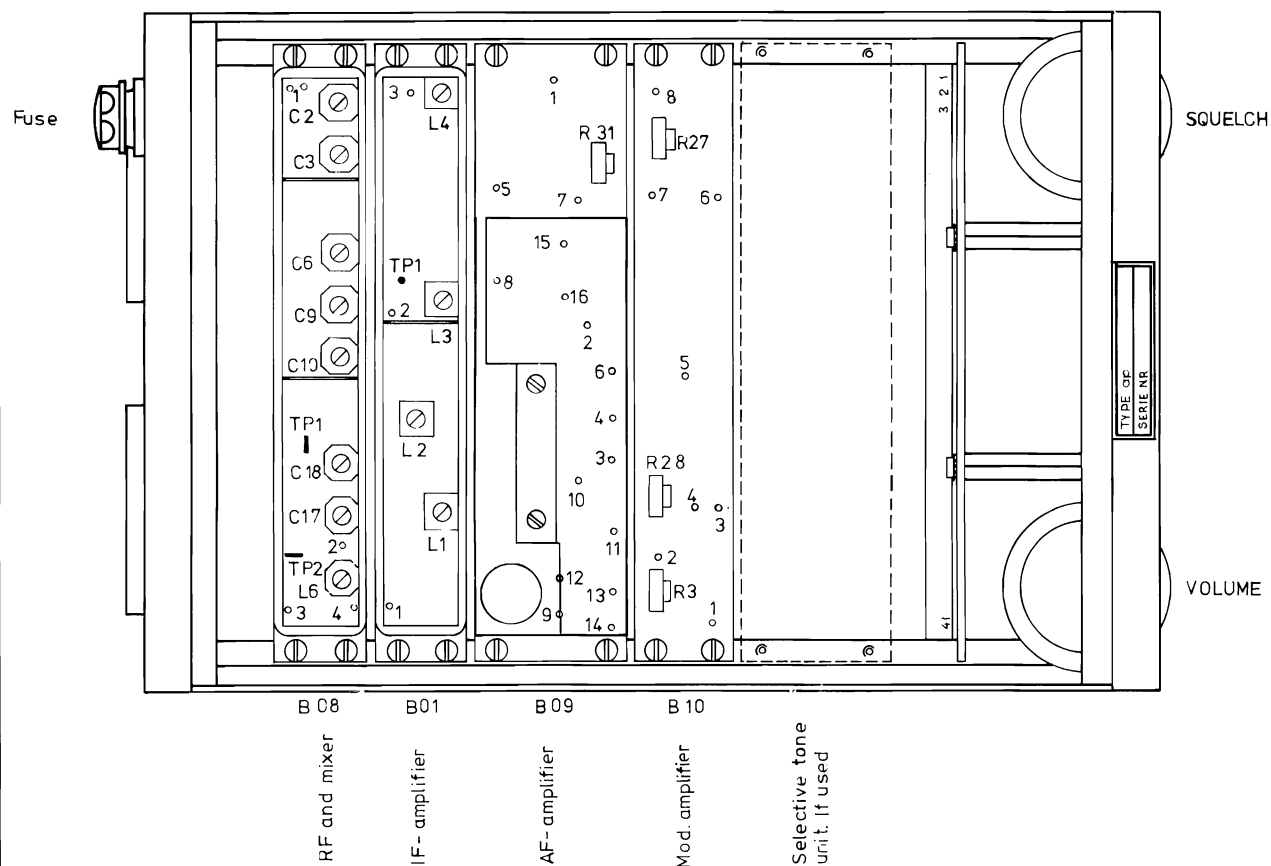
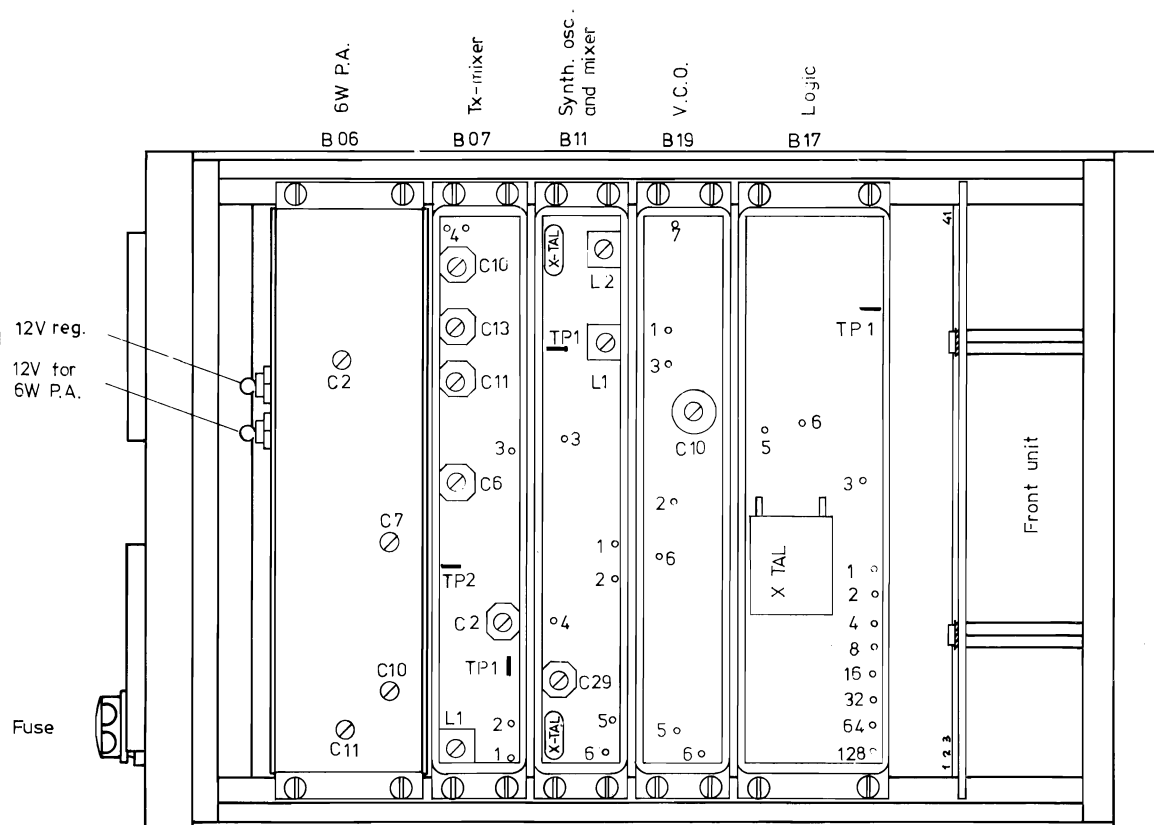
Tegn. nr.:

76218 - 4M2



Rottot:	Interior view of AP 2000, 6W, 2m band Part no. 201-028		Tegn.: 8.-8.-75 NC	Kontr.: LT
			Stykl. nr.:	
	AP-RADIOTELEFON		Tegn. nr.:	75389-3E2





Rettet: 3-7-78 JS/AC

Interior view of AP2000, 10-25W Cont.  
band (PA-stage not shown) 2m, Part no. 201-025

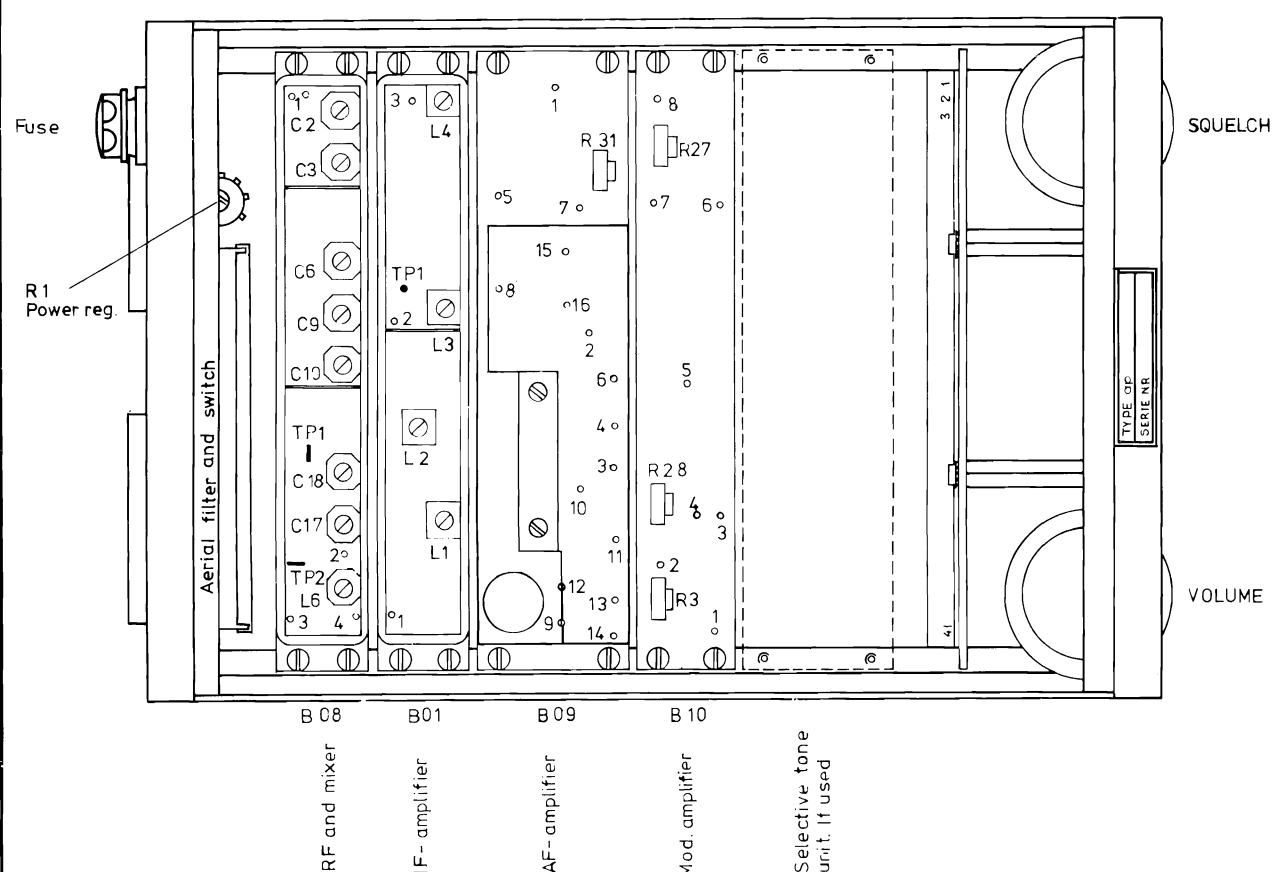
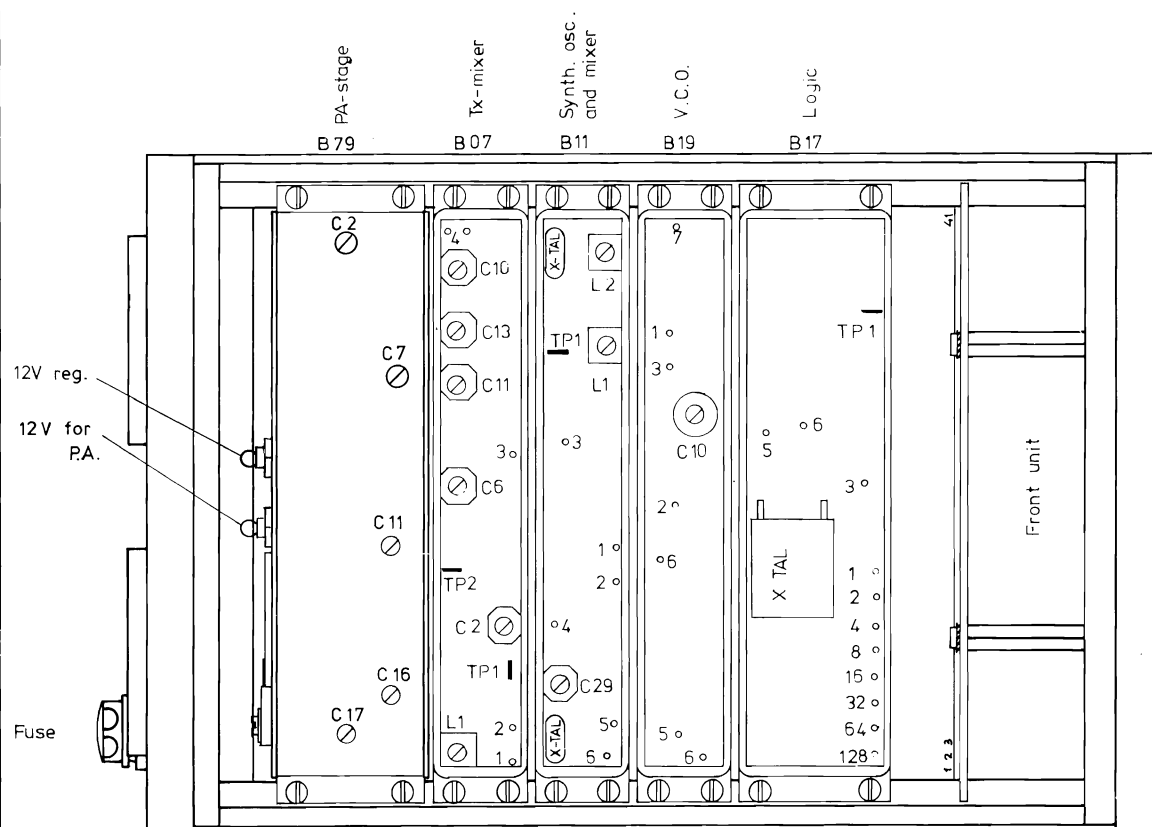
AP-RADIOTELEFON

Tegn.: 21-8-75 EH Kontr.:

Stykl. nr.:

Tegn. nr.:

75390-3E2



Retter: 3-7-78 JS/AC

Interior view of AP2000, 10-25 W intermitt.  
2m band

Part no. 201-036

AP-RADIOTELEFON

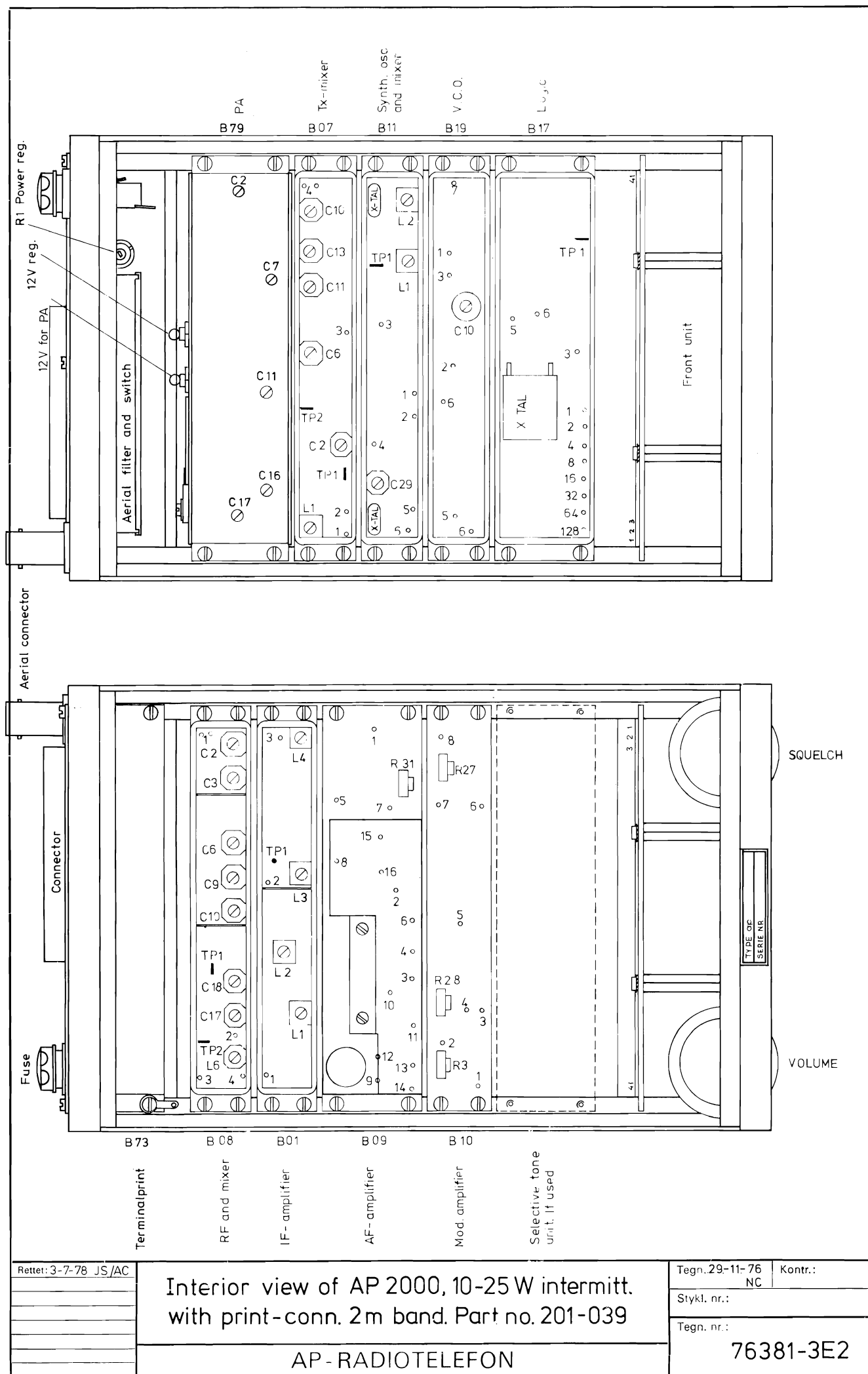
Tegn. 19-11-76 Kontr.: NC

Stykl. nr.:

Tegn. nr.:

76358-3E2

LT



Rettet: 3-7-78 JS/AC

Interior view of AP 2000, 10-25 W intermitt.  
with print-conn. 2m band. Part no. 201-039

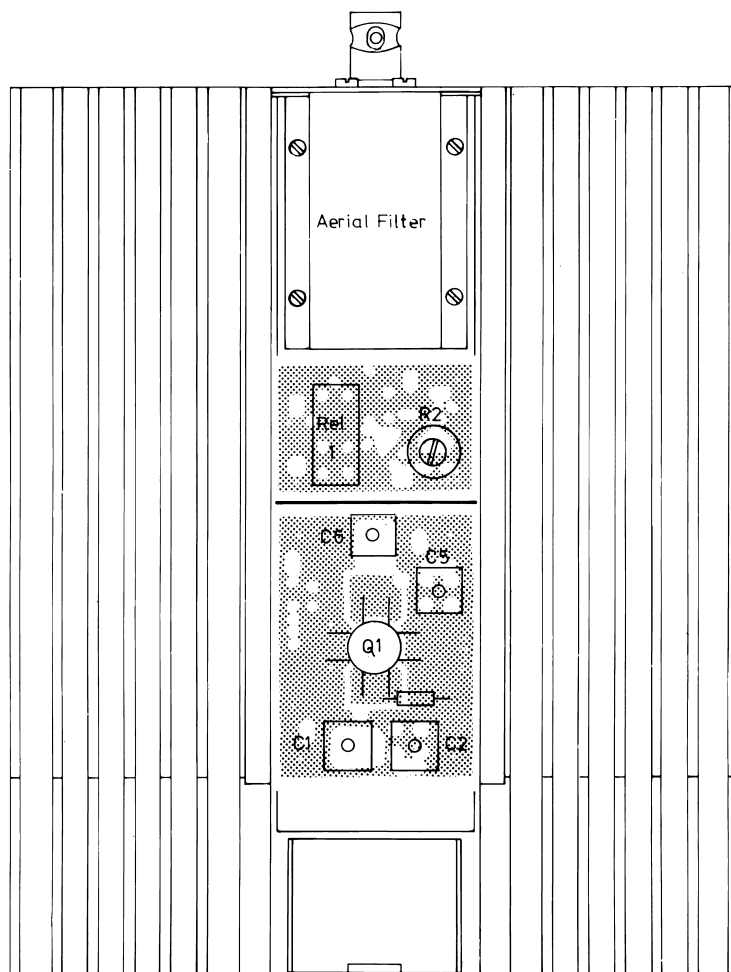
AP - RADIOTELEFON

Tegn. 29-11-76 NC Kontr.:

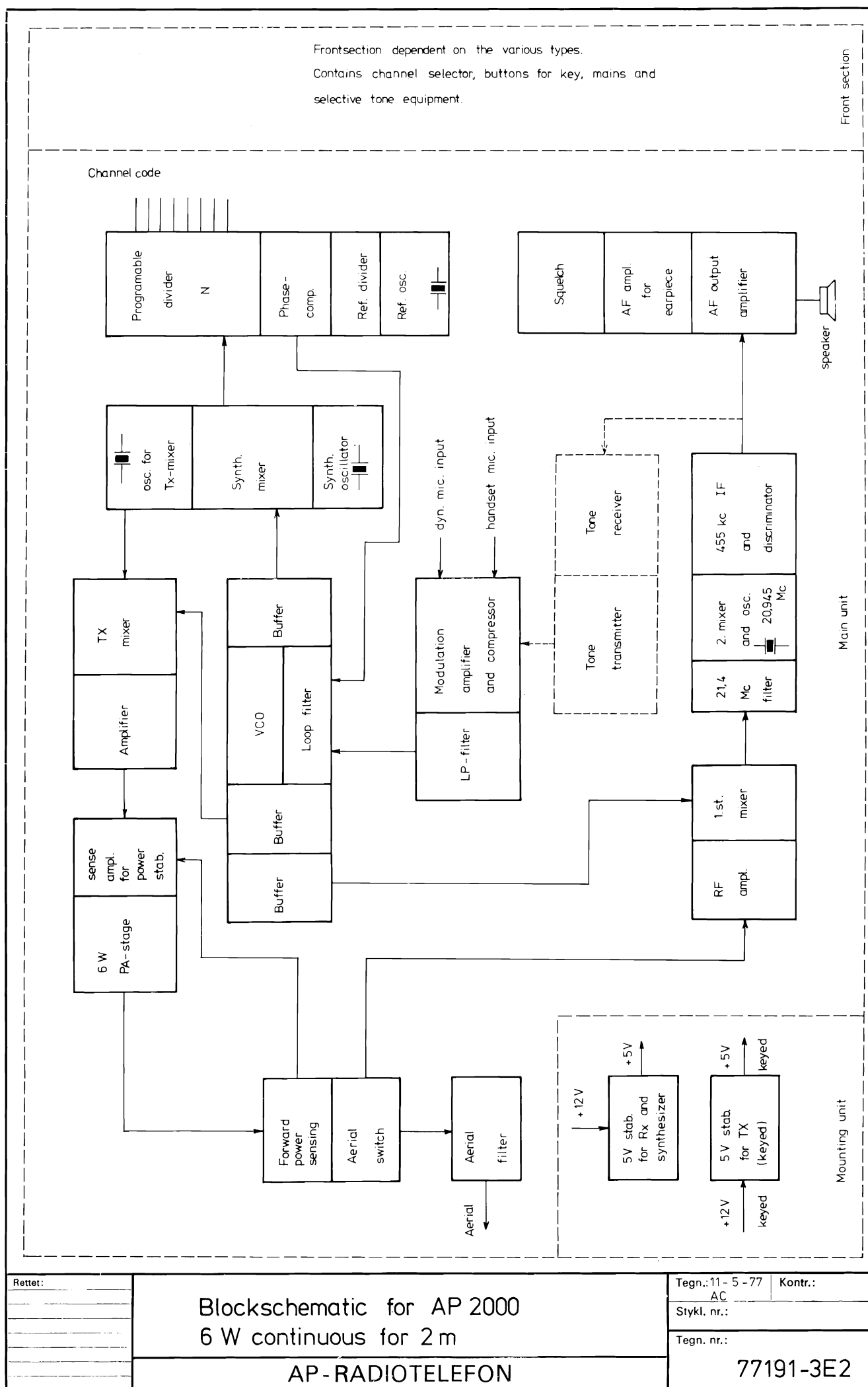
Stykt. nr.:

