2nd edition 25-11-80

MANUAL 165

UHF BAND

AP 2000 MOBILE

Contents AP 2000, UHF

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Technical Data AP 2ooo Series UHF

General:

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

Frequency range:	4o6-432 MHz and 45o-47o MHz
Principle:	Digital frequency synthesizer
Number of channels:	Max. 80 or 160 at 12,5 kHz
Channel spacing:	25 kHz, 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, 24 V and 12 V chassis positive operation. A 22o V AC supply is available too.
Supply voltage varations:	1o,8 V to 15,6 V
Operation Temperature:	% 25°C to + 60°C
Frequency stability:	typ. ± 3 ppm for the above specified temperature and supply voltage variations
Loudspeaker:	External 4 Ω
Microphone:	1 kΩ condenser microphone or 2oo Ω dynamic close talk micro- phone with push-button
Antenna impedance:	5o Ω
Power consumption:	At 13,2 V reception approx. o,4 A transmission { 25 W approx. 7,5 A 6 W " 2,o A

Receiver:

Sensitivity:	typ. o,4 µV (½ E.M.F.) for 2o dB SINAD.
Adjacent channel sensitivity:	typ. 72 dB (CEPT Method)
Spurious and image rejection:	typ. 82 dB (CEPT Method)
Intermodulation attenuation:	typ. 72 dB (CEPT Method)
Undesired conducted power:	typ. o,5 nW
Deemphasis:	Following 6 dB per octave curve from o,3 to 3 KHz within + 1-3 dB relative level at 1ooo Hz
Audio output power:	3 watts into 4 Ω at 1o per cent distortion, 13,2 V supply voltage.
Output for microtelephone:	1 mW in 3oo Ω
Hum and noise:	typ. 45 dB (CEPT Method)
Function of limiter:	Less than 1 dB varation in output voltage for RF-input levels between 1 µV and 1oo mV EMF.

Transmitter:

	6 W ± o,5 dB, 1o W - 1 + o,5 dB from ⁒ 25°C to + 6o°C and supply voltages between 1o,8 V and 15,6 V with external PA: 1o-25 W + 0 dB ⁒ 2 dB from ⁒ 25°C to 6o°C and supply voltages between 10,8 V and 15,6 V
Spurious outputs and harmonics:	typ. each less than 2oo nW into 50 Ω
Adjacent channel power:	typ. 82 dB below the output power.
Frequency deviation:	Max. ± 5 kHz.
Preemphasis:	Following 6 dB per octave curve from 0,3 to 3 kHz within + 1 - 3 dB relative level at 1ooo Hz.
Harmonic distortion:	typ. 1 per cent at ± 3 kHz deviation and 1ooo Hz modulation frequency.
Hum and noise:	typ. 45 dB relative ± 3 kHz deviation and 1ooo Hz modulation frequency (CEPT Method).

Technical description for AP 2000 UHF

Receiver (Fig. 1)

Aerial switch (75624-4E2) for sets with ext. PA (75627-4E2)

The aerial switch is made by a relay, while TR 1, D 1 and D 2 makes a forward power sensing circuit for the transmitter. This circuit is used for power regulation.

RF-amplifier and 1st mixer (80082-3E2)

The RF-amplifier consists of transistor Q 1, Q 2 and the helicoils L 2 to L 5 to give the necessary selectivity. The mixer transistor Q 4 converts the RF signal to 21,4 MHz. The oscillator injection is amplified in Q 3 and coupled to the mixer by a double tuned stripline filter. The oscillator frequency is: F_{Rx} + 21,4 MHz. Matching of the mixer output impedance to the crystalfilter is made by the tuned circuit L 6.

21,4 MHz and 455 kHz IF for 20 kHz, 25 kHz channel spacing (75076-3E2) and (21,4 MHz and 227,5 kHz for 12,5 kHz channel spacing (78152-3E2)).

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 (227,5 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 section feeds the signal to IC 2, which is an integrated 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.

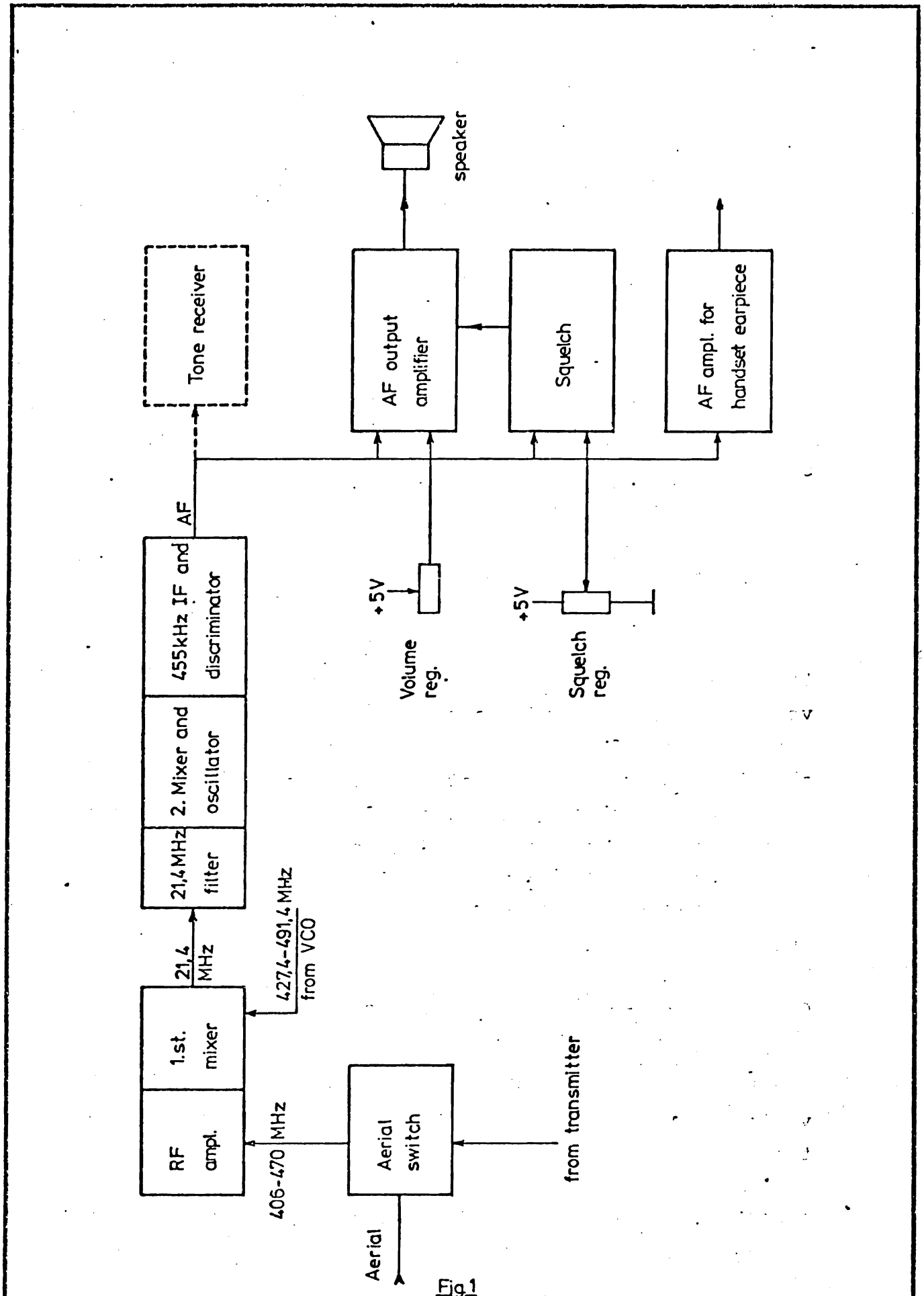

Fig.1

Rettet:	Technical description for AP 2000 UHF Receiver	Tegn.: 26-3-76 AC	Kontr.: 1-4-76 CHB
		Page: 2	
	AP-RADIOTELEFON A/S	Tegn. nr.: 80139-4E2	

The transistors Q 2 and Q 3 makes the handset earpiece amplifier with C 12 and R 22 as deemphasis. The squelch circuit consists o 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 + 5V. 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 (80084-3E2)

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.
The necessary 21,4 MHz signal (for simplex operation) comes from a combined crystal oscillator/doubler and modulator (80090-2E2). For good suppression of VCO and 21,4 MHz injection the Tx-mixer is a balanced transistor type. The two amplifier stages Q 3 and Q 4, together with helicoils L 2 to L 5, give further suppression of unwanted sidebands and necessary amplification to reach an output of approx. 40 mV.

6-10 W power amplifier (75510-4E2)

This power amplifier consists of three stages Q 1, Q 2 and Q 3, where the output level can be regulated by varying the supply voltage for Q 1 and Q 2. The regulation voltage is taken, from the forward power sensing circuit. Situated on print board B 58.

10-25 W power amplifier (75627-4E2)

This amplifier consists of one stage Q 1, and is driven from the 6-10 W amplifier. The output of Q 1 goes through a forward power-sensing circuit to the aerial switch. The output is adjustable with R 2.

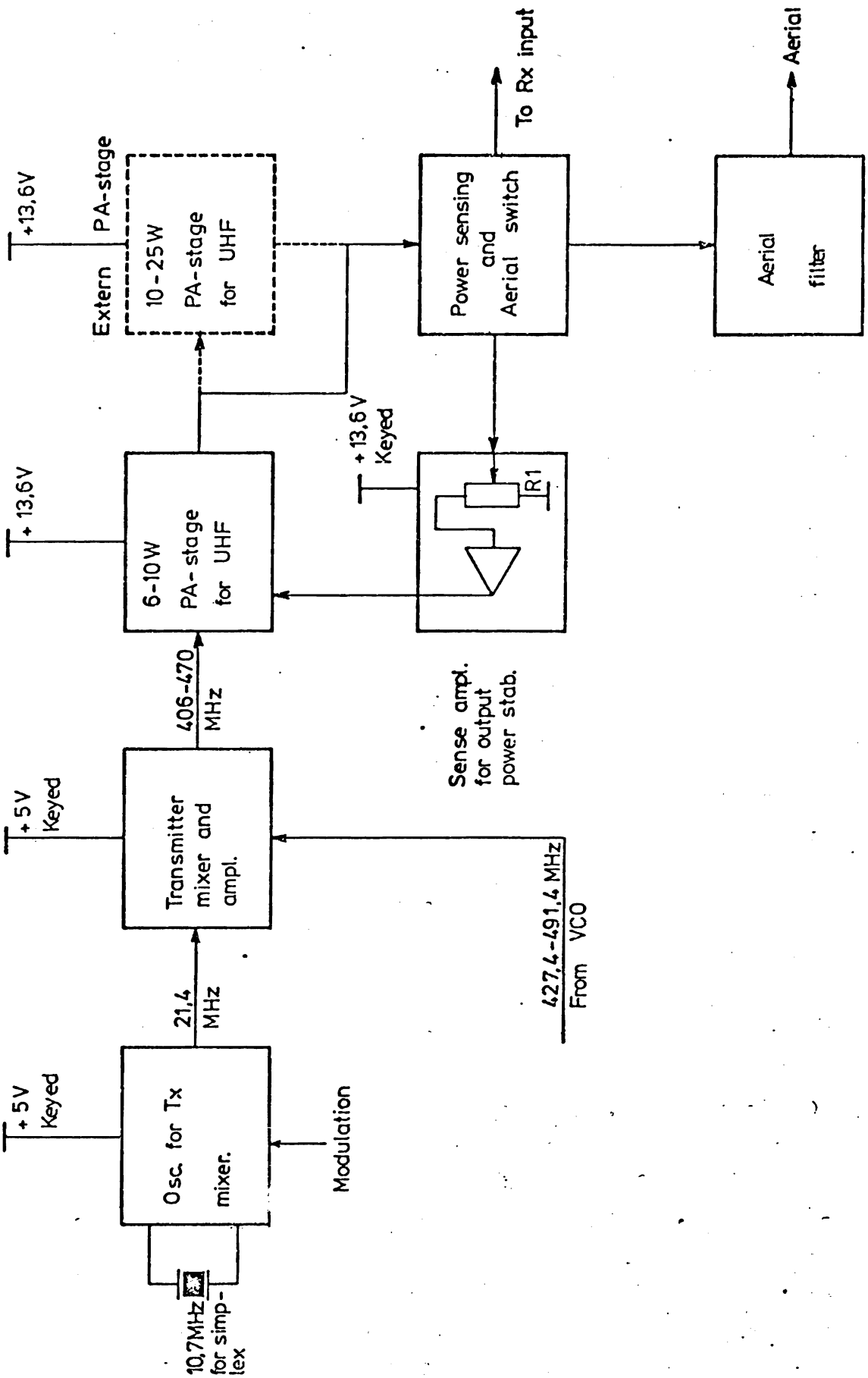

Fig. 2

Rettet:	Technical decription for AP 2000 UHF Transmitter	Tegn.: 26-3-75 AC	Kontr.: 1-4-76 CHB
		Page: 4	
	AP-RADIOTELEFON A/S	Tegn. nr.: 80139-4E2	

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

From the power-sensing a DC voltage propotional 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 voltage (~11 V) the output power will increase with increasing supply voltage, and the output reaches the desired value it will be constant for further increase in the supply voltage. The output level for supply voltages greater than approx. 13 V is adjustable with R 2 on print board B 59 for power outputs between 10-25 W and R 1 on print board B 57 for power outputs between 6-10 W. 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 6-10 W stage and the 10-25 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 (79112-3E2)

The modulation amplifier has two input terminals with different sensivities. Using the less sensitive input 2 (terminal 3), the mic. switch terminal carries +5 V thereby inhibiting IC 1 b (used as the most sensitive amplifier) via D 2 and enabling IC 1 a 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-emphasis, thereby reducing the peak deviation caused by AF signals below approximately 1 kHz. IC 2 b limits the AF signal after pre-emphasis in order to limit the overall peak deviation. Q 1 and Q 2 form an active 3 kHz low-pass filter. A variable capacitance diode in the VCXO is used for modulation.

FREQUENCY SYNTHESIZER CIRCUIT

Basic phase locked loop operation

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

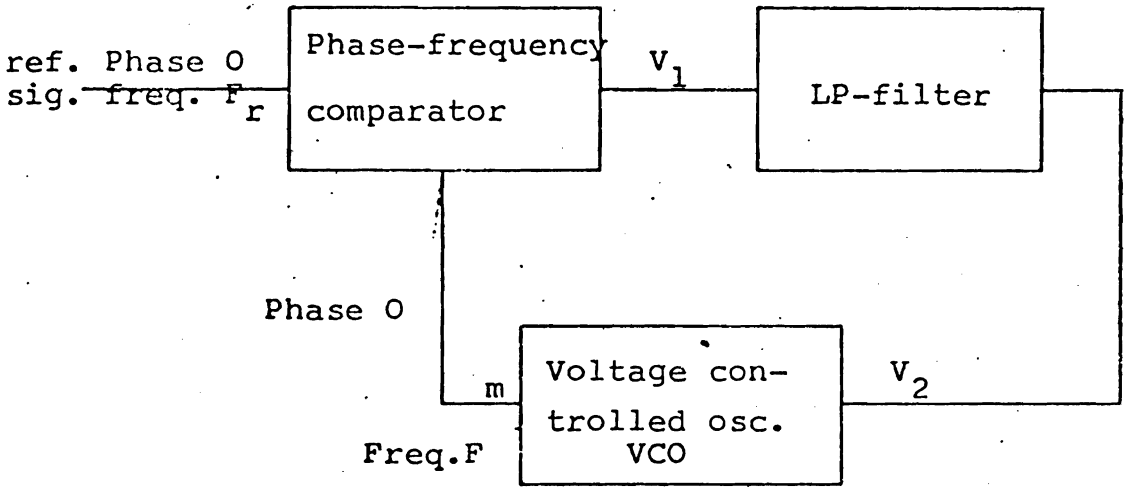

Fig. 1 Basic phase locked loop

Phase-frequency comparator with three-state output

If both input signals have identical frequencies but different phases, with signal F_O leading signal F_r, the comparator output will be low for the time equal to the phase difference If signal F_O lags siganl F_r, the output will be high for the same time. In between the output will be in a three-state condition, and the voltage on the capacitor of an RC filter connected at this point will have some intermidiate value. When used in a phase locked loop, this value will adjust the VCO frequency by reducing the phase difference between F_O and F_r to zero.

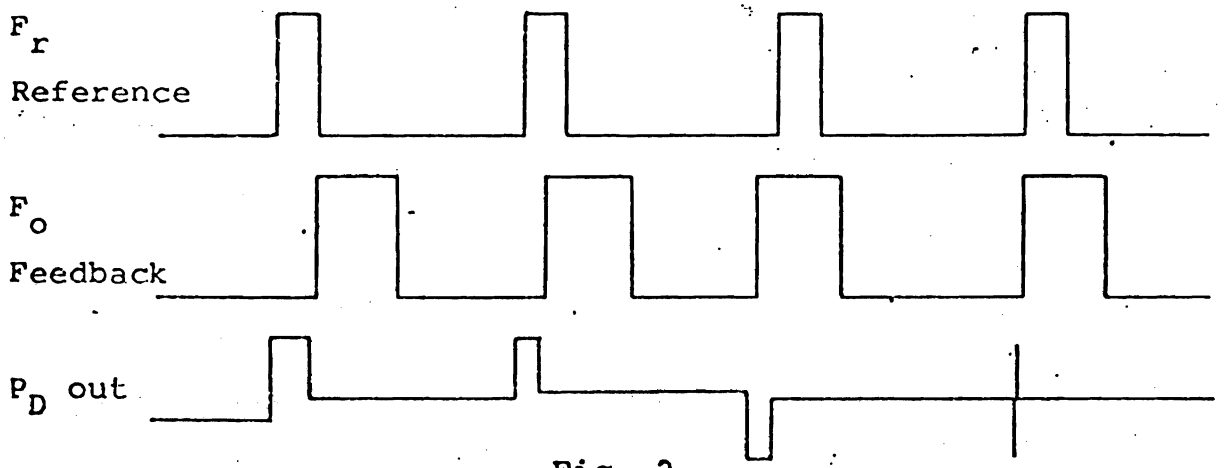

Fig. 2

80140-4E2

If the signals have different frequencies, the output signal will be high when signal F_o has a lower frequency than signal F_r, and low otherwise.

A multichannel synthesizer (Fig.3)

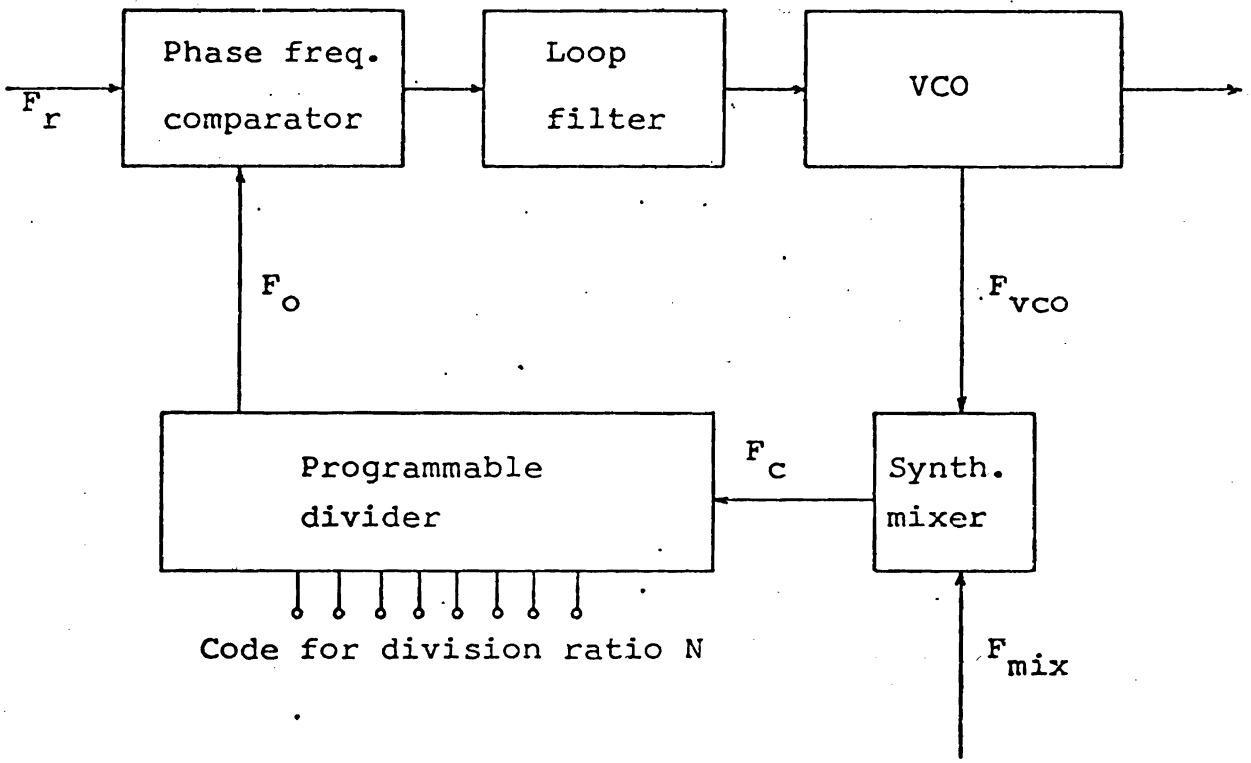

Fig. 3 Synthesizer loop

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 and the phase difference is zero. $F_o = F_r$ (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 (Fig. 4)

Synthesizer and VCXO (80090-2E2)

The synthesizer oscillator Q 1 and Q 2 with crystal X 1 produces the reference frequency for the programmable divider. The crystal frequency is about 20 MHz and the tuned circuits L 1 and L 3 are tuned to 4 x 20 = 80 MHz which is fed to the mixer Q 3. The VCO signal goes through the dual gate MOS-transistor Q 5 which gives high backward isolation but no amplification. Reaching the base of Q 3 the VCO signal is mixed with the sixth harmonic of the 80 MHz to give an output signal of 3,2 - 5,2 MHz. This signal is fed through a low pass filter and after amplification in Q 4 it reaches the input of the programmable divider in IC 1. The division ratio N is the binary number on the nine code lines. The numbers on the code lines correspond to the binary value of each line. The 256 code line can be set by a strap on the print board, and the other 8 code lines can be set from the frontsection.

The 12,5, 2o or 25 kHz reference frequency is made by the build in oscillator in IC 1 and crystal X 2 which is 6,4 MHz for 12,5 and 25 kHz spacing and 5,12 MHz for 20 kHz spacing. A programmable divider can be set to divide by 256 or 512 to reach the desired frequency.

The output from the phasecomperator (pin 4 on IC 1) goes through the loopfilter formed by R 29, R 30 and C 42. The capacitor holds the charging voltage when the phase comparator is in three-state between the phase pulses which are very narrow when the loop is in lock. Diode D 2 is used to clamp the control voltage thus preventing too great VCO frequency excursions when the loop is out of lock.

A build-in lock detector in IC 1 gives negative going pulses on pin 28 when the lopp is out of lock. The collector of Q 6 goes high and remains high because of C 41. Q 7 goes low and blocks the TX-oscillator. When the loop goes in lock the pulses disappears, Q 6 and Q 7 goes of and disables the Tx blocking.

The TX oscillator is formed by Q 8, Q 9 and crystal X 3. For simplex operation the necessary output frequency is 21,4 MHz. X3 is 10,7 MHz as the oscillator acts as a doubler.

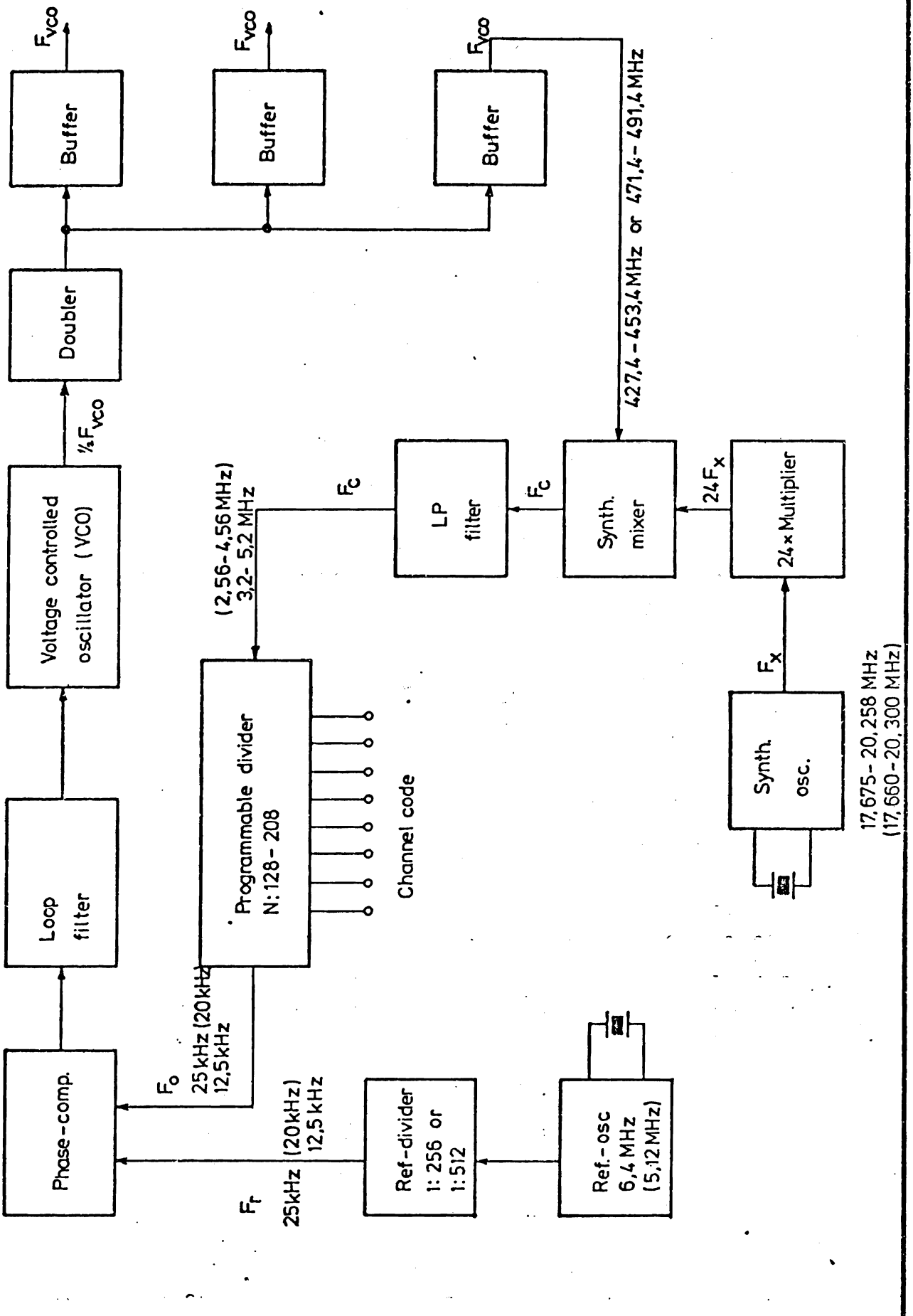

Fig. 4

Rettet:	Figure for synthesizer description, UHF 25 (20) 12,5 kHz	Tegn.: 2-6-77 AC	Kontr.:
		Page: 4	
	AP-RADIOTELEFON A/S	Tegn. nr.: 80140-4E2	

At the same time the oscillator is modulated by the tuning diode D 4. IC 2 acts as an amplifier and voltage doubler to get enough modulation voltage for the tuning diode. The frequency can be adjusted by L 5.

Voltage controlled oscillator (80075-3E2)

The oscillator consists of Q 1, tuned by C1 which is transformed into an inductor by help of a quarter wave transmission-line, and the varicap. diodes D 1 and D 2. The varicap. voltage is controlled by the synthesizer.
The oscillator is buffered by the wideband stage Q 2 which is followed by a balanced wideband doubler stage Q 3 and Q 4.
The output stage Q 5 provides 1 mW on pin 3.
The output stage Q 6 provides 0,5 mW on pin 4.
The output stage Q 7 provides 4 mW on pin 5.
The VCO frequency range tuned by C 1 goes from 390 to 530 MHz.
For lower frequencies a parallel capacitor 8,2 pF is mounted.

