

DANMAR RT 210

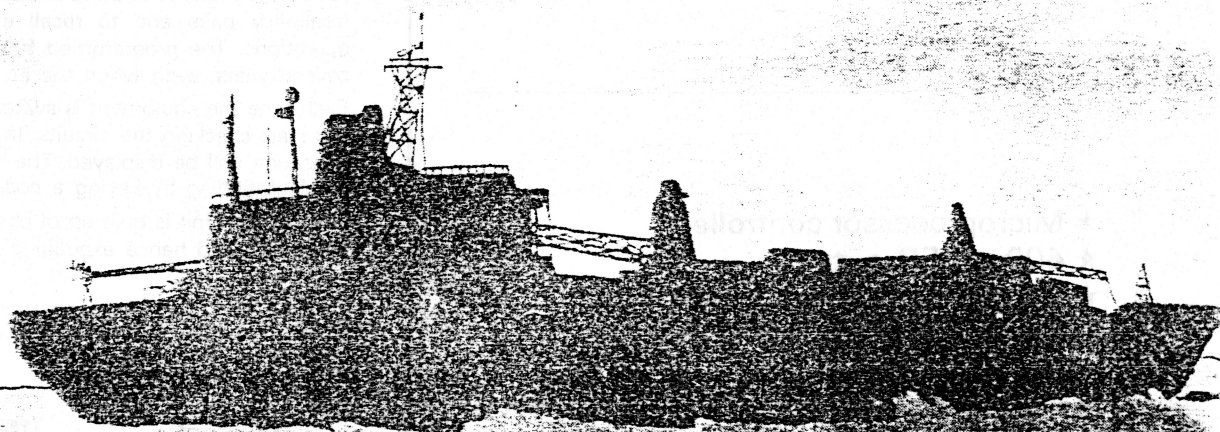
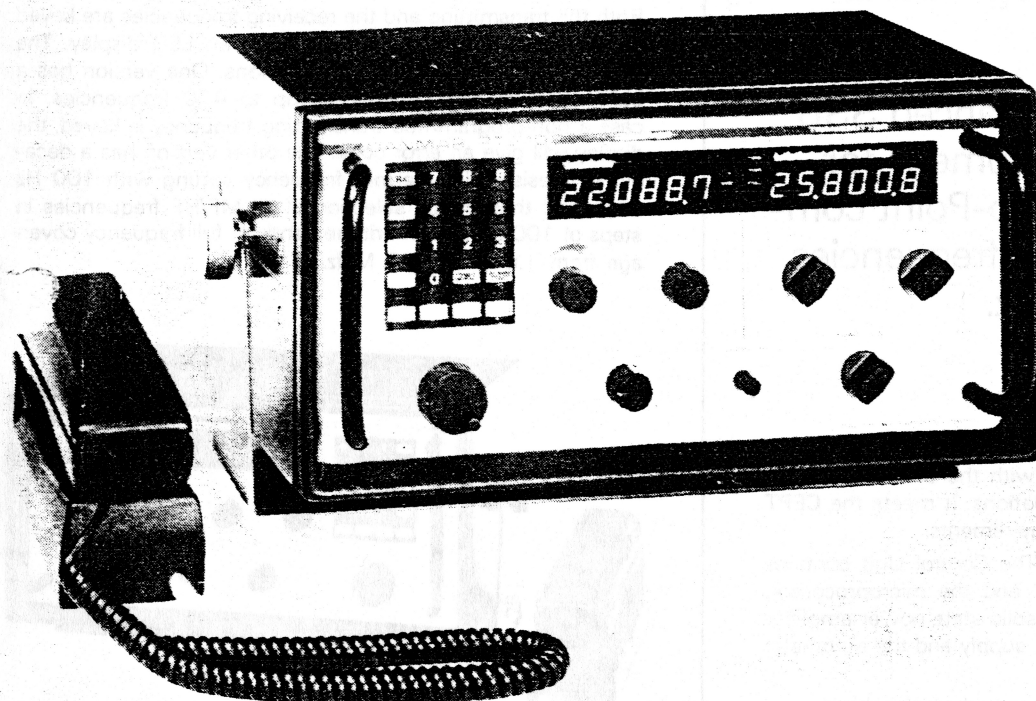
MICROPROCESSOR CONTROLLED

SSB MF/HF

RADIOTELEPHONE

400 WATT P.E.P.

1.6 TO 28 MHz



**DANISH MARINE
COMMUNICATION** A/S

SORUP . DK-9530 STOVING . DENMARK . PHONE 08-37 19 22 . TELEX 69840 dk

SSB Radiotelephone RT210

The World's most advanced SSB Radiotelephone Equipment for Maritime and Point-to-Point communication covering frequencies from 1.6 to 28 MHz.

The RT 210 is designed for use on compulsorily or voluntarily fitted vessels and complies with the SOLAS 74 conventions and the ITU Radio Regulations. It meets the CEPT specifications and the national requirements.

The RT 210 consists of 2 units. The Control Unit contains the complete receiver, the exciter and the microprocessor. The Transmitter Unit contains the solid state power amplifier for 400 or 200 W PEP, the power supply and the automatic antenna tuning unit.

Both units are housed in a nylon-coated steel cabinet.

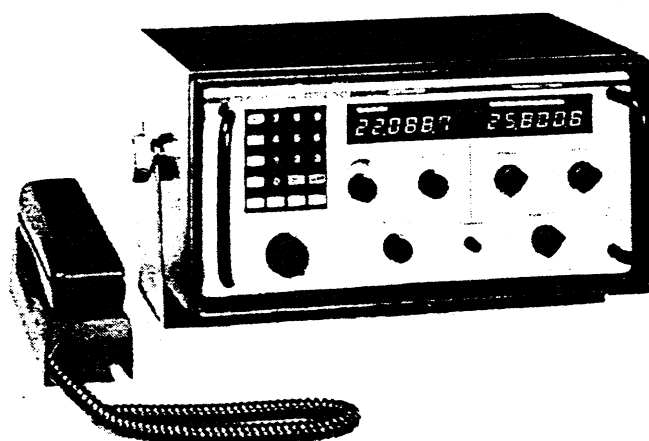
The 100% transistorisation results in an extremely low power consumption.

The RT 210 has no "STAND-BY" position. When the Function Switch is in transmitting position, the transmitter is instantly ready.

- ★ Microprocessor controlled
- ★ 400w PEP output
- ★ Keyboard selection
- ★ Fully synthesized with 100 Hz resolution
- ★ Memory for 80 pairs of frequencies
- ★ Continuously variable receiver from 100 KHz to 30 MHz
- ★ 600 ohm balanced line input/output
- ★ Built-in two-tone alarm generator
- ★ Fully duplex operation
- ★ Built-in self-check facility
- ★ Low power consumption
- ★ Built-in dummy load
- ★ Built-in automatic antenna tuner
- ★ Extremely small dimensions

CONTROL UNIT

Both the transmitting and the receiving frequencies are keyed on the keyboard and are indicated on an LED display. The Control Unit is available in two versions. One version has a built-in PROM programmable for up to 400 frequencies. In case a non-programmed transmitting frequency is keyed, the display will give an error code. The other version has a decadic synthesis which permits frequency setting with 100 Hz steps and thereby full selection of all MF/HF frequencies in steps of 100 Hz in all maritime bands or full frequency coverage from 1.6 to 29.999 MHz.

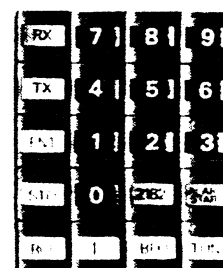


The keyboard permits the operator to program up to 80 pairs of frequencies with his busiest receiving and transmitting frequency pairs and to recall each pair with a few operations. The programmed frequencies will be stored for several years, even when the equipment is switched off.

Each time the equipment is switched on, the microprocessor will start checking the circuits. In case of fault, a fault code indication will be displayed. The service technician can start the fault-finding by keying a code on the keyboard.

The Control Unit is built up of plug-in modules which can be easily replaced hence expediting service.

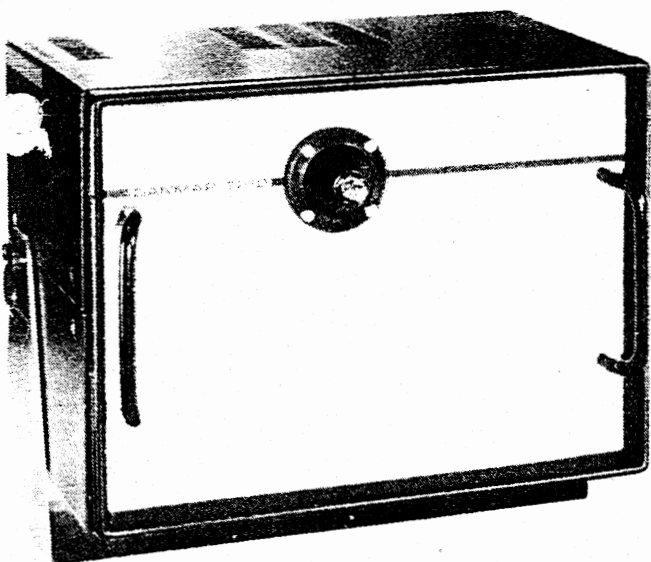
Keyboard.



TRANSMITTER UNIT

This unit contains the power amplifier, the power supply and the automatic antenna tuning system.

The antenna tuning system starts tuning when the transmitting frequency has been entered. The fine tuning starts at the moment when the microtelephone is removed from the cradle.

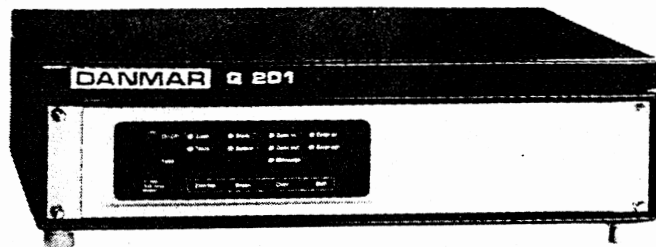


The power supply unit operates at voltages between 21.6 and 45 V.d.c. The output power is constant within the whole voltage variation range. To make the antenna installation most efficient, the transmitter unit can be mounted at a distance of up to 50 metres from the Control Unit.