Tegn. nr.:

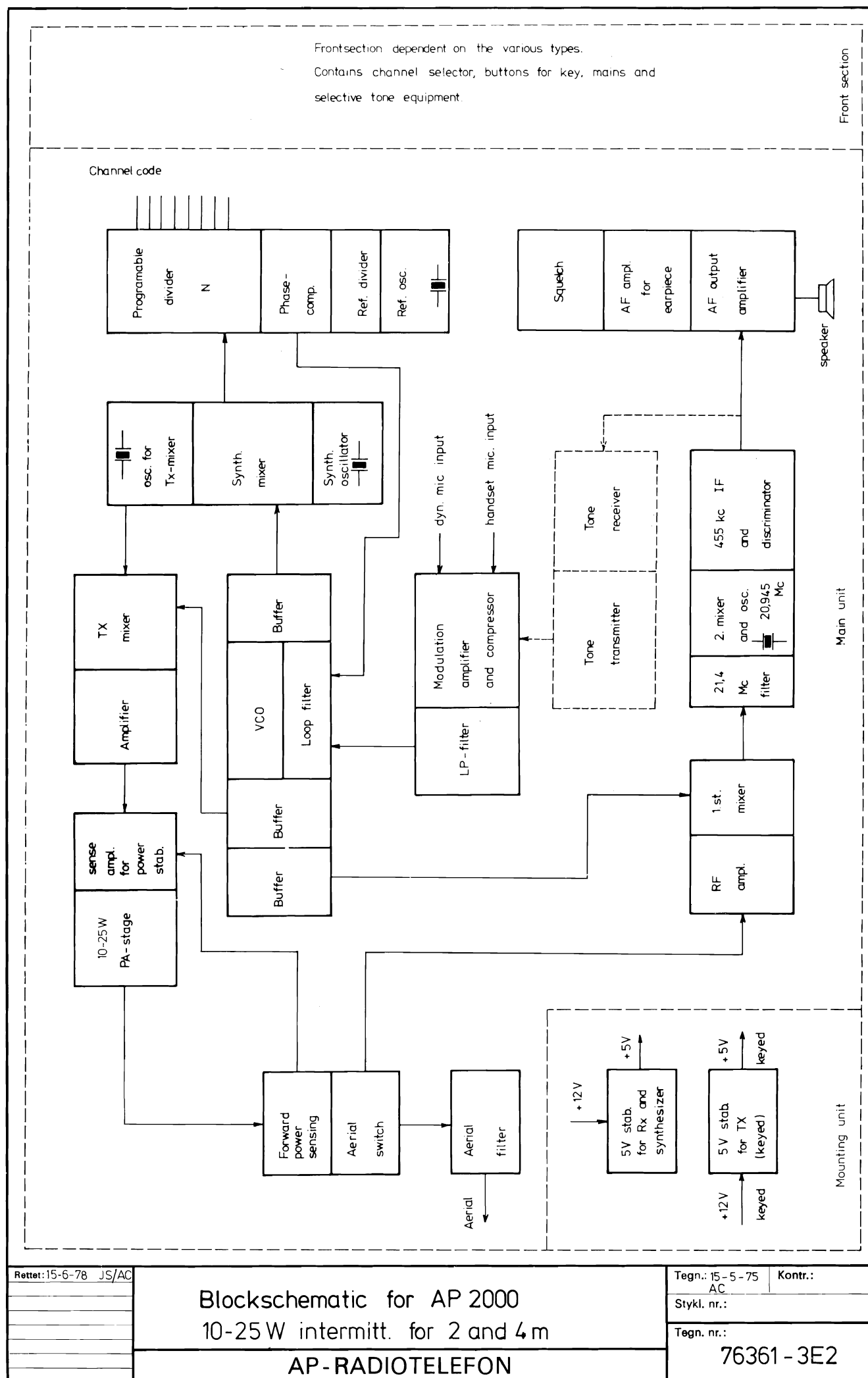
76381-3E2



Retter:	Interior view of 2m band Ext. PA-stage	Tegn.: 28-6-78 AMC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON	Tegn. nr.:	
		78083-3E2	









# Synth. mixer x-tal $F_x$

## SPECIFICATION

for Quartz Crystal Unit

AP 20

1. Mode of operation : 3rd overtone
2. Holder : HC-42/U
3. Frequency range : 40-48 MHz
4. Adjustment tolerance :  $\pm 10$  ppm at 25°C
5. Temperature tolerance :  $\pm 10$  ppm % 20°C to + 70°C
6. Drive level : 1 mW
7. Load : 0,5  $\mu$ H
8. Shunt capacitance ( $C_o$ ) : 5 pF max.
9. Equivalent series resistance : 40  $\Omega$  max.
10. Marking : AP 20 frequency in MHz

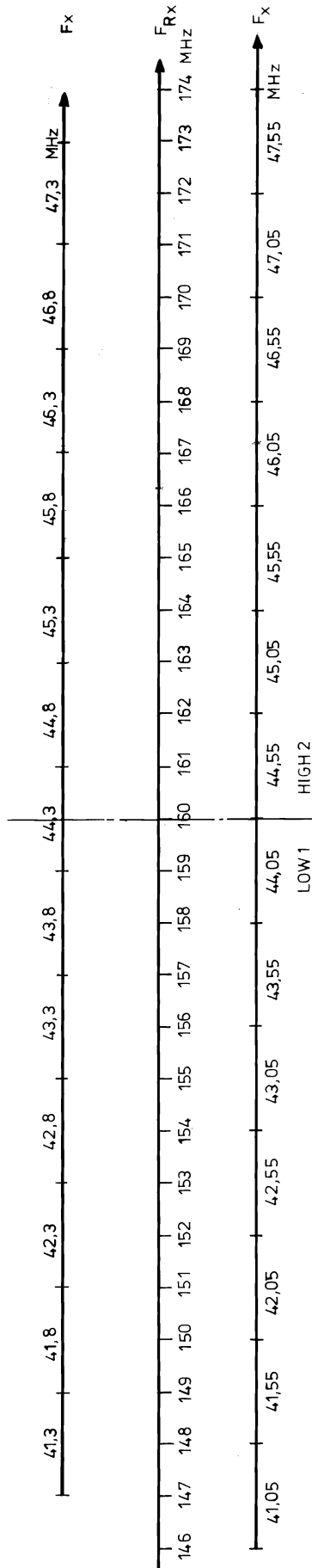
Calculation of the division ratio N

$$N = \frac{F_{Rx} - 4 F_x + 21,4}{0,025}$$

Example:

$$F_x = 42,05 \text{ MHz, } F_{Rx} = 151,625 \text{ MHz}$$

$$N = \frac{(151,625 - 4 \times 42,05 + 21,4)}{0,025} = 193$$



## SPECIFICATION

for Quartz Crystal Unit

AP 22

## Transmitter mixer oscillator

1. Mode of operation : AT-Fundamental
2. Holder : HC-42/U
3. Frequency range : 10-22 MHz
4. Resonance : Parallel (30 pF)
5. Calibration tolerance :  $\pm 15$  ppm at 25°C
6. Temperature tolerance :  $\pm 10$  ppm % 20°C to + 70°C
7. Drive level : 1 mW
8. Equivalent serie resistance : Max. 40  $\Omega$
9. Marking : AP 22 frequency in MHz

Calculation of the crystal frequency for the transmitter mixer oscillator

$$F_{Tx \text{ mix}} = \frac{10,7 + F_{Rx} - F_{Tx}}{2} \text{ Spec. AP 22}$$

Normal mode of operation:  $F_{Rx}$  higher than or equal to  $F_{Tx}$ . However  $F_{Rx}$  can be lower than  $F_{Tx}$  if  $F_{Tx} - F_{Rx}$  is less than 5 MHz.

Rettet:

14-2-77 NC

Standard crystals for AP 2000 2m band  
low range: 1, high: 2  
For channel frequencies ending with  
00, 25, 50, 75 . . . . . kHz

AP-RADIOTELEFON ½

Tegn.: 16-5-75  
AC

Kontr.:

Stykl. nr.:

Tegn. nr.:

75237-4E2

# Synth. mixer x-tal Fx

## SPECIFICATION for Quartz Crystal Unit

AP 20

1. Mode of operation : 3rd overtone
2. Holder : HC-42/U
3. Frequency range : 40-48 MHz
4. Adjustment tolerance :  $\pm 10$  ppm at 25°C
5. Temperature tolerance :  $\pm 10$  ppm  $\times 20^\circ\text{C}$  to  $+70^\circ\text{C}$
6. Drive level : 1 mW
7. Load : 0,5  $\mu\text{H}$
8. Shunt capacitance ( $C_0$ ) : 5 pF max.
9. Equivalent series resistance : 40  $\Omega$  max.
10. Marking : AP 20 frequency in MHz

Calculation of the division ratio N

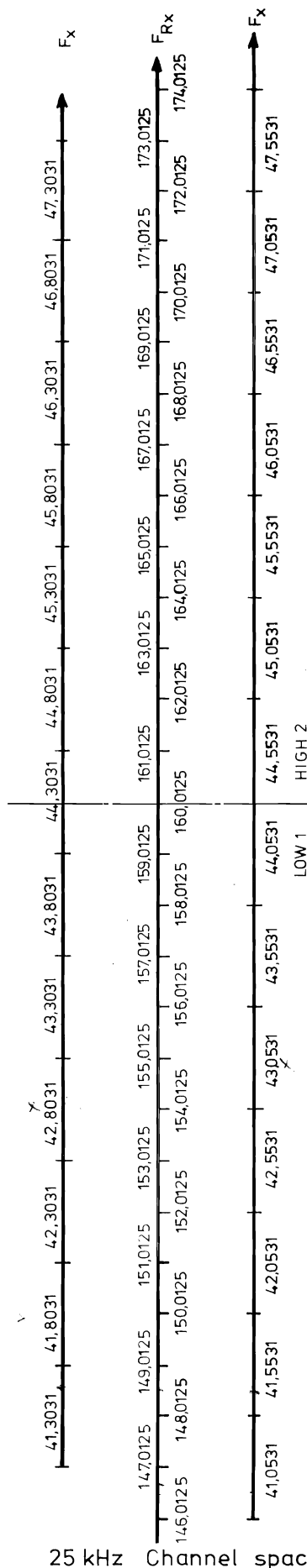
$$N = \frac{F_{Rx} - 4 F_x + 21,4}{0,025}$$

Example:

$$F_x = 42,0531 \text{ MHz}, F_{Rx} = 151,6375$$

$$N = \frac{(151,6375 - 4 \times 42,0531 + 21,4)}{0,025} = 193,004$$

$$N = 193$$



## Transmitter mixer osc.

## SPECIFICATION for Quartz Crystal Unit

AP 22

1. Mode of operation : AT-Fundamental
2. Holder : HC-42/U
3. Frequency range : 10-22 MHz
4. Resonance : Parallel (30 pF)
5. Calibration tolerance :  $\pm 15$  ppm at 25°C
6. Temperature tolerance :  $\pm 10$  ppm  $\times 20^\circ\text{C}$  to  $+70^\circ\text{C}$
7. Drive level : 1 mW
8. Equivalent series resistance : Max. 40  $\Omega$
9. Marking : AP 22 frequency in MHz

Calculation of the crystal frequency for the transmitter mixer oscillator

$$F_{Tx \text{ mix}} = 10,7 + \frac{F_{Rx} - F_{Tx}}{2} \quad \text{Spec. AP 22}$$

Normal mode of operation:  $F_{Rx}$  higher than or equal to  $F_{Tx}$  however  $F_{Rx}$  can be lower than  $F_{Tx}$  if  $F_{Tx} - F_{Rx}$  is less than 5 MHz.

Rettet:

14-2-77 NC

Standard crystals for AP 2000 2m band  
low range: 1, high: 2  
For channel frequencies ending with  
12,5, 37,5, 62,5, 87,5 ..... kHz

AP-RADIOTELEFON  $\frac{\%}{\%}$

Tegn.: 31-1-77  
AC

Kontr.:

Stykl. nr.:

Tegn. nr.:

77078 - 4E2

# Synth. mixer x-tal $F_x$

## SPECIFICATION

### for Quartz Crystal Unit

#### AP 20

1. Mode of operation : 3rd overtone
2. Holder : HC-42/U
3. Frequency range : 40-48 MHz
4. Adjustment tolerance :  $\pm 10$  ppm at 25°C
5. Temperature tolerance :  $\pm 10$  ppm  $\%$  20°C to + 70°C
6. Drive level : 1 mW
7. Load : 0,5  $\mu$ H
8. Shunt capacitance ( $C_0$ ) : 5 pF max.
9. Equivalent series resistance : 40  $\Omega$  max.
10. Marking : AP 20 frequency in MHz

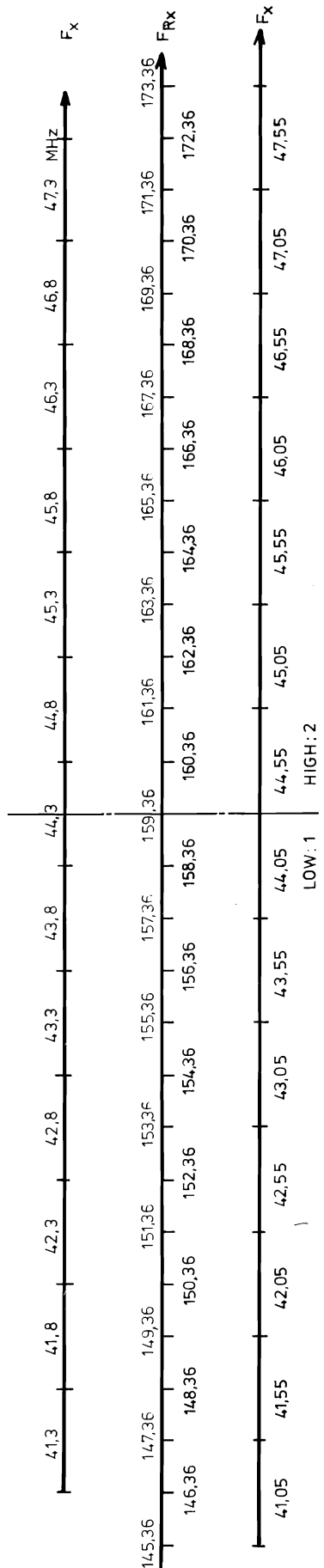
Calculation of the division ratio N

$$N = \frac{F_{Rx} - 4 F_x + 21,4}{0,02}$$

Example:

$$F_x = 42,05 \text{ MHz}, F_{Rx} = 150,660 \text{ MHz}$$

$$N = \frac{(150,66 - 4 \times 42,05 + 21,4)}{0,02} = 193$$



20 kHz Channel spacing

## Transmitter mixer osc.

## SPECIFICATION

### for Quartz Crystal Unit

#### AP 22

1. Mode of operation : AT-Fundamental
2. Holder : HC-42/U
3. Frequency range : 10-22 MHz
4. Resonance : Parallel (30 pF)
5. Calibration tolerance :  $\pm 15$  ppm at 25°C
6. Temperature tolerance :  $\pm 10$  ppm  $\%$  20°C to + 70°C
7. Drive level : 1 mW
8. Equivalent serie resistance : Max. 40  $\Omega$
9. Marking : AP 22 frequency in MHz

Calculation of the crystal frequency for the transmitter mixer oscillator

$$F_{Tx \text{ mix}} = 10,7 + \frac{F_{Rx} - F_{Tx}}{2} \text{ Spec. AP 22}$$

Normal mode of operation:  $F_{Rx}$  higher than or equal to  $F_{Tx}$  however  $F_{Rx}$  can be lower than  $F_{Tx}$  if  $F_{Tx} - F_{Rx}$  is less than 5 MHz.

Rettet:

14-2-77 NC

Standard crystals for AP2000 2m band  
low range: 1, high:2  
For channel frequencies ending with  
00,20,40,60,80..... kHz

AP-RADIOTELEFON  $\frac{1}{2}$

Tegn.: 31-1-77  
AC

Kontr.:

Stykl. nr.:

Tegn. nr.:

77077-4E2

Kottet:

Standard crystals for AP2000 2m band low range : 1, high : 2 For channel frequencies ending with 10,30,50,70,90 ..... kHz	
<b>AP-RADIOTELEFON</b> ¼	

Tegn.: 23-5-77 HJ	Kontr.:
Stykl. nr.:	
Tegn. nr.: 77193-4E2	

# Synth.mixer x-tal Fx

## SPECIFICATION for Quartz Crystal Unit AP 20

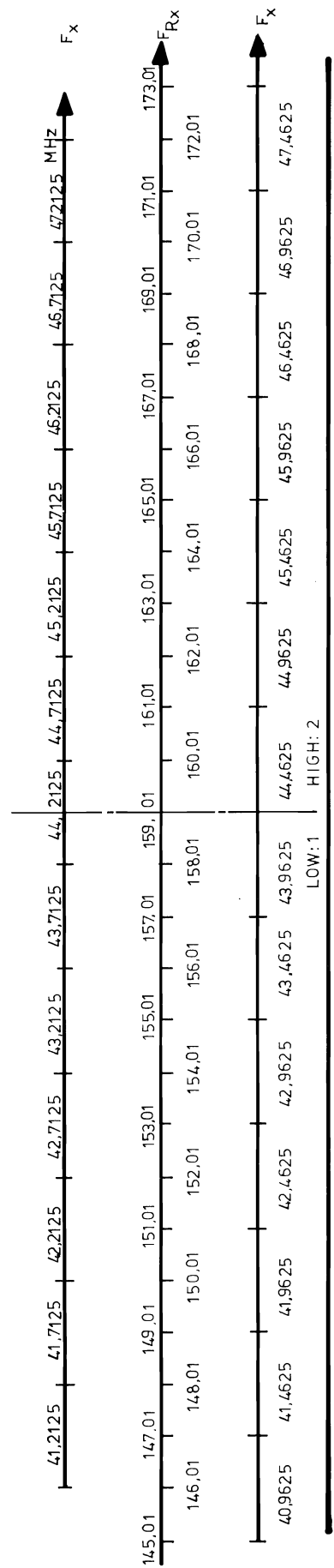
1. Mode of operation : 3rd overtone
2. Holder : HC-42/U
3. Frequency range : 40-48 MHz
4. Adjustment tolerance : ± 10 ppm at 25°C
5. Temperature tolerance : ± 10 ppm % 20°C to + 70°C
6. Drive level : 1 mW
7. Load : 0,5 µH
8. Shunt capacitance (C<sub>0</sub>) : 5 pF max.
9. Equivalent series resistance : 40 Ω max.
10. Marking : AP 20 frequency in MHz

Calculation of the division ratio N

$$N = \frac{F_{Rx} - 4 F_x + 21,4}{0,02}$$

Example:

$$F_x = 42,05 \text{ MHz}, F_{Rx} = 150,660 \text{ MHz}$$

$$N = \frac{(150,66 - 4 \times 42,05 + 21,4)}{0,02} = 193$$


## Transmitter mixer osc.

## SPECIFICATION for Quartz Crystal Unit AP 22

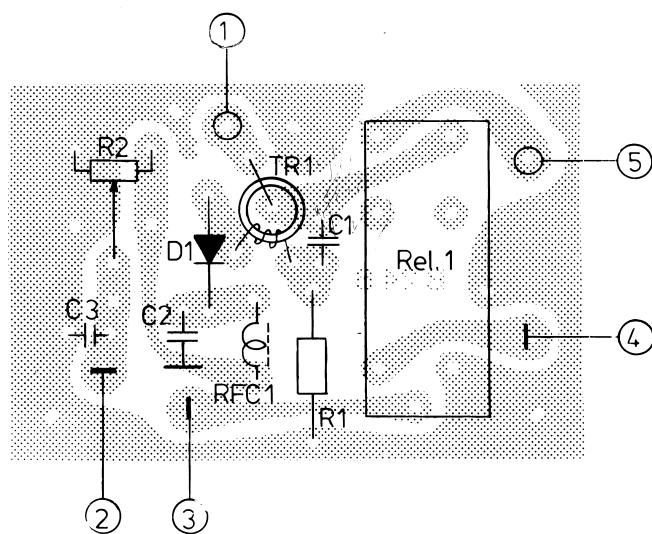
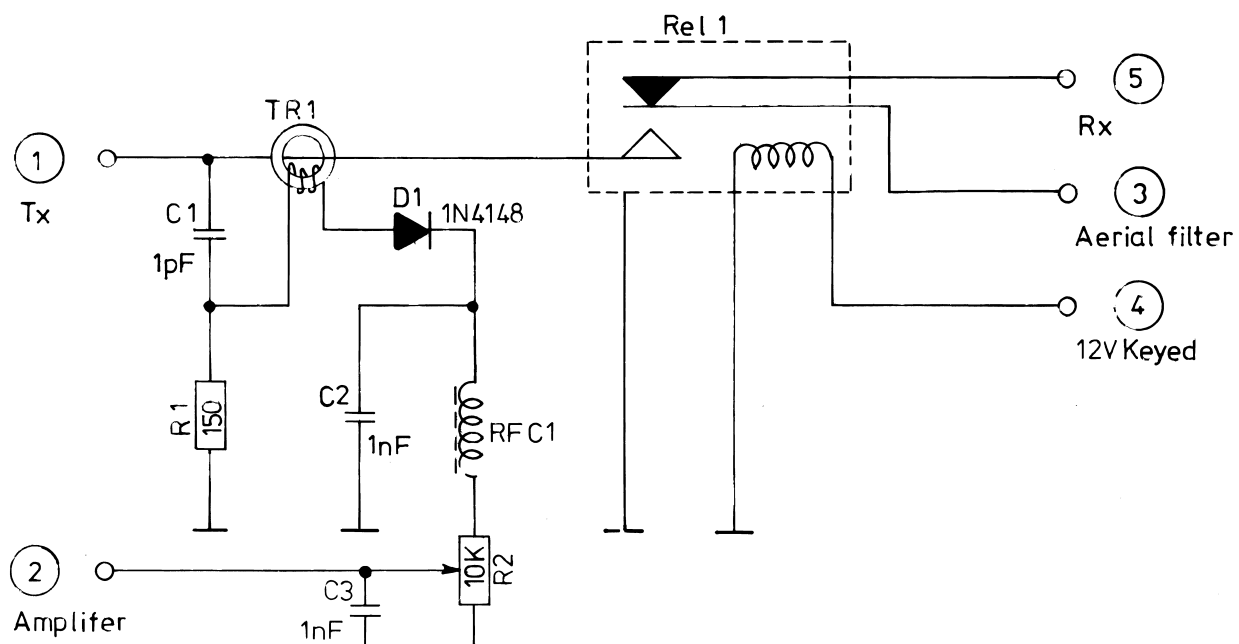
1. Mode of operation : AT-Fundamental
2. Holder : HC-42/U
3. Frequency range : 10-22 MHz
4. Resonance : Parallel (30 pF)
5. Calibration tolerance : ± 15 ppm at 25°C
6. Temperature tolerance : ± 10 ppm % 20°C to + 70°C
7. Drive level : 1 mW
8. Equivalent series resistance : Max. 40 Ω
9. Marking : AP 22 frequency in MHz

Calculation of the crystal frequency for the transmitter mixer oscillator

$$F_{Tx \text{ mix}} = 10,7 + \frac{F_{Rx} - F_{Tx}}{2}$$

Spec. AP 22

Normal mode of operation: F<sub>Rx</sub> higher than or equal to F<sub>Tx</sub> however F<sub>Rx</sub> can be lower than F<sub>Tx</sub> if F<sub>Tx</sub> - F<sub>Rx</sub> is less than 5 MHz.



