

Offentlig biltelefon UHF  
80 kanaler duplex med  
kanalsøgning

MANUAL nr. 145



# CONTENTS FOR PUBLIC MOBILE TELEPHONE UHF

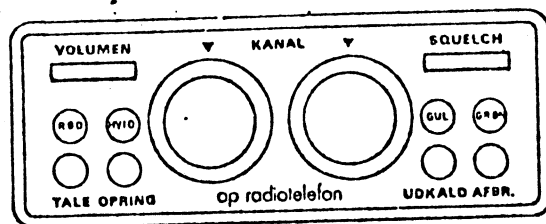
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## Betjening af offentlig biltelefon UHF med kanalsøgning.



1. Tænd for apparatet ved at trykke på knappen "AFBR.". Grøn lampe lyser. Lys i kanalvælger og display.
2. Opkald.  
Stil kanalvælgeren på den ønskede kaldekanal. Når kanalen er fri, trykkes på knappen "OPRING" i ca. 1 sek. Hvid lampe lyser. Når centralen svarer drejes hen på den opgivne samtalekanal. Samtalen føres enten som duplex ved anvendelse af mikrotelefonen, eller som simplex ved brug af apparatets tastknop mærket "TALE". Den røde lampe indikerer tast.  
Når samtalen er slut, trykkes på knappen "OPRING".
3. Lytte/venteposition (med kanalsøgning).  
Kanalvælgeren stilles på 00. Herved slukker display, højttaleren afbrydes, samtlige tastfunktioner blokeres og apparatet starter kanalsøgning på kaldekanalerne.
4. Modtagelse af et opkald (med kanalsøgning).  
Når apparatet modtager et korrekt selektivt opkald på en kaldekanal standser søgningen, og der sendes automatis retursvar (1000 Hz i 2 sek.) på den aktuelle kaldekanal. Højttaleren giver alarm (1000 Hz tone), en eventuel extern alarm aktiveres og den gule lampe blinker. Displayet tænder så længe retursvaret varer, men er ellers stadig slukket. Tastfunktionerne er stadig blokeret.
5. Besvarelse af et opkald (fra kanalsøgning).  
Knappen "UDKALD" betjenes, hvorved den blinkende gule lampe slukkes, højttaleren kobles til, tastblokeringerne ophæves. Displayet tænder og viser, hvilken kaldekanal apparatet står på. Opkaldet besvares med anvendelse af apparatets taletast eller mikrotelefonen.



Kanalvælgeren stilles på den opgivne samtalekanal, og samtalen afvikles. Når samtalen er færdig afsluttes med et tryk på knappen "OPRING".

Kanalvælgeren stilles nu på 00 og kanalsøgningen starter igen, som beskrevet i punkt 3 ovenfor.

6. Lytte/venteposition uden anvendelse af kanalsøgning.

Kanalvælgeren stilles på den ønskede kaldekanal. Knappen "UDKALD" betjenes, hvorved den gule lampe tænder og display slukker. Højttaleren og samtlige tastfunktioner er blokeret.

7. Modtagelse af et opkald (uden anvendelse af kanalsøgning).

Ved modtagelse af et korrekt opkald blinker den gule lampe, og de under punkt 4 beskrevne alarmer (og retursvar) aktiveres.

8. Besvarelse af et opkald (uden anvendelse af kanalsøgning).

Knappen "UDKALD" betjenes hvorved højttaleren kobles til, display tænder og tastblokeringer ophæves. Opkaldet kan nu besvares ved anvendelse af apparatets tast eller mikrotelefonen.

9. Opkald fra lytte/venteposition.

Apparatet står i venteposition, d.v.s. gul lampe lyser og display er slukket. Højttaler og samtlige tastfunktioner er blokeret. Knappen "UDKALD" betjenes, hvorved den gule lampe slukkes, display tænder, højttaleren kobles til og tastblokeringen ophæves. Opkaldet kan nu foretages som under punkt 2.

Det bemærkes, at et opkald ikke kan foretages, medmindre højttaleren først er i funktion for kontrollytning af kaldekanalen.

Bemærkninger:

Hvis man på kanalsøgning har modtaget et opkald, d.v.s. den gule lampe blinker, display er slukket og kanalvælger står på 00, er søgningen stoppet på den kaldekanal, hvor opkaldet blev modtaget. Ønsker man nu at genstarte søgningen uden at besvare opkaldet (kan f.eks. være forældet), slukkes den blinkende gule lampe med

knappen "UDKALD" og kanalvælgeren drejes fra 00 til en vilkårlig anden kanal og tilbage til 00.

Betingelsen for at kanalsøgningen kører er følgende:

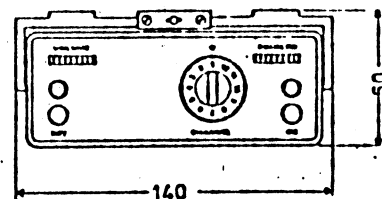
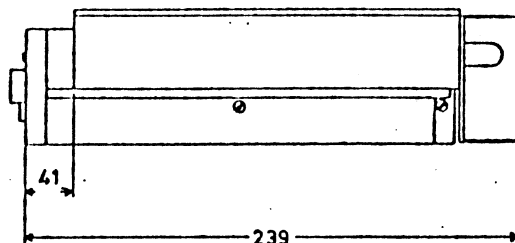
1. kanalvælger i 00.
2. display er slukket.
3. gul lampe ikke blinker.

UHF Offentlig biltelefon m. kanalsøgning

Mål og vægt i millimeter og kilogram

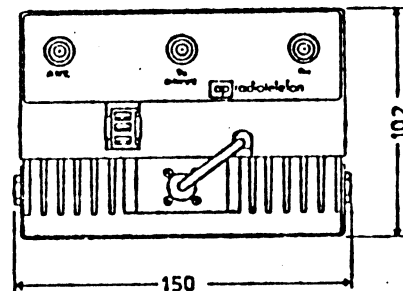
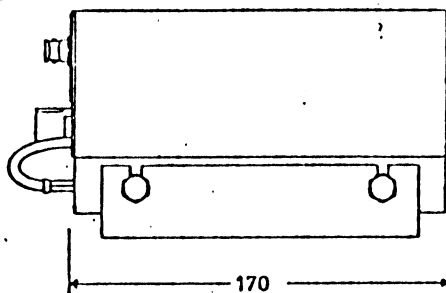
Apparatenhed m. ophæng

Total vægt: 2,4 kg



Duplexfilter m. PA-trin

Total vægt: 3,1 kg



## Technical description for AP 2000 UHF

### RECEIVER(Fig. 1)

Aerial Switch dwg. no. 75624-4E2  
(for sets with ext. PA see dwg. 75627-4E2)

The aerial switch is made by a relay, while TR 1 D1 and D2 makes a forward power sensing circuit for the transmitter.

RF-amplifier and 1st mixer (75476-4E2)

The RF amplifier consists of a bipolar-transistor with several tuned circuits, of this 4 helicoils, to give the necessary selectivity. The first mixer converts the RF-signal 406-432 MHz or 450-470MHz to 21,4 MHz with an oscillator injection of 427,4-453,4 MHz respective 471,4-491,4 MHz on the gate. Matching of the mixer output impedance to the crystal filter is made by the tuned circuit L6.

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 Q3.

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

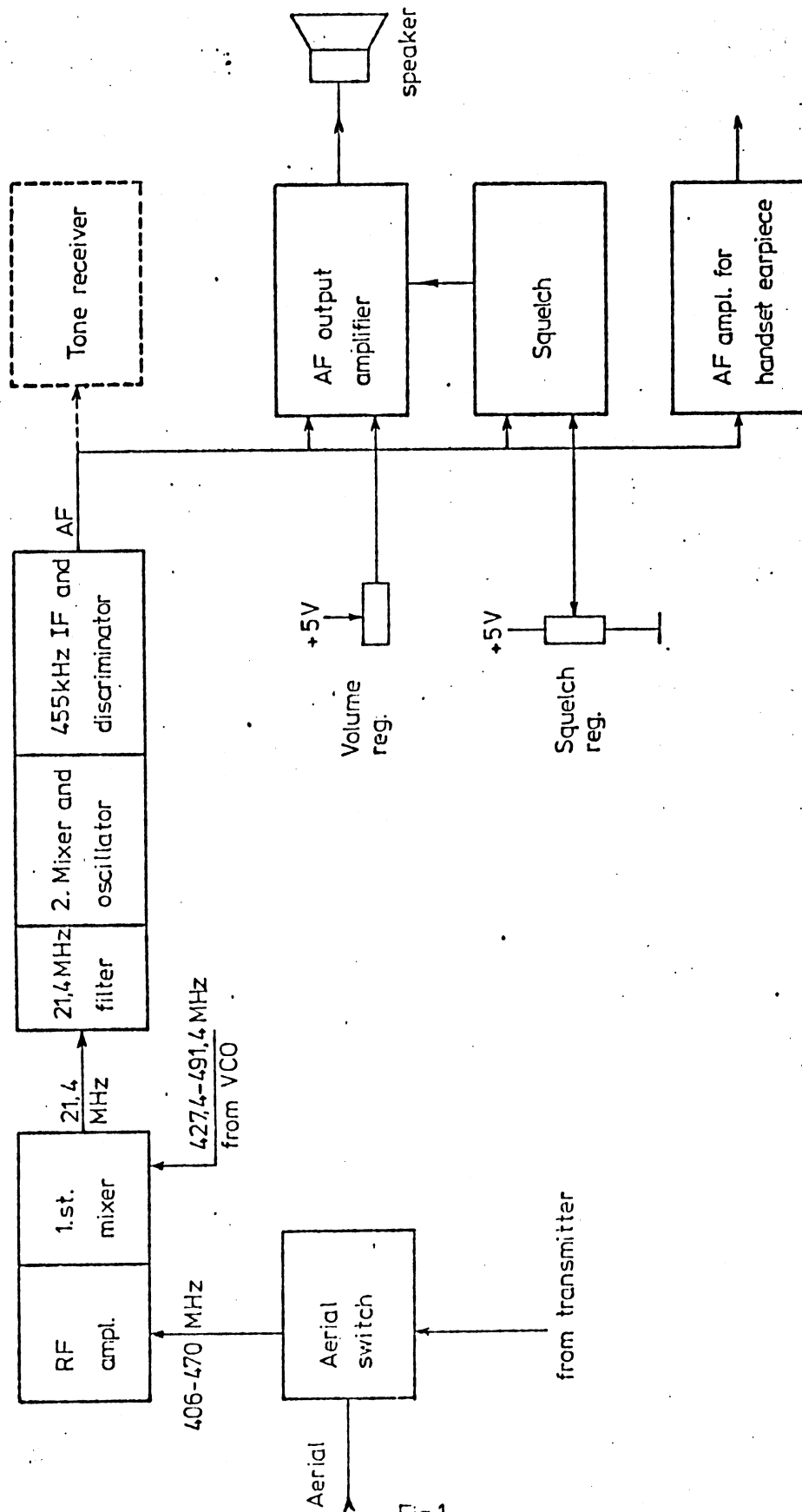


Fig.1

Rettot:       	Technical description for AP 2000 UHF		Tegn.: 26-3-76 AC	Kontr.: 1-4-76 CHB.
	AP-RADIOTELEFON ¼		Page: 2	
			Tegn. nr.: 76085-4E2	

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 C6 and C7 produce the deemphasis.

For the handset earpiece Q4 and Q5 gives the amplification. The squelch circuit consists of an 8 kHz tuned amplifier Q3 followed by a detector D11 and D12. With increasing noise level on the AF-input the voltage on the negative side on C19 will decrease from +5V. Getting lower than the squelch reg. voltage on point 7, the amplifier IC2 switches over to an output voltage of +5V and thus blocking the AF-output through the volume control circuit.

In the key control circuit Q1 and Q2 goes ON when the button in the handset connects point 11 to chassis, thus producing +12V on point 14. A positive voltage applied on point 10 will inhibit this function.

#### TRANSMITTER (Fig. 2)

##### Transmitter mixer and amplifier (75511-4E2)

Because the VCO has a frequency 21,4 MHz higher than the operating Rx- frequency this 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 (75628-3E2). Thus the crystal will be 10,7 MHz. For good suppression of VCO - and 21,4 MHz injection the Tx-mixer is a balanced transistor type. The two amplifier stages Q3 and Q4 give further suppression of unwanted sidebands and the necessary amplification to reach an output of approx. 30 mW.

##### 6 W power amplifier (75510-4E2)

The 6W power amplifier consists of three stages Q1, Q2 and Q3, where the output level can be regulated by varying the supply voltage for Q1 and Q2.

##### 25 W PA-stage (75627-4E2)

The output from the 25 W PA-stage goes through a forward power-

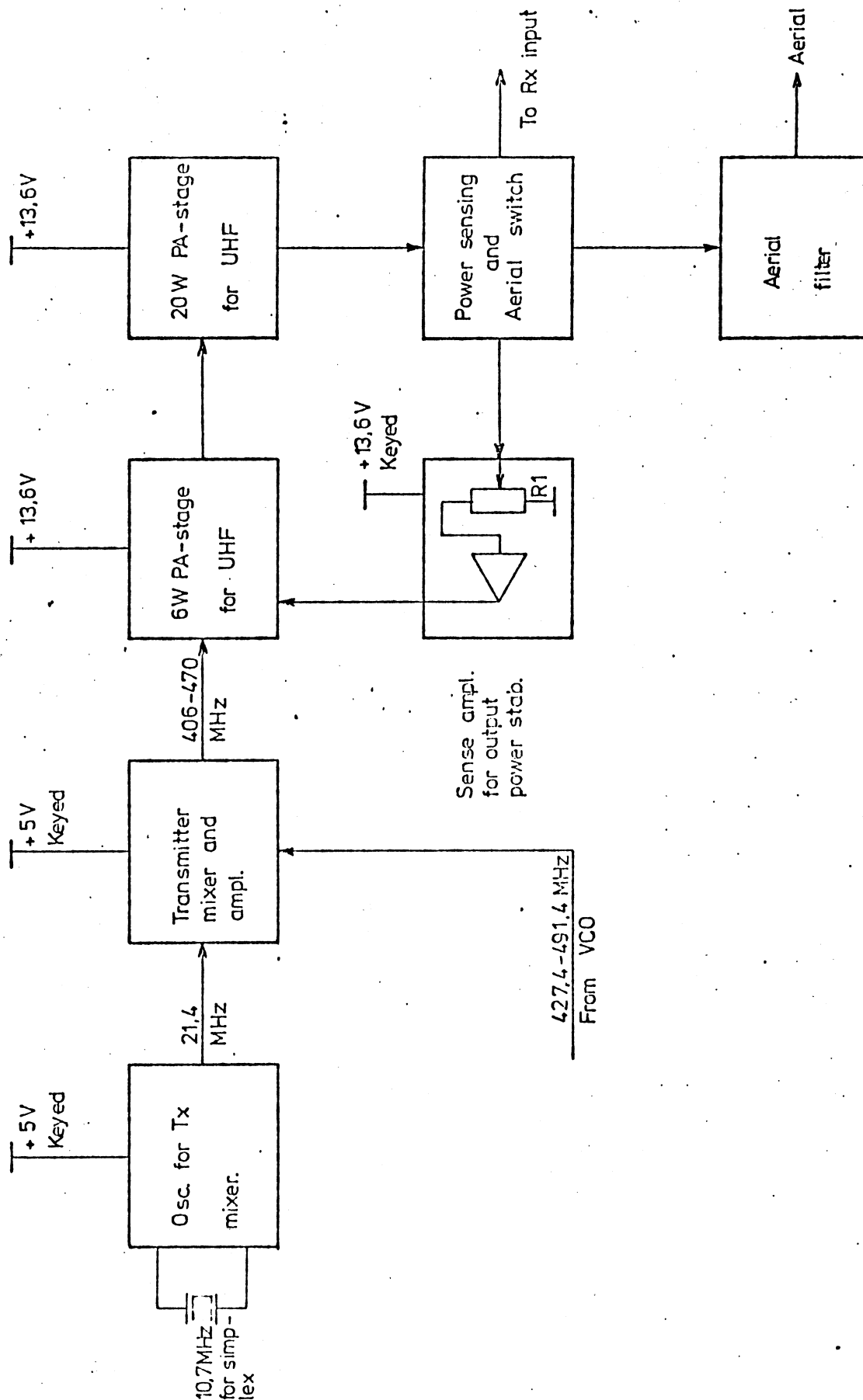


Fig. 2

Rettet:       	Technical description for AP 2000 UHF	Tegn.: 26- 3-75 AC	Kontr.: 1-4-76 CHB
		Page: 4	
	AP-RADIOTELEFON 1/5	Tegn. nr.: 76085-4E2	

sensing circuit to the aerial switch. The output power is adjustable with R2.

#### Output power stabilizing (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 a lower output voltage for the supply of Q 1 and Q 2 (75510-4E2), thus reducing the drive level. 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 25W it will be constant for further increase in supply voltage. The output level for supply voltage greater than approx. 13 V is adjustable with R2 on printboard B 59 B. 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 25 W stage are supplied independent of the key.

#### Aerial filter (75623-4E2)

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. D 4 will be conducting and feed the AF-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 for high AF-levels, which occurs in a conventional clipper-circuit. The other amplifier in IC 2 is used as a 3 kc 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. 3).

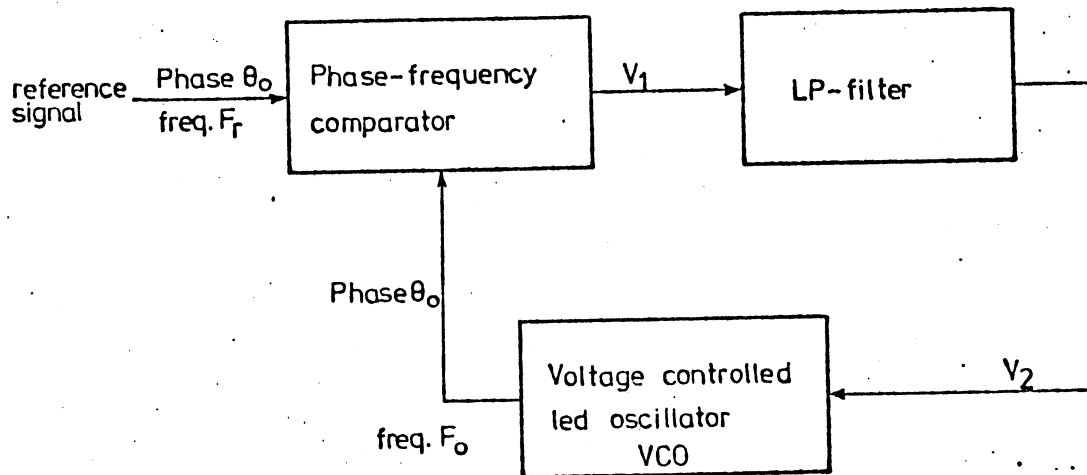


Fig.3 Basic phase locked loop.

### 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. 4). 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  $F_r$ .

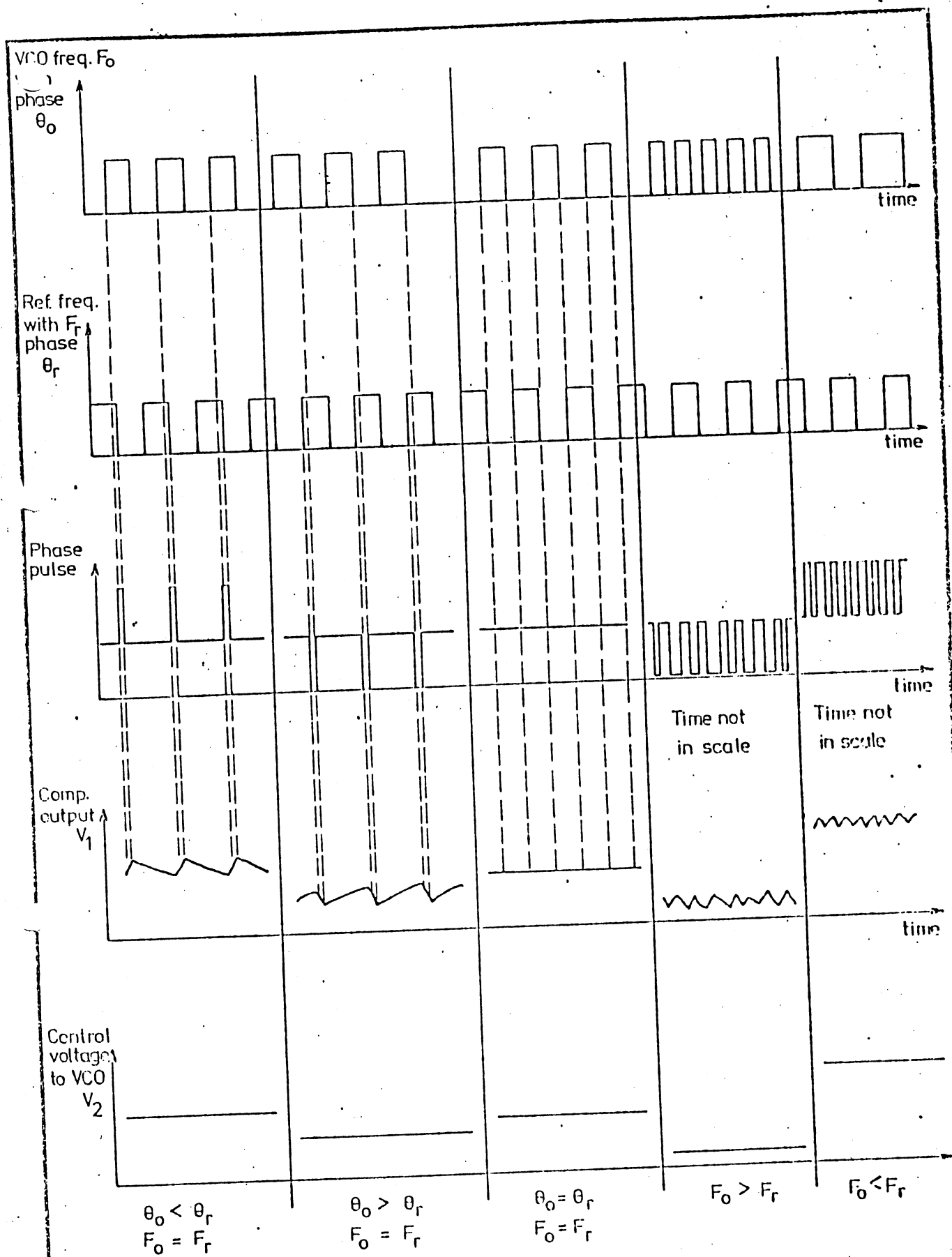
### Voltage controlled oscillator

This can be a 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. 4) and determines the dynamic behaviour (stability, step response) of the loop.

Let us consider a situation where the loop is out of lock and



SIMPLIFIED OPERATION of frequency  
and phase comparator

Fig. 4

Иллюстр.

Figure for synthesizer description

Тегн.: 29-3-76  
AC

Контр.: 1-4-76  
CHB

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Тегн. нр.:

72005-152

$F_o$  is greater than  $F_r$ . The comparator output voltage  $V_1$  will contain the normal ripple with frequency  $F_r$  and a beat note, but the mean DC level ( $= V_2$  after the filter) will be low (Fig. 4). Thus the VCO frequency will decrease and at the time  $F_o$  reaches  $F_r$  the loop will go in lock. Now  $F_o = F_r$  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 long as lock is maintained  $F_o$  will be equal  $F_r$ .