Channel code

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

$$F_{VCO} = 24\ F_x + N \times 0{,}025\ (0{,}020)\ \text{MHz where } 128 \leq N \leq 208.$$

The VCO frequency $F_m = 24\ F_x + N\ 0{,}025\ (0{,}020) - 21{,}4$ MHz (5)
Here N is the division ratio and F_x is the synthesizer mixer crystal. F_x is found from the drawings 75499-4E2, 75500-4E2 and 76312-4E2. For a single channel set you can choose between two standard crystals beeing equally good. Considering a multichannel set, in most cases only one standard crystal will fit the desired frequency range.

1. Computation examble of the receiver frequency for 25 kHz set:

Known is: Crystal frequency F_x and channel code.

Examble: F_x = 19,675 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

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

Examble: F_x = 19,675 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 syntehsizer oscillator circuit, it has been necessary to specify the crystal X 1 with a parallel capacity of 15 pF. If you use a crystal specified with 30 pF parallel capacity, the frequency should be about 250 ppm lower than the standard frequency given on the drawings 75499-4E2, 75500-4E2 and 76321-4E2.
Exactly the same procedure is used when the set is intended for 20 kHz channel spacing.
The synthesizer mixer X-tal for 20 kHz spacing is found on the drawing: 77105-4E2, 77106-4E2, 77107-4E2, 77194-4E2, 77195-4E2 and 77196-4E2.

Channel code for 12,5 kHz set

The division ratio $N = \frac{F_{Rx} - 24\ F_x + 21,4}{0,0125}$

Examble: F_x = 19,675 MHz, F_{Rx} = 455,625 MHz

$$N = \frac{455,625 - 24 \times 19,625 + 21,4}{0,0125} = 386$$

$N = (256) + 128 + 0 + 0 + 0 + 0 + 0 + 2 + 0$

Channel code 1 1 0 0 0 0 0 1 0

Crystal frequencies for 12,5 kHz spacing is found in drawings:

DIVISION RATIO AND CHANNELCODE

20 and 25 kHz channel spacing

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

Bit number	8	7	6	5	4	3	2	1
Value of each bit	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

DIVISION RATIO AND CHANNELCODE

12,5 kHz channel spacing

The division ratio N corresponds to the 9 - bit channel code in this way.

Bit number	9	8	7	6	5	4	3	2	1
Value of each bit	256	128	64	32	16	8	4	2	1
Example: channel code=	1	0	1	0	0	0	0	0	1
N = 321	256	+ 0	+64	+ 0	+ 0+	0+	0+	0+	1

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

Div. ratio	Channel code								
N	256	128	64	32	16	8	4	2	1
256	1	0	0	0	0	0	0	0	0
257	1	0	0	0	0	0	0	0	1
258	1	0	0	0	0	0	0	1	0
259	1	0	0	0	0	0	0	1	1
260	1	0	0	0	0	0	1	0	0
261	1	0	0	0	0	0	1	0	1
262	1	0	0	0	0	0	1	1	0
263	1	0	0	0	0	0	1	1	1
264	1	0	0	0	0	1	0	0	0
265	1	0	0	0	0	1	0	0	1
266	1	0	0	0	0	1	0	1	0
267	1	0	0	0	0	1	0	1	1
268	1	0	0	0	0	1	1	0	0
269	1	0	0	0	0	1	1	0	1
270	1	0	0	0	0	1	1	1	0
271	1	0	0	0	0	1	1	1	1
272	1	0	0	0	1	0	0	0	0
273	1	0	0	0	1	0	0	0	1
274	1	0	0	0	1	0	0	1	0
275	1	0	0	0	1	0	0	1	1
276	1	0	0	0	1	0	1	0	0
277	1	0	0	0	1	0	1	0	1
278	1	0	0	0	1	0	1	1	0
279	1	0	0	0	1	0	1	1	1
280	1	0	0	0	1	1	0	0	0
281	1	0	0	0	1	1	0	0	1
282	1	0	0	0	1	1	0	1	0
283	1	0	0	0	1	1	0	1	1
284	1	0	0	0	1	1	1	0	0
285	1	0	0	0	1	1	1	0	1
286	1	0	0	0	1	1	1	1	0
287	1	0	0	0	1	1	1	1	1
288	1	0	0	1	0	0	0	0	0
289	1	0	0	1	0	0	0	0	1
290	1	0	0	1	0	0	0	1	0
291	1	0	0	1	0	0	0	1	1
292	1	0	0	1	0	0	1	0	0
293	1	0	0	1	0	0	1	0	1
294	1	0	0	1	0	0	1	1	0
295	1	0	0	1	0	0	1	1	1

Div. ratio	Channel code								
N	256	128	64	32	16	8	4	2	1
296	1	0	0	1	0	1	0	0	0
297	1	0	0	1	0	1	0	0	1
298	1	0	0	1	0	1	0	1	0
299	1	0	0	1	0	1	0	1	1
300	1	0	0	1	0	1	1	0	0
301	1	0	0	1	0	1	1	0	1
302	1	0	0	1	0	1	1	1	0
303	1	0	0	1	0	1	1	1	1
304	1	0	0	1	1	0	0	0	0
305	1	0	0	1	1	0	0	0	1
306	1	0	0	1	1	0	0	1	0
307	1	0	0	1	1	0	0	1	1
308	1	0	0	1	1	0	1	0	0
309	1	0	0	1	1	0	1	0	1
310	1	0	0	1	1	0	1	1	0
311	1	0	0	1	1	0	1	1	1
312	1	0	0	1	1	1	0	0	0
313	1	0	0	1	1	1	0	0	1
314	1	0	0	1	1	1	0	1	0
315	1	0	0	1	1	1	0	1	1
316	1	0	0	1	1	1	1	0	0
317	1	0	0	1	1	1	1	0	1
318	1	0	0	1	1	1	1	1	0
319	1	0	0	1	1	1	1	1	1
320	1	0	1	0	0	0	0	0	0
321	1	0	1	0	0	0	0	0	1
322	1	0	1	0	0	0	0	1	0
323	1	0	1	0	0	0	0	1	1
324	1	0	1	0	0	0	1	0	0
325	1	0	1	0	0	0	1	0	1
326	1	0	1	0	0	0	1	1	0
327	1	0	1	0	0	0	1	1	1
328	1	0	1	0	0	1	0	0	0
329	1	0	1	0	0	1	0	0	1
330	1	0	1	0	0	1	0	1	0
331	1	0	1	0	0	1	0	1	1
332	1	0	1	0	0	1	1	0	0
333	1	0	1	0	0	1	1	0	1
334	1	0	1	0	0	1	1	1	0
335	1	0	1	0	0	1	1	1	1
336	1	0	1	0	1	0	0	0	0

Div. ratio	Channel code								
N	256	128	64	32	16	8	4	2	1
337	1	0	1	0	1	0	0	0	1
338	1	0	1	0	1	0	0	1	0
339	1	0	1	0	1	0	0	1	1
340	1	0	1	0	1	0	1	0	0
341	1	0	1	0	1	0	1	0	1
342	1	0	1	0	1	0	1	1	0
343	1	0	1	0	1	0	1	1	1
344	1	0	1	0	1	1	0	0	0
345	1	0	1	0	1	1	0	0	1
346	1	0	1	0	1	1	0	1	0
347	1	0	1	0	1	1	0	1	1
348	1	0	1	0	1	1	1	0	0
349	1	0	1	0	1	1	1	0	1
350	1	0	1	0	1	1	1	1	0
351	1	0	1	0	1	1	1	1	1
352	1	0	1	1	0	0	0	0	0
353	1	0	1	1	0	0	0	0	1
354	1	0	1	1	0	0	0	1	0
355	1	0	1	1	0	0	0	1	1
356	1	0	1	1	0	0	1	0	0
357	1	0	1	1	0	0	1	0	1
358	1	0	1	1	0	0	1	1	0
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360	1	0	1	1	0	1	0	0	0
361	1	0	1	1	0	1	0	0	1
362	1	0	1	1	0	1	0	1	0
363	1	0	1	1	0	1	0	1	1
364	1	0	1	1	0	1	1	0	0
365	1	0	1	1	0	1	1	0	1
366	1	0	1	1	0	1	1	1	0
367	1	0	1	1	0	1	1	1	1
368	1	0	1	1	1	0	0	0	0
369	1	0	1	1	1	0	0	0	1
370	1	0	1	1	1	0	0	1	0
371	1	0	1	1	1	0	0	1	1
372	1	0	1	1	1	0	1	0	0
373	1	0	1	1	1	0	1	0	1
374	1	0	1	1	1	0	1	1	0
375	1	0	1	1	1	0	1	1	1
376	1	0	1	1	1	1	0	0	0
377	1	0	1	1	1	1	0	0	1

Div. ratio	Channel code								
N	256	128	64	32	16	8	4	2	1
378	1	0	1	1	1	1	0	1	0
379	1	0	1	1	1	1	0	1	1
380	1	0	1	1	1	1	1	0	0
381	1	0	1	1	1	1	1	0	1
382	1	0	1	1	1	1	1	1	0
383	1	0	1	1	1	1	1	1	1
384	1	1	0	0	0	0	0	0	0
385	1	1	0	0	0	0	0	0	1
386	1	1	0	0	0	0	0	1	0
387	1	1	0	0	0	0	0	1	1
388	1	1	0	0	0	0	1	0	0
389	1	1	0	0	0	0	1	0	1
390	1	1	0	0	0	0	1	1	0
391	1	1	0	0	0	0	1	1	1
392	1	1	0	0	0	1	0	0	0
393	1	1	0	0	0	1	0	0	1
394	1	1	0	0	0	1	0	1	0
395	1	1	0	0	0	1	0	1	1
396	1	1	0	0	0	1	1	0	0
397	1	1	0	0	0	1	1	0	1
398	1	1	0	0	0	1	1	1	0
399	1	1	0	0	0	1	1	1	1
400	1	1	0	0	1	0	0	0	0
401	1	1	0	0	1	0	0	0	1
402	1	1	0	0	1	0	0	1	0
403	1	1	0	0	1	0	0	1	1
404	1	1	0	0	1	0	1	0	0
405	1	1	0	0	1	0	1	0	1
406	1	1	0	0	1	0	1	1	0
407	1	1	0	0	1	0	1	1	1
408	1	1	0	0	1	1	0	0	0
409	1	1	0	0	1	1	0	0	1
410	1	1	0	0	1	1	0	1	0
411	1	1	0	0	1	1	0	1	1
412	1	1	0	0	1	1	1	0	0
413	1	1	0	0	1	1	1	0	1
414	1	1	0	0	1	1	1	1	0
415	1	1	0	0	1	1	1	1	1
416	1	1	0	1	0	0	0	0	0

Rettet: 15-2-77 NC

AP-RADIOTELEFON A/S

Standard crystals for AP 2000 low UHF band low range: 1 for channel ending with 00, 25, 50, 75 kHz

Tegn. nr.: 75499-4E2

Tegn.: 30-10-75 EH

Kontr.: 30-10-75 CHB

Stykl. nr.:

25 kHz Channel spacing

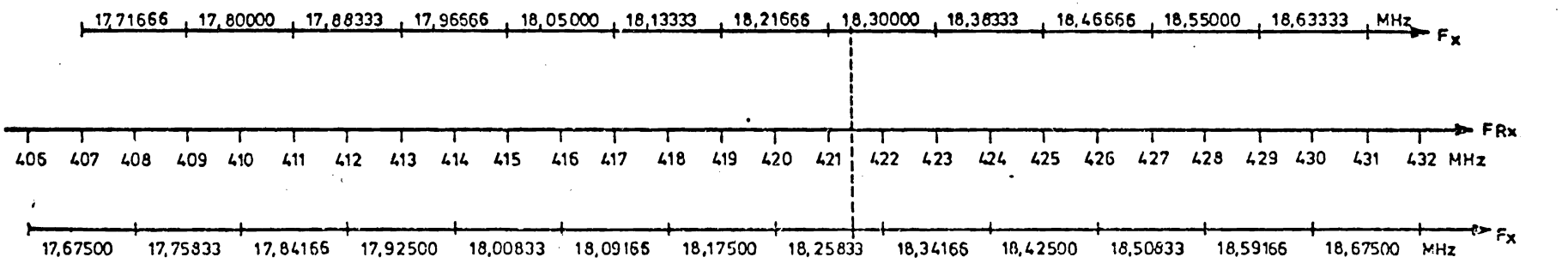
SPECIFICATION
for Quartz Crystal Unit
AP 25

Mode of operation: F_{Rx} higher than or equal to F_{Tx}

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

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

Example:
Known receiver freq. = 421,375 MHz
Found from the table F_x = 18,25833 MHz
Claculated N = 183,0032 as N is an integer the decimal places are deleted so N = 183.



SPECIFICATION
for Quartz Crystal Unit
AP 22

Transmitter mixer oscillator

1.	Mode of operation	:	AT-Fundamental
2.	Holder	:	HC-42/U
3.	Frequency range	:	10-22 MHz
4.	Resonance	:	Parallel (30 pF)
5.	Calibration tolerance	:	± 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

Rettet: 15-2-77 NC

AP-RADIOTELEFON A/S

Standard crystals for AP 2000
UHF band, medium range: 2. For channels ending with 00, 25, 50, 75 khz

25 kHz Channel spacing

Tegn.: 27-10-76 AC
Kontr.: 27-10-76 CHR
Stykl. nr.:
Tegn. nr.: 76312-4E2

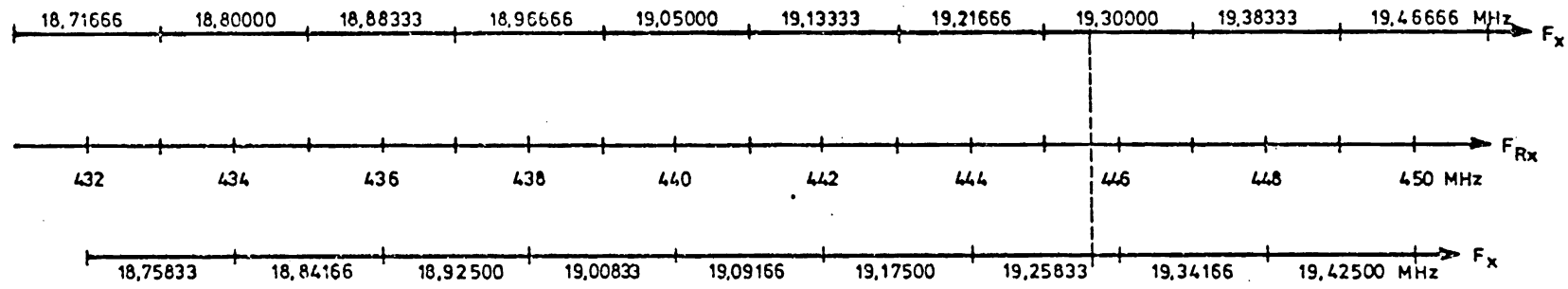
SPECIFICATION
for Quartz Crystal Unit
AP 25

Mode of operation: F_{Rx} higher than or equal to F_{Tx}

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

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

Example:
Known receiver freq. = 445,650 MHz
Found from the table F_x = 19,25833 MHz
Calculated N = 194,0032 as N is an integer the decimal places are deleted so N = 194.



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

Rettet: 22-2-77 NC
15-2-77 NC

AP-RADIOTELEFON A/S

Standard crystals for AP2000
UHF band, high range: 3. For channels ending with 00, 25, 50, 75 kHz

25kHz Channel spacing

Tegn.: 30-10-75 EH
Kontr.: 30-10-75 CHB
Stykl. nr.:
Tegn. nr.: 75500-4E2

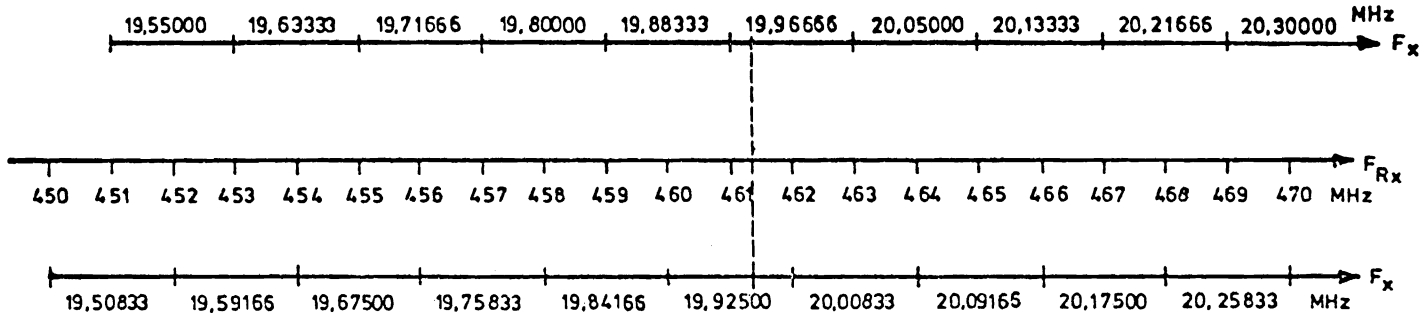
Mode of operation: F_{Rx} higher than or equal to F_{Tx}

SPECIFICATION
for Quartz Crystal Unit
AP 25

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

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

Example:
Known receiver freq. = 461,325 MHz
Found from the table F_x = 19,96666 MHz
Calculated N = 141,0064 as N is an integer the decimal places are deleted so N = 141.



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

Rettet: 15-2-77 NC

AP-RADIOTELEFON A/S

Standard crystals for AP2000 UHF band low range: 1 for channels ending with 00,20,40,60,80 kHz

20kHz Channel spacing

Tegn.: 3-2-77 AC

Kontr.: CHB

Stykl. nr.:

Tegn. nr.: 77105-4E2

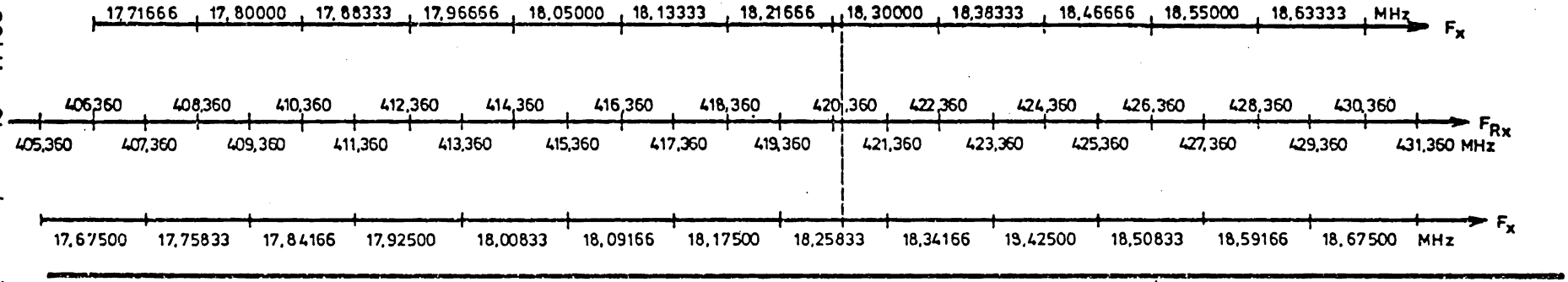
SPECIFICATION
for Quartz Crystal Unit
AP 25

Mode of operation: F_{Rx} higher than or equal to F_{Tx}

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

Division ratio $N = \frac{F_{Rx} + 21,4 - 24\ F_x}{0,020}$

Example:
Known receiver freq. = 420,460 MHz
Found from the table F_x = 18,25833 MHz
Calculated N = 183,004 as N is an integer the decimal places are deleted so N = 183.



SPECIFICATION
for Quartz Crystal Unit
AP 22

Transmitter mixer oscillator

1.	Mode of operation	: AT-Fundamental
2.	Holder	: HC-42/U
3.	Frequency range	: 10-22 MHz
4.	Resonance	: Parallel (30 pF)
5.	Calibration tolerance	: ± 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

Rettet:

AP-RADIOTELEFON A/S

Standard crystals for AP2000 UHF band low range: 1 for channels ending with 10,30,50,70,90, kHz

20kHz Channel spacing

Tegn.: 13-5-77 HJ

Kontr.:

Stykl. nr.:

Tegn. nr.: 77196-4E2

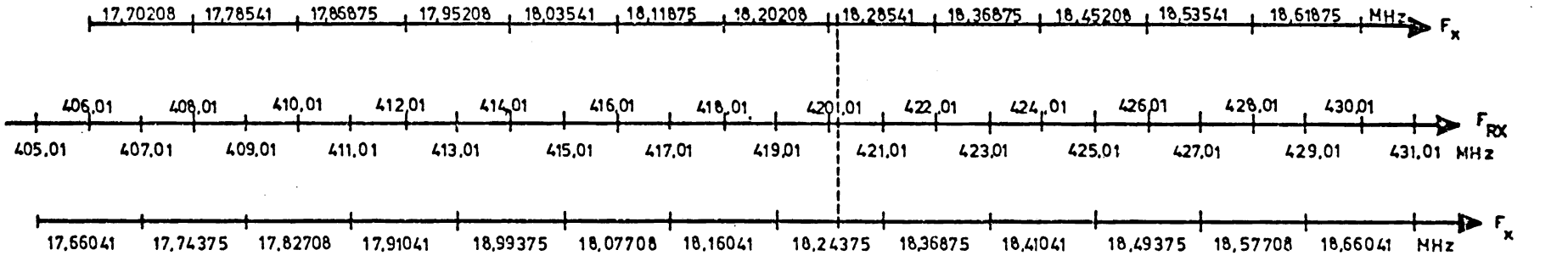
SPECIFICATION for Quartz Crystal Unit AP 25

Mode of operation: F_{Rx} higher than or equal to F_{Tx}

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

Division ratio $N = \frac{F_{Rx} + 21,4 - 24\ F_x}{0,020}$

Example:
Known receiver freq. = 420,460 MHz
Found from the table F_x = 18,25833 MHz
Calculated N = 183,004 as N is an integer the decimal places are deleted so N = 183.



SPECIFICATION for Quartz Crystal Unit AP 22

Transmitter mixer oscillator

1.	Mode of operation	: AT-Fundamental
2.	Holder	: HC-42/U
3.	Frequency range	: 10-22 MHz
4.	Resonance	: Parallel (30 pF)
5.	Calibration tolerance	: ± 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

Rettet: 15-2-77 NC

AP-RADIOTELEFON A/S

Standard crystals for AP2000 UHF band medium range: 2 for channels ending with 00,20,40,60,80 kHz

20 kHz Channel spacing

Tegn.: 7-2-77 AC

Kontr.: CHB

Stykl. nr.:

Tegn. nr.: 77106 - 4E2

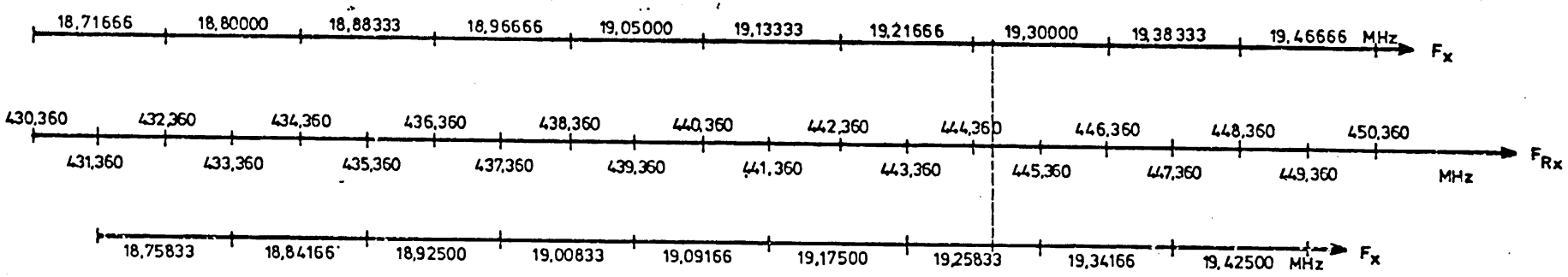
SPECIFICATION
for Quartz Crystal Unit
AP 25

Mode of operation: F_{Rx} higher than or equal to F_{Tx}

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

Division ratio $N = \frac{F_{Rx} + 21,4 - 24\ F_x}{0,020}$

Example:
Known receiver freq. = 444,680 MHz
Found from the table F_x = 19,25833 MHz
Calculated N = 194,004 as N is an integer
the decimal places are deleted so N = 194.



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

Rettet:

AP-RADIOTELEFON A/S

Standard crystals for AP2000 UHF band medium range: 2 for channels ending with 10,30,50,70,90 kHz

20 kHz Channel spacing

Tegn.: 13-5-77 H.J.

Stykl. nr.:

Kontr.:

Tegn. nr.: 77195-4E2

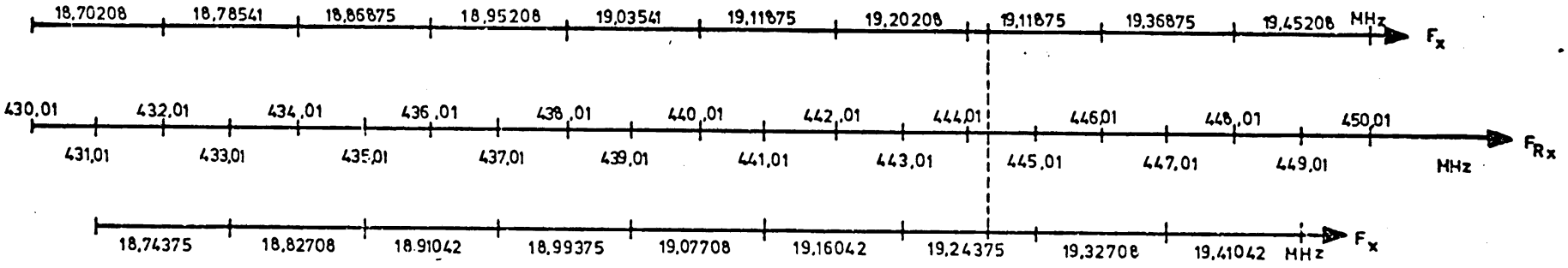
SPECIFICATION
for Quartz Crystal Unit
AP 25

Mode of operation: F_{Rx} higher than or equal to F_{Tx}

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

Division ratio $N = \frac{F_{Rx} + 21,4 - 24 F_x}{0,020}$

Example:
Known receiver freq. = 444,680 MHz
Found from the table F_x = 19,25833 MHz
Calculated N = 194,004 as N is an integer the decimal places are deleted so N = 194.



SPECIFICATION
for Quartz Crystal Unit
AP 22

Transmitter mixer oscillator

1.	Mode of operation	: AT-Fundamental
2.	Holder	: HC-42/U
3.	Frequency range	: 10-22 MHz
4.	Resonance	: Parallel (30 pF)
5.	Calibration tolerance	: ± 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

Rettet: 15-2-77 NC

AP-RADIOTELEFON A/S

Standard crystals for AP2000 UHF-band high range: 3 for channels ending with 00,20,40,60,80 kHz

20kHz Channel spacing

Tegn.: 7-2-77 AC

Kontr.: CHB

Stykl. nr.:

Tegn. nr.: 77107-4E2

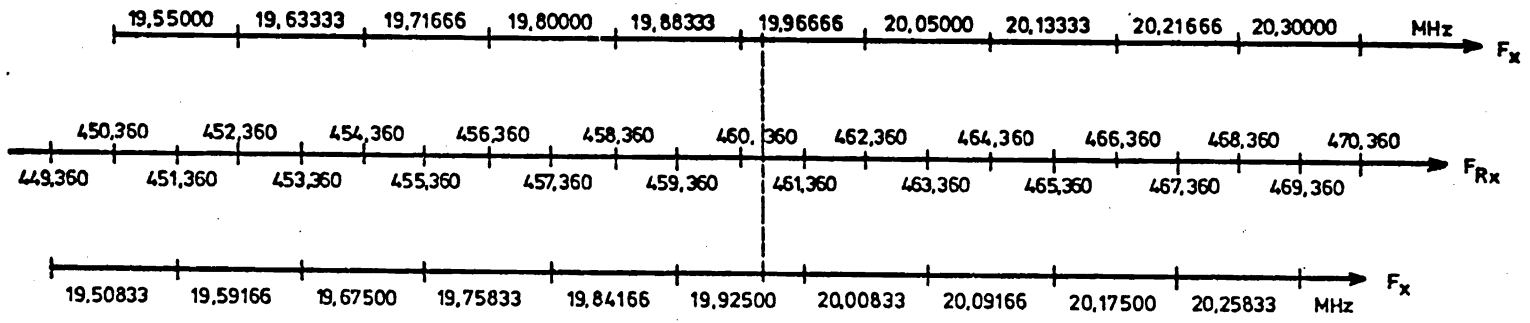
Mode of operation: F_{Rx} higher than or equal to F_{Tx}

SPECIFICATION
for Quartz Crystal Unit
AP 25

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

Division ratio $N = \frac{F_{Rx} + 21,4 - 24\ F_x}{0,020}$

Example:
Known receiver freq. = 460,620 MHz
Found from the table F_x = 19,96666 MHz
Calculated N = 141,008 as N is an integer
the decimal places are deleted so N = 141.