B 24 C2 relay RS-12V

B 24 C3 without relay

B 24 C5 relay RS- 6V

Rettet:  
23-2-78 AMC/IM

Aerial switch for 2m, external PA  
Print board B 24C 2,3 and 5

**AP-RADIOTELEFON**  $\frac{1}{5}$

Tegn.: 1-7-75  
EH.

Kontr.:

Stykl. nr.:

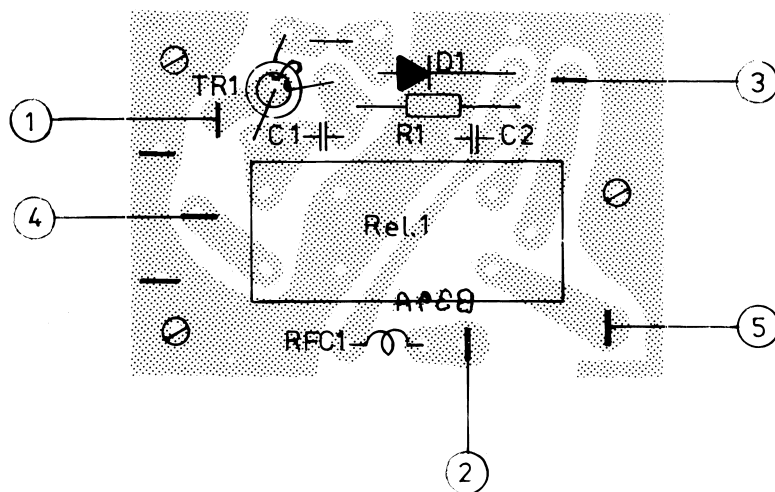
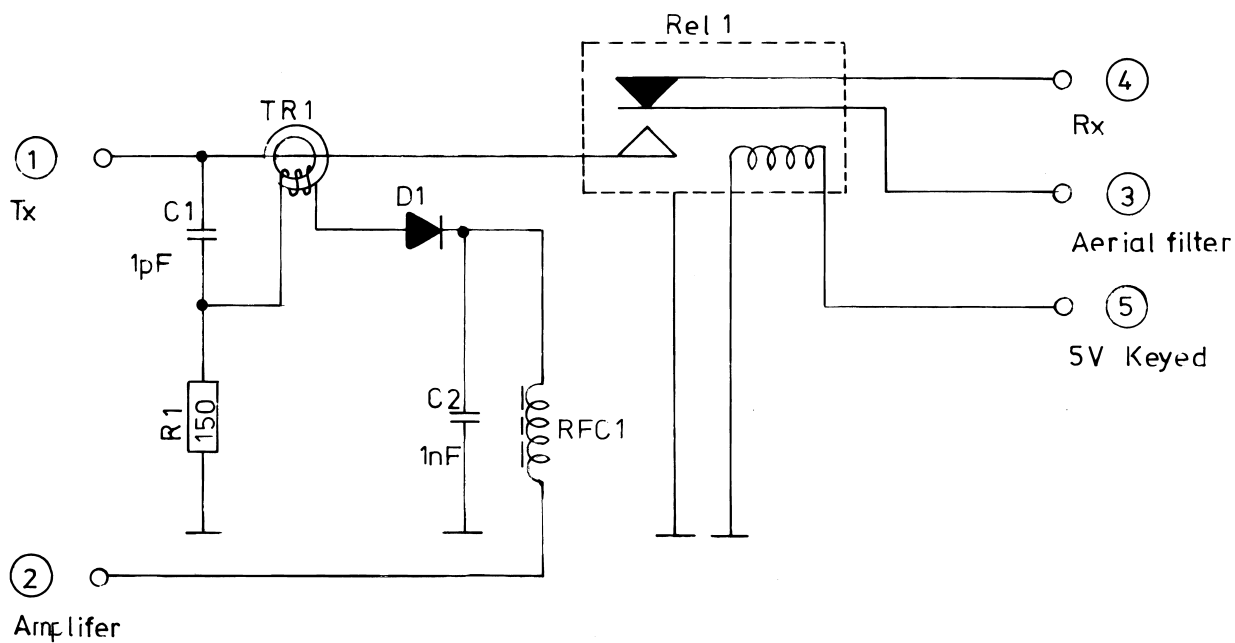
Tegn. nr.:

75010 - 4E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-402	150 $\Omega$ $\frac{1}{4}$ W CR 25			
R2	19-258	10 k $\Omega$ Trimpot.			
C1	11-361	1 pF Ker.			
C2	11-409	1 nF "			
C3	11-409	1 nF "			
D1	04-062	1N4148			
TR1		75332-4E2			
RFC- 1		75290-4E2			
RE 1	17-056	AE 5612-02, RS-12V, National			
RE 1	19-059	AE 5612-02 RS- 6V, Mational			
Aerial switch for 2 m Print board B 24C 2, 3 and 5 Tilhører tegn. nr.: 75010-4E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75010-4S2





Rettet: 5-5-77 H.J.

Aerial switch for 2m internal PA

Print board B 39A 1

AP-RADIOTELEFON 1/8

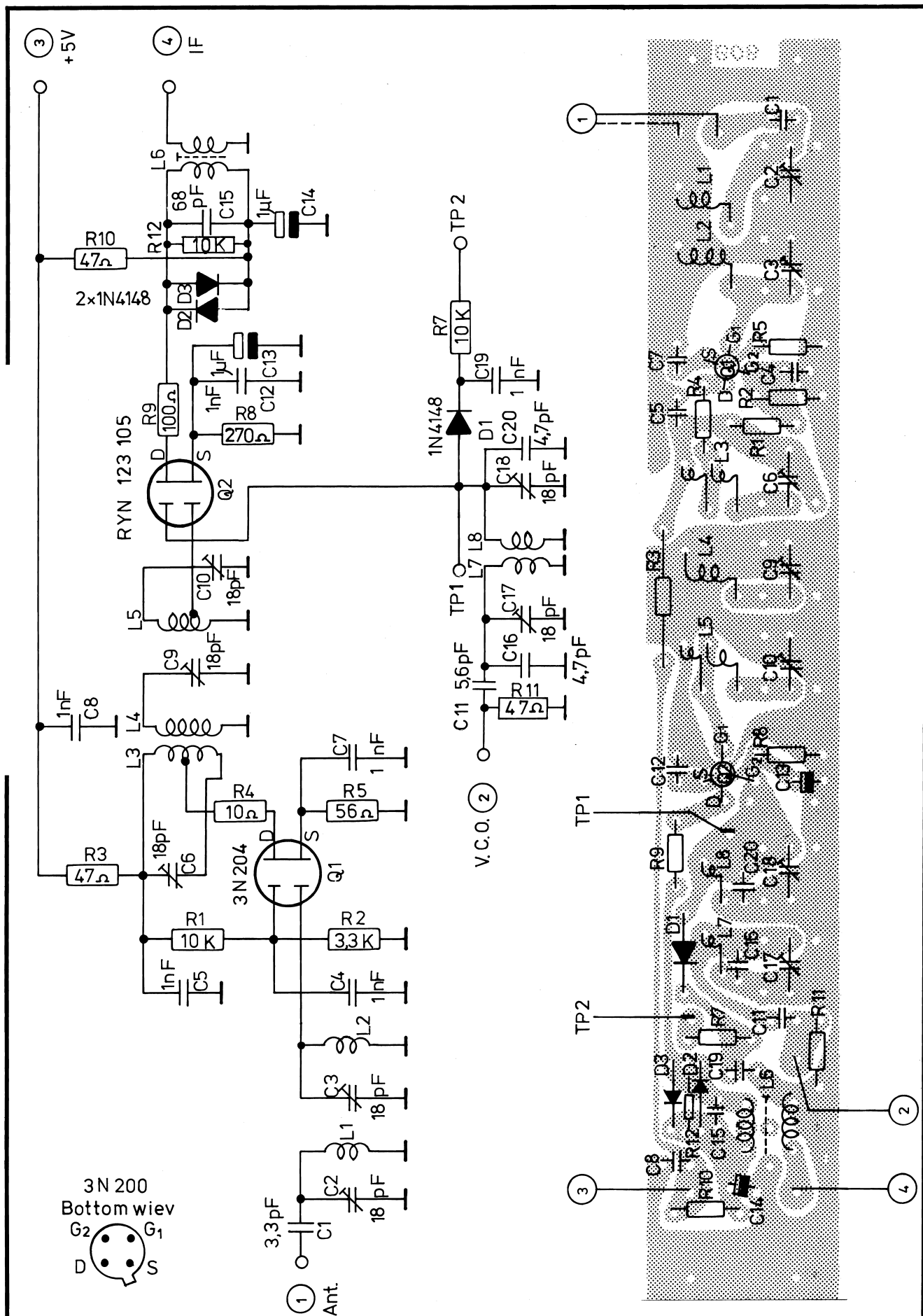
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EH

Kontr.:

Stykl. nr.:

Tegn. nr.:

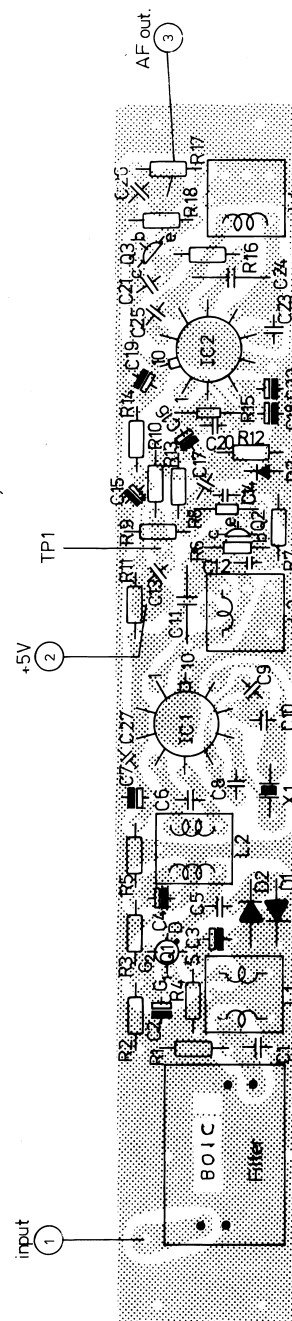
75011 - 4E2





# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-295	10 KΩ 1/8W CR 16	Q1	19-185	3N 204
R2	13-289	3,3 KΩ " "	Q2	19-118	BFR 84
R3	13-267	47 Ω " "	<del>Q2</del>	<del>19-134</del>	<del>RYA 123 105 udvalgt</del>
R4	13-259	10 Ω " "	L1		75331-4E2
R5	13-268	56 Ω " "	L2		75331-4E2
R6			L3		75328+75329-4E2
R7	13-295	10 KΩ	L4		75330-4E2
R8	13-267	47 Ω " "	L5		75328+75329-4E2
R9	13-271	100 Ω " "	L6		76222-4E2
R10	13-267	47 Ω " "	L7		75328-4E2
R11	13-267	47 Ω " "	L8		75328-4E2
R12	13-295	10 KΩ " "			
C1	11-366	3,3 pF Ker.			
C2	19-330	18 pF Trim.			
C3	19-330	18 pF "			
C4	11-409	1 nF Ker.			
C5	11-409	1 nF "			
C6	19-330	18 pF Trim.			
C7	11-409	1 nF Ker.			
C8	11-409	1 nF "			
C9	19-330	18 pF Trim.			
C10	19-330	18 pF "			
C11	11-370	5,6 pF Ker.			
C12	11-409	1 nF "			
C13	11-502	1 μF/35V Tant.			
C14	11-502	1 μF/35V "			
C15	11-397	68 pF Ker.			
C16	11-368	4,7 pF "			
C17	19-330	18 pF Trim.			
C18	19-330	18 pF "			
C19	11-409	1 nF Ker.			
C20	11-368	4,7 pF "			
D1	04-062	1N4148			
D2	04-062	1N4148			
D3	04-062	1N4148			
RF amplifier and mixer 2 m Print board B 08 C 1 Tilhører tegn. nr.: 75015-4E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div> <div>Stykl. nr.: 75015-4S2</div>



75076 - 3E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-290	3,9 KΩ 1/8W CR 16	C19	11-504	4,7 μF/10V Tant.
R2	13-302	47 KΩ " "	C20	11-409	1 nF Ker.
R3	13-302	47 KΩ " "	C21	11-416	4,7 nF "
R4	13-272	120 Ω " "	C22	11-504	4,7 μF/10V Tant.
R5	13-263	22 Ω " "	C23	11-404	150 pF Ker.
R6	13-295	10 KΩ " "	C24	11-461	2,2 nF MKM
R7	13-295	10 KΩ " "	C25	11-404	150 pF Ker.
R8	13-271	100 Ω " "	C26	11-416	4,7 nF "
R9	13-279	470 Ω " "	C27	11-409	1 nF "
R10	13-295	10 KΩ " "	D1	04-062	1N4148
R11	13-267	47 Ω " "	D2	04-062	1N4148
R12	13-306	100 KΩ " "	D3	04-036	0A90
R13	13-271	100 Ω " "			
R14	13-267	47 Ω " "	Q1	19-128	40673
R15	13-279	470 Ω " "	Q2	19-104	BF199
R16	13-263	22 Ω " "	Q3	19-093	BC238B
R17	13-281	680 Ω " "			
R18	13-289	3,3 KΩ " "	IC1	09-007	S042E
			IC2	09-006	S041E
C1	11-403	120 pF Ker.			
C2	11-504	4,7 μF/10V Tant.	L1		75282-4E2
C3	11-502	1 μF/35V "	L2		75281-4E2
C4	11-504	4,7 μF/10V "	L3		75280-4E2
C5	11-409	1 nF Ker.	L4		75279-4E2
C6	11-396	56 pF "			
C7	11-504	4,7 μF/10V Tant.	X1	11-815	AP 22 20,945 Mhz
C8	11-404	150 pF Ker.	X2	11-854	21,4 Mhz
C9	11-396	56 pF "			
C10	11-404	150 pF "			
C11	11-461	2,2 nF MKM			
C12	11-416	4,7 nF Ker.			
C13	11-416	4,7 nF "			
C14	11-409	1 nF "			
C15	11-502	1 μF/35V Tant.			
C16	11-500	0,1 μF/35V "			
C17	11-416	4,7 nF Ker.			
C18	11-504	4,7 μF/10V Tant.			
21,4 MHz IF Print B 01 C Tilhører tegn. nr.: 75076-3E2			Rettet:		<div>Tegn.: Stykl. nr.: 75076-4S2</div> <div>Kontr.:</div>



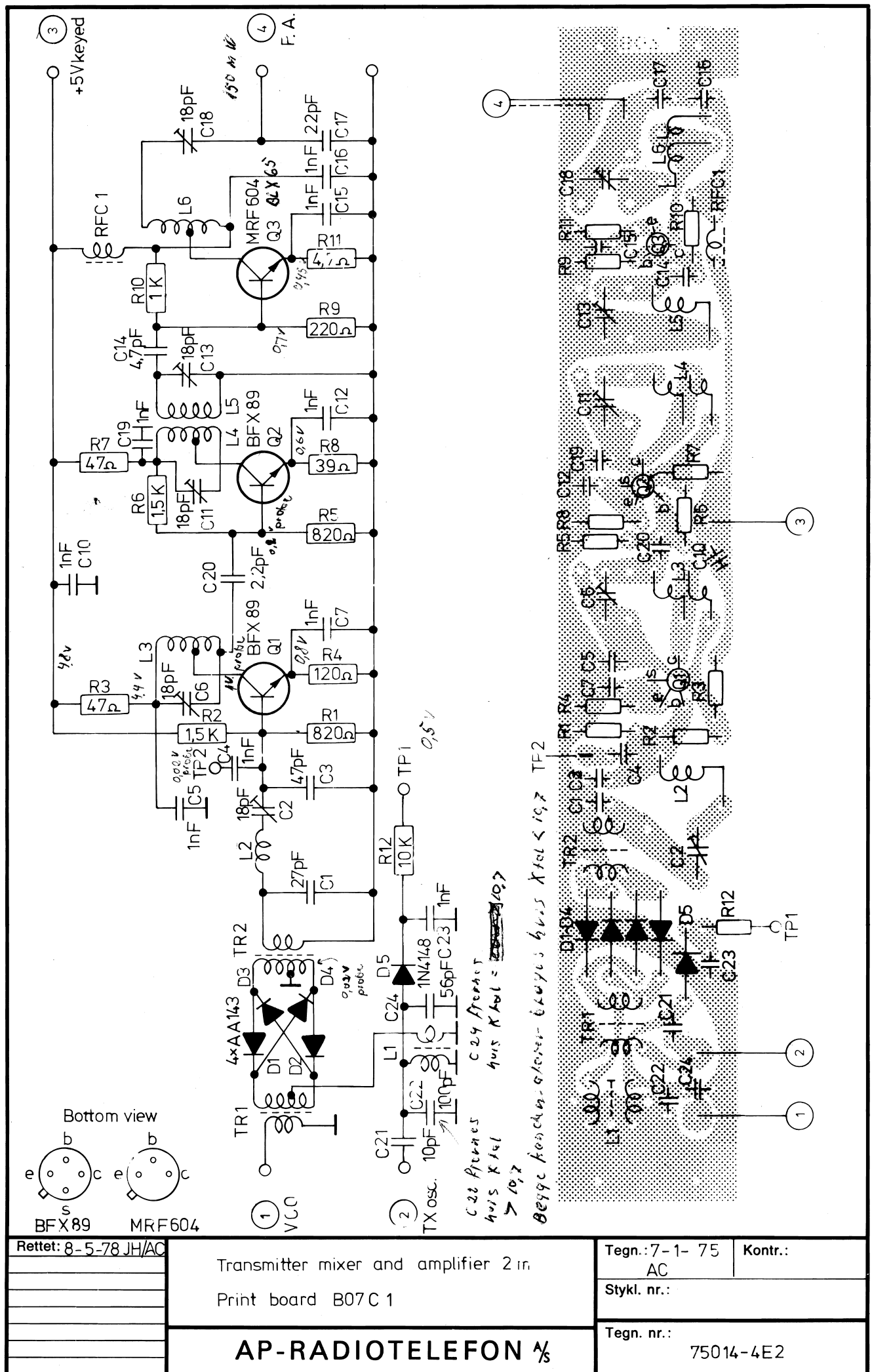
# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-299	22 KΩ 1/8W CR 16	R38	13-277	330 Ω 1/8W CR 16
R2	13-289	3,3 KΩ " "	R39	13-271	100 Ω " "
R3	13-289	3,3 KΩ " "	R40	13-306	100 KΩ " "
R4	13-295	10 KΩ " "	R41	13-283	1 KΩ " "
R5	13-304	68 KΩ " "	R42	13-303	56 KΩ " "
R6	13-306	100 KΩ " "	R43	13-663	15 KΩ NTC
R7	13-295	10 KΩ " "	R44	13-271	100 Ω 1/8W CR 16
R8	13-271	100 Ω " "	R45	13-409	1 Ω 1/2W CR 37
R9	13-271	100 Ω " "	C1	11-502	1 μF/35V Tant.
R10	13-281	680 Ω " "	C2	11-502	1 μF/35V "
R11	13-291	4,7 KΩ " "	C3	11-502	1 μF/35V "
R12	13-295	10 KΩ " "	C4	11-509	47 μF/6,3V "
R13	13-276	270 Ω " "	C5	11-509	47 μF/6,3V "
R14	13-292	5,6 KΩ " "	C6	11-500	0,1 μF/35V "
R15	13-283	1 KΩ " "	C7	11-350	10 nF Laco
R16	13-283	1 KΩ " "	C8	11-507	22 μF/16V Tant.
R17	13-271	100 Ω " "	C9	11-502	1 μF/35V "
R18	13-297	15 KΩ " "	C10	05-024	220 μF/16V Elko
R19	13-275	220 Ω " "	C11	11-502	1 μF/35V Tant.
R20	13-295	10 KΩ " "	C12	11-504	4,7 μF/10V "
R21	13-291	4,7 KΩ " "	C13	11-502	1 μF/35V "
R22	13-277	330 Ω " "	C14	11-506	10 μF/25V "
R23	13-302	47 KΩ " "	C15	11-509	47 μF/6,3V "
R24	13-295	10 KΩ " "	C16	11-504	4,7 μF/10V "
R25	13-302	47 KΩ " "	C17	11-416	4,7 nF Ker.
R26	13-271	100 Ω " "	C18	11-465	6,8 nF MKH
R27	13-295	10 KΩ " "	C19	11-501	0,47 μF/35V Tant.
R28	13-281	680 Ω " "	C20	11-506	10 μF/25V "
R29	13-277	330 Ω " "	C21	11-409	1 nF Ker.
R30	13-299	22 KΩ " "	C22	11-500	0,1 μF/35V Tant.
R31	19-255	2,2 KΩ Trim.	C23	11-506	10 μF/25V "
R32	13-302	47 KΩ 1/8W CR 16	C24	11-416	4,7 nF Ker.
R33	13-297	15 KΩ " "	C25	11-519	3,3 μF/16V Tant.
R34	13-310	330 KΩ " "	C26	11-404	150 pF Ker.
R35	13-271	100 Ω " "	C27	11-409	1 nF "
R36	13-295	10 KΩ " "	C28	11-506	10 μF/25V Tant.
R37	13-311	680 KΩ " "	C29	11-504	4,7 μF/10V "
AF-amplifier, squelch and key circuit Print board B 09 D 1 Tilhører tegn. nr.: 75017-3E2				Tegn.:	Stykl. nr.:
				Kontr.:	75017-4S2