A multichannel synthesizer (Fig. 5)

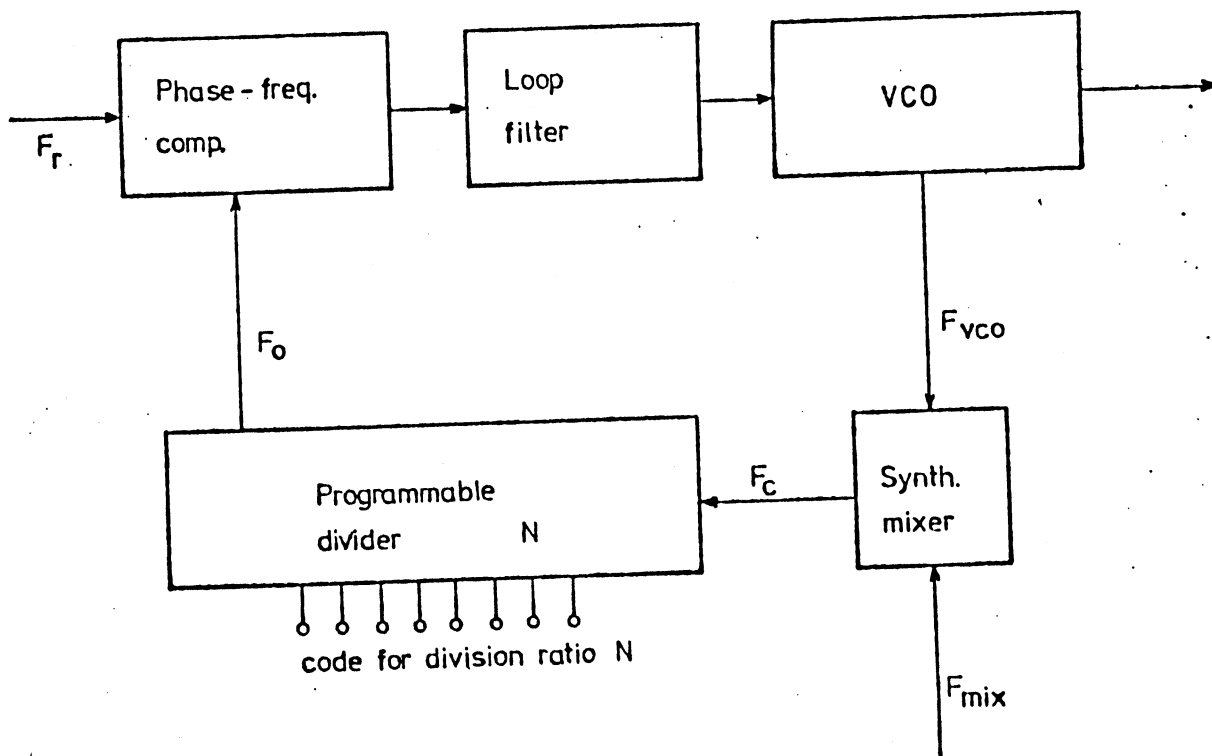


Fig. 5 Synthesizer loop

To build a multichannel synthesizer we have to add some more components (Fig. 5) 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

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

By changing the division ratio  $N$  we can get 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. 6)

#### Synthesizer logic (75062-3E2)

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

The output 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 form the programmable divider, where the division ratio  $N$  is the binary number on the eight channel code lines. The numbers on the codes 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 kHz are used as input to the frequency-phase comparator IC 4. The comparator output voltage  $V_1$  (Fig.2) can be seen on a test point TP 1. To suppress the 25 kHz ripple on the comparator output voltage Q 3 is connected as an active lowpass filter IC 5 is for DC-amplification.

76085-4E2

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# AP-RADIOTELEFON ⅞

### Voltage controlled oscillator (75o82-3E2)

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 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 (75o19-3E2)

In the synthesizer mixer Q 1 is a 4o Mc 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 Mc to give an output signal of 3,2 - 5,2 Mc. DR 1 and DR 2 are part of a 10 Mc low-pass filter connected to the amplifier stage Q 3.

### Channel code

From the blockschematic of the Synthesizer circuit (Fig. 6) we have:

$$F_{VCO} = 4 F_x + N \times 0,025 \text{ Mc where } 128 < N < 208.$$

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

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

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

## 1. Computation of the receiver frequency:

Known is: Crystal frequency  $F_x$  and channel code.

Example:  $F_x = 19,675 \text{ MHz}$

Code: 1 0 0 1 0 0 1 1

Division ratio  $N = 128 + 16 + 2 + 1 = 147$

Using equation (5):

$$F_{Rx} = 24 \times 19,675 + (147 \times 0,025) - 21,4 = \underline{454,475 \text{ MHz}}$$

## 2. Computation of the channel code:

Known is: Crystal frequency  $F_x$  and desired receiver frequency  $F_{Rx}$ .

Rearranging equation (5) gives

$$N = \frac{F_{Rx} - 24 F_x + 21,4}{0,025}$$

Example:  $F_x = 19,675 \text{ MHz}$ ,  $F_{Rx} = 455,625 \text{ MHz}$   
 $N = (455,625 - 24 \times 19,675 + 21,4) / 0,025 = 193$

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

Channel code 1 1 0 0 0 0 0 1

NOTE: Because of the special synthesizer oscillator circuit, it has been necessary to specify the crystal X1 with a parallel capacity of 15pF. If you use a crystal specified with 30pF parallel capacity, the frequency should be about 250 ppm lower than the standard frequency given on the drawings \*75499-4E2, \*75500-4E2, and \*76312-4E2.

\*findes ikke i manual 145

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# Frekvensliste for UHF offentlig biltelefon

Synthesemixerkrystal: Mhz: 20,04896 AP 25

Sendermixerkrystal : Mhz: 15.7 AP 22

Kanal	Modt.frekv.	Send.frekv.	Kode f.kanalv.								Delefh.	Kanalkode							
nr.	Mhz	Mhz	8	4	2	1	8	4	2	1	N	128	64	32	16	8	4	2	1
01	463,000	453,000	0	0	0	0	0	0	0	1	129	1	0	0	0	0	0	0	1
02	463,025	453,025	0	0	0	0	0	0	1	0	130	1	0	0	0	0	0	1	0
03	463,050	453,050	0	0	0	0	0	0	1	1	131	1	0	0	0	0	0	1	1
04	463,075	453,075	0	0	0	0	0	1	0	0	132	1	0	0	0	0	1	0	0
05	463,100	453,100	0	0	0	0	0	1	0	1	133	1	0	0	0	0	1	0	1
06	463,125	453,125	0	0	0	0	0	1	1	0	134	1	0	0	0	0	1	1	0
07	463,150	453,150	0	0	0	0	0	1	1	1	135	1	0	0	0	0	1	1	1
08	463,175	453,175	0	0	0	0	1	0	0	0	136	1	0	0	0	1	0	0	0
09	463,200	453,200	0	0	0	0	1	0	0	1	137	1	0	0	0	1	0	0	1
10	463,225	453,225	0	0	0	1	0	0	0	0	138	1	0	0	0	1	0	1	0
11	463,250	453,250	0	0	0	1	0	0	0	1	139	1	0	0	0	1	0	1	1
12	463,275	453,275	0	0	0	1	0	0	1	0	140	1	0	0	0	1	1	0	0
13	463,300	453,300	0	0	0	1	0	0	1	1	141	1	0	0	0	1	1	0	1
14	463,325	453,325	0	0	0	1	0	1	0	0	142	1	0	0	0	1	1	1	0
15	463,350	453,350	0	0	0	1	0	1	0	1	143	1	0	0	0	1	1	1	1
16	463,375	453,375	0	0	0	1	0	1	1	0	144	1	0	0	1	0	0	0	0
17	463,400	453,400	0	0	0	1	0	1	1	1	145	1	0	0	1	0	0	0	1
18	463,425	453,425	0	0	0	1	1	0	0	0	146	1	0	0	1	0	0	1	0
19	463,450	453,450	0	0	0	1	1	0	0	1	147	1	0	0	1	0	0	1	1
20	463,475	453,475	0	0	1	0	0	0	0	0	148	1	0	0	1	0	1	0	0
21	463,500	453,500	0	0	1	0	0	0	0	1	149	1	0	0	1	0	1	0	1
22	463,525	453,525	0	0	1	0	0	0	1	0	150	1	0	0	1	0	1	1	0
23	463,550	453,550	0	0	1	0	0	0	1	1	151	1	0	0	1	0	1	1	1
24	463,575	453,575	0	0	1	0	0	1	0	0	152	1	0	0	1	1	0	0	0
25	463,600	453,600	0	0	1	0	0	1	0	1	153	1	0	0	1	1	0	0	1
26	463,625	453,625	0	0	1	0	0	1	1	0	154	1	0	0	1	1	0	1	0
27	463,650	453,650	0	0	1	0	0	1	1	1	155	1	0	0	1	1	0	1	1
28	463,675	453,675	0	0	1	0	1	0	0	0	156	1	0	0	1	1	1	0	0
29	463,700	453,700	0	0	1	0	1	0	0	1	157	1	0	0	1	1	1	0	1
30	463,725	453,725	0	0	1	1	0	0	0	0	158	1	0	0	1	1	1	1	0



Kanal	Modt.frekv.	Send.frekv.	Kode f.kanalv.								Delefh.	Kanalkode							
nr.	Mhz	Mhz	8	4	2	1	8	4	2	1	N	128	64	32	16	8	4	2	1
31	463,750	453,750	0	0	1	1	0	0	0	1	159	1	0	0	1	1	1	1	1
32	463,775	453,775	0	0	1	1	0	0	1	0	160	1	0	1	0	0	0	0	0
33	463,800	453,800	0	0	1	1	0	0	1	1	161	1	0	1	0	0	0	0	1
34	463,825	453,825	0	0	1	1	0	1	0	0	162	1	0	1	0	0	0	1	0
35	463,850	453,850	0	0	1	1	0	1	0	1	163	1	0	1	0	0	0	1	1
36	463,875	453,875	0	0	1	1	0	1	1	0	164	1	0	1	0	0	1	0	0
37	463,900	453,900	0	0	1	1	0	1	1	1	165	1	0	1	0	0	1	0	1
38	463,925	453,925	0	0	1	1	1	0	0	0	166	1	0	1	0	0	1	1	0
39	463,950	453,950	0	0	1	1	1	0	0	1	167	1	0	1	0	0	1	1	1
40	463,975	453,975	0	1	0	0	0	0	0	0	168	1	0	1	0	1	0	0	0
41	464,000	454,000	0	1	0	0	0	0	0	1	169	1	0	1	0	1	0	0	1
42	464,025	454,025	0	1	0	0	0	0	1	0	170	1	0	1	0	1	0	1	0
43	464,050	454,050	0	1	0	0	0	0	1	1	171	1	0	1	0	1	0	1	1
44	464,075	454,075	0	1	0	0	0	1	0	0	172	1	0	1	0	1	1	0	0
45	464,100	454,100	0	1	0	0	0	1	0	1	173	1	0	1	0	1	1	0	1
46	464,125	454,125	0	1	0	0	0	1	1	0	174	1	0	1	0	1	1	1	0
47	464,150	454,150	0	1	0	0	0	1	1	1	175	1	0	1	0	1	1	1	1
48	464,175	454,175	0	1	0	0	1	0	0	0	176	1	0	1	1	0	0	0	0
49	464,200	454,200	0	1	0	0	1	0	0	1	177	1	0	1	1	0	0	0	1
50	464,225	454,225	0	1	0	1	0	0	0	0	178	1	0	1	1	0	0	1	0
51	464,250	454,250	0	1	0	1	0	0	0	1	179	1	0	1	1	0	0	1	1
52	464,275	454,275	0	1	0	1	0	0	1	0	180	1	0	1	1	0	1	0	0
53	464,300	454,300	0	1	0	1	0	0	1	1	181	1	0	1	1	0	1	0	1
54	464,325	454,325	0	1	0	1	0	1	0	0	182	1	0	1	1	0	1	1	0
55	464,350	454,350	0	1	0	1	0	1	0	1	183	1	0	1	1	0	1	1	1
56	464,375	454,375	0	1	0	1	0	1	1	0	184	1	0	1	1	1	0	0	0
57	464,400	454,400	0	1	0	1	0	1	1	1	185	1	0	1	1	1	0	0	1
58	464,425	454,425	0	1	0	1	1	0	0	0	186	1	0	1	1	1	0	1	0
59	464,450	454,450	0	1	0	1	1	0	0	1	187	1	0	1	1	1	0	1	1
60	464,475	454,475	0	1	1	0	0	0	0	0	188	1	0	1	1	1	1	0	0
61	464,500	454,500	0	1	1	0	0	0	0	1	189	1	0	1	1	1	1	0	1
62	464,525	454,525	0	1	1	0	0	0	1	0	190	1	0	1	1	1	1	1	0
63	464,550	454,550	0	1	1	0	0	0	1	1	191	1	0	1	1	1	1	1	1
64	464,575	454,575	0	1	1	0	0	1	0	0	192	1	1	0	0	0	0	0	0
65	464,600	454,600	0	1	1	0	0	1	0	1	193	1	1	0	0	0	0	0	1
66	464,625	454,625	0	1	1	0	0	1	1	0	194	1	1	0	0	0	0	1	0
67	464,650	454,650	0	1	1	0	0	1	1	1	195	1	1	0	0	0	0	1	1
68	464,675	454,675	0	1	1	0	1	0	0	0	196	1	1	0	0	0	1	0	0
69	464,700	454,700	0	1	1	0	1	0	0	1	197	1	1	0	0	0	1	0	1

kanal	Modt.frekv.	Send.frekv.	Kode f.kanalv.	Delefh.	Kanalkode
nr.	Mhz	Mhz	8 4 2 1 8 4 2 1	N	128 64 32 16 8 4 2 1
70	464,725	454,725	0 1 1 1 0 0 0 0	198	1 1 0 0 0 1 1 0
71	464,750	454,750	0 1 1 1 0 0 0 1	199	1 1 0 0 0 1 1 1
72	464,775	454,775	0 1 1 1 0 0 1 0	200	1 1 0 0 1 0 0 0
73	464,800	454,800	0 1 1 1 0 0 1 1	201	1 1 0 0 1 0 0 1
74	464,825	454,825	0 1 1 1 0 1 0 0	202	1 1 0 0 1 0 1 0
75	464,850	454,850	0 1 1 1 0 1 0 1	203	1 1 0 0 1 0 1 1
76	464,875	454,875	0 1 1 1 0 1 1 0	204	1 1 0 0 1 1 0 0
77	464,900	454,900	0 1 1 1 0 1 1 1	205	1 1 0 0 1 1 0 1
78	464,925	454,925	0 1 1 1 1 0 0 0	206	1 1 0 0 1 1 1 0
79	464,950	454,950	0 1 1 1 1 0 0 1	207	1 1 0 0 1 1 1 1
80	464,975	454,975	1 0 0 0 0 0 0 0	208	1 1 0 1 0 0 0 0
iv			Kode fra Prom		

Beregning af kode for privatkanal:

Deleforhold  $N = (F_m - 459,775) / 0,025$  eks.:  $F_m = 462,725$ ,  $\Rightarrow N = 118$

Da kanalkode 128 altid er 0 på privatkanalen skal prommen afgive

den kode som om omskifterne havde stået på tallet 118

f.eks. 1011 1000

## TEKNISK BESKRIVELSE

### AF:

Kontrolkredsløb for offentlig biltelefon med kanalsøgning, print B 44A og logikenhed for UHF offentlig biltelefon med kanalsøgning print B 70A.

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#### Kontrolkredsløb (Tegn. 76225-3E2)

Transistoren Q4 sørger for at den hvide lampe tænder ved tonetast, idet terminal nr. 5 (mic. input block) da vil have spændingen 5V. Q3 og Q2 sørger for at den hvide og den røde tastlampe ikke tænder hvis senderen er blokeret og tastknapperne betjenes. Kanalomskifterne giver en BCD-kode for hvert ciffer i kanalnummeret, idet de ledninger som skal være logisk "0", sluttes til stel. Transistoren Q6 blokerer sender og modtagers lavfrekvens når omskifter for "enere" står i stilling 10 og 11. Q6 blokerer sender og modtager fra kanal 81 og opefter, men ved fjernelse af dioden D9 kan kanal 81 åbnes for anvendelse til privatkanal. Transistoren Q1 er "ON" for alle andre kanaler end 00, og indikerer således med 5V på terminal 15, at kanalvælgeren står på 00. Kredsene IC1 og IC2 er ikke inverterende buffere, som ved 5V på ben 1 og 15 afbryder forbindelsen fra omskifterne og videre til terminalerne 25-32. I kredsen IC1 er 4 buffere dog koblet parallelt og anvendes i forbindelse med dioderne D19 og D20 til at udkode kanal 81.

#### Logikenhed (tegn. 76249-2E2)

##### 1. Kanalvælgeren står f.eks. på 53

Terminalerne E og H er logisk 0, hvorved 5V strømforsyningen Q8, Q9 og Q10 er "slukket". Det vil sige at kredsen IC4 er uden forsyningsspænding og kan betragtes som afbrudt. Koderne fra fronten er da X8 --- X1 ~ 0011 og V8 --- V1 ~ 0101. Kredsene IC2 og IC3 (4 bit adder) omsætter disse to BCD-koder til en ren binær kode som repræsenterer tallet 53, Y64 --- Y1 ~ 0110101. IC1 indeholder 6 stk. buffere som er nødvendige for at kunne trække syntheseselogikkens indgange. Q2 og Q3 fungerer som den syvende buffer og transistoren Q1 er "OFF", d.v.s.: Y128 er logisk 1. Den komplette kanalkode som er lig med deleforholdet N, er da  $128 + 53 = 181$  med den binære repræsentation Y128 --- Y1 ~ 10110101. Y128 er logisk 1 for alle kanaler undtagen privatkanalen.

## 2. Kanalvælgeren står på 00 - Kanalsøgning

Terminal H får nu 5V fra frontenheden og strømforsyningen Q8, Q9 og Q10 forsyner kredsene IC4 og IC5 med 5V. Q13 er "ON", hvorved OV på terminal G blokerer apparatets sender og LF-kredsløb. Q11 og Q12 slukker for displayet. 5V på terminal F kobler kanalvælgeren fra således at kodeledningerne V8 --- V1 og X8 --- X1 ingen forbindelse har til kanalvælgeromskifterne. IC4 er en prom (32 ord af 8 bit) medens IC5 er en 4 bit programbar tæller med clock generator NA1. Når apparatet tændes sørger R25, C16 for at NA4 er logisk 1 på udgangen, medens NA2 får multivibratoren, bestående af NA3 og NA4 til at stå i den nævnte position, når kanalvælgeren drejes fra vilkårlig kanal og hen på stilling 00. Terminal D og C er logisk 1, hvorfor clock generatoren NA1 kører med en periodetid på ca. 70 ms. IC5 tæller nu i rækkefølgen "preset" 11, 10, 9, 8---1, 0 og preset 11, 10, 9 o.s.v. Da transistorerne Q4 --- Q7 inverteres bliver rækkefølgen af adresser til IC4 følgende: 4, 5, 6 ----- 14, 1, 2, 3, o.s.v. For hver af disse adresser af prommen IC4 kodet til den ønskede kanal, således at de 8 bit på udgangen er delt i 2 gange 4 bit BCD svarende til kanalomskifterens koder.

Apparatet søger nu på de indkodede kanaler og i det øjeblik tonemodtageren modtager en rigtig 1ste tone, bliver terminal D logisk 0. Herved stopper clock oscillatoren NA1 og apparatet står på den aktuelle kanal. Hvis de næste 4 toner også er korrekte, bliver terminal C "0", NA3 og NA4 skifter stilling og kanalsøgningen bliver stående. Sender og modtagerblokeringen (Q13) er nu ophævet via dioden D11, men tonemodtageren holder stadigvæk blokeringen medens den gule lampe blinker. Når det gule blink slukkes ved tryk på knappen "UDKALD", ophæves denne blokering, terminal G bliver logisk 1, displayet tænder og viser på hvilken kanal søgningen er stoppet. Opkaldet kan nu besvares, samtalen føres på den opvigne samtalekanal og idet kanalvælgeren stilles på 00 igen, skifter NA3 og NA4 således at kanalsøgningen starter.

### Privatkanal

Stilles kanalvælgeren i stilling 81 og er dioden D9 i kontrolkredsløbet (76225-3E2) fjernet, får terminal E spændingen 5V. Herved kobles omskifterne fra, IC4 og IC5 får spænding og kodeledning Y128 bliver low. Privatkoden ligger altid under den laveste kanalfrekvens, d.v.s.

deleforholdet N er mindre end 128. Ben 3 på IC5 (preset) er nu logisk 1, hvorved tælleren står på det tal som terminalerne Z8 - Z1 er forbundet til. I dette tilfælde tallet 12 Adressen til IC4 er da 0011 svarende til tallet 3 og for denne adresse er IC4 kodet til det ønskede deleforhold for privatkodning. Da privatkanalen maksimalt kan ligge ca. 0,5 Mhz (20 kanaler) under den laveste kanalfrekvens (kanal 01), vil N for privatkanalen ligge i området 108-128. Da Y128 er OV svarer dette til at omskifterne står på et tal fra 108 til 128. Første ciffer er altså altid større end 9 og dette medfører, at første ciffer i displayet er slukket på privatkanalen.

# Funktionsbeskrivelse af 5-tonet modtager CCIR og 1-tone sender

Print B52A

## Indgangssignal:

Dekoderen modtager et signal bestående af 5 toneimpulser. Et opkald vil modtages korrekt, såfremt den enkelte tones varighed er større end 40 ms, og en eventuel pause mellem to toner ikke overstiger 250 ms.

## Funktion ved modtagelse af et "korrekt" opkald:

Opkaldets første toneimpuls når forstærkeren A2 gennem det aktive filter A1. Her forstærkes signalet så meget, at den selektive kreds L1, C7 påvirkes med et firkantsignal (4 V pp) selv ved minimum indgangssignal (50 mV). Tælleren IC3 er nulstillet, d.v.s. ben 3 er logisk 1, Q3 er "ON" og udtaget svarende til første tone er fastholdt. Spændingen over tonespolen bliver detekteret af transistoren Q2 og udgangene af NA1 og NA2 bliver logisk 0. I det øjeblik indgangssignalet skifter til næste tone, falder spændingen over R12 og udgangen af NA2 bliver logisk 1. Tælleren IC3 går et trin frem, således at det nu er Q4 som er "ON". Hermed er tonespolen igen i resonans, spændingen over R12 stiger og udgangen af NA2 bliver logisk "0".

Således fortsættes indtil toneimpuls nr. 5 slutter, hvorved tællerens ben 1 bliver logisk 1. Schmitttrigger NA1 nulstiller tælleren således at dekodeeren er klar til at modtage et nyt opkald 250 ms efter slutningen af sidste rigtige tone. Hvis sidste rigtige tone er tone nr. 5 (d.v.s. et korrekt opkald) vil tællerens ben 1 være logisk "1" i 250 ms. I løbet af denne tid oplades C13 via dioden D3 og tællerens ben 13 (clock enable) holdes på logisk 1 de næste 4-5 sek. Modtages to korrekte opkald lige efter hinanden, vil kun det første opkald indikeres med alarm. Er tiden mellem flere korrekte opkald større end 5 sek. vil alle opkald indikeres.

## Indikering af opkald:

Et opkald indikeres med en alarmtone i højttaleren. Her bestemmer NA3 i forbindelse med R19 og C14 varigheden af denne tone (ca. 2 sek.), medens NA4 er oscillatoren (ca. 1000 Hz). Yderligere vil FF2 blive resat således, at ben 13 på IC6 er logisk 1 uanset hvad stillingen var før opkaldet. FF1 bliver sat således at ben 1 er logisk 1 og ben 2 er logisk 0. Herved starter blinkoscillatoren NA5 og transistoren Q10 går "ON" for aktivering af en extern alarm. Gaten NA6 sørger

for at den selektive lampe blinker, og Q11 og Q12 holder højttaleren i tastfunktionen blokeret. Ved betjening af apparatets selektive knap kommer en positiv puls på clock indgangene 3 og 11, hvorved ophæves alle blokeringer og indikatorlampen slukker. Et fornyet tryk på den selektive knap vil sætte FF1 til logisk 0 på ben 1 og FF2 vil skifte stilling. Herved tænder Q9 for den selektive lampe, og såvel apparatets lavfrekvensdel som senderdel blokeres.

Hvis den viste strapning mellem ben 6 og 8 på IC5 monteres vil et selektivt opkald automatisk åbne højttaleren.

Et opkald vil yderligere sende retursvar på følgende måde: Ved et modtaget opkald er ben 11 på IC4 logisk 0 i 2 sek. Dioden D9 ophæver tastblokeringen og Q18 taster senderen via Q17 og Q19. D5 sørger for at Q16 stadig er blokeret. Firkantsignalet fra NA4 (ca. 1000 Hz) går gennem det aktive lavpasfilter Q15 og forsyner samtidig denne transistor med basisstrøm således at D16 leder og giver passage for signalet til modulationsforstærkeren.

#### Funktion ved modtagelse af et mangelfuldt/forkert opkald:

Hvis f.eks. opkaldets 2. toneimpuls har en forkert frekvens vil tælleren blive stående med ben 2 på logisk 1. Hverken denne toneimpuls eller de følgende vil give nogen spænding over tonespolen, og efter 250 ms vil NA1 sørge for at nulstille tælleren igen.

#### 1-tone sender

Forstærkeren IC7 fungerer som Wien-bro oscillator. Ved tryk på den selektive tast ("OPKALD") leverer transistoren Q19 spænding til senderen, medens Q16 leverer 5 V til blokering af mikrofonindgangen i modulationsforstærkeren. Samtidig bliver spændingen på Q14's gate høj, således at den åbner for signalet fra oscillatoren IC7 til modulationsforstærkeren.

## DUPLEXFILTER FOR UHF BAND 450 - 470 MHz.

### DESCRIPTION:

This duplexfilter is of the bandreject type, using five capacitively tuned coaxial cavities.

