MANUAL 179

AP 2275 - 52

2m, 25W intermitt

N Y F A L C K

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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 or 12,5 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.
Supply voltage variations:	10,8 V to 15,5 V
Operation temperature:	÷ 25°C to 60°C
Frequency stability:	Typ. ± 10 ppm for the above specified temperature and supply voltage variations
Loudspeaker:	External 4 ohm
Microphone:	1 kohm condenser microphone or 200 ohm dynamic close talk micro-phone with push-button
Antenna impedance:	50 ohm
Power comsumption:	AT 13,2 V reception approx. 0,25 A
	transmission { 25 W approx.5,5 A 6 W " 2,0 A

Receiver:

Sensitivity:	Typ.o,4 µV (1/2 E.M.F.) for 20 dB SINAD
Adjacent cahnnel sensitivity:	Typ. 75 dB (CEPT Method)
Spurios and image rejection:	Typ. 80 dB (CEPT Method)
Intermodulation attenuation:	Typ. 71 dB (CEPT Method)
Undesired conducted power:	Typ. 1,5 nW

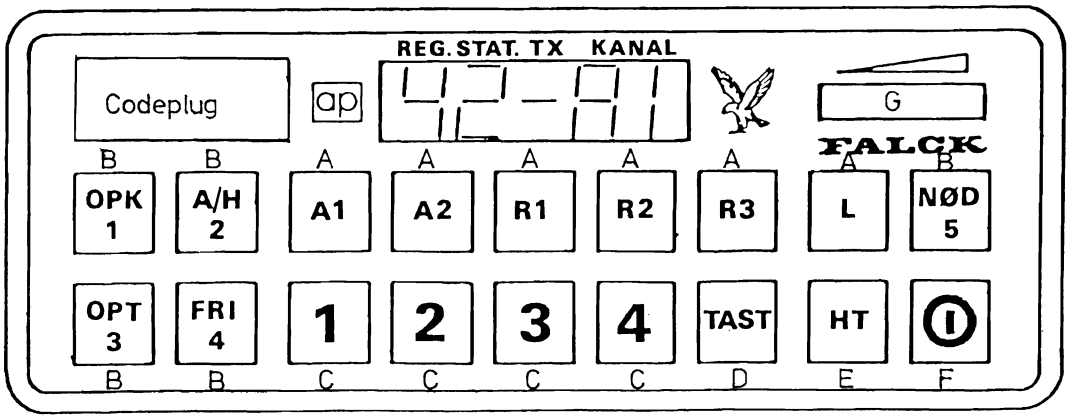
Deemphassis:	Following 6 dB per octave curve from 0,3 to 3 kHz within + 1 -3 dB relative level at 1000 Hz
Audio power:	3 Watts into 4 ohm at 10 per cent distortion, 13,2 V supply voltage
Output for microtelephone:	1 mW in 300 ohm
Hum and noise:	Typ. 50 dB (CEPT Method)
Function and limiter:	Less than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

Transmitter:

Power output:	6 W ± 0,5 dB, 10-25 W + 0,5 - 1,0 dB from ÷ 25°C to + 60°C With external PA: 25 W + 0 dB ÷ 2 dB from ÷ 25°C to 60°C at 13,2 V.
Spurious outputs and harmonics:	Typ. each less than 2 µW into 50 50 ohm.
Adjustment 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 ± 3 kHz deviation and 1000 Hz modulation frequency.
Hum and noise:	Typ. 45 dB relative ± 3 kHz deviation and 1000 Hz modulation frequency (CEPT Method).

BETJENING AF MOBILSTATION

FALCK (MIKROPROCESSOR FRONT)



A: Valg af kanal
B: Send status
C: Valg af region
D: Tast sender
E: Højttaler ON/OFF
F: Radio ON/OFF
G: Volumen

Den nye ap 2000 Falck mobilradio består af en mikroprocessor styret front med 18 knapper og 5 display samt en 2 m radio, der indeholder alle 18 kanaler, der anvendes i systemet.

Til kodning af de 6 ønskede kanaler samt vognens identifikationsnummer anvendes en for-programmeret kodeplug, der stikkes i den tilhørende fatning i fronten.

De 5 display udlæser region (1-4), vognens status (1-5) og kanalnummer (A1-A2-r1-r2-r3-L).

Desuden vises, om højttaleren er tændt eller slukket, og om der tastes eller ej.

Hver gang en knap på fronten aktiveres, undtagen tænd/sluk-knap, høret et "dyt" i højttaleren som kvittering fra computeren.

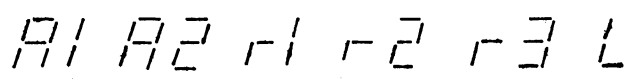
Når radioen tændes ved tryk på ON/OFF-knap, skal kodepluggen være monteret, da ID-kode og kanalkode indlæses i computeren ved opstart, ellers viser displayet PLUG og radioen blokeres.

Radioen vil altid starte op med region 1 valgt, medens kodepluggen afgør, om den starter op i kanal A1 eller A2.

Højttaleren vil være slukket, og der sendes ingen toner.

1. Valg af kanal foregår ved at trykke på knappen med det ønskede kanalnummer.

   Kanalnummer udlæses på displayet som:



2. Valg af region foregår ved at trykke knappen med det ønskede regionsnummer, der vises på displayet.

3. Skal status sendes, aktiveres knappen mærket med ønsket status. Statusknapper er mærket med både tekst og nummer.

   Statusnummer udlæses på displayet.

   OPK = Opkald = Status 1
   A/H = Afgang/Hjemkomst = Status 2
   OPT = Optaget = Status 3
   FRI = Fri = Status 4
   NØD = Nødopkald = Status 5

   Under sending af status vil mikrofonen være blokeret.

4. Højttaleren tændes og slukkes ved at aktivere knappen mærket "HT".

   Når højttaleren er tændt, tændes den miderste streg i det midterste display.

5. Aktiveres knappen mærket "Tast", tastes senderen, hvis der ikke tonesendes.

   Under tastning er den øverste streg i det midterste display tændt.

   Når tastknappen slippes, vil højttaleren automatisk tændes.

   Pkt. 5 gentages ved aktivering af ekstern tast eller knogletast. Dog genereres ikke "dyt".

Der kan modtages tre slags opkald:

a) Selektivt opkald

Ved selektivt opkald genereres ringetone og extern alarm, displayet vil blinke, og højttaleren vil tænde.

Svares ikke på opkaldet, slukkes højttaleren igen efter 20 sek, medens displayet vil fortsætte med at blinke.

Blinkningen af displayet stopper, når tast aktiveres, eller højttaleren tændes/slukkes.

b) Gruppekald og allekald

Ved gruppekald og allekald åbnes højttaleren i ca. 60 sek. Der genereres ingen ringetone, og displayet blinker ikke.

KODNING AF KODEPLUG
F A L C K

Indholdet i kodepluggen 11-068 er kodet efter nedenstående tabel:

Adresse	Data				
ØØ	8	4	2	1	ID-kode tone 1
Ø1	8	4	2	1	ID-kode tone 2
Ø2	8	4	2	1	ID-kode tone 3
Ø3	8	4	2	1	ID-kode tone 4
Ø4	0	0	0	0	Start på kanal A1 = 0000 Start på kanal A2 = 1111
Ø5	128	64	32	16	Kanalkode A1
Ø6	8	4	2	1	
Ø7	128	64	32	16	Kanalkode A2
Ø8	8	4	2	1	
Ø9	128	64	32	16	Kanalkode r1
ØA	8	4	2	1	
ØB	128	64	32	16	Kanalkode r2
ØC	8	4	2	1	
ØD	128	64	32	16	Kanalkode r3
ØE	8	4	2	1	
ØF	128	64	32	16	Kanalkode L
1Ø	8	4	2	1	
FF	1	0	1	0	Kontrolkode

SKEMATISK OVERSIGT FOR
INDKODNING AF CIFFER 5

Region		1	2	3	4	
Kanal	A1 - A2	R1-R2-R3	R1-R2-R3	R1-R2-R3	R1-R2-R3	L
OPK	1	1	5	7	9	0
A/H	2	÷	÷	÷	÷	÷
OPT	3	3	3	3	3	÷
FRI	4	4	4	4	4	÷
NØD	5	2	6	8	0	÷

Tonesender:

Ciffer 1-2-3 og 4 vælges af kodepluggen.

Ciffer 5 indkodes i overensstemmelse med ovenstående skema af mikroprocessoren.

Tonemodtager:

Ciffer 1-2-3-4 og 5 vælges af kodepluggen.

Ciffer 5 er altid kodet til tone 1.

Technical description for AP 2000

RECEIVER (Fig. 1)

Aerial switch (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. (In a duplex set,the relay is not mounted).

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 double-balanced 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 (80073-2E2)

The AF signal passes through the squelch gate Q 1. to the volume control circuit. Here, the diodes D 2, D 3 and D 4 acts as an electronic attenuator regulated by the diode current. This circuit is also used for external AF-blocking. IC 1 amplifies the signal and R 9 and C 7 make the deemphasis. An integrated AF output amplifier is used for the 3 W loudspeaker output.

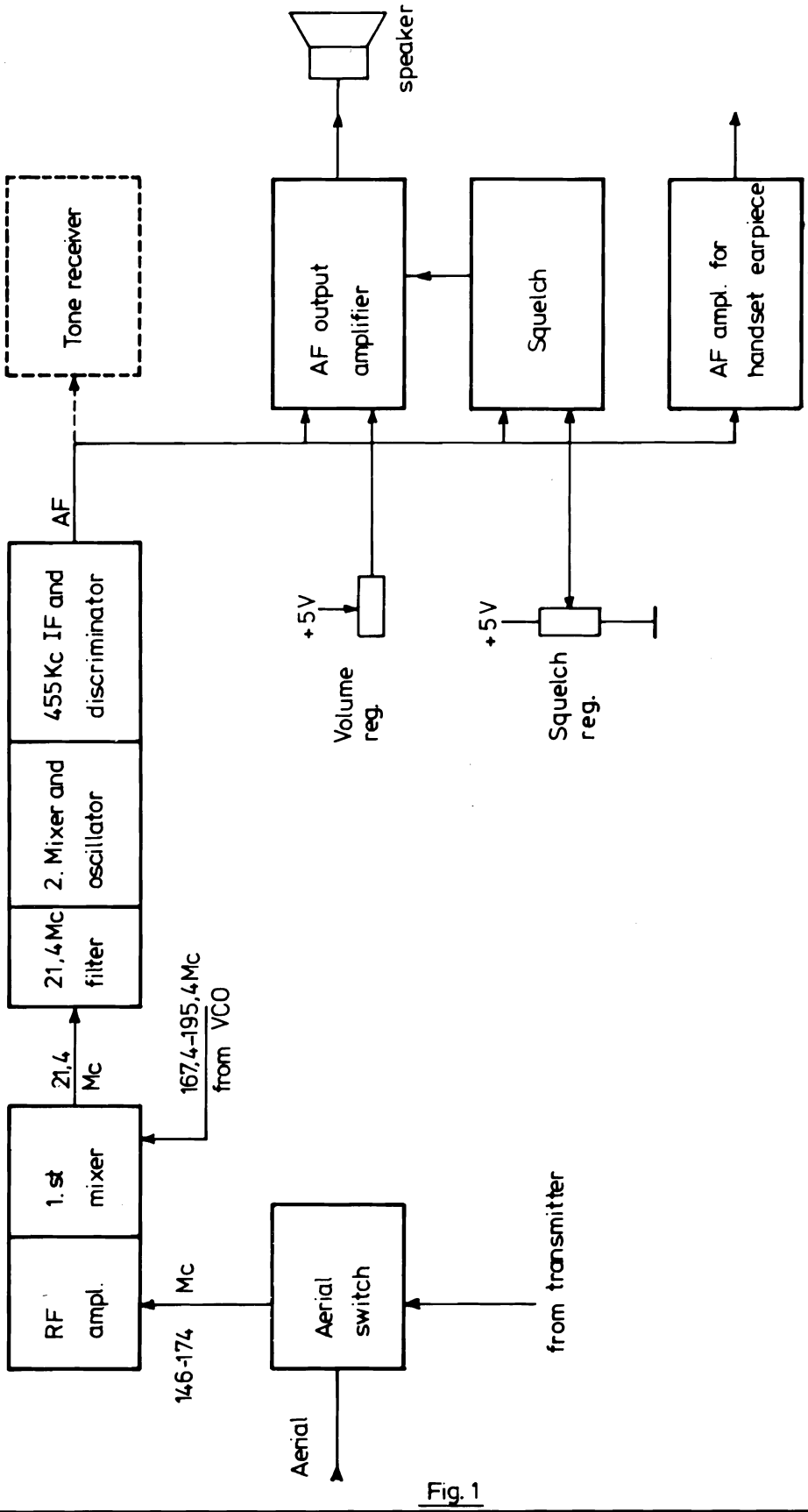


Fig. 1

Rettet:	Technical decription for AP 2000, 2 m band	Tegn.: 9 - 5 - 77 AC	Kontr.:
		Page: 2	
	AP-RADIOTELEFON A/S	Tegn. nr.: 77164 - 4E2	

The transistors Q 2 and Q 3 makes the handset earpiece amplifier with C 12 and 22 as deemphasis. The squelch circuit consists of a 10 kHz tuned high pass filter Q 4, a noise amplifier Q 5 followed by a detector D 9 and d 10. With increasing noise level on the AF-input the voltage at the negative side on C 20 will decrease from +5 V. Getting lower than the squelch reg. voltage at the inverting input pin 2, on IC 1 which the comparator IC 1 switches from an output voltage of ca. +4 V to 0 V and thus blocking the AF-output through the switch Q 1.
In the key control circuit Q 7 and Q 8 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.

TRANSMITTER (Fig. 2)

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 approx. 150 mW.

25 W PA-stage(76307-4E2)

The outpt from the 25 W PA-stage consisting of Q 1, Q 2 and Q 3 goes through a forward powersensing circuit to the aerial switch. (75011-4E2)

Output power stabilizing (75622-4E2)

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.

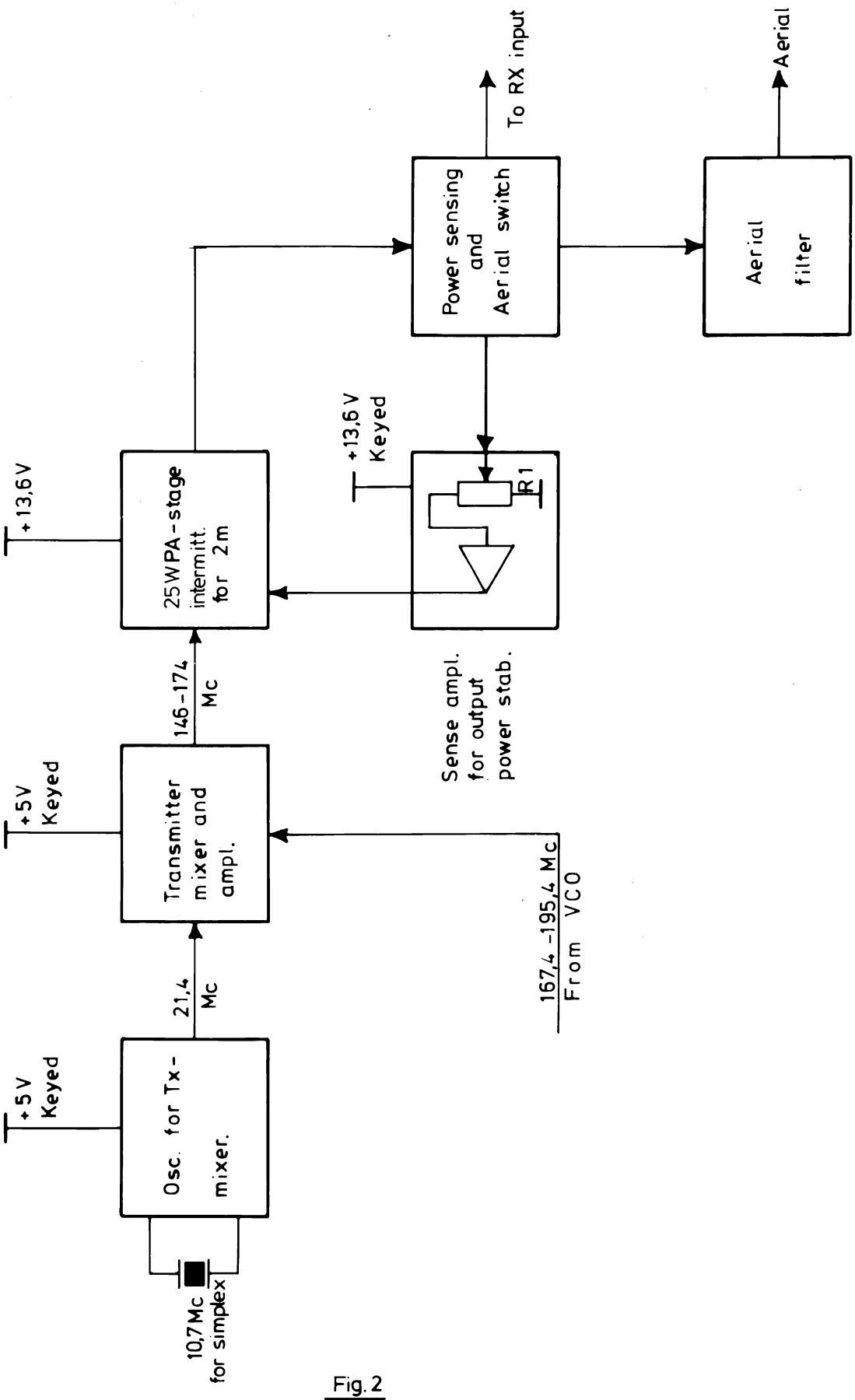


Fig. 2

Rettet:	Technical decription for AP 2000, 2 m band	Tegn.: 9-5-77 AC	Kontr.:
		Page: 4	
	AP-RADIOTELEFON A/S	Tegn. nr.: 77164-4E2	

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 25 W it will be constant for further increase in supply voltage. The output level for supply voltage greater than approx. 13 V is adjustable with R 1. Note that the oscillator for TX-mixer, the transmitter mixer and amplifier, and sense amplifier have keyed supply lines, while the last 2 transistors in the 25 W stage 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 (79112-3E2)

The modulation amplifier has two input terminals with different sensitivities. Using the less sensitive input 2 (terminal 3), the mic. switch terminal carries +5 V thereby inhibiting IC 1b (used as the most sensitive amplifier) via D 2 and enabling IC 1a via D 1. For selective tone transmission, the transmitter tone input (terminal 5) is used while the speech path is inhibited via D 3. D 4 is used for inhibition of the modulation amplifier while receiving in simplex mode. IC 2 limits the AF signal prior to pre-emphassis, thereby reducing the peak deviation caused by AF signal below approximately 1 kHz. IC 2b limits the AF signal after pre-emphasis in order to limit the overall peak deviation. Q 1 and Q 2 from an active 3 kHz low-pass filter. A variable capacitance diode in the VCO is used for modulation.

FREQUENCY SYNTHESIZER CIRCUIT 2M

Basic phase lock loop operation

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

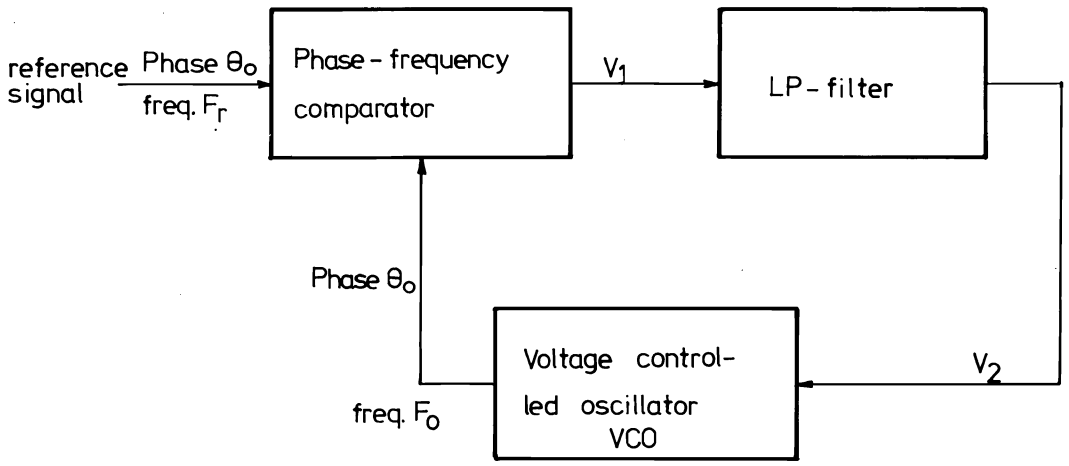


Fig. 1 Basic phase locked loop.