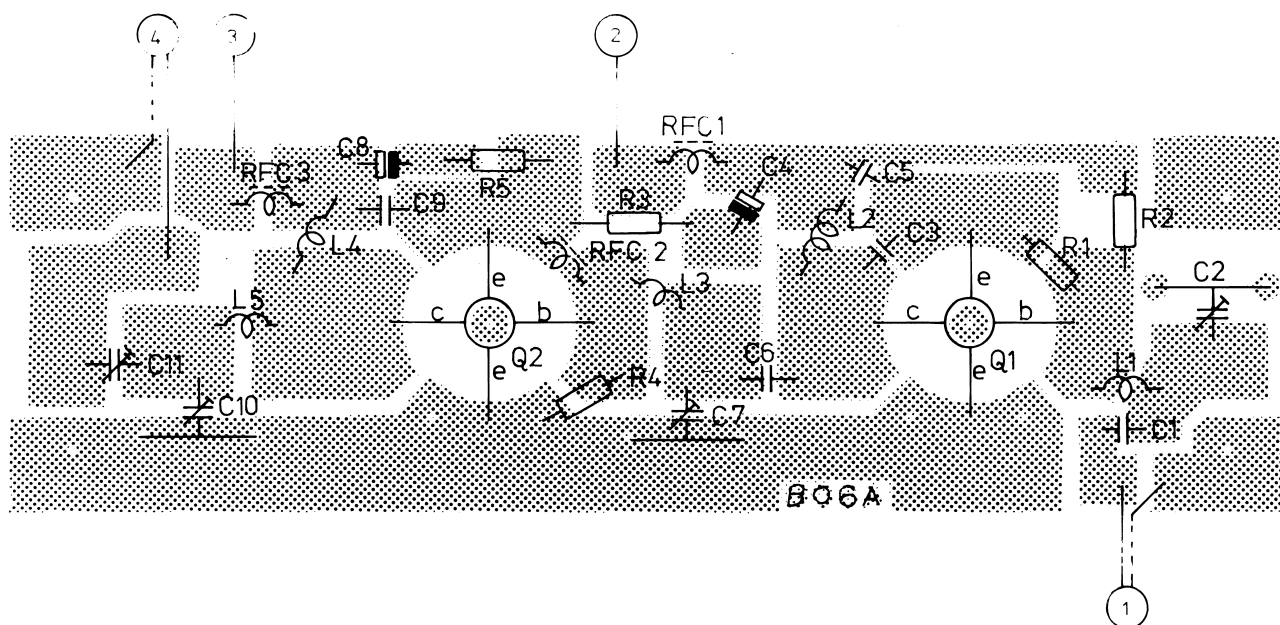
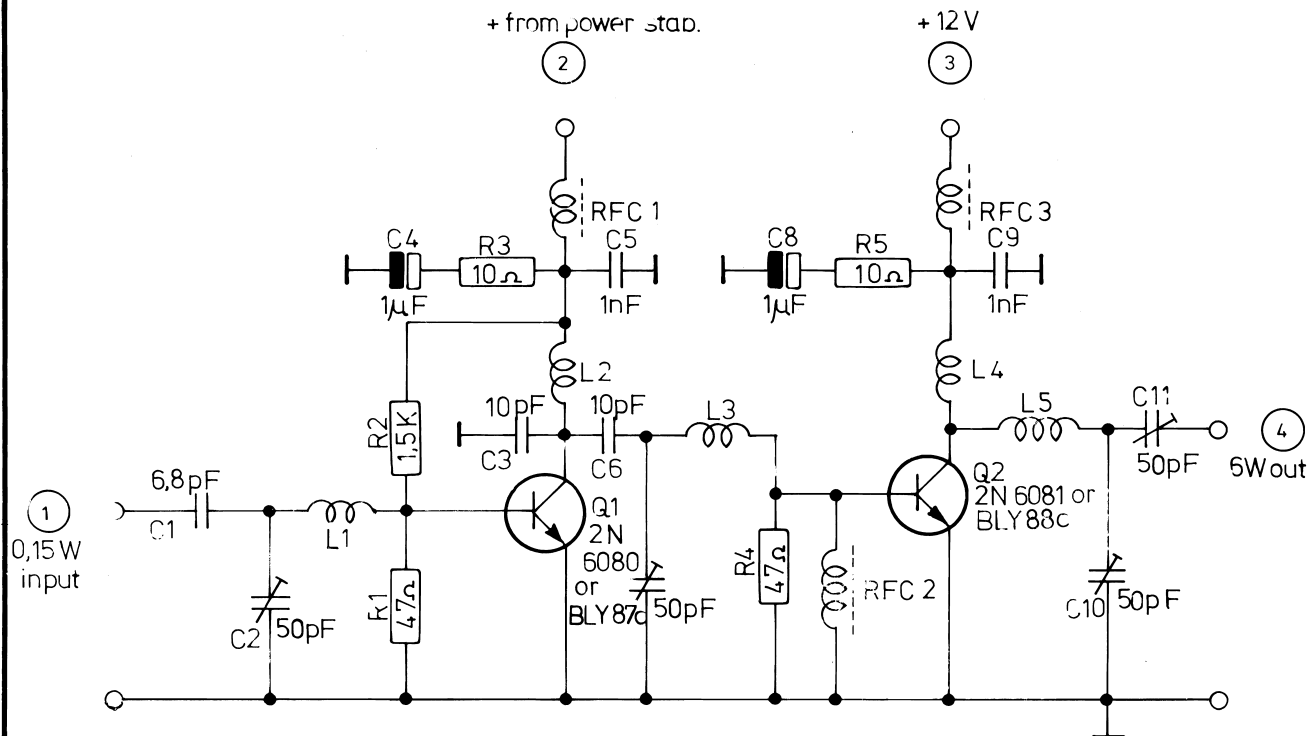
# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
C30	11-416	4,7 nF ker.			
C31	11-409	1 nF "			
C32	11-409	1 nF "			
D1	04-062	1N4148			
D2	04-062	1N4148			
D3	04-062	1N4148			
D4	04-062	1N4148			
D5	04-062	1N4148			
D6	04-062	1N4148			
D7	04-062	1N4148			
D8	04-062	1N4148			
D9	04-062	1N4148			
D10	04-062	1N4148			
D11	04-062	1N4148			
D12	04-062	1N4148			
D13	04-062	1N4148			
D14	04-062	1N4148			
D15	04-062	1N4148			
D16	04-062	1N4148			
Q1	19-093	BC 238B			
Q2	19-095	BC 327			
Q3	19-093	BC 238B			
Q4	19-093	BC 238B			
Q5	19-093	BC 238B			
Q6	19-093	BC 238B			
IC1	09-004	TBA 641B11			
IC2	09-003	TAA 765A			
RFC 1	04-114	74016-4E2 drossel			
L1		75295-4E2			
AF-amplifier, squelch and key circuit. Print board B 09 D1 Tilhører tegn. nr.: 75017-3E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75017-4S2



# AP-RADIOTELEFON

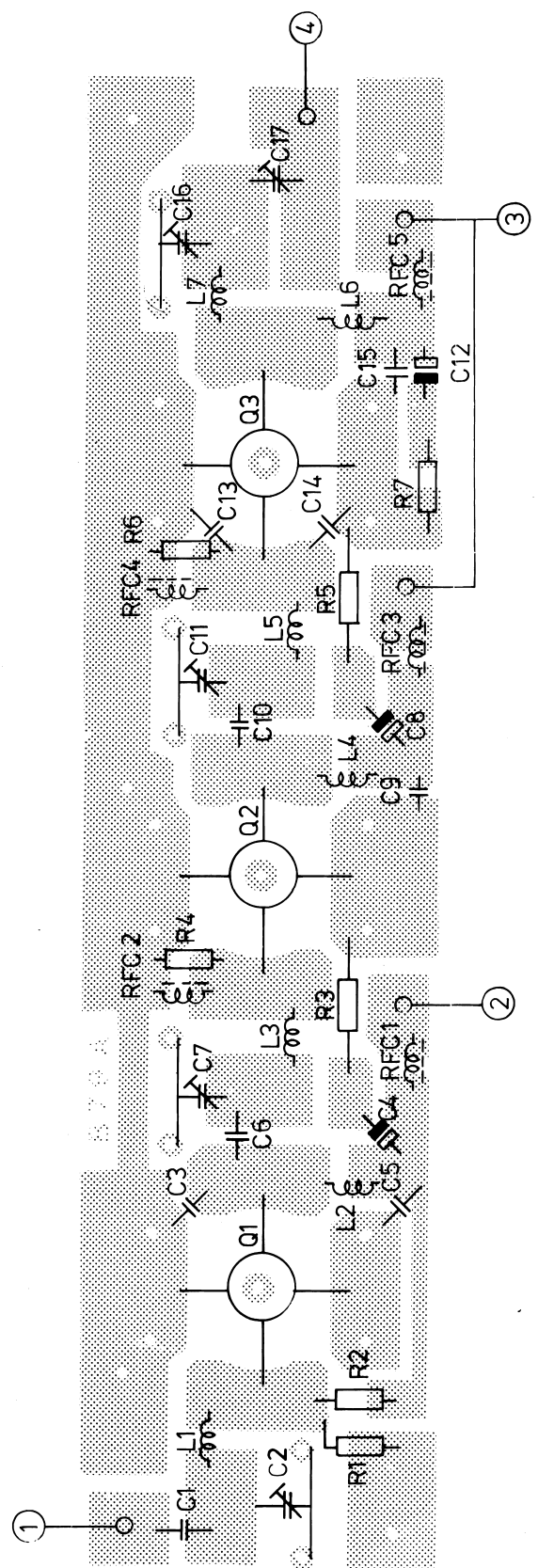
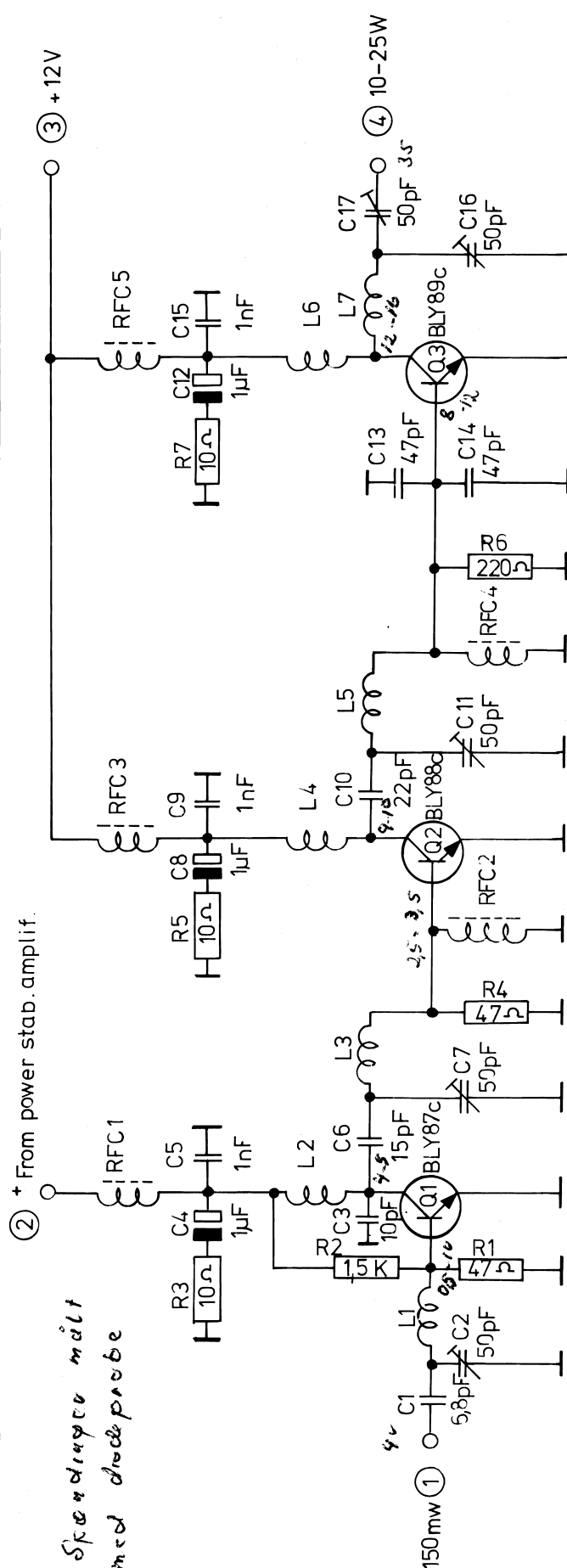
Nr.	Kode	Data	Nr.	Kode	Data
R1	13-282	820 $\Omega$ 1/8W CR 16	D1	04-003	AA143
R2	13-285	1,5 K $\Omega$ " "	D2	04-003	AA143
R3	13-267	47 $\Omega$ " "	D3	04-003	AA143
R4	13-272	120 $\Omega$ " "	D4	04-003	AA143
R5	13-282	820 $\Omega$ " "	D5	04-062	1N4148
R6	13-285	1,5 K $\Omega$ " "			
R7	13-267	47 $\Omega$ " "	Q1	19-102	BFX89
R8	13-266	39 $\Omega$ " "	Q2	19-102	BFX89
R9	13-275	220 $\Omega$ " "	Q3	19-124	MRF 604
R10	13-283	1 K $\Omega$ " "			
R11	13-257	4,7 $\Omega$ " "	RFC1		75290-4E2
R12	13-382	10 K $\Omega$ " "			
			TR1		75289-4E2
C1	11-388	27 pF Ker.	TR2		75289-4E2
C2	19-330	18 pF Trim.			
C3	11-394	47 pF Ker.	L1		75517-4E2
C4	11-409	1 nF "	L2		75327-4E2
C5	11-409	1 nF "	L3		75323+75325-4E2
C6	19-330	18 pF Trim.	L4		75323+75325-4E2
C7	11-409	1 nF Ker.	L5		75326-4E2
C8			L6		75323+75324-4E2
C9					
C10	11-409	1 nF Ker.			
C11	19-330	18 pF Trim.			
C12	11-409	1 nF Ker.			
C13	19-330	18 pF Trim.			
C14	11-368	4,7 pF Ker.			
C15	11-409	1 nF "			
C16	11-409	1 nF "			
C17	11-385	22 pF "			
C18	19-330	18 pF Trim.			
C19	11-409	1 nF Ker.			
C20	11-363	2,2 pF "			
C21	11-376	10 pF "			
C22	11-401	100 pF "			
C23	11-409	1 nF "			
C24	11-396	56 pF "			
Tranmitter mixer and amplifier Print board B 07 C 1 Tilhører tegn. nr.: 75014-4E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75014-4S2



Rettet:	6 W PA-stage for 2m Print board B06 A 1	Tegn.: 6-1-75 AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON $\frac{1}{5}$	Tegn. nr.:	75013-4E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-267	47 $\Omega$ 1/8W CR 16			
R2	13-285	1,5 k $\Omega$ " "			
R3	13-259	10 $\Omega$ " "			
R4	13-267	47 $\Omega$ " "			
R5	13-259	10 $\Omega$ " "			
C1	11-373	6,8 pF Ker.			
C2	19-334	50 pF Trim.			
C3	11-376	10 pF Ker.			
C4	11-502	1 $\mu$ F/35V Tant.			
C5	11-409	1 nF Ker.			
C6	11-376	10 pF "			
C7	19-334	50 pF Trim.			
C8	11-502	1 $\mu$ F/35V Tant.			
C9	11-409	1 nF Ker.			
C10	19-334	50 pF Trim.			
C11	19-334	50 pF "			
Q1		2N6080 or BLY87c			
Q2		2N6081 or BLY88c			
RFC1		75290-4E2			
RFC2		75290-4E2			
RFC3		75290-4E2			
L1		75320-4E2			
L2		75320-4E2			
L3		75318-4E2			
L4		75320-4E2			
L5		75319-4E2			
6 W PA-stage for 2m Printboard B 06 A 1 Tilhører tegn. nr.: 75013-4E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75013-4S2



Rettet:

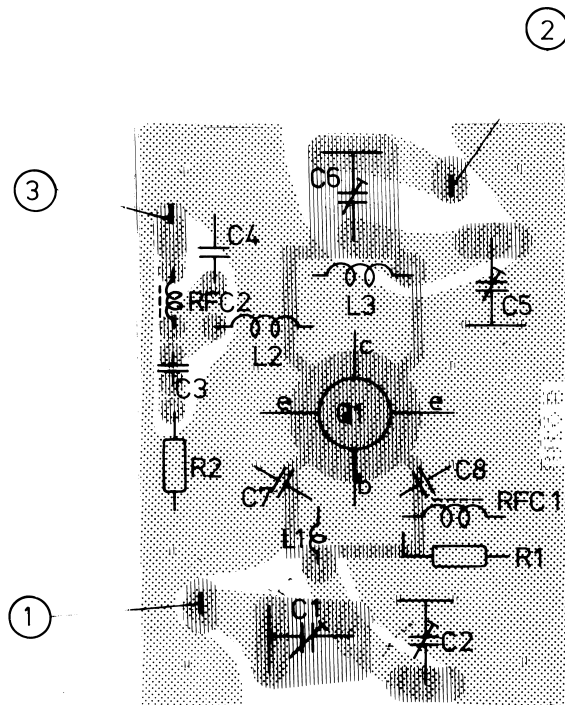
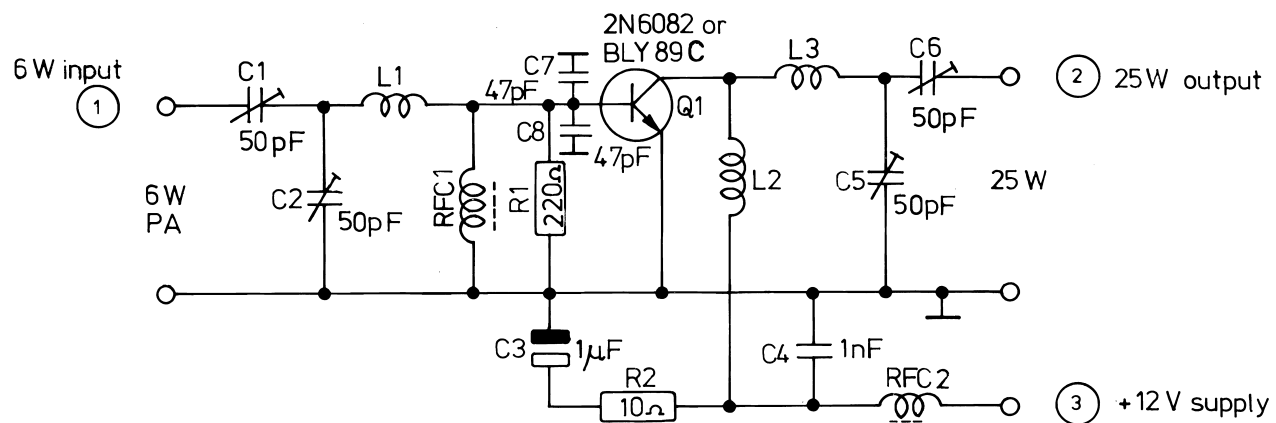
10-25 W internal PA 2m  
Print B 79 A 1

AP-RADIOTELEFON ¼

Tegn.: 27-10-76 H.J.	Kontr.:
Stykl. nr.:	
Tegn. nr.:	76307- 4E 2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-267	47 $\Omega$ 1/8 W	RFC		
R2	13-285	1,5 K $\Omega$ "	1		75290-4E2
R3	13-259	10 $\Omega$ "	RFC		
R4	13-267	47 $\Omega$ "	2		75290-4E2
R5	13-259	10 $\Omega$ "	RFC		
R6	13-275	220 $\Omega$ "	3		75290-4E2
			RFC		
C1	11-373	6,8 pF Ker.	4		75290-4E2
C2	19-334	50 pF Trim.	RFC		
C3	11-376	10 pF Ker.	5		75290-4E2
C4	11-502	1 $\mu$ F/35 V Tant.			
C5	11-409	1 nF Ker.			
C6	11-381	15 pF "			
C7	19-334	50 pF Trim.			
C8	11-502	1 $\mu$ F/35 V Tant.			
C9	11-409	1 nF Ker.			
C10	11-387	22 pF "			
C11	19-334	50 pF Trim			
C12	11-502	1 $\mu$ F/35 V Tant.			
C13	11-394	47 pF Ker.			
C14	11-394	47 pF "			
C15	11-409	1 nF "			
C16	19-334	50 pF Trim.			
C17	19-334	50 pF "			
Q1	19-121	BLY 87 c			
Q2	19-122	BLY 88 c			
Q3	19-111	BLY 89 c			
L1		75320-4E2			
L2		75320-4E2			
L3		75318-4E2			
L4		75320-4E2			
L5		75318-4E2			
L6		75320-4E2			
L7		75318-4E2			
10-25 W internal PA 2 m Print board B 79A 1 Tilhører tegn. nr.: 76307-4E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div> <div>Stykl. nr.: 76307-4S2</div>



Rettet: 17-3-79 JH/AC

Extern 10-25WPA-stage for 2m  
Print board B02C1

AP-RADIOTELEFON ¼

Tegn.: 2-1-75  
AC

Kontr.:

Stykl. nr.:

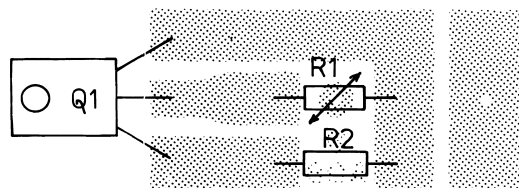
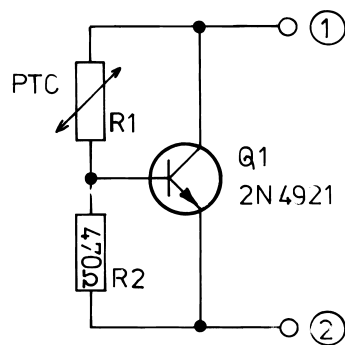
Tegn. nr.:

75009-4E2



# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-362	220 $\Omega$ $\frac{1}{4}$ W CR 25			
R2	13-350	10 $\Omega$ " "			
C1	19-334	50 pF Trim.			
C2	19-334	50 pF "			
C3	11-502	1 $\mu$ F/35V Tant.			
C4	11-409	1 nF Ker.			
C5	19-334	50 pF Trim.			
C6	19-334	50 pF "			
C7	11-394	47 pF Ker.			
C8	11-394	47 pF "			
Q1	19-111 19-164	BLY89C or 2N6082			
L1		75317-4E2			
L2		75316-4E2			
L3		75315-4E2			
RFC- 1		75290-4E2			
RFC- 2		75290-4E2			
Extern 10-25 W PA-stage 2 m Print board B 02C 1 Tilhører tegn. nr.: 75009-4E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75009-4S2



Rettet: 15-6-78 JS/AC

Thermal protection of 10-25 W internal PA  
Print board B80A 1

Tegn.: 5-11 -76  
AC

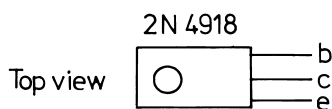
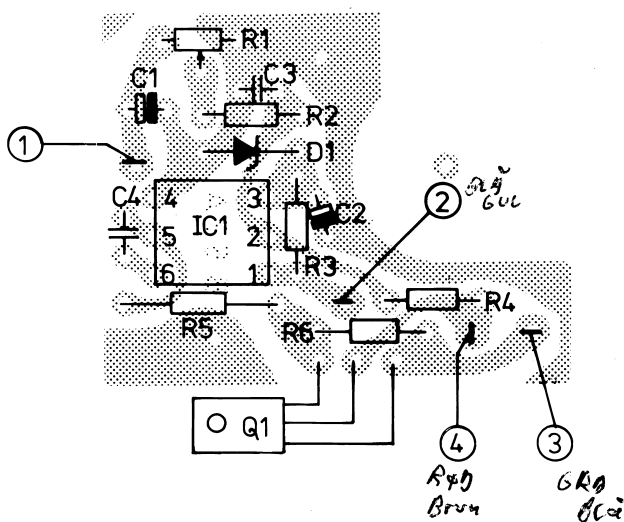
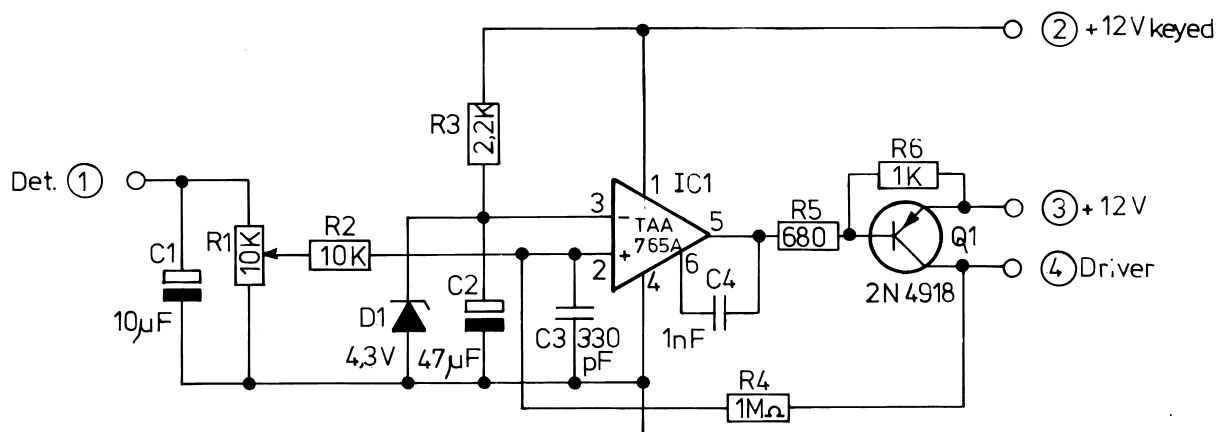
Kontr.:

Stykl. nr.:

Tegn. nr.:

76328 - 4E2

**AP-RADIOTELEFON ⅓**



Rettet: 21-4-77 JH/ac

Sense amplifier for output power stabilizing of  
internal PA. Print board B 57 B 1

**AP-RADIOTELEFON 1/5**

Tegn.: 29-12-75  
AC

Kontr.:

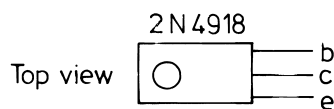
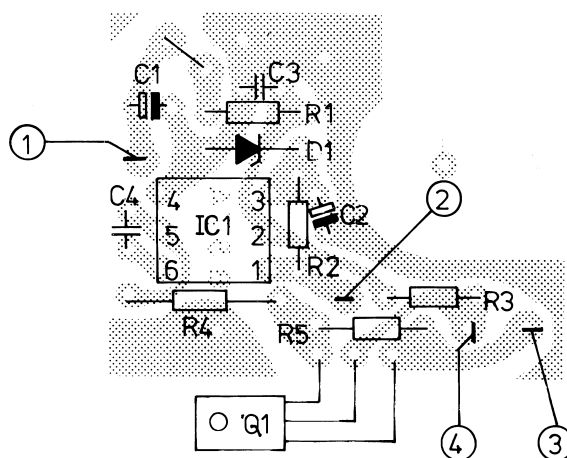
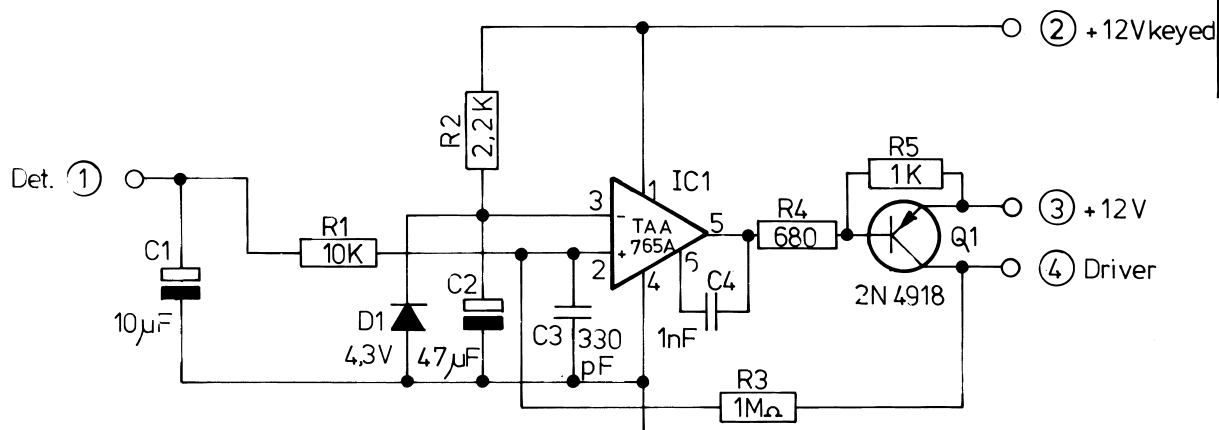
Stykl. nr.:

Tegn. nr.:

75622-4E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	19-258	10 K $\Omega$ Trim.			
R2	13-295	10 K $\Omega$ 1/8W CR 16			
R3	13-287	2,2 K $\Omega$ " "			
R4	13-312	1 M $\Omega$ " "			
R5	13-368	680 $\Omega$ $\frac{1}{4}$ W CR 25			
R6	13-283	1 K $\Omega$ 1/8W CR 16			
C1	11-506	10 $\mu$ F/25V Tant.			
C2	11-509	47 $\mu$ F/6,3V "			
C3	11-406	330 pF Ker.			
C4	11-409	1 nF "			
D1	04-045	4,3 V Zener			
Q1	19-176	2N4918			
IC1	09-003	TAA765A			
Sense amplifier for output power stabilizing of internal PA Print board B 57B 1			Tilhører tegn. nr.: 75622-4E2		
			Tegn.: Stykl. nr.: 75622-4S2		
			Kontr.:		



Rettet: 21-4-77 BJ/ac

Sense amplifier for output power stabilizing  
of external PA  
Print board B57B 2

**AP-RADIOTELEFON**  $\frac{A}{S}$

Tegn.: 3-11-76  
AC

Kontr.:

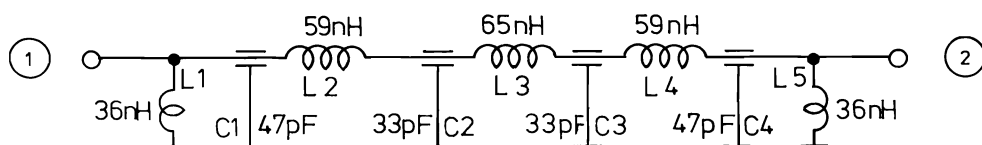
Stykl. nr.:

Tegn. nr.:

76325-4E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-295	10 K $\Omega$ 1/8W CR 16			
R2	13-287	2,2 K $\Omega$ " "			
R3	13-312	1 M $\Omega$ " "			
R4	13-368	680 $\Omega$ $\frac{1}{4}$ W CR 25			
R5	13-283	1 K $\Omega$ 1/8W CR 16			
C1	11-506	10 $\mu$ F/25V Tant.			
C2	11-509	47 $\mu$ F/6,3V "			
C3	11-406	330 pF Ker.			
C4	11-409	1 nF "			
D1	04-045	4,3 V Zener			
Q1	19-176	2N4918			
IC1	09-003	TAA765A			
Sense amplifier for output power stabilizing of external PA. Print board B 57 B 2 Tilhører tegn. nr.: 76325-4E2			<div>Tegn.:</div> <div>Kontr.:</div> <div>Stykl. nr.: 76325-4S2</div>		



Rettet:	Aerial filter for 2 m	Tegn.: 9-1-75 AC	Kontr.:
		Stykl. nr.:	
		Tegn. nr.:	75016-4E2
	AP-RADIOTELEFON 1/8		

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
C1	11-450	47 pF feed-thru Philips 2222 700 03479			
C2	11-449	33 pF feed-thru Philips 2222 700 03339			
C3	11-449	33 pF feed-thru Philips 2222 700 03339			
C4	11-450	47 pF feed-thru Philips 2222 700 03479			
L1		75325-4E2			
L2		75322-4E2			
L3		75321-4E2			
L4		75322-4E2			
L5		75325-4E2			
Aerial filter for 2m			Rettet:		Tegn.:
Tilhører tegn. nr.: 75016-4E2					Kontr.:
					Stykl. nr.: 75016-4S2





# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-295	10 KΩ 1/8W CR 16	C4	11-507	22 μF/16V Tant.
R2	13-291	4,7 KΩ " "	C5	11-466	6,8 nF Ker.
R3	19-255	2,2 KΩ Trim.	C6	11-509	47 μF/6,3V Tant.
R4	13-277	330 Ω 1/8W CR 16	C7	11-507	22 μF/16V "
R5	13-283	1 KΩ " "	C8	11-409	1 nF Ker.
R6	13-271	100 Ω " "	C9	11-510	100 μF/3V Tant.
R7	13-283	1 KΩ " "	C10	11-507	22 μF/16V "
R8	13-287	2,2 KΩ " "	C11	11-470	0,1 μF MKH
R9	13-287	2,2 KΩ " "	C12	11-506	10 μF/25V Tant.
R10	13-283	1 KΩ " "	C13	11-503	2,2 μF/25V "
R11	13-306	100 KΩ " "	C14	11-470	0,1 μF MKH
R12	13-283	1 KΩ " "	C15	<b>11-489</b>	22 nF "
R13	13-267	47 Ω " "	C16	11-465	6,8 nF MKH
R14	13-285	1,5 KΩ " "	C17	11-507	22 μF/16V Tant.
R15	13-280	560 Ω " "	C18	11-430	330 pF N750 Ker.
R16	13-664	1 KΩ NTC	C19	11-501	0,47 μF/35V Tant.
R17	13-288	2,7 KΩ 1/8 W "	C20		
R18	13-306	100 KΩ " "	C21	11-504	4,7 μF/10V Tant.
R19	13-291	4,7 KΩ " "	C22	11-508	33 μF/10V Tant.
R20	13-283	1 KΩ " "	C23	11-409	1 nF Ker.
R21	13-307	47 KΩ " "	C24	11-409	1 nF "
R22	13-297	15 KΩ " "	C25	11-409	1 nF "
R23	13-295	10 KΩ " "			
R24	13-299	22 KΩ " "	D1	04-062	1N4148
R25	13-300	33 KΩ " "	D2	04-062	1N4148
R26	13-300	33 KΩ " "	D3	04-062	1N4148
R27	19-255	2,2 KΩ Trim.	D4	04-062	1N4148
R28	19-252	1 KΩ " "	D5	04-062	1N4148
R29	13-288	2,7 KΩ 1/8W CR 16			
R30	13-295	10 KΩ " "	Q1	19-093	BC 238B
R31	13-295	10 KΩ " "			
R32	13-299	22 KΩ " "	IC1	09-005	LM 370
R33	13-283	1 KΩ " "	IC2	09-075	SN 72558 p
R34	13-299	22 KΩ " "			
R35	13-300	33 KΩ " "			
C1	11-502	1 μF/35V Tant.			
C3	11-416	4,7 nF Ker.			
Modulation amplifier Print board B 10 D1 Tilhører tegn. nr.: 75018-3E2			Rettet:		<div>Tegn.: Stykl. nr.: 75018-4S2</div> <div>Kontr.:</div>

75062-3E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-295	10 K $\Omega$ 1/8WCR16	R38	13-302	47 K $\Omega$ 1/8WCR16
R2	13-295	10 K $\Omega$ " "	R39	13-306	100 K $\Omega$ " "
R3	13-279	470 $\Omega$ " "	R40	13-287	2,2 K $\Omega$ " "
R4	13-307	120 K $\Omega$ " "	R41	13-299	22 K $\Omega$ " "
R5	13-283	1 K $\Omega$ " "	R42	13-291	4,7 k $\Omega$ " "
R6	13-275	220 $\Omega$ " "	R43	13-271	100 $\Omega$ " "
R7	13-295	10 K $\Omega$ " "	R44	13-382	10 K $\Omega$ $\frac{1}{4}$ W CR25
R8	13-295	10 K $\Omega$ " "			
R9	13-295	10 K $\Omega$ " "	C1	11-385	22 pF Ker
R10	13-295	10 K $\Omega$ " "	C2	11-416	4,7 nF "
R11	13-295	10 K $\Omega$ " "	C3	11-416	4,7 nF "
R12	13-295	10 K $\Omega$ " "	C4	11-404	150 pF "
R13	13-295	10 K $\Omega$ " "	C5	11-409	1 nF "
R14	13-295	10 K $\Omega$ " "	C6	11-409	1 nF "
R15	13-271	100 $\Omega$ " "	C7	11-409	1 nF "
R16	13-271	100 $\Omega$ " "	C8	11-409	1 nF "
R17	13-271	100 $\Omega$ " "	C9	11-409	1 nF "
R18	13-271	100 $\Omega$ " "	C10	11-409	1 nF "
R19	13-271	100 $\Omega$ " "	C11	11-409	1 nF "
R20	13-271	100 $\Omega$ " "	C12	11-409	1 nF "
R21	13-271	100 $\Omega$ " "	C13	11-416	4,7 nF "
R22	13-271	100 $\Omega$ " "	C14	11-504	4,7 $\mu$ F/10V Tant
R23	13-259	10 $\Omega$ " "	C15	11-416	4,7 nF Ker
R24	13-283	1 K $\Omega$ " "	C16	11-481	10 nF Pol.
R25	13-283	1 K $\Omega$ " "	C17	11-478	6,8 nF "
R26	13-291	4,7 K $\Omega$ " "	C18	11-476	2,2 nF "
R27	13-291	4,7 K $\Omega$ " "	C19	11-508	33 $\mu$ F/10V Tant
R28	13-291	4,7 K $\Omega$ " "	C20	11-504	4,7 $\mu$ F/10V "
R29	13-299	22 K $\Omega$ " "	C21	11-409	1 nF Ker
R30	13-299	22 K $\Omega$ " "	C22	11-401	100 pF "
R31	13-271	100 $\Omega$ " "	C23	11-504	4,7 $\mu$ F/10V Tant
R32	13-287	2,2 K $\Omega$ " "	C24	11-394	47 pF Ker
R33	13-295	10 K $\Omega$ " "	C25	11-409	1 nF "
R34	13-299	22 K $\Omega$ " "	C26	11-444	560 pF "
R35	13-313	27 K $\Omega$ " "	C27	11-504	4,7 $\mu$ F/10V Tant
R36	13-287	2,2 K $\Omega$ " "	C28	11-444	560 pF Ker.
R37	13-300	33 K $\Omega$ " "	C29	11-509	47 $\mu$ F/6,3V Tant
Synthesizer logic				Tegn.:	Stykl. nr.:
Print board B 17 C 1 B 22 C 1				Kontr.:	75062-4S 2
Tilhører tegn. nr.: 75062-3E					

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
Q1	19-093	BC 238B			
Q2	19-093	BC 238B			
Q3	19-093	BC 238B			
Q4	19-093	BC 238B			
Q5	19-093	BC 238B			
IC1	09-077	SN74LS02N			
IC2	09-052	SN74193N			
IC3	09-076	SN74LS193N			
IC4	09-008	MC4044P			
IC5	09-003	TAA765A			
IC6	09-078	SN74LS93N			
RFC1	04-114	74016-4E			
X1	11-816	AP 21 400 Khz			
Synthesizer logic Print board B 17C 1+B 22 C 1 Tilhører tegn. nr.: 75062-3E 2			Tegn.: Stykl. nr.: Kontr.: 75062-4S 2		



# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-295	10 KΩ 1/8WCR16	R38	13-302	47 KΩ 1/8WCR16
R2	13-295	10 KΩ " "	R39	13-306	100 KΩ " "
R3	13-279	470 Ω " "	R40	13-287	2,2 KΩ " "
R4	13-307	120 KΩ " "	R41	13-299	22 KΩ " "
R5	13-283	1 KΩ " "	R42	13-291	4,7 kΩ " "
R6	13-275	220 Ω " "	R43	13-271	100 Ω " "
R7	13-295	10 KΩ " "	R44	13-382	10 KΩ $\frac{1}{4}$ W CR25
R8	13-295	10 KΩ " "			
R9	13-295	10 KΩ " "	C1	11-385	22 pF Ker
R10	13-295	10 KΩ " "	C2	11-416	4,7 nF "
R11	13-295	10 KΩ " "	C3	11-416	4,7 nF "
R12	13-295	10 KΩ " "	C4	11-404	150 pF "
R13	13-295	10 KΩ " "	C5	11-409	1 nF "
R14	13-295	10 KΩ " "	C6	11-409	1 nF "
R15	13-271	100 Ω " "	C7	11-409	1 nF "
R16	13-271	100 Ω " "	C8	11-409	1 nF "
R17	13-271	100 Ω " "	C9	11-409	1 nF "
R18	13-271	100 Ω " "	C10	11-409	1 nF "
R19	13-271	100 Ω " "	C11	11-409	1 nF "
R20	13-271	100 Ω " "	C12	11-409	1 nF "
R21	13-271	100 Ω " "	C13	11-416	4,7 nF "
R22	13-271	100 Ω " "	C14	11-504	4,7 μF/10V Tant
R23	13-259	10 Ω " "	C15	11-416	4,7 nF Ker
R24	13-283	1 KΩ " "	C16	11-481	10 nF Pol.
R25	13-283	1 KΩ " "	C17	11-478	6,8 nF "
R26	13-291	4,7 KΩ " "	C18	11-476	2,2 nF "
R27	13-291	4,7 KΩ " "	C19	11-508	33 μF/10V Tant
R28	13-291	4,7 KΩ " "	C20	11-504	4,7 μF/10V "
R29	13-299	22 KΩ " "	C21	11-409	1 nF Ker
R30	13-299	22 KΩ " "	C22	11-401	100 pF "
R31	13-271	100 Ω " "	C23	11-504	4,7 μF/10V Tant
R32	13-287	2,2 KΩ " "	C24	11-394	47 pF Ker
R33	13-295	10 KΩ " "	C25	11-409	1 nF "
R34	13-299	22 KΩ " "	C26	11-409	1 nF "
R35	13-313	27 KΩ " "	C27	11-504	4,7 μF/10V Tant
R36	13-287	2,2 KΩ " "	C28	11-444	560 pF Ker.
R37	13-300	33 KΩ " "	C29	11-509	47 μF/6,3VTant

Synthesizer logic

Print board B 17 C2 and B 22 C1

Tilhører tegn. nr.: 77201-3E2

Tegn.:

Stykl. nr.:

Kontr.:

77201-4S2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
Q1	19-093	BC 238B			
Q2	19-093	BC 238B			
Q3	19-093	BC 238B			
Q4	19-093	BC 238B			
Q5	19-093	BC 238B			
IC1	09-077	SN74LS02N			
IC2	09-052	SN74193N			
IC3	09-076	SN74LS193N			
IC4	09-008	MC4044P			
IC5	09-003	TAA765A			
IC6	09-078	SN74LS93N			
RFC1	04-114	74016-4E			
X1	11-816	AP 21 320 Khz			
Synthesizer logic Print board B 17 C2 and B 22 C1 Tilhører tegn. nr.: 77201-3E2			Tegn.:		Stykl. nr.:
			Kontr.:		77201-4S2