If there should be a fault in the antenna installation - detached antenna, short-circuited antenna, or too short (broken) antenna - the transmitter will not be damaged or stop transmitting. The fully transistorized output stage will adjust the output to a suitable level and go on transmitting.

OPTIONS

- ★ 200 or 400 W P.E.P.
- ★ Programable transmitter
- ★ Higher stability TCXO
- ★ LSB/USB
- ★ 10.5 – 45 V.d.c.
- ★ 90 – 145/175 – 290 V.a.c.
- ★ 12 V.d.c. version (200 W only)
- ★ Battery charger



- ★ Reliable and simple operation
- ★ User programmability
- ★ 24 hours unattended operation
- ★ SITOR operation
- ★ Up to 64.000 character text memory
- ★ Comprehensive file manager and text editor
- ★ Interface to Baudot and ASCII equipment
- ★ Full RX/TX control by simple, adjustable interface
- ★ Flexible mark- and spacefrequencies
- ★ Dual bandpass filter tracking and dynamic threshold control
- ★ Cabinet version

The Q201 Radiotelex Modem provides automatic ARQ/FEC communication in Maritime and Point-to-Point applications. It fulfils all relevant CCIR recommendations.

The Q201 recognizes individual and group calls with automatic reception and transmission of messages. The unit is very flexible with user control of all relevant functions. Parameters selected during installation are stored permanently in the computer. Any later modification can be carried out directly from the keyboard.

The Q201 can be programmed for any combination of mark and space frequencies in the audio band from 1 KHz to 3 KHz. The demodulator features ± 100 Hz tracking range. It is designed with due respect for the HF medium and compensates for selective fading by adaptive threshold control. A special bit-slicing technique is used to correct multi-path distortion.

The Q201 includes a large text memory of 16.000 characters, expandable up to 64.000 characters with optional battery back-up. An effective file handler and a text editor gives the Q201 word processing facilities.

TECHNICAL DATA

GENERALLY

Freq. presentations:	Two 6-digit LED displays
Freq. accuracy:	Better than 40 Hz Short term (15 min.) 20 Hz
Operating modes:	Duplex, Semiduplex, Simplex F1, A1, A3A, A3H and A3J
Operating temp.:	-10°C to +55°C
2182 KHz selection:	By keyboard entered simultaneously for TX and RX, also providing auto- matic selection of A3H and Simplex modes
Power supply:	21.6-45 V.d.c. External a.c. power supply with auto- matic change-over to d.c.
Weight:	20 kg

TRANSMITTER:

Output power:	400 W P.E.P. - Option 200 W P.E.P.
Power reduction:	Full - ½ - ¼ - Low
Frequency range:	1.6 to 28 MHz
Transmitter freqs.:	Maximum 400 programable channels or free frequency selection in 100 Hz steps
Antenna requirements:	7-20 metres
Antenna tuning:	Fully automatic
Two-tone alarm:	Incorporated

RECEIVER:

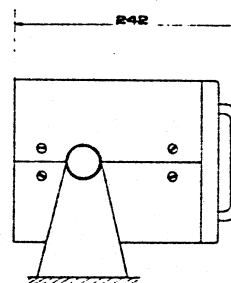
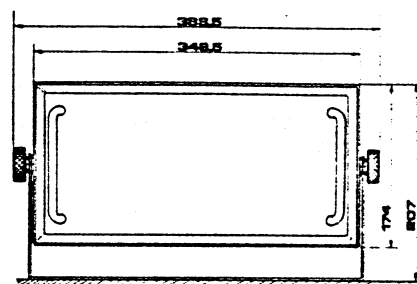
Frequency range:	100 KHz to 29.999 MHz
Frequency tuning:	Tuning in 10 Hz steps. The Hz per revolution ratio increases with the rotation speed of the knob
Sensitivity:	AM: 3 µV for 10 dB S/N CW/SSB: 1 µV for 10 dB S/N
Audio output:	3.5 W into 4 Ω to external loud- speaker

Above specifications are subject to change without notice.

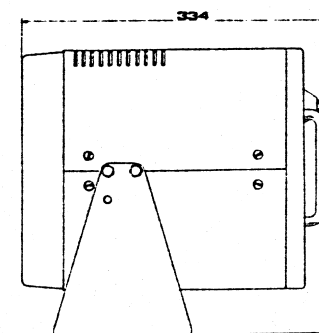
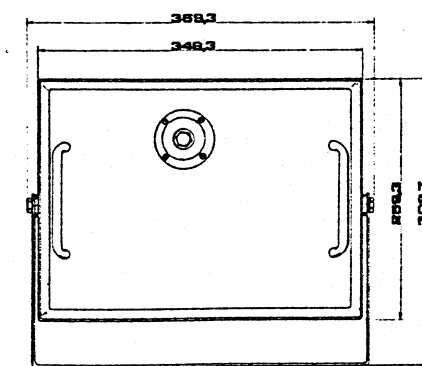
Your Authorized Danmar Dealer is:

DIMENSIONS

RT210



T210



RT 210 OPERATING INSTRUCTIONS

1. SWITCH ON: Turn function sw to RX - Sx or Dx.
2. If no error occurs, the display shows 2182.
3. Should there be fault(s) in the system, the display will show an error code which refers to RT 210 ERROR CODE SCHEMATIC.
4.
 - A. To select an RX frequency, press the (RX) key.
 - B. Thereafter select a frequency by using the keyboard.
 - C. Then press (ENT) to enter the frequency.
 - D. The set-up can now be stored.
 - E. First press (STO) . Then press (RX) . Next select a storage location number between 1 and 100.
 - F. Then press (ENT) to enter the frequency into the storage.
5. The same procedure applies to the (TX) frequency selection.
6. The RX and the TX set-ups can also be stored as a pair. In this case both RX and TX must be set-up before one of the location numbers is entered into the storage.
7. The storage capability is 100 pairs of RX and TX set-ups.
8. To recall a frequency the procedure is as follows:
 - A. Press (RCL) and the wanted storage location number.
 - B. Press (ENT) and the displays show the selected frequency pair (RX and TX).
 - C. To recall either an RX or a TX frequency from the storage: Press (RCL) . Thereafter press (RX) or (TX) and the storage number. Finally press (ENT)
 - D. The selected frequency is now displayed in either the TX or the RX display.
 - E. If the storage location is an invalid number (>100), the display will show ERROR 2 for invalid location No in STO/RCL.
 - F. If the wanted RX location number is empty, the display shows ERROR 4.
 - G. If the wanted TX location number is empty, the display shows ERROR 5.

9. RX FUNCTIONS:

- A. To select TUNE press TUNE and the tuning knob is activated.
- B. When the knob is turned slowly, the frequency changes in 10 Hz steps.
When the knob is turned at a faster pace, the frequency is changed in three stages.
If the tune key is pressed once more, the tune function is inhibited again.
- C. In position A1A the tuning knob acts as BFO control.
To activate this function, press the BFO knob. If pressed again, the function is released.

10. To select 2182 press the RED BUTTON marked 2182.
Both displays show 2182, and the decimal points start flashing.
In position 2182 the mode is automatically set for H3E MODE and FULL PWR.
Operation of the power and the mode switches has no effect.
To release press ENT and the set returns to normal operation.
The decimal point will not flash.

11. MODE SWITCH FUNCTIONS:

- A. In position ANT GND the antenna is grounded in the PA box T210.
- B. In position ANT OPEN the antenna is left open.
- C. In position J3E the set operates in USB mode.
- D. In position H3E the set operated in SSB FULL CARRIER.
- E. In position F1B the set operates in TELEX MODE and the 600 ohm line input is selected.
Furthermore, the power reduction does not allow selection of FULL PWR.
The "RED" is displayed in the TX window.
- F. In position A1A the set operates in CW mode.
- G. In position R3E the set operates in SSB MODE REDUCED CARRIER.

12. ALARM OPERATION:

- A. In position TEST ALARM the set can be tested to check that the PA and the Tuner operate correctly.

When ALARM START is pressed, the built-in dummy load is switched on.

The ANT CURRENT INDICATOR shows that there is RF power at the antenna tuner output.

At the same time the antenna is grounded so that no incidental distress call can be transmitted.


B. DISTRESS OPERATION:

1. Select 2182 by pressing the "2182" key.
2. Set mode switch in position SEND ALARM.
3. Press the ALARM START key and the alarm will operate for 45 seconds.
(The alarm can be stopped by repressing the "ALARM START" key).
4. When the alarm stops, the distress procedure can be continued.

13. POWER SWITCH OPERATION:

The power switch allows the operator

1. to select FULL PWR (400 W PEP) except in F1B and A1A.
 2. to select $\frac{1}{2}$ PWR
 3. to select $\frac{1}{4}$ PWR
 4. to select LOW PWR
- } the "RED" indicator is turned on.