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 $V_1 = K_1 x(\theta_r - \theta_o)$ 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. 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, 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. 3)

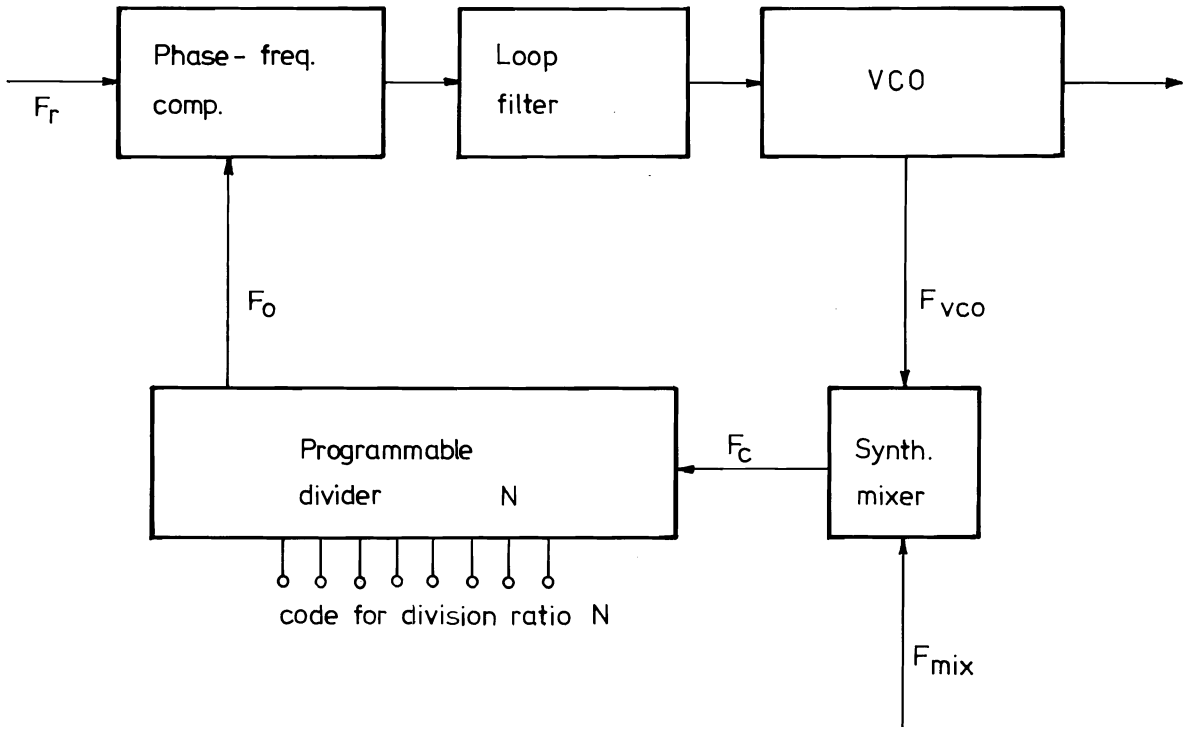


Fig. 3 Synthesizer loop

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)

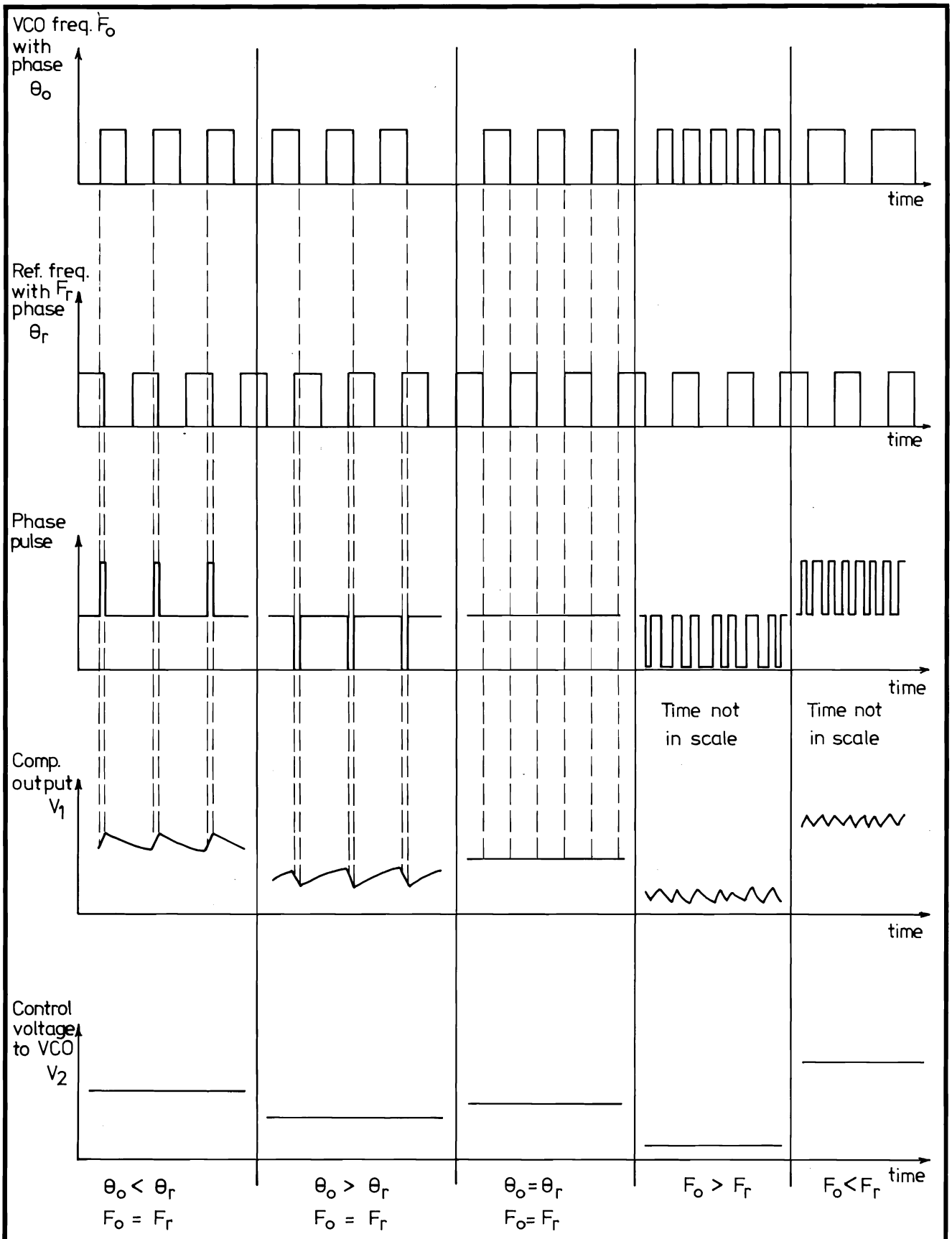
The 25 kc reference frequency is produced by dividing a 400 kc crystal oscillator (X 1 and Q 4) by 16 in the counter IC 6.

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 form 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 0V 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 kc are used as input to the frequency-phase comparator IC 4. The comparator output voltage V_1 can be seen on a test point TP 1. To suppress the 25 kc ripple on the comparator output voltage Q 3 is connected as an active lowpass filter. IC 5 is for DC-amplification.



SIMPLIFIED OPERATION of frequency and phase comparator.

Fig. 2

Rettet:	Figure for synthesizer description	Tegn.: 10-5-77 AC	Kontr.:
		Page: 2	
	AP-RADIOTELEFON A/S	Tegn. nr.: 77167-4E 2	

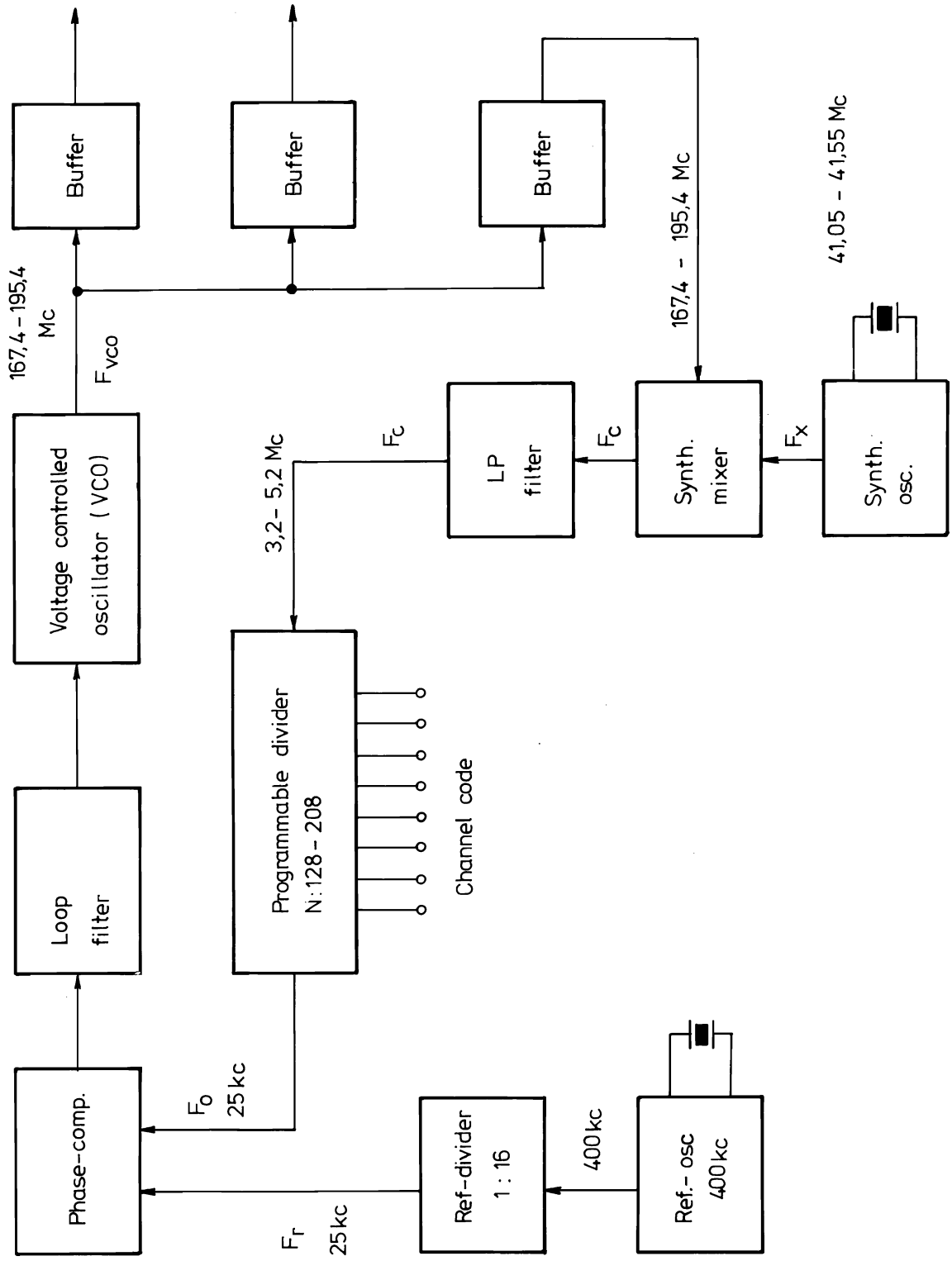


Fig. 4

Rettet:	Figure for synthesizer description	Tegn.: 10 - 5 - 77 AC	Kontr.:
		Page: 5	
	AP-RADIOTELEFON A/S	Tegn. nr.: 77167 - 4E2	

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

Channel code

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

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

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

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

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 = 42,05 Mc

Code: 1 0 0 1 0 0 1 1

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

Using equation (5):

$$F_{Rx} = 4 \times 42{,}05 + (147 \times 0{,}025) - 21{,}4 = 150{,}475 \text{ Mc}.$$

2. Computation of the channel code:

Known is: Crystal frequency F_x and desired receiver frequency F_m.

Rearranging equation (5) gives

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

Example: F_x = 42,05 Mc, F_{Rx} = 151,625 Mc.

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

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

Channel code 1 1 0 0 0 0 0 1

DIVISION RATIO AND CHANNEL CODE

The division ratio N corresponds to the 8 bit channel code as follows:

Bit number	8	7	6	5	4	3	2	1
Bit weight	128	64	32	16	8	4	2	1
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

FREKVENSLISTE OG KANALKODE FOR MOBILSTATION TIL FALCK.

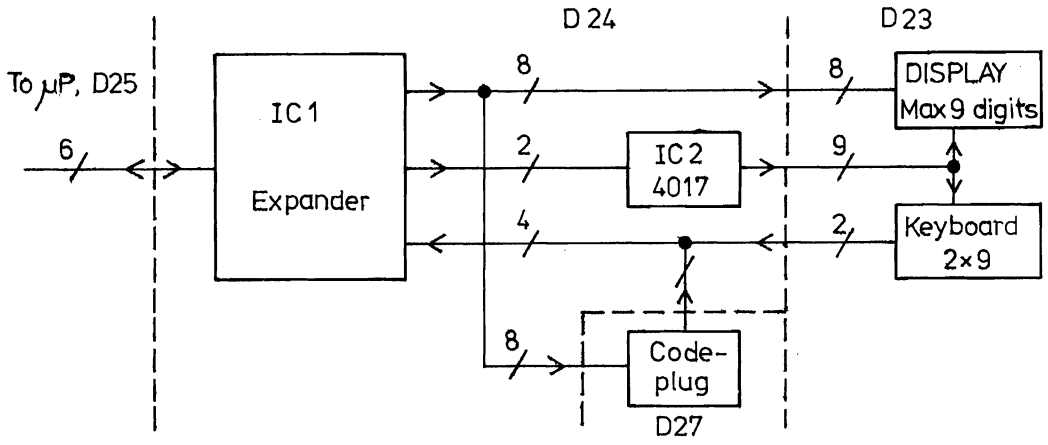
Kanal	Modtagerfrekvens i Mhz	Dele forhold	128	64	32	16	8	4	2	1
1	167.475	147	1	0	0	1	0	0	1	1
2	167.775	159	1	0	0	1	1	1	1	1
3	167.875	163	1	0	1	0	0	0	1	1
4	167.925	165	1	0	1	0	0	1	0	1
5	167.525	149	1	0	0	1	0	1	0	1
6	167.575	151	1	0	0	1	0	1	1	1
7	168.150	174	1	0	1	0	1	1	1	0
8	167.975	167	1	0	1	0	0	1	1	1
9	167.675	155	1	0	0	1	1	0	1	1
10	167.725	157	1	0	0	1	1	1	0	1
11	168.000	168	1	0	1	0	1	0	0	0
12	168.075	171	1	0	1	0	1	0	1	1
13	168.125	173	1	0	1	0	1	1	0	1
14	168.100	172	1	0	1	0	1	1	0	0
15	168.175	175	1	0	1	0	1	1	1	1
16	167.950	166	1	0	1	0	0	1	1	0
17	168.275	179	1	0	1	1	0	0	1	1
18	168.300	180	1	0	1	1	0	1	0	0

Tx = Rx - 9 MHz

77399-4E2

TECHNICAL DESCRIPTION FOR MICROPROCESSOR FRONT
****

FRONTUNIT D23 + D24 + D25 (82059-3E2. 82116-2E2).



Drivers Q10-Q17 for the display segments are controlled by the output ports P70-P73 and P60-P63, which also are the address lines for the codeplug. The digit driver transistors Q1-Q9 are turned on sequentially one at a time by means of the decimal counter IC2, which is controlled by the microprocessor with P50 (reset) and P51 (clock).

The digit drivers Q1-Q9 are also used in the scanning of the keyboard. Two buttons at a time are selected through the diodes D1-D9 (PCB D23). The illumination LED's in the same two buttons are turned on simultaniously. When one of the selected buttons is pressed on, one of the keyboard return lines 1 or 2 is pulled low (approx. 1,8V). This turns on either Q18 or Q19 thus applying a logical "1" to the input port of the expander on P42 or P43.

The codeplug IC3 is enabled from the expander by setting P53 low. This turns on Q20 and + 5 V is applyed to the codeplug IC3. Data from the codeplug is read into the expander at port P40 and P41, and through Q18 and Q19 at port P42 and P43.

The AF-output volume is regulated by potentiometer P1. Note that there are separate ground and supply lines for the display (emitters of Q1-Q9 and Q10-Q17) in order to reduce interference from the heavy multiplexing current (max. 400 mA).

COMPUTERPRINT D25 (82100-2E2).

The heart of the computerprint is IC1, the microprocessor; IC 4, the program storage Eprom; and IC3, the address latch. The behaviour of the microprocessor is controlled by the software program in the Eprom. A new step in the execution of this program is performed every 2,48µS in the following way:

The microprocessor supplyes the address of the next instruction at DB0-DB7 and latches it in IC3 at the falling edge of the ALE-pulse. The address is now supplied to the Eprom, addresses A0-A7 from the latch IC3, and the highest four bits A8-A11 directly from the microprocessor P20-P23. The outputs of the Eprom Q0-Q7 is now activated by the falling edge of the PSEN output from the microprocessor. The contents of the Eprom (the next instruction) at the selected address is fed back to the microprocessor, DB0-DB7.

The microprocessor is kept reset (pin 4 low) from toneprint D26 the first approx. 150 mS after power is applied to the circuit. During the reset time the external alarm output Q8 is forced off through D3 and IC6. The Rx-block output Q6 and Tx-block output Q7 are forced on through D4, D5 and IC 7, After the elapse of the reset time the microprocessor takes over control of these outputs, and all other functions.

The"12V keyed"output of the microprocessor P10 feeds the common base coupled transistor Q2 which supplies a constant current to the base of the output transistor Q3.

The ringing tone output P14 is buffered in IC7 and fed to the AF-amplifier through R19.

The pushbutton "beep" output P12 is fed to the pulse stretcher circuit D6, C3 and R53, buffered by IC7 and fed to the AF-amplifier through R20.

The expander IC5 sets the channel code at outputs P50-P53 and P60-P63. Double receiver, off-block (to toneprint D26), spare out 1 and spare out 2 are set at outputs P70-P73. All inputs to the microprocessor (T0, T1 and INT) and to the expander (P40-P43) are buffered in schmitt-trigger devices (IC2, IC6 and IC7). The trigger level of the field-strength input (IC2) is adjustable by means of R33.

TONEPRINT D26 (82098 - 2E2)

The toneprint contains three 5V supply regulators, tone-transmitter/receiver with expander, start/stop circuit including supply voltage supervisoring, and 27 interconnectionlines from microprocessor (PCB D25) to radio motherboard.

The voltage regulator IC2 is continously supplying the start/stop logic with 5V as soon as battery voltage is applied to the radio. The relay REL1 is switched on and off from the D-flip/flop IC4. This flip/flop is clocked from the on/off pushbutton through C10 and IC3 C. R14 and C12 performs debouncing. The pulldown of the reset timing capacitor C8 through D5 disappears when IC4 is set (=the radio switched on). The RESET of the microprocessor through IC3A and B then disappears after approx. 150 mS delay.

The undervoltage supervisory circuit consists of D2, R8, R9, Q6, Q7 and RA. The transistor Q6 switches off and Q7 on when the battery voltage drops below approx. 6V. C8 is then discharged through D7, and the microprocessor is RESET and the flip/flop IC4 is reset through IC3 D after approx. 10 mS delay (R13, C9).

When the battery voltage is higher than approx. 16V Q5 is switched on through D2, D3, R10, R11 and the flip/flop IC4 is reset through IC3D after approx. 10 mS delay (R13, C9).

The voltage regulator IC1 supplies 5V to the microprocessor + frontsection +tonesystem. The regulator consisting of Q1-Q3, R1-R4 and D1 supplies 5V to the display. This regulator is disabled when the microprocessor is reset (from IC3 pin 3).

The tonereceiver IC5 has a 560,2 kHz reference oscillator (pin 2 and 3) which controls the tone decoding. The AF-signal from the discriminator is fed to signal input (pin 14) through input amplifier Q8 with associated components. The data outputs Q0-Q3 are high when no correct tone is detected, and when a tone is detected the binary number of that tone is present at the outputs. The data change output pin 8 pulses high in 1 mS each time the outputs Q0-Q3 changes state.

The reference oscillator pin 14 in the tone transmitter IC6 is slave coupled to the tonereceiver oscillator. Tone-transmitting is performed by applying the binary code of the wanted tone to data inputs D0-D3 from the expander IC7 (port P50-P53). The data is latched into IC6 by pulsing pin 5 (data change) high. This starts an internal timer in IC6 which pulses pin 2, t_D high in 1 mS after the elapse of the correct tonelength (CCIR=100 mS, ZVEI= 70 mS). The tone output at pin 1 is attenuated and filtered by C20, C21 and R22. The output level is adjusted by R23.