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

Rettet: 26-6-78 LT/AC

AP-RADIOTELEFON A/S

Standard crystals for AP 2000 UHF-band high range: 3 for channels ending with 10,30,50,70,90 kHz

20kHz Channel spacing

Tegn.: 13-5-77 HJ

Kontr.:

Tegn. nr.: 77194-4E 2

Styk. nr.:

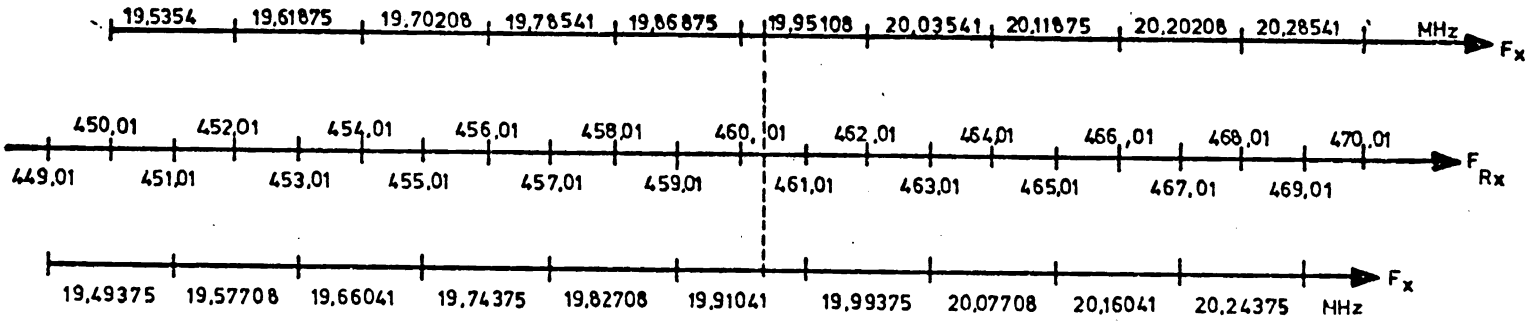
Mode of operation: F_{Rx} higher than or equal to F_{Tx}

SPECIFICATION
for Quartz Crystal Unit
AP 25

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

Division ratio $N = \frac{F_{Rx} + 21,4 - 24\ F_x}{0,020}$

Example:
Known receiver freq. = 460,620 MHz
Found from the table F_x = 19,96666 MHz
Calculated N = 141,008 as N is an integer the decimal places are deleted so N = 141.



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

Rettet:

AP-RADIOTELEFON A/S

Standard crystals for AP2000 low UHF band
low range: 1

12,5kHz Channel spacing

Tegn.: 23-10-80 AMC | Kontr.:

Stykl. nr.:

Tegn. nr.: 80142-4E2

SPECIFICATION
for Quartz Crystal Unit
AP 25

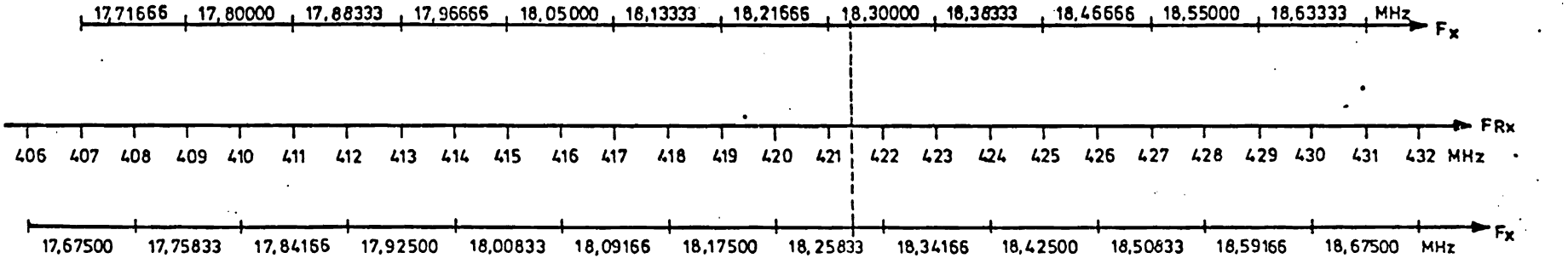
Mode of operation: F_{Rx} higher than or equal to F_{Tx}

1.	Mode of operation	: AT-Fundamental
2.	Holder	: HC-42/U
3.	Frequency range	: 10-22 MHz
4.	Resonance	: Parallel (15 pF)
5.	Calibration tolerance	: ± 10 ppm at 25°C
6.	Temperature tolerance	: ± 5 ppm ⅔ 20°C to + 70°C
7.	Drive level	: 1 mW
8.	Equivalent series resistance	: Max. 40 Ω
9.	Marking	: AP 25 frequency in MHz

Division ratio $N = \frac{F_{Rx} + 21,4 - 24\ F_x}{0,0125}$

Examble:

Known receiver freq. = 421,375 MHz
Found from the table F_x = 18,25833 MHz
Calculated N = 366,0064 as N is an integer
the decimal places are deleted so N = 366.



SPECIFICATION
for Quartz Crystal Unit
AP 22

Transmitter mixer oscillator

1.	Mode of operation	: AT-Fundamental
2.	Holder	: HC-42/U
3.	Frequency range	: 10-22 MHz
4.	Resonance	: Parallel (30 pF)
5.	Calibration tolerance	: ± 15 ppm at 25°C
6.	Temperature tolerance	: ± 10 ppm ⅔ 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

Rettet:

AP-RADIOTELEFON A/S

Standard crystals for AP 2000
UHF band, medium range: 2.

12,5 kHz Channel spacing

Tegn.: 23-10-80 AMC | Kontr.:

Stykl. nr.:

Tegn. nr.: 80143-4E2

SPECIFICATION
for Quartz Crystal Unit
AP 25

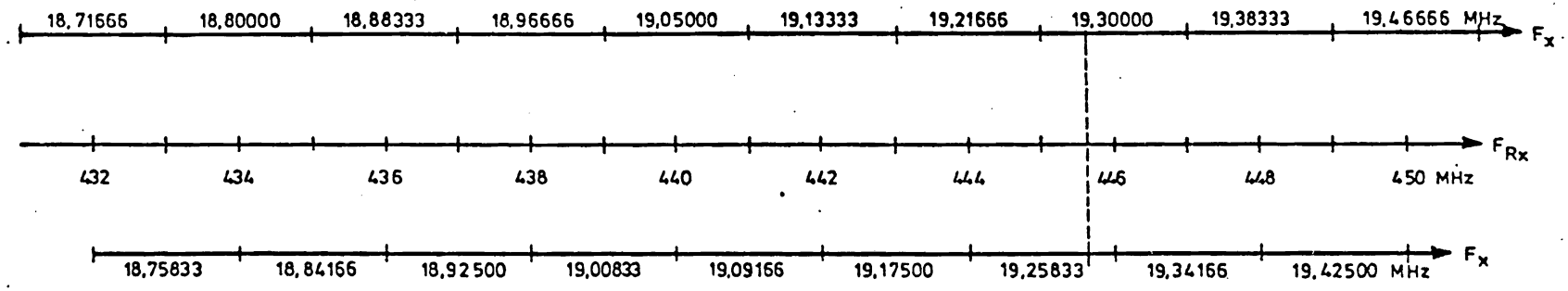
Mode of operation: F_{Rx} higher than or equal to F_{Tx}

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

Division ratio $N = \frac{F_{Rx} + 21,4 - 24\ F_x}{0,0125}$

Examble:

Known receiver freq. = 461,325 MHz
Found from the table F_x = 19,96666 MHz
Calculated N = 282,0128 as N is an integer
the decimal places are deleted so N = 282.



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

Rettet:

AP-RADIOTELEFON A/S

Standard crystals for AP2000
UHF band, high range: 3.

12,5 kHz Channel spacing

Tegn.: 23-10-80 AMC

Kontr.:

Stykl. nr.:

Tegn. nr.: 80144-4E2

Mode of operation: F_{Rx} higher than or equal to F_{Tx}

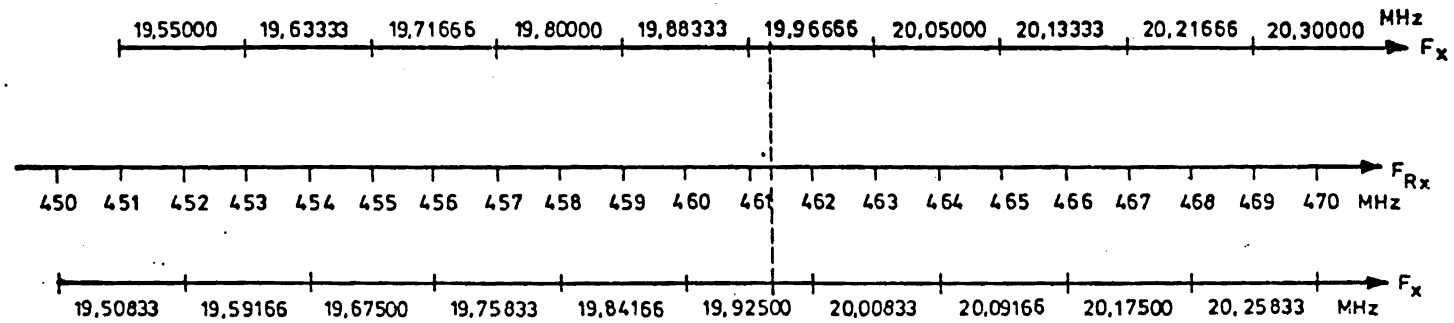
SPECIFICATION
for Quartz Crystal Unit
AP 25

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

Division ratio $N = \frac{F_{Rx} + 21,4 - 24\ F_x}{0,0125}$

Example:

Known receiver freq. = 455,650 MHz
Found from the table F_x = 19,25833 MHz
Calculated N = 388,0064 as N is an integer
the decimal places are delected so N = 388.



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

Tuning instruction for UHF

1. Tuning of the synthesizer circuit (print C 92)

Connect a high input resistance DC-voltmeter to TP 1. By tuning coils L 1 and L 3 to max., a reading of approx. 1,5 V should be obtained.

If the set contains more than one channel, turn channel selector to a channel with frequency in the middle of the used band. Check the channel code with a voltmeter at point 1, 2,....64, 128. Point 256 must be strapped low in 20 and 25 kHz sets. The strap is removed in 12,5 kHz sets. Check also the code for channel spacing. See drawing number 80090-2E2.

Turn C 27 (on print C 84) to minimum capacity. Connect a 500 Mhz counter to point 5 (on print C 84) and adjust C 1 (on print C 84) to about the right frequency (F_{Rx} + 21,4 MHz). Then adjust C 27 to max. DC at TP 1 (on print C 84).

Now connect a DC voltmeter to point 10 and key the transmitter. Turn C 1 slowly and when the loop is in lock the voltage on point 10 is high (approx. 3,5 V) and low otherwise.

When lock is achieved fine adjust C 1 to 3 V DC on point 7.

For multichannel sets turn the channel selector to lowest and highest frequency and check that the loop still goes in lock. The loop voltage have to lie between 2 and 4 V.

With the counter connected to point 3 adjust C 3 to get the exact frequency (F_{Rx} + 21,4 MHz).

Connect the counter to point 11 and key the transmitter. Adjust L 5 to get exact frequency of 2 x X 3.

22 Tuning of the receiver

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

Connect a 21,4 MHz sweep generator (a 10,7 MHz sweep generator normally contains sufficient second harmonics to be used on 21,4 MHz) to point TP 2 on the RF and mixer print board C 85 and the (DC) probe on point TP 1 on the print board B 01. adjust L 6 (print board C 85) and L 1 (print board B 01) for minimum ripple. L 2 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 amplifier print board C 79) and adjust L 4 in the IF to max. discriminator slope and the best linearity.

B. RF amplifier and mixer (print board C 85)

With the voltmeter on TP 1 the capacitors C 11 and C 12 are adjusted to max. deflection (approx 1,5 V DC). With the signal generator connected to the receiver input, C 1, L 2, L 3, L 4 and L 5 are now tuned to give optimum sensitivity.

C. AF-amplifier (print board C 79)

Adjust the output level for the handset earpiece to 60 mW with potmeter R 29 (3,5 kHz dev., 1 kHz mod.). IF Tx blocking of earpiece is wanted D 8 is mounted and point G and H connected. Point A and B are internal connected but can be separated for optional use. When point C and D are connected the earpiece ampl. is not depending on the volume control. This will happen if piont D and E are connected instead. In this case C 12 must be replaced by 68 pF and R 26 set to a value where the amplifier is not saturating.

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

Adjust C 11 and C 12 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. TX - VCXO (print board C 92)

Connect a counter to point 11 and adjust L 5 to obtain the exact frequency of 2 x X 3.

B. Tx-mixer and amplifier (print board C 86)

If X 3 > 10,7 MHz C 3 have to be removed. Tune L 1 to max. DC on TP 1 (approx. 1 V). Connect a wattmeter (50 Ω, 0,1 W range) to pin 4 and key the transmitter.

L 2, L 3 and L 4 is now adjusted to get max. DC on TP 3. Adjust L 5 to get max. reading on the wattmeter. Finally a slight tuning of L2, L 3, L 4 and L 5 should be done in order to get max. output power approx. 30-40 mW.

C. 6-10 W PA-stage (print board B 45)

Turn the power regulation potmeter R 1 counterclockwise to get the cutput power stabilization out of function. Connect a wattmeter(50 Ω, 10 W) to the test installation output and set the supply voltage to 12,0 V. Now tune C 2, C 5, C 6, C 10, C 11 C 15 and C 16 to max. output power.

Finally the tuning should be repeated once or twice in order to get the max. possible output power approx. 12 W. The potmeter R 1 on print board B 57 will adjust the output power for any desired value between 6-10 W.

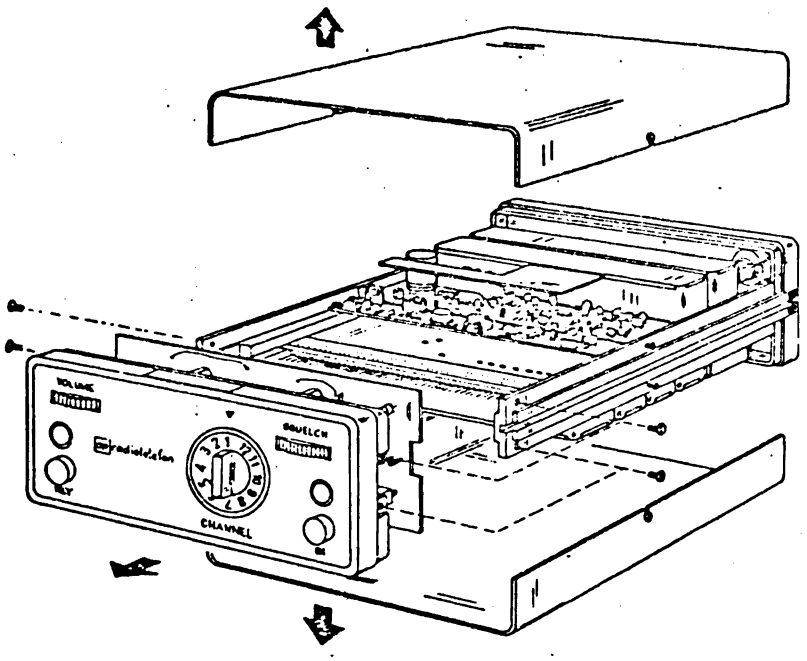
D. 10-25 W PA-stage (print board B 59 extern PA-stage)

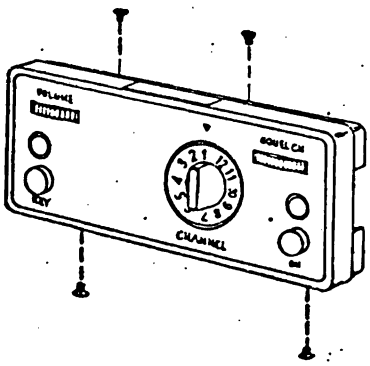
Push the radio into the power cassette, connect the wattmeter (50 Ω, 25 W) and adjust C 1, C 2, C 8 and C 9 to max. output power with a supply voltages of 12,0 V. In-crease the supply voltage to 13,6 V and turn the potmeter R 2 on print board B 59 clockwise until the power decreases to the desired value. Check the power regulation by varying the supply voltage from 10,8 V to 16,0 V. In the case of 25 W set, the output power may be a little less than 25 W at supply voltages below 13,2 V, but for voltages from 13,2 V and up the output power shall be held constantly on 25 W.

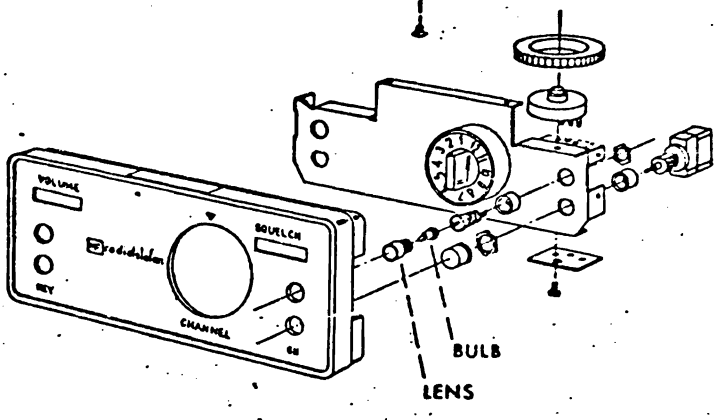
E. Modulation amplifier (print board C 61)

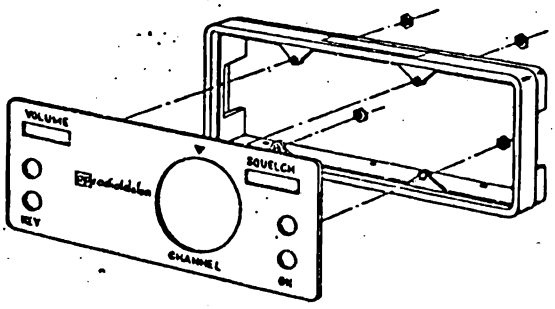
Connect a modulation meter to the transmitter and a low output impedance generator to the microphone input 1 (term. 1).
Set all three potentiometers to their centre posistions, and adjust the tonegenerator to give an output level of 40 mV at 1 kHz. Adjust potentiometer R 35 to give ± 5 kHz deviation on the modulation meter. Set the tonegenerator to 1 kHz, 4 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 equipped with a handset, R 35 adjusted to ± 5 kHz with an input level of 8 V at 1 kHz. When the generator is adjusted to give 1 kHz, 800 mV, R 5 is adjusted to give a deviation of ± 3 kHz.

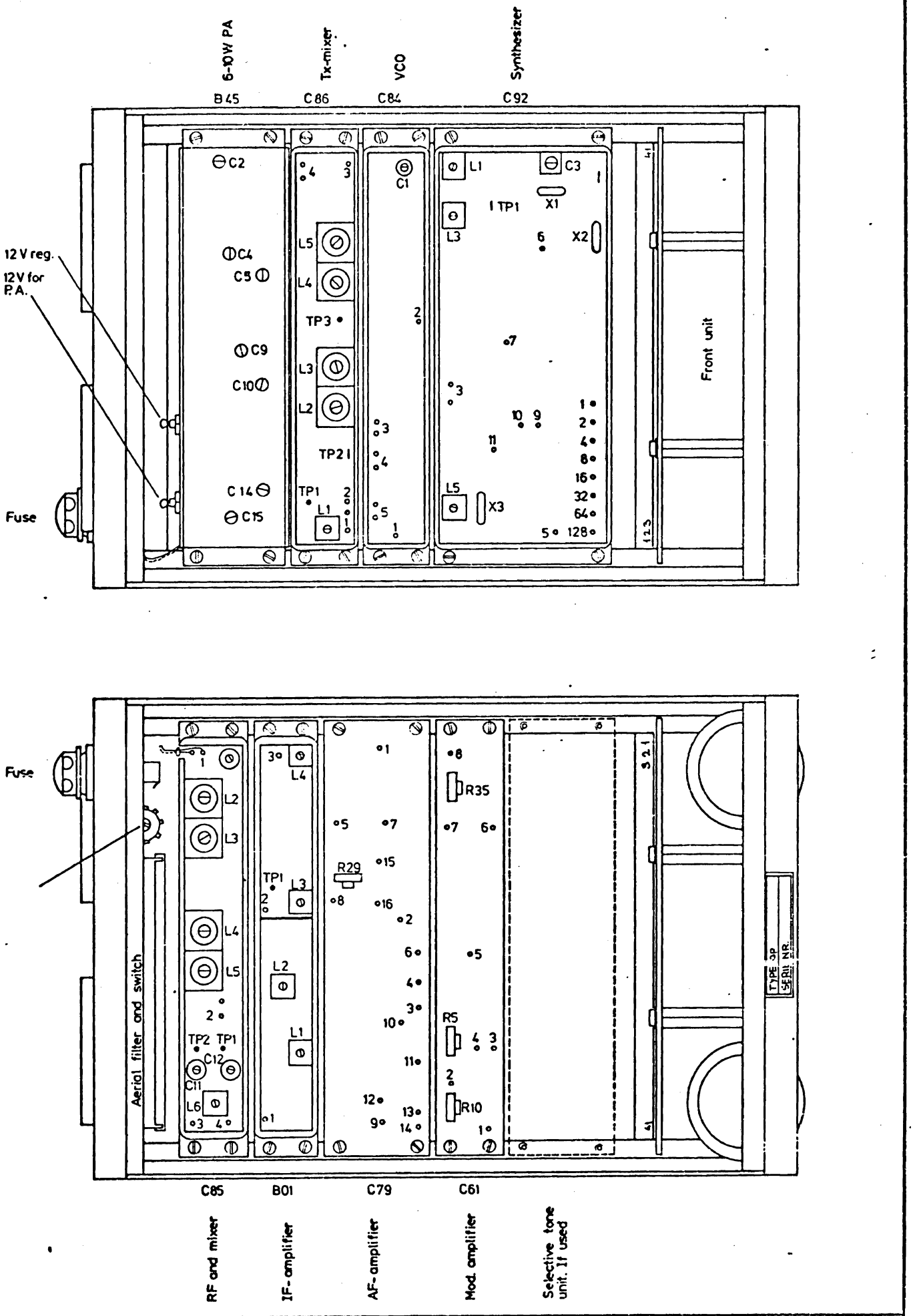




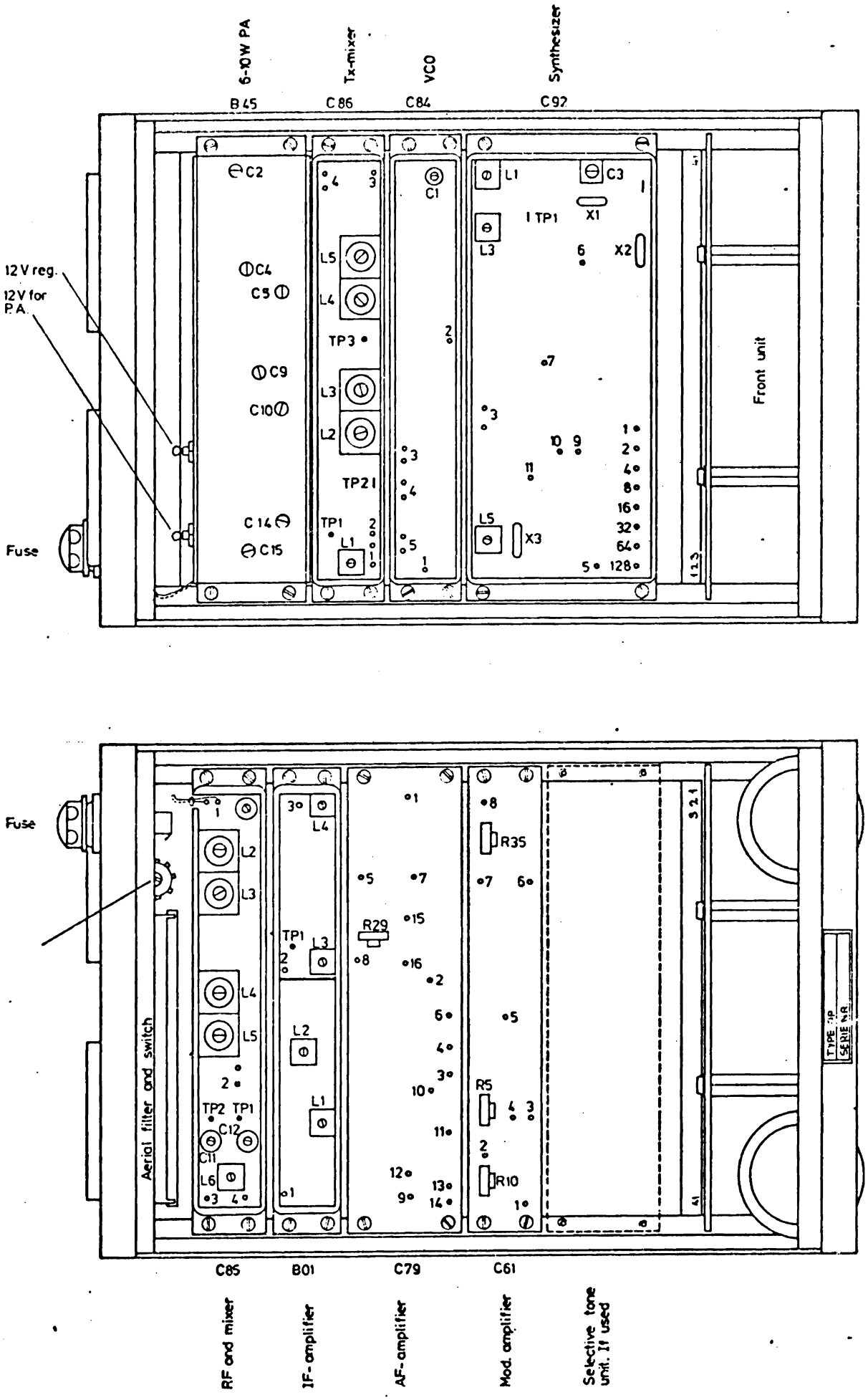




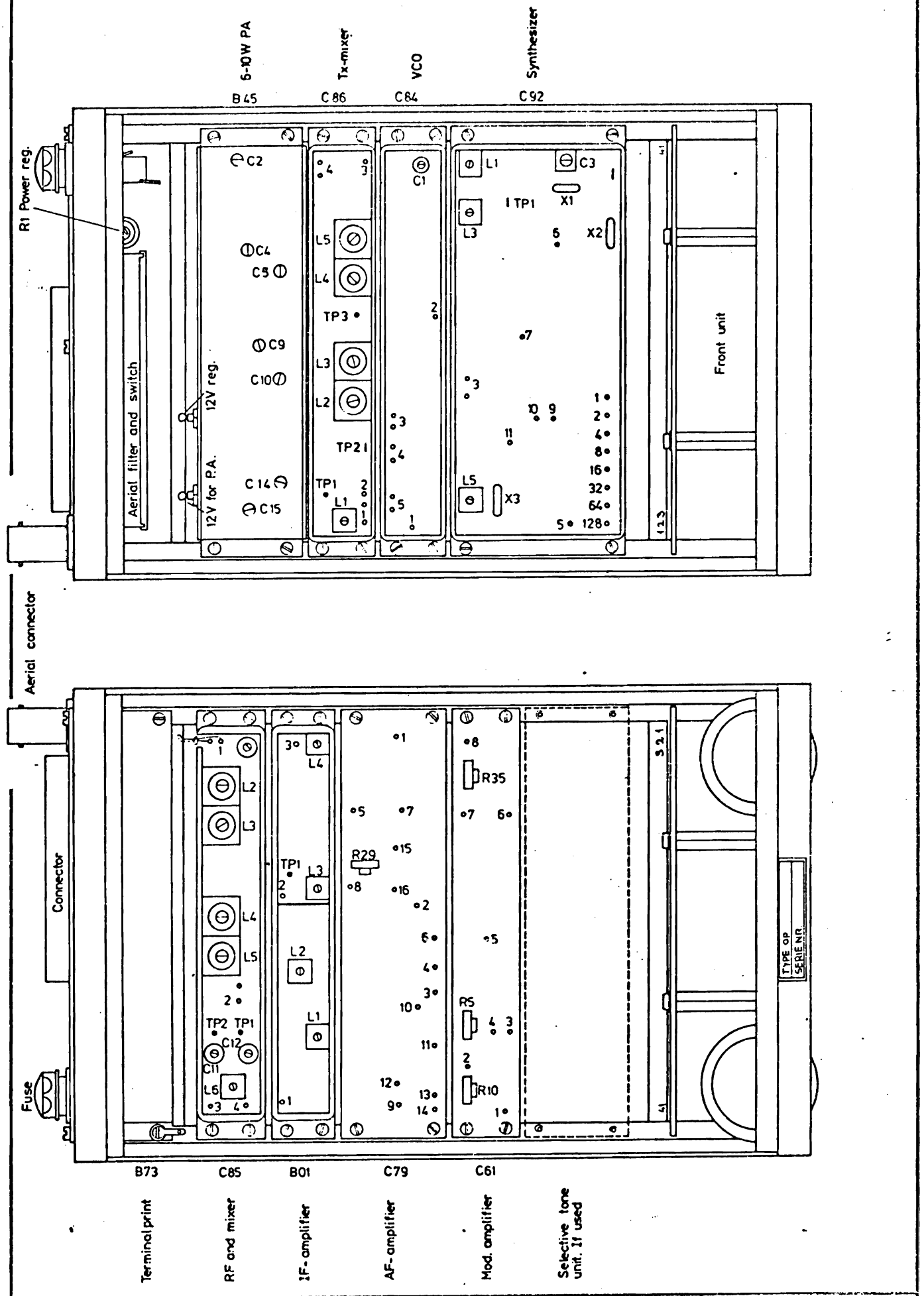
Rettet: 29-11-76 H.J.	Disassembling of AP 2000	Tegn.: 10-8-76 AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON ⅞	Tegn. nr.: 76218 - 4M2	