The filter is combined of 2 cavities in the high frequency side and 3 cavities in the low frequency side. It is specially built for The Public telephone service ( MTD ) 453 - 463 MHz ) but may be used within the band 450 - 470 MHz when  $F_{Tx} < F_{Rx}$ .

The filter is supplied factory-tuned to the specified frequencies.

### TECHNICAL DATA.

MTD system mobile station:

Tx frequency range:	453 - 455 MHz
Rx frequency range:	463 - 465 MHz
Attenuation high frq. side :	min. 55 dB
Attenuation low frq. side :	min. 75 dB
Insertion loss high frq. side :	max. 0,8 dB
Insertion loss low frq. side :	max. 0,9 dB
Transmitter Power :	max. 40 w
Weight	2,7 kg



## Tuning instructions for AP 2000 UHF

### 1. Tuning of the synthesizer circuit

#### A. Synthesizer oscillator

Connect a high input resistance DC-voltmeter to TP 1 on print board B 56. By tuning coils L1 and L2 to max., a reading of approx. 1,7 V should be obtained.

The coil L3 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 three types of VCO's corresponding to the following Rx-frequencies 406-432 MHz, 432-450 MHz, 450-470 MHz: check that the right type is used for the desired frequency range. The marking is noted on the VCO-diagram. Set the trimmers C24, C30 and C35 to the center position and then connect a counter to point 5 (coax cable). The VCO should now be set to about the right frequency (with C4). Connect a DC-voltmeter to TP 1 and tune C 24 to maximum reading ( about 1 VDC ). Move the voltmeter to point 2 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 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 kHz ripple on TP 1. Now when the loop is in lock a slight tuning of C 24 should be done to control that the voltage on TP 1 still is maximum.

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 500 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 C 39 on synthesizer mixer print board B 56.

2. Tuning of the receiver.

A. 21,4 MHz and 455 kHz IF ( print board B01 ).

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 2 on the RF and mixer print board B 48 and the (DC) probe on point TP 1 on the IF print board B 01. Adjust L 6 (print B 48) and L 1 (print B 01) for minimum ripple. L 2 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 mixer. Connect the probe to the AF output from the detector (a suitable point is pin 1 on the ampl. 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 48)

With the voltmeter on TP 1 (print board B 48) the capacitors B 43 - C 35, B 48 - C 10 and C 11 are adjusted to max. deflection (approx. 2 V DC). With the signal generator connected to the receiver input, C 20, L 1, L 2, L 3 and L 4 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 ).

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

Adjust C 10 and C 18 as described under 'B'. Tune the RF-signal generator either to 21,4 MHz or to the receiving frequency and connect it to TP 2 in the RF-amplifier. The horizontal deflection voltage from an oscilloscope should be used to modulate (FM) the signal generator. Now the IF can be tuned as previously described. By connecting the signal generator (tuned to the receiving frequency) 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 46)

Turn the capacitors C 9 and C 17 to max. capacitance and tune the helicoils L 4, L 5, L 7 and L 8 to max. frequency (screw up the four alignment screws). Remove the VCO signal and connect a wattmeter (50 $\Omega$ , 1W range) to pin 4, then key the transmitter. The 21,4 MHz injection to the transmitter mixer is tuned with L 1 (print B 46) to max. DC-voltage on TP 1 - approx. 0,1 V. Reconnect the VCO signal and tune the capacitor C 30 on print B 43 to max. DC-voltage on TP 1 print B 46 - approx. 0,5 V. Decrease the capacitance of C 9 slowly until the first time a max. of about 0,4 V<sub>DC</sub> is indicated on TP 2. Now tune L 4 until the voltage on TP 2 decreases. Move the voltmeter to TP 3 and tune L 5 and L 4 to max. reading approx. 0,55 V<sub>DC</sub>. Tune L 7 until a decrease in the reading on TP 3 is seen. L 8 and L 7 should now be tuned to max. DC-voltage on TP 4 approx. 0,75 V. C 17 can now be tuned to max. output on the wattmeter. Finally a slight tuning of C 9, L 4, L 5, L 7, L 8 and C 17 should be done in order to get max. output power approx. 30 mV.

B. 6 W PA-stage (printboard B 45)

Turn the potmeter R2 (print board B59) counter-clockwise to get the output power stabilization out of function. Connect a wattmeter (50Ω, 10W) to the test installation output and set the supply voltage to 12,0 V. Now tune C 2, C5, C 6, C 10, C 11, C 15 and C 16 in the 6 W stage to max. output power. Then a fine adjustment of C 17 on the transmitter amplifier print B 07 should be done. Finally the tuning should be repeated once or twice in order to get the max. possible output power approx. 8 W. For a 6 W set the potmeter R1 on printboard B57 will adjust the output power.

C. Transmitter frequency

Connect a counter to the wattmeter and adjust the transmitter frequency with the capacitor C 31 in the Tx-oscillator print board B 56.

D. 25 W PA-stage (print board B 59)

Push the radio into the 25 W PA-stage, connect the wattmeter (50 Ω, 25 W) and adjust C 1, C 2, C 8 and C 9 to max. output power with a supply voltage of 12,0 V. Increase the supply voltage to 13,6 V and turn the potmeter R2 on print B 59 clockwise until the output power decreases to 25 W. Check the power regulation by varying the supply voltage from 10,8 V to 16,0 V. By supply voltages lower than 13,6 V, the output power may be a little less than 25 W but for voltages from 13,6 V and up the output power shall be held constantly on 25 W.

E. 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 10 mV, potmeter R 27 is adjusted to give  $\pm 5$  kHz deviation on the modulation meter. Decrease the input level to 1 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 2 V. When the level is decreased to 200 mV R 28 is set to give a deviation of  $\pm 3$  kHz.

### Kodning af Prom for kanalsøgning.

#### For svensk MTD uden privatkanal

13 kanaler skal søges d.v.s. på print B 70 A tegn.nr.

76249-4E2 skal Z8.....Z1 strappes til tallet 13.

Z8.....Z1 = 1 1 1 0 1

Prom adresse Prom output kode Prom output ord Kanal

2	0 0 0 0	0 0 1 1	03	03
3	0 0 0 0	1 0 0 0	08	08
4	0 0 0 1	0 1 0 1	21	15
5	0 0 1 0	0 0 1 1	35	23
6	0 0 1 0	0 1 1 0	38	26
7	0 0 1 1	0 1 1 0	54	36
8	0 0 1 1	0 1 1 1	55	37
9	0 0 1 1	0 1 0 1	53	35
10	0 0 1 0	0 1 0 1	37	25
11	0 0 0 1	0 1 1 0	22	16
12	0 0 0 1	0 1 0 0	20	14
13	0 0 0 0	0 1 1 1	07	07
14	0 0 0 0	0 0 0 1	01	01

#### For svensk MTD med privatkanal

14 kanaler skal søges d.v.s. Z8.....Z1 strappes til

tallet 14. Z8.....Z1 = 1 1 1 0

Prom adresse Prom output kode Prom output ord Kanal

1	Privat kanal		Privat kanal	81
2	0 0 0 0	0 0 1 1	03	03
3	0 0 0 0	1 0 0 0	08	08
4	0 0 0 1	0 1 0 1	21	15
5	0 0 1 0	0 0 1 1	35	23
6	0 0 1 0	0 1 1 0	38	26
7	0 0 1 1	0 1 1 0	54	36
8	0 0 1 1	0 1 1 1	55	37
9	0 0 1 1	0 1 0 1	53	35
10	0 0 1 0	0 1 0 1	37	25
11	0 0 0 1	0 1 1 0	22	16
12	0 0 0 1	0 1 0 0	20	14
13	0 0 0 0	0 1 1 1	07	07
14	0 0 0 0	0 0 0 1	01	01

## Justering af 5-tonet tonemodtager CCIR og 1-tonet sender

### Print B 52

Tonemodtagerens indgang forsynes med en spænding på 100 mV med frekvensen 1540 Hz (tone 6). Ledningen for tone nr. 1 loddes på tonespolens udtag nr. 6. Med udtagsspolens kerne og potentiometret R9 justeres spændingen på IC4 ben 1 og 2, således at tone 6 giver ca. 4,5V DC medens tone 6  $\pm$  3% giver 1 V DC. (Højimpedanset voltmeter).

Herefter indstilles den ønskede kode ved at lodde ledningerne fra Q3 -- Q7 på spolens udtag. Her svarer udtag nr. 5 til tone 5 o.s.v. medens udtag nr. 11 er repetitionstonen.

Larmkredsløbene kan afprøves ved at sætte + 5V på IC4 ben 12 og 13.

#### Tonerække efter CCIR

<u>Tone</u>	<u>Frekvens</u>
1	1124
2	1197
3	1275
4	1358
5	1446
6	1540
7	1640
8	1747
9	1860
0	1981
rep. 11	2110

#### Justering af 1-tonet tonesender

Knappen "OPRING" trykkes ind, hvorved senderen tages og Q14 åbner for signalet fra oscillatoren IC7 til modulationsforstærkeren. Med potentiometret R47 justeres senderens frekvenssving til  $\pm$  3 khz. Med en tæller på frekvenssvingmetrets udgang stilles frekvensen ved hjælp af R49 til 2400 Hz.

#### Bemærk:

Toneenheden B 52A kan fungere når printpladen er skruet løs fra apparatet men stadig har stikket sat i fronten, blot man husker at sætte en extern stelforbindelse på.

## Alignment procedure.

### UHF duplex filter for Public telephone service ( MTD ).

Normally the filter will be factory-adjusted by means of a R & S polyscope, but adjustment can also be done by using a transmitter and receiver tuned to the proper frequencies.

#### Equipment necessary for tuning and test.

1. Transmitter with all the specified frequencies.
2. Receiver with output indicator for all specified frequencies.
3. Signal generator with calibrated attenuator.
4. Directional power meter.
5. 50  $\Omega$  dummy load.

The rejection frequencies are adjusted first by means of the following set-up.

The signalgenerator is connected to the ant. terminal and the receiver to the low frequency terminal. The 50  $\Omega$  dummy to the high frequency terminal. The signal generator and the receiver is set to 466,0 MHz and the resonator L 4 is tuned to minimum signal into the receiver. The receiver is then switched to 463,0 MHz and the resonator L 5 is tuned to minimum. The resonator L 3 is tuned the same way to the frequency 464,5 MHz.

Now the set-up is switched to the high frequency side, that is the receiver to the high frequency terminal, the dummy to the low frequency terminal. The receiver and signal generator is set to 454,8 MHz and the resonator L 2 tuned to min. Resonator L 1 is tuned to 453,0 MHz.

Now all rejection circuits are tuned and the adjustment of the compensation circuit is next.

The transmitter is connected to the antenna terminal via a reflectormeter. The 50  $\Omega$  dummy is connected to the low frequency terminal.



The reflected power on the frequency 454 MHz is adjusted to min. by adjusting the compensation coils L 6, L 7 and L 8. The reflected power at the band limits is now checked. It should be of equal value at both sides and less than 5%. The adjustment is repeated for the high frequency side with the dummy on the high frequency terminal. The two trimmer capacitors C 2 and C 3 are adjusted to min. reflection. After the compensation adjustment the attenuation is controlled using the same set-up as used for adjusting the rejection.

The attenuation or isolation is checked by means of the receiver and a signal generator. This is measured as the difference in attenuation setting when the filter is in the circuit and when the generator is connected directly to the receiver.

This attenuation should be checked on all specified frequencies. The insertion loss should be less than 0,9 dB in both sides.

When the filter is tuned by means of a polyscope,  
curves similar to those in fig.1 must be achieved.

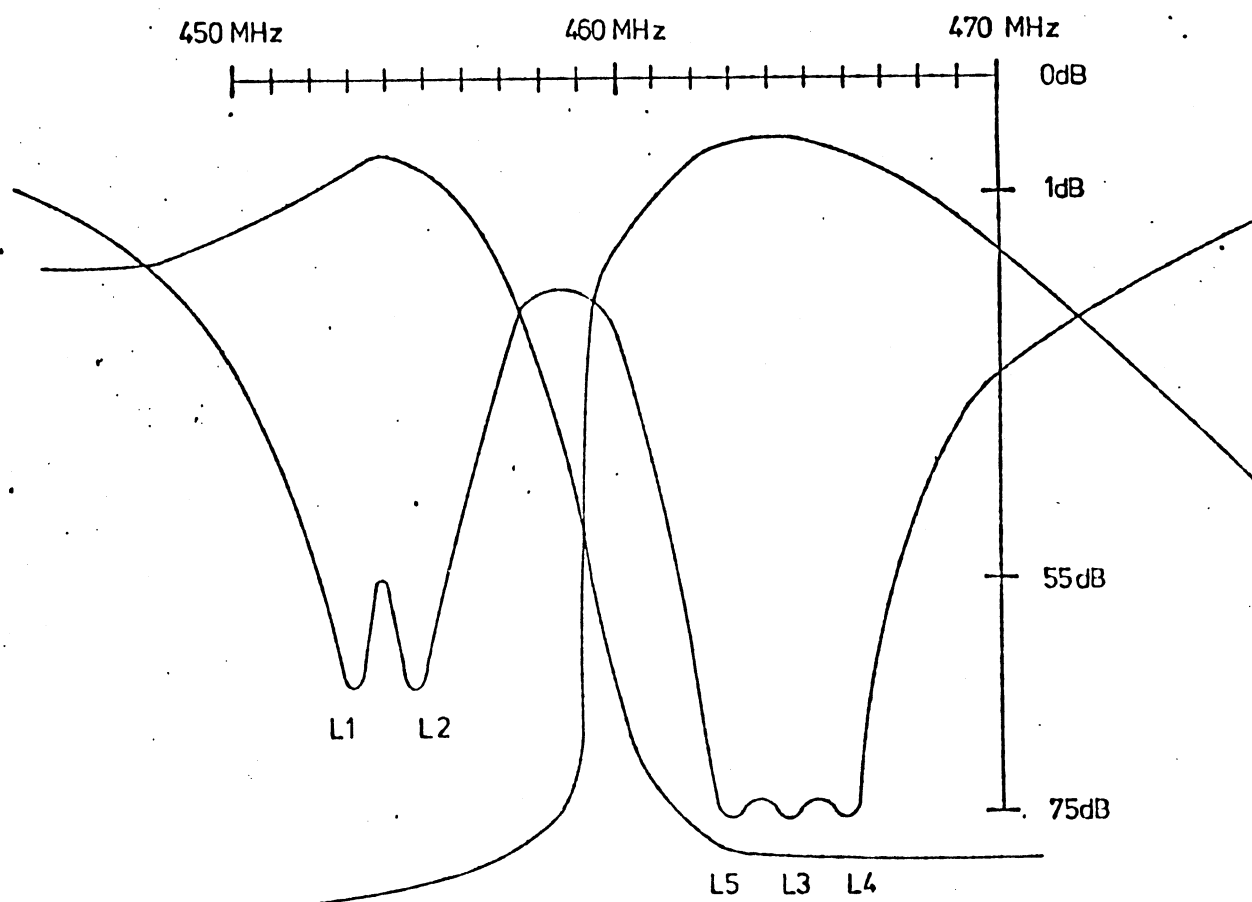


Fig. 1

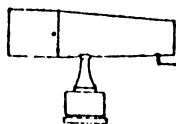
#### Adjustment frequencies

Resonator L1: 453,0 MHz  
 —||— L2: 454,8 MHz  
 —||— L3: 464,5 MHz  
 —||— L4: 466,0 MHz  
 —||— L5: 465,0 MHz

Tx center frequency 454,0MHz

Rx center frequency 464,0MHz

Hettot:	Adjustment frequencies for UHF duplexfilter MTD	Tegn.: 11-10-76	Kontr.: 12-10-76
		AC	JS
	AP-RADIOTELEFON 1/5	Stykl. nr.:	
		Tegn. nr.:	76271-4E2



Mikrofon 213-020



Ext. tast

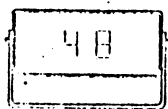


Grå- 208-001  
Sort- 08-015

Højtaler



Telefon 213-001



Display 204-021



Hornrelæbox 217-001



Sikringsholder 218-001  
12 V Forsyning

Toneenhed for VHF

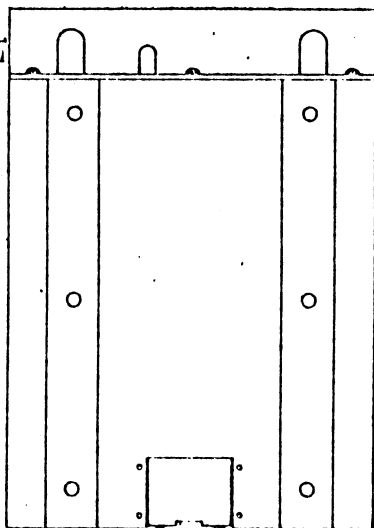
219-012

Frontsektion

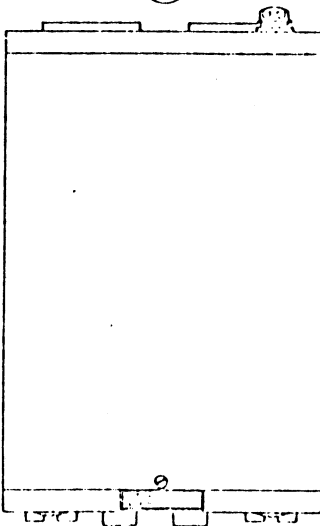
206-056 (Nr.-15 )

206-057 (Nr.-18 )MTD

Installationssæt 209-001



Ophæng 215-005



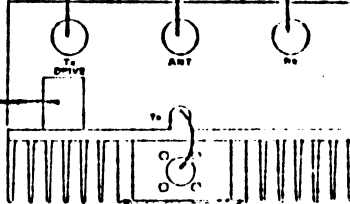
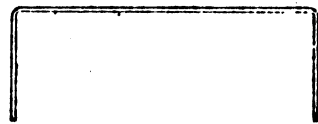
Antenne

Standard

201-100 2m

201-102 UHF

Ophæng for PA-trin +  
Duplexfilter



PA trin + Duplexfilter

204-004 2m

204-005 UHF

Apparatenhed

UHF (MTD) 201-032

VHF 201-025

Heltet:

OB System komplet

AP-RADIOTELEFON 1/3

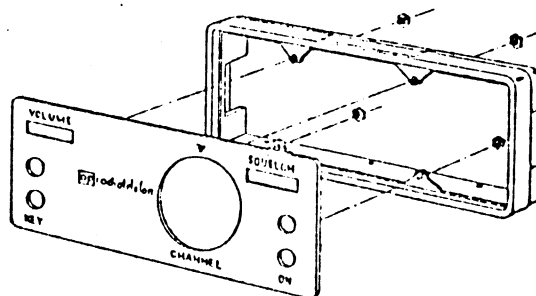
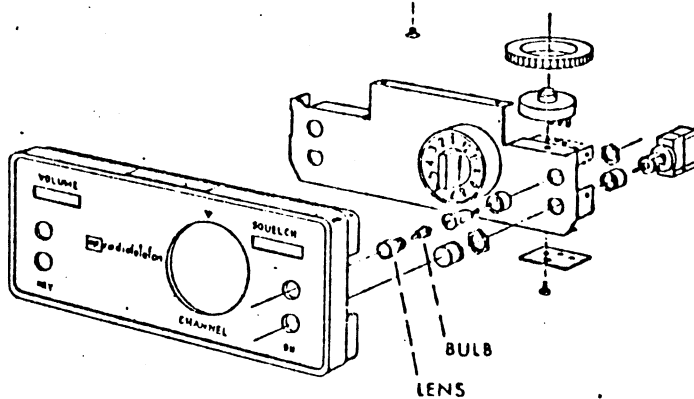
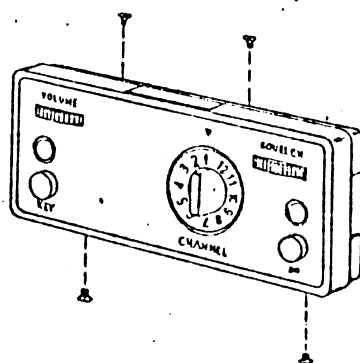
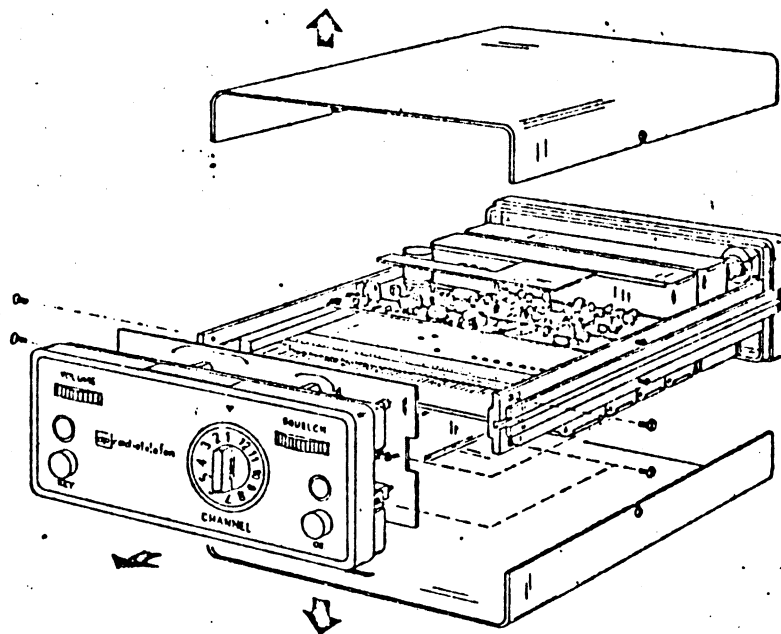
Tegn.: 9-8-76  
AC

Kontr.:

Stykl. nr.:

Tegn. nr.:

76217-4E2



Nettet: 29-11-76 H.J.