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 Mc and the other for RX-frequencies 160 - 174 Mc, 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 kc 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 kc ripple on TP 1. For multi-channel 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 Mc, 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 Mc counter to the VCO-output point 5. The reading will be RX frequency + 21,4 Mc 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 Mc and 455 kc IF (print board B 01)

Connect a 21,4 Mc sweep generator (a 10,7 Mc sweep generator normally contains sufficient second harmonics to be used on 21,4 Mc) 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. 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 second 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 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 C 79)

Adjust the output level for the handset earpiece to 60 mV with potmeter R 29. (3,5 kHz dev., 1 kHz modulation).

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 i (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-tal = 10,7 MHz, C24 is removed. When X-tal > 10,7 MHz, C22 is removed. When X-tal < 10,7 MHz, both capacitors are used.

B. 25 W PA-stage (B 79)

Turn the potmeter R 1 (print board B 57) counter-clockwise to get the output power stabilization out of function. Connect a wattmeter (50 Ω, 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 13,6V and turn the potmeter R 1 clockwise until the output power decreases to the desired value.

C. Transmitter frequency

Connect a counter to the wattmeter and adjust the transmitter frequency with the capacitor C 29 in the Tx-oscillator print board B 11.

D. Modulation amplifier C 61

Connect a modulation meter to the transmitter low output impedance generator to the microphone input 1 (term. 1).
Set all three potentiometers to their centre posistions, and adjust the tonegenerator to give an output level of 20 mV at 1 kHz. Adjust potentiometer R 35 to give an output level of 20 mV at 1 kHz. Adjust potentiometer R 35 to give $\pm$5 kHz deviation on the modulation meter. Set the tonegenerator to 1 kHz, 2 mV, and adjust potentiometer R 10 for a deviation of 3 kHz. Repeat the procedure to check and adjust R 35 and R 10 if necessary.
If the station is eqipped with a handset, R 35 is adjusted to $\pm$5 kHz with an input level of 4 V at 1 kHz.
When the generator is adjusted to give 1 kHz 400 mV, R 5 is adjusted to give the 25 kHz version.
With respect to the 20 kHz version, use the same procedure but read:
4 kHz in place of 5 kHz and
2,4 kHz in place of 3 kHz.
And with respect to the 12,5 kHz version, use the same procedure but read:
2,5 kHz in place of 5 kHz and
1,5 kHz in place of 3 kHz.

TRIMNING AF MIKROPROCESSORFRONT

F A L C K

1. Squelch

Squelchpotentiometeret R6 på toneprint drejes helt mod uret og højttaleren åbnes. Målesender tilsluttes med 1kHz modulation 3kHz deviation. Signalniveauet sænkes indtil signal/støjforholdet på højttalerudgangen er 12 dB SINAD uden psophometrisk filter. Squelchpotentiometeret drejes nu helt med uret og langsomt tilbage igen indtil squelchen netop åbner. Målesenderniveauet reguleres ned og op, og det kontrolleres at squelchen lukker ved ca. 7 - 9 dB SINAD og åbner ved 12 dB SINAD +/÷ 2 dB.

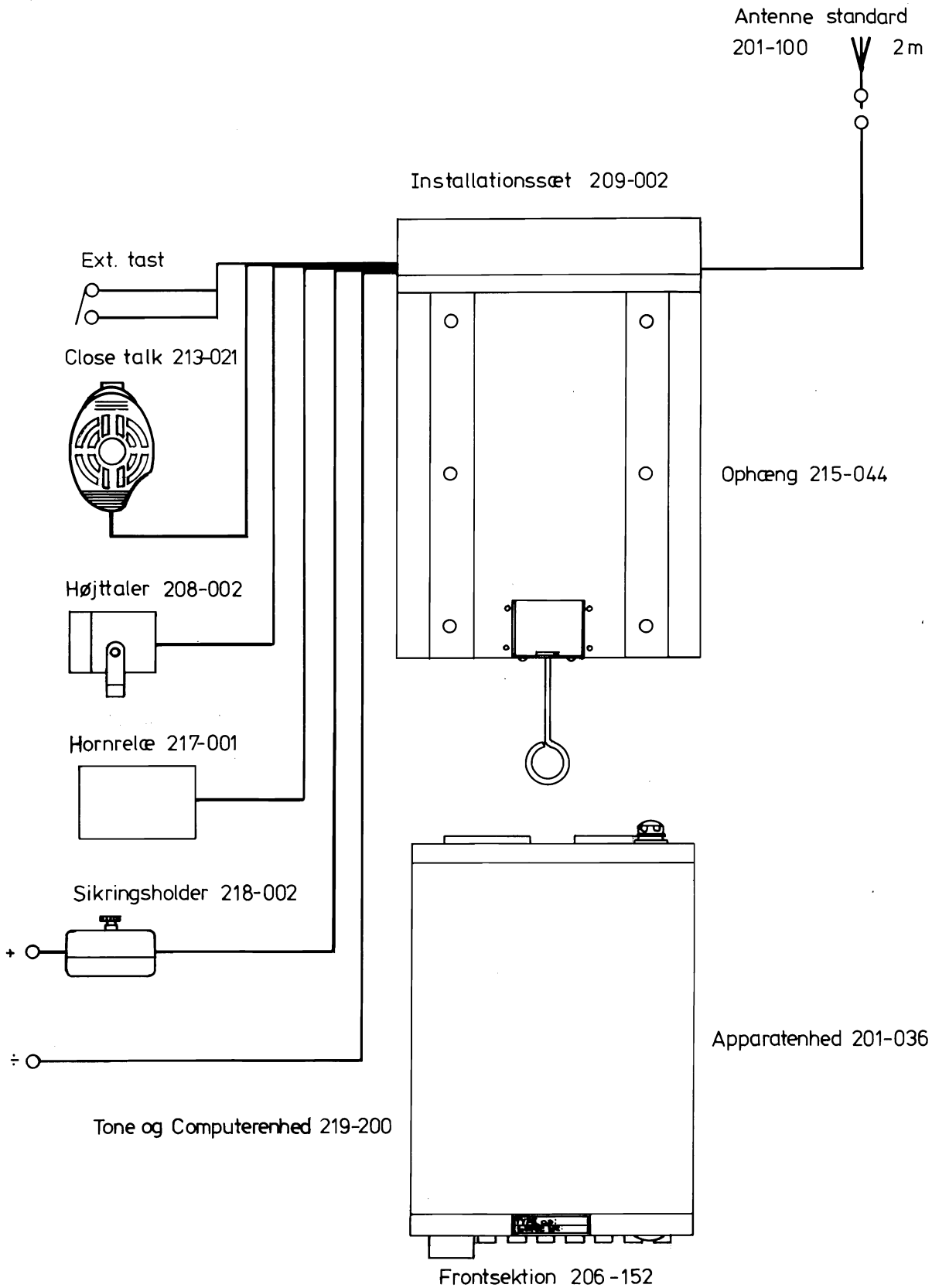
2. Tonemodulation

Modulationsmeter med tæller på LF-udgangen tilsluttes. Testpunkt TP1 på D26 kortsluttes til stel. Knappen mærket OPK 1 aktiveres. Displayet viser nu S FEJL. Senderen tastes og potentiometeret R23 på D26 justeres til 2,4 kHz deviation. Tonefrekvensen kontrolleres med tælleren. Frekvensen skal være 1539,0 Hz +/÷ 1,5 Hz. Er dette ikke tilfældet kan frekvensen ændres med C17 og C22 og D26. Fjernelse/tilføjelse af C22 giver en forøgelse/formindskelse med ca. 1,8 Hz. Fjernelse/tilføjelse af C17 giver en forøgelse/formindskelse med ca. 4,0 Hz.

NOTE: Er IC4 på D25 mærket uge 31/82 eller før, skal en kodeplug med første ciffer i ID-koden = 6 benyttes.

3. Feltstyrke

Feltstyrketriggerniveau justeres med R33 på computerprint D25. Denne funktion benyttes ikke i Falck anlæg, så justering er ikke nødvendig.



Ændr. nr.:	Rettet:

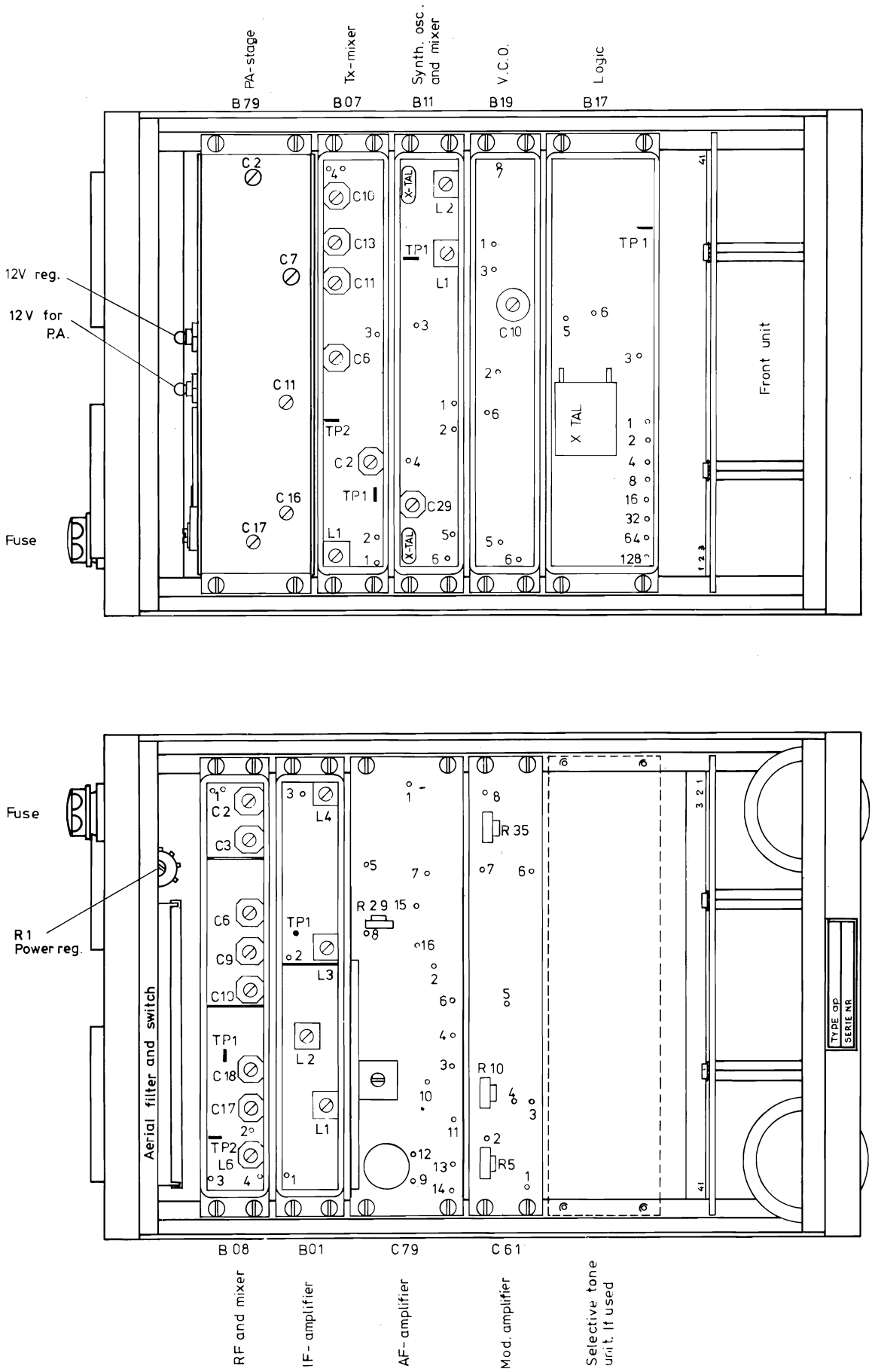
Accesories and installations for
FALCK mobilstation, mikroprocessorfront

Tegn.: AMS 82-10-12 | Kontr.:

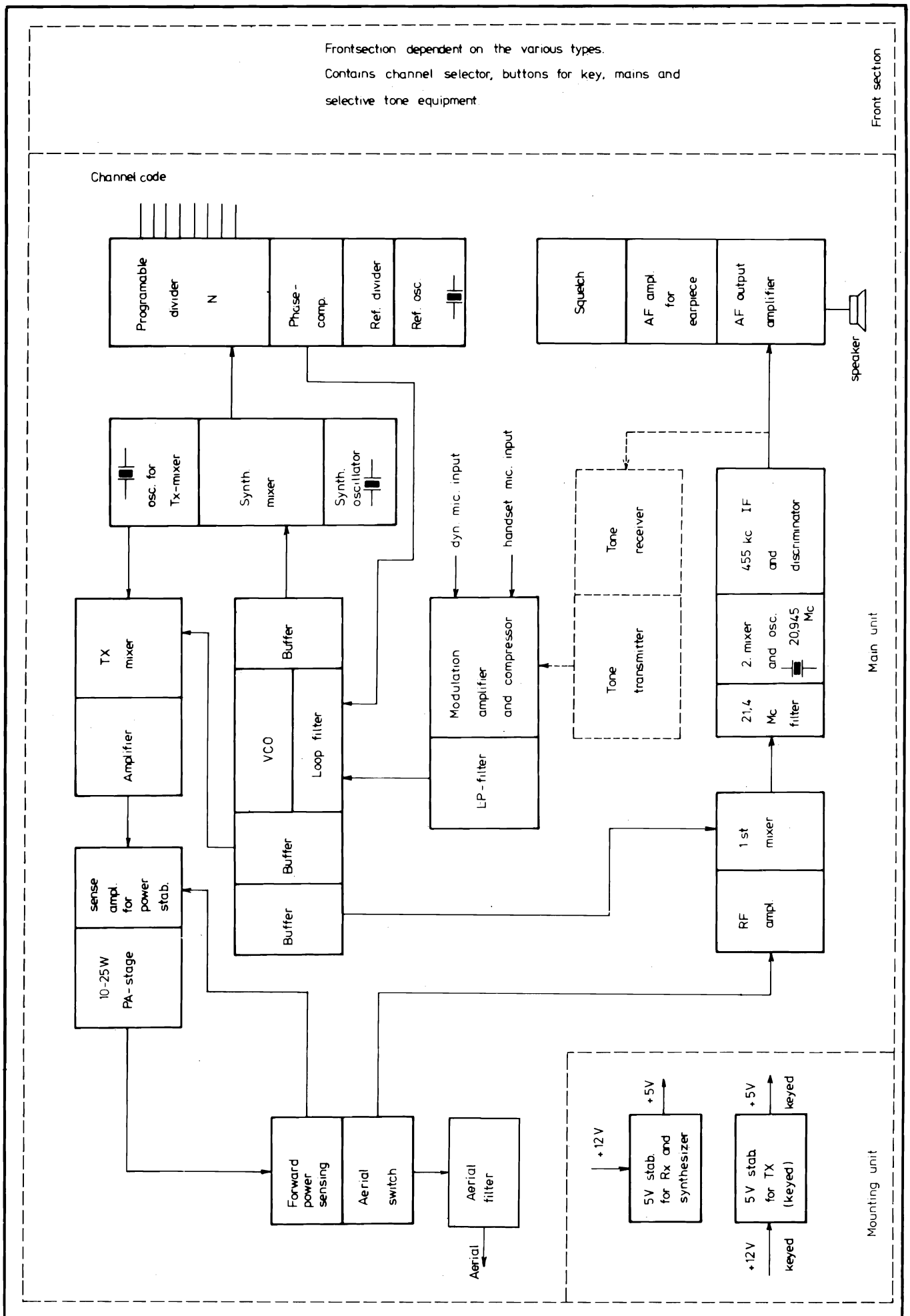
AP-RADIOTELEFON A/S

Tegn. nr.: 82249-4E2

6058 J. & K. Diaprint 01-54 44 22



Rettet: 3-7-78 JS/AC 21-5-80 OS/BC	Interior view of AP2000, 10-25 W intermitt. 2m band Part no. 201-036	Tegn. 19-11-76 NC Kontr.: LT Stykl. nr.:
	AP-RADIOTELEFON	Tegn. nr.: 76358-3E2



Rettet.

Blockschematic for AP 2000
10-25 W intermitt. for 2 m
AP-RADIOTELEFON

Tegn.: 15-5-75 Kontr.:
AC
Stykl. nr.:

Tegn. nr.:
79090 - 3E2

Rettet: 14-2-77 NC
27-11-79 MO/AMC

AP-RADIOTELEFON A/S

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

Tegn.: 16-5-75 AC
Kontr.:
Stykl. nr.:
Tegn. nr.: 75237-4E2

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	: ± 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_o)	: 5 pF max.
9.	Equivalent series resistance	: 40 Ω max.
10.	Marking	: AP 20 frequency in MHz

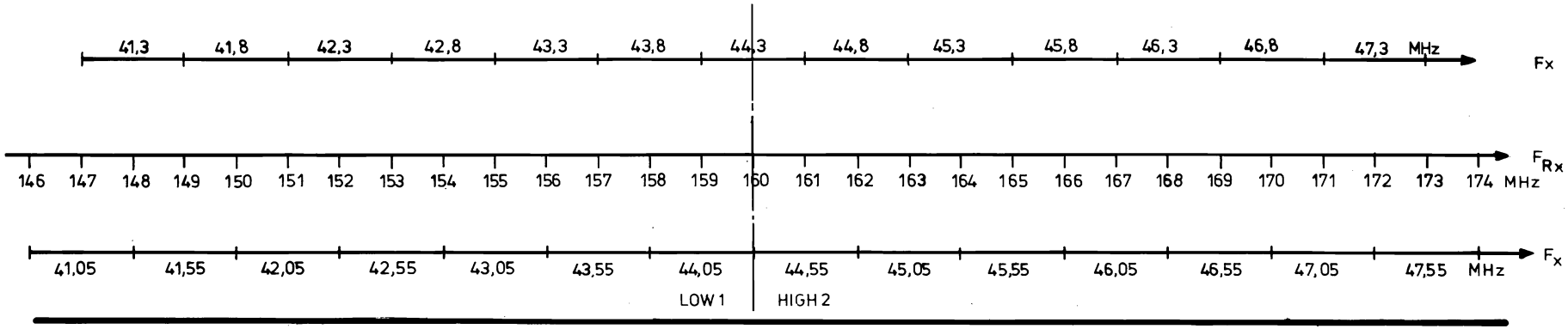
Calculation of the division ratio N

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

Example:

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

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



Transmitter mixer oscillator

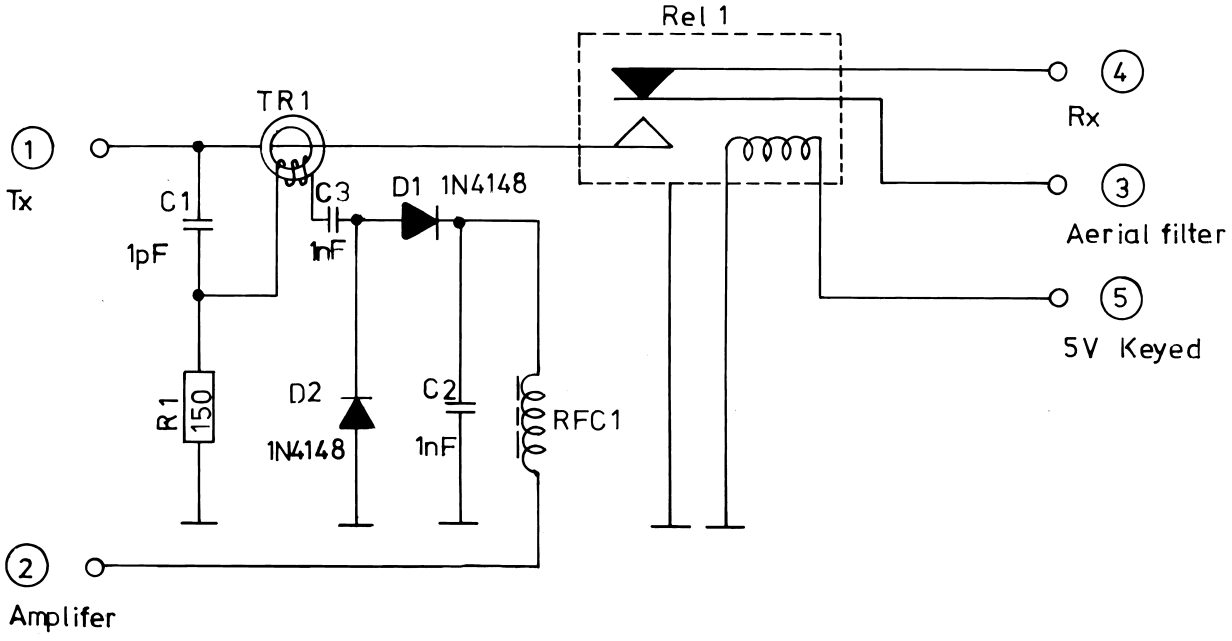
SPECIFICATION
for Quartz Crystal Unit
AP 22