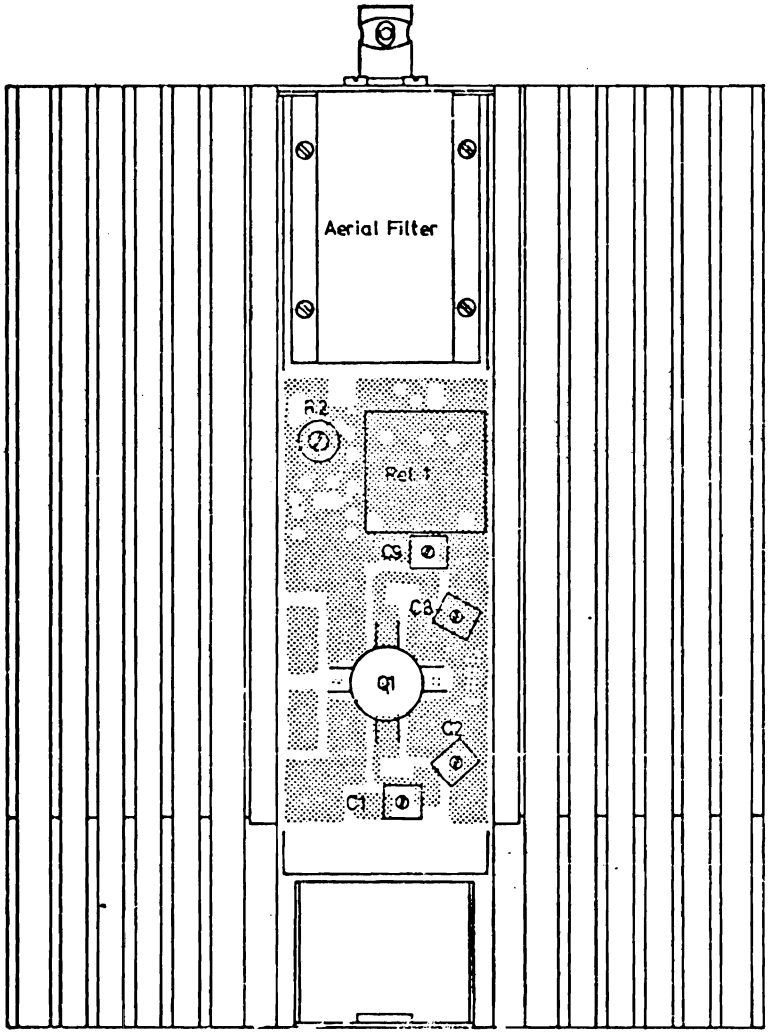
Rettet:	Interior view of AP 2000, 6-10 W UHF	Tegn.: 24-10-80 AMC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON	Tegn. nr.: 80137-3E2	



Rettet:	Interior view of AP 2000, 10-25 W, UHF (Ext. PA-stage not shown)	Tegn.: 27-10-80 AMC | Kontr.:
		Stykl. nr.:
	AP-RADIOTELEFON	Tegn. nr.: 80147-3E2



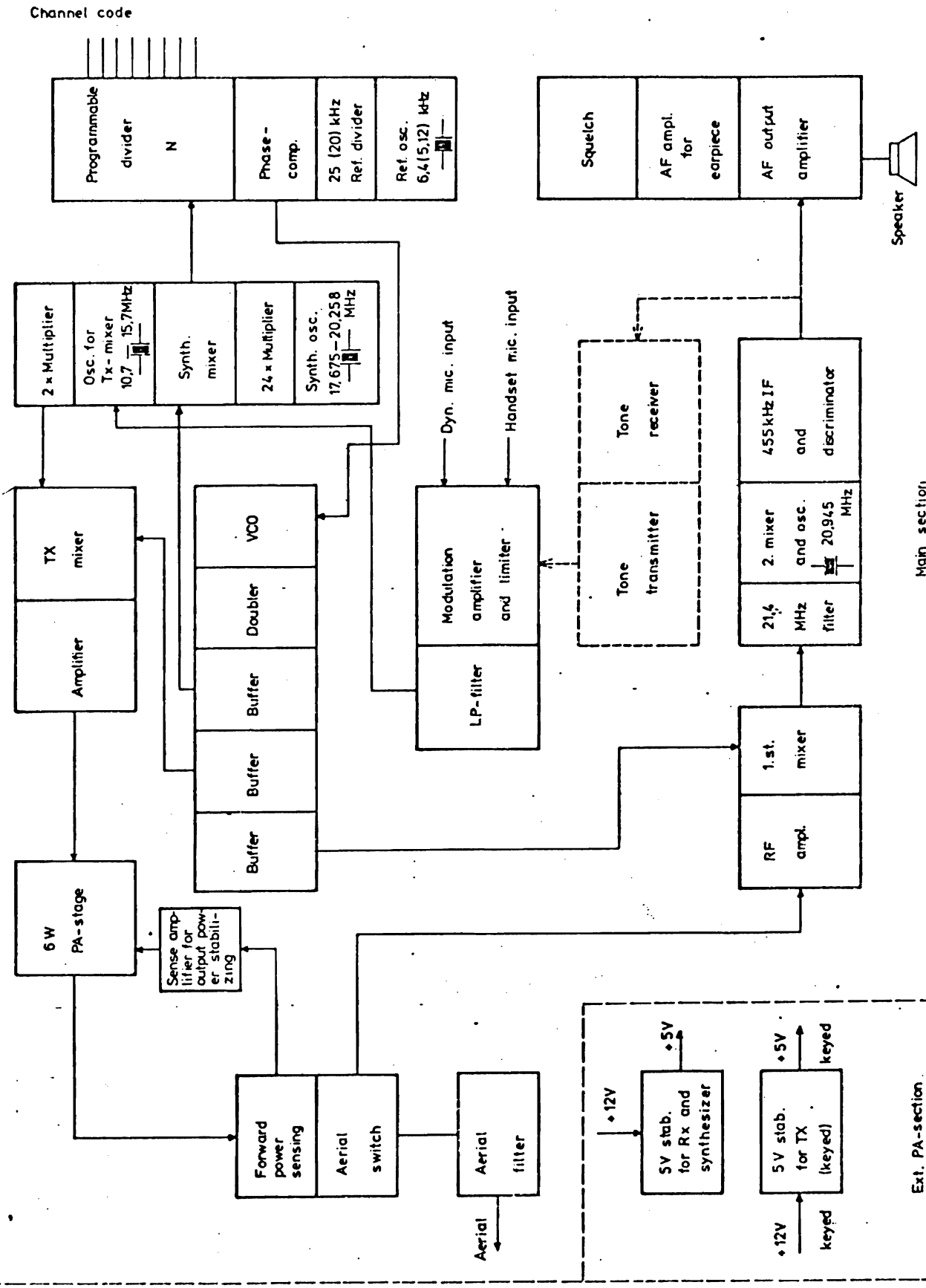
Rettet:	Interior view of AP 2000, 6-10 W UHF with print-connector	Tegn.: 28-10-80 AMC / Kontr.:
		Stykl. nr.:
	AP-RADIOTELEFON	Tegn. nr.: 80148-3E2



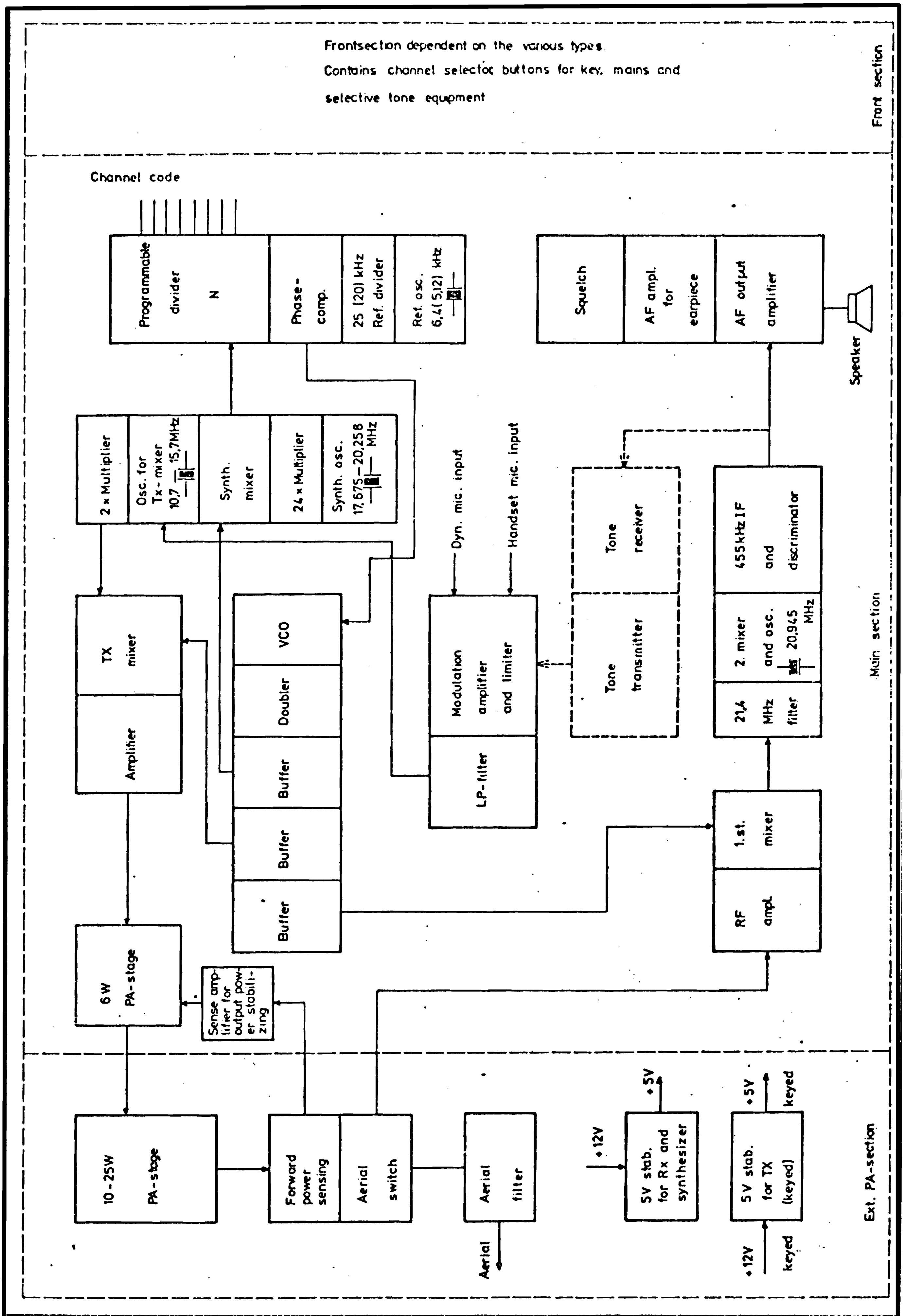
Rettet: 2-6-78 JS/AC	Interior view of UHF Ext. PA-stage	Tegn.: 12-4-76 NC	Kontr.: 12-4-76 CHB
		Stykl. nr.:	
	AP-RADIOTELEFON	Tegn. nr.:	76108-3E 2

Frontsection dependent on the various types
Contains channel selector buttons for key, mains and selective tone equipment.

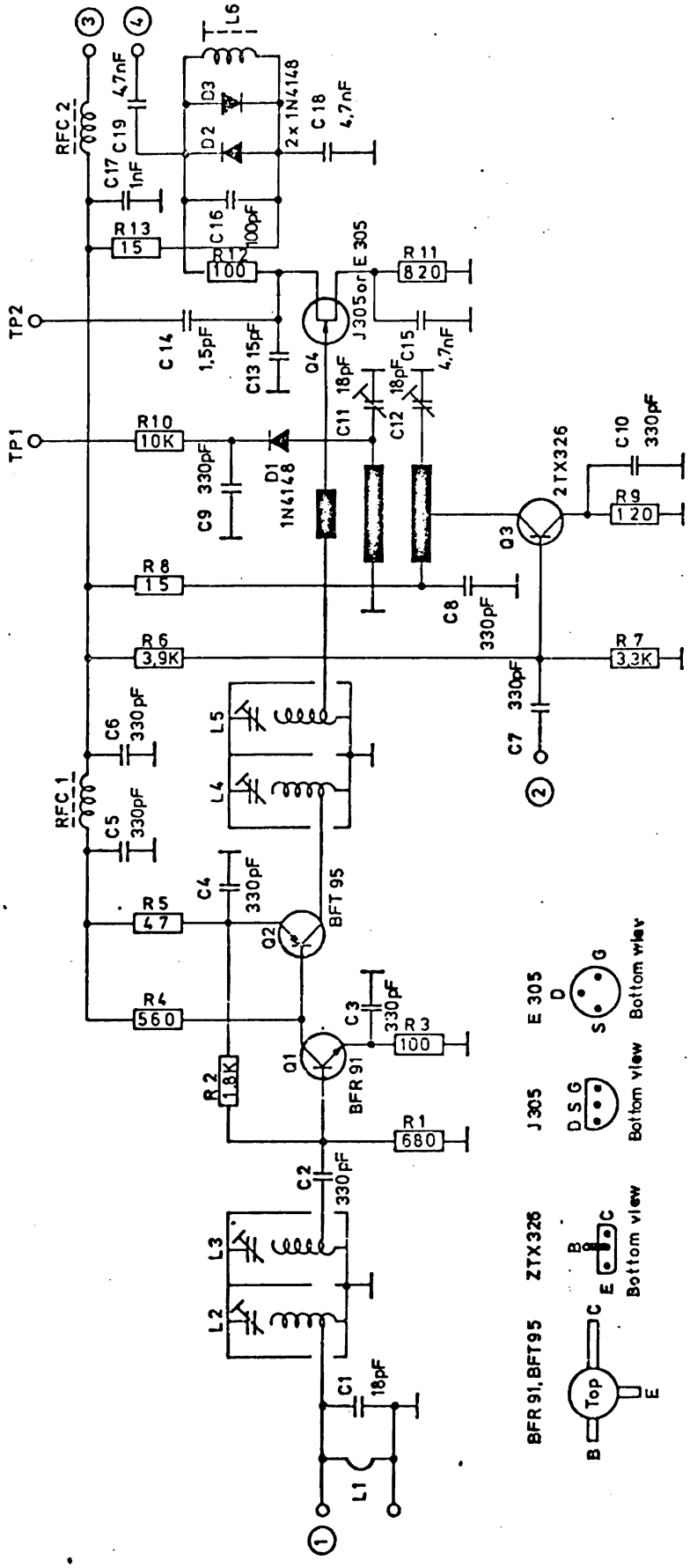
Front section

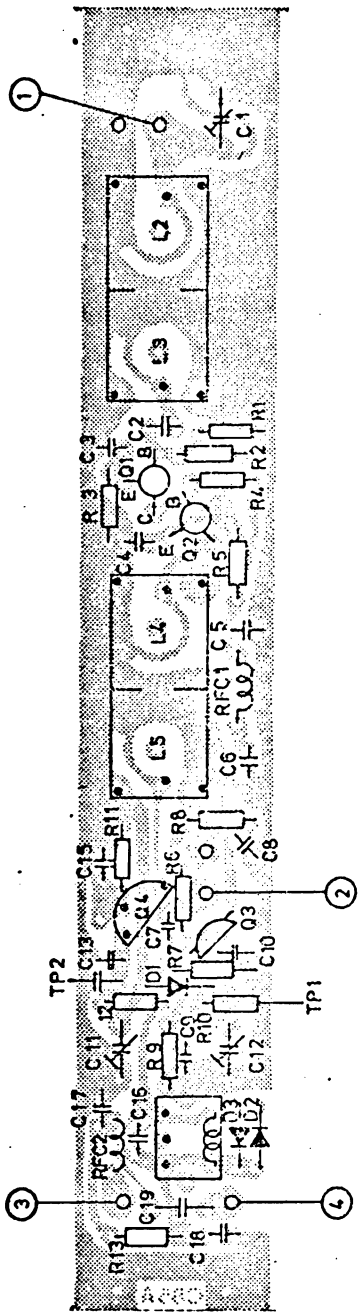


Rettet: 2-6-78 JS/AC	Blockschematic for AP 2000 6-10 W, UHF band	Tegn.: 27-10-80 AMC	Kontr.:
		Stykl. nr.:	
		Tegn. nr.:	
	AP-RADIOTELEFON		80145-3E2



Rettet:		
	Blockschematic for AP 2000 **10-25W, UHF band**	Tegn.: 27-10-80 Kontr.: AMC Stykl. nr.: Tegn. nr.:
	AP-RADIOTELEFON	80146 -3E2





Rettet:	RF mixer UHF for AP 2000 Print board C 85 A1	Tegn.: BC 19 - 5 - 80 Kontr.: Stykl. nr.: Tegn. nr.:
	AP-RADIOTELEFON	80082 - 3E2

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-281	680 Ω 1/8 W
R2	13-286	1,8 KΩ "
R3	13-271	100 Ω "
R4	13-280	560 Ω "
R5	13-267	47 Q "
R6	13-290	3,9 KΩ "
R7	13-289	3,3 KΩ "
R8	13-261	15 Ω "
R9	13-272	120 Ω "
R10	13-295	10 KΩ "
R11	13-282	820 Ω "
R12	13-271	100 Ω "
R13	13-261	15 Ω "
C1	19-336	18 pF Trim.
C2	11-406	330 pF Ker.
C3	11-406	330 pF "
C4	11-406	330 pF "
C5	11-406	330 pF "
C6	11-406	330 pF "
C7	11-406	330 pF "
C8	11-406	330 pF "
C9	11-406	330 pF "
C10	11-406	330 pF "
C11	19-336	18 pF Trim.
C12	19-336	18 pF "
C13	11-381	15 pF Ker.
C14	11-362	1,5 pF "
C15	11-416	4,7 nF "
C16	11-401	100 pF "
C17	11-409	1 nF "
C18	11-416	4,7 nF "
C19	11-415	4,7 nF "
D1	04-062	1N4148
D2	04-062	1N4148
D3	04-062	1N4148

Nr.	Kode	Data
Q1	19-116	BFR91
Q2	19-110	BFT95
Q3	19-115	ZTX326
Q4	19-083	J305
RFC1	25-009	75290-4E2
RFC2	25-009	75290-4E2
L2		
L3	25-083	Helix sp. 80089-4
L4	80-047	Helix hus 80047-4
L5		

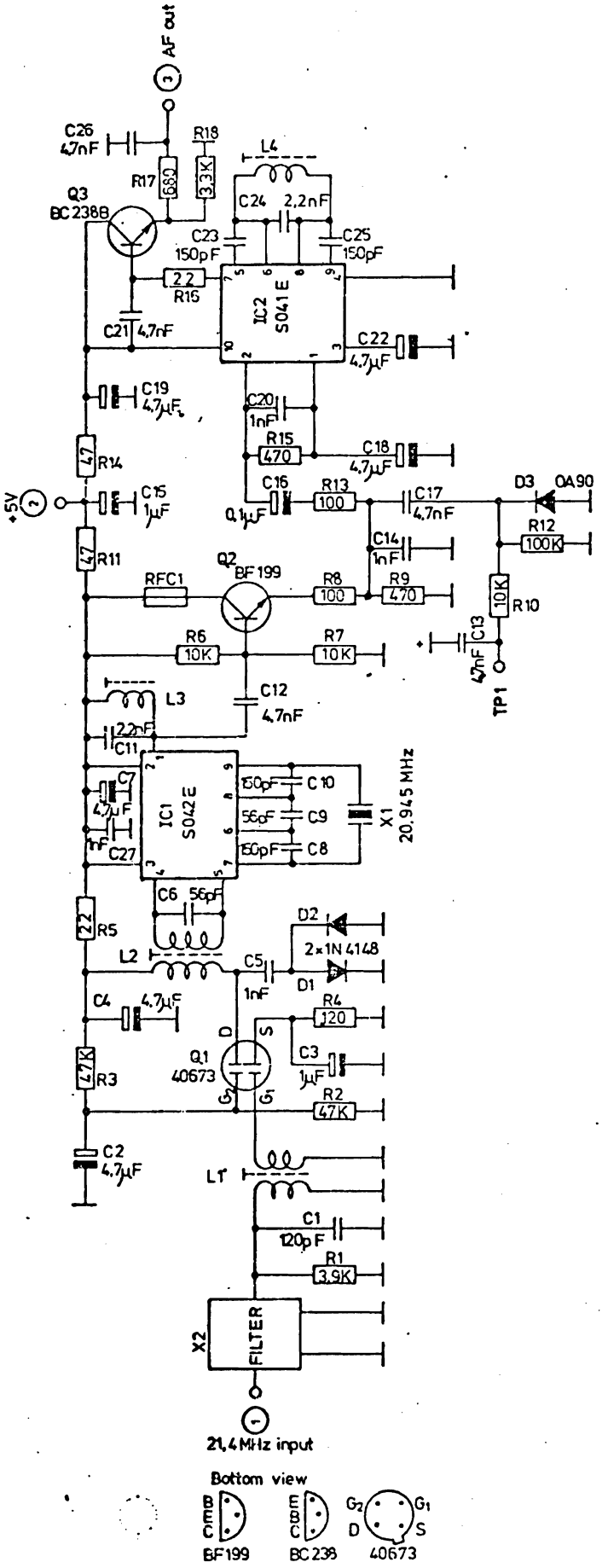
RF mixer UHF for AP 2000
Print board C 85 A1
Tilhører tegn. nr.: 80082-3E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.: 80082-4S2



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	Tegn.: 28-2-75 AC | Kontr.: Stykl. nr.: Tegn. nr.: 75076-3E2
	AP-RADIOTELEFON	

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

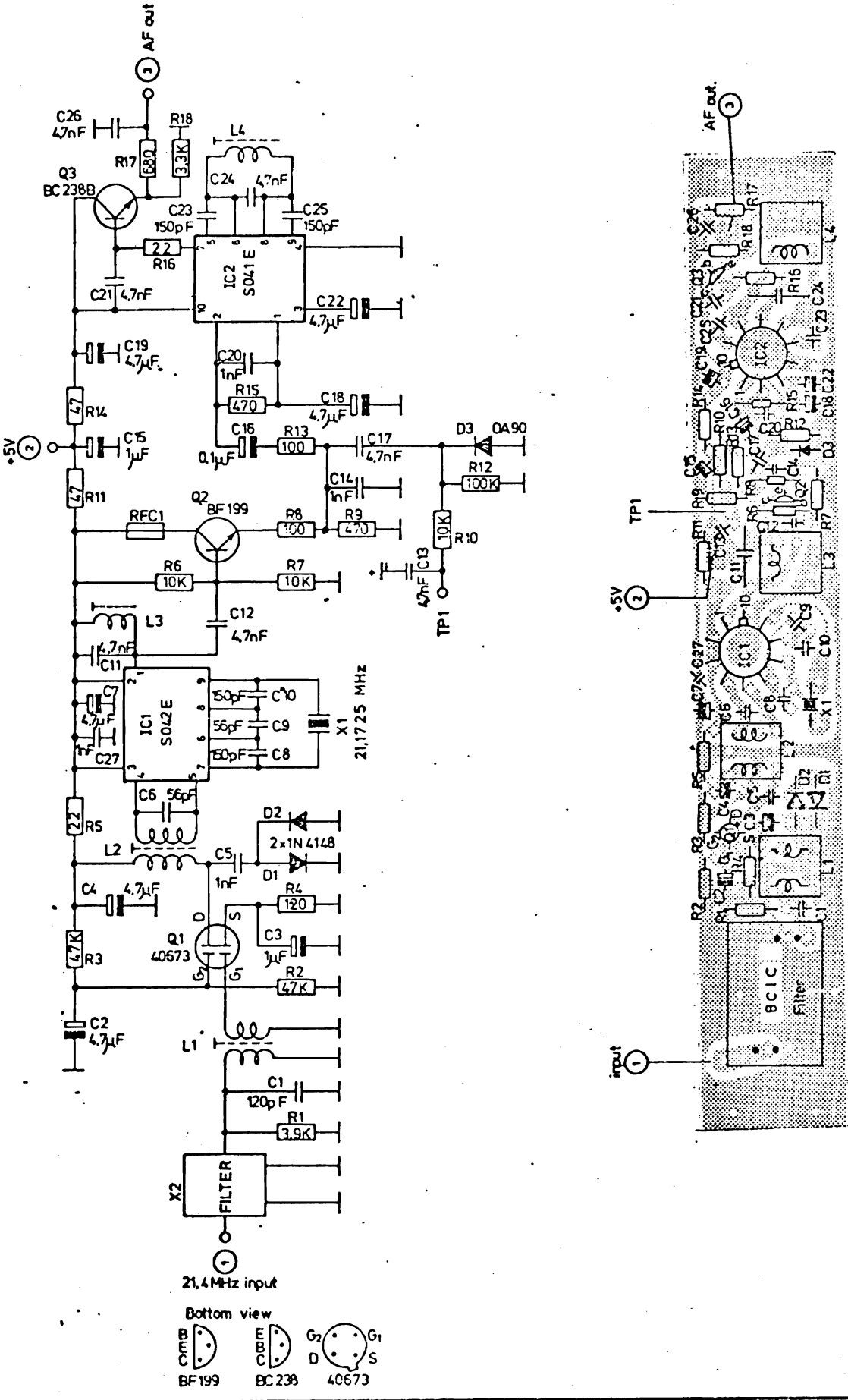
21,4 MHz IF
Print B 01 C 1 and B 01 C3
Tilhører tegn. nr.: 75076-3E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.: 75076-4S2



Rettet: 27-2-79 AC/A	21,4 MHz IF 12,5 kc band width Print B01C2	Tegn. 20-10-78 BC / Kontr.: Stykl. nr.: Tegn. nr.: 78152-3E2
	AP-RADIOTELEFON	

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	11-494	4,7 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	11-494	4,7 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		78134-4E2
L4		78135-4E2
X1	11-819	AP 22 21,1725 Mhz
X2	11-856	21,4 Mhz
RFC-1	06-001	Ferritperle - Philips