Rettet: 26-6-75, EH  
22-9-77 LT/AC  
8-5-78 JH/AC  
13-2-81 LBU/BC

# Voltage controlled oscillator for 2 m. Print board B19 B 1,2,3

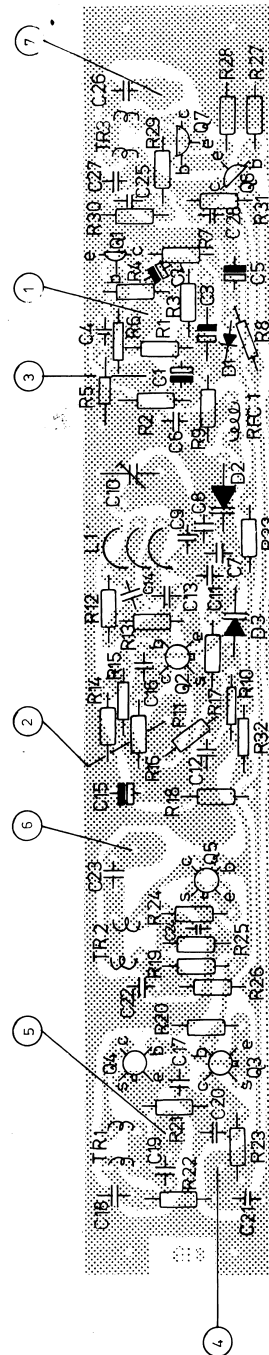
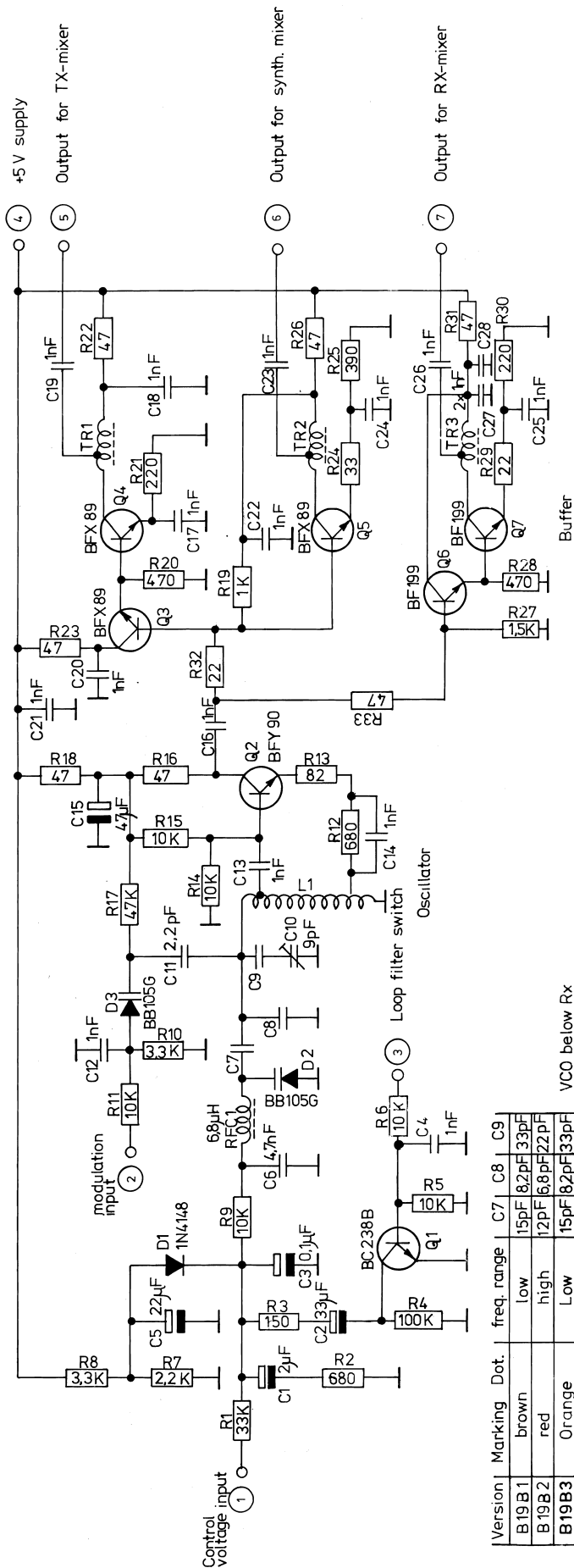
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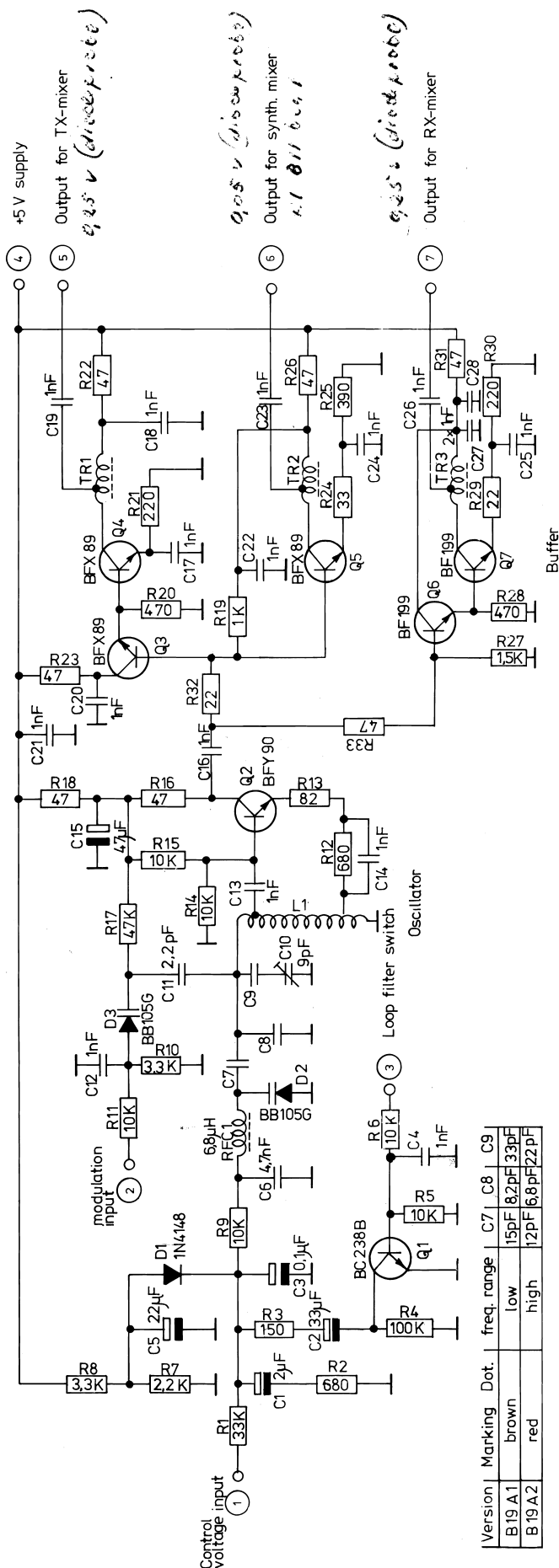
Tegn.: 7-3-75  
AC

Stykl. nr.:

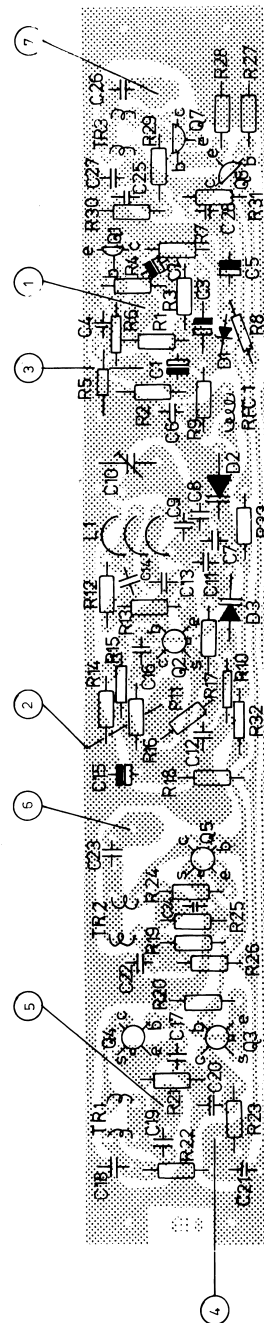
Tegn. nr.:

75082-3E2





D2 kan give korrering systemet



Rettet: 26-6-75, EH  
22-9-77 LT/AC  
8-5-78 JH/AC

Voltage controlled oscillator for 2m.  
Print board B19 B 1,2

AP-RADIOTELEFON

Tegn.: 7-3-75  
AC

Kontr.:

Stykl. nr.:

Tegn. nr.:

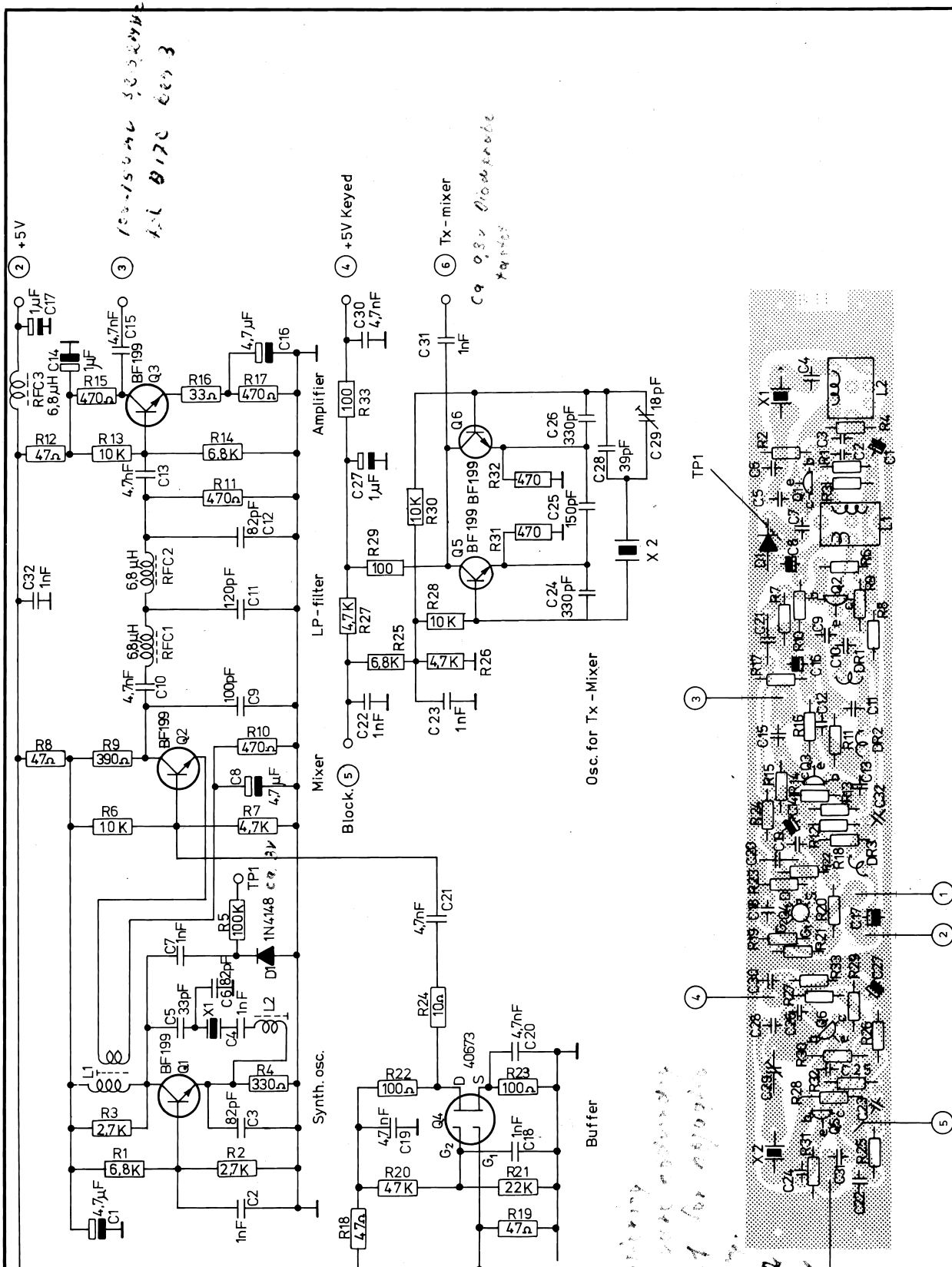
75082-3E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-300	33 K $\Omega$ 1/8 W	C4	11-409	1 nF Ker
R2	13-281	680 $\Omega$ "	C5	11-507	22 $\mu$ F/16 V Tant
R3	13-273	150 $\Omega$ "	C6	11-416	4,7 nF Ker
R4	13-306	100 K $\Omega$ "	C7	11-379	12 pF "
R5	13-295	10 K $\Omega$ "	C7	11-381	15 pF "
R6	13-295	10 K $\Omega$ "	C8	11-373	6,8 pF "
R7	13-287	2,2 K $\Omega$ "	C8	11-374	8,2 pF "
R8	13-289	3,3 K $\Omega$ "	C9	11-385	22 pF "
R9	13-295	10 K $\Omega$ "	C9	11-390	33 pF "
R10	13-289	3,3 K $\Omega$ "	C10	19-328	9 pF Tekelec
R11	13-295	10 K $\Omega$ "	C11	11-363	2,2 pF Ker
R12	13-281	680 $\Omega$ "	C12	11-409	1 nF "
R13	13-270	82 $\Omega$ "	C13	11-409	1 nF "
R14	13-295	10 K $\Omega$ "	C14	11-409	1 nF "
R15	13-295	10 K $\Omega$ "	C15	11-509	47 $\mu$ F/6,3V Tant
R16	13-267	47 $\Omega$ "	C16	11-409	1 nF Ker.
R17	13-302	47 K $\Omega$ "	C17	11-409	1 nF "
R18	13-267	47 $\Omega$ "	C18	11-409	1 nF "
R19	13-283	1 K $\Omega$ "	C19	11-409	1 nF "
R20	13-279	470 $\Omega$ "	C20	11-409	1 nF "
R21	13-275	220 $\Omega$ "	C21	11-409	1 nF "
R22	13-267	47 $\Omega$ "	C22	11-409	1 nF "
R23	13-267	47 $\Omega$ "	C23	11-409	1 nF "
R24	13-265	33 $\Omega$ "	C24	11-409	1 nF "
R25	13-278	390 $\Omega$ "	C25	11-409	1 nF "
R26	13-267	47 $\Omega$ "	C26	11-409	1 nF "
R27	13-285	1,5 K $\Omega$ "	C27	11-409	1 nF "
R28	13-279	470 $\Omega$ "	C28	11-409	1 nF "
R29	13-263	22 $\Omega$ "	D1	04-062	1N4148
R30	13-275	220 $\Omega$ "	D2	04-009	BB105G
R31	13-267	47 $\Omega$ "	D3	04-009	BB105G
R32	13-263	22 $\Omega$ "			
R33	13-267	47 $\Omega$ "	Q1	19-093	BC238B
			Q2	19-105	BFY90
C1	11-503	2,2 $\mu$ F/25 V Tant	Q3	19-102	BFX89
C2	11-508	33 $\mu$ F/10 V "	Q4	19-102	BFX89
C3	11-500	0,1 $\mu$ F/35 V "	Q5	19-102	BFX89
Voltage controlled oscillator for 2M				Tegn.:	Stykl. nr.:
Print board B 19 B 1,2				Kontr.:	75082-4S 2
Tilhører tegn. nr.: 75082-3E 2					

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
Q6	19-104	BF 199			
Q7	19-104	BF 199			
RFC- 1	04-114	74016-4E			
L1/1-2 L1/3		75291-4E2 80123-4E2			
TR1		75288-4E2			
TR2		75288-4E2			
TR3		75288-4E2			
Voltage controlled oscillator for 2M Print board B 19 B 1,2,3 Tilhører tegn. nr.: 75082-3E2			<div>Tegn.:</div> <div>Stykl. nr.:</div> <div>Kontr.:</div> <div>75082-4S 2</div>		



Rettet: 26- 6- 75 EH.  
8-5-78 JH/AC

Synthesizer mixer and TX-oscillator  
for 2 m Print board B11B1

AP-RADIOTELEFON

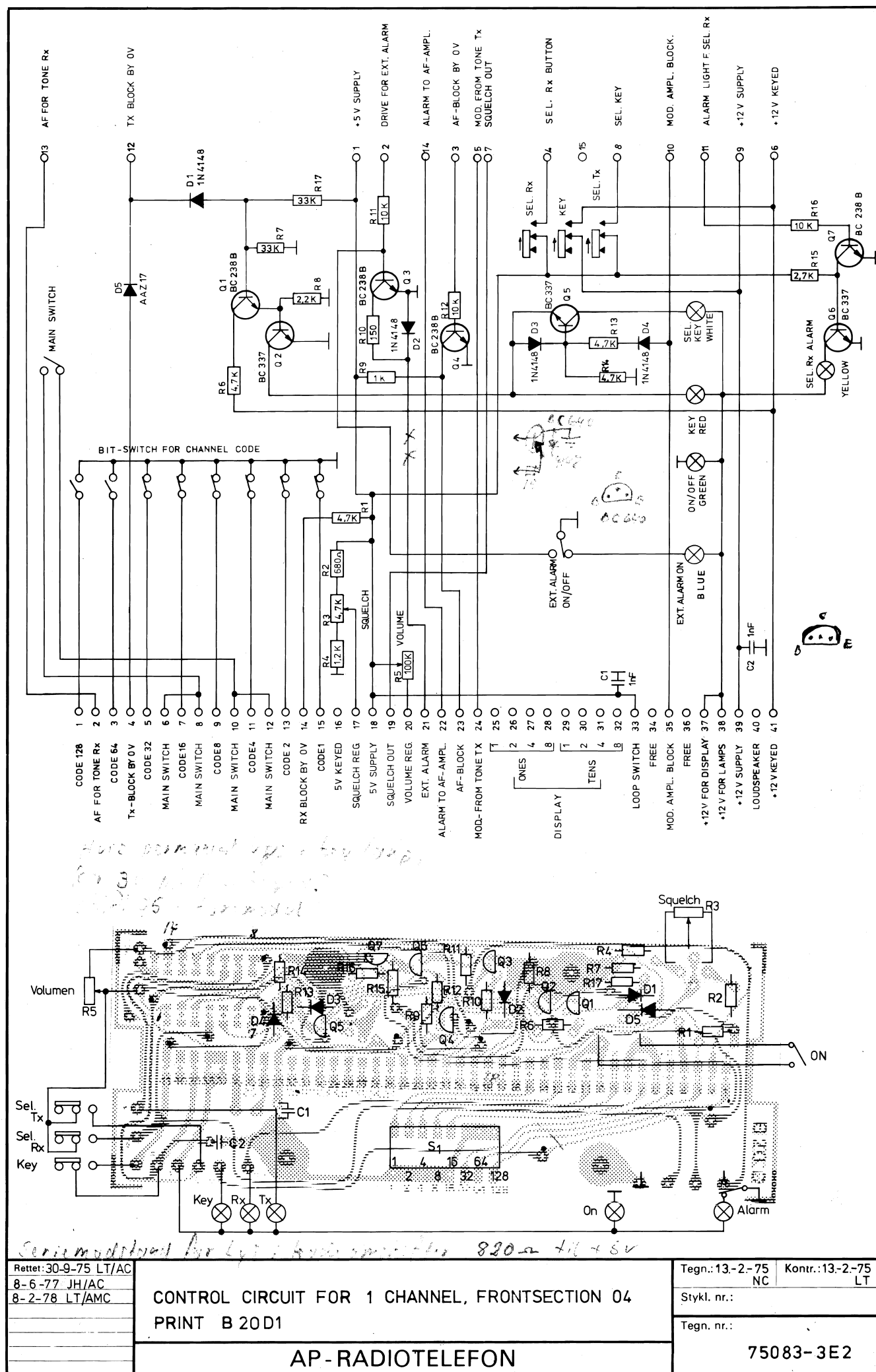
Tegn.: 13-1-75 Kontr.:  
AC  
Stykl. nr.:  
Tegn. nr.:  
75019-3E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-293	6,8 K $\Omega$ 1/8W CR 16	C4	11-409	1 nF Ker.
R2	13-288	2,7 K $\Omega$ " "	C5	11-428	33 pF Ker. N750
R3	13-288	2,7 K $\Omega$ " "	C6	11-429	82 pF Ker. "
R4	13-277	330 $\Omega$ " "	C7	11-409	1 nF Ker.
R5	13-394	100 K $\Omega$ $\frac{1}{4}$ W CR 25	C8	11-504	4,7 $\mu$ F/10V Tant.
R6	13-295	10 K $\Omega$ 1/8W CR 16	C9	11-401	100 pF Ker.
R7	13-291	4,7 K $\Omega$ " "	C10	11-416	4,7 nF "
R8	13-267	47 $\Omega$ " "	C11	11-403	120 pF "
R9	13-278	390 $\Omega$ " "	C12	11-399	82 pF "
R10	13-279	470 $\Omega$ " "	C13	11-416	4,7 nF "
R11	13-279	470 $\Omega$ " "	C14	11-502	1 $\mu$ F/35V Tant.
R12	13-267	47 $\Omega$ " "	C15	11-416	4,7 nF Ker.
R13	13-295	10 K $\Omega$ " "	C16	11-504	4,7 $\mu$ F/10V Tant.
R14	13-293	6,8 K $\Omega$ " "	C17	11-502	1 $\mu$ F/35V "
R15	13-279	470 $\Omega$ " "	C18	11-409	1 nF Ker.
R16	13-265	33 $\Omega$ " "	C19	11-416	4,7 nF "
R17	13-279	470 $\Omega$ " "	C20	11-415	4,7 nF "
R18	13-267	47 $\Omega$ " "	C21	11-415	4,7 nF "
R19	13-267	47 $\Omega$ " "	C22	11-409	1 nF "
R20	13-302	47 K $\Omega$ " "	C23	11-409	1 nF "
R21	13-299	22 K $\Omega$ " "	C24	11-430	330 pF N750
R22	13-271	100 $\Omega$ " "	C25	11-404	150 pF "
R23	13-271	100 $\Omega$ " "	C26	11-430	330 pF N750
R24	13-259	10 $\Omega$ " "	C27	11-502	1 $\mu$ F/35V Tant.
R25	13-293	6,8 K $\Omega$ " "	C28	11-293	39 pF Ker.
R26	13-291	4,7 K $\Omega$ " "	C29	19-330	18 pF Trim.
R27	13-291	4,7 K $\Omega$ " "	C30	11-416	4,7 nF Ker.
R28	13-295	10 K $\Omega$ " "	C31	11-409	1 nF "
R29	13-271	100 $\Omega$ " "	C32	11-409	1 nF "
R30	13-295	10 K $\Omega$ " "			
R31	13-279	470 $\Omega$ " "			
R32	13-279	470 $\Omega$ " "	D1	04-062	1N4148
R33	13-271	100 $\Omega$ " "			
C1	11-504	4,7 $\mu$ F/10V Tant.			
C2	11-409	1 nF Ker.			
C3	11-429	82 pF Ker. N750			
Synthesizer mixer and Tx-oscillator for 2 m. Print board B 11 B 1 Tilhører tegn. nr.: 75019-3E2				Tegn.:	Stykl. nr.:
				Kontr.:	75019-4S2