14. Switch on the RT210 - Function Switch in position RX - ignore ERROR 31.
The receiver is checked by following the Operating Instructions.
Other ERRORS - Pls see the error table.
- 1)  VOLUME
 - 2) Sensitivity fully clockwise = max sensitivity.
 - 3) Ant. Tune is turned to maximum on RX Bargraph, when a station is received.
 - 4) Tune button for continuously variable station search.
15. Turn FUNCTION SWITCH into position SX.
The ANTENNA TUNER starts tuning a transmit frequency e.g. 2182 KHz.
When the tuning is terminated:
- 1) Press digit 5 till the display shows A.cal - 30.000.0 which it will do after about 15 secs.
 - 2) Press digit 1 briefly. Hereafter the display starts counting downwards.
- The impedance of the transmitter antenna is now being measured and the result is stored in the computer.
- When the counting is terminated, the receiver/transmitter display will return to the most recently keyed frequency.
16. Dismount the top and bottom covers on T210.
17. Dismount the front.
18. The antenna feeder is connected to the antenna wire in T210 (plug placed on the antenna horn).
19. Press the red 2182 button.. The tuner starts. After finished tuning, continue with point 20. - If errors are displayed, repeat 19.
20. Next to the variometer on the relay driver print, the DIL switches placed opposite the switched on light diodes must be switched on, and the DIL switches placed opposite the switched off light diodes must be switched off.
- With the LEVER of the toggle switch tilted towards the middle of the tuner check that the light diodes remain unchanged.
- Tilt back the LEVER of the toggle switch (towards the end of the tuner).
21. The red tape-marking sent with the equipment is glued onto the print next to the wheel on the variometer coil.
- Also the aluminium wheel on the variable capacitor is marked with tape opposite the red tape on the tune motor for the drive capacitor.

22. Tilt the toggle switch towards the middle once more.

Press the key **ENT** . The tuner must hereby tune to the exact same setting as that shown by the red marks. If this is not the case, repeat points 19 to 22.

23. Tilt back the toggle switch towards the end of the tuner.

24. In case of tuner failure on the frequency 2182 KHz, the newly marked setting must be selected manually.

25. Check the equipment on all bands.

Make a test call to a coast station.

RT 210 ERROR CODE

HELP	Ø	=	INVALID MODE
HELP	1	=	INVALID KEY
HELP	2	=	INVALID CHANNEL/LOCATION NO
HELP	3	=	INVALID RX/TX FREQUENCY IN MODE
HELP	4	=	RECALLED RX CHANNEL/LOCATION EMPTY
HELP	5	=	RECALLED TX CHANNEL/LOCATION EMPTY
HELP	6	=	TX KEY BLOCK
HELP	7	=	MODE/FREQUENCY CONFLICT

RT 210 ERROR CODE

ERROR	20	=	COMMUNICATION ERROR
ERROR	21	=	COMMUNICATION BREAK
ERROR	22	=	INVALID COMMAND REC.
ERROR	23	=	BUFFER OVERFLOW
ERROR	24		
ERROR	25		
ERROR	26		
ERROR	27		
ERROR	30	=	RAM CHANNEL/LOCATION ERROR
ERROR	31	=	TUNER PREDATA ERROR
ERROR	32	=	POWER UP/DOWN ERROR
ERROR	33	=	MPU WATCH DOG ERROR
ERROR	34	=	MPU INTERRUPT WATCH DOG ERROR
ERROR	35		
ERROR	36		
ERROR	37		
ERROR	40	=	TUNER WILL NOT RETURN TO STARTING POSITION
ERROR	41	=	TUNING TIME OUT
ERROR	42	=	TUNE ERROR
ERROR	43		
ERROR	44		
ERROR	45	=	SWR ERROR
ERROR	46	=	TUNER OVERHEAT
ERROR	47	=	
ERROR	50	=	SYNTHESIZER LOCK ERROR
ERROR	51		
ERROR	52		
ERROR	53		
ERROR	54		
ERROR	55		
ERROR	56		
ERROR	57		
ERROR	60	=	KEY SCAN ERROR
ERROR	61	=	MODE/PWR/FUNCTION ERROR
ERROR	62	=	INTERRUPT ERROR
ERROR	63	=	TIMER ERROR
ERROR	64		
ERROR	65		
ERROR	66		
ERROR	67		

RT 210 ERROR CODE

ERROR 20	=	COMMUNICATION ERROR
ERROR 21	=	COMMUNICATION BREAK
ERROR 22	=	INVALID COMMAND REC
ERROR 23	=	BUFFER OVERFLOW
ERROR 27	=	STI ERROR
ERROR 30	=	RAM CHANNEL/LOCATION ERROR
ERROR 31	=	TUNER PREDATA ERROR
ERROR 32	=	POWER UP/DAWN ERROR
ERROR 33	=	MPU WATCHDOG ERROR
ERROR 34	=	MPU INTERRUPT WATCHDOG ERROR
ERROR 40	=	TUNER WILL NOT RETURN TO STARTING POS.
ERROR 41	=	TUNING TIME OUT
ERROR 42	=	TUNE ERROR
ERROR 43	=	PREDATA ERROR
ERROR 44	=	POWER FAIL
ERROR 45	=	SWR ERROR
ERROR 46	=	TUNER OVERHEAT
ERROR 47	=	TUNER RESET
ERROR 50	=	SYNTHESIZER LOCK ERROR
ERROR 60	=	KEY SCAN ERROR
ERROR 61	=	MODE/PWR/FUNCTION ERROR
ERROR 62	=	INTERRUPT ERROR
ERROR 63	=	TIMER ERROR
ERROR 64	=	STACK POINTER ERROR
ERROR 70	=	ILLEGAL BAND UNIT
ERROR 71	=	ILLEGAL RECIVER
ERROR 72	=	ILLEGAL SYNTHESIZER
ERROR 73	=	ILLEGAL EXCITER

EXCITER

The AF connection takes place via 3 inputs. These are opened by the processor depending on the selected mode.

The transistor T1 mutes the 600 ohm line input.

The transistor T2 mutes the microphone input.

The transistor T3 mutes the ALARM tone input.

The AF signal is fed into pin 2 on IC1A from where it is fed into pin 4 on IC2. IC2 is an audio compressor, which starts attenuating when the output signal on pin 8 is approx. 200 mV rms. The compressor ensures that the AF signal does not exceed the 200 mV.

The AF signal is fed from pin 8 on IC2 into IC1B. The amplification of IC1B is adjusted with R24 to maximum output voltage without the signal being distorted at any time.

The signal is fed from pin 7 on IC1B into the mixer IC3. IC3 is a double balanced high level mixer, the injection signal of which is 9 MHz and comes from the TCXO. The 9 MHz residual carrier is outbalanced with the potentiometer P2.

The product from the mixer contains both side bands. The carrier is attenuated by minimum 43 dB. Should the modulation frequency be 1.7 KHz, the mixer will produce two frequencies - 9001,700 KHz and 8998,300 KHz.

In position USB the USB filter allows only the upper side band - 9000,350 KHz to 9002,700 KHz to pass.

In position LSB the LSB filter allows only the lower side band 8999,650 KHz to 8997,300 KHz to pass.

The filters allow only side bands of minimum 350 Hz to maximum 2700 Hz to pass.

The signal is fed from the USB/LSB filters into a diode switch controlled attenuator. The diodes D9 to D12 are controlled from the microprocessor.

The diode D9 conducts in position SSB - J3E.

The signal will pass through the capacitors C35-37 without being attenuated.

The diode D10 conducts in position R3E.

The signal passes through the voltage divider R45-R46-R47 before being directed through C36-37. The signal is attenuated by 1 dB.

The diode D11 conducts in position AM H3E.

The signal passes through the voltage divider R45-R46-R47 where it is attenuated by 6 dB.

The diode D12 conducts in position CW - A1A.

The capacitor C34 will prevent signals from passing.

CARRIER REINSERTION

The microprocessor will reinsert the missing carrier in the various emission modes.

The carrier level is controlled by IC4. The diodes D13-D16 are connected alternately in the various modes. The attenuator consists of R61, R62, R63, R64, R65. The carrier level is adjusted to the correct ratio with the potentiometer P3.

Diode D16 is switched on in position J3E-SSB, resulting in the carrier being attenuated through the voltage divider R64, R65, C49 by at least 43 dB in relation to the output signal.

D14 is switched on in position R3E. The carrier level is attenuated by 18 dB in relation to the output signal.

D13 is switched on in position H3E-AM. The carrier level is attenuated through the voltage divider R61, R62, R63 by 6 dB in relation to the output signal.

D15 is switched on in position A1A-CW. The carrier level is attenuated by R64, R65.

SUM AMPLIFIER

The side-band and the carrier in the ratio described above are added up in the sum amplifier.

The signal from the attenuator is fed into the base of T8.
The carrier from the attenuator is fed into the base of T7.
The sum of these two signals is fed into T9.

The signal is amplified by T9 and is thereafter fed into the power switch. T9 has an adjustable amplification. The processor is capable of connecting three resistors in parallel to R86 - the EMITTER RESISTOR. The result is that the amplification is adjusted in 1 dB steps. IC5 connects the three resistors through D17-D19.

Through IC5 the processor selects the four output levels - FULL POWER - 1PWR - 1/4 PWR - LOW POWER. The diodes D23-D30 connect the attenuators. The signal from the Power Switch can be adjusted with P4.

1st MIXER

The signal from the Power Switch is fed into the 1st Mixer IC8 - a double balanced high level mixer.

The injection signal comes from the 100 Hz loop. The frequency is approximately 61 MHz.

The mixing provides 70 MHz. This signal makes out the 1st IF which is directed through a 70 MHz X-tal filter FL3.

LOOP 3

LOOP 3 is a 20 KHz loop. The reference frequency of LOOP 3 is the sum of LOOP 1 and LOOP 2.

The oscillator is built up around T2. Coils - maximum 5 - are connected to the drain of T2. The connection is controlled by the microprocessor which by means of an octantal flip-flop makes a transistor conduct and supply the oscillator with voltage. The voltage can be supplied through one or more coils. The frequency range of the oscillator is hereby changed in 5 bands:

Band 1	-	75, MHz
Band 2	-	80.5 MHz
Band 3	-	83.5 MHz
Band 4	-	90.5 MHz
Band 5	-	97.5 MHz

This division is called COARSE-TUNING.

The oscillator frequency is amplified by T3. The signal is fed from the Drain coil of T3 into the receiver module and, furthermore, into T4 where it is amplified and thereafter fed into the pre-scaler IC10 and into the PLL circuit IC9. The division number of IC9 is programmed from the microprocessor.

IC4 gets the same programming.

All 3 loops have an out of lock detector notifying the microprocessor when the loop is out of lock.