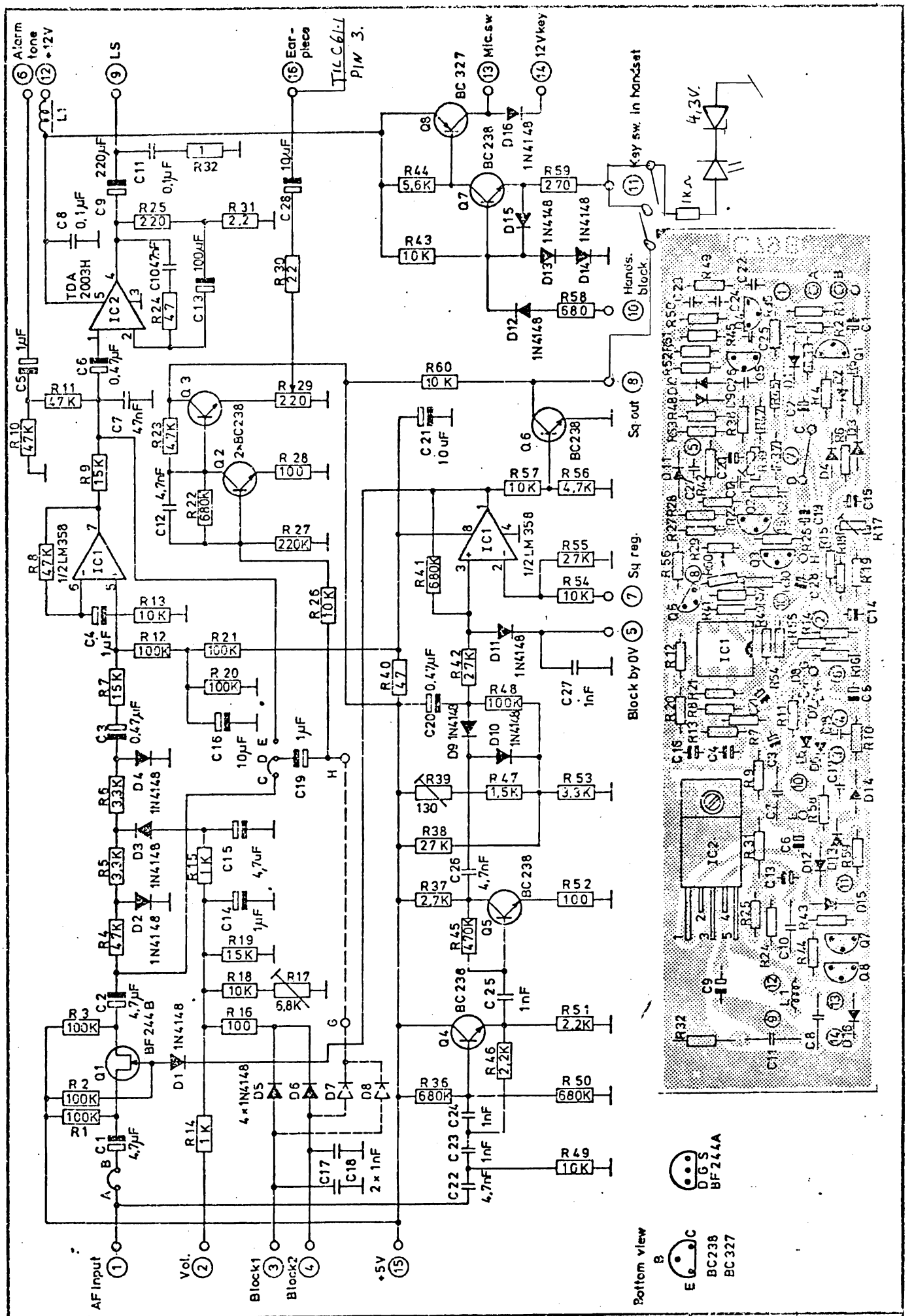
21,4 MHz IF. 12,5 kc band width
Print B 01 C2
Tilhører tegn. nr.: 78152-3E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.: 78152-4S2



Rettet:	AF and squelch Print board C 79 B1	Tegn.: BC 9-6-80 Kontr.:
		Stykl. nr.:
	AP-RADIOTELEFON	Tegn. nr.: 80073 - 3E2

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-306	100 KΩ 1/8 W CR16	R41	13-311	680 KΩ 1/8 W CR16
R2	13-306	100 KΩ " "	R42	13-313	27 KΩ " "
R3	13-306	100 KΩ " "	R43	13-295	10 KΩ " "
R4	13-302	47 KΩ " "	R44	13-292	5,6 KΩ " "
R5	13-289	3,3 KΩ " "	R45	13-315	470 KΩ " "
R6	13-289	3,3 KΩ " "	R46	13-287	2,2 KΩ " "
R7	13-297	15 KΩ " "	R47	13-285	1,5 KΩ " "
R8	13-302	47 KΩ " "	R48	13-306	100 KΩ " "
R9	13-297	15 KΩ " "	R49	13-295	10 KΩ " "
R10	13-302	47 KΩ " "	R50	13-311	680 KΩ " "
R11	13-302	47 KΩ " "	R51	13-287	2,2 KΩ " "
R12	13-306	100 KΩ " "	R52	13-271	100 Ω " "
R13	13-295	10 KΩ " "	R53	13-289	3,3 KΩ " "
R14	13-283	1 KΩ " "	R54	13-295	10 KΩ " "
R15	13-283	1 KΩ " "	R55	13-313	27 KΩ " "
R16	13-271	100 Ω " "	R56	13-291	4,7 KΩ " "
R17	13-662	6,8 KΩ NTC 642	R57	13-295	10 KΩ " "
R18	13-295	10 KΩ 1/8 W CR16	R58	13-281	680 Ω " "
R19	13-297	15 KΩ " "	R59	13-276	270 Ω " "
R20	13-306	100 KΩ " "	R60	13-295	10 kΩ " "
R21	13-306	100 KΩ " "	C1	11-504	4,7 µF/ 10V Tant.
R22	13-311	680 KΩ " "	C2	11-504	4,7 µF/ 10V Tant.
R23	13-291	4,7 KΩ " "	C3	11-501	0,47 µF/35 V ""
R24	13-267	47 Ω " "	C4	11-502	1 µF/35 V "
R25	13-275	220 Ω " "	C5	11-502	1 µF/35 V "
R26	13-295	10 KΩ " "	C6	11-501	0,47 µF/35 V "
R27	13-309	220 KΩ " "	C7	11-493	47 nF MKH
R28	13-271	100 Ω " "	C8	11-490	0,1 µF "
R29	19-266	220 Ω Trim.	C9	05-024	220 µF/16 V Ellyt
R30	19-263	22 Ω 1/8 W CR16	C10	11-493	47 nF MKH
R31	13-347	2,2 Ω 1/4 W CR25	C11	11-490	0,1 µF "
R32	13-346	1 Ω " "	C12	11-416	4,7 nF Ker.
R36	13-311	680 KΩ 1/8 W CR16	C13	11-510	100 µF/3V Tant.
R37	13-288	2,7 KΩ " "	C14	11-502	1 µF/35V "
R38	13-313	27 KΩ " "	C15	11-504	4,7 µF/10V "
R39	13-666	130 Ω NTC 610	C16	11-506	10 µF/25 V "
R40	13-267	47 Ω 1/8 W CR16	C17	11-409	1 nF Ker.

AF and squelch Print board C79 B1 Tilhører tegn. nr.: 80073-3E2	Rettet:	Tegn.:	Stykl. nr.: 80073-4S2
		Kontr.:	

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
C18	11-409	1 nF Ker.	L1	25-009	RFC
C19	11-502	1 µF/35 V Tant.			
C20	11-501	0,47µF/35 V "	IC1	09-080	LM358
C21	11-506	10 µF/25 V "	IC2	09-210	TDA2003H
C22	11-416	4,7 nF Ker.			
C23	11-409	1 nF "			
C24	11-409	1 nF "			
C25	11-409	1 nF "			
C26	11-416	4,7 nF "			
C27	11-409	1 nF "			
C28	11-506	10 µF/25 V Tant			
D1	04-062	1N4148			
D2	04-062	1N4148			
D3	04-062	1N4148			
D4	04-062	1N4148			
D5	04-062	1N4148			
D6	04-062	1N4148			
D9	04-062	1N4148			
D10	04-062	1N4148			
D11	04-062	1N4148			
D12	04-062	1N4148			
D13	04-062	1N4148			
D14	04-062	1N4148			
D15	04-062	1N4148			
D16	04-062	1N4148			
Q1	19-087	BF244B			
Q2	19-093	BC238			
Q3	19-093	BC238			
Q4	19-093	BC238			
Q5	19-093	BC238			
Q6	19-093	BC238			
Q7	19-093	BC238			
Q8	19-095	BC327			

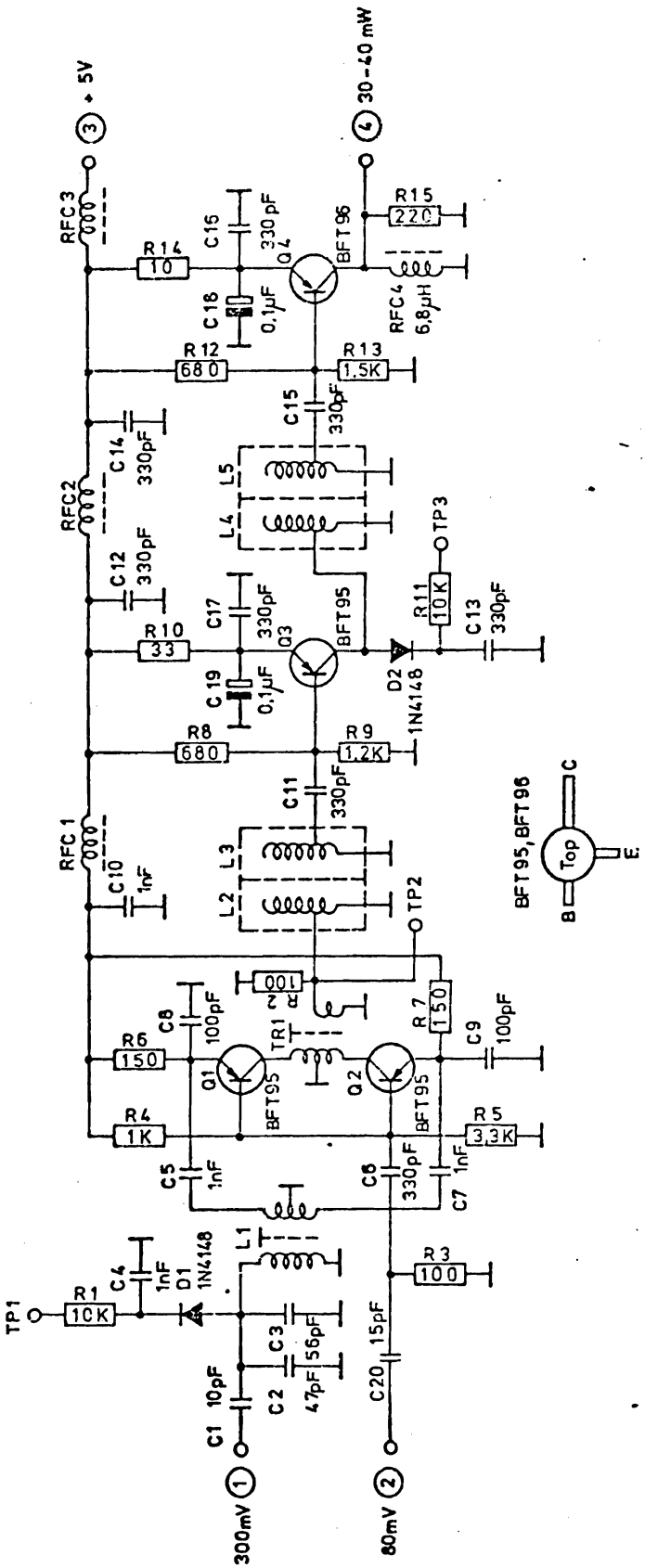
AF and squelch
Print board C 79 B1
Tilhører tegn. nr.: 80073-3E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.: 80073-4S2



Rettet:	Tx-mixer UHF for AP 2000 Print board C 86 A1	Tegn.:	Kontr.:
		Stykl. nr.:	
		Tegn. nr.:	
	AP-RADIOTELEFON		80084-3E2

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-295	10 KΩ 1/8 W
R2	13-271	100 Ω 1/8 W
R3	13-271	100 Ω 1/8 W
R4	13-283	1 KΩ 1/8 W
R5	13-289	3,3 KΩ 1/8 W
R6	13-273	150 Ω 1/8 W
R7	13-273	150 Ω 1/8 W
R8	13-281	680 Ω 1/8 W
R9	13-284	1,2 KΩ 1/8 W
R10	13-265	33 Ω 1/8 W
R11	13-295	10 KΩ 1/8 W
R12	13-281	680 Ω 1/8 W
R13	13-285	1,5 KΩ 1/8 W
R14	13-259	10 Ω 1/8 W
R15	13-275	220 Ω 1/8 W
C1	11-376	10 pF Ker.
C2	11-394	47 pF "
C3	11-396	56 pF "
C4	11-409	1 nF "
C5	11-409	1 nF "
C6	11-406	330 pF "
C7	11-409	1 nF "
C8	11-401	100 pF "
C9	11-401	100 pF "
C10	11-409	1 nF "
C11	11-406	330 pF "
C12	11-406	330 pF "
C13	11-406	330 pF "
C14	11-406	330 pF "
C15	11-406	330 pF "
C16	11-406	330 pF "
C17	11-406	330 pF "
C18	11-500	0,1 µF Tant.
C19	11-500	0,1 µF "
C20	11-465	15 pF Ker. N150 2 modul.

Nr.	Kode	Data
D1	04-062	1N4148
D2	04-062	1N4148
Q1	19-110	BFT 95
Q2	19-110	BFT 95
Q3	19-110	BFT 95
Q4	19-076	BFT 96
L1	25-066	76009
L2		
L3	25-083	Helix sp. 80089-4
L4	80-047	Helix hus 80047-4
L5		
RFC1	25-009	75290-4E2
RFC2	25-009	"
RFC3	25-009	"
RFC4	04-114	6,8 µH 74016-4E
TR1	25-084	80045-4E2

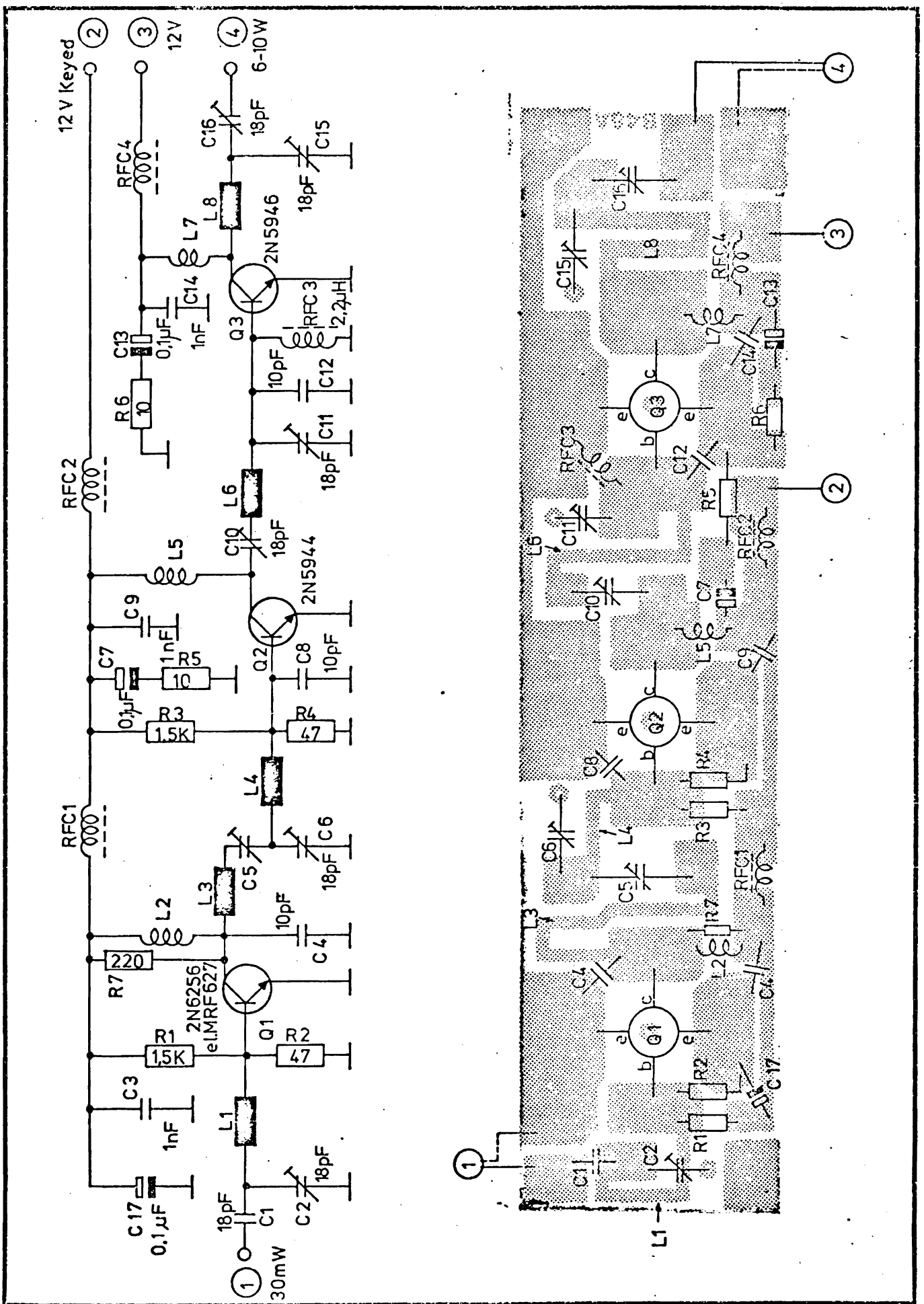
Tx-mixer UHF for AP 2000
Print board C 86 A1
Tilhører tegn. nr.: 80084-3E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.: 80084-4S2



Rettet: 2-6-78 JS/AC	6-10W PA UHF B 45A1	Tegn.: 31-10-75 EH	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON %	Tegn. nr.: 75510-4E2	

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-285	1,5 KΩ 1/8W CR 16	RFC 1		75290-4E2
R2	13-267	47 Ω " "	RFC 2		75290-4E2
R3	13-285	1,5 KΩ " "	RFC 3		75290-4E2
R4	13-267	47 Ω " "	RFC 4		75290-4E2
R5	13-259	10 Ω " "			
R6	13-259	10 Ω " "			
R7	13-362	220 Ω ¼W CR 25			
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			

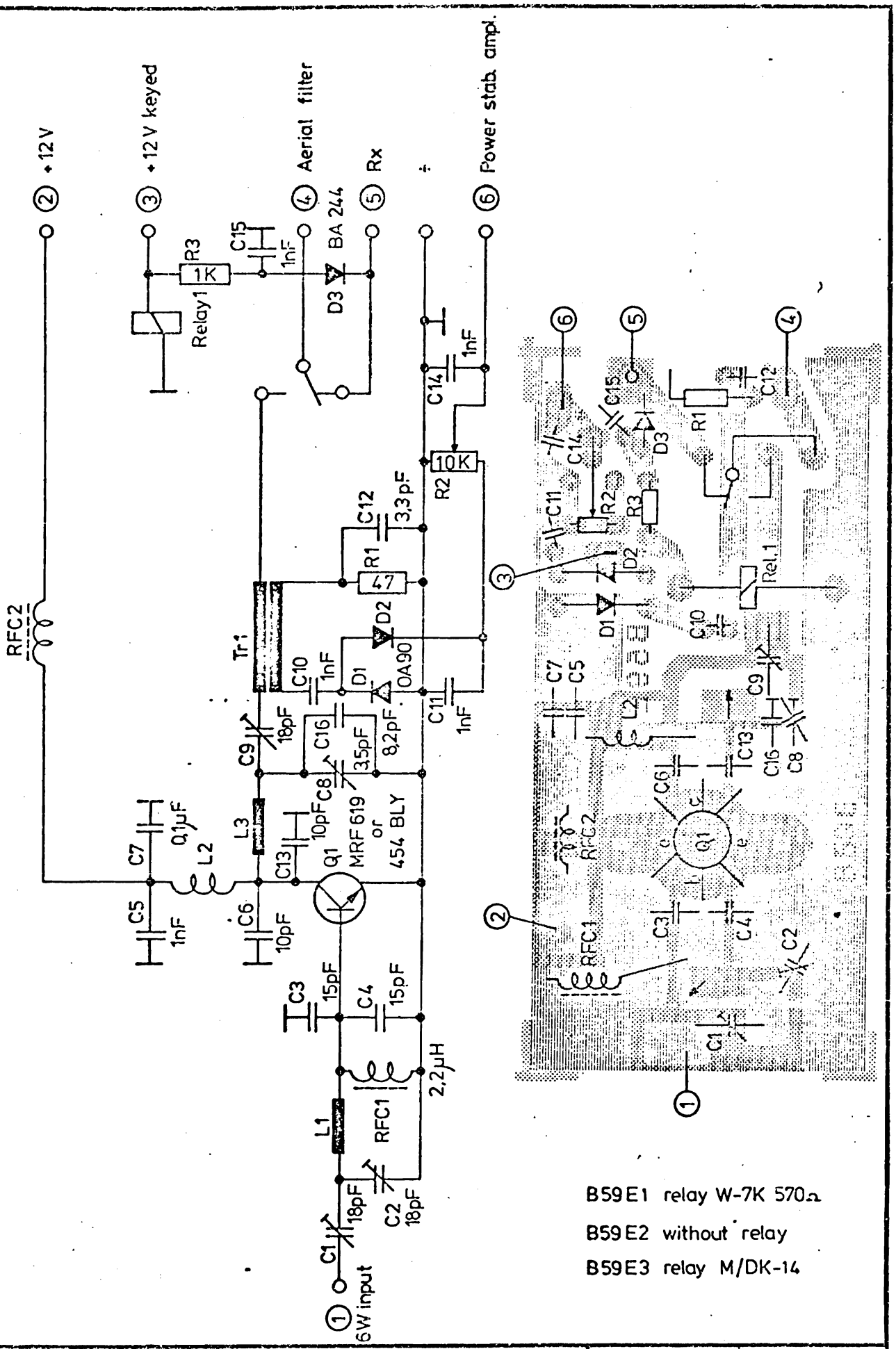
6-10 W, PA-stage UHF
Print-board B 45 A 1
Tilhører tegn. nr.: 75510-4E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.: 75510-4S2



Rettet: 9-1-78 AC/GR 23-2-78 AMC/IM 2-6-78 JS/AC	10-25W PA UHF, aerial switch and power detector. Print board B59F1,2 and 3	Tegn.: 17-11-76 AC	Kontr.:
		Stykl. nr.: 75627-4E2	
	AP-RADIOTELEFON A/S	Tegn. nr.: 75627-4E2	

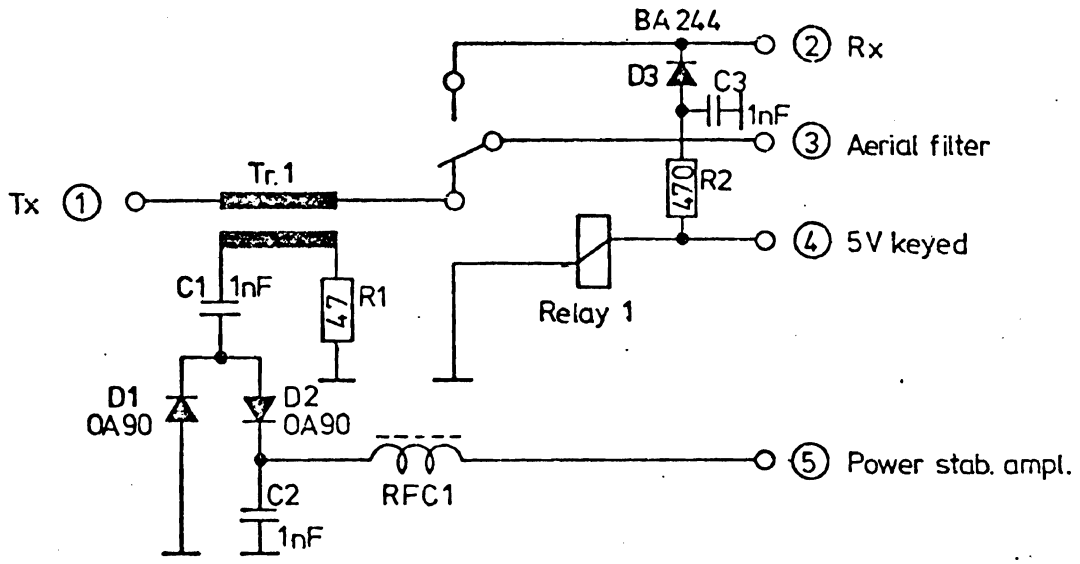
AP-RADIOTELEFON

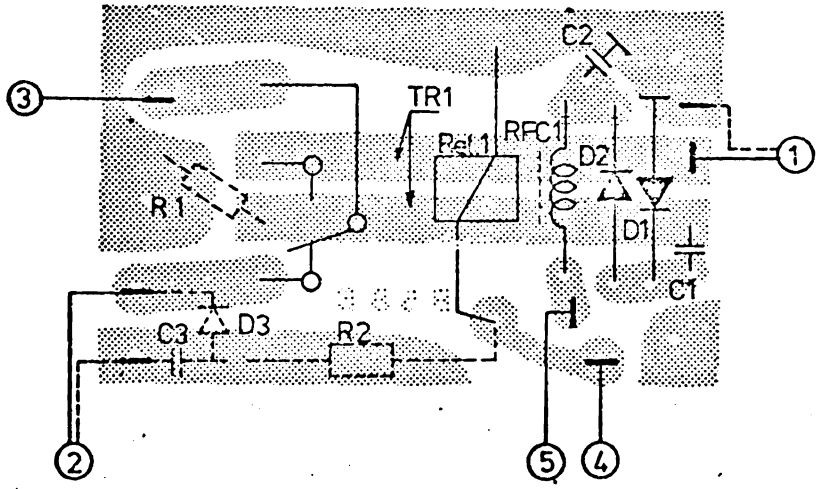
Nr.	Kode	Data	Nr.	Kode	Data
R1	13-356	47 Ω ¼ W CR 25			
R2	19-258	10 KΩ Trim.			
R3	13-283	1 KΩ 1/8 CR 16			
C1	19-330	18 pF Trim.			
C2	19-330	18 pF "			
C3	11-381	15 pF ker.			
C4	11-381	15 pF "			
C5	11-409	1 nF "			
C6	11-376	10 pF "			
C7	11-353	0,1 µF Laco			
C8	19-346	3,5 pF Trim.			
C9	19-330	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 "			
C16	11-423	8,2 pF NPO "			
D1	04-036	OA 90			
D2	04-036	OA 90			
D3	04-008	BA 244			
Q1	19-177	MRF 619 or 454BLY			
RFC-1	04-111	2,2 µH			
RFC-2		75290-4E2			
L2		75619-4E2			
Rel. 1	17-057	W-7K 570 Ω			
Rel.	17-058	MD/K - 14 PASI			

10-25 W PA-stage UHF, aerial switch and power detector. Print board B 59F1, 2 and 3
Tilhører tegn. nr.: 75627-4E2

Tegn.:
Kontr.:

Stykl. nr.: 75627-4S2





Rettet: 8-2-77 JH/AC 2-6-78 JS/AC	6-10 W aerial switch and power detector for UHF. Print board B58C 1	Tegn.: 29-12-75 AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON A/S	Tegn. nr.: 75624-4E2	

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-356	47 Ω ¼ W CR 25			
R2	13-366	470 Ω " " " "			
C1	11-409	1 nF Ker.			
C2	11-409	1 nF "			
C3	11-409	1 nF "			
D1	04-036	OA90			
D2	04-036	OA90			
D3	04-008	BA244			
RFC 1		75290-4E2			
Rel. 1	17-058	W-4K 115 Ω			