Disassembling of AP 2000

AP-RADIOTELEFON 1/5

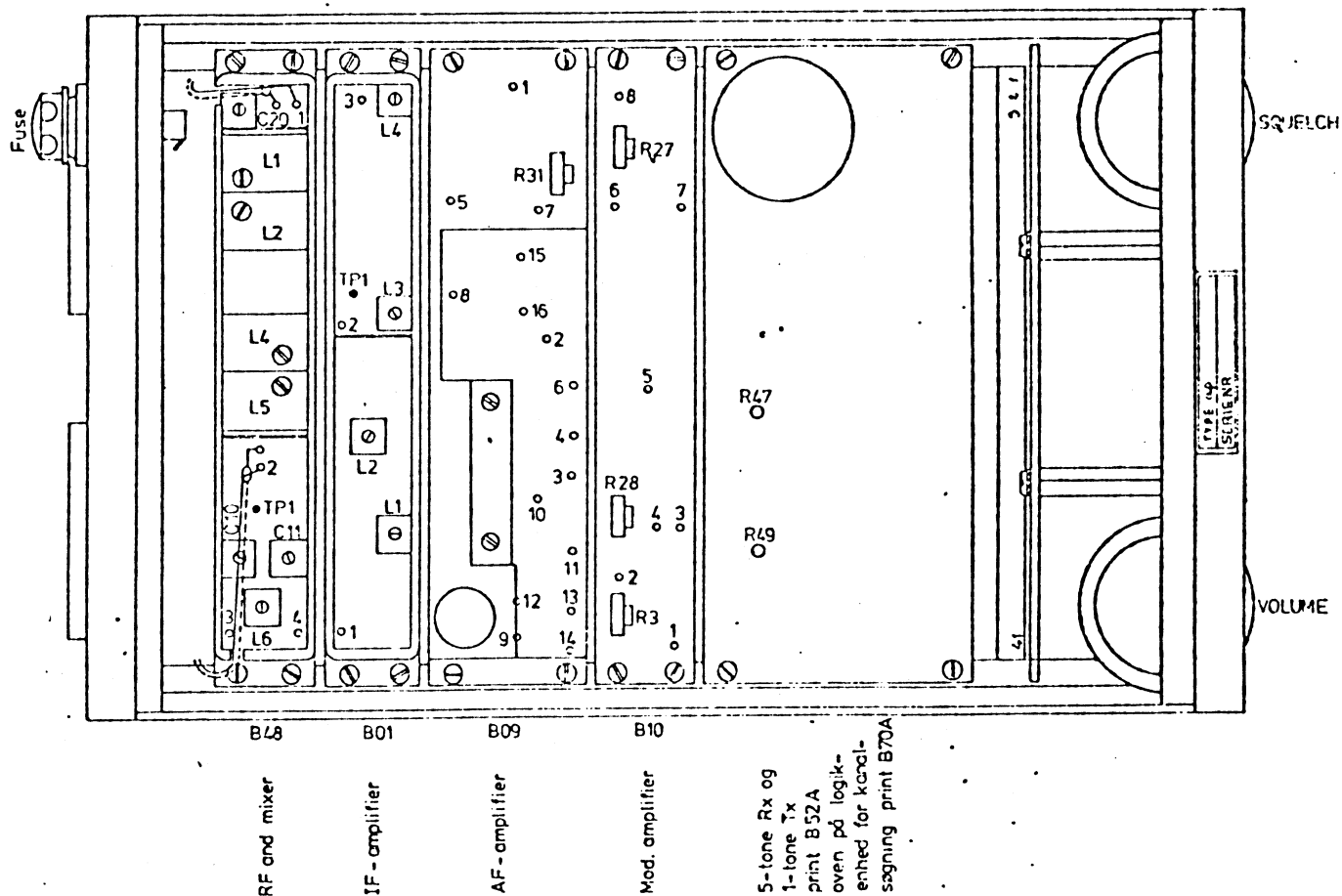
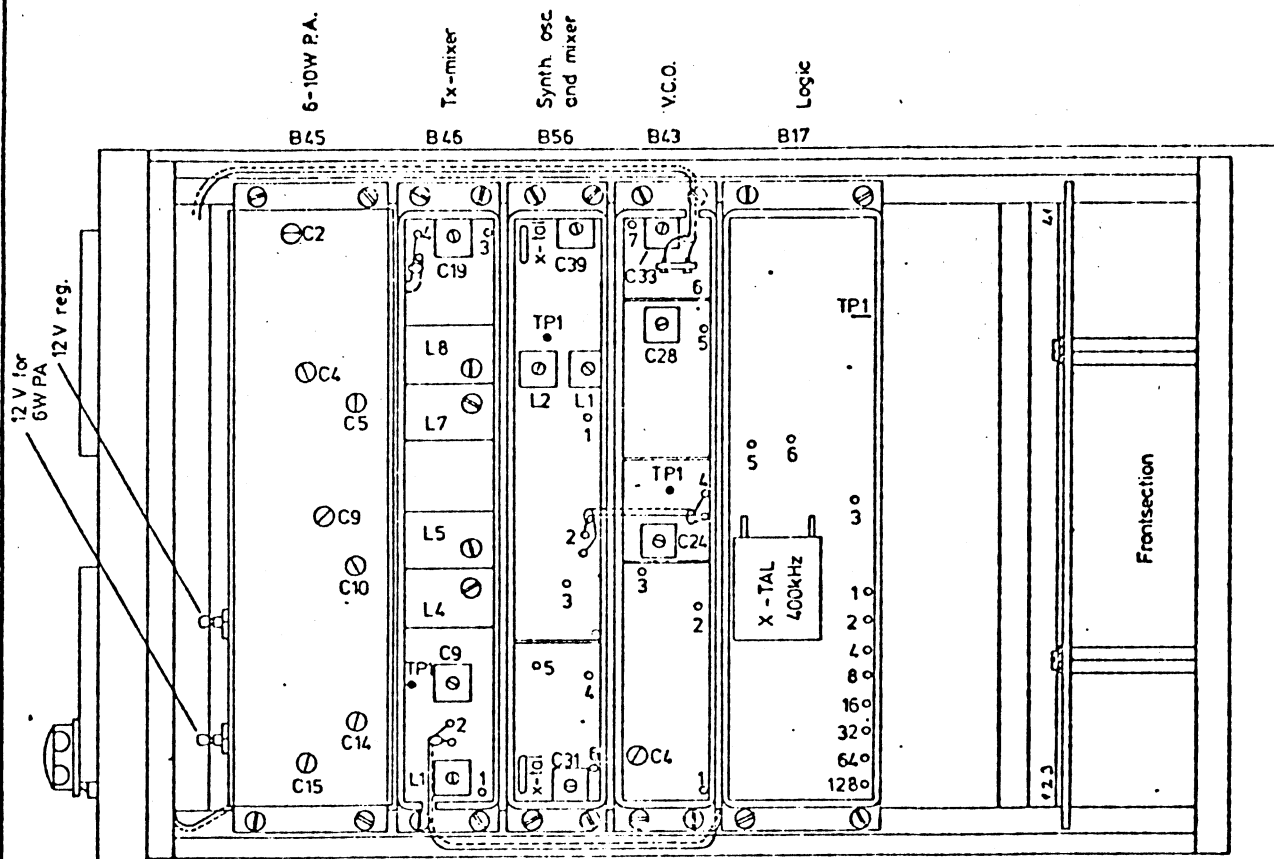
Tegn.: 10-8-76  
AC

Kontr.:

Stykl. nr.:

Tegn. nr.:

76218 - 4M2



Restet:

Interior view of AP 2000, mobil telephone  
UHF band. Part no. 201-032

AP-RADIOTELEFON

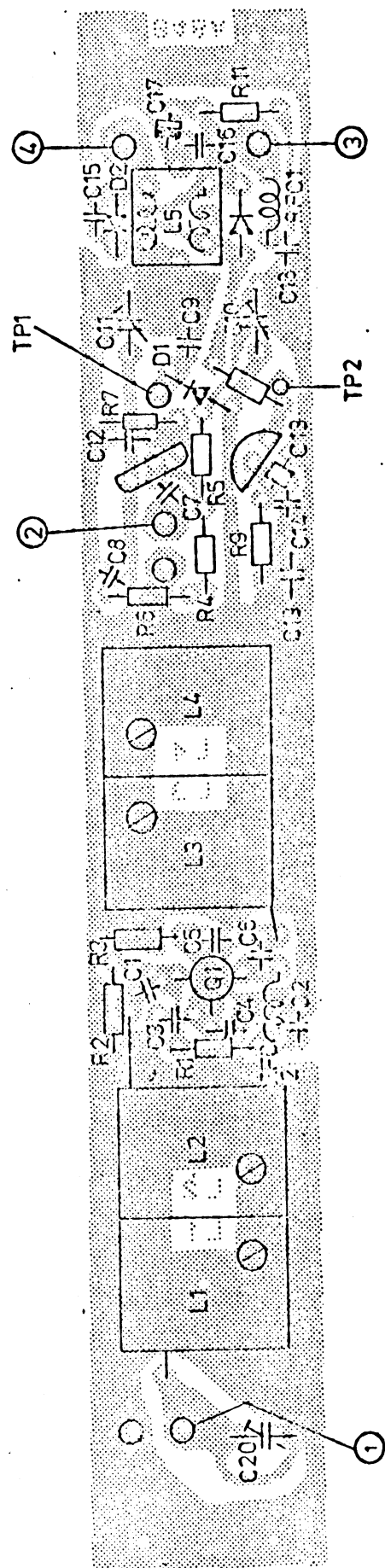
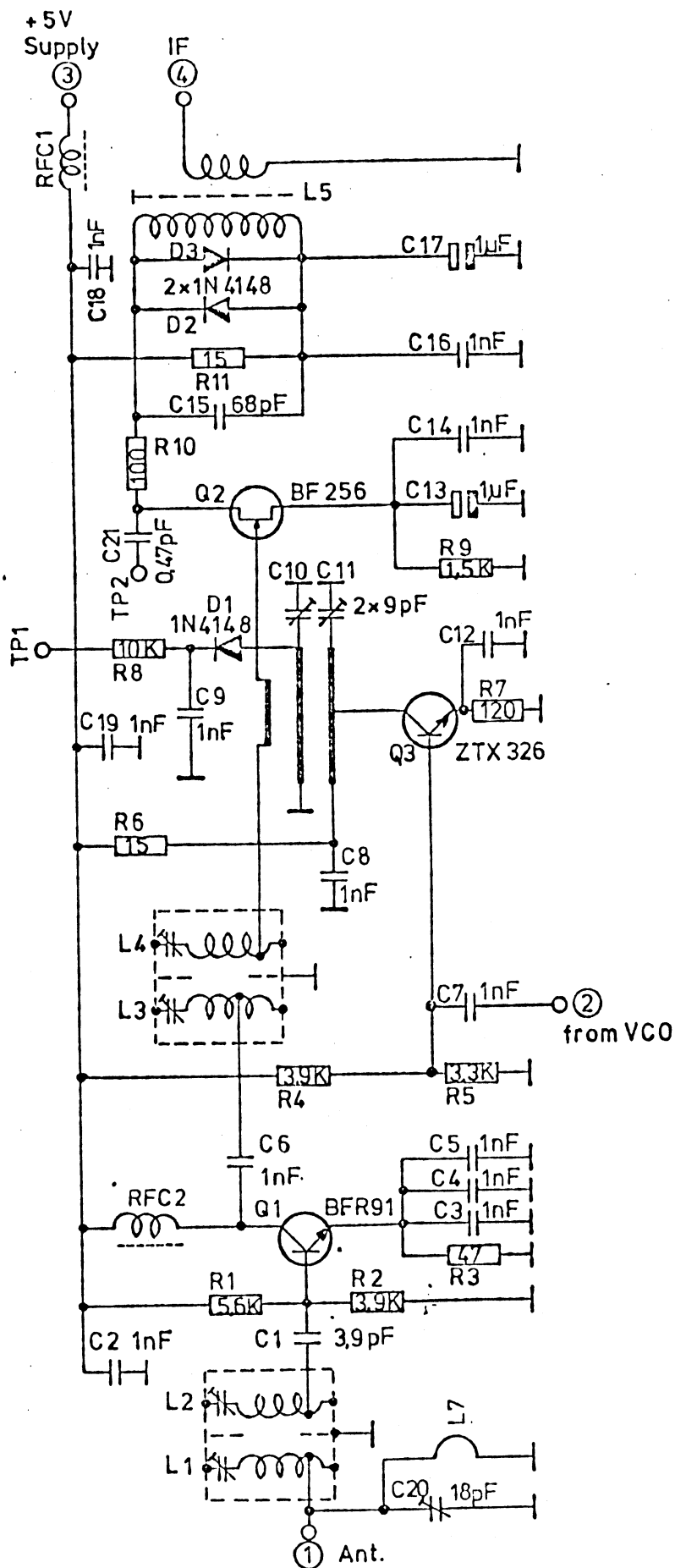
Tegn.: S - 11 - 76 Kontr.:

AC  
Styktl. nr.:

Tegn. nr.:

76329-3E2





Retlot: 21-4-77 B/AC

RF AMPLIFIER AND MIXER F. UHF  
PRINT BOARD B48A 1

AP-RADIOTELEFON 1/2

Tegn.: 29.10.75  
NC

Kontr.: 29.10.75  
BJ

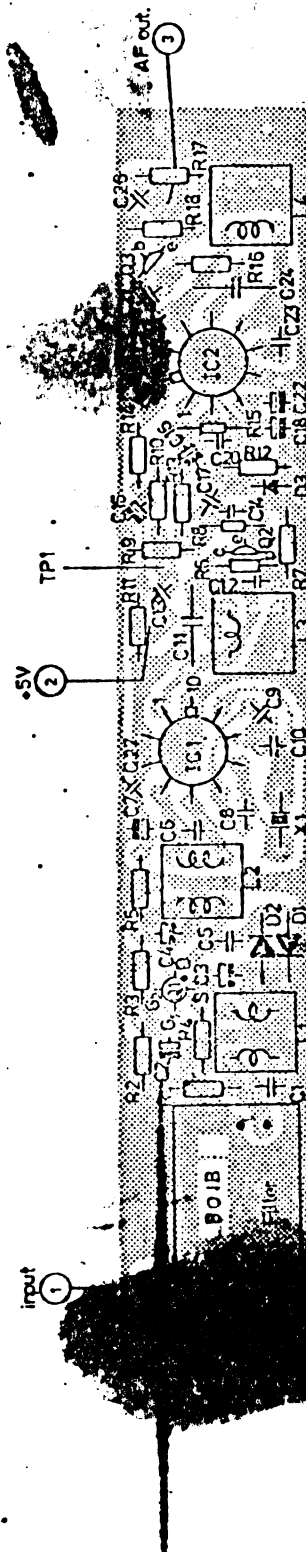
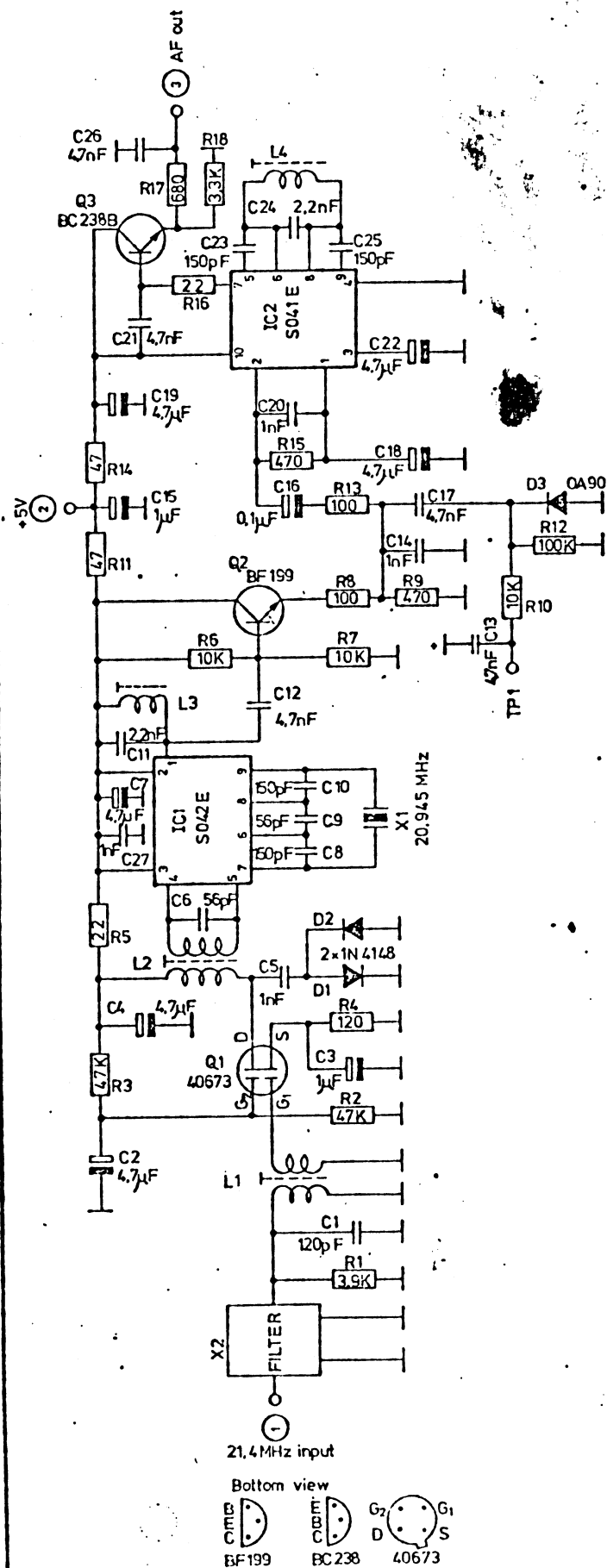
Stykl. nr.: 75476-4S2

Tegn. nr.: 75476-4E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-292	5,6 kΩ 1/8 w	D1	04-062	1N 4148
R2	13-290	3,9 kΩ "	D2	04-062	1N 4148
R3	13-267	47 Ω "	D3	04-062	1N 4148
R4	13-290	3,9 kΩ "			
R5	13-289	3,3 kΩ "			
R6	13-261	15 Ω "	Q1	19-116	BFR 91
R7	13-272	120 Ω "	Q2	19-113	BF 256 A Philips
R8	13-295	10 kΩ "	Q3	19-115	ZTX 326
R9	13-285	1,5 kΩ "			
R10	13-271	100 Ω "			
R11	13-261	15 Ω "	L1		75472-4E2
			L2		75474-4E2
			L3		75473-4E2
			L4		75472-4E2
			L5		75285-4E2
C1	11-433	3,9 pF Ker.			
C2	11-409	1 nF "			
C3	11-409	1 nF "			
C4	11-409	1 nF "	RFC-1		75290-4E2
C5	11-409	1 nF "			
C6	11-409	1 nF "	RFC-2		77155-4E2
C7	11-409	1 nF "			
C8	11-442	1 nF chip			
C9	11-409	1 nF "			
C10	19-329	9 pF Trim.			
C11	19-329	9 pF "			
C12	11-409	1 nF Ker.			
C13	11-502	1 μF/35V Tant.			
C14	11-409	1 nF Ker.			
C15	11-397	68 pF "			
C16	11-409	1 nF "			
C17	11-502	1 μF/35V Tant.			
C18	11-409	1 nF Ker.			
C19	11-409	1 nF "			
C20	19-330	18 pF Trim.			
C21	11-360	0,47 pF ker.			
RF-mixer UHF Print board B 48 A 1 Tilhører tegn. nr.: 75476-4E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75476-4S2





Rottet:

21,4 MHz IF  
Print B01B1

AP-RADIOTELEFON

Tegn.: 28-2-75 | Kontr.:

AC

Stykl. nr.:

Tegn. nr.:

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	11-396	56 pF "			
C11	11-396	56 pF 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 B 1 Tilhører tegn. nr.: 75076-3E2			Rettet:		<div>Tegn.: Stykl. nr.: 75076-4S2</div> <div>Kontr.:</div>

75017-3E2

# 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 "

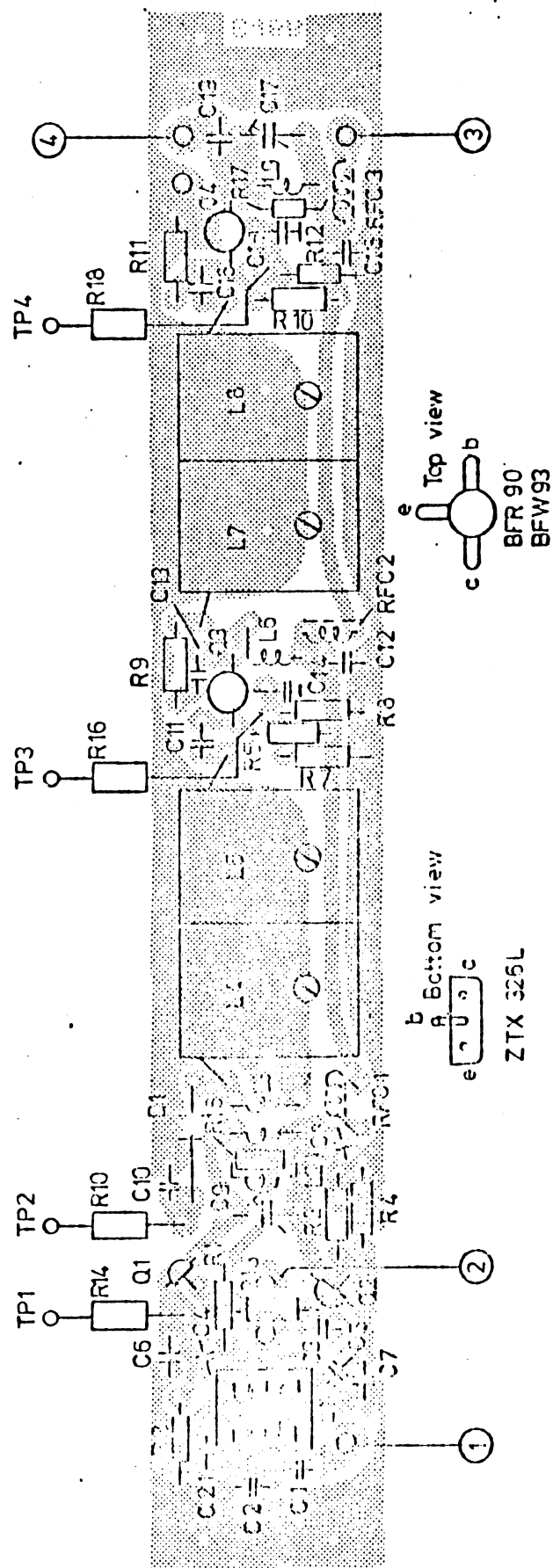
AF-amplifier, squelch and key circuit  
 Print board B 09 D 1  
 Tilhører tegn. nr.: 75017-3E2

Tegn.:

Stykl. nr.:

Kontr.:

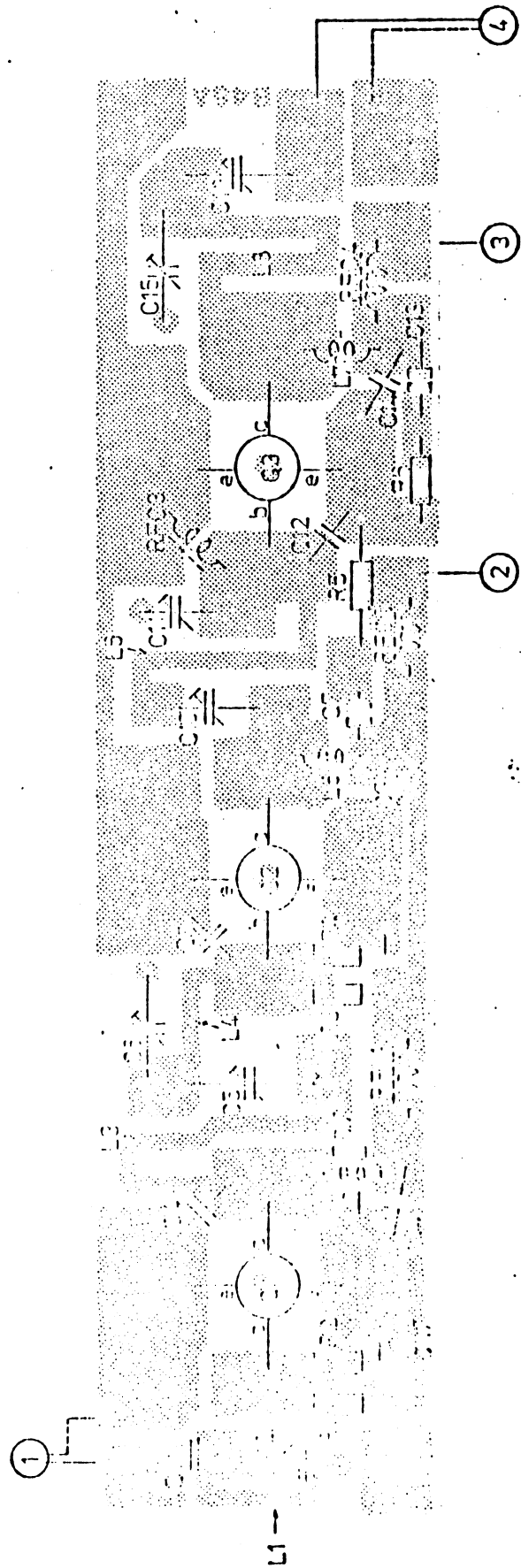
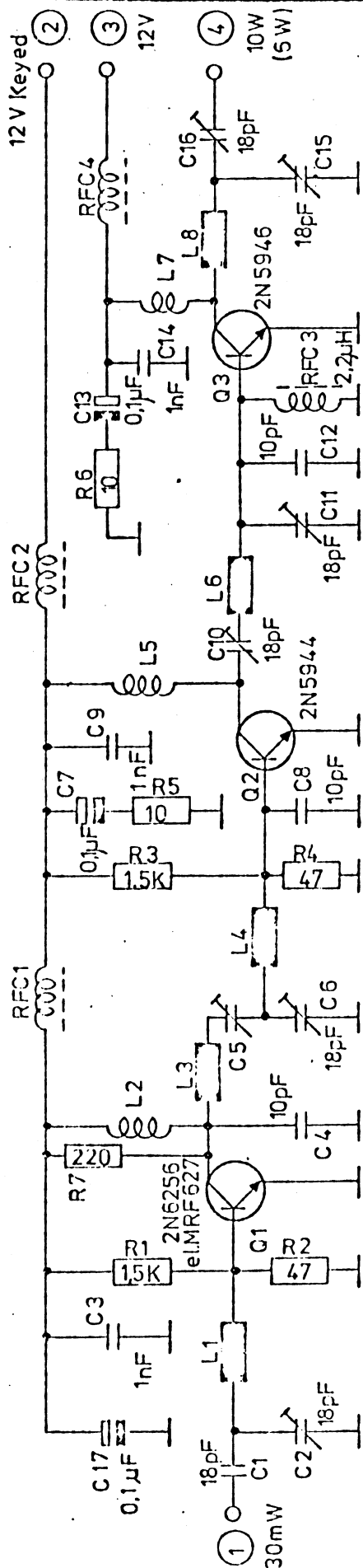
75017-4S2