The programming of the loops is controlled by the microprocessor. Through IC13 and IC14 the microprocessor enables each loop. At the same time the microprocessor codes the division number into the latch of the loop through data D0-D7. The next loop is hereafter programmed in the same way.

IC15 gives the lock information from the loops to the microprocessor.

I N S T A L L A T I O N I N S T R U C T I O N S

RT 210

-
1. Install the RT 210
 2. Mount the Junction box by RT 210.
 3. Mount the microtelephone cradle.
 4. Mount the external loudspeaker.
 5. Install T210. The distance to RT210 must be maximum 50 metres.
 6. Mount the Junction box.
 7. Mount the TRANSMITTER ANTENNA. Lead the feeder to the antenna horn on T210.
 8. Mount COPPER BAND - must be 18 cm wide.
 9. Mount the RECEIVER ANTENNA. Lead feeder to the antenna bushing on RT210 marked REC. ANT.
 10. Connect multicable from the RT210 junction box to the T210 junction box.
 NB! Max 50 metres.
 The cable must be 0.35 mm² pair-twisted with screen.
 (Pls see the page with cable connections for junction boxes)
 11. Connect coax cable E.g. RG 58 between the RT210 Connector PL259 marked TRANS and the T210 Connector PL259.
 12. Remove the bottom cover on T210.
 Connect supply cables between battery and T210.

 Screw terminal with 3 x black cables = - (minus)

 Screw terminal with 3 x red cables = + (plus)

 NB! The power consumption by supply voltage 26 volt is approx. 30 Amp.
 13. Check that all above points have been carried out correctly.

14. Switch on the RT210 - Function Switch in position RX - ignore ERROR 31.

The receiver is checked by following the Operating Instructions.

Other ERRORS - Pls see the error table.

- 1)  VOLUME

- 2) Sensitivity fully clockwise = max sensitivity.

- 3) Ant. Tune is turned to maximum on RX Bargraph, when a station is received.

- 4) Tune button for continuously variable station search.

15. Turn FUNCTION SWITCH into position SX.

The ANTENNA TUNER starts tuning a transmit frequency e.g. 2182 KHz.

When the tuning is terminated:

- 1) Press digit 5 till the display shows A.cal - 30.000.0 which it will do after about 15 secs.
- 2) Press digit 1 briefly. Hereafter the display starts counting downwards.

The impedance of the transmitter antenna is now being measured and the result is stored in the computer.

When the counting is terminated, the receiver/transmitter display will return to the most recently keyed frequency.

16. Dismount the top and bottom covers on T210.

17. Dismount the front.

18. The antenna feeder is connected to the antenna wire in T210 (plug placed on the antenna horn).

19. Press the red 2182 button.. The tuner starts. After finished tuning, continue with point 20. - If errors are displayed, repeat 19.

20. Next to the variometer on the relay driver print, the DIL switches placed opposite the switched on light diodes must be switched on, and the DIL switches placed opposite the switched off light diodes must be switched off.

With the LEVER of the toggle switch tilted towards the middle of the tuner check that the light diodes remain unchanged.

Tilt back the LEVER of the toggle switch (towards the end of the tuner).

21. The red tape-marking sent with the equipment is glued onto the print next to the wheel on the variometer coil.

Also the aluminium wheel on the variable capacitor is marked with tape opposite the red tape on the tune motor for the drive capacitor.

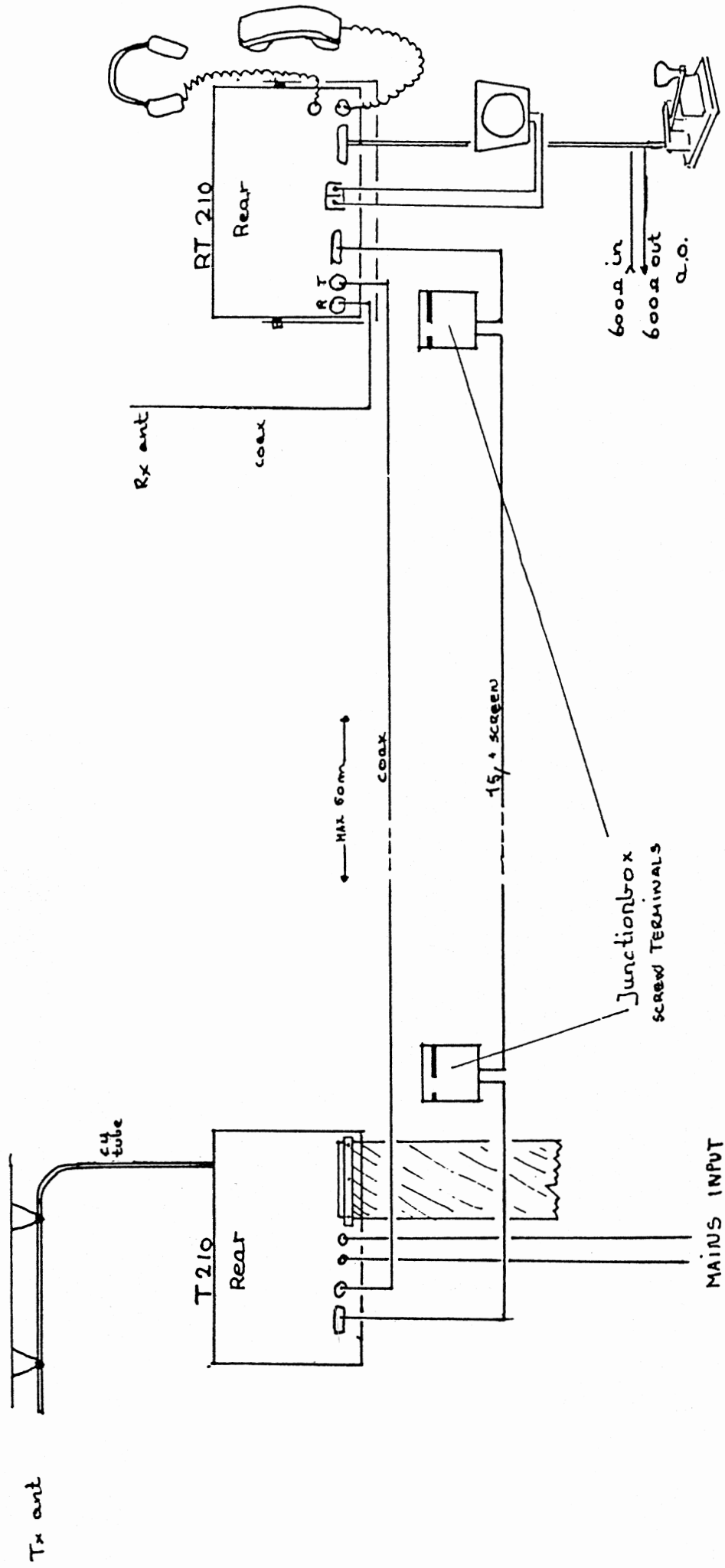
22. Tilt the toggle switch towards the middle once more.

Press the key **ENT** . The tuner must hereby tune to the exact same setting as that shown by the red marks. If this is not the case, repeat points 19 to 22.

23. Tilt back the toggle switch towards the end of the tuner.
24. In case of tuner failure on the frequency 2182 KHz, the newly marked setting must be selected manually.
25. Check the equipment on all bands.

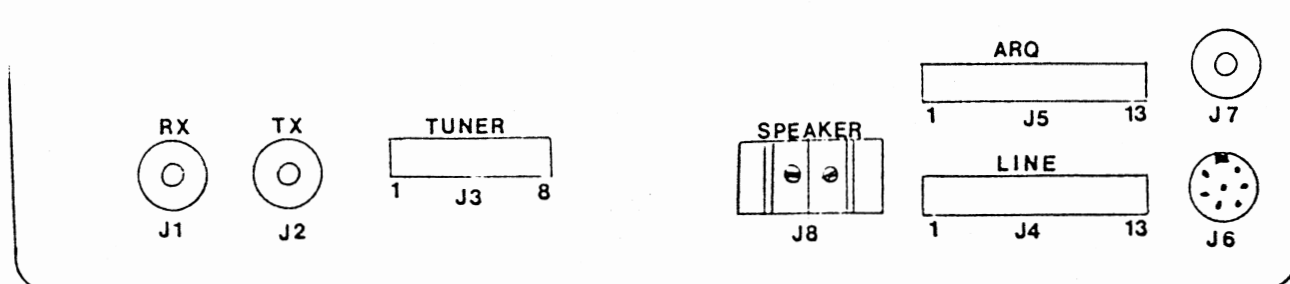
Make a test call to a coast station.