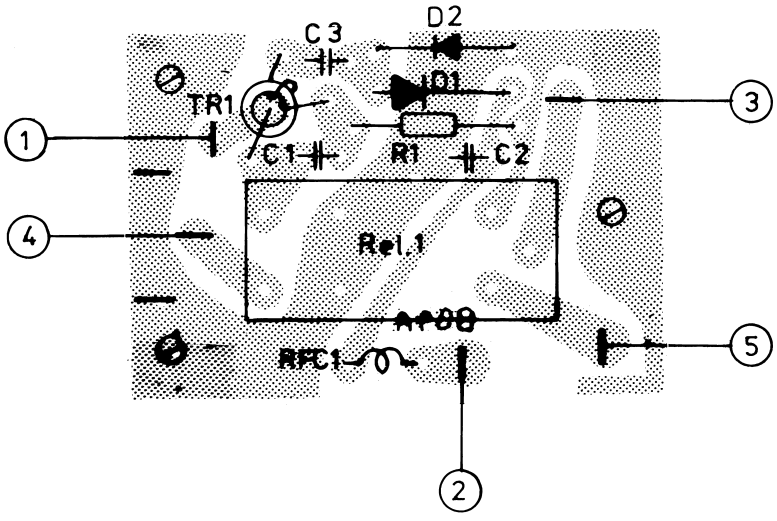
1.	Mode of operation	: AT-Fundamental
2.	Holder	: HC-42/U
3.	Frequency range	: 10-22 MHz
4.	Resonance	: Parallel (30 pF)
5.	Calibration tolerance	: ± 15 ppm at 25°C
6.	Temperature tolerance	: ± 10 ppm % 20°C to + 70°C
7.	Drive level	: 1 mW
8.	Equivalent serie resistance	: Max. 40 Ω
9.	Marking	: AP 22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

Calculation of the crystal frequency for the transmitter mixer oscillator

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



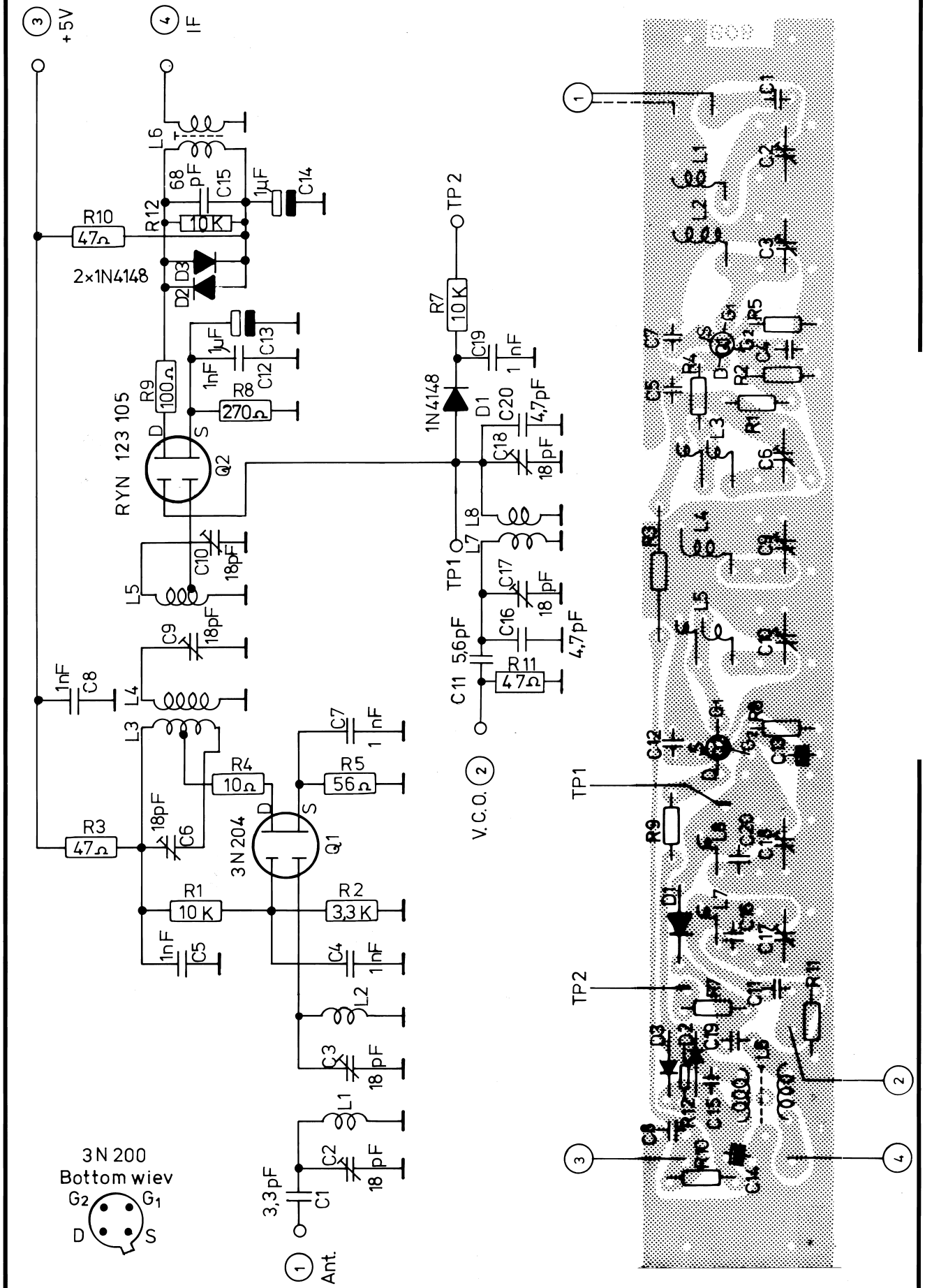


Rettet: 5-5-77 HJ. 2-10-79 BJ/BC	Aerial switch for 2m internal PA Print board B 39B1	Tegn.: 2-7-75 EH	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON A/S	Tegn. nr.: 75011 - 4E2	

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-402	150 Ω $\frac{1}{4}$ W CR 25			
C1	11-361	1 pF Ker.			
C2	11-409	1 nF "			
C3	11-409	1 nF "			
D1	04-062	1N4148			
D2	04-062	1N4148			
TR1		75332-4E2			
RFC-1		75290-4E2			
RE 1	17-059	AE 5612-02, RS-6V National			

Aerial switch for 2 m internal PA Print board B 39B1 Tilhører tegn. nr.: 75011-4E2	Rettet:	Tegn.: / Kontr.:	Stykl. nr.: 75011-4S2



Rettet:	RF Amplifier and mixer for 2 m	Tegn.: 9-1-75 AC	Kontr.:
11.-8.-76 NC/JH	Print board B08 C1,2	Stykl. nr.:	
1-7-77 JH/AC			
8-5-78 JH/AC			
27-9-79 POR/AC			
25-10-79 POR			
12-2-81 LBu			
	AP-RADIOTELEFON A/S	Tegn. nr.: 75015-4E2	

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-295	10 KΩ 1/8W CR 16
R2	13-289	3,3 KΩ " "
R3	13-267	47 Ω " "
R4	13-259	10 Ω " "
R5	13-268	56 Ω " "
R6		
R7	13-295	10 KΩ
R8	13-276	270 Ω " "
R9	13-271	100 Ω " "
R10	13-267	47 Ω " "
R11	13-267	47 Ω " "
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

Nr.	Kode	Data
Q1	19-185	3N 204
Q2	19-134	RYN 123 105 udmålt
L1		75331-4E2
L2		75331-4E2
L3		75328+75329-4E2
L4		75330-4E2
L5		75328+75329-4E2
L6		76222-4E2
L7/1		75328-4E2
L8/1		75328-4E2
L7/2		80122-4E2
L8/2		80122-4E2

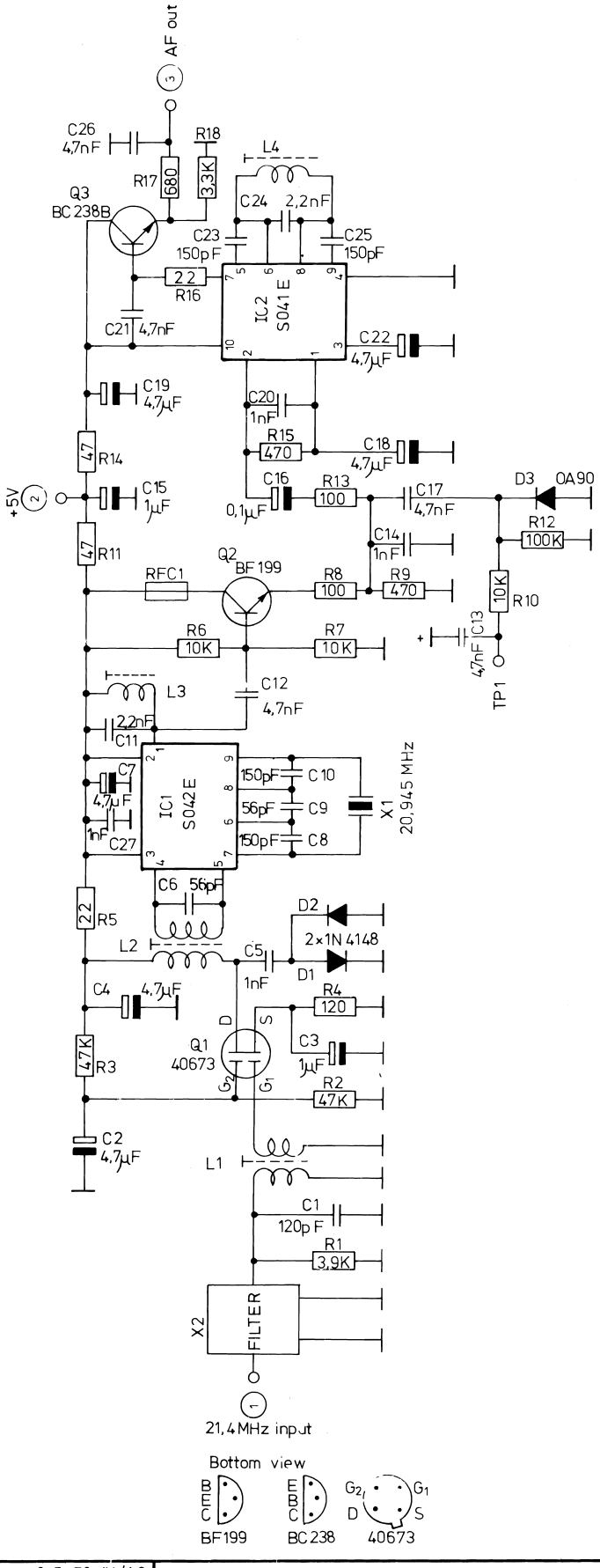
RF amplifier and mixer 2 m
Print board B 08 C 1+2
Tilhører tegn. nr.: 75015-4E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.: 75015-4S2



Printno. kHz	X 2	
B01C1	25	11-854
B01C3	20	11-857

Rettet 8-5-78 JH/AC
27-2-79 AMC/LB
14-3-80 OS
21-8-80 OS/AMC

21,4 MHz IF

Print B01C1 and B01C3

AP-RADIOTELEFON

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

Stykl. nr.:

Tegn. nr.: 75076-3E2

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-290	3,9 KΩ 1/8W CR 16
R2	13-302	47 KΩ " "
R3	13-302	47 KΩ " "
R4	13-272	120 Ω " "
R5	13-263	22 Ω " "
R6	13-295	10 KΩ " "
R7	13-295	10 KΩ " "
R8	13-271	100 Ω " "
R9	13-279	470 Ω " "
R10	13-295	10 KΩ " "
R11	13-267	47 Ω " "
R12	13-306	100 KΩ " "
R13	13-271	100 Ω " "
R14	13-267	47 Ω " "
R15	13-279	470 Ω " "
R16	13-263	22 Ω " "
R17	13-281	680 Ω " "
R18	13-289	3,3 KΩ " "
C1	11-403	120 pF Ker.
C2	11-504	4,7 µF/10V Tant.
C3	11-502	1 µF/35V "
C4	11-504	4,7 µF/10V "
C5	11-409	1 nF Ker.
C6	11-396	56 pF "
C7	11-504	4,7 µF/10V Tant.
C8	11-413	150 pF N750 Ker.
C9	11-396	56 pF Ker.
C10	11-413	150 pF N750 Ker.
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.

Nr.	Kode	Data
C19	11-504	4,7 µF/10V Tant.
C20	11-409	1 nF Ker.
C21	11-416	4,7 nF "
C22	11-504	4,7 µF/10V Tant.
C23	11-404	150 pF Ker.
C24	11-461	2,2 nF MKM
C25	11-404	150 pF Ker.
C26	11-416	4,7 nF "
C27	11-409	1 nF "
D1	04-062	1N4148
D2	04-062	1N4148
D3	04-036	OA90
Q1	19-128	40673
Q2	19-104	BF199
Q3	19-093	BC238B
IC1	09-007	SO42E
IC2	09-006	SO41E
L1		75282-4E2
L2		75281-4E2
L3		75280-4E2
L4		75279-4E2
X1	11-815	AP 22 20,945 Mhz
X2	11-854	21,4 Mhz
X2	11-857	21,4 Mhz
RFC-1	06-001	Ferritperle-Philips

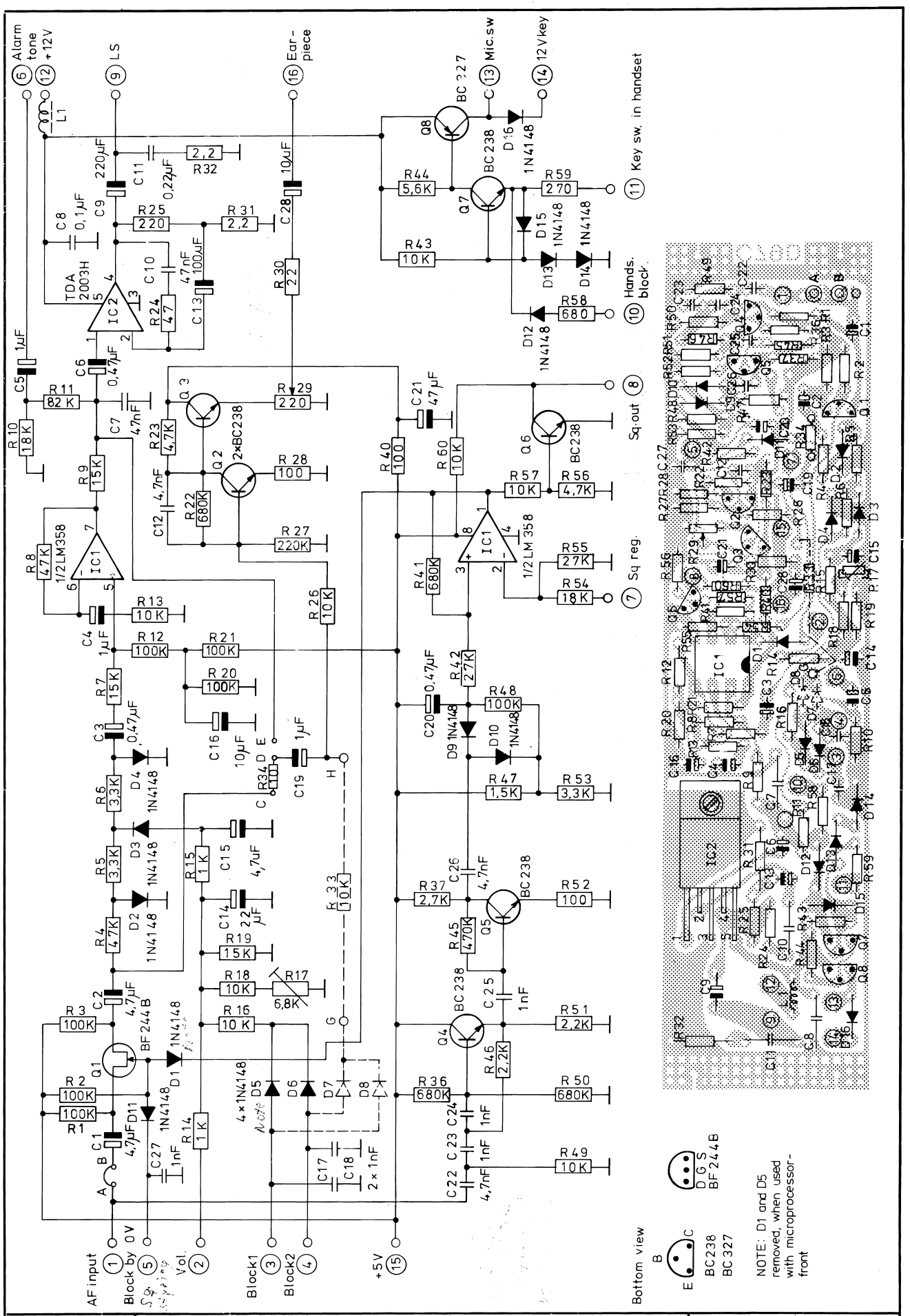
21,4 MHz IF
Print B 01 C 1 and B 01 C3
Tilhører tegn. nr.: 75076-3E2

Rettet:

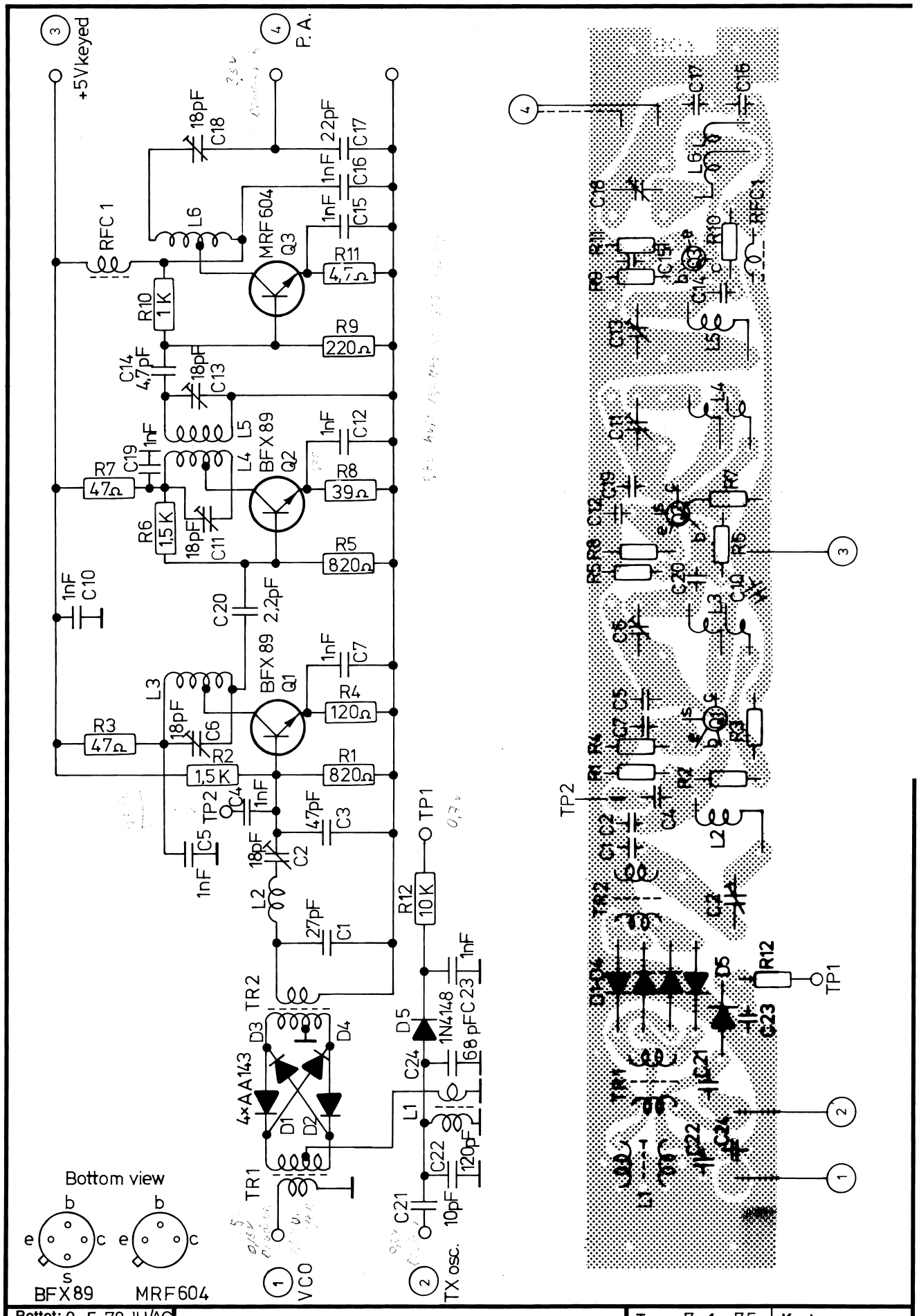
Tegn.:

Kontr.:

Stykl. nr.: 75076-4S2



Rettet: 9 - 4 - 81 LBu 4 - 5 - 81 LB 2 - 7 - 81 LB 7 - 10 - 81 LB 28 - 10 - 81 LB	AF and squelch Print board C 79 D 1	Tegn.: BC 9-6-80 Kontr.: Stykl. nr.: Tegn. nr.: 80073 - 3E2
	AP-RADIOTELEFON	



Rettet: 8-5-78 JH/AC 18-5-79 BJ/AC	Transmitter mixer and amplifier 2 m Print board B07 D 1	Tegn.: 7-1-75 AC Kontr.: Stykl. nr.:
	AP-RADIOTELEFON A/S	Tegn. nr.: 75014-4E2

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-282	820 Ω 1/8W CR 16
R2	13-285	1,5 KΩ " "
R3	13-267	47 Ω " "
R4	13-272	120 Ω " "
R5	13-282	820 Ω " "
R6	13-285	1,5 KΩ " "
R7	13-267	47 Ω " "
R8	13-266	39 Ω " "
R9	13-275	220 Ω " "
R10	13-283	1 KΩ " "
R11	13-257	4,7 Ω " "
R12	13-382	10 KΩ " "
C1	11-388	27 pF Ker.
C2	19-330	18 pF Trim.
C3	11-394	47 pF Ker.
C4	11-409	1 nF "
C5	11-409	1 nF "
C6	19-330	18 pF Trim.
C7	11-409	1 nF Ker.
C8		
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	11-403	120 pF "
C23	11-409	1 nF "
C24	11-397	68 "

Nr.	Kode	Data
D1	04-003	AA143
D2	04-003	AA143
D3	04-003	AA143
D4	04-003	AA143
D5	04-062	1N4148
Q1	19-102	BFX89
Q2	19-102	BFX89
Q3	19-124	MRF 604
RFC1		75290-4E2
TR1		75289-4E2
TR2		75289-4E2
L1		75517-4E2
L2		75327-4E2
L3		75323+75325-4E2
L4		75323+75325-4E2
L5		75326-4E2
L6		75323+75324-4E2

Tranmitter mixer and amplifier
Print board B 07 D 1
Tilhører tegn. nr.: 75014-4E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.: 75014-4S2

Rettet:

AP-RADIOTELEFON A/S

10-25 W internal PA 2m

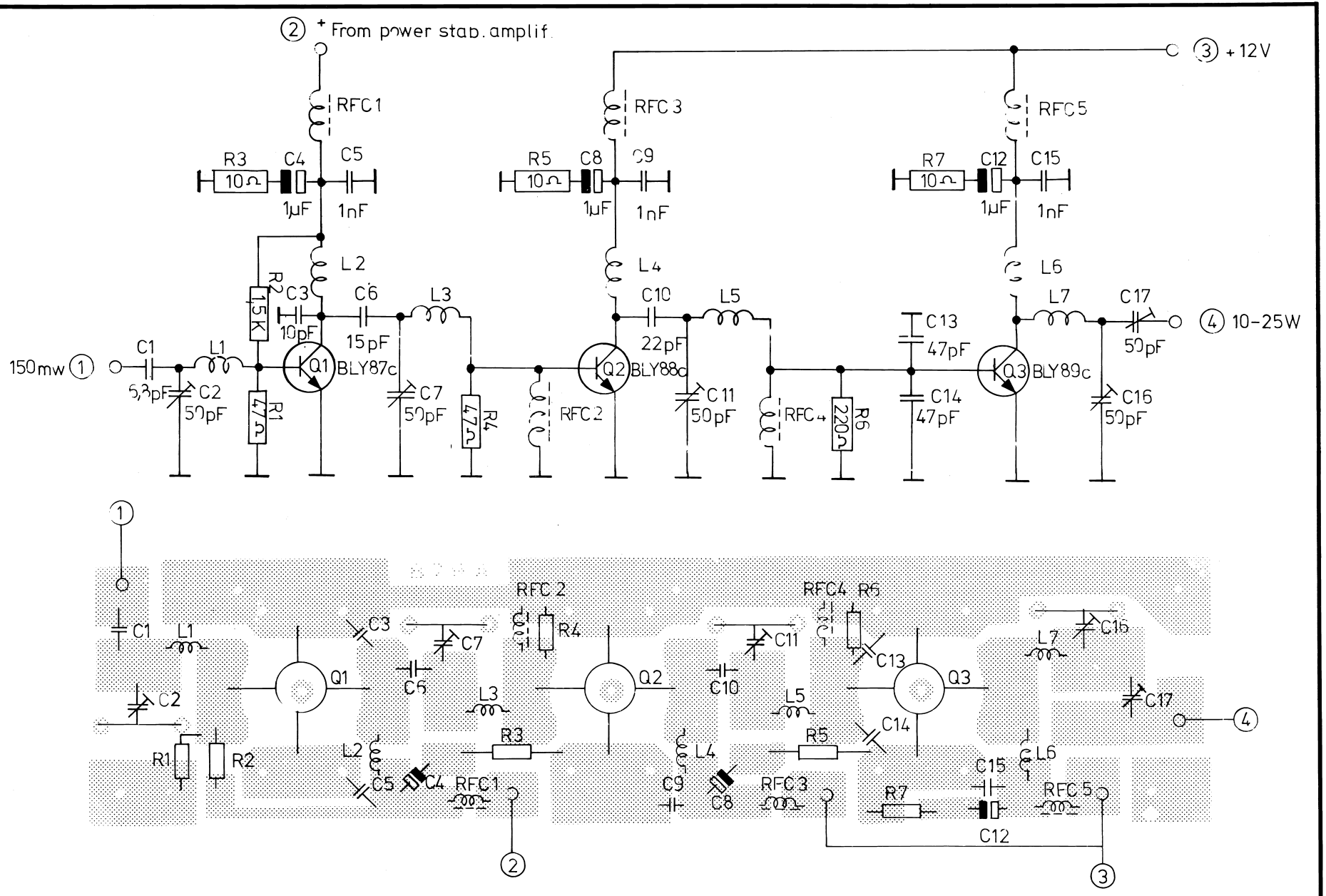
Print B 79 A 1

Tegn.: 27-10-76 H.J.

Stykl. nr.:

Kontr.:

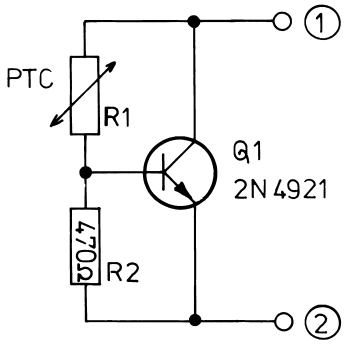
Tegn. nr.: 76307- 4E 2

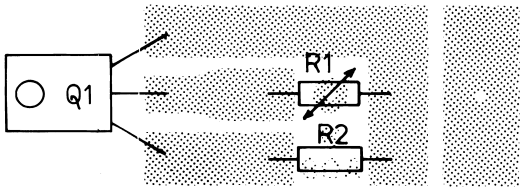


AP-RADIOTELEFON

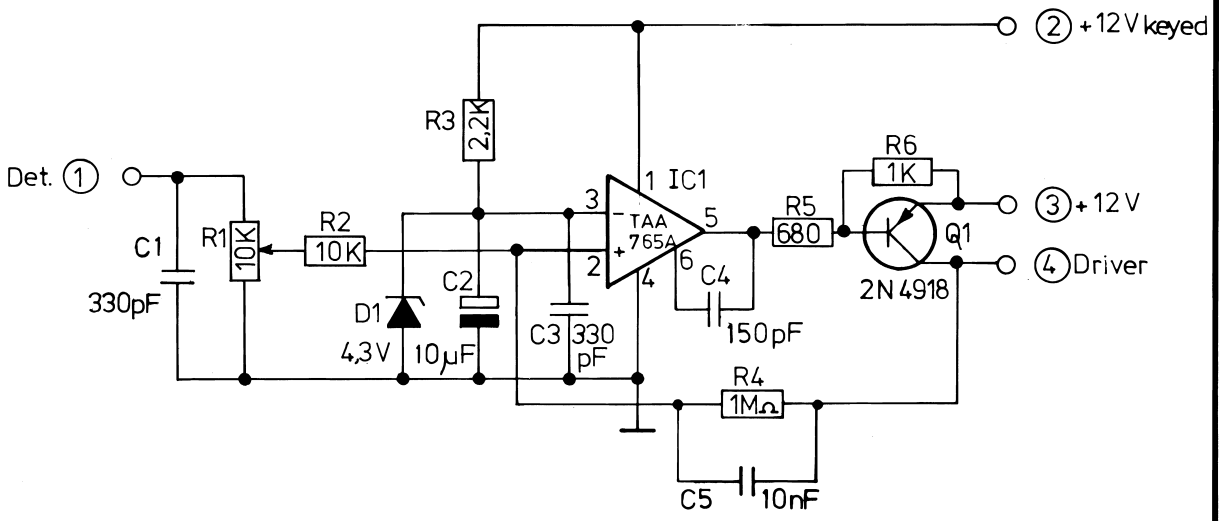
Nr.	Kode	Data	Nr.	Kode	Data
R1	13-267	47 Ω 1/8 W	RFC		
R2	13-285	1,5 KΩ "	1		75290-4E2
R3	13-259	10 Ω "	RFC		
R4	13-267	47 Ω "	2		75290-4E2
R5	13-259	10 Ω "	RFC		
R6	13-275	220 Ω "	3		75290-4E2
R7	13-259	10 Ω "	RFC		
C1	11-373	6,8 pF Ker.	4		75290-4E2
C2	19-334	50 pF Trim.	RFC		
C3	11-376	10 pF Ker.	5		75290-4E2
C4	11-502	1 µF/35 V Tant.			
C5	11-409	1 nF Ker.			
C6	11-381	15 pF "			
C7	19-334	50 pF Trim.			
C8	11-502	1 µF/35 V Tant.			
C9	11-409	1 nF Ker.			
C10	11-387	22 pF "			
C11	19-334	50 pF Trim			
C12	11-502	1 µF/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			

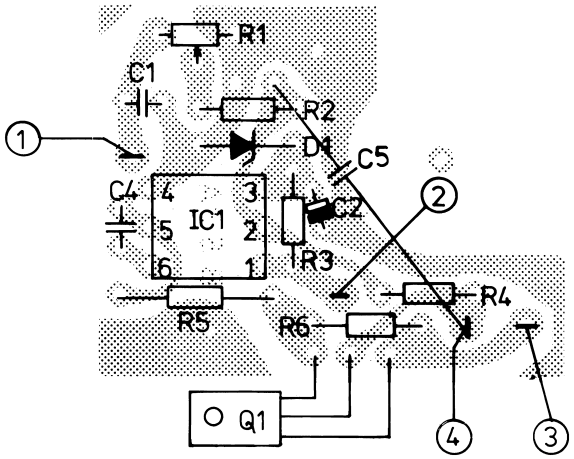
10-25 W internal PA 2 m Print board B 79A 1 Tilhører tegn. nr.: 76307-4E2	Rettet:	Tegn.:	Stykl. nr.: 76307-4S2
		Kontr.:	

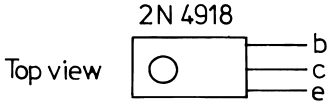




Rettet: 15-6-78 JS/AC	Thermal protection of 10-25 W internal PA Print board B80A 1	Tegn.: 5-11-76 AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON A/S	Tegn. nr.: 76328 - 4E2	







Rettet: 21-4-77 JH/AC 16-3-79 BJ	Sense amplifier for output power stabilizing of internal PA. Print board B 57 B 1	Tegn.: 29-12-75 AC Kontr.: Stykl. nr.:
	AP-RADIOTELEFON A/S	Tegn. nr.: 75622-4E2

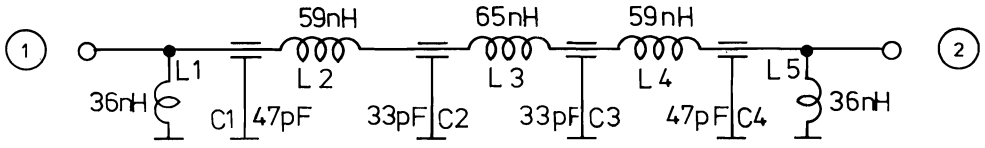
AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	19-258	10 KΩ Trim.			
R2	13-295	10 KΩ 1/8W CR 16			
R3	13-287	2,2 KΩ " "			
R4	13-312	1 MΩ " "			
R5	13-368	680 Ω $\frac{1}{4}$ W CR 25			
R6	13-283	1 KΩ 1/8W CR 16			
C1	11-406	330 pF Ker.			
C2	11-506	10 µF/25V Tant.			
C3	11-406	330 pF Ker.			
C4	11-404	150 pF "			
C5	11-481	10 nF Pol.			
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.:
Kontr.:

Stykl. nr.: 75622-4S2

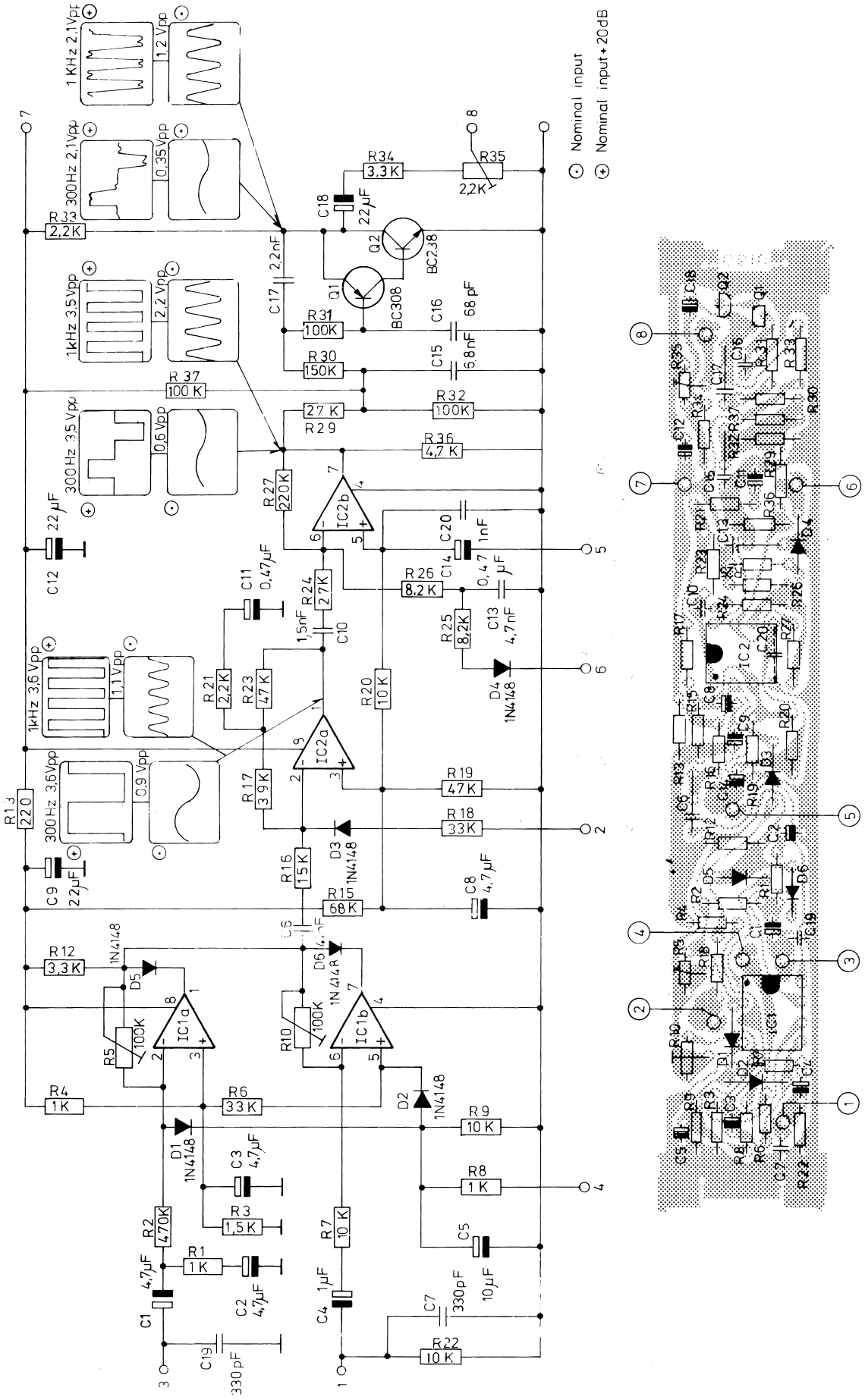


Rettet:	Aerial filter for 2 m	**Tegn.:** 9-1-75 AC	**Kontr.:**
		Stykl. nr.:	
	AP-RADIOTELEFON A/S	**Tegn. nr.:** 75016-4E2	

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 Tilhører tegn. nr.: 75016-4E2	Rettet:	Tegn.:	Stykl. nr.: 75016-4S2
		Kontr.:	

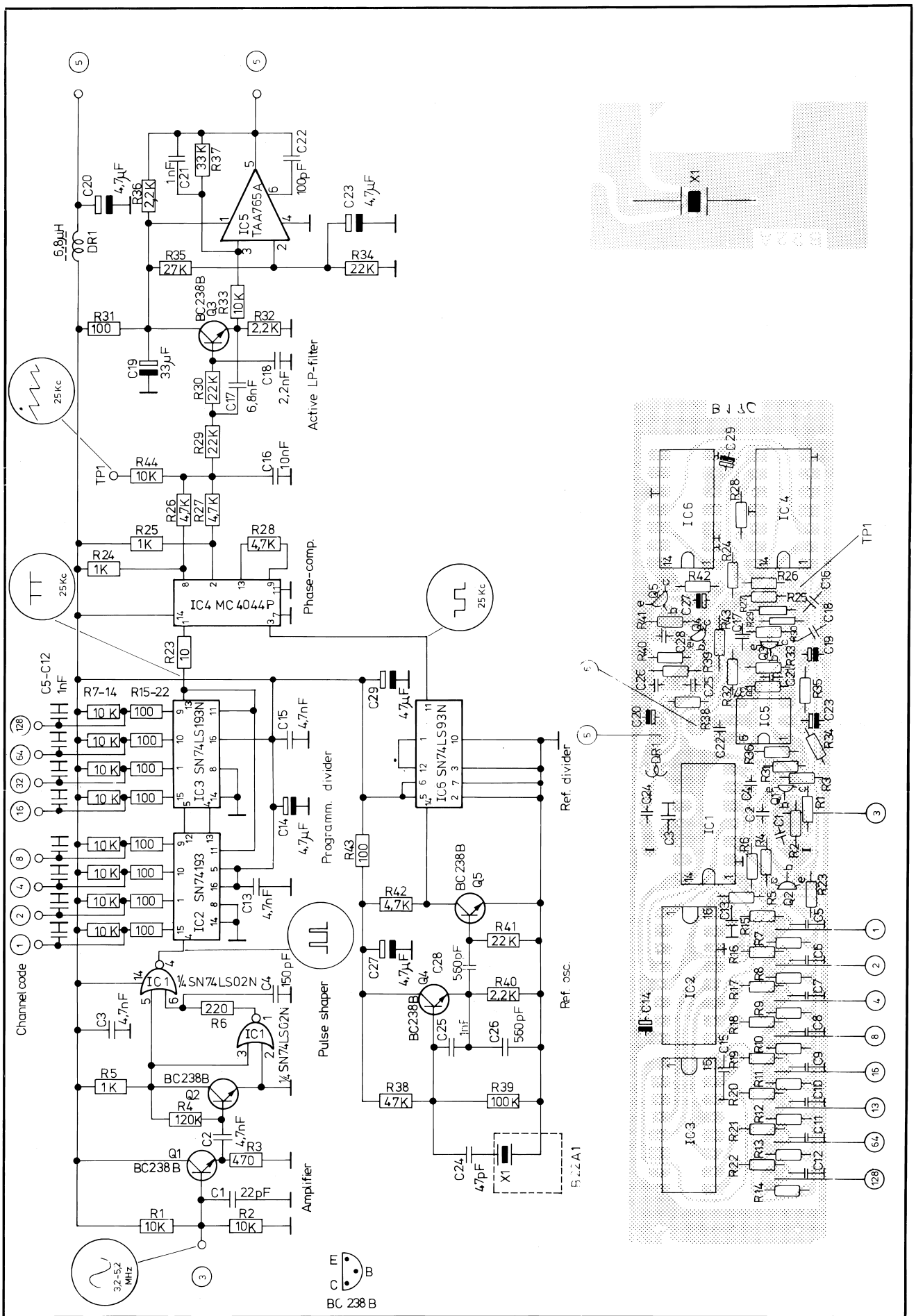


Rev. 2-10-79 AC/SB 10-1-80 BC/SB 15-1-80 BC/SB 18-11-80 BC/LB 11-3-81 SB 8-5-81 SB/BC 27-7-82 LB	Modulation amplifier Print board C61D1 20/25 kHz	Tegn. 3-7-79 BC Kontr. SB Stykl. nr.: Tegn. nr.: 79112 - 3E2
	AP-RADIOTELEFON	