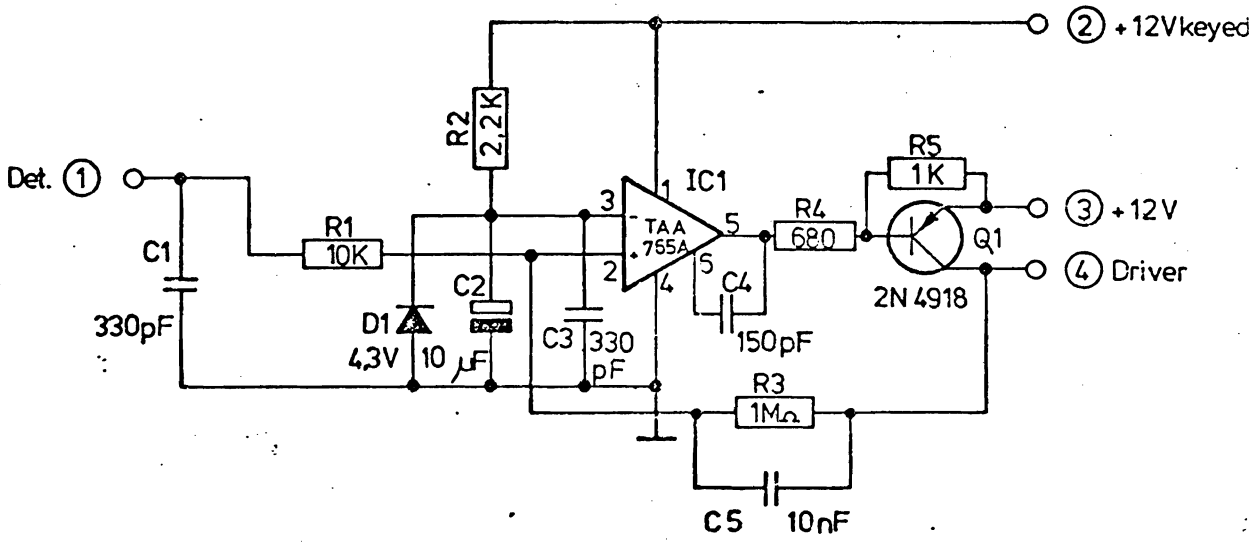
10-25 W aerial switch and power detector Print board B 58 C 1
Tilhører tegn. nr.: 75624-4E2

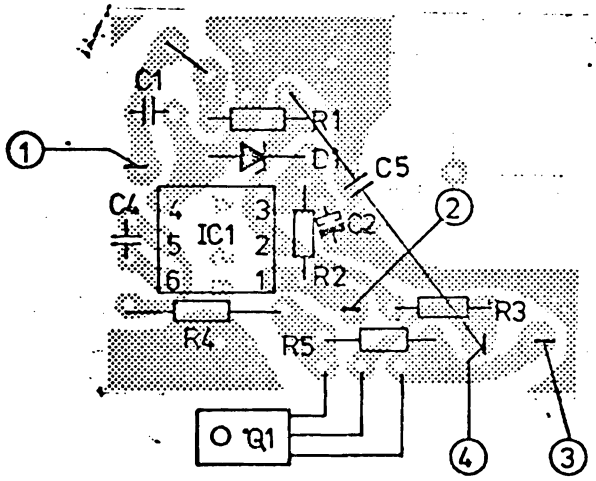
Rettet:

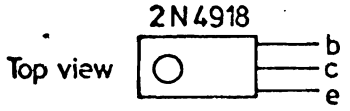
Tegn.:

Kontr.:

Stykl. nr.: 75624-4S2







Rettet: 21-4-77 BJ 16-3-79 BJ	Sense amplifier for output power stabilizing of external PA Print board B57B 2	Tegn.: 3-11-76 AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON A/S	Tegn. nr.: 76325-4E2	

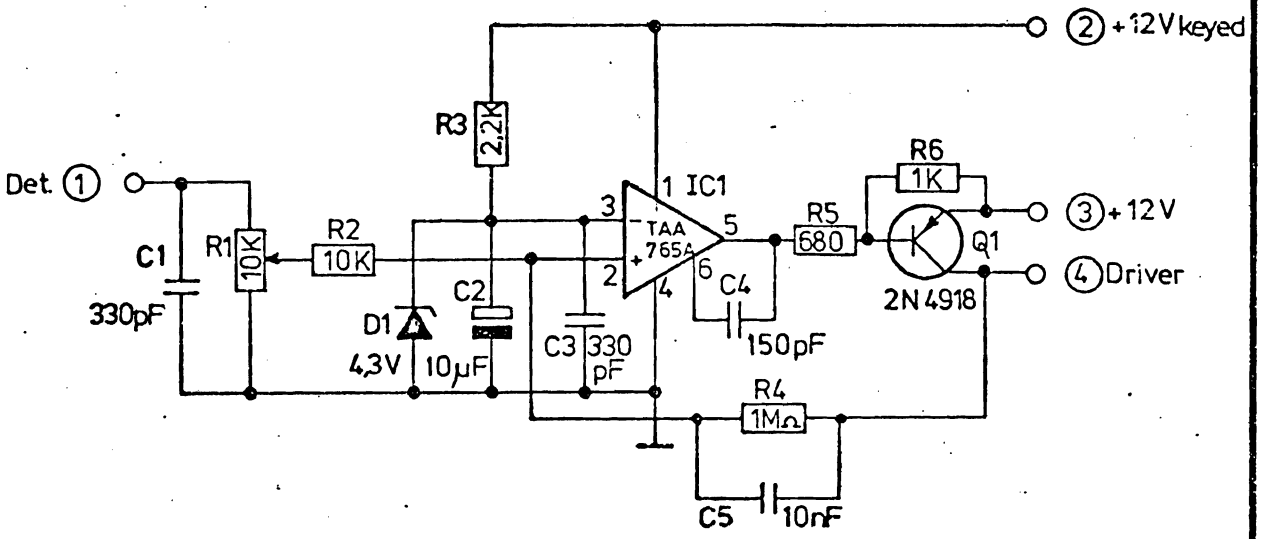
AP-RADIOTELEFON

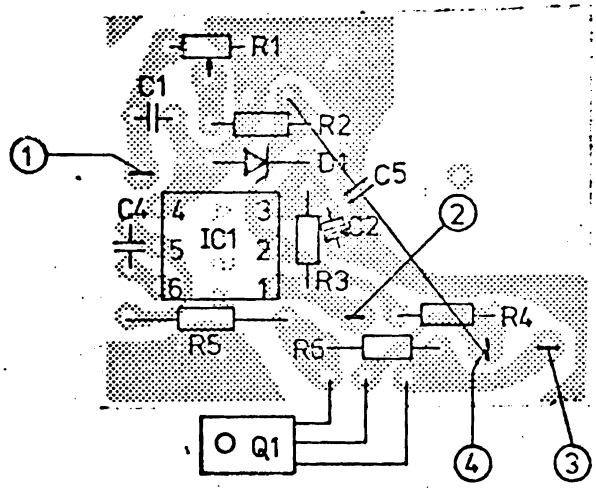
Nr.	Kode	Data	Nr.	Kode	Data
R1	13-295	10 KΩ 1/8W CR 16			
R2	13-287	2,2 KΩ " "			
R3	13-312	1 MΩ " "			
R4	13-368	680 Ω ¼ W CR 25			
R5	13-283	1 KΩ 1/8W CR 16			
C1	11-406	330 pF Ker.			
C2	11-506	10 µF/25V Tant.			
C3	11-406	330 pF Ker.			
C4	11-404	150 pF "			
C5	11-481	10 nF Pol.			
D1	04-045	4,3 V Zener			
Q1	19-176	2N4918			
IC1	09-003	TAA765A			

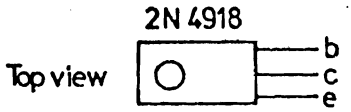
Sense amplifier for output power stabilizing of external PA. Print board B 57 B 2
Tilhører tegn. nr.: 76325-4E2

Tegn.:
Kontr.:

Stykl. nr.:
76325-4S2







Rettet: 21-4-77 JH/K 16-3-79 BI	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 ¼ 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			

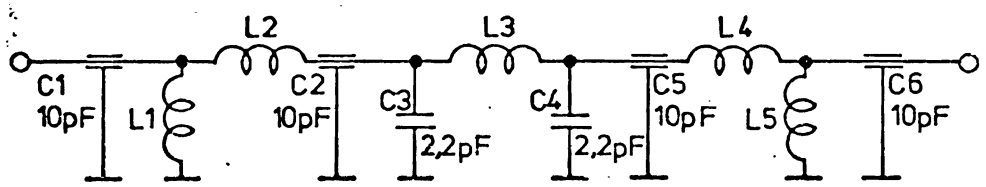
Sense amplifier for output power stabilizing of internal PA Print board B 57B 1

Tilhører tegn. nr.: 75622-4E2

Tegn.:

Kontr.:

Stykl. nr.: 75622-4S2

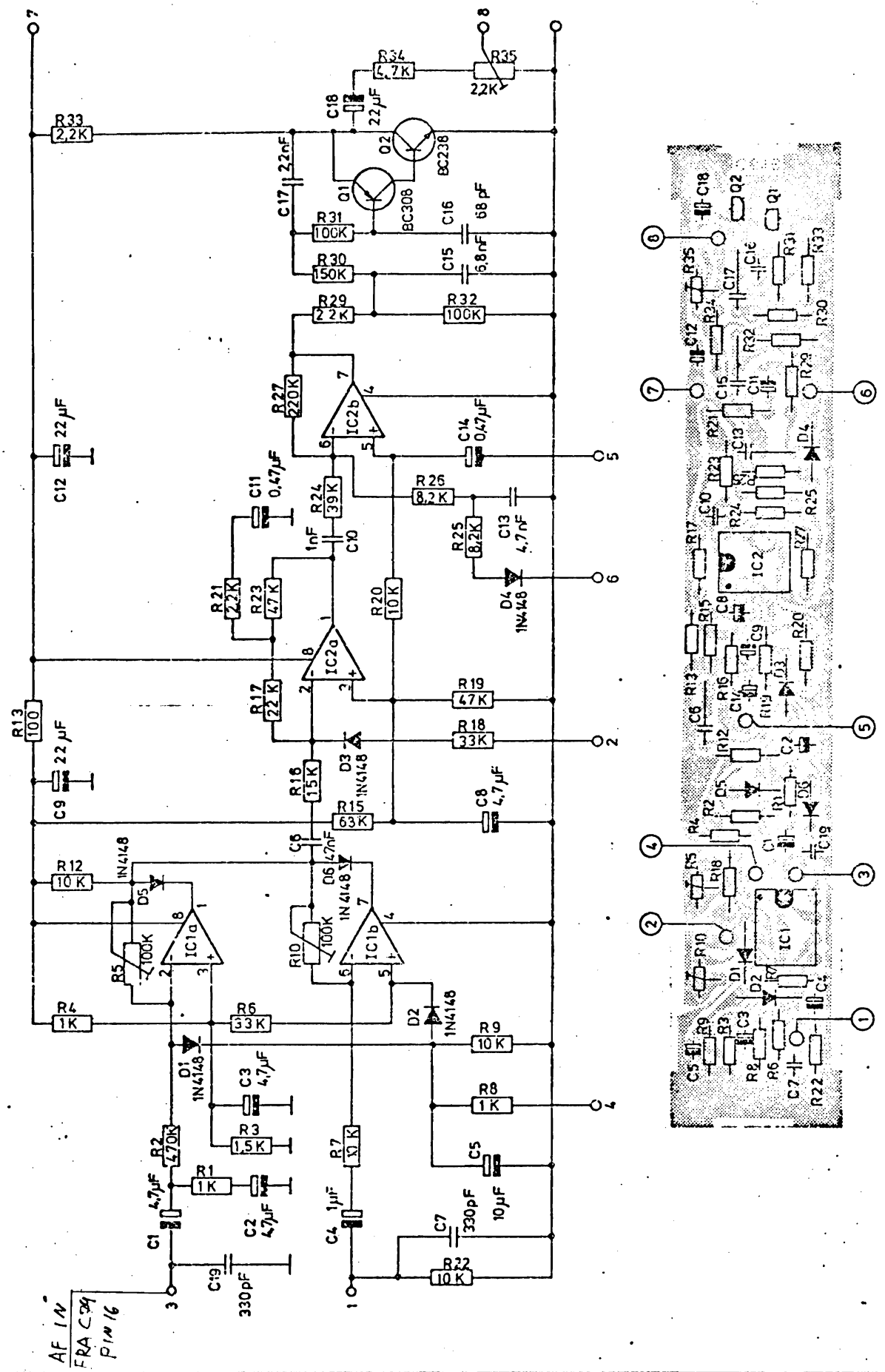


Rettet:	Aerialfilter UHF	Tegn.: 29-12-75 NC-AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON A/S	Tegn. nr.: 75623-4E2	

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 Tilhører tegn. nr.: 75623-4E2	Rettet:	Tegn.:	Stykl. nr.: 75623-4S2
		Kontr.:	



Rettet: 2-10-79 AC/SB 10-1-80 BC/SB 15-1-80 BC/SB 18-11-80 BC/LB	Modulation amplifier Print board C61C1	Tegn.: 3-7-79 BC Kontr.: Stykl. nr.: Tegn. nr.: 79112 - 3E2
	AP-RADIOTELEFON	

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-283	1 KΩ 1/8 W CR16
R2	13-315	470 KΩ " "
R3	13-285	1,5 KΩ " "
R4	13-283	1 KΩ " "
R5	19-263	100 KΩ Trim.
R6	13-300	33 KΩ 1/8 W CR16
R7	13-295	10 KΩ " "
R8	13-283	1 KΩ " "
R9	13-295	10 KΩ " "
R10	19-263	100 KΩ Trim.
R11		
R12	13-295	10 KΩ 1/8 W CR16
R13	13-271	100 Ω " "
R14		
R15	13-304	68 KΩ " "
R16	13-297	15 KΩ " "
R17	13-301	39 KΩ " "
R18	13-300	33 KΩ " "
R19	13-302	47 KΩ " "
R20	13-295	10 KΩ " "
R21	13-287	2,2 KΩ " "
R22	13-295	10 KΩ " "
R23	13-302	47 KΩ " "
R24	13-301	39 KΩ " "
R25	13-294	8,2 KΩ " "
R26	13-294	8,2 KΩ " "
R27	13-309	220 KΩ " "
R28		
R29	13-299	22 KΩ " "
R30	13-308	150 KΩ " "
R31	13-306	100 KΩ " "
R32	13-306	100 KΩ " "
R33	13-287	2,2 KΩ " "
R34	13-291	4,7 KΩ " "
R35	19-255	2,2 KΩ Trim.

Nr.	Kode	Data
C1	11-504	4,7 µF/10 V Tant.
C2	11-504	4,7 µF/10 V Tant.
C3	11-504	4,7 µF/10 V Tant.
C4	11-502	1 µF/35 V Tant.
C5	11-506	10 µF/25 V Tant.
C6	11-493	47 nF MKH
C7	11-406	330 pF Ker.
C8	11-504	4,7 µF/10 V Tant.
C9	11-507	22 µF/16 V Tant.
C10	11-409	1 nF Ker.
C11	11-501	0,47µF/35 V Tant.
C12	11-507	22 µF/16 V Tant.
C13	11-487	4,7 nF MKH
C14	11-501	0,47µF/35 V Tant.
C15	11-488	6,8 nF MKH
C16	11-397	68 pF N750 Ker.
C17	11-486	2,2 nF MKH
C18	11-507	22 µF/16V Tant.
C19	11-406	330 pF 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
Q1	19-084	BC 308B
Q2	19-117	BC 238
IC1	09-080	LM 358N
IC2	09-080	LM 358N

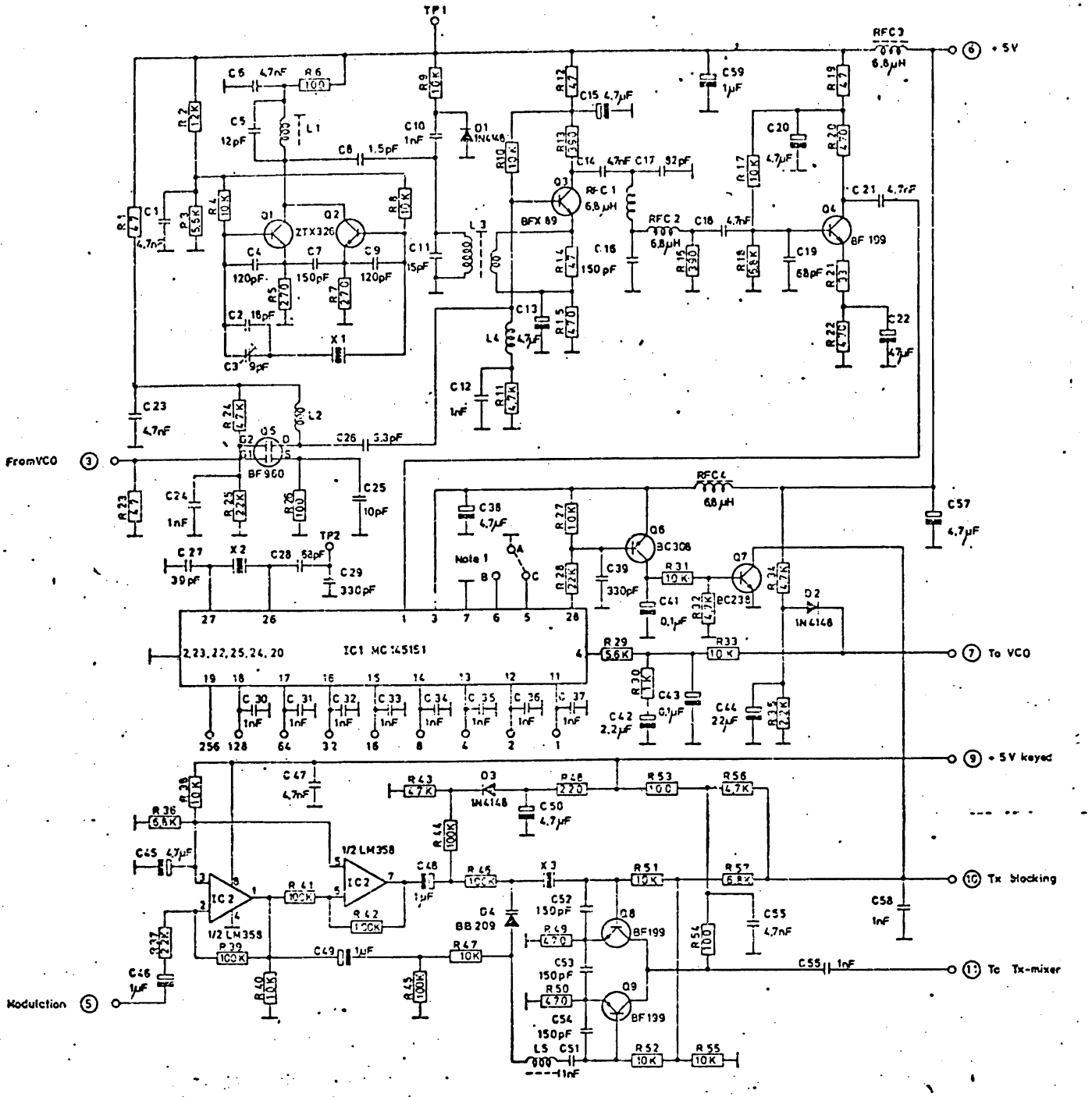
Modulation amplifier
Print board C 61C 1
Tilhører tegn. nr.: 79112-3E2

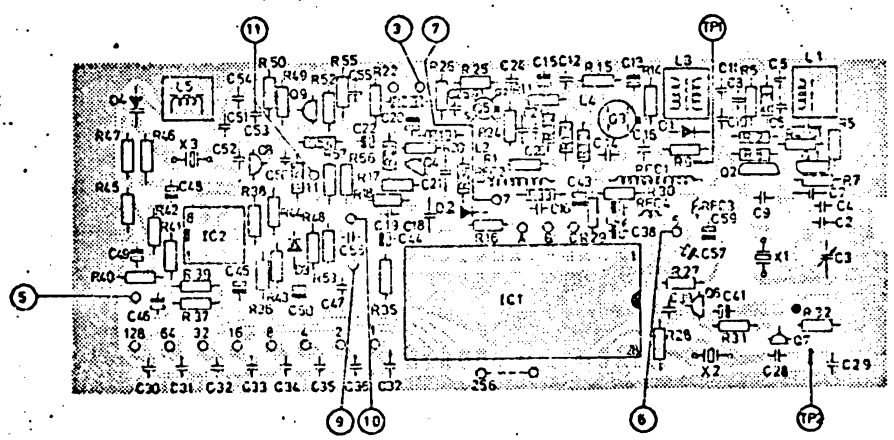
Rettet:

Tegn.:

Kontr.:

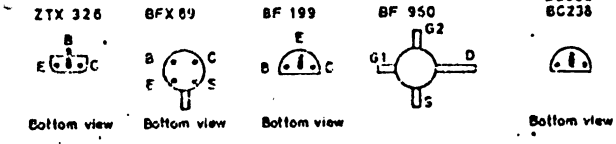
Stykl. nr.: 79112-4S2





Note 1

Channel spacing	Point A - C	X2
25 kHz	Connected	5,4MHz
20 kHz	Connected	5,12MHz
12,5 kHz	Open	6,4MHz



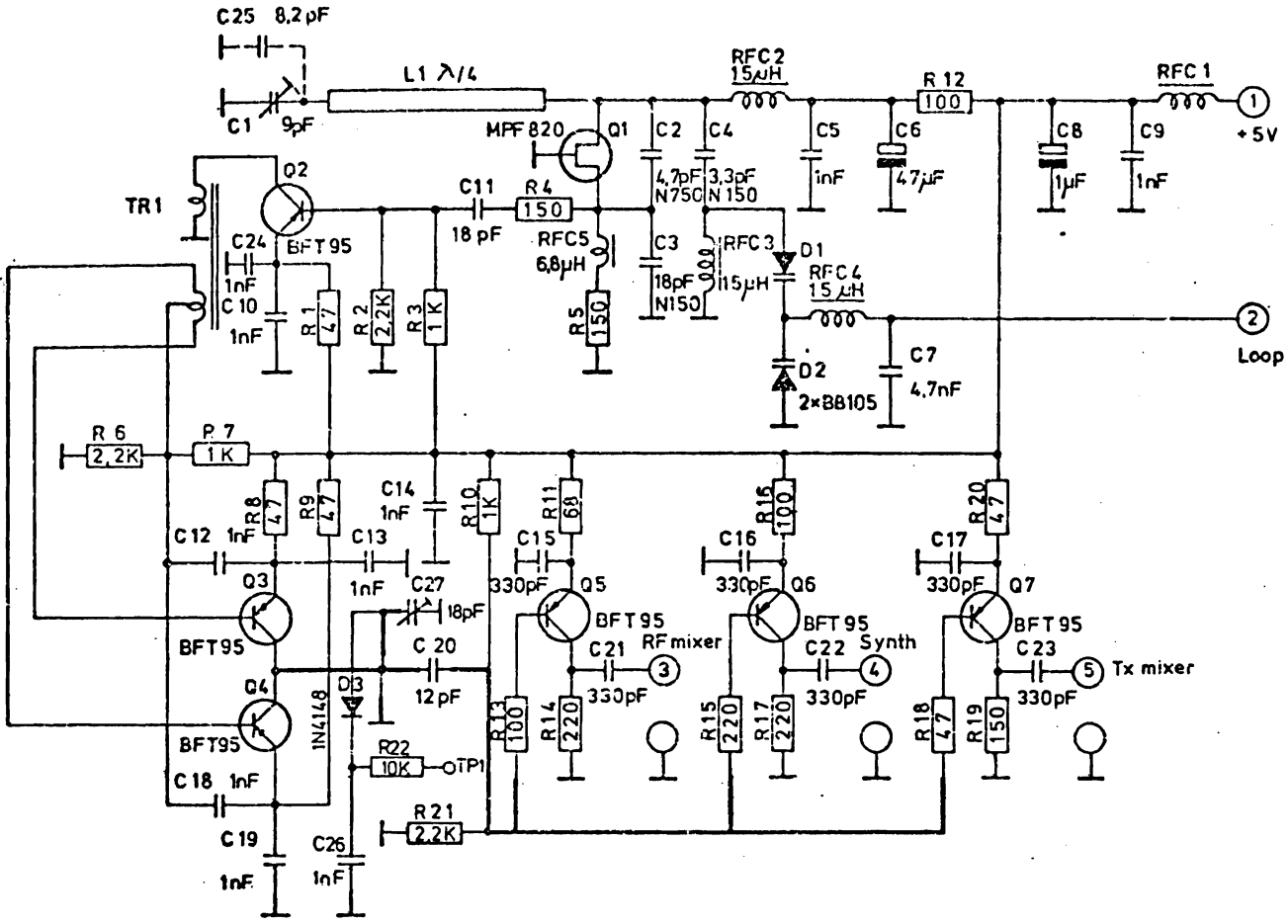
Synthesizer and Tx-VCXO AP 2000 UHF Print board C 92 A1			22-7-80

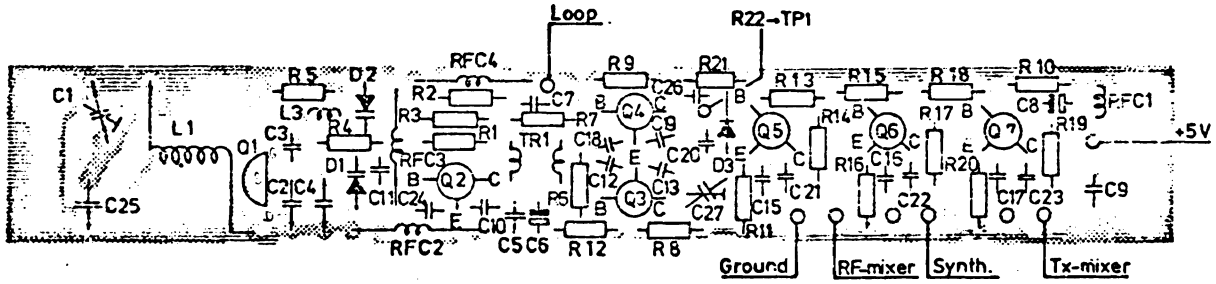
Nr.	Kode	Data	Nr.	Kode	Data
R1	13-267	47 Ω 1/8 W CR16	R38	13-295	10 KΩ 1/8 W CR16
R2	13-296	12 KΩ " "	R39	13-306	100 KΩ " "
R3	13-292	5,6 KΩ " "	R40	13-295	10 KΩ " "
R4	13-295	10 KΩ " "	R41	13-306	100 KΩ " "
R5	13-276	270 Ω " "	R42	13-306	100 KΩ " "
R6	13-271	100 Ω " "	R43	13-302	47 KΩ " "
R7	13-276	270 Ω " "	R44	13-306	100 KΩ " "
R8	13-295	10 KΩ " "	R45	13-306	100 KΩ " "
R9	13-295	10 KΩ " "	R46	13-306	100 KΩ " "
R10	13-292	5,6 KΩ " "	R47	13-295	10 kΩ " "
R11	13-291	4,7 KΩ " "	R48	13-275	220 Ω " "
R12	13-267	47 Ω " "	R49	13-279	470 Ω " "
R13	13-278	390 Ω " "	R50	13-279	470 Ω " "
R14	13-267	47 Ω " "	R51	13-295	10 KΩ " "
R15	13-279	470 Ω " "	R52	13-295	10 KΩ " "
R16	13-278	390 Ω " "	R53	13-271	100 Ω " "
R17	13-295	10 KΩ " "	R54	13-279	470 Ω " "
R18	13-293	6,8 KΩ " "	R55	13-295	10 KΩ " "
R19	13-267	47 Ω " "	R56	13-291	4,7 KΩ " "
R20	13-279	470 Ω " "	R57	13-293	6,8 KΩ " "
R21	13-265	33 Ω " "			
R22	13-279	470 Ω " "	C1	11-415	4,7 nF Ker. 2 mod
R23	13-267	47 Ω " "	C2	11-381	15 pF "
R24	13-302	47 KΩ " "	C3	19-329	9 pF Trim.
R25	13-299	22 KΩ " "	C4	11-403	120 pF Ker.
R26	13-271	100 Ω " "	C5	11-379	12 pF "
R27	13-295	10 KΩ " "	C6	11-416	4,7 nF "
R28	13-299	22 KΩ " "	C7	11-404	150 pF "
R29	13-292	5,6 KΩ " "	C8	11-362	1,5 pF "
R30	13-283	1 KΩ " "	C9	11-403	120 pF "
R31	13-295	10 KΩ " "	C10	11-409	1 nF "
R32	13-291	4,7 KΩ " "	C11	11-381	15 pF "
R33	13-295	10 KΩ " "	C12	11-409	1 nF "
R34	13-291	4,7 KΩ " "	C13	11-504	4,7 µF/10V Tant.
R35	13-287	2,2 KΩ " "	C14	11-416	4,7 nF Ker.
R36	13-293	6,8 KΩ " "	C15	11-504	4,7 µF/10V Tant.
R37	13-299	2,2 KΩ " "	C16	11-404	150 pF Ker.