# AP-RADIOTELEFON

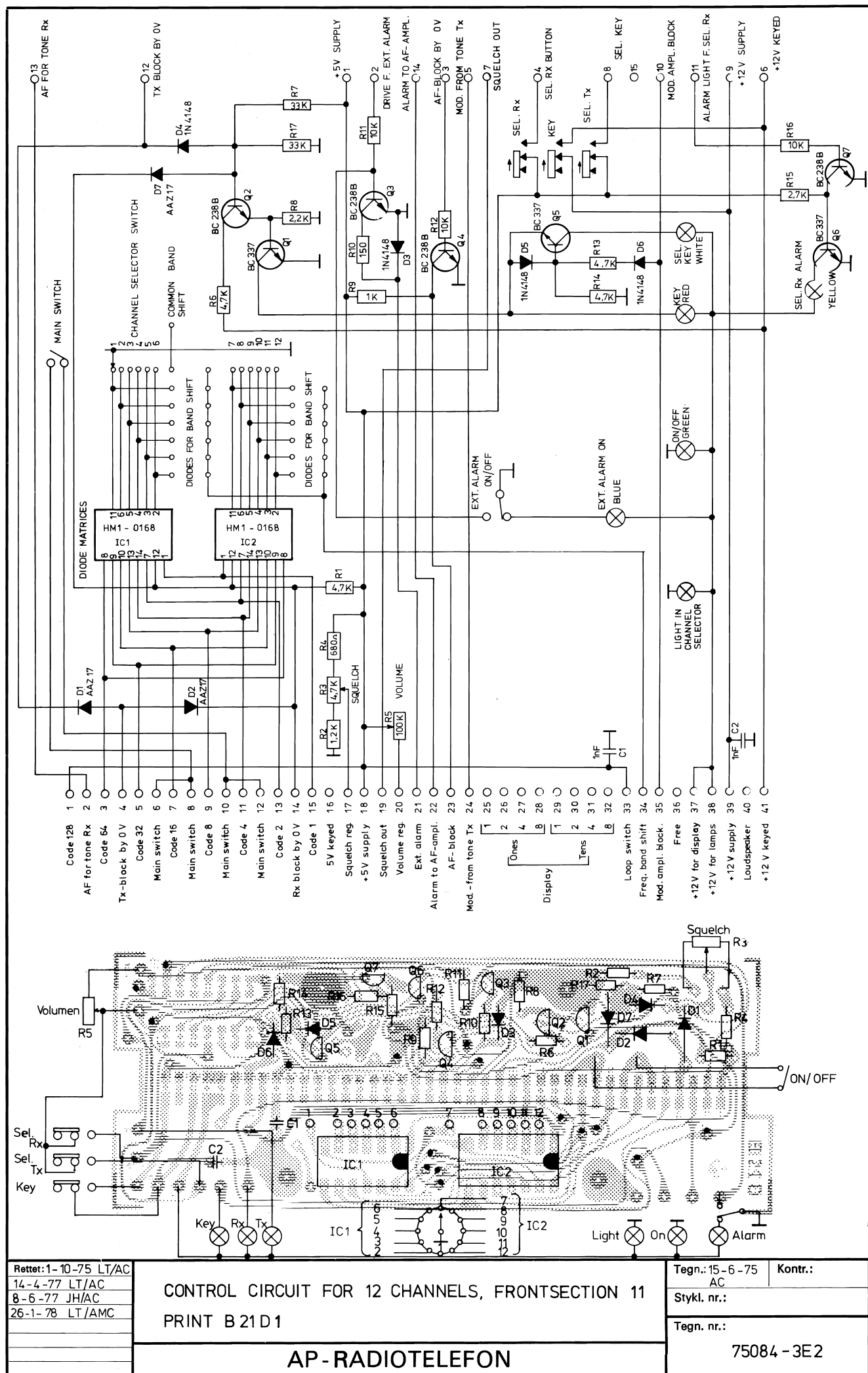
Nr.	Kode	Data	Nr.	Kode	Data
Q1	19-104	BF199			
Q2	19-104	BF199			
Q3	19-104	BF199			
Q4	19-128	40673			
Q5	19-104	BF199			
Q6	19-104	BF199			
RFC- 1	04-114	74016-4E			
RFC- 2	04-114	74016-4E			
RFC- 3	04-114	74016-4E			
L1		75294-4E2			
L2		75293-4E2			
X1		Frequency depen- dent on desired band. Spec. AP20			
X2		Frequency depen- dent on mode of operation. (Simplex, duplex etc) Spec. AP22			
Synthesizer mixer and TX-oscillator for 2m . Print board B 11B 1 Tilhører tegn. nr.: 75019-3E2					<div>Tegn.:</div> <div>Kontr.:</div> <div>Stykl. nr.: 75019-4S2</div>





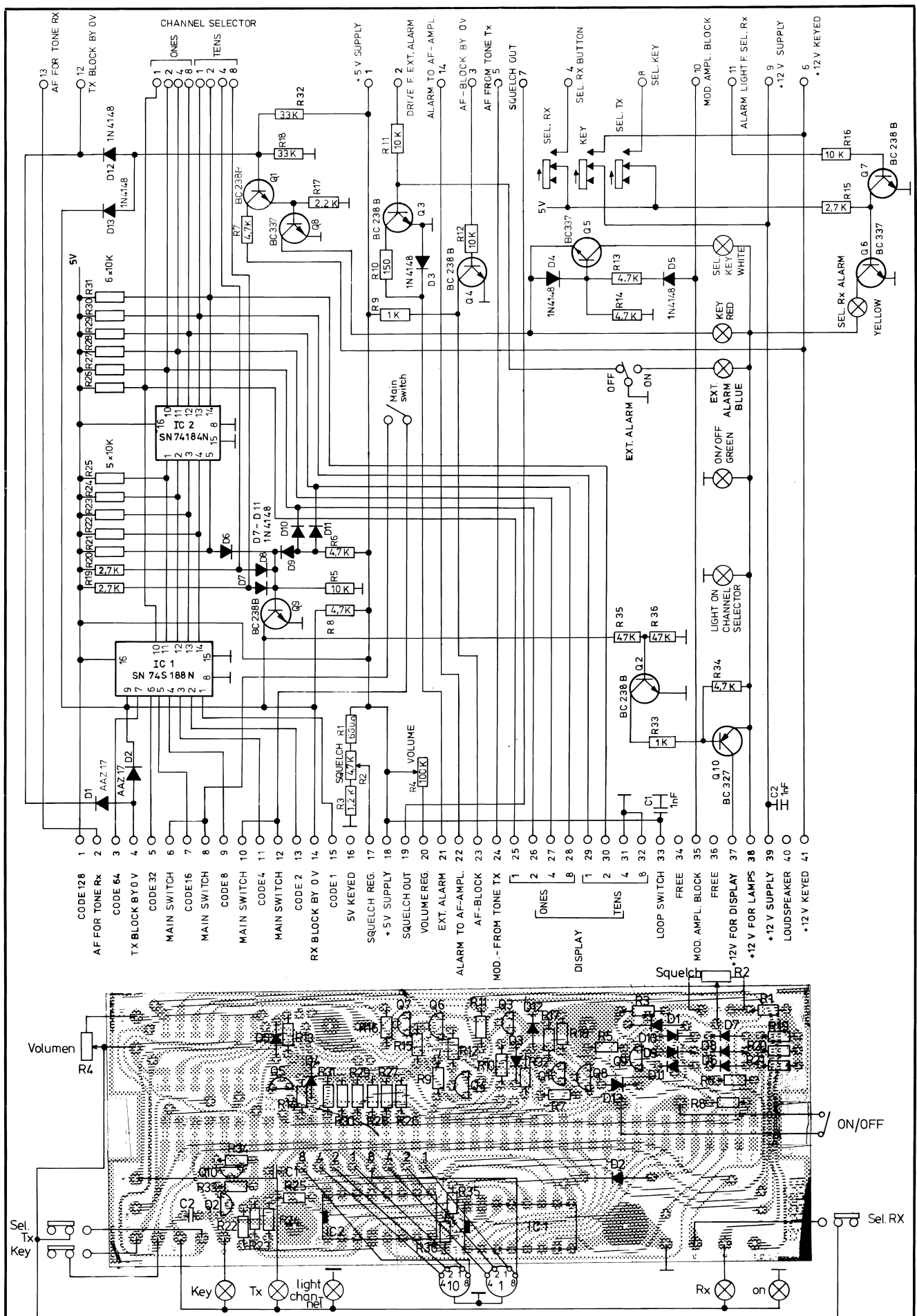
# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-291	4,7 K $\Omega$ 1/8 W CR16			
R2	13-281	680 $\Omega$ " "			
R3	16-022	4,7 K $\Omega$ Potm.			
R4	13-284	1,2 K $\Omega$ 1/8 W "			
R5	16-023	100 K $\Omega$ Lin.Potm.			
R6	13-291	4,7 K $\Omega$ 1/8 W CR16			
R7	13-300	33 K $\Omega$ " "			
R8	13-287	2,2 K $\Omega$ " "			
R9	13-283	1 K $\Omega$ " "			
R10	13-273	150 $\Omega$ " "			
R11	13-295	10 K $\Omega$ " "			
R12	13-295	10 K $\Omega$ " "			
R13	13-291	4,7 K $\Omega$ " "			
R14	13-291	4,7 K $\Omega$ " "			
R15	13-288	2,7 K $\Omega$ " "			
R16	13-295	10 K $\Omega$ " "			
R17	13-300	33 K $\Omega$ " "			
C1	11-409	1 nF Ker.			
C2	11-409	1 nF Ker.			
D1	04-062	1N4148			
D2	04-062	1N4148			
D3	04-062	1N4148			
D4	04-062	1N4148			
D5	04-002	AAZ17			
Q1	19-093	BC238B			
Q2	19-096	BC337			
Q3	19-093	BC238B			
Q4	19-093	BC238B			
Q5	19-096	BC337			
Q6	19-096	BC337			
Q7	19-093	BC238B			
Control Circuit for 1 channel, frontsection 04. Print B 20 D1 Tilhører tegn. nr.: 75083-3E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75083-4S2



# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-291	4,7 K $\Omega$ 1/8 W CR16	IC1	09-067	HM1-0168
R2	13-284	1,2 K $\Omega$ " "	IC2	09-067	HM1-0168
R3	16-022	4,7 K $\Omega$ Potm.			
R4	13-281	680 $\Omega$ 1/8 W "			
R5	16-023	100 K $\Omega$ Lin.Potm.			
R6	13-291	4,7 K $\Omega$ 1/8 W CR16			
R7	13-300	33 K $\Omega$ " "			
R8	13-287	2,2 K $\Omega$ " "			
R9	13-283	1 K $\Omega$ " "			
R10	13-273	150 $\Omega$ " "			
R11	13-295	10 K $\Omega$ " "			
R12	13-295	10 K $\Omega$ " "			
R13	13-291	4,7 K $\Omega$ " "			
R14	13-291	4,7 K $\Omega$ " "			
R15	13-288	2,7 K $\Omega$ " "			
R16	13-295	10 K $\Omega$ " "			
C1	11-409	1 nF Ker.			
C2	11-409	1 nF Ker.			
D1	04-002	AAZ17			
D2	04-002	AAZ17			
D3	04-062	1N4148			
D4	04-062	1N4148			
D5	04-062	1N4148			
D6	04-062	1N4148			
D7	04-002	AAZ17			
Q1	19-096	BC337			
Q2	19-093	BC238B			
Q3	19-093	BC238B			
Q4	19-093	BC238B			
Q5	19-096	BC337			
Q6	19-096	BC337			
Q7	19-093	BC238B			
Control circuit for 12 channel frontsection 11. Print B 21 D1 Tilhører tegn. nr.: 75084-3E2			Rettet:		<div>Tegn.: Stykl. nr.: 75084-4S2</div> <div>Kontr.:</div>



Rettet: 30-9-75 LT/AC  
 16-6-76 NC/LT  
 21-2-77 AC/LT  
 8-6-77 JH/AC

CONTROL CIRCUIT FOR 32 CHANNELS, FRONTSECTION 12  
 PRINT B 38 C 1

AP-RADIOTELEFON

Tegn.: 6-5-75  
 AC  
 Stylk. nr.:

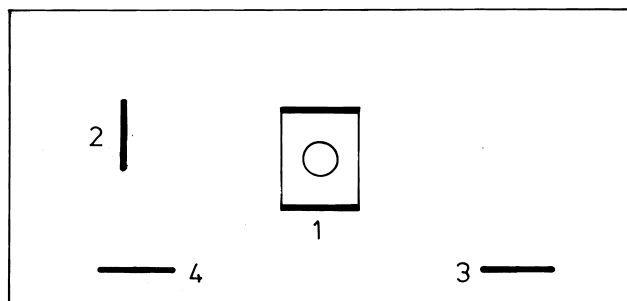
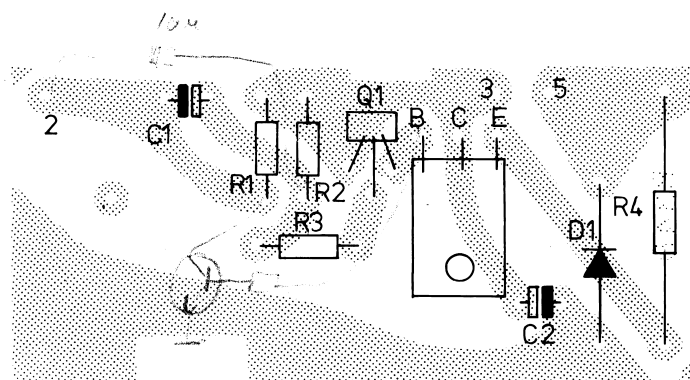
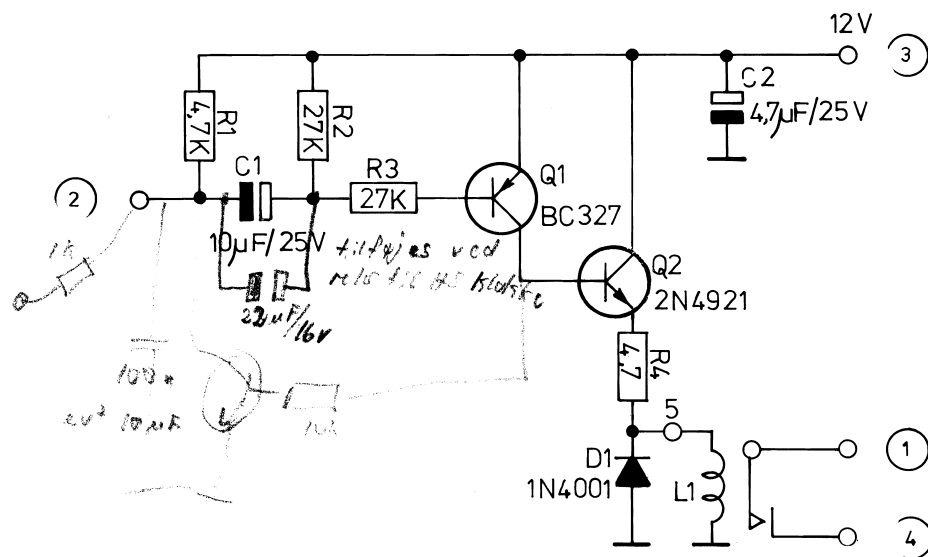
Kontr.: 7-5-75  
 LT

Tegn. nr.:

75207-3 E 2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-281	680 $\Omega$ 1/8 W CR16	C1	11-409	1nF Ker.
R2	16-022	4,7 K $\Omega$ Potm.	C2	11-409	1nF Ker.
R3	13-284	1,2 K $\Omega$ 1/8 W CR16			
R4	16-023	100 K $\Omega$ Lin.Potm.	D1	04-002	AAZ17
R5	13-295	10 K $\Omega$ 1/8 W CR16	D2	04-002	AAZ17
R6	13-291	4,7 K $\Omega$ " "	D3	04-062	1N4148
R7	13-291	4,7 K $\Omega$ " "	D4	04-062	1N4148
R8	13-291	4,7 K $\Omega$ " "	D5	04-062	1N4148
R9	13-283	1 K $\Omega$ " "	D6	04-062	1N4148
R10	13-273	150 $\Omega$ " "	D7	04-062	1N4148
R11	13-295	10 K $\Omega$ " "	D8	04-062	1N4148
R12	13-295	10 K $\Omega$ " "	D9	04-062	1N4148
R13	13-291	4,7 K $\Omega$ " "	D10	04-062	1N4148
R14	13-291	4,7 K $\Omega$ " "	D11	04-062	1N4148
R15	13-288	2,7 K $\Omega$ " "	D12	04-062	1N4148
R16	13-295	10 K $\Omega$ " "	D13	04-062	1N4148
R17	13-287	2,2 K $\Omega$ " "			
R18	13-300	33 K $\Omega$ " "	Q1	19-093	BC238B
R19	13-288	2,7 K $\Omega$ " "	Q2	19-093	BC238B
R20	13-288	2,7 K $\Omega$ " "	Q3	19-093	BC238B
R21	13-295	10 K $\Omega$ " "	Q4	19-093	BC238B
R22	13-295	10 K $\Omega$ " "	Q5	19-096	BC337
R23	13-295	10 K $\Omega$ " "	Q6	19-096	BC337
R24	13-295	10 K $\Omega$ " "	Q7	19-093	BC238B
R25	13-295	10 K $\Omega$ " "	Q8	19-096	BC337
R26	13-295	10 K $\Omega$ " "	Q9	19-093	BC238B
R27	13-295	10 K $\Omega$ " "	Q10	19-095	BC327
R28	13-295	10 K $\Omega$ " "			
R29	13-295	10 K $\Omega$ " "	IC1	09-066	SN74S188N
R30	13-295	10 K $\Omega$ " "	IC2	09-051	SN74184N
R31	13-295	10 K $\Omega$ " "			
R32	13-300	33 K $\Omega$ " "			
R33	13-283	1 K $\Omega$ " "			
R34	13-291	4,7 K $\Omega$ " "			
R35	13-302	47 K $\Omega$ " "			
R36	13-302	47 K $\Omega$ " "			
Control Circuit for 32 channel frontsection 12. Print B38C1 Tilhører tegn. nr.: 75207-3E2			Rettet:		<div>Tegn.:</div> <div>Stykl. nr.: 75207-4S2</div> <div>Kontr.:</div>



Relay box

Rettet: 23-3-76 AC/LT

Extern timing for hornrelay  
Print board B 34 B 1

AP-RADIOTELEFON 1/5

Tegn.: 21-4-75  
AC

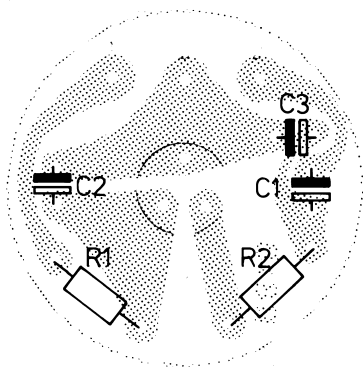
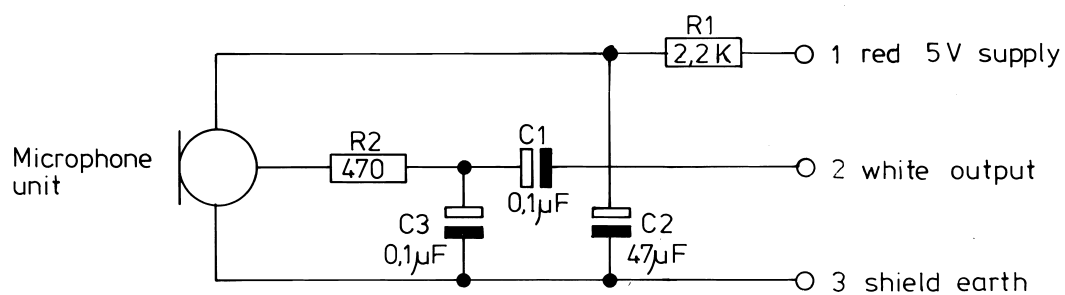
Kontr.: 21-4-75  
TJ

Stykl. nr.: 75169-4S2

Tegn. nr.: 75169-4E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-291	4,7 K $\Omega$ 1/8W CR16			
R2	13-313	27 K $\Omega$ " "			
R3	13-313	27 K $\Omega$ " "			
R4	13-687	4,7 $\Omega$ 6 W Dale			
C1	11-506	10 $\mu$ F/25V Tant.			
C2	11-505	4,7 $\mu$ F"25V "			
D1	04-060	1N4001			
Q1	19-095	BC327			
Q2	19-175	2N4921			
L1	17-054	Relæ 274-10			
Extern timing hornrelay Print board B 34 B 1 Tilhører tegn. nr.: 75169-4E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div> <div>Stykl. nr.: 75169-4S2</div>

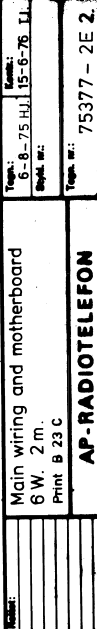


Rettet:	Microphone 213-020	Tegn.: 4-3-77	Kontr.:
25-5-77 LT/AC		AC	
	Print board B 81 B1	Stykl. nr.:	
	AP-RADIOTELEFON 1/5	Tegn. nr.:	
		77127-4E2	