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-283	1 KΩ 1/8W CR16	C1	11-504	4,7 µF/10V Tant.
R2	13-315	470 KΩ " "	C2	11-504	4,7 µF/10V Tant.
R3	13-285	1,5 KΩ " "	C3	11-504	4,7 µF/10V Tant.
R4	13-283	1 KΩ " "	C4	11-502	1 µF/35V Tant.
R5	19-263	100 KΩ Trim.	C5	11-506	10 µF/25V Tant.
R6	13-300	33 KΩ 1/8W CR16	C6	11-493	47 nF MKH
R7	13-295	10 KΩ " "	C7	11-406	330 pF Ker.
R8	13-283	1 KΩ " "	C8	11-504	4,7 µF/10V Tant.
R9	13-295	10 KΩ " "	C9	11-507	22 µF/16V Tant.
R10	19-263	100 KΩ Trim.	C10	11-471	1,5 nF Ker.
R11			C11	11-501	0,47 µF/35V Tant.
R12	13-289	3,3 KΩ 1/8W CR16	C12	11-507	22 µF/16V Tant.
R13	13-275	220 Ω " "	C13	11-477	4,7 nF Poly.
R14			C14	11-501	0,47 µF/35V Tant.
R15	13-304	68 KΩ " "	C15	11-478	6,8 nF Poly
R16	13-297	15 KΩ " "	C16	11-397	68 pF N750Ker.
R17	13-301	39 KΩ " "	C17	11-486	2,2 nF MKH
R18	13-300	33 KΩ " "	C18	11-507	22 µF/16V Tant.
R19	13-302	47 KΩ " "	C19	11-406	330 pF Ker.
R20	13-295	10 KΩ " "	C20	11-409	1 nF Ker.
R21	13-287	2,2 KΩ " "			
R22	13-295	10 KΩ " "	D1	04-062	1N4148
R23	13-302	47 KΩ " "	D2	04-062	1N4148
R24	13-313	27 KΩ " "	D3	04-062	1N4148
R25	13-294	8,2 KΩ " "	D4	04-062	1N4148
R26	13-294	8,2 KΩ " "	D5	04-062	1N4148
R27	13-309	220 KΩ " "	D6	04-062	1N4148
R28					
R29	13-313	27 KΩ " "	Q1	19-084	BC308B
R30	13-308	150 KΩ " "	Q2	19-117	BC238
R31	13-306	100 KΩ " "			
R32	13-306	100 KΩ " "	IC1	09-080	LM358N
R33	13-287	2,2 KΩ " "	IC2	09-080	LM358N
R34	13-289	3,3 KΩ " "			
R35	19-255	2,2 KΩ Trim.			
R36	13-291	4,7 KΩ 1/8W CR16			
R37	13-306	100 KΩ " "			

Modulation amplifier Print board C61D1 Tilhører tegn. nr.: 79112-3E2	Rettet:	Tegn.:	Stykl. nr.: 79112-4S2
		Kontr.:	



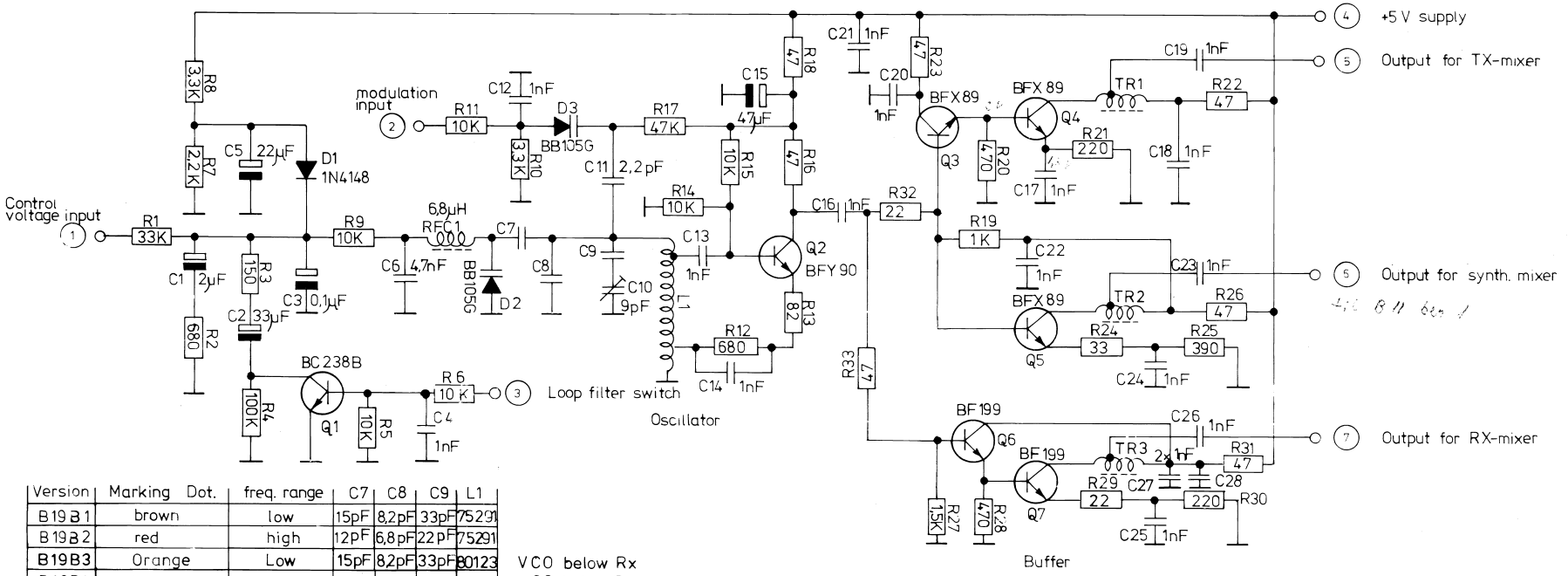
Rettet: 1-4-77 AC/HJ 27-4-77 AC/LT 8-5-78 JH/AC	Synthesizer logic 25 kHz Print board B17 C 1 + B 22 C 1	Tegn.: 18-2-75 AC Kontr.: Stykl. nr.: Tegn. nr.: 75062-3E2
	AP-RADIOTELEFON	

Rettet: 26-6-75, EH
22-9-77 LT/AC
8-5-78 JH/AC
13-2-81 LBu/BC
27-7-81 LBu/BC

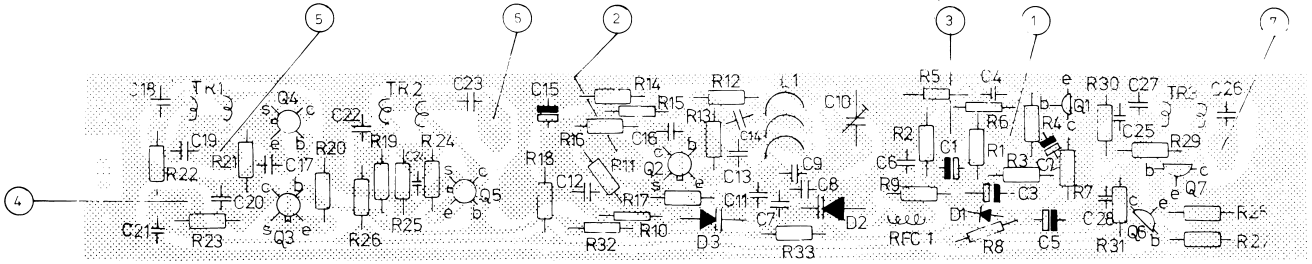
Voltage controlled oscillator for 2 m.
Print board B19 B 1,2,3,4

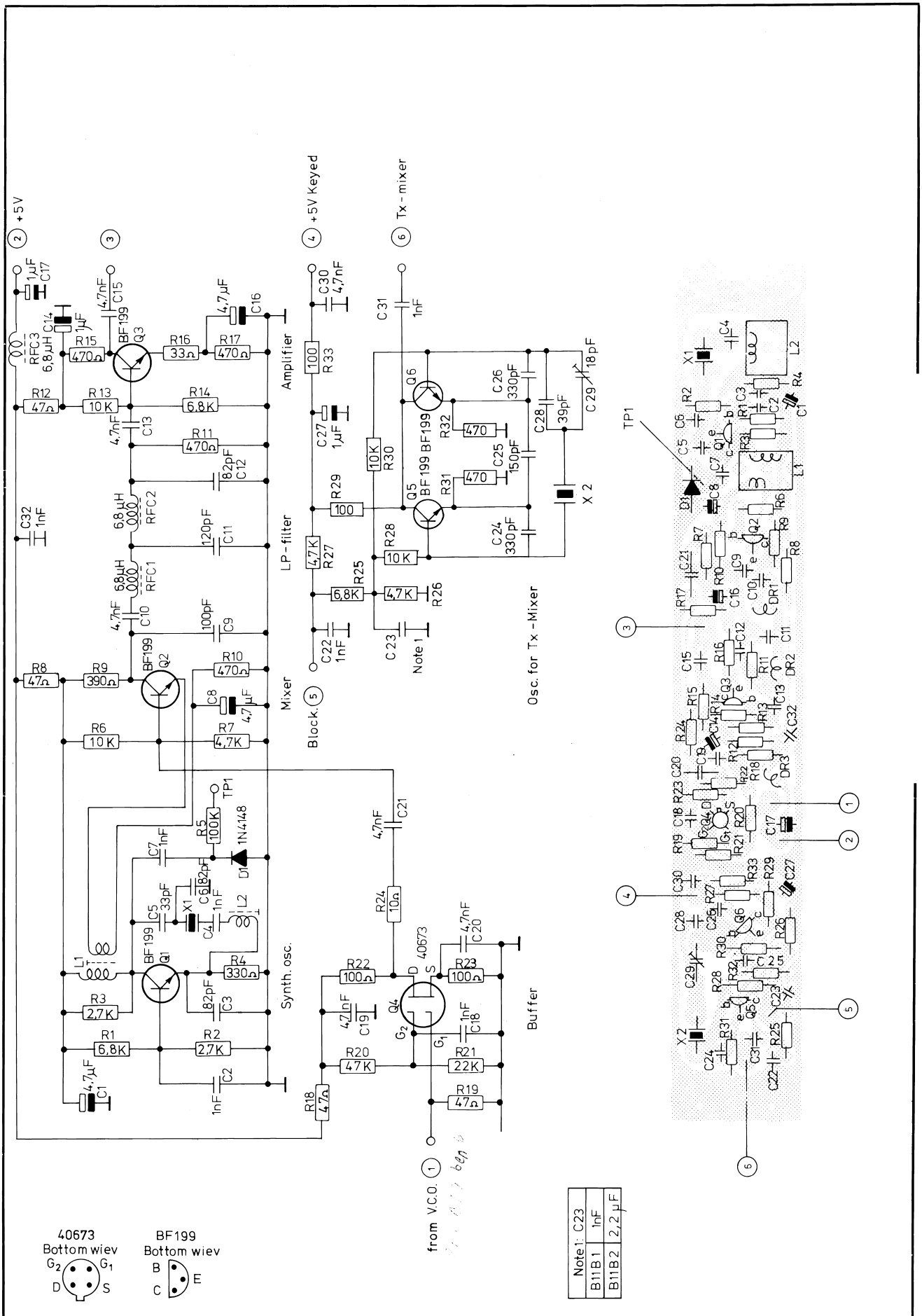
AP-RADIOTELEFON

Tegn.: 7-3-75 AC
Kontr.:
Stykl. nr.:
Tegn. nr.: 75082-3E2



Version	Marking Dot.	freq. range	C7	C8	C9	L1	
B19 B 1	brown	low	15pF	8,2pF	33pF	75291	
B19 B 2	red	high	12pF	6,8pF	22pF	75291	
B19B3	Orange	Low	15pF	8,2pF	33pF	80123	VCO below Rx
B19B4	Yellow	high	12pF	6,8pF	22pF	80123	VCO below Rx





Rettet: 26-5-75 EH. 8-5-78 JH/AC 17-1-80 JH/AC	Synthesizer mixer and TX-oscillator for 2 m Print board B11B1 and B11B2	Tegn.: 13-1-75 AC Kontr.: Stykl. nr.: Tegn. nr.: 75019-3E2
	AP-RADIOTELEFON	

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-293	6,8 KΩ 1/8W CR 16
R2	13-288	2,7 KΩ " "
R3	13-288	2,7 KΩ " "
R4	13-277	330 Ω " "
R5	13-394	100 KΩ ¼ W CR 25
R6	13-295	10 KΩ 1/8W CR 16
R7	13-291	4,7 KΩ " "
R8	13-267	47 Ω " "
R9	13-278	390 Ω " "
R10	13-279	470 Ω " "
R11	13-279	470 Ω " "
R12	13-267	47 Ω " "
R13	13-295	10 KΩ " "
R14	13-293	6,8 KΩ " "
R15	13-279	470 Ω " "
R16	13-265	33 Ω " "
R17	13-279	470 Ω " "
R18	13-267	47 Ω " "
R19	13-267	47 Ω " "
R20	13-302	47 KΩ " "
R21	13-299	22 KΩ " "
R22	13-271	100 Ω " "
R23	13-271	100 Ω " "
R24	13-259	10 Ω " "
R25	13-293	6,8 KΩ " "
R26	13-291	4,7 KΩ " "
R27	13-291	4,7 KΩ " "
R28	13-295	10 KΩ " "
R29	13-271	100 Ω " "
R30	13-295	10 KΩ " "
R31	13-279	470 Ω " "
R32	13-279	470 Ω " "
R33	13-271	100 Ω " "
C1	11-504	4,7 µF/10V Tant.
C2	11-409	1 nF Ker.
C3	11-429	82 pF Ker. N750

Nr.	Kode	Data
C4	11-409	1 nF Ker.
C5	11-428	33 pF Ker. N750
C6	11-429	82 pF Ker. "
C7	11-409	1 nF Ker.
C8	11-504	4,7 µF/10V Tant.
C9	11-401	100 pF Ker.
C10	11-416	4,7 nF "
C11	11-403	120 pF "
C12	11-399	82 pF "
C13	11-416	4,7 nF "
C14	11-502	1 µF/35V Tant.
C15	11-416	4,7 nF Ker.
C16	11-504	4,7 µF/10V Tant.
C17	11-502	1 µF/35V "
C18	11-409	1 nF Ker.
C19	11-416	4,7 nF "
C20	11-415	4,7 nF "
C21	11-415	4,7 nF "
C22	11-409	1 nF "
C23		Note: see draw.
C24	11-430	330 pF N750
C25	11-404	150 pF "
C26	11-430	330 pF N750
C27	11-502	1 µF/35V Tant.
C28	11-293	39 pF Ker.
C29	19-330	18 pF Trim.
C30	11-416	4,7 nF Ker.
C31	11-409	1 nF "
C32	11-409	1 nF "
D1	04-062	1N4148

Synthesizer mixer and Tx-oscillator for 2 m Print board B 11 B 1

Tilhører tegn. nr.: 75019-3E2

Tegn.:

Kontr.:

Stykl. nr.: 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 dependent on desired band. Spec. AP20			
X2		Frequency dependent on mode of operation. (Simplex, duplex etc) Spec. AP22			

Synthesizer mixer and TX-oscillator for 2m Print board B 11 B 1
Tilhører tegn. nr.: 75019-3E2

Tegn.:

Kontr.:

Stykl. nr.: 75019-4S2

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-293	6,8 KΩ 1/8W CR 16
R2	13-288	2,7 KΩ " "
R3	13-288	2,7 KΩ " "
R4	13-277	330 Ω " "
R5	13-394	100 KΩ ¼ W CR 25
R6	13-295	10 KΩ 1/8W CR 16
R7	13-291	4,7 KΩ " "
R8	13-267	47 Ω " "
R9	13-278	390 Ω " "
R10	13-279	470 Ω " "
R11	13-279	470 Ω " "
R12	13-267	47 Ω " "
R13	13-295	10 KΩ " "
R14	13-293	6,8 KΩ " "
R15	13-279	470 Ω " "
R16	13-265	33 Ω " "
R17	13-279	470 Ω " "
R18	13-267	47 Ω " "
R19	13-267	47 Ω " "
R20	13-302	47 KΩ " "
R21	13-299	22 KΩ " "
R22	13-271	100 Ω " "
R23	13-271	100 Ω " "
R24	13-259	10 Ω " "
R25	13-293	6,8 KΩ " "
R26	13-291	4,7 KΩ " "
R27	13-291	4,7 KΩ " "
R28	13-295	10 KΩ " "
R29	13-271	100 Ω " "
R30	13-295	10 KΩ " "
R31	13-279	470 Ω " "
R32	13-279	470 Ω " "
R33	13-271	100 Ω " "
C1	11-504	4,7 µF/10V Tant.
C2	11-409	1 nF Ker.
C3	11-429	82 pF Ker. N750

Nr.	Kode	Data
C4	11-409	1 nF Ker.
C5	11-428	33 pF Ker. N750
C6	11-429	82 pF Ker. "
C7	11-409	1 nF Ker.
C8	11-504	4,7 µF/10V Tant.
C9	11-401	100 pF Ker.
C10	11-416	4,7 nF "
C11	11-403	120 pF "
C12	11-399	82 pF "
C13	11-416	4,7 nF "
C14	11-502	1 µF/35V Tant.
C15	11-416	4,7 nF Ker.
C16	11-504	4,7 µF/10V Tant.
C17	11-502	1 µF/35V "
C18	11-409	1 nF Ker.
C19	11-416	4,7 nF "
C20	11-415	4,7 nF "
C21	11-415	4,7 nF "
C22	11-409	1 nF "
C23		Note: see draw.
C24	11-430	330 pF N750
C25	11-404	150 pF "
C26	11-430	330 pF N750
C27	11-502	1 µF/35V Tant.
C28	11-293	39 pF Ker.
C29	19-330	18 pF Trim.
C30	11-416	4,7 nF Ker.
C31	11-409	1 nF "
C32	11-409	1 nF "
D1	04-062	1N4148

Synthesizer mixer and Tx-oscillator for 2 m Print board B 11 B 2
Tilhører tegn. nr.: 75019-3E2

Tegn.:
Kontr.:

Stykl. nr.: 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		45,30 MHz			
X2		12,95 MHz			

Synthesizer mixer and TX-oscillator for 2m Print board B 11B 2
Tilhører tegn. nr.: 75019-3E2

Tegn.:
Kontr.:

Stykl. nr.: 75019-4S2

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-300	33 KΩ 1/8 W
R2	13-281	680 Ω "
R3	13-273	150 Ω "
R4	13-306	100 KΩ "
R5	13-295	10 KΩ "
R6	13-295	10 KΩ "
R7	13-287	2,2 KΩ "
R8	13-289	3,3 KΩ "
R9	13-295	10 KΩ "
R10	13-289	3,3 KΩ "
R11	13-295	10 KΩ "
R12	13-281	680 Ω "
R13	13-270	82 Ω "
R14	13-295	10 KΩ "
R15	13-295	10 KΩ "
R16	13-267	47 Ω "
R17	13-302	47 KΩ "
R18	13-267	47 Ω "
R19	13-283	1 KΩ "
R20	13-279	470 Ω "
R21	13-275	220 Ω "
R22	13-267	47 Ω "
R23	13-267	47 Ω "
R24	13-265	33 Ω "
R25	13-278	390 Ω "
R26	13-267	47 Ω "
R27	13-285	1,5 KΩ "
R28	13-279	470 Ω "
R29	13-263	22 Ω "
R30	13-275	220 Ω "
R31	13-267	47 Ω "
R32	13-263	22 Ω "
R33	13-267	47 Ω "
C1	11-503	2,2 µF/25 V Tant
C2	11-508	33 µF/10 V "
C3	11-500	0,1 µF/35 V "