Synthesizer and VCXO AP 2000 UHF, Print board C 92 B1 Tilhører tegn. nr.: 80090-2E2	Rettet:	Tegn.:	Stykl. nr.: 80090-4S2
		Kontr.:	

Nr.	Kode	Data	Nr.	Kode	Data
C17	11-399	82 pF Ker.	C55	11-416	4,7 nF Ker.
C18	11-415	4,7 nF " 2 mod	C56	11-409	1 nF Ker.
C19	11-397	68 pF "	C57	11-504	4,7 µF/10V Tant.
C20	11-504	4,7 µF/10V Tant.	C58	11-409	1 nF Ker.
C21	11-416	4,7 nF Ker.	C59	11-502	1 µF/35V Tant.
C22	11-504	4,7 µF/10V Tant.			
C23	11-415	4,7 nF Ker.2 mod	D1	04-062	1N4148
C24	11-409	1 nF "	D2	04-062	1N4148
C25	11-376	10 pF "	D3	04-062	1N4148
C26	11-366	3,3 pF "	D4	04-017	BB209
C27	11-395	47 pF "			
C28	11-397	68 pF "	Q1	19-115	ZTX326
C29	11-406	330 pF "	Q2	19-115	ZTX326
C30	11-409	1 nF "	Q3	19-102	BFX89
C31	11-409	1 nF "	Q4	19-104	BF199
C32	11-409	1 nF "	Q5	19-081	BF960
C33	11-409	1 nF "	Q6	19-084	BC308
C34	11-409	1 nF "	Q7	19-093	BC238
C35	11-409	1 nF "	Q8	19-104	BF199
C36	11-409	1 nF "	Q9	19-104	BF199
C37	11-409	1 nF "			
C38	11-504	4,7 µF/10V Tant.	IC1	09-218	MC145151
C39	11-406	330 pF Ker.	IC2	09-080	LM358N
C41	11-500	0,1 µF/35V Tant.			
C42	11-503	2,2 µF/25V Tant.	L1	25-054	75594-4E2
C43	11-500	0,1 µF/35V Tant.	L3	25-055	75595-4E2
C44	11-507	22 µF/16V Tant.	L5	25-090	80102-4E2
C45	11-504	4,7 µF/10V Tant.			
C46	11-502	1 µF/35V Tant.			
C47	11-416	4,7 nF Ker.	RFC1		
C48	11-500	0,1 µF/35V Tant.	RFC2		
C49	11-500	0,1 µF/35V Tant.	RFC3		
C50	11-504	4,7 µF/10V Tant.	RFC4		
C51	11-409	1 nF Ker.			
C52	11-404	150 pF "			
C53	11-404	150 pF "			
C54	11-404	150 pF "			

Synthesizer and VCXO AP 2000 UHF. Print board C 92 B1 Tilhører tegn. nr.: 80090-2E2	Rettet:	Tegn.:	Stykl. nr.: 80090-4S2
		Kontr.:	





Q1 BF256

Q2 MPF 820

Type	C 25	VCO-range
1	Not mounted	415 to 520 MHz
2	mounted	370 to 420 MHz

Rettet: 7-11-80 AC/BJ	VCO AP 2000 UHF Print board C84 B 1,2	Tegn.: BC 16-06-80 | Kontr.: BJ 16-06-80 Stykl. nr.: Tegn. nr.:
	AP-RADIOTELEFON	80075-3E2

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-267	47 Ω 1/8 W CR16	C15	11-406	330 pF ker.
R2	13-287	2,2 KΩ " "	C16	11-406	330 pF "
R3	13-283	1 KΩ " "	C17	11-406	330 pF "
R4	13-273	150 Ω " "	C18	11-409	1 nF "
R5	13-273	150 Ω " "	C19	11-409	1 nF "
R6	13-287	2,2 KΩ " "	C20	11-379	12 pF "
R7	13-283	1 KΩ " "	C21	11-406	330 pF "
R8	13-267	47 Ω " "	C22	11-406	330 pF "
R9	13-267	47 Ω " "	C23	11-406	330 pF "
R10	13-283	1 KΩ " "	C24	11-409	1 nF "
R11	13-269	68 Ω " "	C25	11-423	8,2 pF NP0 400V
R12	13-271	100 Ω " "	C26	11-409	1 nF ker.
R13	13-271	100 Ω " "	C27	19-336	18 pF Dau
R14	13-275	220 Ω " "			
R15	13-275	220 Ω " "	D1	04-009	BB105G
R16	13-271	100 Ω " "	D2	04-009	BB105G
R17	13-275	220 Ω " "	D3	04-062	1N4148
R18	13-267	47 Ω " "			
R19	13-273	150 Ω " "	Q1	19-090	MPF 820
R20	13-267	47 Ω " "	Q2	19-110	BFT 95/BFQ 23
R21	13-287	2,2 KΩ " "	Q3	19-110	BFT 95/BFQ 23
R22	13-295	10 KΩ " "	Q4	19-110	BFT 95
			Q5	19-110	BFT 95
C1	19-238	9 pF Tec. Trim.	Q6	19-110	BFT 95
C2	11-368	4,7 pF N750 400V	Q7	19-110	BFT 95
C3	11-434	18 pF ker.			
C4	11-367	3,3 pF N150 400V	L1	25-085	λ/4 coaxlinie
C5	11-409	1 nF ker.			80044-4E2
C6	11-509	47 µF/6,3V tant.			
C7	11-416	4,7 nF ker.	RFC1	25-009	75290-4E2
C8	11-502	1 µF/35V tant.	RFC2	04-109	15 µH Philips
C9	11-409	1 nF ker.	RFC3	04-109	15 µH Philips
C10	11-409	1 nF "	RFC4	04-109	15 µH Philips
C11	11-434	18 pF "	RFC5	04-114	6,8 µH 74016-4E2
C12	11-409	1 nF "			
C13	11-409	1 nF "	TR1	25-008	75289-4E2
C14	11-409	1 nF "			

VCO AP 2000 UHF
Print board C 84 B 2
Tilhører tegn. nr.: 80075-3E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.:
80075-4S2

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-267	47 Ω 1/8 W CR16	C15	11-406	330 pF ker.
R2	13-287	2,2 KΩ " "	C16	11-406	330 pF "
R3	13-283	1 KΩ " "	C17	11-406	330 pF "
R4	13-273	150 Ω " "	C18	11-409	1 nF "
R5	13-273	150 Ω " "	C19	11-409	1 nF "
R6	13-287	2,2 KΩ " "	C20	11-379	12 pF "
R7	13-283	1 KΩ " "	C21	11-406	330 pF "
R8	13-267	47 Ω " "	C22	11-406	330 pF "
R9	13-267	47 Ω " "	C23	11-406	330 pF "
R10	13-283	1 KΩ " "	C24	11-409	1 nF "
R11	13-269	68 Ω " "			
R12	13-271	100 Ω " "	C26	11-409	1 nF ker.
R13	13-271	100 Ω " "	C27	19-336	18 pF Dau
R14	13-275	220 Ω " "			
R15	13-275	220 Ω " "	D1	04-009	BB105G
R16	13-271	100 Ω " "	D2	04-009	BB105G
R17	13-275	220 Ω " "	D3	04-062	1N4148
R18	13-267	47 Ω " "			
R19	13-273	150 Ω " "	Q1	19-090	MPF 820
R20	13-267	47 Ω " "	Q2	19-110	BFT 95/BFQ 23
R21	13-287	2,2 KΩ " "	Q3	19-110	BFT 95/BFQ 23
R22	13-295	10 KΩ " "	Q4	19-110	BFT 95
			Q5	19-110	BFT 95
C1	19-238	9 pF Tec. Trim.	Q6	19-110	BFT 95
C2	11-368	4,7 pF N750 400V	Q7	19-110	BFT 95
C3	11-434	18 pF ker.			
C4	11-367	3,3 pF N150 400V	L1	25-085	λ/4 coaxlinie
C5	11-409	1 nF ker.			80044-4E2
C6	11-509	47 µF/6,3V tant.			
C7	11-416	4,7 nF ker.	RFC1	25-009	75290-4E2
C8	11-502	1 µF/35V tant.	RFC2	04-109	15 µH Philips
C9	11-409	1 nF ker.	RFC3	04-109	15 µH Philips
C10	11-409	1 nF "	RFC4	04-109	15 µH Philips
C11	11-434	18 pF "	RFC5	04-114	6,8 µH 74016-4E2
C12	11-409	1 nF "			
C13	11-409	1 nF "	TR1	25-008	75289-4E2
C14	11-409	1 nF "			

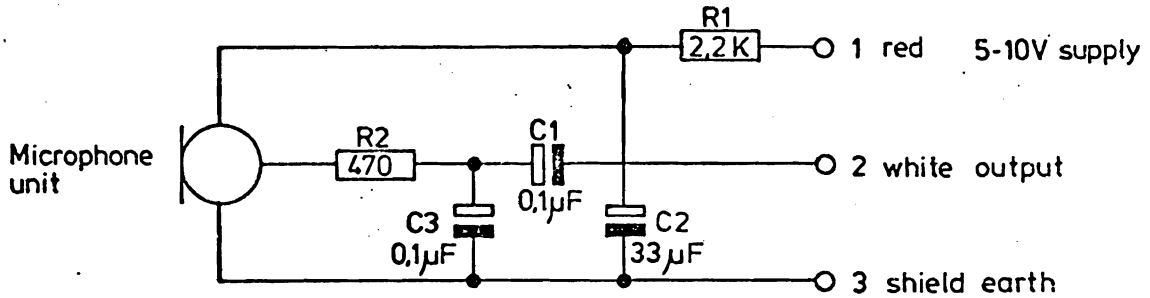
VCO AP 2000 UHF
Print board C 84 B 1
Tilhører tegn. nr.: 80075-3E2

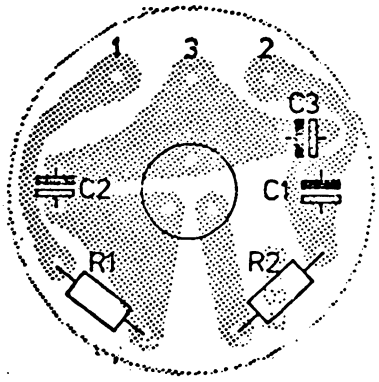
Rettet:

Tegn.:

Kontr.:

Stykl. nr.:
80075-4S2



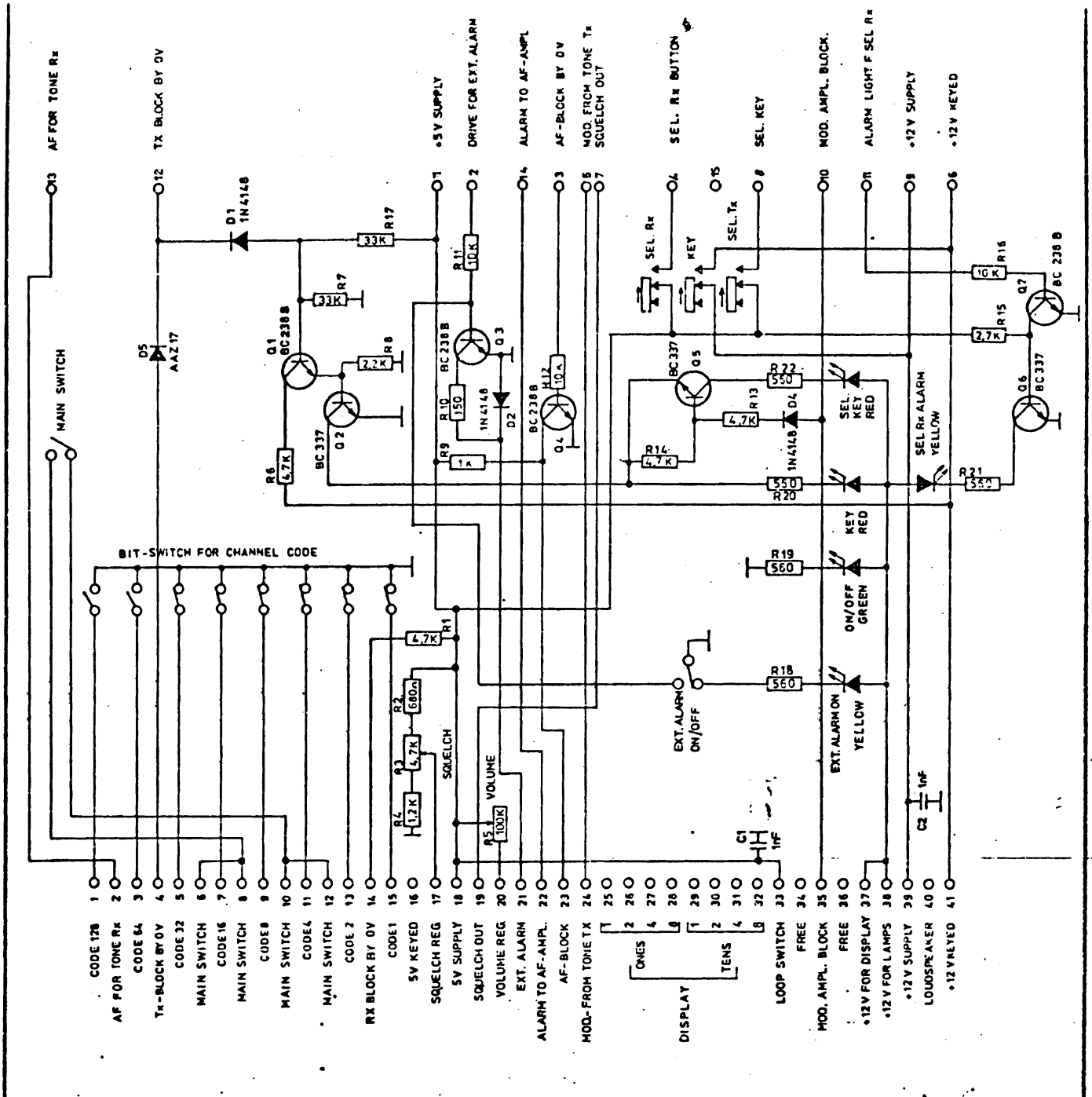


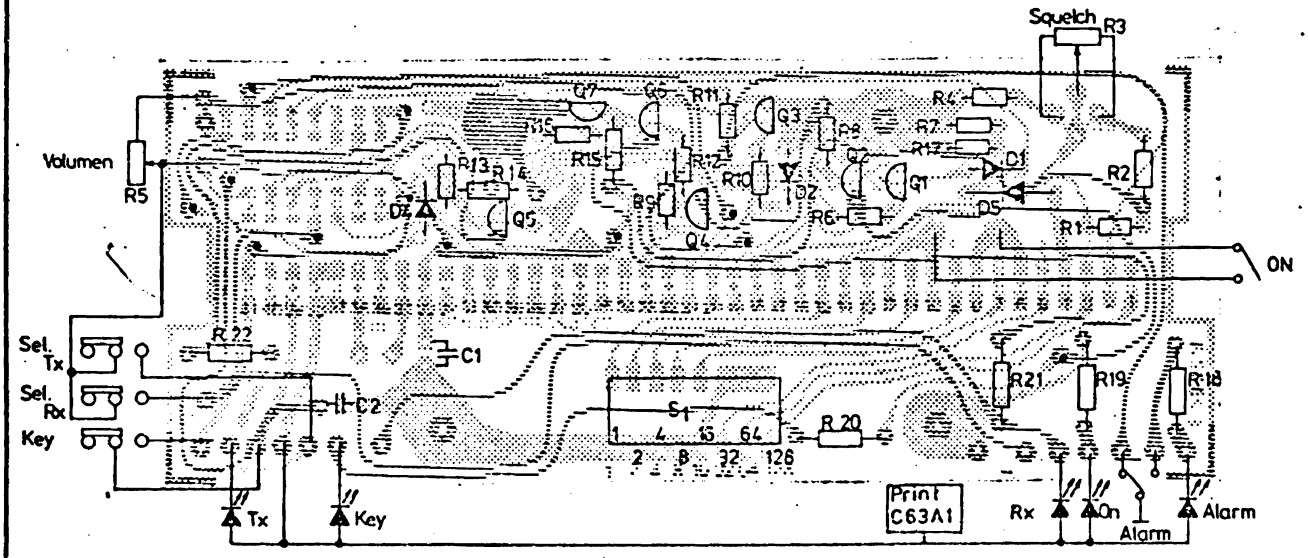
Rettet: 25-5-77 LT/AC 13-10-80 LB/AMC	Microphone 213-020 Print board B 81 B1	Tegn.: 4-3-77 AC	Kontr.:
		Stykl. nr.:	
	AP-RADIOTELEFON A/S	Tegn. nr.: 77127-4E2	

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-287	2,2 KΩ 1/8W CR 16			
R2	13-279	470 Ω " "			
C1	11-500	0,1 µF/35 V tant.			
C2	11-508	33 µF/10 V "			
C3	11-500	0,1 µF/35 V "			
	13-062	Mic. EM-10LB			

Microphone 213-020 Print board B 81 B1 Tilhører tegn. nr.: 77127-4E2	Rettet:	Tegn.:	Stykl. nr.: 77127-4S2
		Kontr.:	





Rettet: 30-9-75 LT/AC 8-6-77 JH/AC 8-2-78 LT/AMC 5-7-79 JH/BC 1-8-79 JH/BC	CONTROL CIRCUIT FOR 1 CHANNEL, FRONTSECTION 04 PRINT B 20E1	Tegn.: 13-2-75 NC Kontr.: 13-2-75 LT Stykl. nr.: Tegn. nr.:
	AP-RADIOTELEFON	75083-3E2

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-291	4,7 KΩ 1/8 W CR16
R2	13-281	680 Ω " "
R3	16-022	4,7 KΩ Potm. "
R4	13-284	1,2 KΩ 1/8 W CR16
R5	16-023	100 KΩ Lin. Potm.
R6	13-291	4,7 KΩ 1/8 W CR16
R7	13-300	33 KΩ " "
R8	13-287	2,2 KΩ " "
R9	13-283	1 KΩ " "
R10	13-273	150 Ω " "
R11	13-295	10 KΩ " "
R12	13-295	10 KΩ " "
R13	13-291	4,7 KΩ " "
R14	13-291	4,7 KΩ " "
R15	13-288	2,7 KΩ " "
R16	13-295	10 KΩ " "
R17	13-300	33 KΩ " "
R18	13-367	560 Ω 1/4 W CR25
R19	13-367	560 Ω " "
R20	13-367	560 Ω " "
R21	13-367	560 Ω " "
R22	13-367	560 Ω " "
C1	11-409	1 nF Ker.
C2	11-409	1 nF Ker.
D1	04-062	1N4148
D2	04-062	1N4148
D4	04-062	1N4148
D5	04-062	AAZ17
Q1	19-093	BC238B
Q2	19-096	BC337
Q3	19-093	BC238B
Q4	19-093	BC238B
Q5	19-096	BC337

Nr.	Kode	Data
Q6	19-096	BC337
Q7	19-093	BC238B

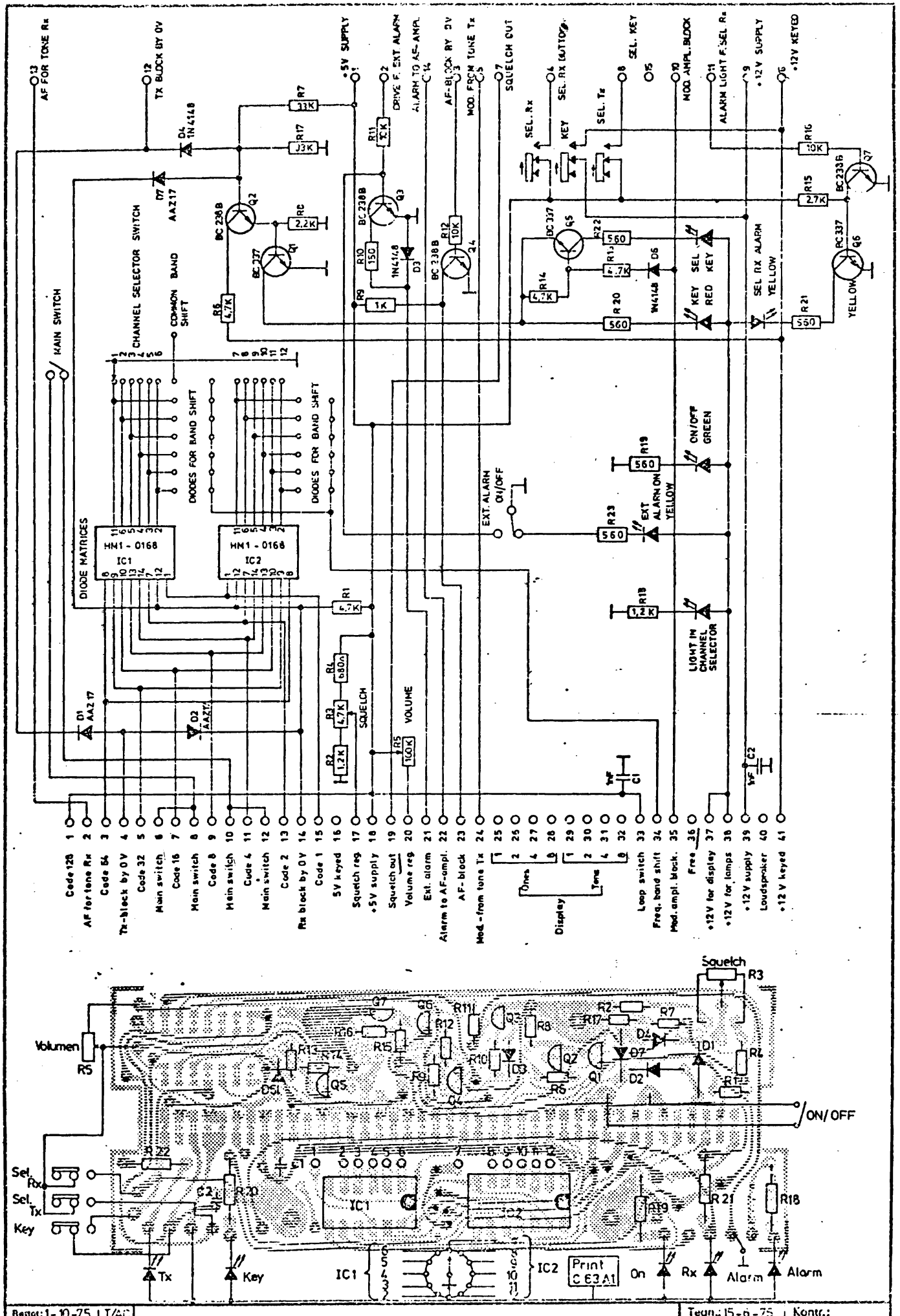
Control circuit for 1 channel
Frontsection 04 Print B20E1
Tilhører tegn. nr.: 75083-3E2

Rettet:

Tegn.:

Kontr.:

Stykl. nr.: 75083-4S2



Rettet: 1-10-75 LT/AC 14-4-77 LT/AC 8-6-77 JH/AC 26-1-78 LT/AMC 30-7-79 MO 31 7 79 JH/BC	CONTROL CIRCUIT FOR 12 CHANNELS, FRONTSECTION 11 PRINT C 47 A1 + C 63 A	Tegn.: 15-6-75 AC | Kontr.: Stykl. nr.: Tegn. nr.: 75084-3E2
	AP-RADIOTELEFON	

AP-RADIOTELEFON

Nr.	Kode	Data
R1	13-291	4,7 KΩ 1/8 W CR16
R2	13-284	1,2 KΩ " "
R3	16-022	4,7 KΩ Potm.
R4	13-281	680 Ω 1/8 W CR16
R5	16-023	100 KΩ Lin.Potm.
R6	13-291	4,7 KΩ 1/8 W CR16
R7	13-300	33 KΩ " "
R8	13-287	2,2 KΩ " "
R9	13-283	1 KΩ " "
R10	13-273	150 Ω " "
R11	13-295	10 KΩ " "
R12	13-295	10 KΩ " "
R13	13-291	4,7 KΩ " "
R14	13-291	4,7 KΩ " "
R15	13-288	2,7 KΩ " "
R16	13-295	10 KΩ " "
R17	13-300	33 KΩ " "
R18	13-284	1,2 KΩ " "
R19	13-367	560 Ω 1/4 W CR25
R20	13-367	560 Ω " "
R21	13-367	560 Ω " "
R22	13-367	560 Ω " "
R23	13-367	560 Ω " "
C1	11-409	1 nF Ker.
C2	11-409	1 nF Ker.
D1	04-002	AAZ17
D2	04-002	AAZ17
D3	04-062	1N4148
D4	04-062	1N4148
	04-062	1N4148
D7	04-002	AAZ17
Q1	19-096	BC337
Q2	19-093	BC238B

Nr.	Kode	Data
Q3	19-093	BC238B
Q4	19-093	BC238B
Q5	19-096	BC337
Q6	19-096	BC337
Q7	19-093	BC238B
IC1	09-067	HM1-0168
IC2	09-067	HM1-0168

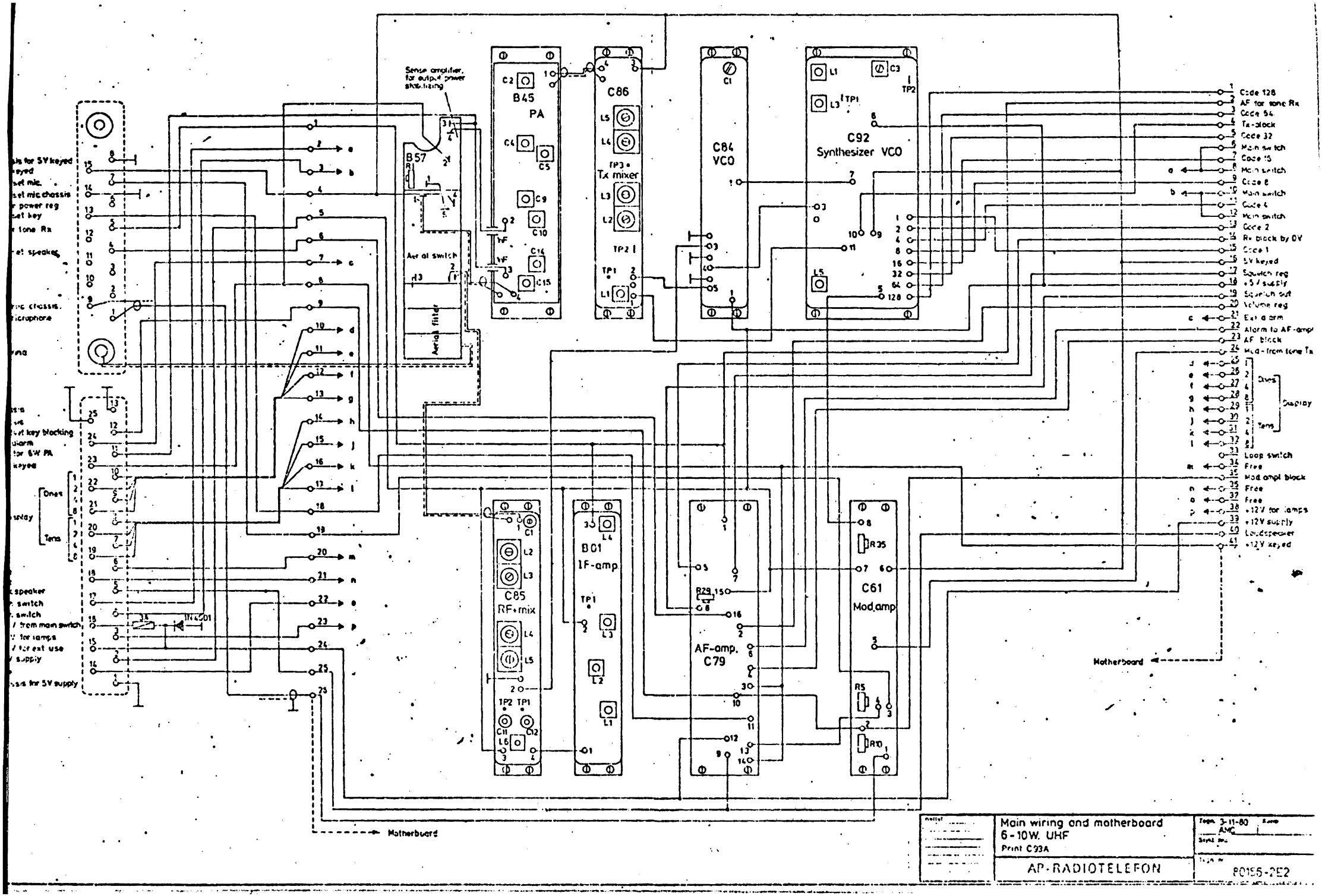
Control circuit for 12 channel
Frontsection 11 Print C47+C63
Tilhører tegn. nr.: 75084-3E2