75511-4E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-289	3,3 KΩ 1/8W CR 16	C19	11-363	2,2 pF Ker.
R2	13-283	1 KΩ " "	C20	11-442	1 nF "
R3	13-273	150 Ω " "	C21	11-394	47 pF "
R4	13-273	150 Ω " "	D1	04-036	0A90
R5	13-382	10 KΩ 1/4 W CR 25			
R6	13-286	1,8 KΩ 1/8W CR 16	Q1	19-115	ZTX326L
R7	13-281	680 Ω " "	Q2	19-115	ZTX326L
R8	13-267	47 Ω " "	Q3	19-114	BFR90
R9	13-267	47 Ω " "	Q4	19-119	BFW93
R10	13-286	1,8 KΩ " "			
R11	13-281	680 Ω " "	L1		76009-4E2
R12	13-263	22 Ω " "	L2		2x75616-4E2
R13	13-263	22 Ω " "	L3		75616-4E2
R14	13-382	10 KΩ 1/4 W CR 16	L4		75603-4E2
R15	13-292	5,6 KΩ 1/8W CR 16	L5		75602-4E2
R16	13-382	10 KΩ 1/4 W CR 25	L6		75614-4E2
R17	13-288	2,7 KΩ 1/8W CR 16	L7		75603-4E2
R18	13-382	10 KΩ 1/4 W CR 25	L8		75602-4E2
			L9		75617-4E2
C1	11-381	15 pF Ker.			
C2	11-396	56 pF "	RFC 1		75290-4E2
C3	11-409	1 nF "			
C4	11-409	1 nF "	RFC 2		75290-4E2
C5	11-409	1 nF "			
C6	11-401	100 pF "	RFC 3		75290-4E2
C7	11-401	100 pF "			
C8	11-409	1 nF "			
C9	19-346	3,5 pF Trim.			
C10	11-409	1 nF Ker.			
C11	11-409	1 nF "			
C12	11-409	1 nF "			
C13	11-409	1 nF "			
C14	11-442	1 nF "			
C15	11-409	1 nF "			
C16	11-409	1 nF "			
C17	19-329	9 pF Trim.			
C18	11-442	1 nF Ker.			
Tx-mixer UHF Print board B 46 B 1 Tilhører tegn. nr.: 75511-4E2			Rettet:		<div>Tegn.: Stykl. nr.: 75511-4S2</div> <div>Kontr.:</div>



Hettet:

6 W P.A. UHF B 45A 1

AP-RADIOTELEFON 1/2

Tegn.: 31-10-75  
EH

Kontr.:

Stykl. nr.:

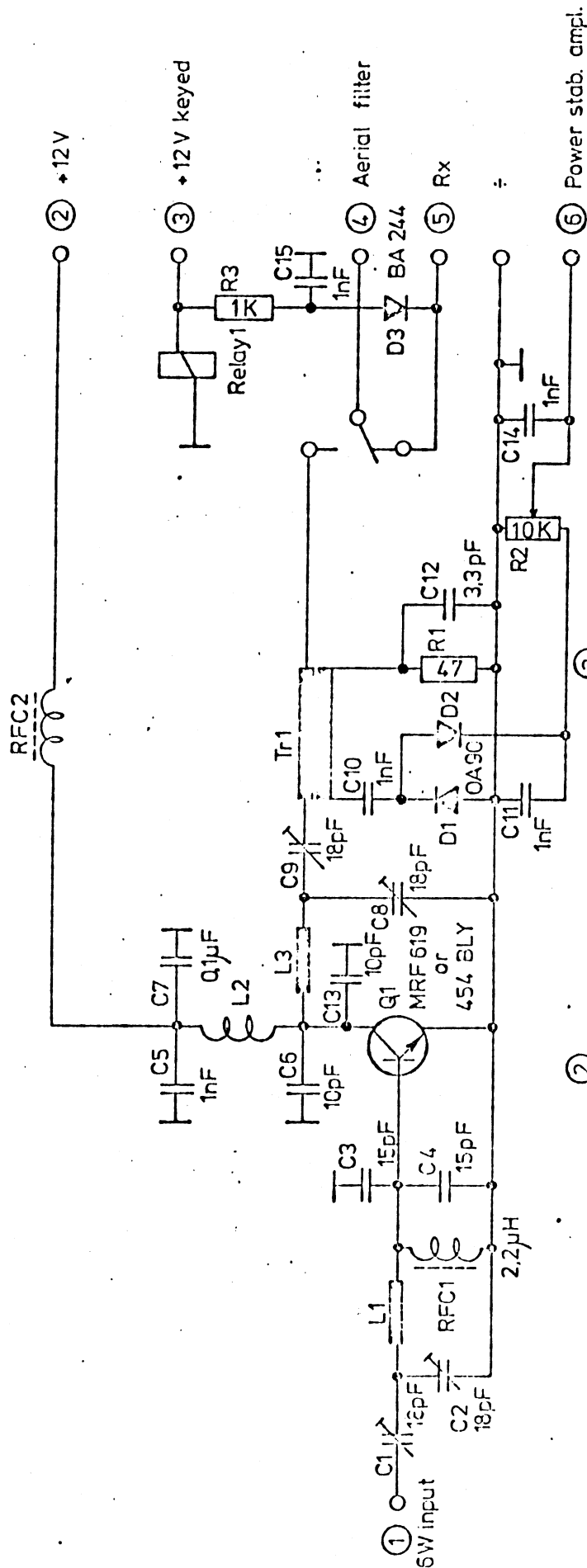
Tegn. nr.:

75510-4E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-285	1,5 KΩ 1/8W CR 16	RFC		75290-4E2
R2	13-267	47 Ω " "	1		
R3	13-285	1,5 KΩ " "	RFC		75290-4E2
R4	13-267	47 Ω " "	2		
R5	13-259	10 Ω " "	RFC		75290-4E2
R6	13-259	10 Ω " "	3		
R7	13-362	220 Ω 1/4W CR 25	RFC		75290-4E2
			4		
C1	11-434	18 pF Ker.			
C2	19-330	18 pF Trim.			
C3	11-409	1 nF Ker.			
C4	11-376	10 pF "			
C5	19-330	18 pF Trim.			
C6	19-330	18 pF "			
C7	11-500	0,1 μF Tant.			
C8	11-376	10 pF Ker.			
C9	11-409	1 nF "			
C10	19-330	18 pF Trim.			
C11	19-330	18 pF "			
C12	11-376	10 pF Ker.			
C13	11-500	0,1 μF Tant.			
C14	11-409	1 nF Ker.			
C15	19-330	18 pF Trim.			
C16	19-330	18 pF "			
C17	11-500	0,1 μF Tant.			
Q1	19-123	MRF627			
Q2	19-162	2N5944			
Q3	19-163	2N5946			
L2		75615-4E2			
L5		75619-4E2			
L7		75619-4E2			
G W PA-stage UHF Print board B 45 A 1 Tilhører tegn. nr.: 75510-4E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div> <div>Stykl. nr.: 75510-4S2</div>





REMARK:  
In a duplex set, the relay  
is not mounted. (B59 D2)

Hetlet:

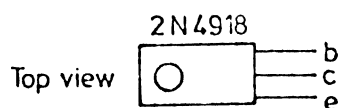
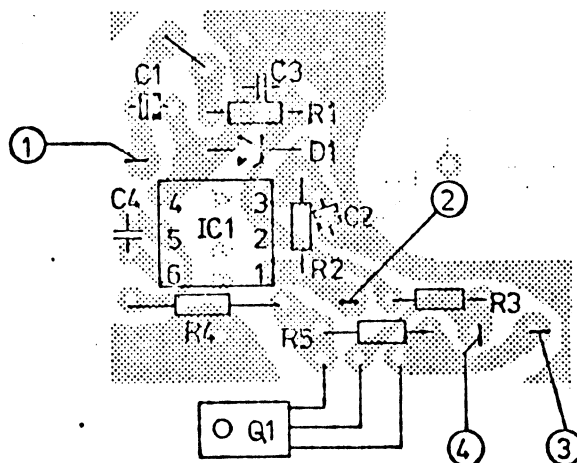
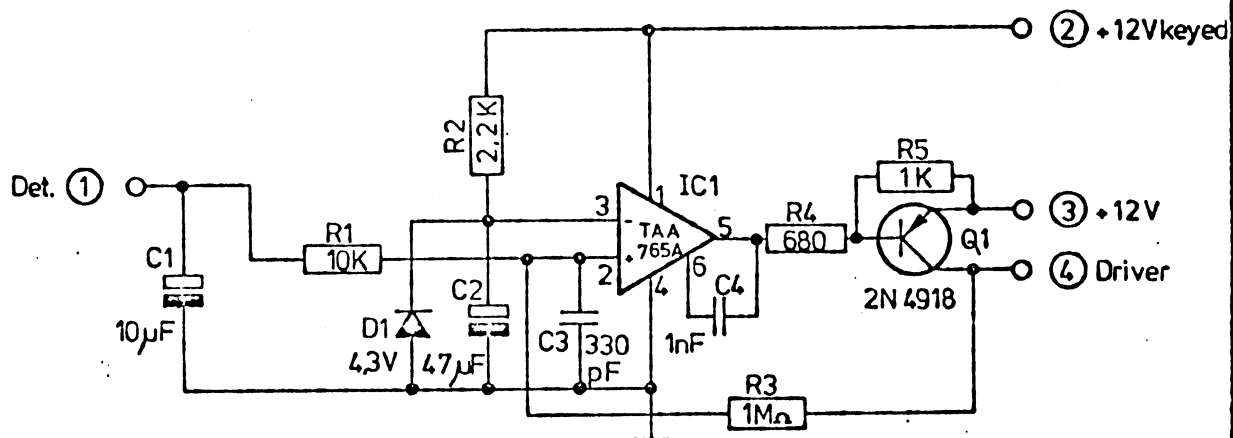
PA 25W UHF, aerial switch and  
power detector. Print board B59 D 1

AP-RADIOTELEFON 1/2

Tegn.: 17-11-76 AC	Kontr.:
Slykl. nr.: 75627-4E2	
Tegn. nr.: 75627-4E2	

# 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 A 2 Tilhører tegn. nr.: 76325-4E2			Tegn.: Kontr.: Stykl. nr.: 76325-4S2		



Rellet: 21-4-77B/ac

Sense amplifier for output power stabilizing  
of external PA  
Print board B57A 2

AP-RADIOTELEFON 1/5

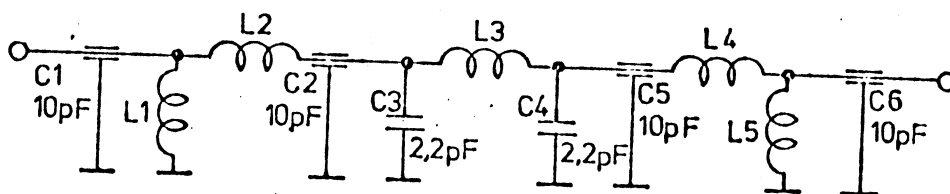
Tegn.: 3 - 11-76  
AC

Kontr.:

Stykl. nr.:

Tegn. nr.:

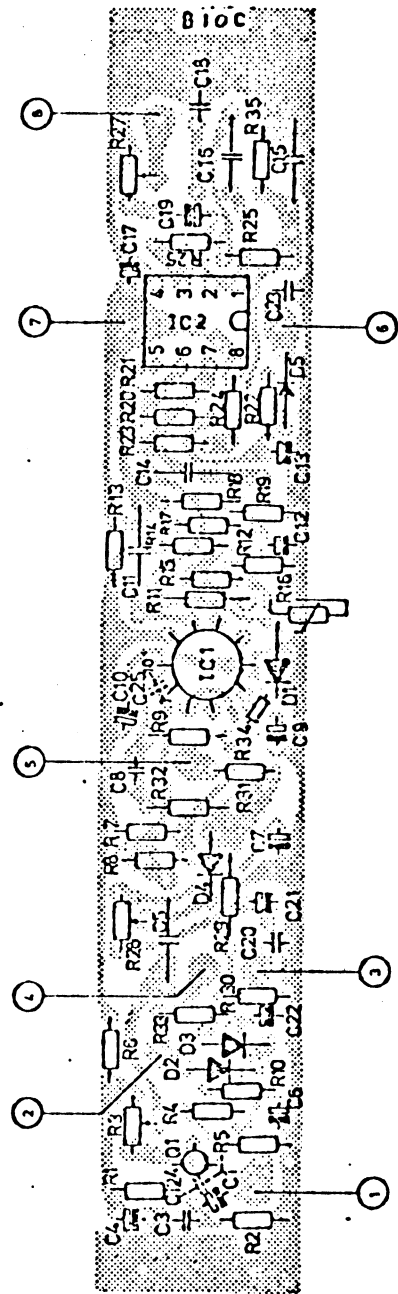
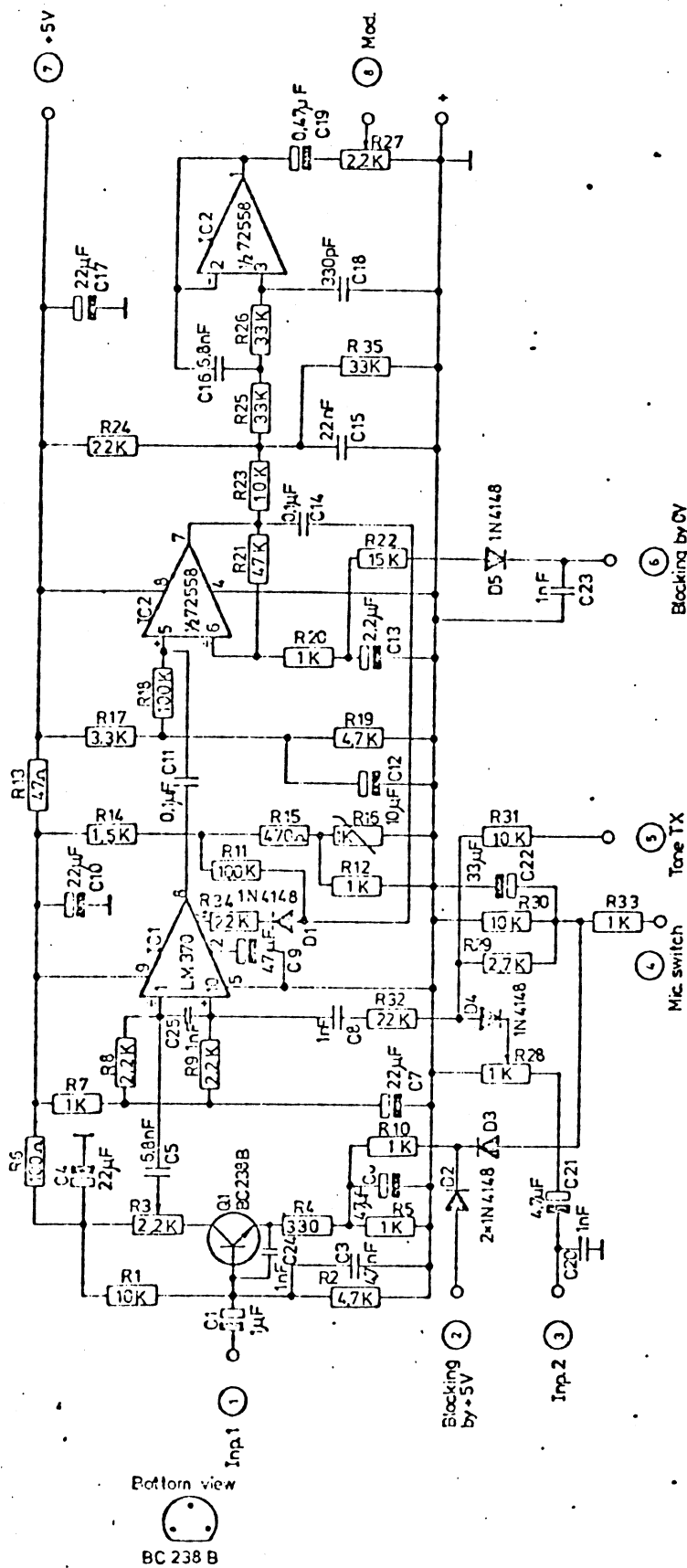
76325 - 4E2



Relett:		Aerialfilter UHF	Tegn.:29-12-75	Kontr.:
			NC-AC	
			Stykl. nr.:	
			Tegn. nr.:	75623 - 4E2
	AP-RADIOTELEFON 1/5			

# AP-RADIOTELEFON

Nr.	Kode	Data		Nr.	Kode	Data	
C1	11-447	10 pF	Ker.				
C2	11-447	10 pF	"				
C3	11-363	2,2 pF	"				
C4	11-363	2,2 pF	"				
C5	11-447	10 pF	"				
C6	11-447	10 pF	"				
L1		75618-4E2					
L2		75613-4E2					
L3		75612-4E2					
L4		75613-4E2					
L5		75618-4E2					
6 W aerial filter UHF				Rettet:		Tegn.:	Stykl. nr.:
Tilhører tegn. nr.: 75623-4E2						Kontr.:	75623-4S2



Revizija:  
7-9-75 JH/NC  
1-2-77 HJ

Modulation amplifier  
Print board B10C1

AP-RADIOTELEFON

Tegna: 8-1-75  
AC  
Stykt. nr.:

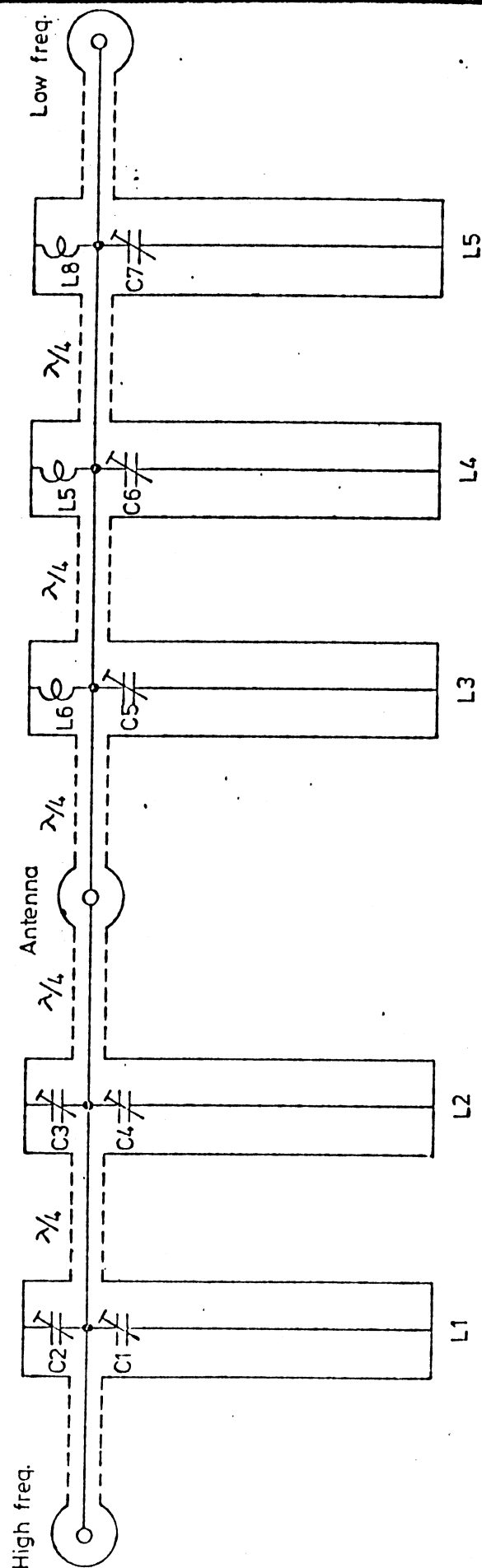
Kontroll:

Tegna. nr.:

75018-3E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
1	13-295	10 KΩ 1/8W CR 10	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/6,3VTant.
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	11-509	47 μF/6,3VTant.
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	11-351	22 nF Laco
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	13-279	470 Ω " "	C18	11-430	330 pF N750 Ker.
R16	13-664	1 KΩ NTC	C19	11-501	0,47 μF/35VTant.
R17	13-289	3,3 KΩ 1/8W CR 10	C20	11-409	1nF Ker.
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-C62	1N4148
R25	13-300	33 KΩ " "	D2	04-C62	1N4148
R26	13-300	33 KΩ " "	D3	04-C62	1N4148
R27	19-2 5	2,2 KΩ Trim.	D4	04-062	1N4148
R28	19-252	1 KΩ " "	D5	04-C62	1N4148
R29	13-288	2,7 KΩ 1/8W CR 10			
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.			
C2	11-416	4,7 nF Ker.			
Modulation amplifier Print board B 1C C 1 Tilhører tegn. nr.: 75018-3E2			Rettet:		Tegn.: Kontr.: Stykl. nr.: 75018-4S2



Notat:

UHF Duplexfilter

Tegn.: 11-10-76  
AC

Kontr.: 12-10-76  
JS

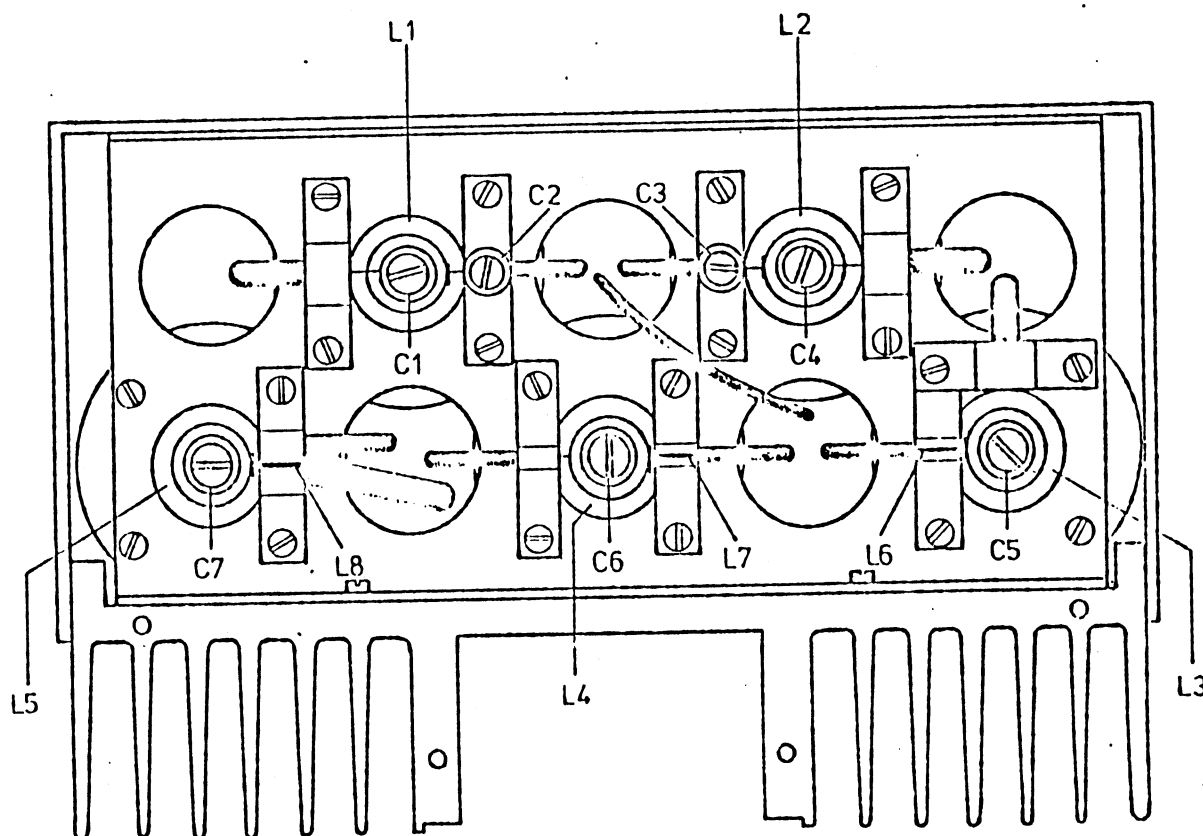
Stykl. nr.:

Tegn. nr.:

76272 - 4E2

AP-RADIOTELEFON 1/2





Rettot:      	UHF Duplexfilter Tuning section  <b>AP-RADIOTELEFON ½</b>	Tegn.: 12-10-76 AC Stykl. nr.:  Tegn. nr.: 76273-4E2	Kontr.: 12-10-76 JS
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# 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 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	11-444	560 pF "
R34	13-299	22 KΩ " "	C26	11-444	560 pF "
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/6,3V Tant

Synthesizer logic

Print board B 17 B. 1+B 22 A 1

Tilhører tegn. nr.: 75062-3E

Tegn.:

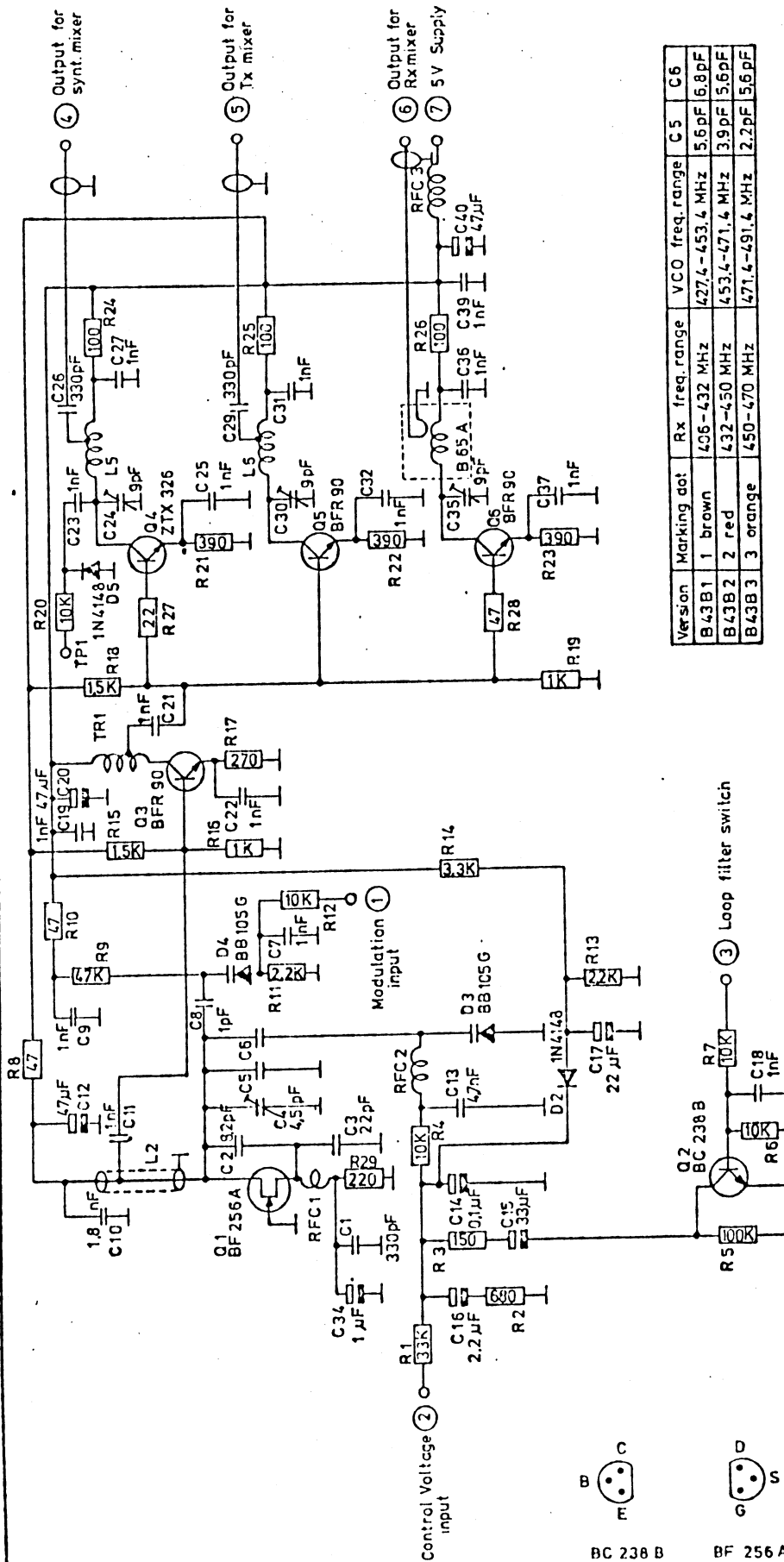
Stykl. nr.:

Kontr.:

75062-4S 2

# AP-RADIOTELEFON

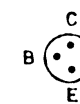
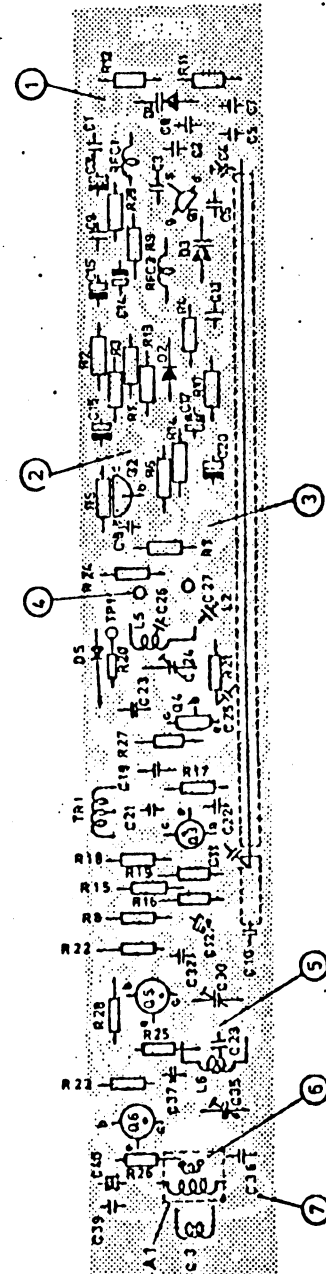
Nr.	Kode	Data	Nr.	Kode	Data
Q1	19-093	BC 238B			
Q2	19-093	BC 238B			
Q3	19-093	BC 238B			
Q4	19-093	BC 238B			
Q5	19-093	BC 238B			
IC1	09-077	SN74LS02N			
IC2	09-052	SN74193N			
IC3	09-076	SN74LS193N			
IC4	09-008	MC4044P			
IC5	09-003	TAA765A			
IC6	09-078	SN74LS93N			
RFC1	04-114	74016-4E			
X1	11-816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



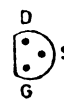
Version	Marking dot	Rx freq. range	VCO freq. range	C5	C6
B43B1	1 brown	406-432 MHz	427.4-453.4 MHz	5.6pF	6.8pF
B43B2	2 red	432-450 MHz	453.4-471.4 MHz	3.9pF	5.6pF
B43B3	3 orange	450-470 MHz	471.4-491.4 MHz	2.2pF	5.6pF



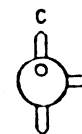
B65A1



BC 238 B  
Bottom view



BF 256 A  
Bottom view



BFR 90  
Top view



ZTX 326  
Bottom view

Retort: 13-4-77 CHB/KC

Voltage controlled oscillator for UHF  
Print board B43B 1,2 and 3 + B65A1

AP-RADIOTELEFON

Tegn.: 22-1-76

NC

Kontr.: 22-1-76

CHB

Stykl, nr.:

Tegn. nr.:

76024-3E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-300	33 KΩ 1/8W CR 16	C6/3	11-370	5,6 pF Ker.
R2	13-281	680 Ω " "	C7	11-409	1 nF "
R3	13-273	150 Ω " "	C8	11-361	1 pF "
R4	13-295	10 KΩ " "	C9	11-409	1 nF "
R5	13-306	100 KΩ " "	C10	11-441	1,8 nF chip "
R6	13-295	10 KΩ " "	C11	11-409	1 nF "
R7	13-295	10 KΩ " "	C12	11-509	47 μF/6,3V Tant.
R8	13-267	47 Ω " "	C13	11-416	4,7 nF Ker.
R9	13-302	47 KΩ " "	C14	11-515	0,1 μF/35 V Tant.
R10	13-267	47 Ω " "	C15	11-508	33 μF/10 V "
R11	13-287	2,2 KΩ " "	C16	11-503	2,2 μF/25 V "
R12	13-295	10 KΩ " "	C17	11-507	22 μF/25 V "
R13	13-287	2,2 KΩ " "	C18	11-409	1 nF Ker.
R14	13-289	3,3 KΩ " "	C19	11-409	1 nF Ker.
R15	13-285	1,5 KΩ " "	C20	11-509	47 μF/6,3V Tant
R16	13-283	1 KΩ " "	C21	11-409	1 nF Ker.
R17	13-276	270 Ω " "	C22	11-442	1 nF chip "
R18	13-285	1,5 KΩ " "	C23	11-409	1 nF "
R19	13-283	1 KΩ " "	C24	19-329	9 pF Trim.
R20	13-382	10 KΩ 1/4 W CR 25	C25	11-442	1 nF chip Ker.
R21	13-278	390 Ω 1/8W CR 16	C26	11-406	330 pF "
R22	13-278	390 Ω " "	C27	11-442	1 nF chip "
R23	13-278	390 Ω " "	C28		
R24	13-271	100 Ω " "	C29	11-406	330 pF "
R25	13-271	100 Ω " "	C30	19-329	9 pF Trim.
R26	13-271	100 Ω " "	C31	11-442	1 nF chip Ker.
R27	13-263	22 Ω " "	C32	11-442	1 nF " "
R28	13-267	47 Ω " "	C33		
R29	13-275	220 Ω " "	C34	11-517	1 μF/25 V Tant.
C1	11-406	330 pF Ker.	C35	19-329	9 pF Trim.
C2	11-374	8,2 pF "	C36	11-442	1 nF chip Ker.
C3	11-385	22 pF "	C37	11-442	1 nF " "
C4	19-319	4,5 pF Trim.	C38		
C5/1	11-370	5,6 pF Ker.	C39	11-409	1 nF "
C5/2	11-433	3,9 pF "	C40	11-509	47 μF/6,3V Tant.
C5/3	11-439	2,2 pF NPO Ker.			
C6/1	11-373	6,8 pF "			
C6/2	11-370	5,6 pF "			

Voltage controlled oscillator for UHF  
 Print board B43B 1,2,3, and Print board  
 Tilhører tegn. nr.: 76024-3E2 B65A 1

Tegn.:

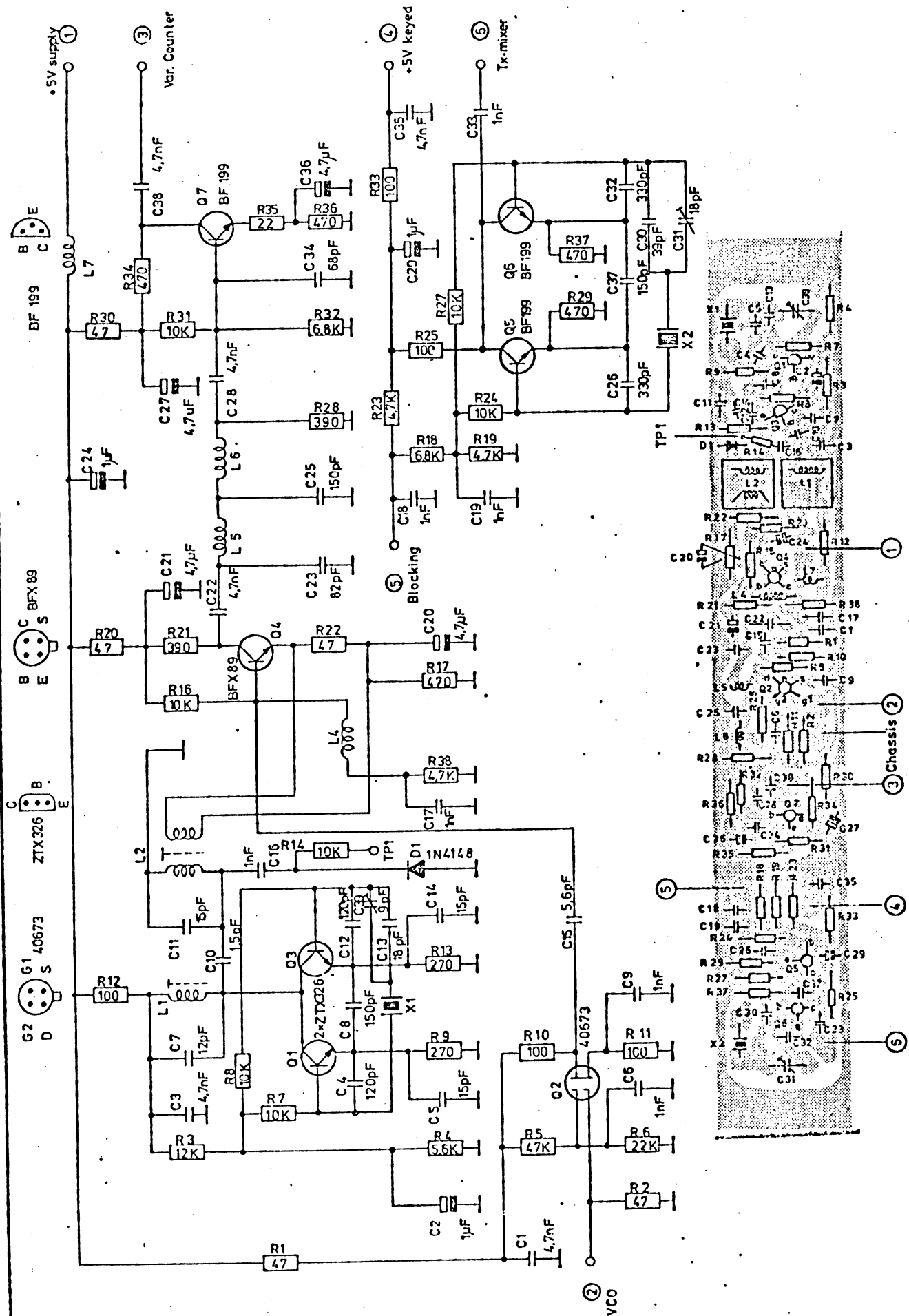
Stykl. nr.:

Kontr.:

76024-4S2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
D2	04-062	1N4148			
D3	04-009	BB105G			
D4	04-009	BB105G			
D5	04-062	1N4148			
Q1	19-113	BF256A Philips			
Q2	19-093	BC238B			
Q3	19-114	BFR90			
Q4	19-115	ZTX326			
Q5	19-114	BFR90			
Q6	19-114	BFR90			
L2		75523-4E2			
L5		76082-4E2			
L6		76082-4E2			
TR1		75288-4E2			
RFC 1	04-114	6,8 $\mu$ H			
RFC 2	04-114	6,8 $\mu$ H			
RFC 3	04-117	100 $\mu$ H			
Voltage controlled oscillator for UHF Print board B43B 1,2,3 and Print board Tilhører tegn. nr.: 76024-3E2 B65A 1			Tegn.: Kontr.:		Stykl. nr.: 76024-4S2



Notes:

Synthesizer mixer and Tx-oscillator UHF  
Print board B56 B 1

AP-RADIOTELEFON

Tegn. 19-12-75 Kontr. 23-1-76  
EH CHB

Stykl. nr.:

Tegn. nr.:

75628-3E2



# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-267	47 $\Omega$ 1/8W CR 16	C1	11-416	4,7 nF Ker.
R2	13-267	47 $\Omega$ " "	C2	11-502	1 $\mu$ F/35V Tant.
R3	13-296	12 K $\Omega$ " "	C3	11-416	4,7 nF Ker.
R4	13-292	5,6 K $\Omega$ " "	C4	11-403	120 pF "
R5	13-302	47 K $\Omega$ " "	C5	11-381	15 pF "
R6	13-299	22 K $\Omega$ " "	C6	11-409	1 nF "
R7	13-295	10 K $\Omega$ " "	C7	11-379	12 pF "
R8	13-295	10 K $\Omega$ " "	C8	11-404	150 pF "
R9	13-276	270 $\Omega$ " "	C9	11-409	1 nF "
R10	13-271	100 $\Omega$ " "	C10	11-362	1,5 pF "
R11	13-271	100 $\Omega$ " "	C11	11-381	15 pF "
R12	13-271	100 $\Omega$ " "	C12	11-403	120 pF "
R13	13-276	270 $\Omega$ " "	C13	11-434	18 pF "
R14	13-382	10 K $\Omega$ $\frac{1}{4}$ W CR 25	C14	11-381	15 pF "
R16	13-295	10 K $\Omega$ 1/8W CR 16	C15	11-370	5,6 pF "
R17	13-279	470 $\Omega$ " "	C16	11-409	1 nF "
R18	13-293	6,8 K $\Omega$ " "	C17	11-409	1 nF "
R19	13-291	4,7 K $\Omega$ " "	C18	11-409	1 nF "
R20	13-267	47 $\Omega$ " "	C19	11-409	1 nF "
R21	13-278	390 $\Omega$ " "	C20	11-504	4,7 $\mu$ F/10V Tant.
R22	13-267	47 $\Omega$ " "	C21	11-504	4,7 $\mu$ F/10V "
R23	13-291	4,7 K $\Omega$ " "	C22	11-416	4,7 nF Ker.
R24	13-295	10 K $\Omega$ " "	C23	11-399	82 pF "
R25	13-271	100 $\Omega$ " "	C24	11-502	1 $\mu$ F/35V Tant.
R27	13-295	10 K $\Omega$ " "	C25	11-404	150 pF Ker.
R28	13-278	390 $\Omega$ " "	C26	11-430	330 pF N750 "
R29	13-279	470 $\Omega$ " "	C27	11-504	4,7 $\mu$ F/10V Tant.
R30	13-267	47 $\Omega$ " "	C28	11-416	4,7 nF Ker.
R31	13-295	10 K $\Omega$ " "	C29	11-502	1 $\mu$ F/35V Tant.
R32	13-293	6,8 K $\Omega$ " "	C30	11-393	39 pF Ker.
R33	13-271	100 $\Omega$ " "	C31	11-330	18 pF Trim.
R34	13-279	470 $\Omega$ " "	C32	11-430	330 pF N750 Ker.
R35	13-263	22 $\Omega$ " "	C33	11-409	1 nF "
R36	13-279	470 $\Omega$ " "	C34	11-397	68 pF "
R37	13-279	470 $\Omega$ " "	C35	11-416	4,7 nF "
R38	13-291	4,7 K $\Omega$ " "	C36	11-504	4,7 $\mu$ F/10V Tant.
			C37	11-404	150 pF Ker.

Synthesizer mixer and Tx-oscillator UHF  
 Print board B 56 B 1  
 Tilhører tegn. nr.: 75628-3E2

Tegn.:

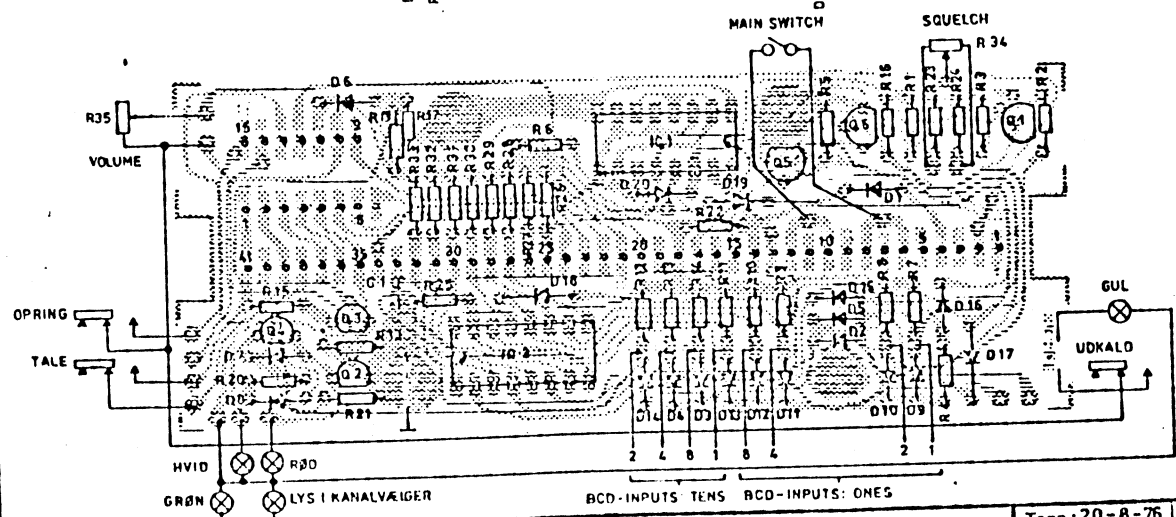
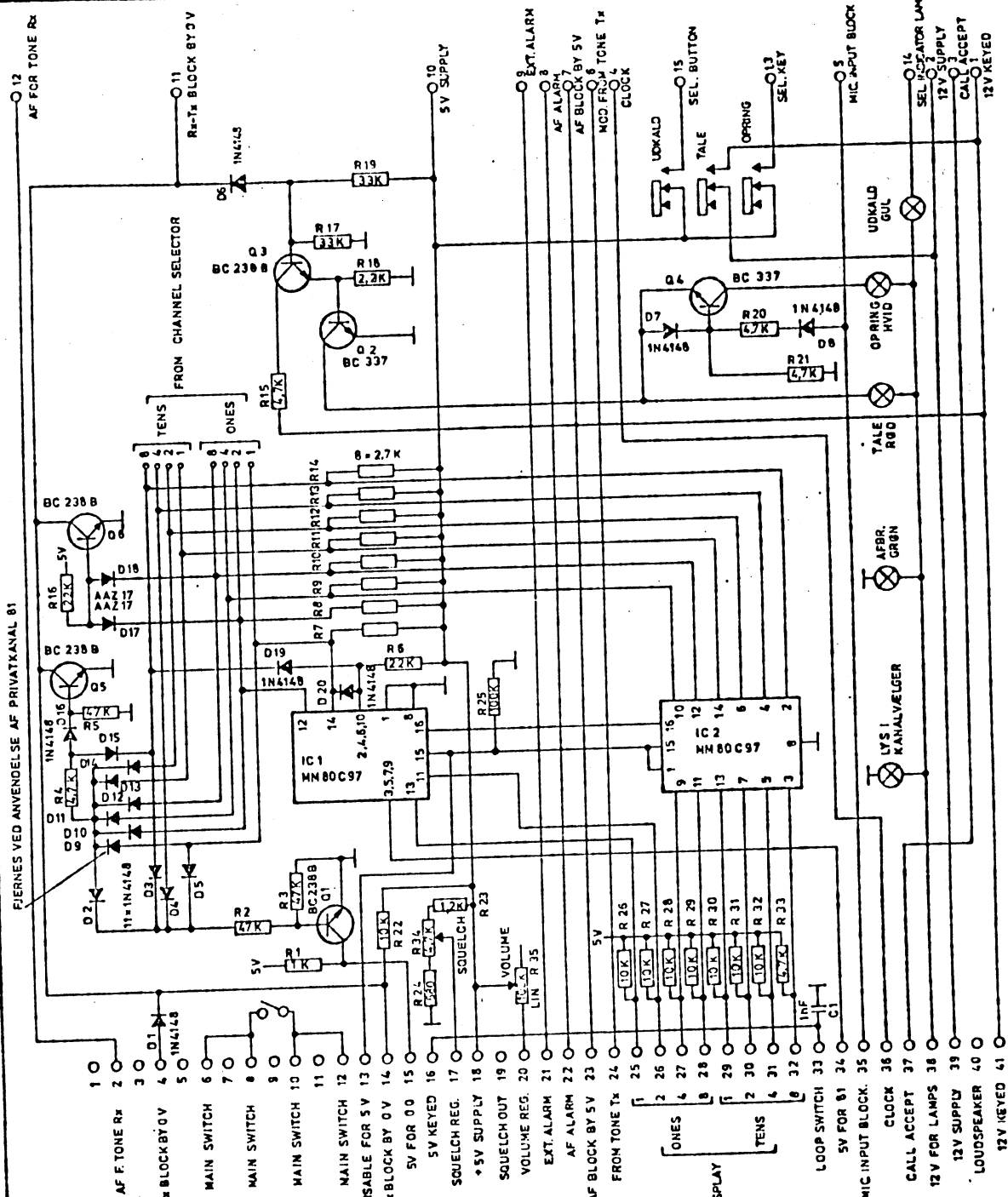
Stykl. nr.:

Kontr.:

75628-4S2

# AP-RADIOTELEFON

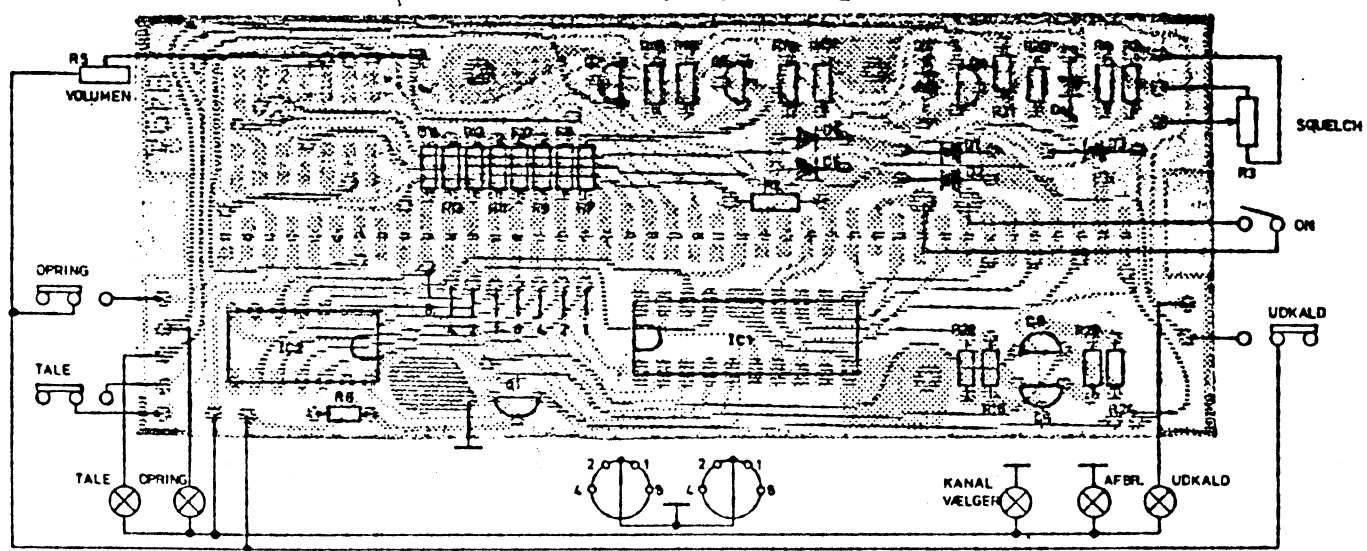
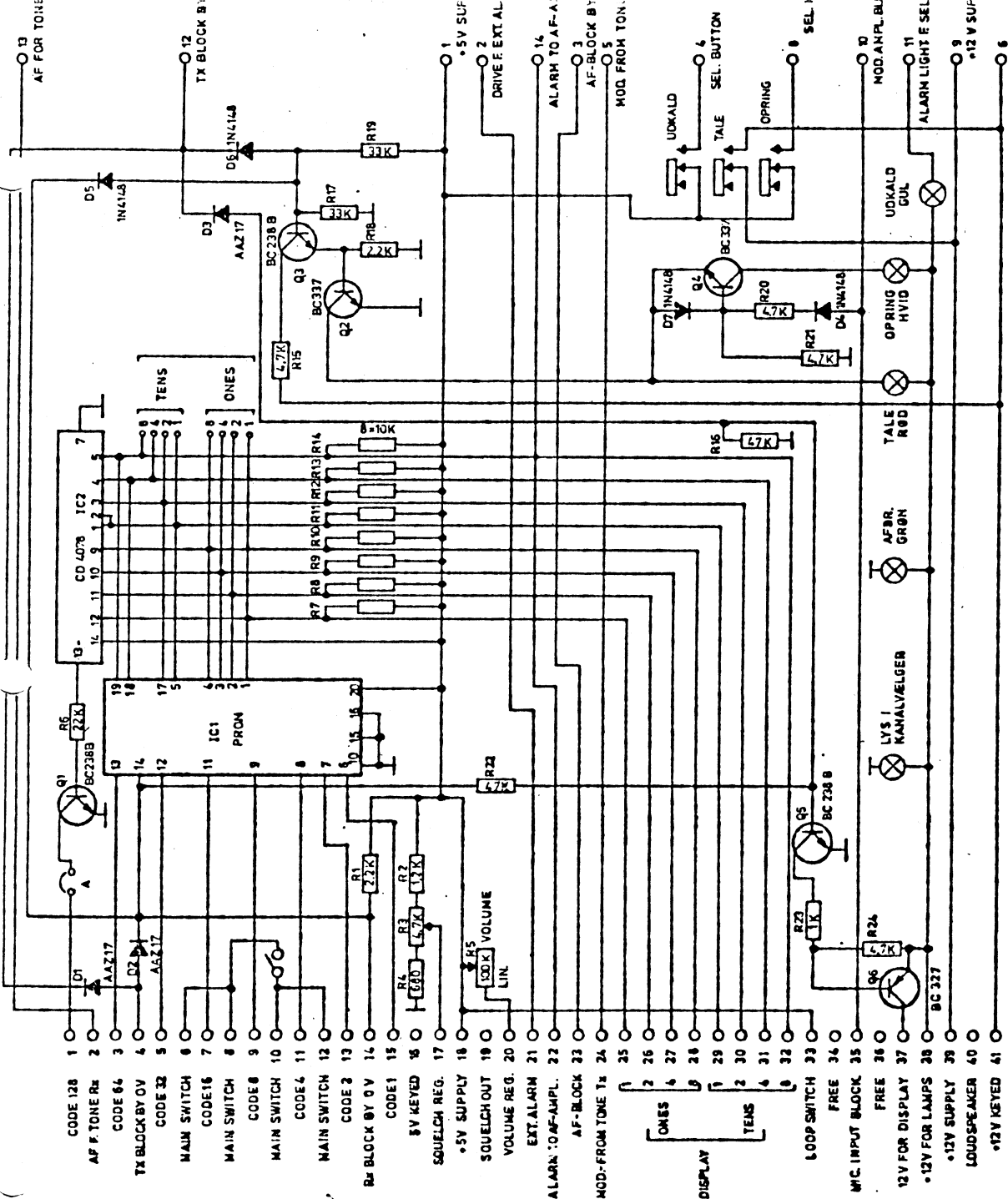
TRANSMITTER SECTION							
Nr.	Kode	Data		Nr.	Kode	Data	
C38	11-416	4,7 nF	Ker.				
C39	19-329	9 pF	Trim.				
D1	04-062	1N4148					
Q1	19-115	ZTX 326					
Q2	19-128	40673					
Q3	19-115	ZTX 326					
Q4	19-102	BFX89					
Q5	19-104	BF199					
Q6	19-104	BF199					
Q7	19-104	BF199					
L1		75594-4E2					
L2		75595-4E2					
L4		76079-4E2					
L5	04-114	6,8 $\mu$ H					
L6	04-114	6,8 $\mu$ H					
L7	04-114	6,8 $\mu$ H					
X1		Frequency dependent on desired band spec. AP 25					
X2		Frequency dependent on mode of operation (simplex) duplex etc.) spec. AP 22					
Synthesizer mixer and Tx-oscillator UHF Print board B 56 B 1 Tilhører tegn. nr.: 75628-3E2						Tegn.:	Stykl. nr.:
						Kontr.:	75628-4S2



Rettel: J4-4-77.HJ		Tegn.: 20-8-76 NC    Kontr.: 20-8-76 LT	
KONTROL KREDSLØB FOR OFFENTLIG BILTELEFON UHF MED KANALSØGNING PRINT B44A1		Stykt. nr.: Tegn. nr.:	
AP-RADIOTELEFON		76225-3 E 2	

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-283	1 kΩ 1/8W CR 16	D1	04-062	1N4148
R2	13-302	47 kΩ " "	D2	04-062	1N4148
R3	13-302	47 kΩ " "	D3	04-062	1N4148
R4	13-291	4,7 kΩ " "	D3	04-062	1N4148
R5	13-302	47 kΩ " "	D4	04-062	1N4148
R6	13-299	22 kΩ " "	D5	04-062	1N4148
R7	13-288	2,7 kΩ " "	D6	04-062	1N4148
R8	13-288	2,7 kΩ " "	D7	04-062	1N4148
R9	13-288	2,7 kΩ " "	D8	04-062	1N4148
R10	13-288	2,7 kΩ " "	D9	04-062	1N4148
R11	13-288	2,7 kΩ " "	D10	04-062	1N4148
R12	13-288	2,7 kΩ " "	D11	04-062	1N4148
R13	13-288	2,7 kΩ " "	D12	04-062	1N4148
R14	13-288	2,7 kΩ " "	D13	04-062	1N4148
R15	13-291	4,7 kΩ " "	D14	04-062	1N4148
R16	13-299	22 kΩ " "	D15	04-062	1N4148
R17	13-300	33 kΩ " "	D16	04-062	1N4148
R18	13-287	2,2 kΩ " "	D17	04-002	AAZ17
R19	13-300	33 kΩ " "	D18	04-002	AAZ17
R20	13-291	4,7 kΩ " "	D19	04-062	1N4148
R21	13-291	4,7 kΩ " "	D20	04-062	1N4148
R22	13-295	10 kΩ " "			
R23	13-284	1,2 kΩ " "	Q1	19-093	BC238B
R24	13-281	680 Ω " "	Q2	19-096	BC337
R25	13-306	100 kΩ " "	Q3	19-093	BC238B
R26	13-295	10 kΩ " "	Q4	19-096	BC337
R27	13-295	10 kΩ " "	Q5	19-093	BC238B
R28	13-295	10 kΩ " "	Q6	19-093	BC238B
R29	13-295	10 kΩ " "			
R30	13-295	10 kΩ " "	IC1	09-082	MM80C97N
R31	13-295	10 kΩ " "	IC2	09-082	MM80C97N
R32	13-295	10 kΩ " "			
R33	13-295	10 kΩ " "			
C1	11-409	1 nF ker.			
Kontrol kredsløb for OB UHF med kanalsøgn. B 44 A 1 Tilhører tegn. nr.: 76225-3E2			Rettet:		<div>Tegn.: Stykl. nr:</div> <div>Kontr.: 76225-4S2</div>



76 LT/NC  
21-3-77-HJ

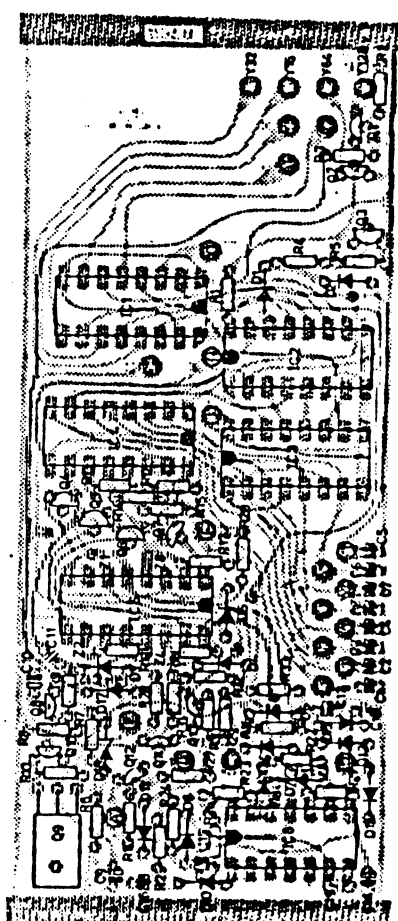
CONTROL CIRCUIT FOR PUBLIC MOBILE TELEPHONE  
FRONTSECTION 15, PRINT B 49A 1 (prom no.1)  
FRONTSECTION 19, PRINT B 49A 2 (prom no.2)

AP-RADIOTELEFON

Tegn.: 11-12-75 AC	Kontr.: LT
Stykl. nr.:	
Tegn. nr.:	75590-3E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-287	2,2 K $\Omega$ 1/8 W CR16	Q4	19-096	BC337
R2	13-284	1,2 K $\Omega$ " "	Q5	19-093	BC238B
R3	16-022	4,7 K $\Omega$ Potm.	Q6	19-095	BC327
R4	13-281	680 $\Omega$ 1/8 W CR16	IC1	09-073	SN74S470N
R5	16-023	100 K $\Omega$ Lin.Potm.	IC2	09-083	CD4078BE
R6	13-299	22 K $\Omega$ 1/8 W CR16			
R7	13-295	10 K $\Omega$ " "			
R8	13-295	10 K $\Omega$ " "			
R9	13-295	10 K $\Omega$ " "			
R10	13-295	10 K $\Omega$ " "			
R11	13-295	10 K $\Omega$ " "			
R12	13-295	10 K $\Omega$ " "			
R13	13-295	10 K $\Omega$ " "			
R14	13-295	10 K $\Omega$ " "			
R15	13-291	4,7 K $\Omega$ " "			
R16	13-302	47 K $\Omega$ " "			
R17	13-300	33 K $\Omega$ " "			
R18	13-287	2,2 K $\Omega$ " "			
R19	13-300	33 K $\Omega$ " "			
R20	13-291	4,7 K $\Omega$ " "			
R21	13-291	4,7 K $\Omega$ " "			
R22	13-302	47 K $\Omega$ " "			
R23	13-283	1 K $\Omega$ " "			
R24	13-291	4,7 K $\Omega$ " "			
D1	04-002	AAZ17			
D2	04-002	AAZ17			
D3	04-002	AAZ17			
D4	04-062	1N4148			
D5	04-062	1N4148			
D6	04-062	1N4148			
D7	04-062	1N4148			
Q1	19-093	BC238B			
Q2	19-096	BC337			
Q3	19-093	BC238B			
Control Circuit for public mob. Telephone frontsection 15/19 Tilhører tegn. nr.: 75590-3E2			Rettet:		<div>Tegn.: Stykl. nr.:</div> <div>Kontr.: 75590-4S2</div>

[illegible]

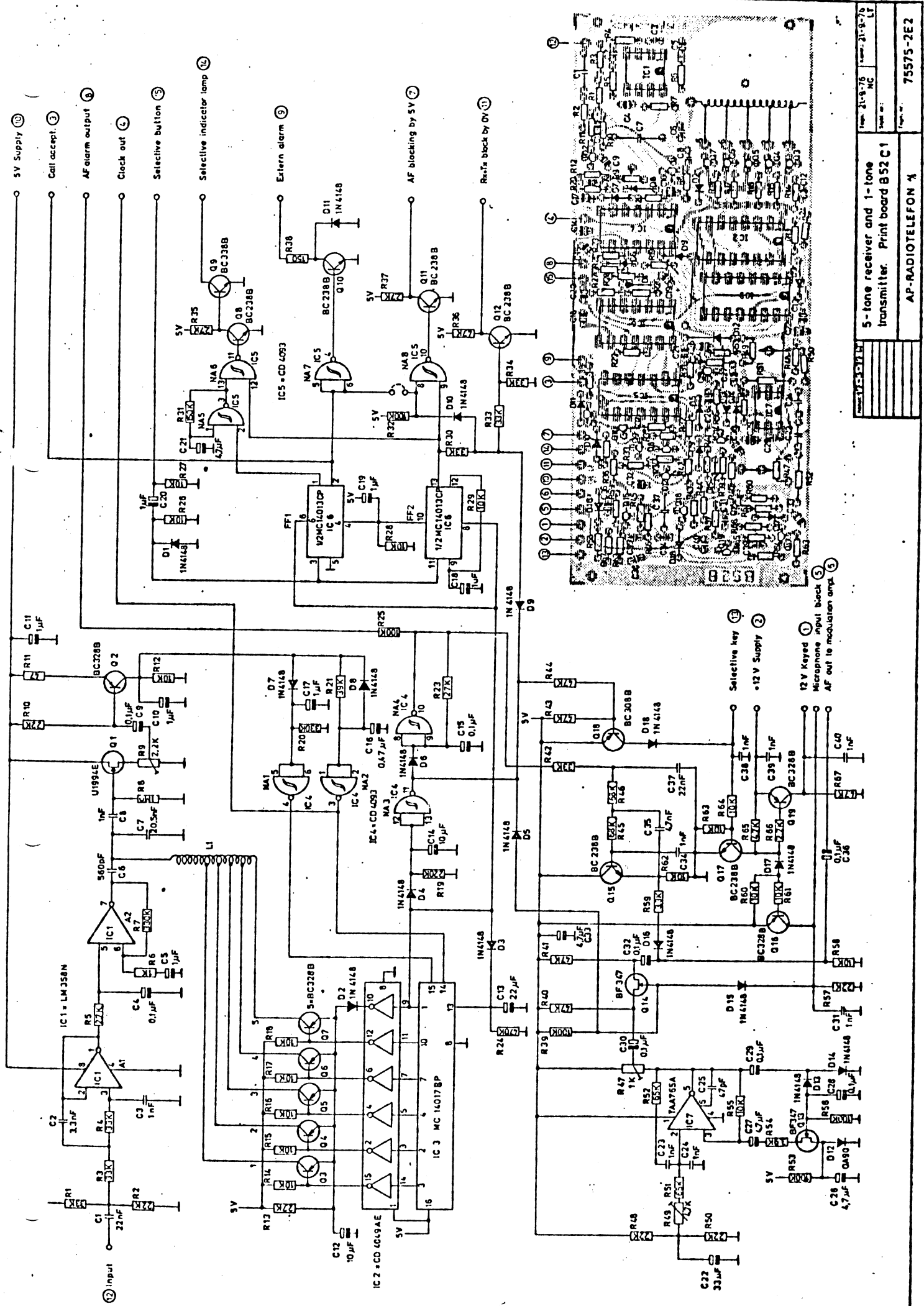
# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
P1	13-299	22 kΩ 1/8W CR 16	C4	11-515	0,1 μF/35V Tant.
R2	13-302	47 kΩ " "	C5	11-515	0,1 μF/35V "
R3	13-302	47 kΩ " "	C6	11-515	0,1 μF/35V "
R4	13-302	47 kΩ " "	C7	11-515	0,1 μF/35V "
R5	13-302	47 kΩ " "	C8	11-515	0,1 μF/35V "
R6	13-273	150 Ω " "	C9	11-504	4,7 μF/10V "
R7	13-283	1 kΩ " "	C10	11-502	1 μF/35V "
R8	13-271	100 Ω " "	C11	11-409	1 nF ker.
R9	13-295	10 kΩ " "	C12	11-409	1 nF "
R10	13-295	10 kΩ " "	C13	11-409	1 nF "
R11	13-291	4,7 kΩ " "	C14	11-502	1 μF/35V Tant.
R12	13-295	10 kΩ " "	C15	11-515	0,1 μF/35V "
R13	13-295	10 kΩ " "	C16	11-500	1 μF/35V "
R14	13-295	10 kΩ " "	C17	11-504	4,7 μF/10V "
R15	13-295	10 kΩ " "	C18	11-409	1 nF ker.
R16	13-297	15 kΩ " "	C19	11-409	1 nF "
R17	13-302	47 kΩ " "			
R18	13-302	47 kΩ " "	D1	04-062	1N4148
R19	13-302	47 kΩ " "	D2	04-062	1N4148
R20	13-302	47 kΩ " "	D3	04-062	1N4148
R21	13-307	120 kΩ " "	D4	04-062	1N4148
R22	13-306	100 kΩ " "	D5	04-062	1N4148
R23	13-300	33 kΩ " "	D6	04-062	1N4148
R24	13-300	33 kΩ " "	D7	04-062	1N4148
R25	13-302	47 kΩ " "	D8	04-062	1N4148
R26	13-302	47 kΩ " "	D9	04-062	1N4148
R27	13-283	1 kΩ " "	D10	04-062	1N4148
R28	13-299	22 kΩ " "	D11	04-062	1N4148
R29	13-300	33 kΩ " "	D12	04-062	1N4148
R30	13-295	10 kΩ " "	D13	04-062	1N4148
R31	13-299	22 kΩ " "	D14	04-062	1N4148
R32	13-287	2,2 kΩ " "	D15	04-062	1N4148
R33	13-306	100 kΩ " "	D16	04-045	ZPD 4,3 zener
			D17	04-062	1N4148
C1	11-515	0,1 μF/35V Tant.			
C2	11-515	0,1 μF/35V "			
C3	11-515	0,1 μF/35V "			
Sikkerhed for OB UHF med kan- alsøgning. B 70 A 1 Tilhører tegn. nr.: 76249-2E2			Rettet:		Tegn.: Kontr.:
					Stykl. nr.: 76249-4S2



# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
Q1	19-117	BC238B			
Q2	19-117	BC238B			
Q3	19-117	BC238B			
Q4	19-117	BC238B			
Q5	19-117	BC238B			
Q6	19-117	BC238B			
Q7	19-117	BC238B			
Q8	19-117	BC238B			
Q9	19-176	2N4918			
Q10	19-117	BC238B			
Q11	19-117	BC238B			
Q12	19-082	BC328B			
Q13	19-117	BC238B			
IC1	09-082	MM80C97N			
IC2	09-087	CD4008AE			
IC3	09-087	CD4008AE			
IC4	09-066	SN74188AN			
IC5	09-084	MC14526CP			
IC6	09-072	CD4093BE			
Logikenhed for OB UHF med kan- alsøgning. B 70 A 1 Tilhører tegn. nr.: 76249-2E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 76249-4S2



5-tone receiver and 1-tone transmitter Print board B52 C1	Page 21-8-76	NC	LT
AP-RADIOTELEFON 4	75575-2E2		

# AP-RADIOTELEFON

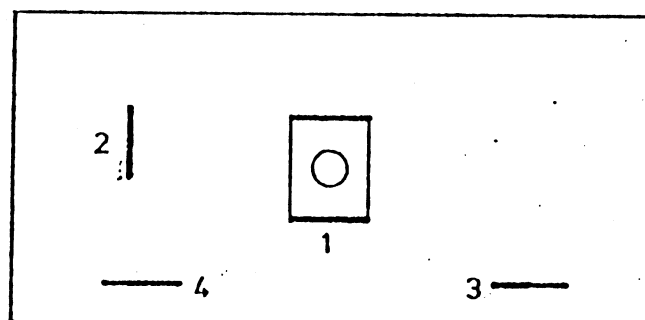
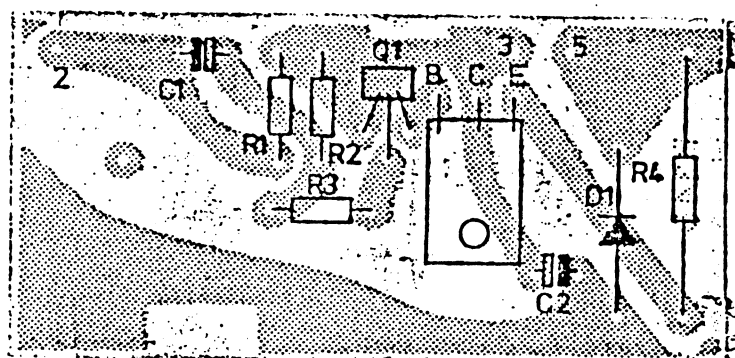
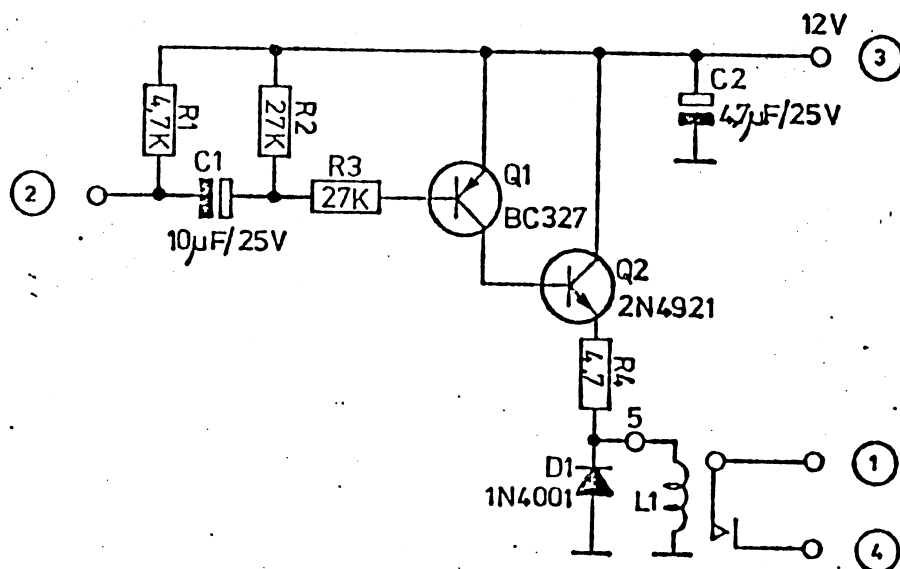
Nr.	Kode	Data	Nr.	Kode	Data
R1	13-300	33 kΩ 1/8W CR 16	R38	13-273	150 Ω 1/8W CR 16
R2	13-299	22 kΩ " "	R39	13-306	100 kΩ " "
R3	13-300	33 kΩ " "	R40	13-302	47 kΩ " "
R4	13-300	33 kΩ " "	R41	13-302	47 kΩ " "
R5	13-288	2,2 kΩ " "	R42	13-300	33 kΩ " "
R6	13-283	1 kΩ " "	R43	13-302	47 kΩ " "
R7	13-310	330 kΩ " "	R44	13-302	47 kΩ " "
R8	13-312	1 MΩ " "	R45	13-304	68 kΩ " "
R9	19-255	2,2 kΩ Trimpot.	R46	13-304	68 kΩ " "
R10	13-299	22 kΩ 1/8W CR 16	R47	19-253	1 kΩ Trimpot.
R11	13-267	47 Ω " "	R48	13-299	22 kΩ 1/8W CR 16
R12	13-295	10 kΩ " "	R49	19-256	4,7 kΩ Trimpot.
R13	13-288	2,2 kΩ " "	R50	13-299	22 kΩ 1/8W CR 16
R14	13-295	10 kΩ " "	R51	13-689	65 kΩ " "
R15	13-295	10 kΩ " "	R52	13-689	65 kΩ " "
R16	13-295	10 kΩ " "	R53	13-306	100 kΩ " "
R17	13-295	10 kΩ " "	R54	13-290	3,9 kΩ " "
R18	13-295	10 kΩ " "	R55	13-295	10 kΩ " "
R19	13-309	220 kΩ " "	R56	13-306	100 kΩ " "
R20	13-310	330 kΩ " "	R57	13-287	2,2 kΩ " "
R21	13-301	39 kΩ " "	R58	13-295	10 kΩ " "
R22			R59	13-289	3,3 kΩ " "
R23	13-313	27 kΩ " "	R60	13-295	10 kΩ " "
R24	13-315	470 kΩ " "	R61	13-295	10 kΩ " "
R25	13-306	100 kΩ " "	R62	13-295	10 kΩ " "
R26	13-295	10 kΩ " "	R63	13-295	10 kΩ " "
R27	13-295	10 kΩ " "	R64	13-295	10 kΩ " "
R28	13-295	10 kΩ " "	R65	13-291	4,7 kΩ " "
R29	13-295	10 kΩ " "	R66	13-287	2,2 kΩ " "
R30	13-300	33 kΩ " "	R67	13-291	4,7 kΩ " "
R31	13-308	150 kΩ " "			
R32	13-306	100 kΩ " "			
R33	13-300	33 kΩ " "			
R34	13-300	33 kΩ " "			
R35	13-288	2,7 kΩ " "			
R36	13-291	4,7 kΩ " "			
R37	13-288	2,7 kΩ " "			
5-tone receiver and 1-tone transmitter. Print board B 52 C1 Tilhører tegn. nr.: 75575-2E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75575-4S2