RT 210 Installation

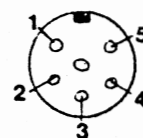


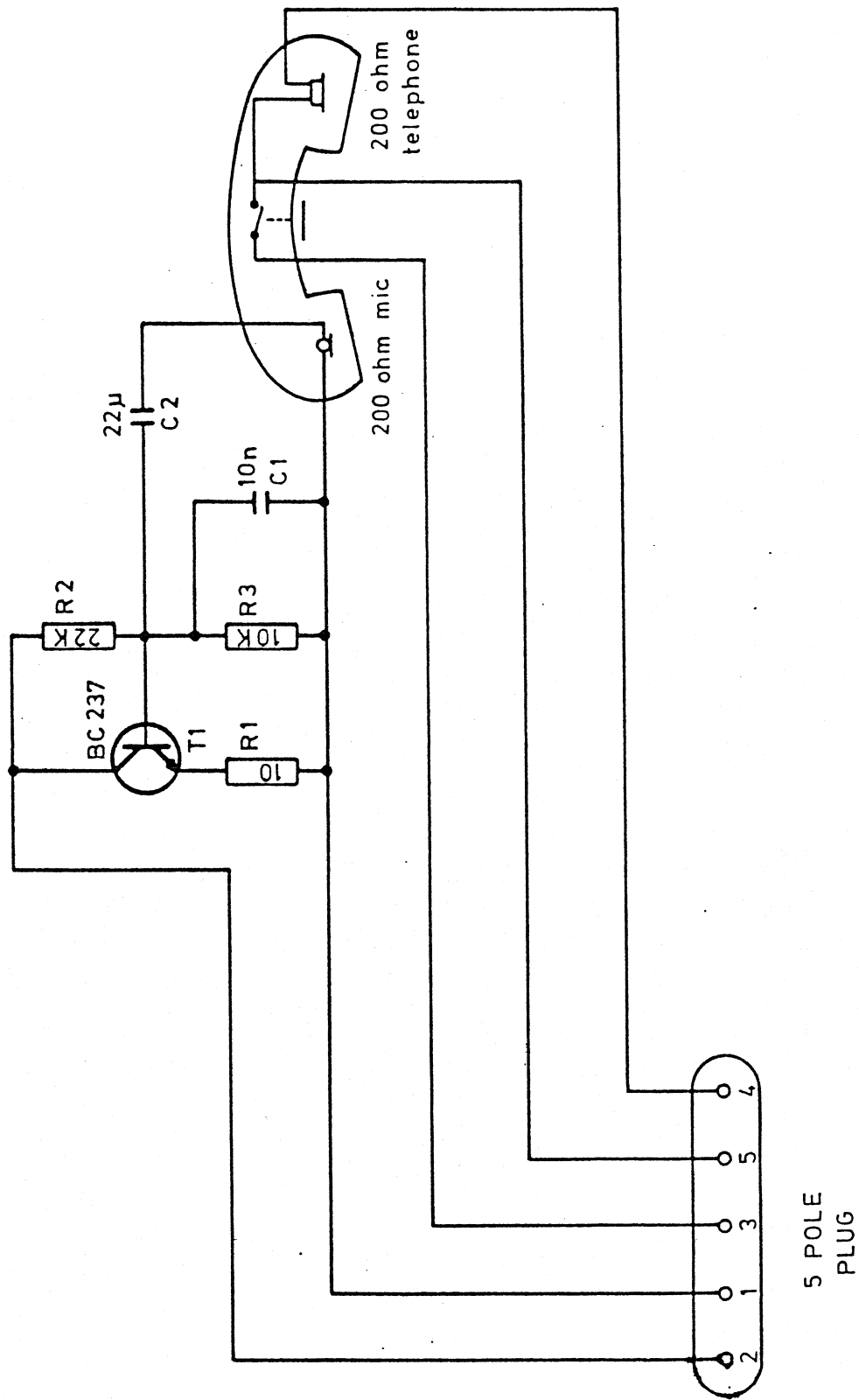
REAR CONNECTION

RT210

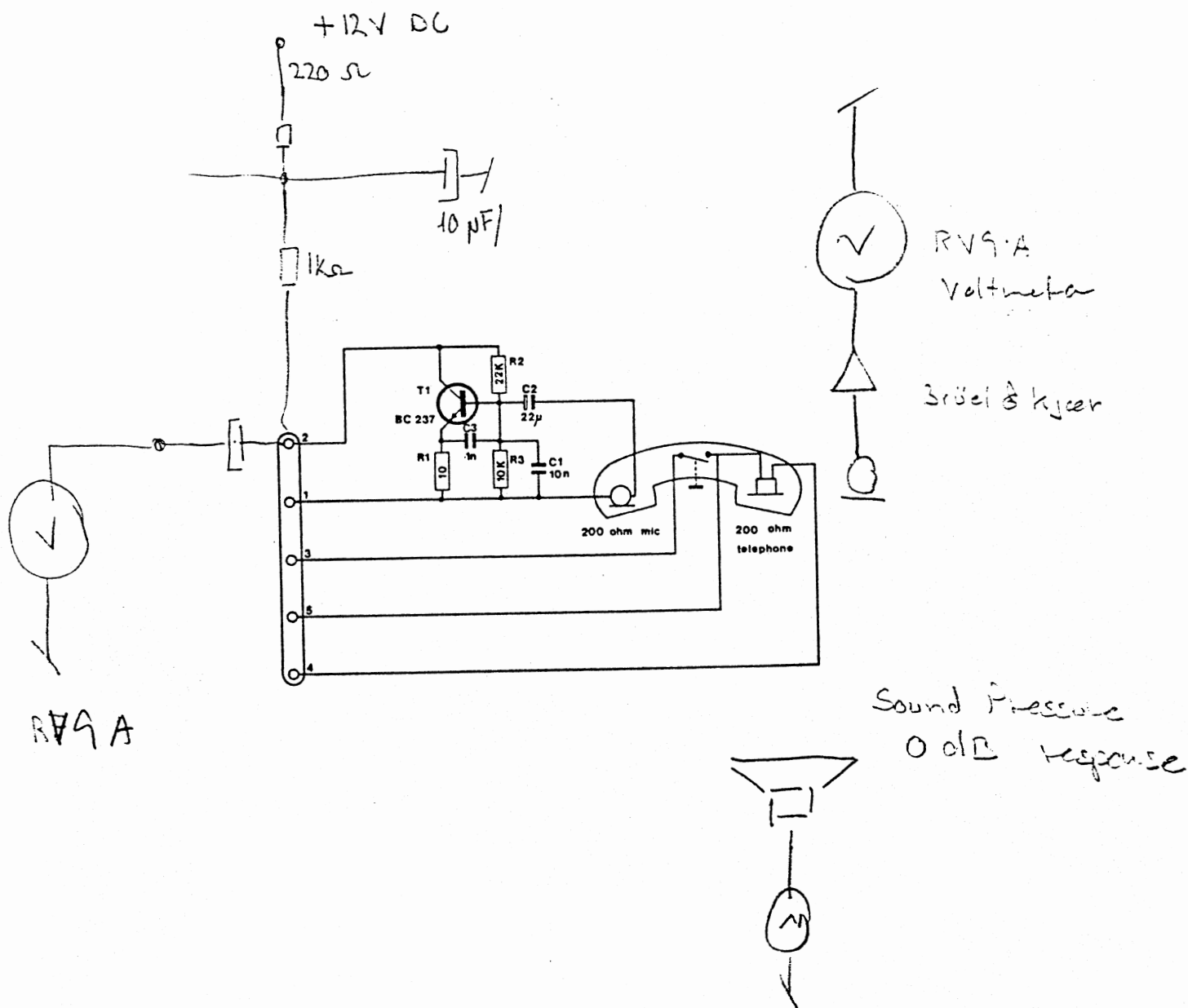


CONNECTOR	PIN	FUNCTION	CONN. TO
J5	1		
	2		
	3		
	3		
	5	F1 B. KEY	J4 # 5
	6	RX MUTE	J4 # 6
	7		
	8		
	9		
	10		
	11	AF LINE OUTPUT	J4 # 11
	12	AF LINE OUTPUT	J4 # 12
	13	AF LINE OUTPUT	J4 # 13
	14	AND	J4 # 14
	15	SERIES SIGN.	
	16	SERIES SIGN.	
	17		
	18		
	19		
	20		
	21		
	22		
	23	AF LINE INPUT	
	24	AF LINE INPUT	
	25	AF LINE INPUT	
J6	1	GND MIC	2080/J
	2	MIC	2080/J
	3	GND EARPIECE	2080/J
	4	EARPIECE	2080/J
	5	TX KEY	2080/J
J7	1	HEADPHONE	JACK PLUG
	2	HEADPHONE	