Nr.	Kode	Data
C4	11-409	1 nF Ker
C5	11-507	22 µF/16 V Tant
C6	11-416	4,7 nF Ker
C7/2,4	11-379	12 pF "
C7/1,3	11-381	15 pF "
C8/2,4	11-373	6,8 pF "
C8/1,3	11-374	8,2 pF "
C9/2,4	11-385	22 pF "
C9/1,3	11-390	33 pF "
C10	19-328	9 pF Tekelec
C11	11-363	2,2 pF Ker
C12	11-409	1 nF "
C13	11-409	1 nF "
C14	11-409	1 nF "
C15	11-509	47 µF/6,3V Tant
C16	11-409	1 nF Ker.
C17	11-409	1 nF "
C18	11-409	1 nF "
C19	11-409	1 nF "
C20	11-409	1 nF "
C21	11-409	1 nF "
C22	11-409	1 nF "
C23	11-409	1 nF "
C24	11-409	1 nF "
C25	11-409	1 nF "
C26	11-409	1 nF "
C27	11-409	1 nF "
C28	11-409	1 nF "
D1	04-062	1N4148
D2	04-009	BB105G
D3	04-009	BB105G
Q1	19-093	BC238B
Q2	19-105	BFY90
Q3	19-102	BFX89
Q4	19-102	BFX89
Q5	19-102	BFX89

Voltage controlled oscillator for 2M
Print board B 19 B 1,2,3,4.
Tilhører tegn. nr.: 75082-3E 2

Tegn.:

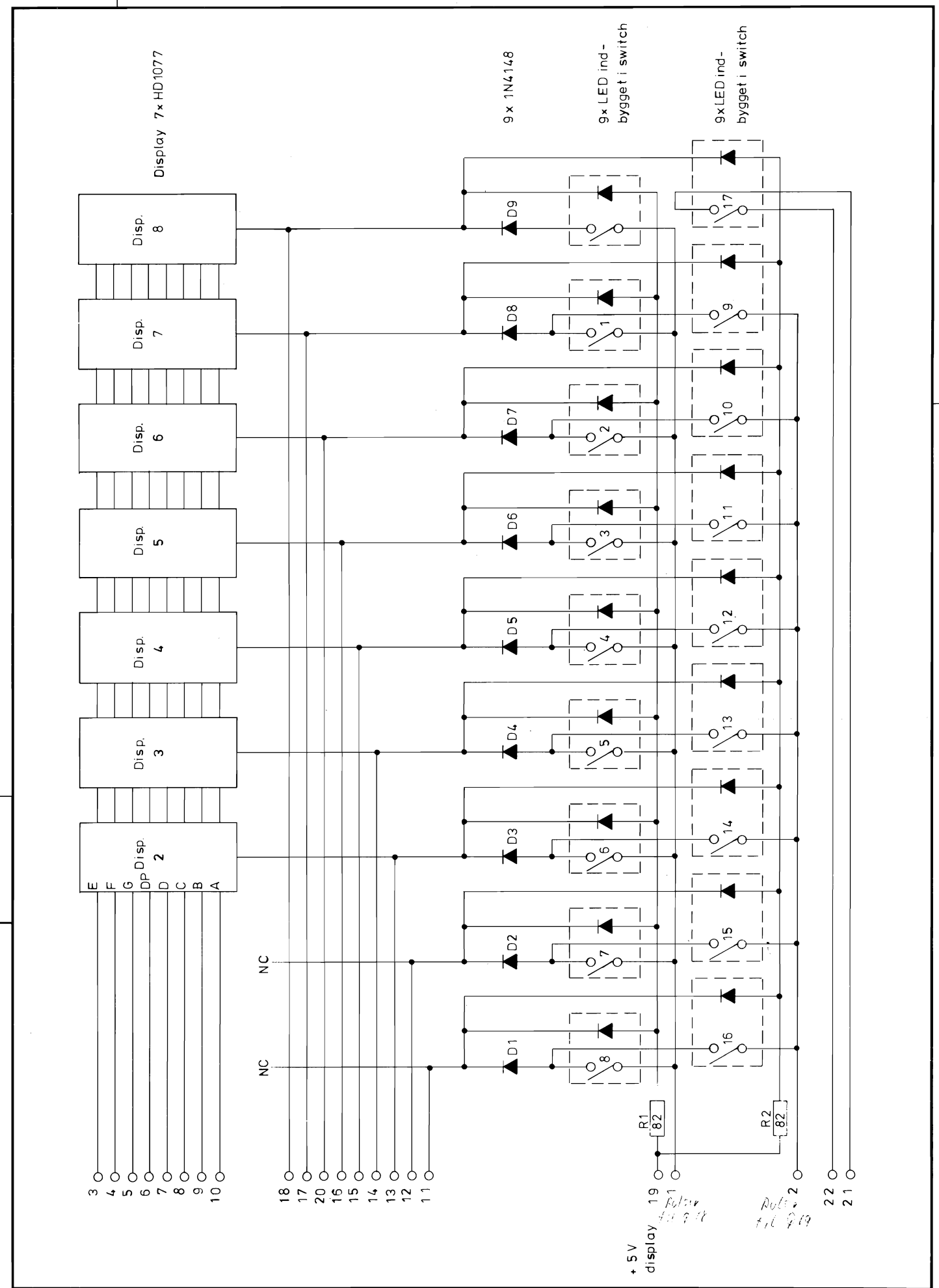
Kontr.:

Stykl. nr.: 75082-4S 2

AP-RADIOTELEFON

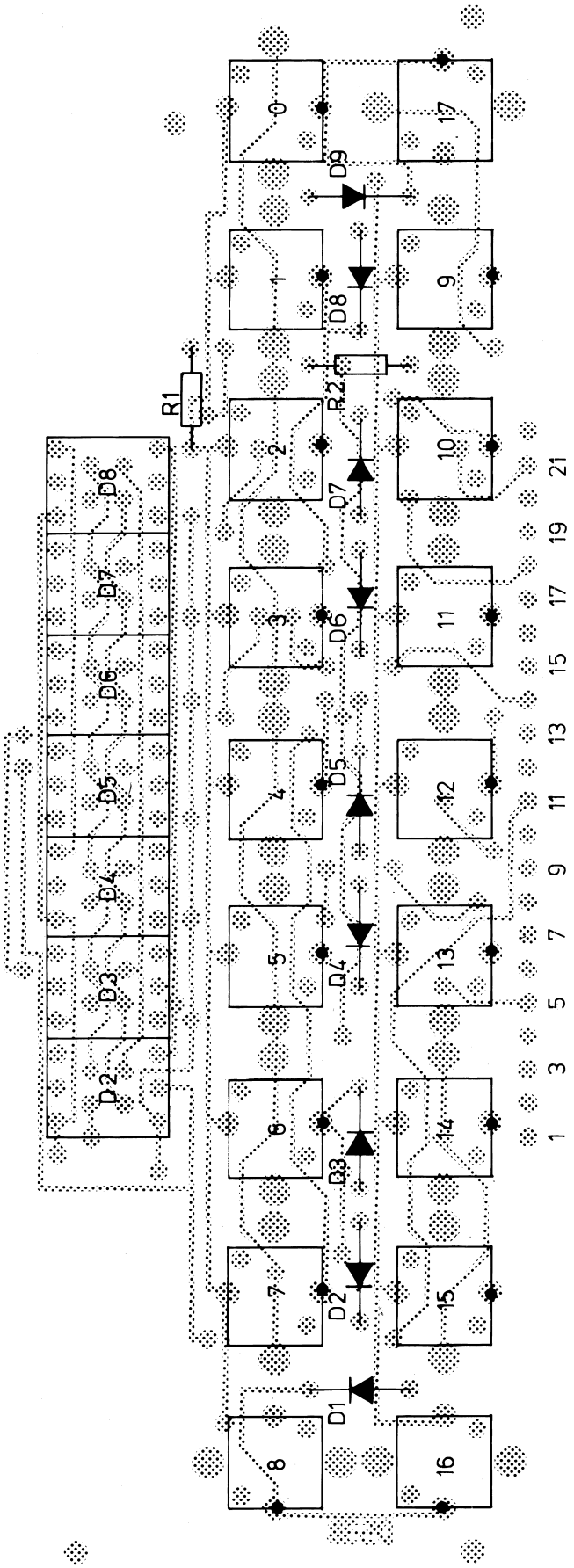
Nr.	Kode	Data	Nr.	Kode	Data
Q6	19-104	BF199			
Q7	19-104	BF199			
RFC1	04-114	74016-4E			
L1/1,2		75291-4E2			
L1/3,4		80123-4E2			
TR1		75288-4E2			
TR2		75288-4E2			
TR3		75288-4E2			

Voltage controlled oscillator for 2m Print board B19B 1,2,3,4. Tilhører tegn. nr.: 75082-3E2	Rettet:	Tegn.: / Kontr.:	Stykl. nr.: 75082-4S2



Ændr. nr.:	Rettet:	Display og tastatur D23 B For microprocessor front AP 2000	Tegn.: BC 22-2-82	Kontr.: PK
		AP-RADIOTELEFON A/s	Tegn. nr.: 82059-3E2	

6058 J & K, Diaprint 01-54 44 22



Ændr. nr.:	Rettet:

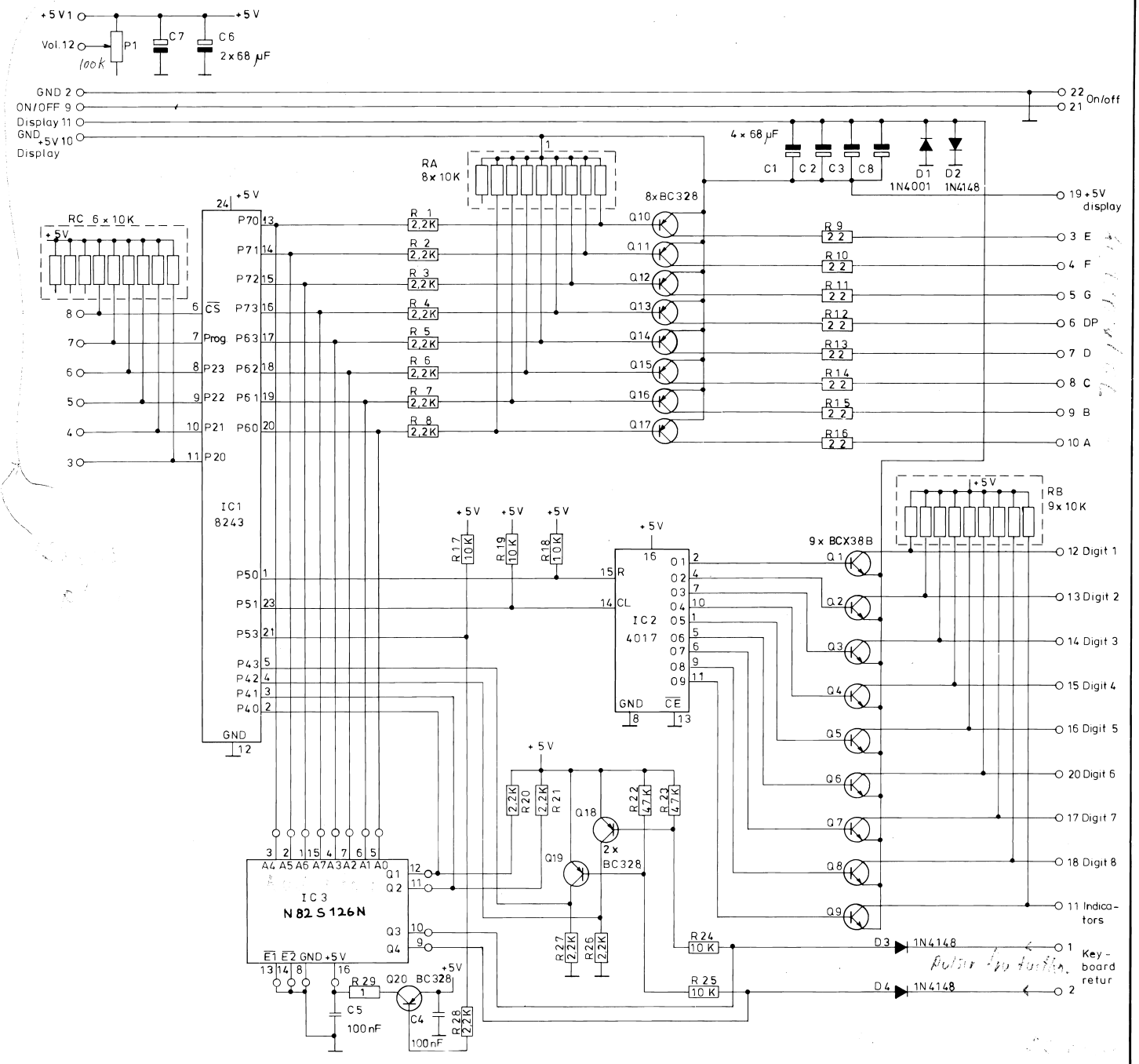
Display og tastatur D 23 B
For microprocessor front AP 2000

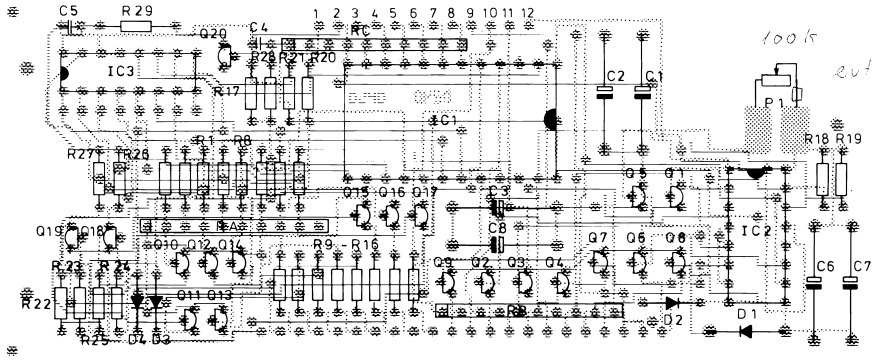
Tegn.: AMS 82-08-19 | Kontr.: PK 82-08-24

AP-RADIOTELEFON A/S

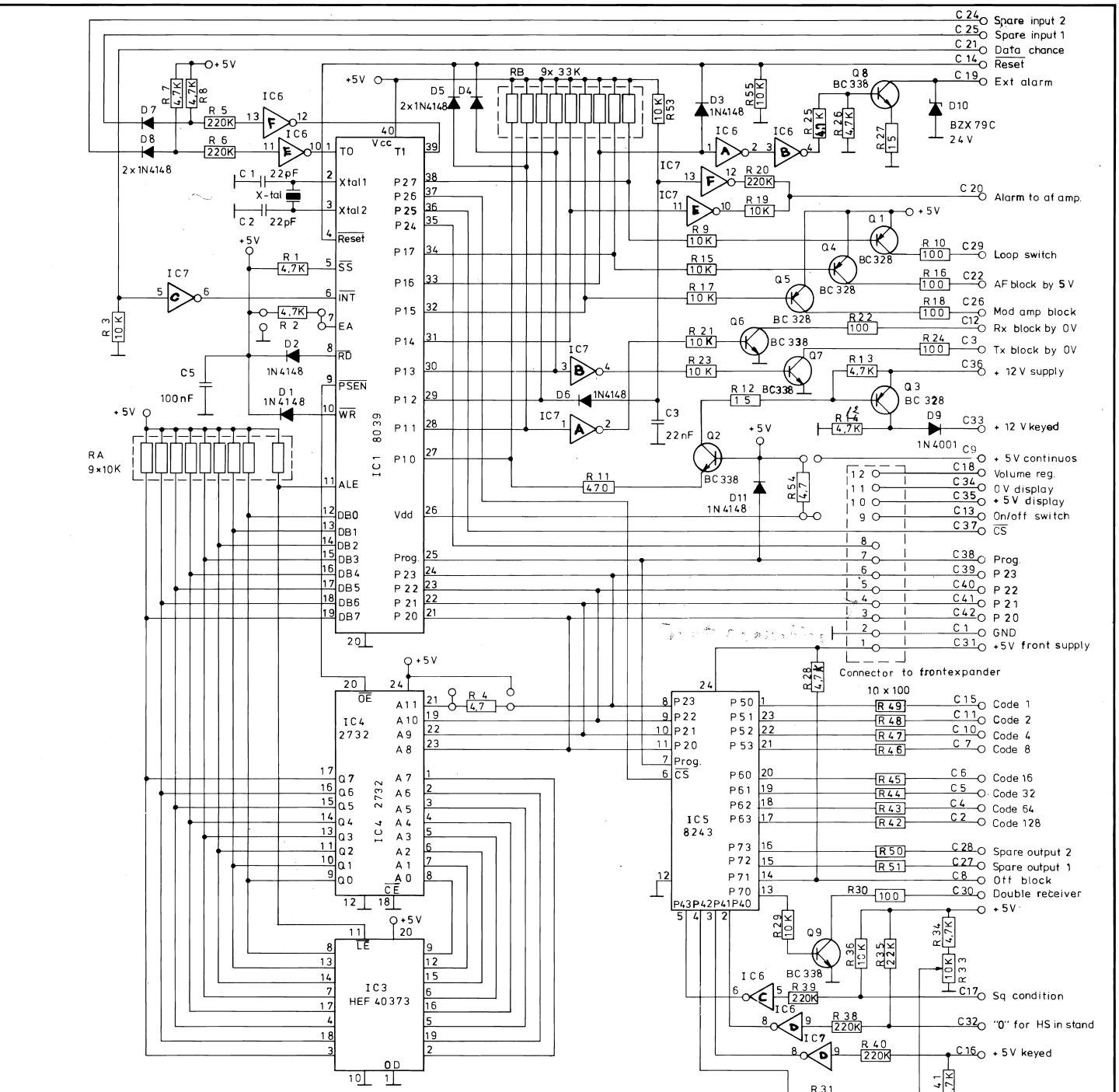
Tegn. nr.: 82059 - 4E2

6058 J. & K. Diaprint 01 54 44 22



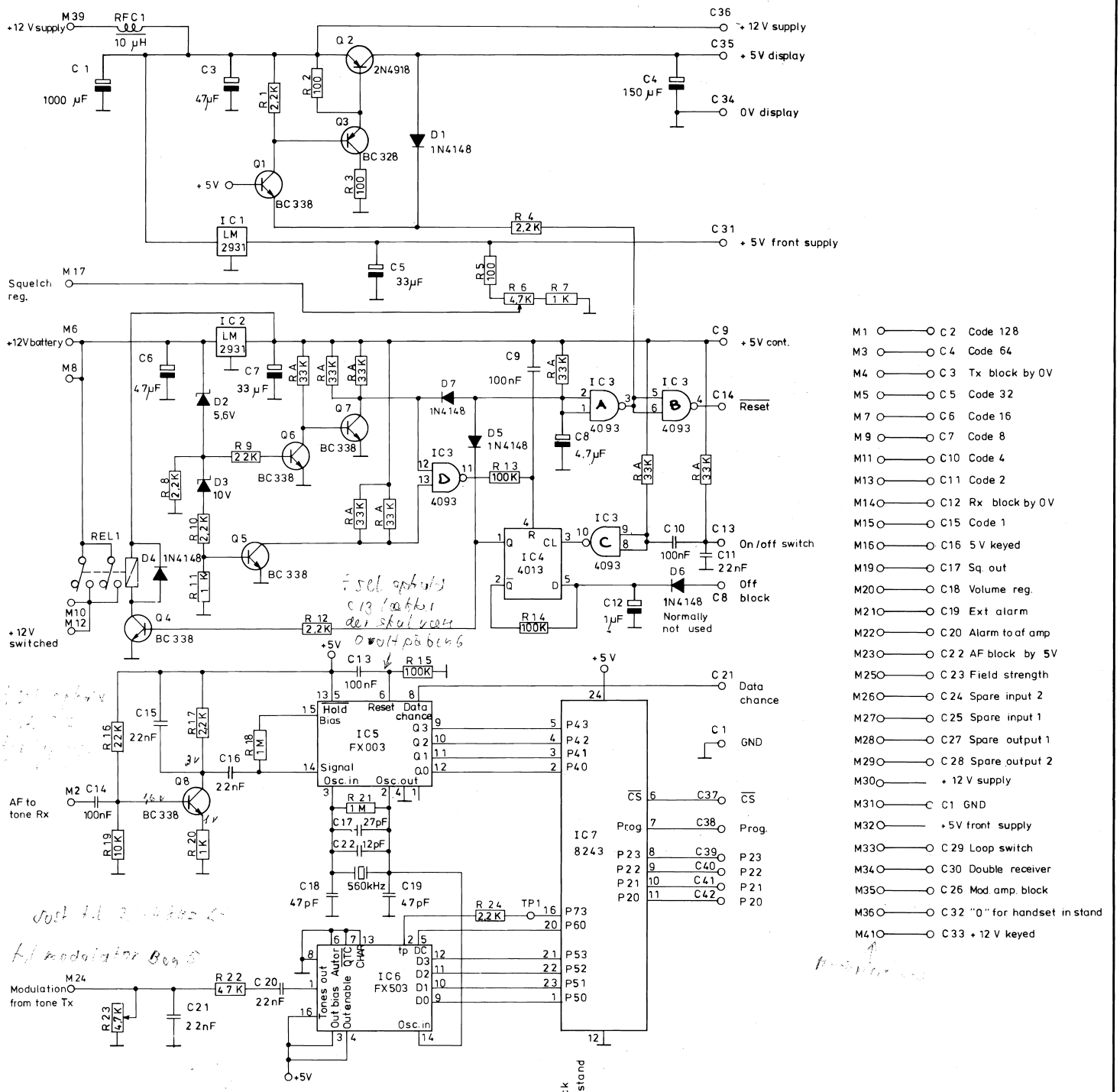


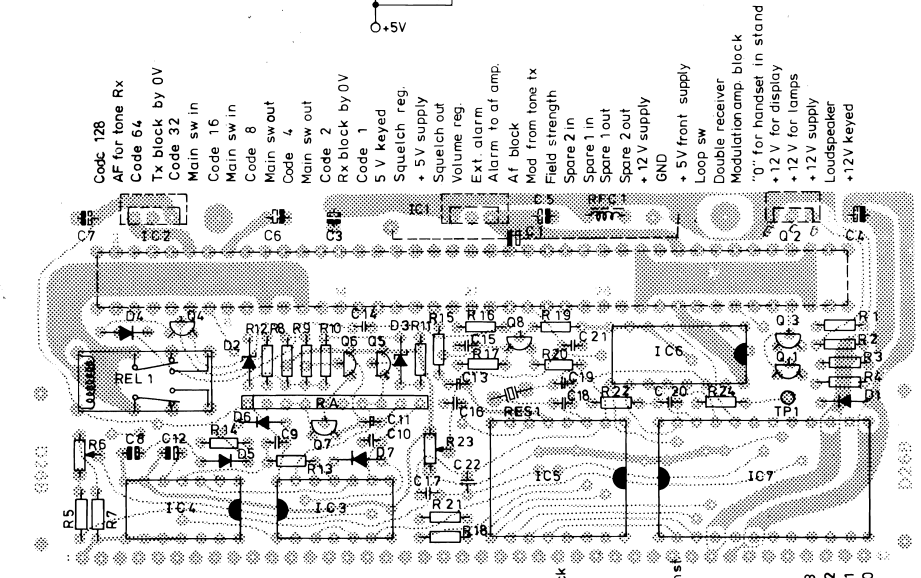
Ændr. nr.:	Rettet: 7 - 6 - 82 PK	Expander print D24E Kodeplug print D27A Microprocessor front AP 2000	Tegn.: BC	Kontr.: PK
		ap radiotelefon a/s	Tegn. nr.: 82 106-2E2	