Rettet:

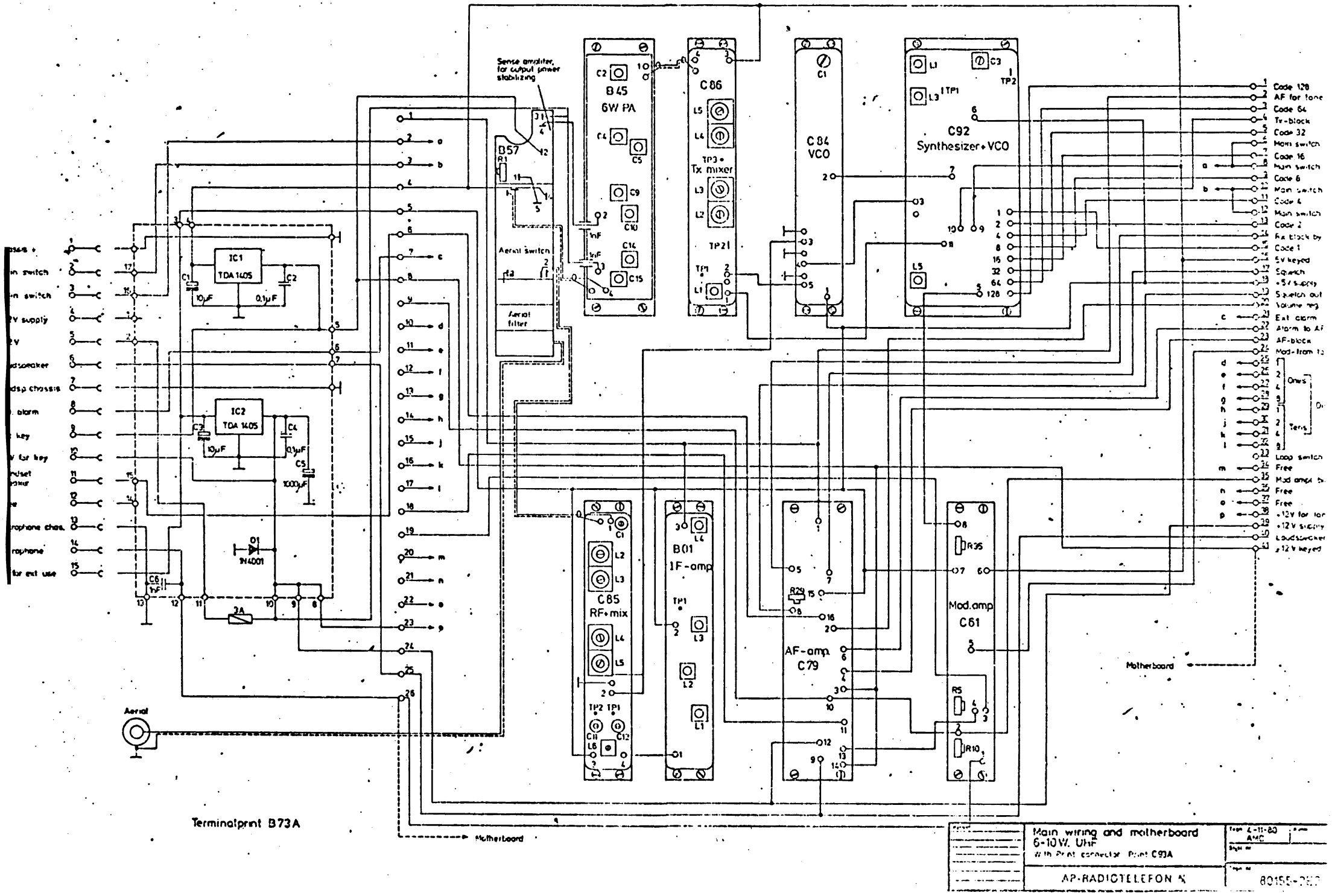
Tegn.:

Kontr.:

Stykl. nr.: 75084-4S2



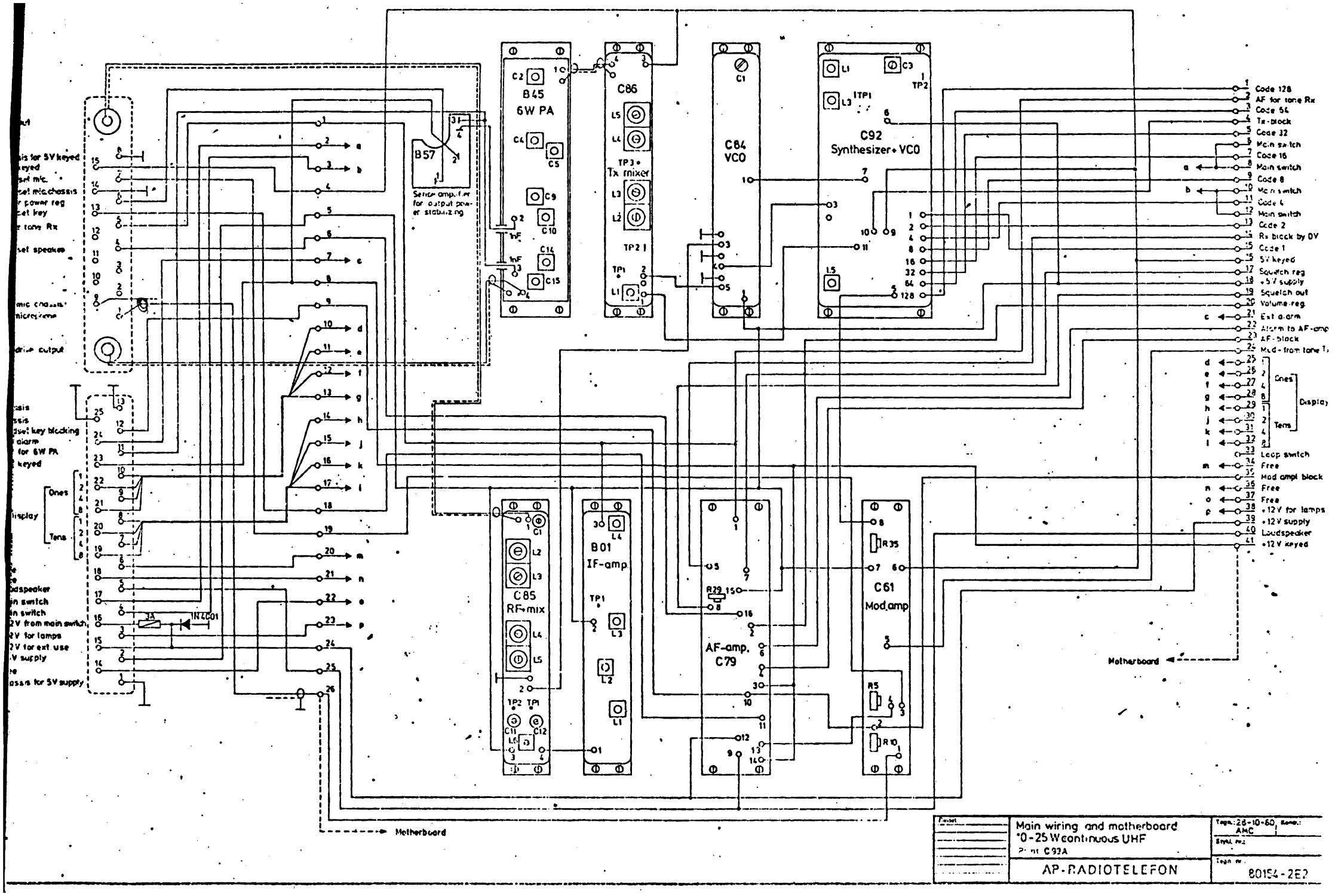
	Main wiring and motherboard 6 - 10W. UHF Print C93A	Tegn. 3-11-80 AMC
	AP-RADIOTELEFON	80155-2E2

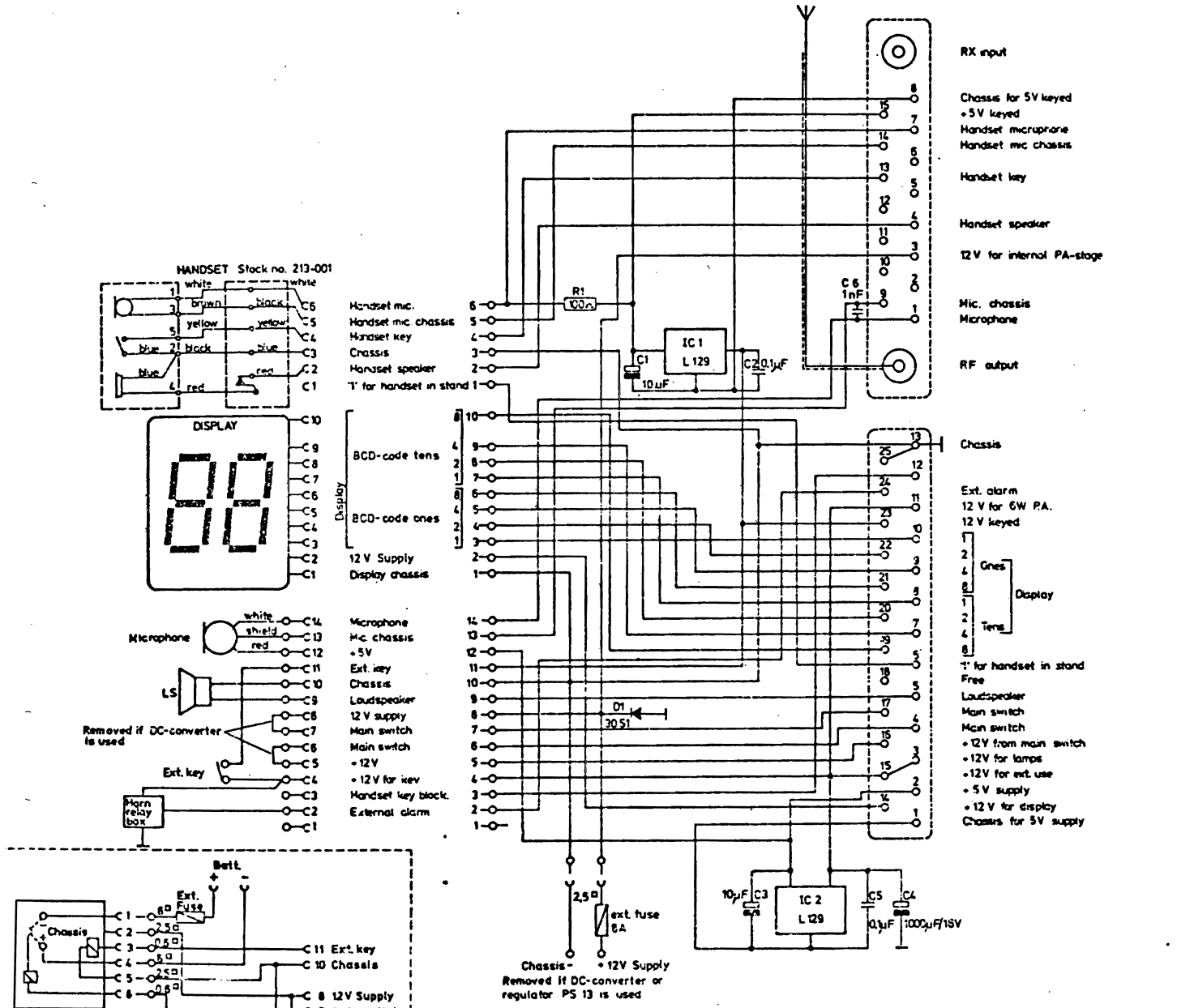


Terminalprint B73A

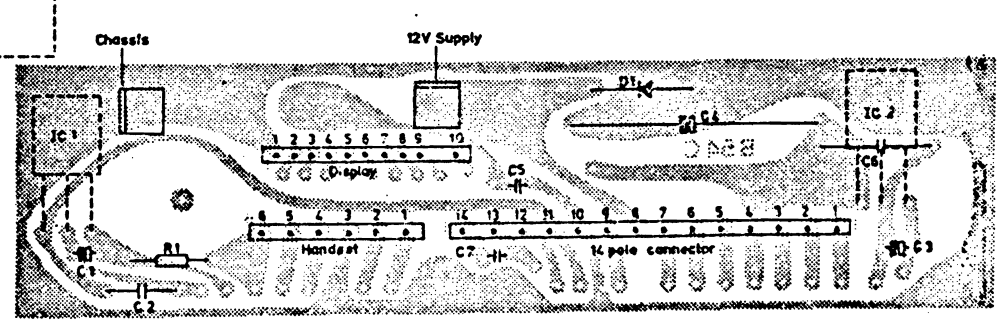
Main wiring and motherboard
6-10W, UHF
With Print connector Print C93A

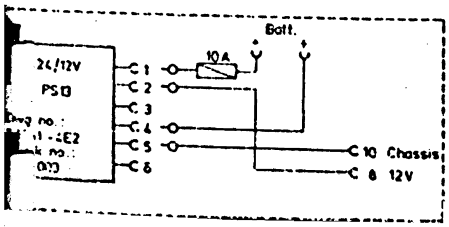
AP-RADIOTELEFON A


B45
6W PA
C86
TP3 • Tx mixer
C84
VCO
C92
Synthesizer • VCO
B57
Sensor amplifier for output power stabilizing
C85
RF-mix
B01
IF-amp
AF-amp.
C79
C61
Mod.amp
R35
R29
R5
R10
IN4001
3A
Code 128
AF for tone Rx
Code 64
Tx-block
Code 32
Main switch
Code 16
Main switch
Code 8
Main switch
Code 4
Main switch
Code 2
Rx block by 0V
Code 1
5V keyed
Squelch reg
+5V supply
Squelch out
Volume reg
Ext alarm
Alarm to AF-amp
AF-block
Mod-from tone T
Ones
Tens
Display
Loop switch
Free
Mod ampl block
Free
Free
+12V for lamps
+12V supply
Loudspeaker
+12V keyed
Motherboard
Motherboard
Main wiring and motherboard
0-25 W continuous UHF
AP-RADIOTELEFON
80154-2E2



nnections for AP DC-Converter
or 12V: Dwg.no 68171/4 Stock no. 203-001
V: Dwg. no. 68196/4 Stock no. 203-002
can not be used at 25W UHF)





Kontr. 6-9-76 TT/AC	Installation for AP 2000 with internal PA-stage	Tegn. 14-2-75 AC
		Kontr.:
		Erstl. av.:

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-359	100 Ω ¼ W CR 25			
C1	11-506	10 µF/25V Tant.			
C2	11-353	0,1 µF Laco			
C3	11-506	10 µF/25V Tant.			
C4	05-030	1000 µF/16V Elko			
C5	11-353	0,1 µF Laco			
C6	11-409	1 nF ker.			
D1	04-040	30S1			
IC2	18-107	L 129			
IC1	09-081	TDA 1405			
IC2	09-081	TDA 1405			

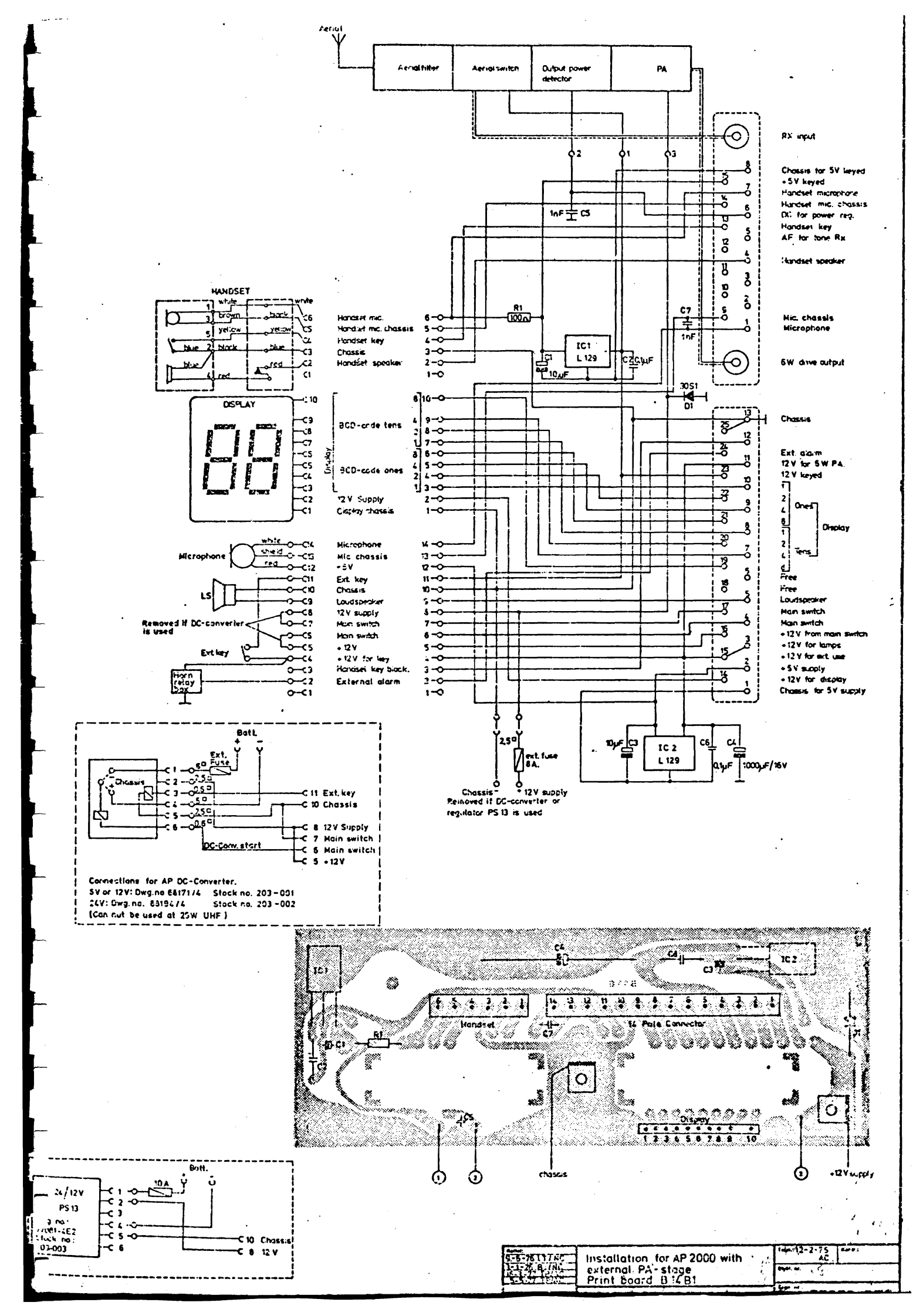
Installation for AP 2000 int.
Print board B 54 C 2 PA
Tilhører tegn. nr.: 75061-2E2

Rettet:

Tegn.:

Kontr.:

Styki. nr.: 75061-4S2


Aerial
Aerial filter
Aerial switch
Output power detector
PA
RX input
Chassis for 5V keyed
+5V keyed
Handset microphone
Handset mic. chassis
DC for power reg.
Handset key
AF for tone Rx
Handset speaker
Mic. chassis
Microphone
6W drive output
1nF C5
R1 100Ω
C7 1nF
IC1 L 129
C1 10µF
C2 0,1µF
30S1
D1
HANDSET
white
brown
yellow
black
blue
red
Handset mic.
Handset mic. chassis
Handset key
Chassis
Handset speaker
DISPLAY
BCD-code tens
BCD-code ones
Display
12V Supply
Display chassis
Microphone
shield
Mic chassis
+5V
LS
Ext. key
Chassis
Loudspeaker
12V supply
Main switch
Removed if DC-converter is used
Ext key
+12V
+12V for key
Horn relay box
Handset key block.
External alarm
Chassis
Ext. alarm
12V for 5W PA.
12V keyed
Ones
Tens
Display
Free
Free
Loudspeaker
Main switch
Main switch
+12V from main switch
+12V for lamps
+12V for ext. use
+5V supply
+12V for display
Chassis for 5V supply
2,5A
ext. fuse 8A.
Chassis – Removed if DC-converter or regulator PS 13 is used
+12V supply
10µF C3
IC 2 L 129
C6 0,1µF
C4 1000µF/16V
Batt.
Ext. Fuse
Chassis
11 Ext. key
10 Chassis
8 12V Supply
7 Main switch
6 Main switch
5 +12V
DC-Conv. start
Connections for AP DC-Converter.
5V or 12V: Dwg.no 68171/4 Stock no. 203-001
24V: Dwg.no. 68194/4 Stock no. 203-002
(Can not be used at 25W UHF)
IC1
IC2
C4
C6
C3
Handset
14 Pole Connector
C7
R1
C1
C2
Display
chassis
+12V supply
24/12V
PS 13
10A
10 Chassis
8 12V
Installation for AP 2000 with external PA-stage
Print Board B 14 B1
12-2-75
AC

AP-RADIOTELEFON

Nr.	Kode	Data	Nr.	Kode	Data
R1	13-359	100 Ω ¼ W CR 16			
C1	11-506	10 µF/25V Tant.			
C2	11-353	0,1 µF Laco			
C3	11-506	10 µF/25V Tant.			
C4	05-030	1000 µF/16V Elko			
C5	11-409	1 nF Ker.			
C6	11-353	0,1 µF Laco.			
C7	11-409	1 nF Ker.			
D1	04-040	30S1			
IC1	09-081	TDA 1405			
IC2	09-081	TDA 1405			

Installation for AP 2000, ext PA
Print board B 14 B 1
Tilhører tegn. nr.: 75058-2E2

Tegn.:
Kontr.:

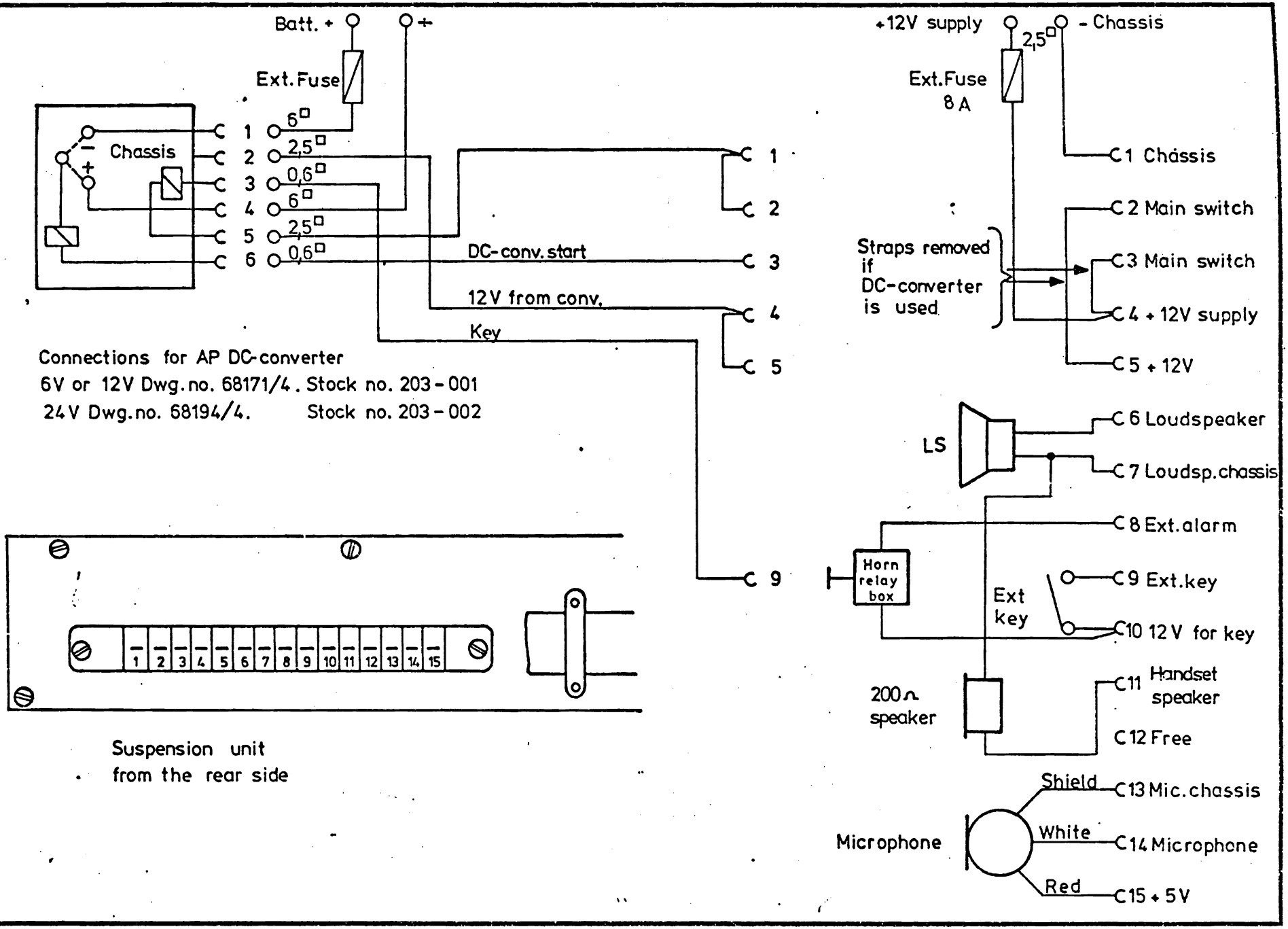
Stykl. nr.: 75058-4S2

Rettet:
30-3-77 LT/NC
16-6-77 HM/AC
16-10-78 IM

AP-RADIOTELEFON A/S

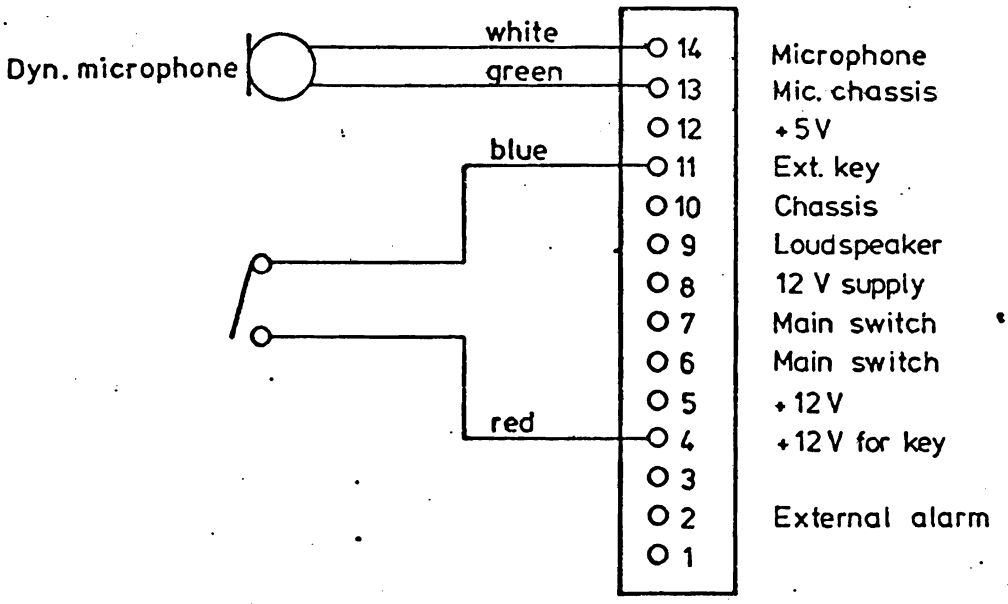
Installation for AP 2000 with printconnector

Tegn.: 10-1-77 HJ.
Kontr.: 12-1-77 BJ.
Stykl. nr.:
Tegn. nr.: 77001-4E2.



Connections for AP DC-converter
6V or 12V Dwg.no. 68171/4. Stock no. 203-001
24V Dwg.no. 68194/4. Stock no. 203-002

Suspension unit
from the rear side



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