HANDSET FOR RT 210



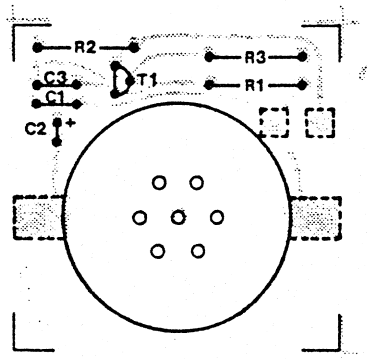
Handset

Drawing no. 001.0401A

Unit no. 002.2005

PC.Board no. 003.0820

Layout no 33.0820



Microtelephone
Layout no. 33.0820

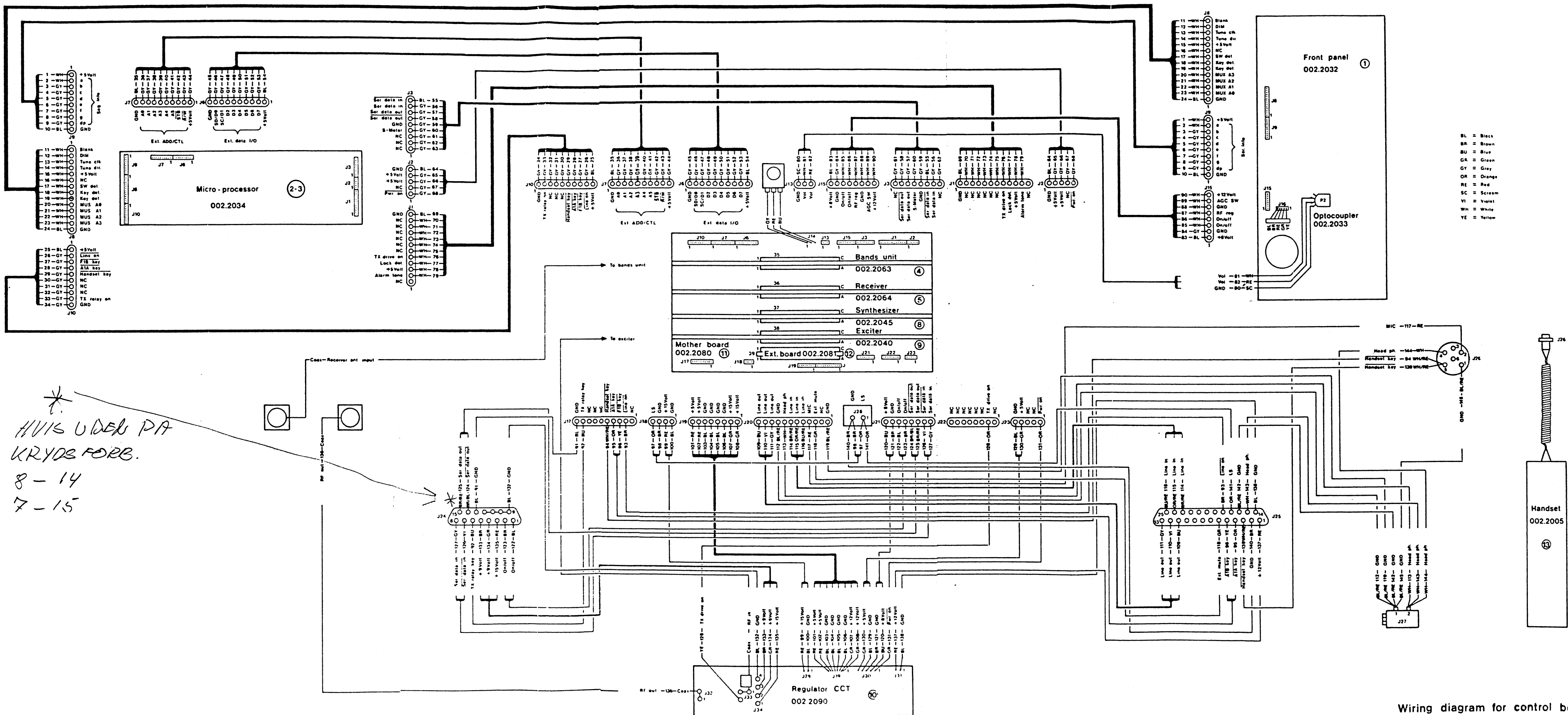
RT 210

CABLE BETWEEN JUNCTION BOXES

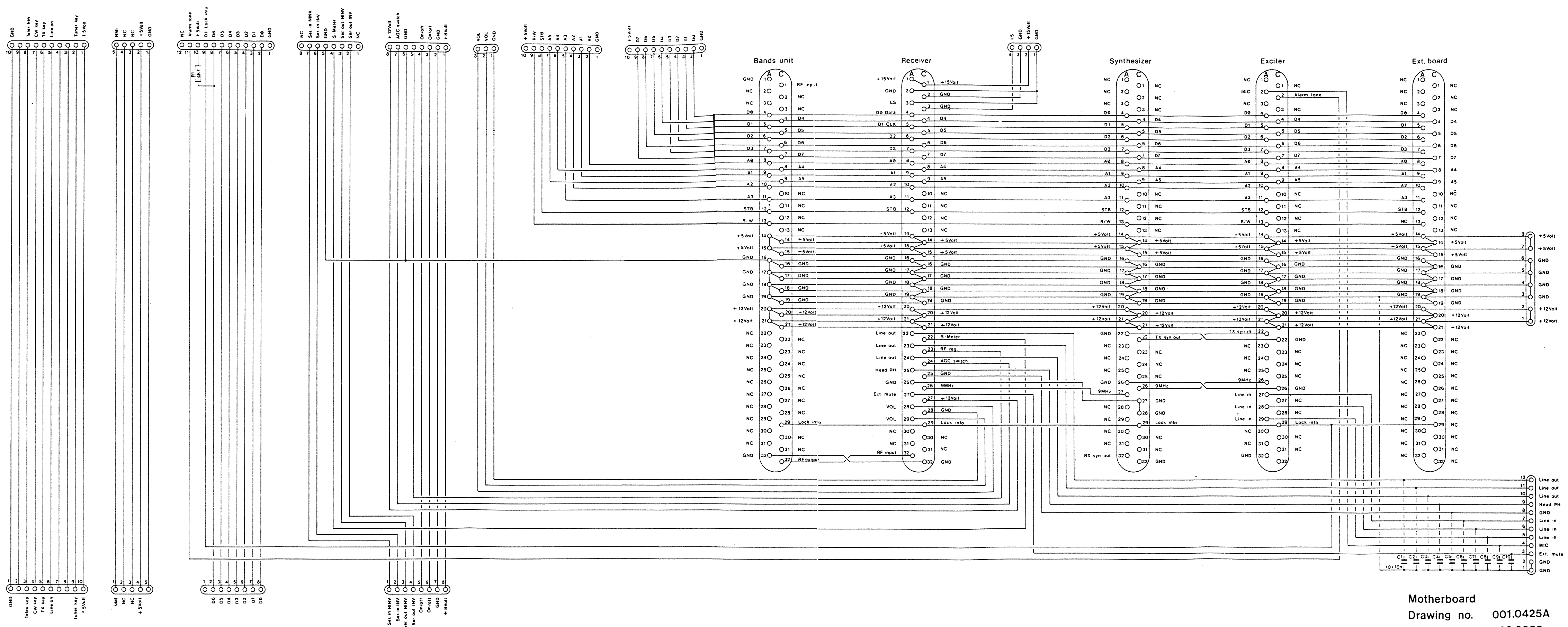
- 15 white I blue
- 14 blue I white
- 13 white I green
- 12 Orange I red
- 11 white I orange
- 10 blue I red
- 9 screen
- 8 white I grey
- 7 grey I white
- 6 green I white
- 5 red I orange
- 4 orange I white
- 3 red I blue
- 2 white I brown
- 1 brown I white

THE REMAINING LOOSE WIRES ARE TO BE CONNECTED TO TERMINALS
3, 4, 5 IN BOTH JUNCTION BOXES.