42 P 20
41 P 21
40 P 22
39 P 23
38 Prog.
37 CS
36 + 12 V supply
35 + 5 V display
34 0V display
33 + 12 V keyed
32 "0" for HS in stand
31 + 5 V front supply
30 Double receiver
29 Loop switch
28 Spare output 2
27 Spare output 1
26 Modul amp. block
25 Spare input 1
24 Spare input 2
23 Field strength
22 AF block by 5V
21 Data chance
20 Alarm to af amp
19 Ext alarm
18 Volume reg.
17 Squelch cond.
16 + 5V keyed
15 Code 1
14 Reset
13 On/off switch
12 Rx block by 0V
11 Code 2
10 Code 4
9 + 5V cont
8 Off block
7 Code 8
6 Code 16
5 Code 32
4 Code 64
3 Tx block by 0V
2 Code 128
1 GND

Ændr. nr.:	Rettet:	Computerprint D 25 A	Tegn.: BC 12-5-82	Kontr.: POK
		Microprocessor front AP 2000		
		ap radiotelefon a/s	Tegn. nr.: 82100-2E2	





IC5 = FX003QC for CCIR tonereceiver D26B1
FX003QZ for ZVEI tonereceiver D26B2

IC6 = FX503C for CCIR tonetransmitter D26B1
FX503Z for ZVEI tonetransmitter D26B2

1 GND
2 Code 128
3 Tx block by 0V
4 Code 64
5 Code 32
6 Code 16
7 Code 8
8 Off block
9 + 5V cont.
10 Code 4
11 Code 2
12 Rx block by 0V
13 On/off switch
14 Reset
15 Code 1
16 5V keyed
17 Squelch out
18 Volume reg.
19 Ext. alarm
20 Alarm to af amp.
21 Data chance
22 AF block
23 Field strength
24 Spare 2 in
25 Spare 1 in
26 Modulat amp. block
27 Spare 1 out
28 Spare 2 out
29 Loop SW
30 Double receiver
31 + 5V front supply
32 "0" for handset in st.
33 + 12 V keyed
34 GND display
35 + 5V display
36 + 12 V supply
37 CS
38 Prog
39 P23
40 P22
41 P21
42 P20

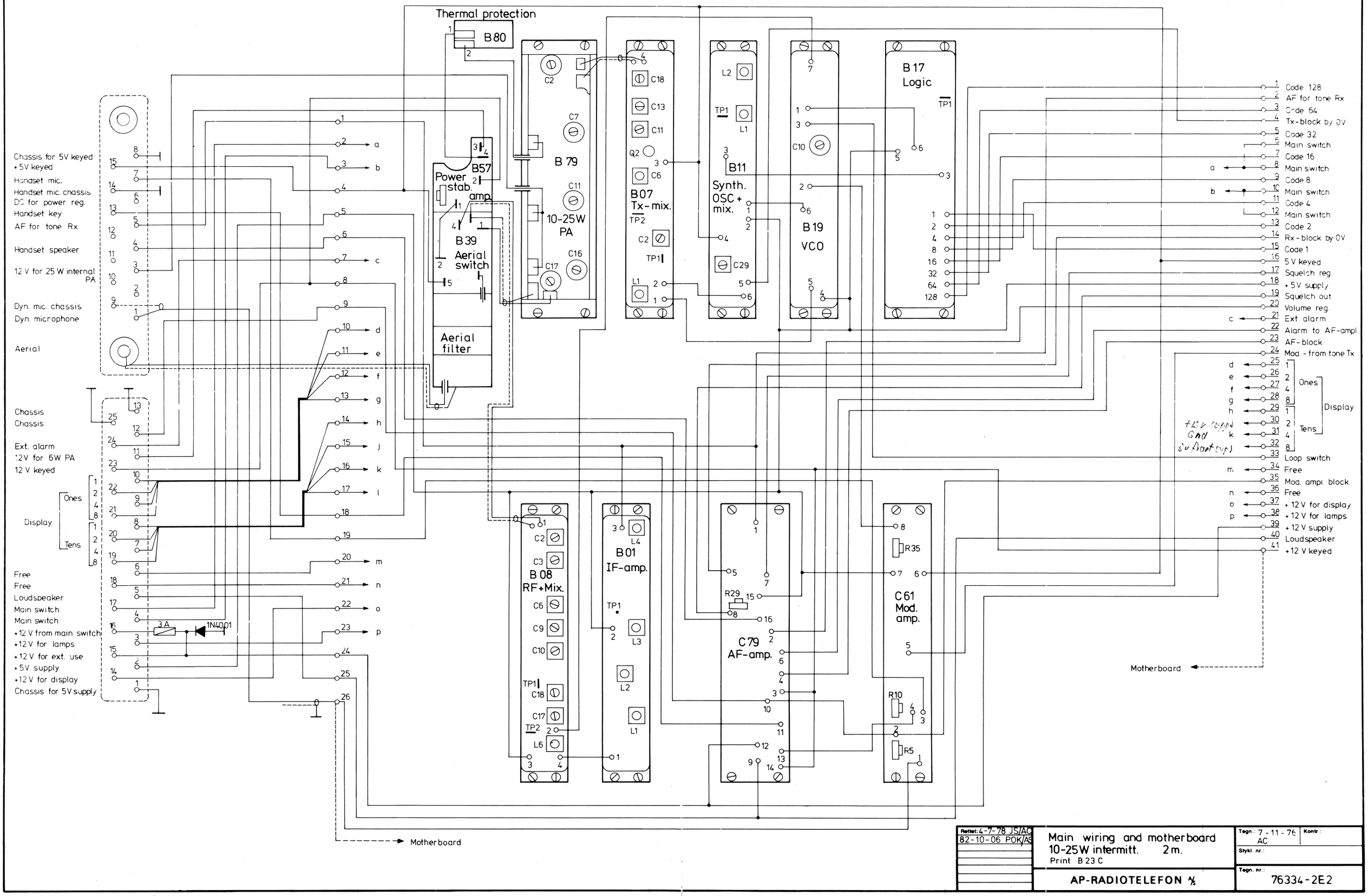
Ændr. nr.:	Rettet 21-6-82 POK

Toneprint D 26B
Microprocessor front AP 2000

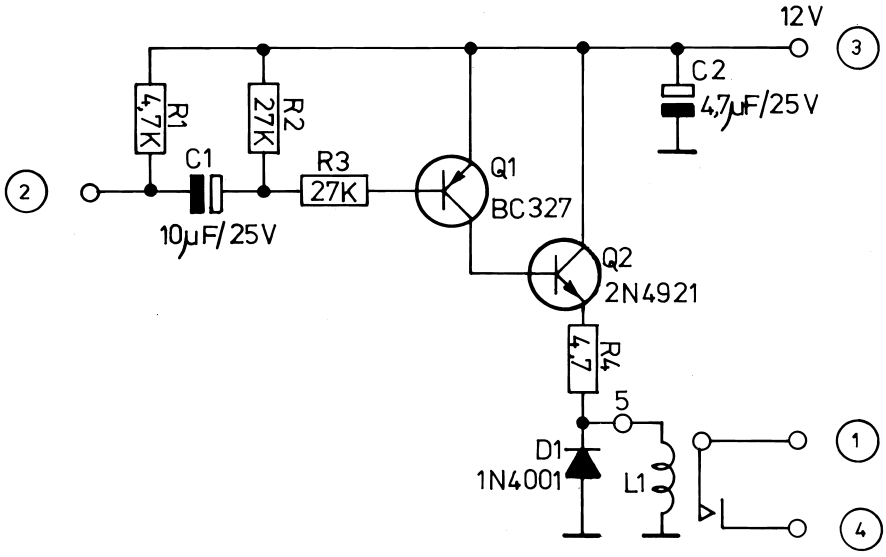
Tegn.: BC 3-5-82 | Kontr.: POK 3-5-82

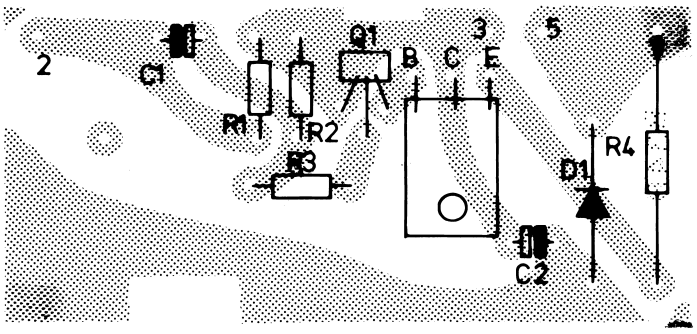
ap radiotelefon a/s

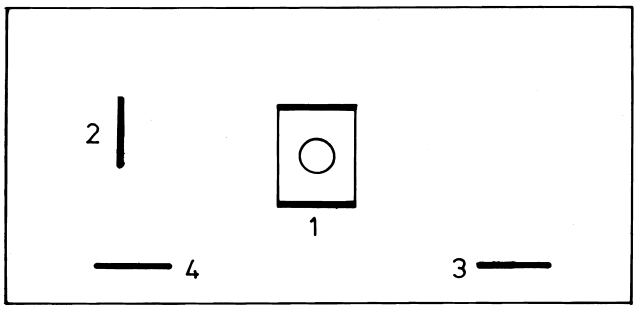
Tegn. nr.: 82098-2E2



Rettet: 4-7-78 JS/AC 82-10-06 POK/AS	Main wiring and motherboard 10-25W intermitt. 2 m. Print B 23 C	Tegn.: 7-11-76 AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON A/S	Tegn. nr.:	76334-2E2







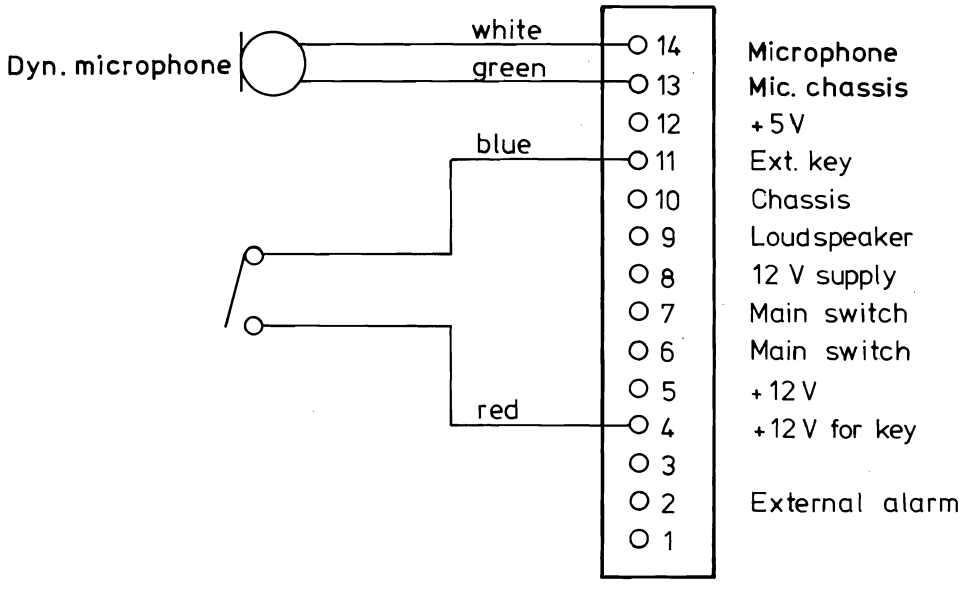
Relay box

Rettet: 23-3-76 AC/LT	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 A/S	Tegn. nr.: 75169-4E2	

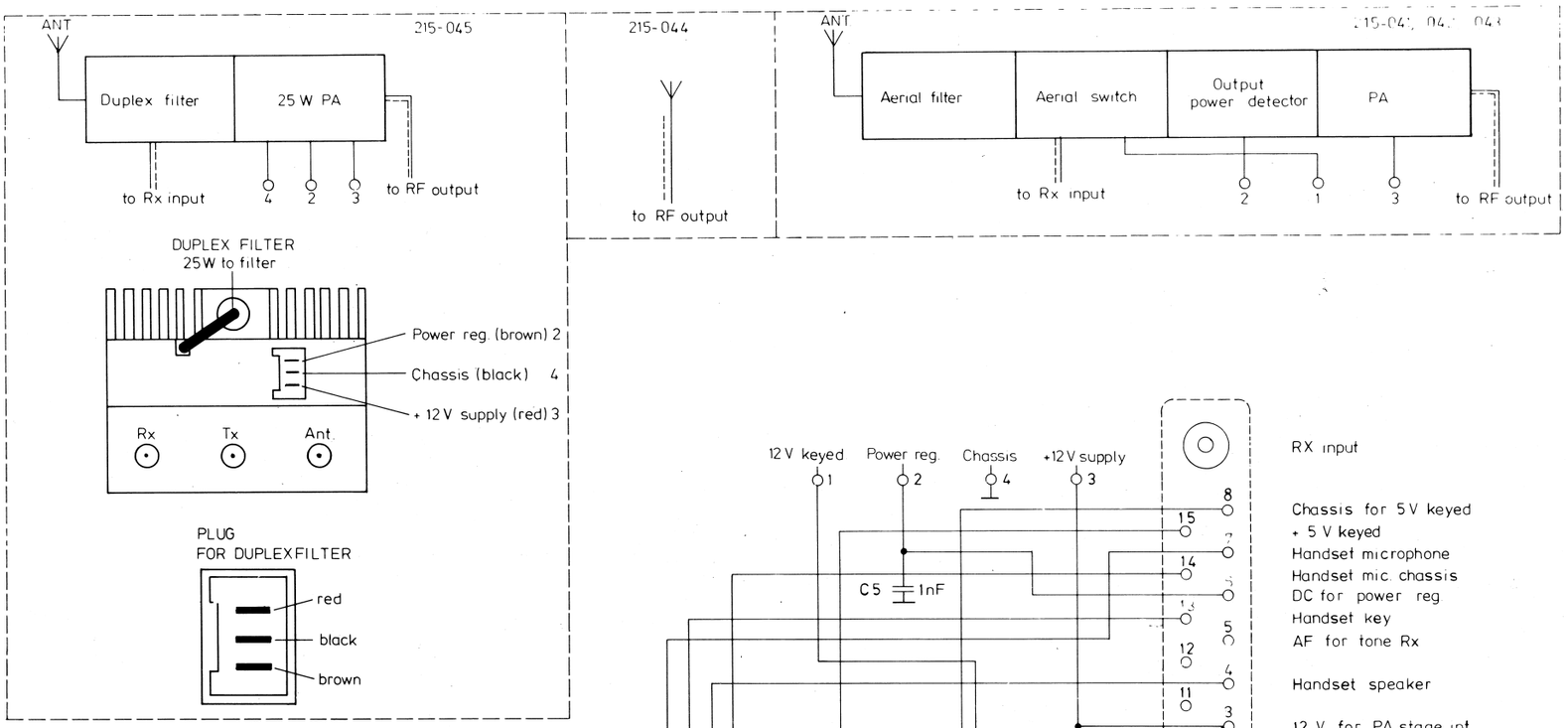
AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-291	4,7 KΩ 1/8W CR16			
R2	13-313	27 KΩ " "			
R3	13-313	27 KΩ " "			
R4	13-687	4,7 Ω 6 W Dale			
C1	11-506	10 µF/25V Tant.			
C2	11-505	4,7 µF"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:	Tegn.:	Stykl. nr.: 75169-4S2
		Kontr.:	



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



Rettet

Installation for microprocessor front
215-041, -042, -043, -044, -045
Print board C 48 A 1

AP-RADIOTELEFON A/S

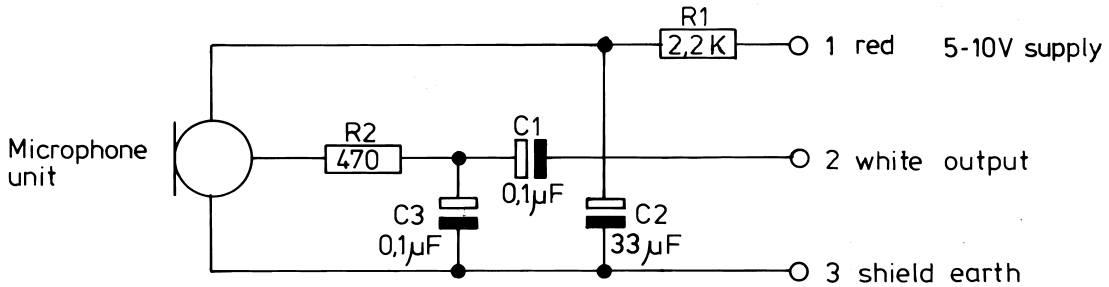
Tegn nr 82246-2E2

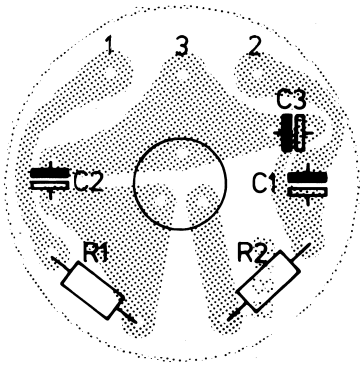
Tegn 82-10-6 AMS
Kontr
Stykl nr

AP-RADIOTELEFON

Nr.	Kode	Data	Nr	Kode	Data
R1	13-359	100 Ω CR25 1/4W			
C1	11-506	10 µF/25V Tant.			
C2	11-500	0,1 µF/35V "			
C3	11-506	10 µF/25V "			
C4	05-030	1000 µF/16V El.lyt			
C5	11-409	1 nF Ker.			
C6	11-500	0,1 µF/35V Tant.			
C7	11-409	1 nF Ker.			
C8	11-409	1 nF "			
C9	11-409	1 nF "			
D1	04-040	30S1			

Installation for microprocessor Print board C 48 A1 front Tilhører tegn. nr.: 82246-2E2	Rettet:	Tegn.: Kontr.:	Stykl. nr.: 82246-2E2





Rettet:			
25-5-77 LT/AC 13-10-80 LB/AMC	Microphone 213-020 Print board B 81 B1	Tegn.: 4-3-77 AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON A/S	Tegn. nr.: 77127-4E2	