# AP-RADIOTELEFON

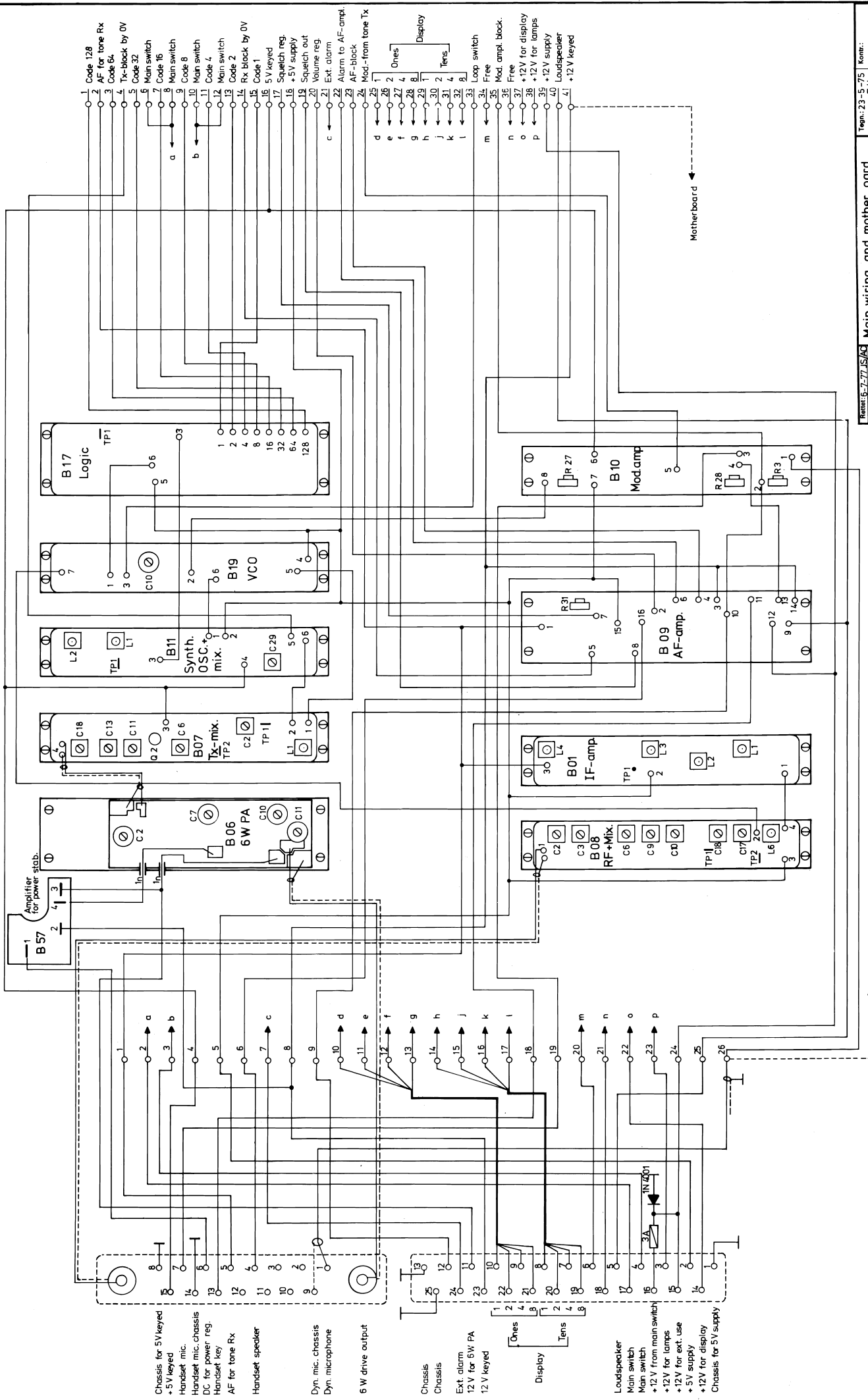
Nr.	Kode	Data	Nr.	Kode	Data
R1	13-287	2,2 K $\Omega$ 1/8W CR 16			
R2	13-279	470 $\Omega$ " "			
C1	11-500	0,1 $\mu$ F/35 V tant.			
C2	11-509	47 $\mu$ F/6,3 V "			
C3	11-500	0,1 $\mu$ F/35 V "			
	13-062	Mic. EM-10LB			
Microphone 213-020 Print board B 81 B1 Tilhører tegn. nr.: 77127-4E2			Rettet:		Tegn.: Kontr.:
					Stykl. nr.: 77127-4S2





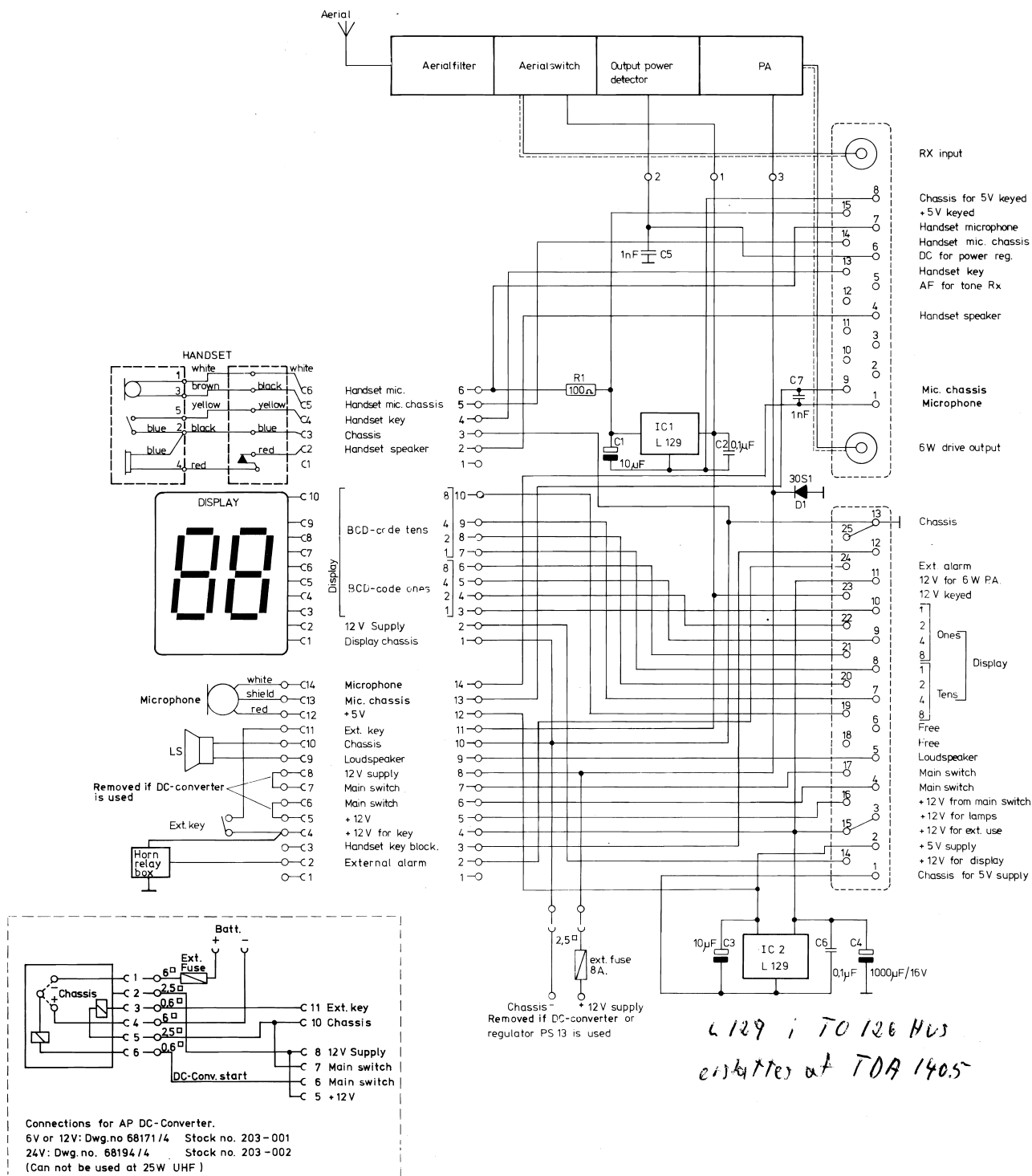




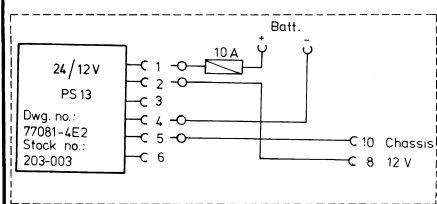
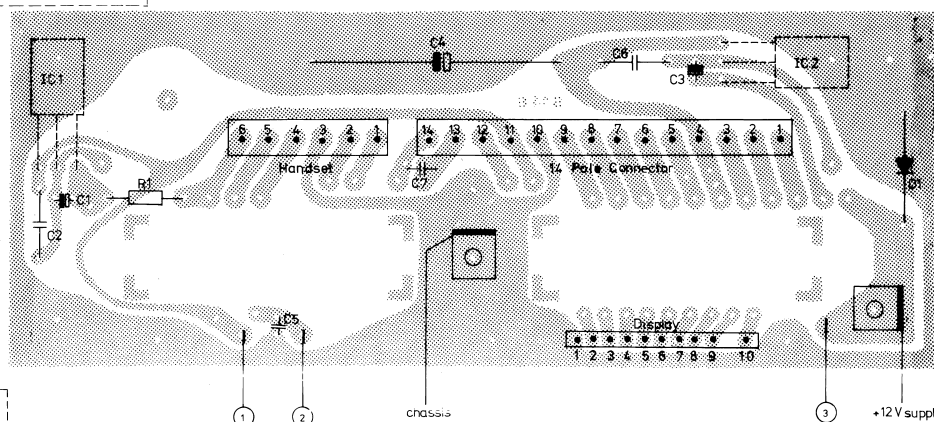


Reviz. 5-77 JS/AC	Topn. 23-5-75	Kont.:
4-7-78 JS/AC	EH	
	Bykl. nr.:	
	Topn. nr.:	75240-2E2

Main wiring and mother oard  
 Extern  
 2 m.  
 Print B 23 C  
 AP-RADIOTELEFON



L 129 ; TO 126 HV3  
 existier at TOA 1405

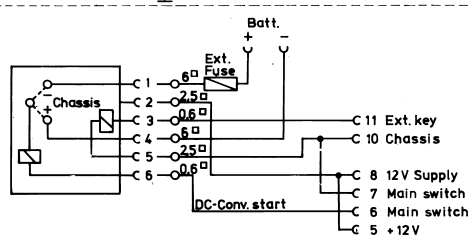
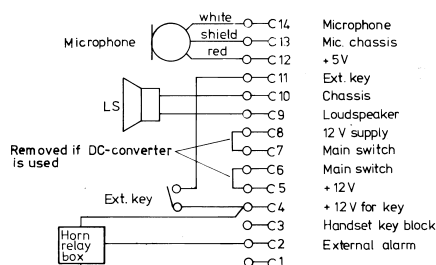
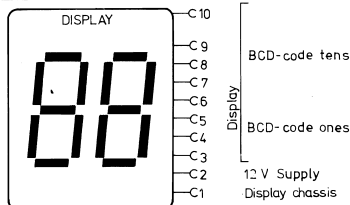
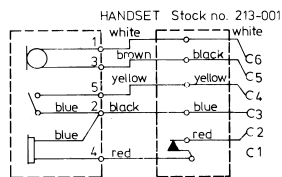


Retest: 9-6-76 LT/NC 1-1-76 BT/NC 16-3-77 TP/AC 15-5-77 TP/AC	Installation for AP 2000 with external PA-stage Print board B 14 B1	Tegn.: 12-2-75 AC	Kont.:
	AP-RADIOTELEFON %	Styl. nr.:	Tegn. nr.: 75058-2E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-359	100 $\Omega$ $\frac{1}{4}$ W CR 16			
C1	11-506	10 $\mu$ F/25V Tant.			
C2	11-353	0,1 $\mu$ F Laco			
C3	11-506	10 $\mu$ F/25V Tant.			
C4	05-030	1000 $\mu$ F/16V Elko			
C5	11-409	1 nF Ker.			
C6	11-353	0,1 $\mu$ F Laco.			
C7	11-409	1 nF Ker.			
D1	04-040	30S1			
IC1	09-081	TDA 1405			
IC2	09-081	TDA 1405			
Installation for AP 2000, ext PA			Tegn.:		
Print board B 14 B 1			Stykl. nr.:		
Tilhører tegn. nr.: 75058-2E2			Kontr.:		
			75058-4S2		



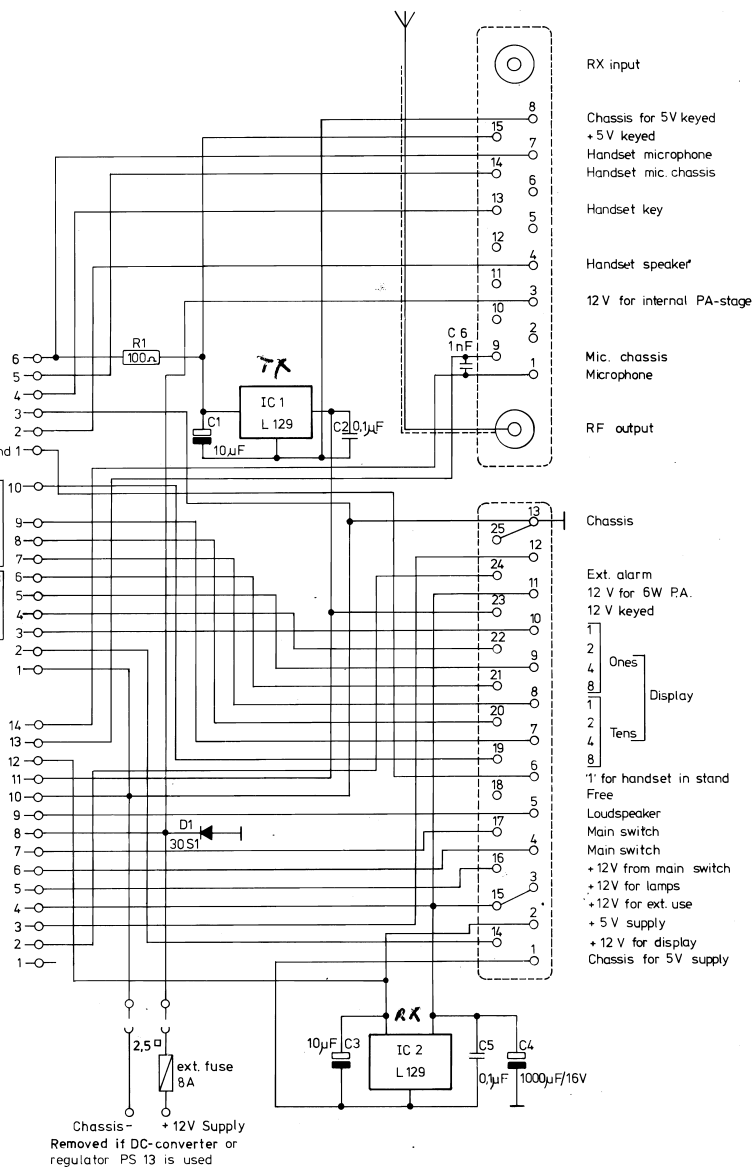


Connections for AP DC-Converter  
 6V or 12V: Dwg.no 68171/4 Stock no. 203-001  
 24V: Dwg.no. 68194/4 Stock no. 203-002  
 (Can not be used at 25W UHF)

Handset mic.  
 Handset mic. chassis  
 Handset key  
 Chassis  
 Handset speaker  
 '1' for handset in stand 1

BCD-code tens  
 BCD-code ones  
 12 V Supply  
 Display chassis

Microphone  
 Mic. chassis  
 +5V  
 Ext. key  
 Chassis  
 Loudspeaker  
 12 V supply  
 Main switch  
 Main switch  
 +12V  
 +12V for key  
 Handset key block.  
 External alarm



RX input

Chassis for 5V keyed  
 +5V keyed  
 Handset microphone  
 Handset mic. chassis  
 Handset key

Handset speaker

12 V for internal PA-stage

Mic. chassis  
 Microphone

RF output

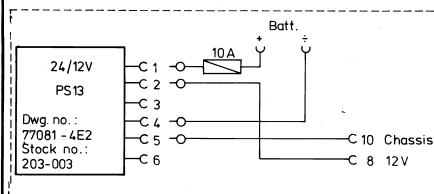
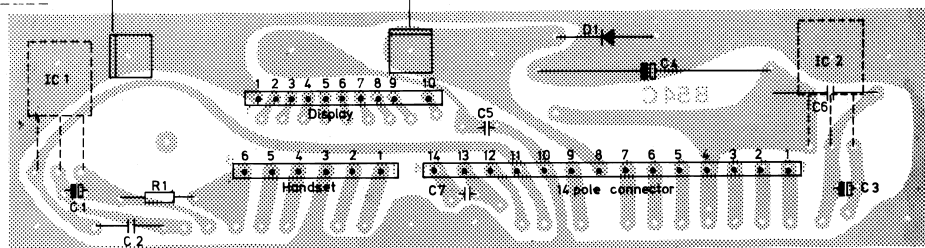
Chassis

Ext. alarm  
 12 V for 6W PA.  
 12 V keyed

Ones  
 Tens

'1' for handset in stand  
 Free  
 Loudspeaker  
 Main switch  
 Main switch  
 +12V from main switch  
 +12V for lamps  
 +12V for ext. use  
 +5V supply  
 +12V for display  
 Chassis for 5V supply

Chassis 12V Supply



Rettet:  
 6-9-76 LT/NC  
 16-3-77 TP/AC  
 4-5-77 TP/AC  
 7-6-77 BU/AC

Installation for AP 2000  
 with internal PA-stage  
 Print board B54C2

AP-RADIOTELEFON

Tegn.: 14-2-75

AC

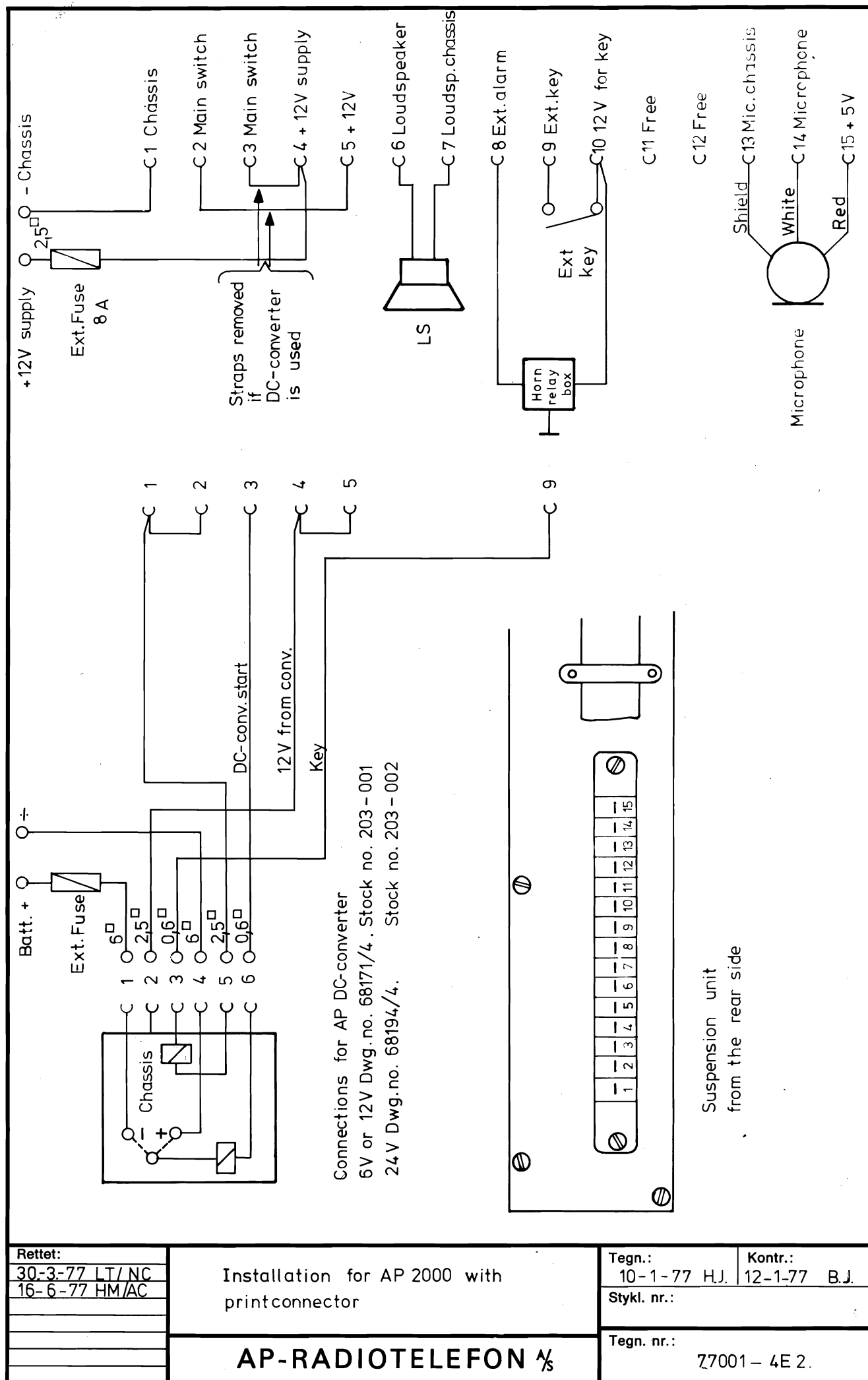
Stykt. nr.:

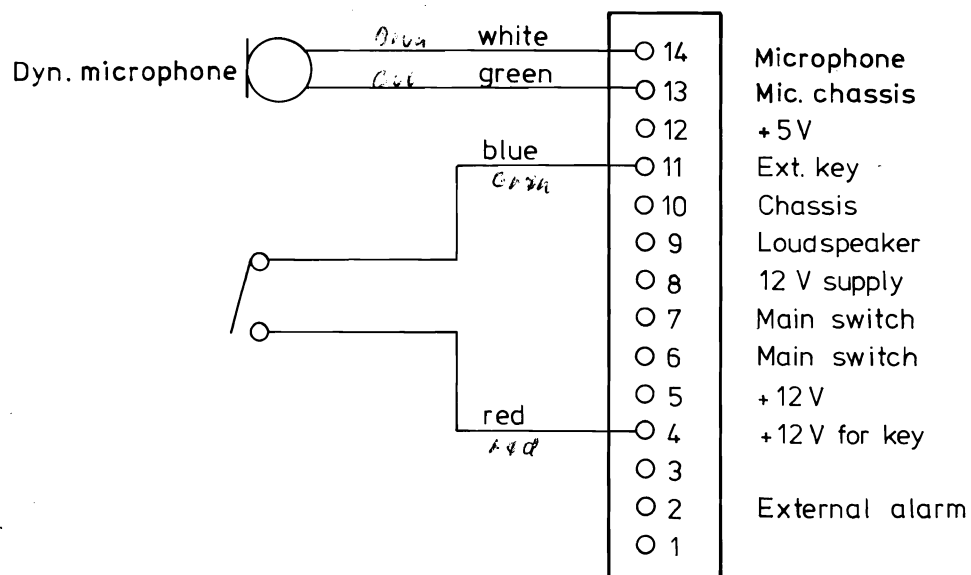
Tegn. nr.:

75061-2E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-359	100 $\Omega$ $\frac{1}{4}$ W CR 25			
C1	11-506	10 $\mu$ F/25V Tant.			
C2	11-353	0,1 $\mu$ F Laco			
C3	11-506	10 $\mu$ F/25V Tant.			
C4	05-030	1000 $\mu$ F/16V Elko			
C5	11-353	0,1 $\mu$ F Laco			
C6	11-409	1 nF ker.			
D1	04-040	30S1			
IC1	09-081	TDA 1405			
IC2	09-081	TDA 1405			
Installation for AP 2000 int. Print board B 54 C 2 PA Tilhører tegn. nr.: 75061-2E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75061-4S2





Rettet:	Installation for close talk microphone, AP 2000	Tegn.: 4-11-76	Kontr.:
		AC	
		Stykl. nr.:	
		Tegn. nr.:	
		76327-4E2	
AP-RADIOTELEFON 1/2			