I = twisted with



Wiring diagram for control box
 Drawing no. 001.0446A
 Unit no. 002.2010



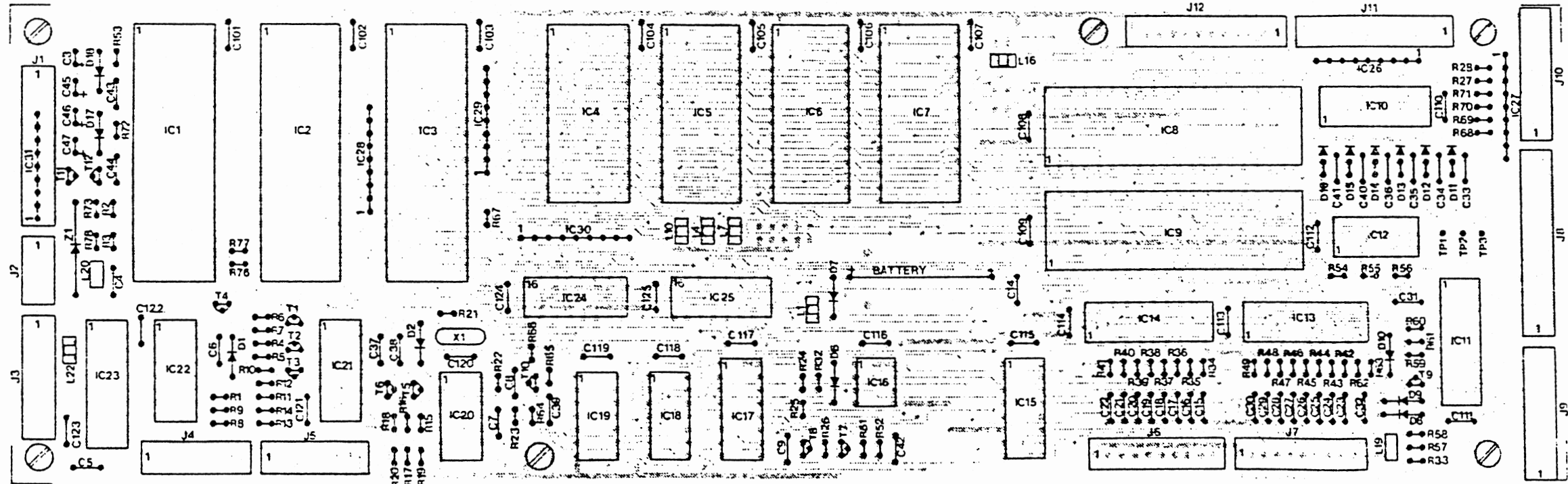
Motherboard

Drawing no. 001.0425A

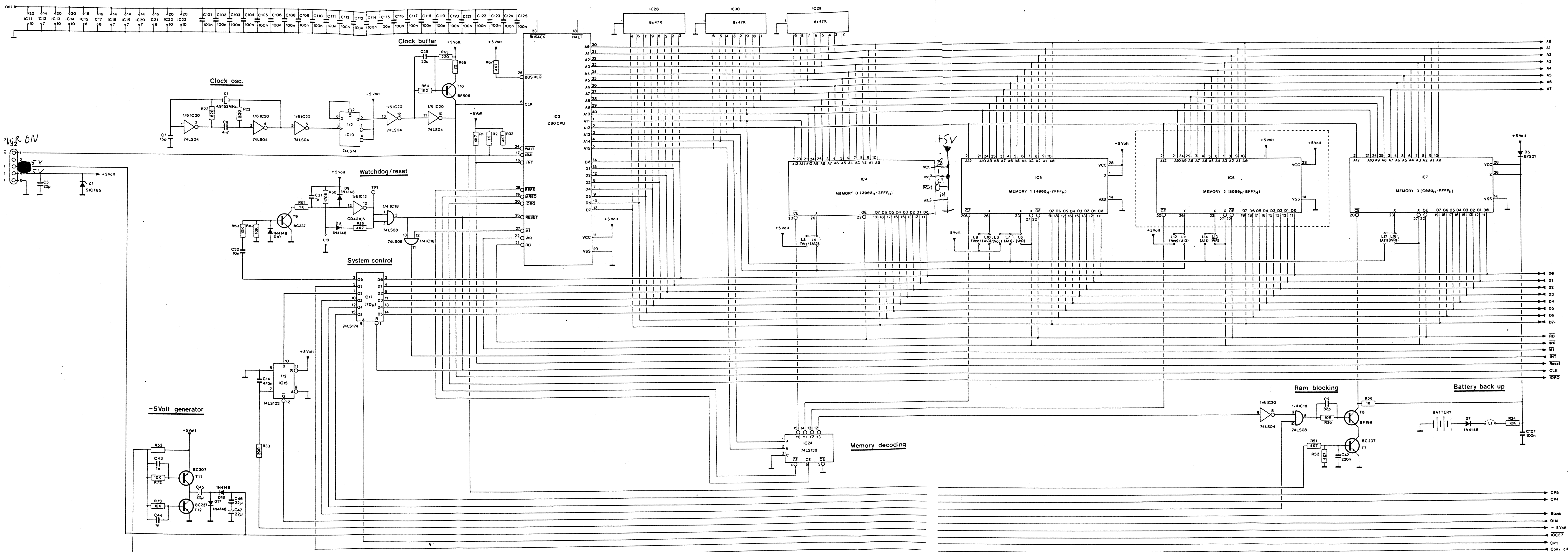
Unit no. 002.2080

PC. Board no. 003.2080

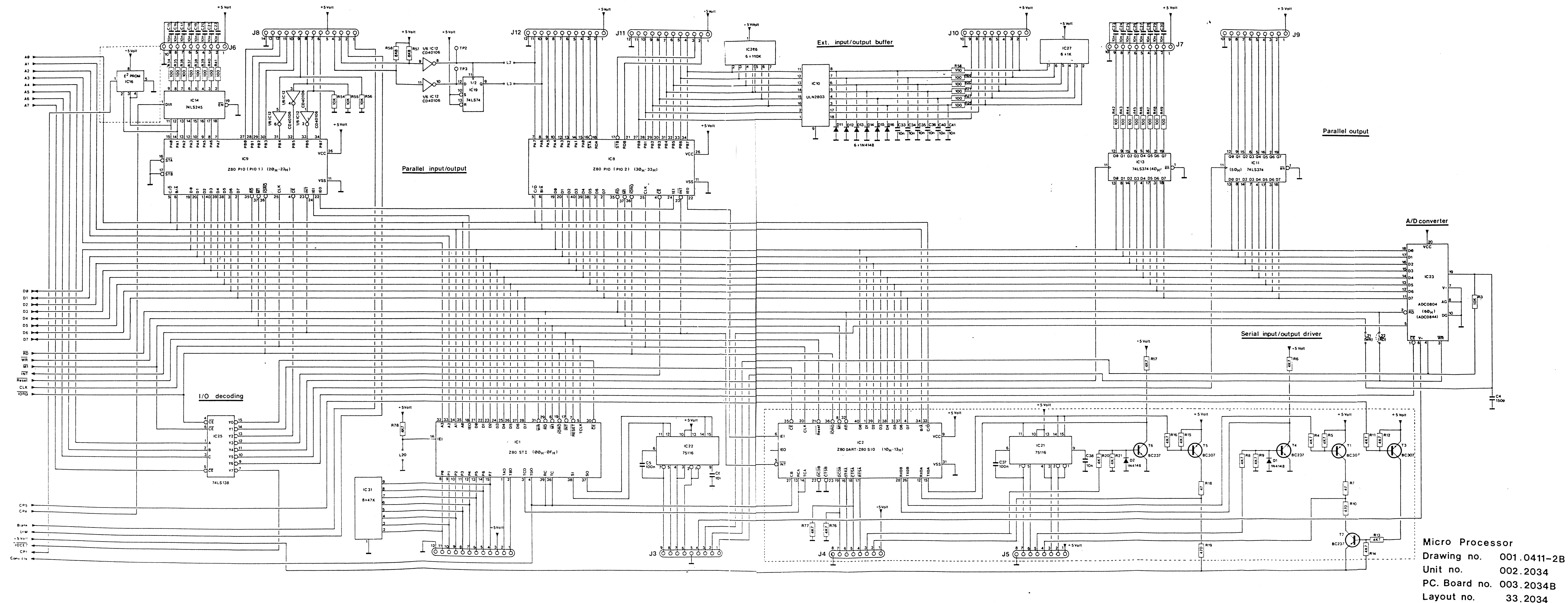
Layout no. 33.2080



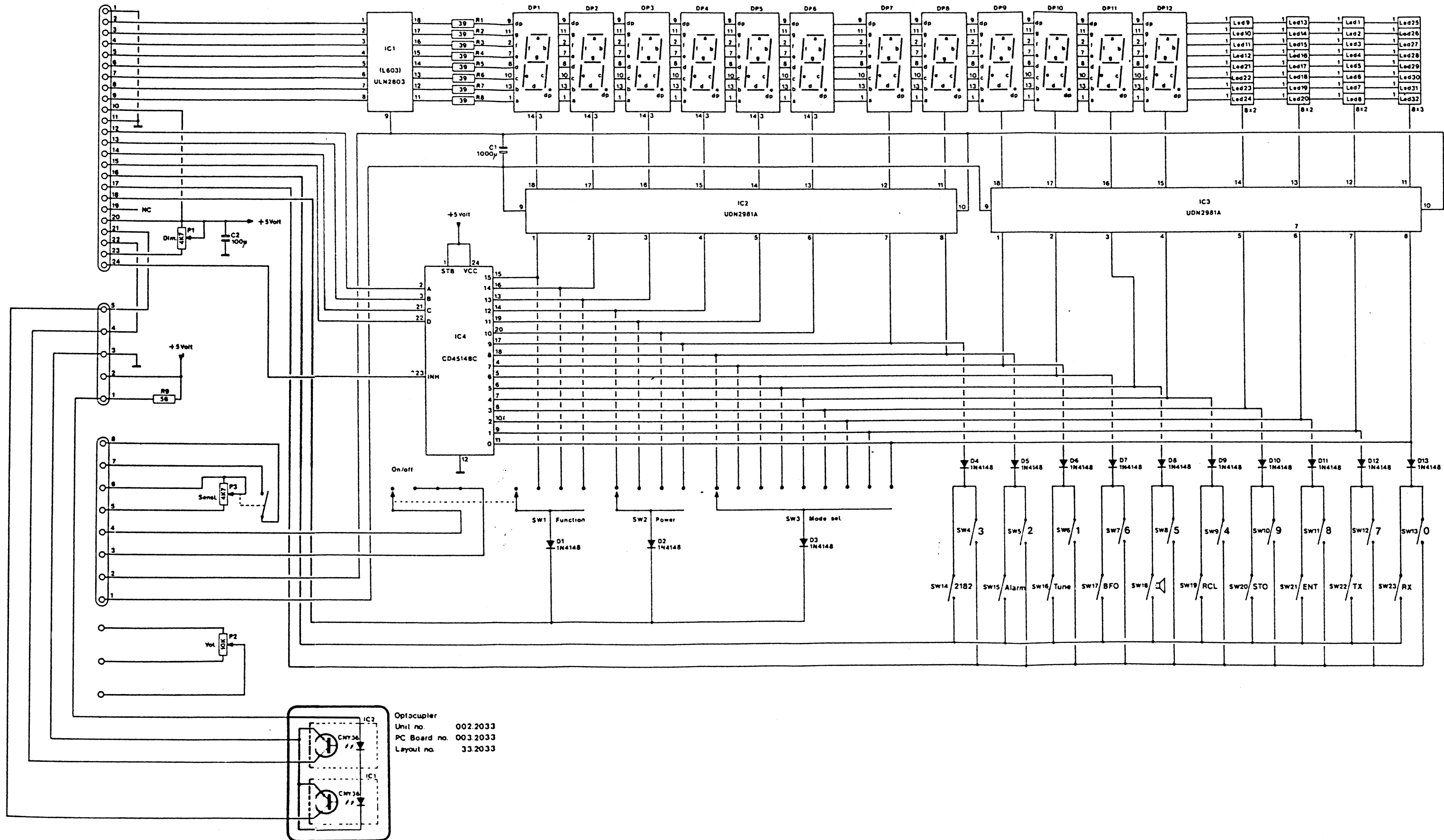
Micro-processor
Layout no. 33.2034

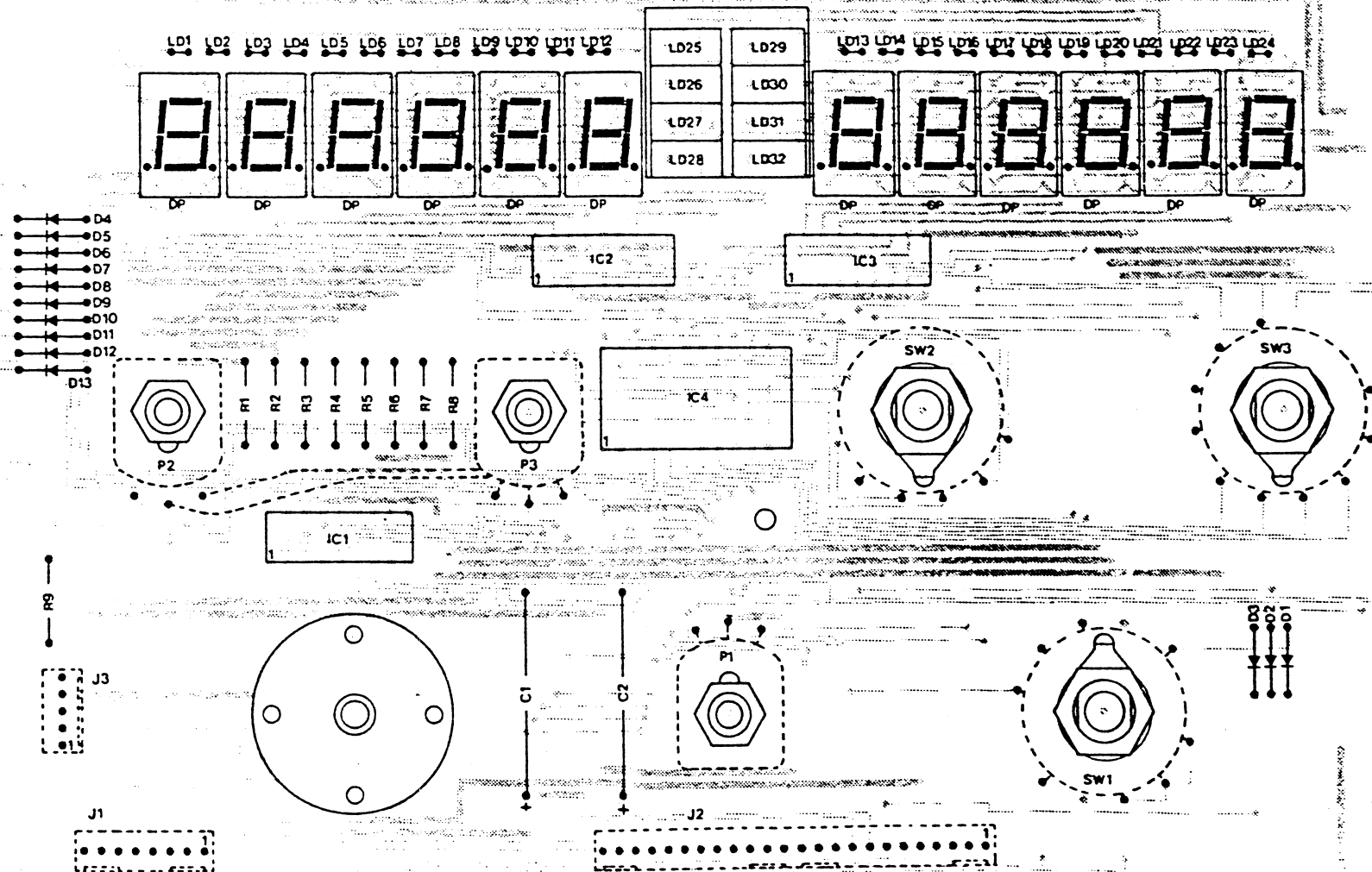
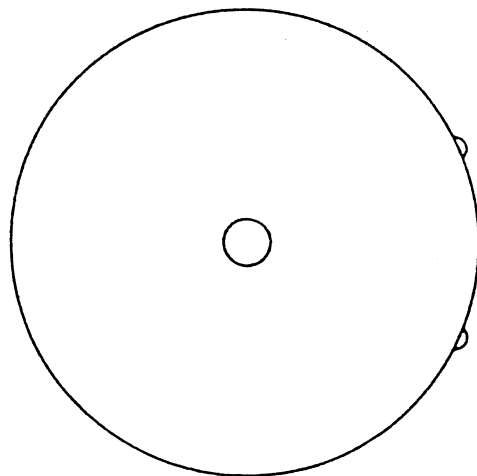
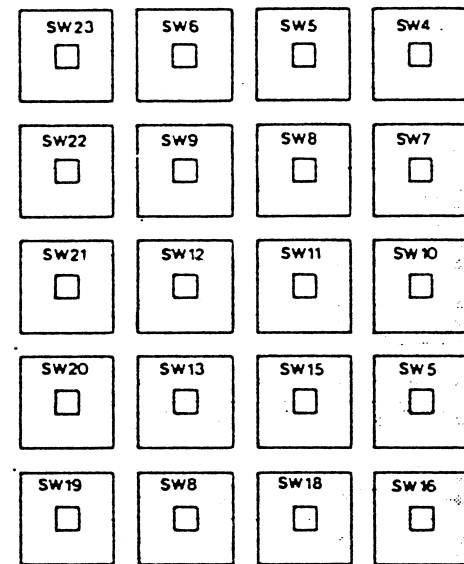


Micro Processor
Drawing no. 001.0411-1B
Unit no. 002.2034
PC. Board no. 003.2034B
Layout no. 33.2034

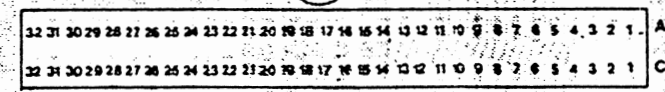
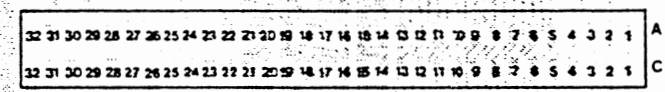
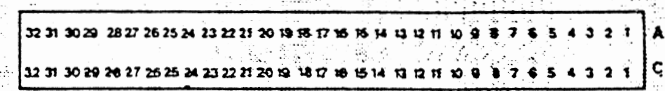
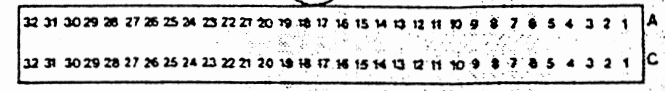
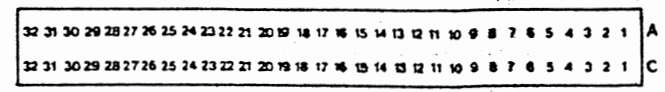