# AP-RADIOTELEFON

Nr.	Kode	Data		Nr.	Kode	Data	
C1	11-489	22 nF	MKH	C38	11-409	1 nF	ker.
C2	11-414	3,3 nF	ker.	C39	11-409	1 nF	"
C3	11-409	1 nF	"	C40	11-409	1 nF	"
C4	11-500	0,1 $\mu$ F/35V	Tant.				
C5	11-502	1 $\mu$ F/35V	"	D1	04-062	1N4148	
C6	11-407	560 pF	ker.	D2	04-062	1N4148	
C7	11-651	20,5 nF	styr.	D3	04-062	1N4148	
C8	11-409	1 nF	ker.	D4	04-062	1N4148	
C9	11-500	0,1 $\mu$ F/35V	Tant.	D5	04-062	1N4148	
C10	11-502	1 $\mu$ F/35V	"	D6	04-062	1N4148	
C11	11-502	1 $\mu$ F/35V	"	D7	04-062	1N4148	
C12	11-506	10 $\mu$ F/25V	"	D8	04-062	1N4148	
C13	11-507	22 $\mu$ F/16V	"	D9	04-062	1N4148	
C14	11-506	10 $\mu$ F/25V	"	D10	04-062	1N4148	
C15	11-500	0,1 $\mu$ F/35V	"	D11	04-062	1N4148	
C16	11-501	0,47 $\mu$ F/35V	"	D12	04-036	0A90	
C17	11-502	1 $\mu$ F/35V	"	D13	04-062	1N4148	
C18	11-502	1 $\mu$ F/35V	"	D14	04-062	1N4148	
C19	11-502	1 $\mu$ F/35V	"	D15	04-062	1N4148	
C20	11-502	1 $\mu$ F/35V	"	D16	04-062	1N4148	
C21	11-504	4,7 $\mu$ F/10V	"	D17	04-062	1N4148	
C22	11-508	33 $\mu$ F/10V	"	D18	04-062	1N4148	
C23	11-409	1 nF	ker.				
C24	11-409	1 nF	"	Q1	19-127	U1994	
C25	11-394	47 pF	"	Q2	19-082	BC328B	
C26	11-504	4,7 $\mu$ F/10V	Tant.	Q3	19-082	BC328B	
C27	11-504	4,7 $\mu$ F/10V	"	Q4	19-082	BC328B	
C28	11-500	0,1 $\mu$ F/35V	"	Q5	19-082	BC328B	
C29	11-500	0,1 $\mu$ F/35V	"	Q6	19-082	BC328B	
C30	11-500	0,1 $\mu$ F/35V	"	Q7	19-082	BC328B	
C31	11-409	1 nF	ker.	Q8	19-117	BC238B	
C32	11-500	0,1 $\mu$ F/35V	Tant.	Q9	19-117	BC238B	
C33	11-504	4,7 $\mu$ F/10V	"	Q10	19-117	BC238B	
C34	11-409	1 nF	ker.	Q11	19-117	BC238B	
C35	11-416	4,7 nF	"	Q12	19-117	BC238B	
C36	11-500	0,1 $\mu$ F/35V	Tant.	Q13	19-106	BF347	
C37	11-489	22 nF	MKH	Q14	19-106	BF347	
5-tone receiver and 1-tone transmitter. Print board B52C Tilhører tegn. nr.: 75575-2E2 1				Rettet:		Tegn.:	Stykl. nr.: 75575-4S2
						Kontr.:	

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
Q15	19-117	BC238B			
Q16	19-082	BC328B			
Q17	19-117	BC238B			
Q18	19-084	BC308B			
Q19	19-082	BC328B			
IC1	09-080	LM358N			
IC2	09-071	CD 4049AE			
IC3	09-070	MC14017BP			
IC4	09-072	CD4093BE			
IC5	09-072	CD4093BE			
IC6	09-074	MC14013CP			
IC7	09-003	TAA765			
L1	18-677	75425-4E2			
5-tone receiver and 1-tone transmitter. Print board B 52 C1 Tilhører tegn. nr.: 75575-2E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75575-4S2

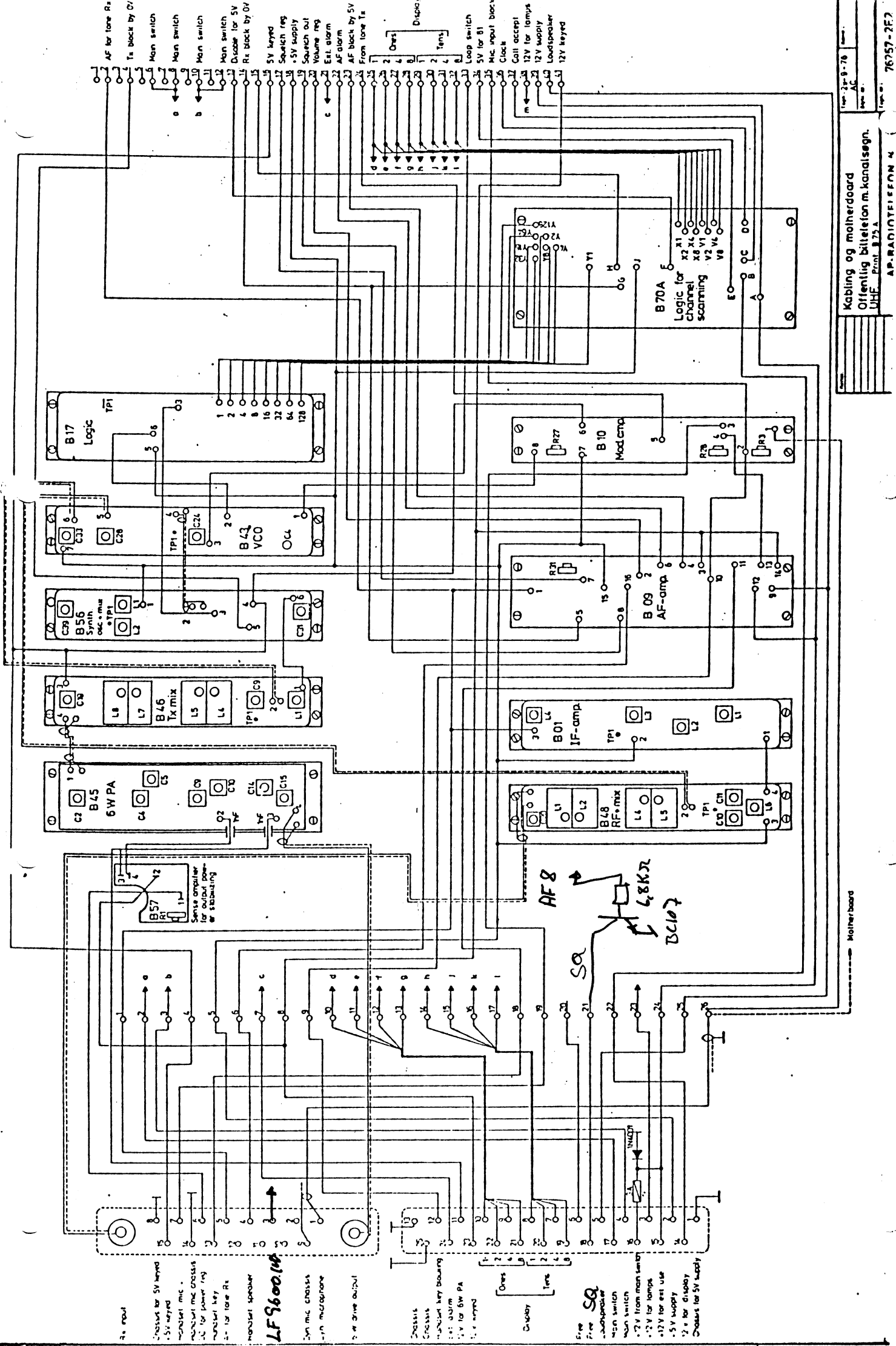


Relay box

Rettet: 23-3-76 AQL	Extern timing for hornrelay Print board B 34 B 1	Tegn.: 21-4-75 AC	Kontr.: 21-4-75 TJ
		Stykl. nr.: 75169-4S2	
	AP-RADIOTELEFON $\frac{1}{S}$	Tegn. nr.: 75169-4E2	

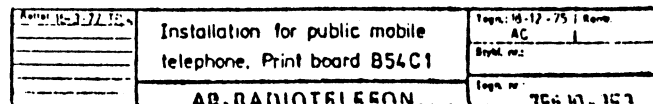
# AP-RADIOTELEFON

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>



Kabling og mølterboard  
 Offentlig bittelefon m. kanalsøgning  
 UHF - Print 875A  
 AP-RADIOTELEFON 4  
 76757-2F2





# AP-RADIOTELEFON

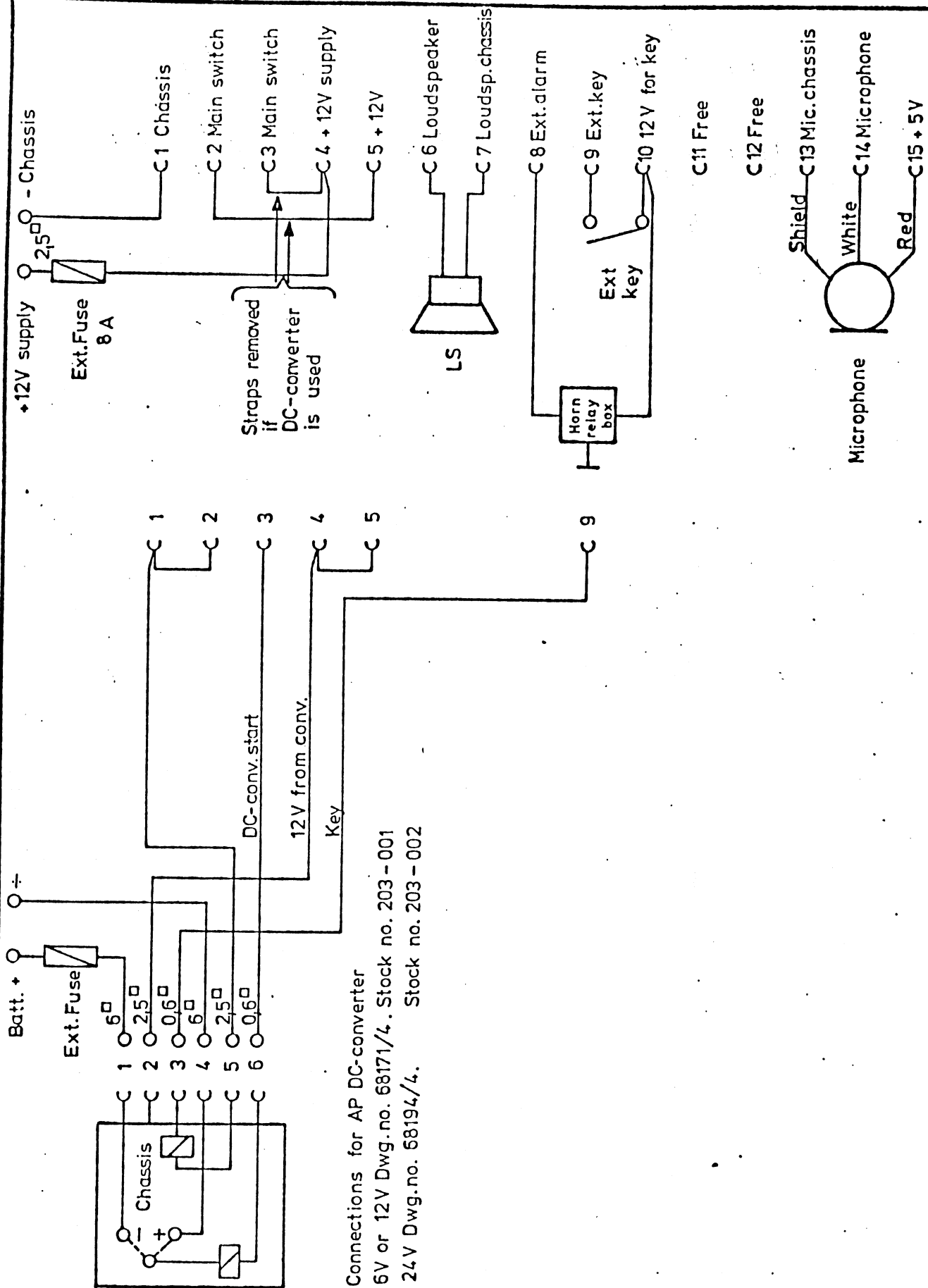
Nr.	Kode	Data	Nr.	Kode	Data
	13-359	100 $\Omega$ $\frac{1}{4}$ W CR 25			
C1	11-506	10 $\mu$ F/25V Tant.			
C2	11-353	0,1 $\mu$ F Laco.			
C3	11-506	10 $\mu$ F/25V Tant.			
C4	05-030	1000 $\mu$ F/16V Elco.			
C5	11-409	1 nF Ker.			
C6	11-353	0,1 $\mu$ F Laco.			
C7	11-409	1 nF Ker.			
D1	04-040	30S1			
Installation for public mobile telephone, Print board B 54 B 1 Tilhører tegn. nr.: 75620-2E2			Rettet:		<div>Tegn.:</div> <div>Kontr.:</div>
					Stykl. nr.: 75620-4S2

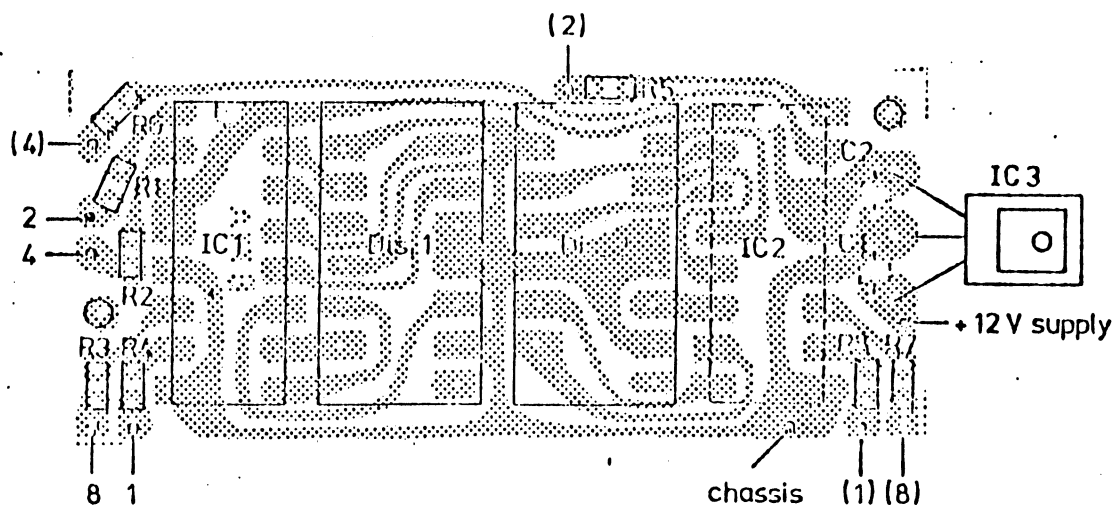
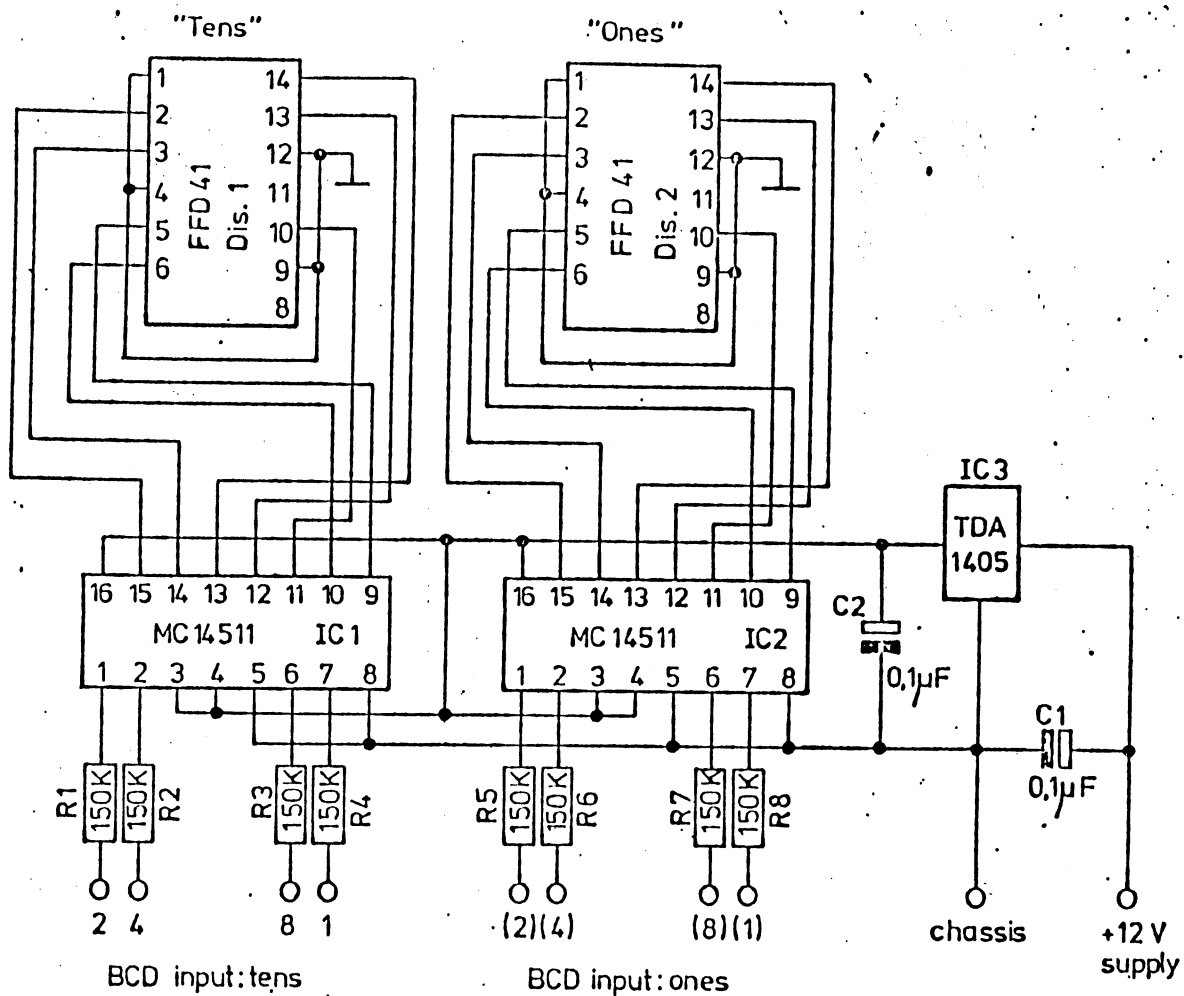
Rettet:
30-3-77 LT/NC

Installation for AP 2000 with  
printconnector

AP-RADIOTELEFON ½

Tegn.:	Kontr.:
10-1-77 HJ.	12-1-77 B.J.
Stykl. nr.:	
Tegn. nr.:	77001-4E 2.

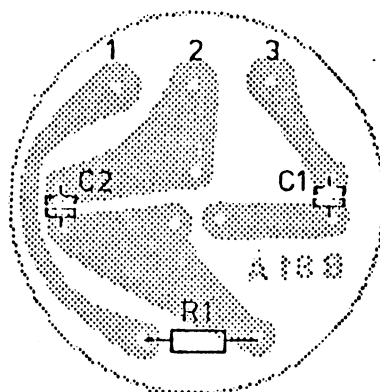
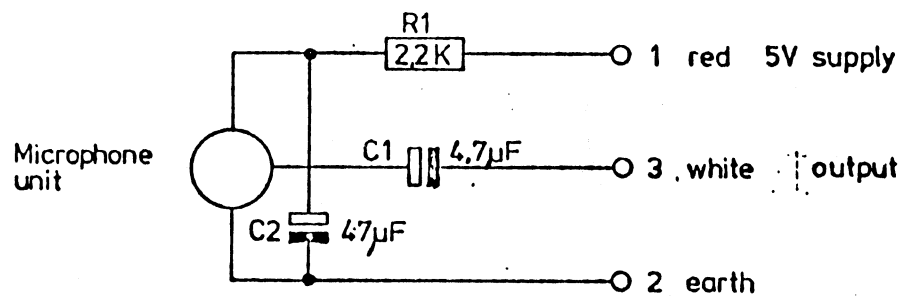




Holtot:	Display and decoder for AP 2000 Print board B71A 1	Tegn.: 6-7-76 AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON 1/2	Tegn. nr.:	
		76171- 4E2	

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-308	150 k $\Omega$ 1/8W CR16			
R2	13-308	150 k $\Omega$ " "			
R3	13-308	150 k $\Omega$ " "			
R4	13-308	150 k $\Omega$ " "			
R5	13-308	150 K $\Omega$ " "			
R6	13-308	150 k $\Omega$ " "			
R7	13-308	150 k $\Omega$ " "			
R8	13-308	150 k $\Omega$ " "			
C1	11-515	0,1 $\mu$ F/35V Tant.			
C2	11-515	0,1 $\mu$ F/35V "			
IC1	09-068	MC14511			
IC2	09-068	MC14511			
Display and decoder			Rettet:		Tegn.:
Print board B 71 A 1					Stykl. nr.:
Tilhører tegn. nr.: 76171-4E2					Kontr.:
					76171-4S2



Rettot:      	Microphone 213-020 Print board B 81 A1  <b>AP-RADIOTELEFON ⅓</b>	Tegn.: 4-3-77 AC Stykl. nr.:  Tegn. nr.: 77127-4E2	Kontr.:  
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# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-287	2,2 K $\Omega$ 1/8W CR16			
C1	11-504	4,7 $\mu$ F/10 Tantal			
C2	11-509	47 $\mu$ F/6,3 V Tant.			
	13-062	Mic. EM-10LB			
Microphone 213-020 Print board B 81 A1 Tilhører tegn. nr.: 77127-4E2			Rettet:		Tegn.: Kontr.:
					Stykl. nr.: 77127-4E2

# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-356	47 $\Omega$ $\frac{1}{4}$ W CR 25			
R2	19-258	10 K $\Omega$ Trim.			
R3	13-283	1 K $\Omega$ 1/8 CR 16			
C1	19-330	18 pF Trim.			
C2	19-330	18 pF "			
C3	11-381	15 pF ker.			
C4	11-381	15 pF "			
C5	11-409	1 nF "			
C6	11-376	10 pF "			
C7	11-353	0,1 $\mu$ F Laco			
C8	19-330	18 pF Trim.			
C9	19-330	18 pF "			
C10	11-409	1 nF ker.			
C11	11-409	1 nF "			
C12	11-366	3,3 pF "			
C13	11-376	10 pF "			
C14	11-409	1 nF "			
C15	11-409	1 nF "			
D1	04-036	OA 90			
D2	04-036	OA 90			
D3	04-008	BA 244			
1	19-177	MRF 619 or 454BL			
RFC-1	04-111	2,2 $\mu$ H			
RFC-2		75290-4E2			
L2		75619-4E2			
Rel. 1	17-057	W-7K 570 $\Omega$			
PA 25 W UHF, aerial switch and power detector. Print board B59D 1 Tilhører tegn. nr.: 75627-4E2			Tegn.: Kontr.: Stykl. nr.: 75627-4S2		



# AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
C30	11-416	4,7 nF Ker.			
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	04-002	AAZ17			
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 D 1 Tilhører tegn. nr.: 75017-3E2			Tegn.:		Stykl. nr.:
			Kontr.:		75017-4S2