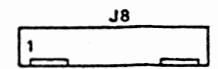
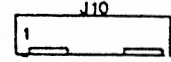
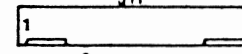


Micro Processor
Drawing no. 001.0411-2B
Unit no. 002.2034
PC. Board no. 003.2034B
Layout no. 33.2034

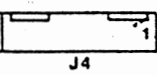
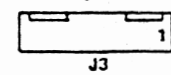
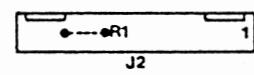
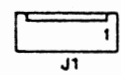
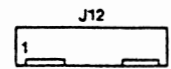
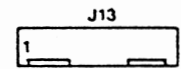
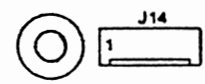
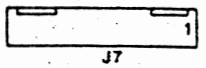
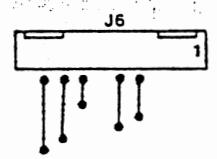
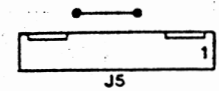
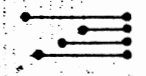
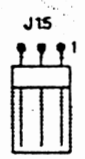


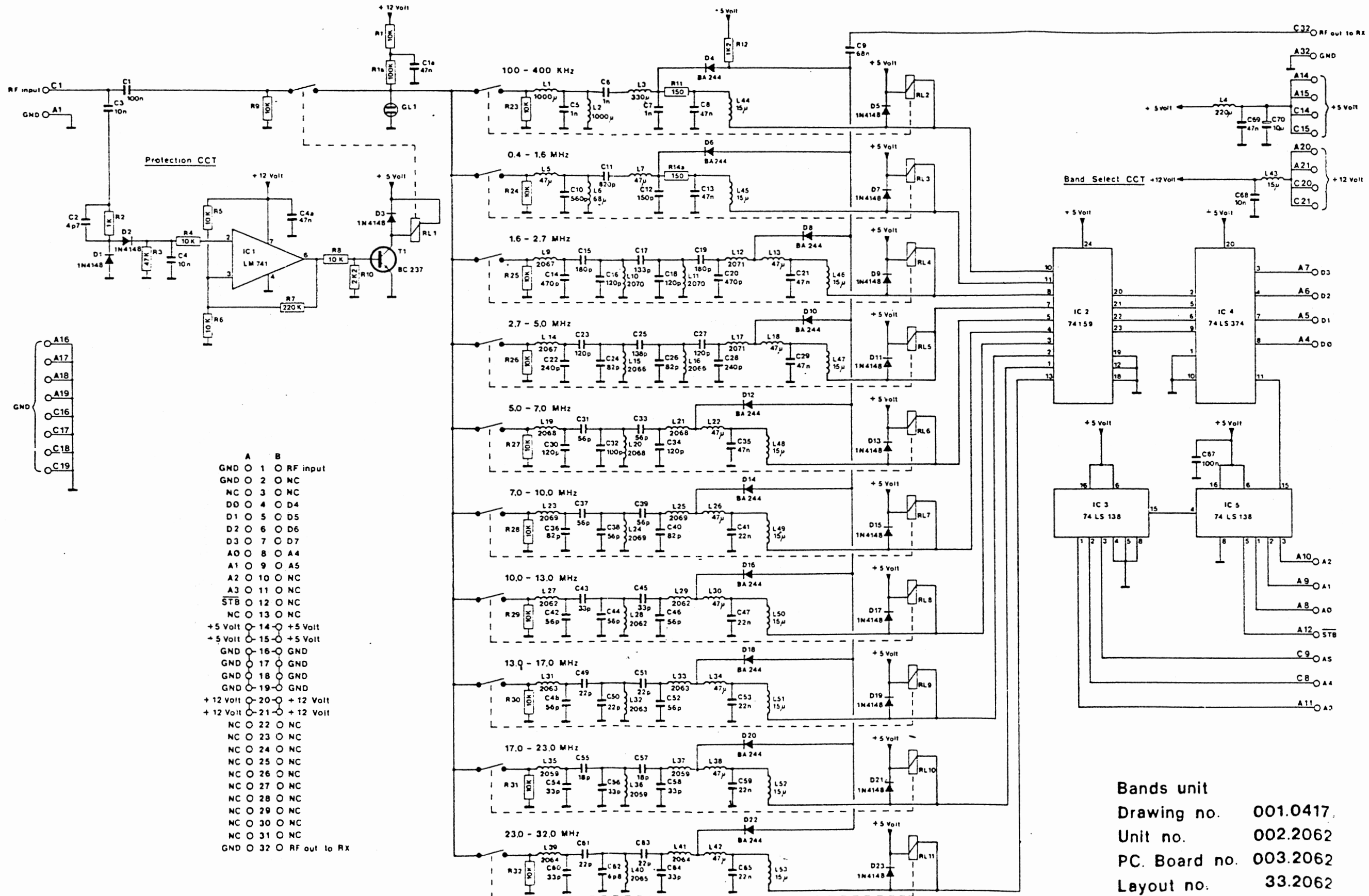


Front panel
Layout no. 33.2032

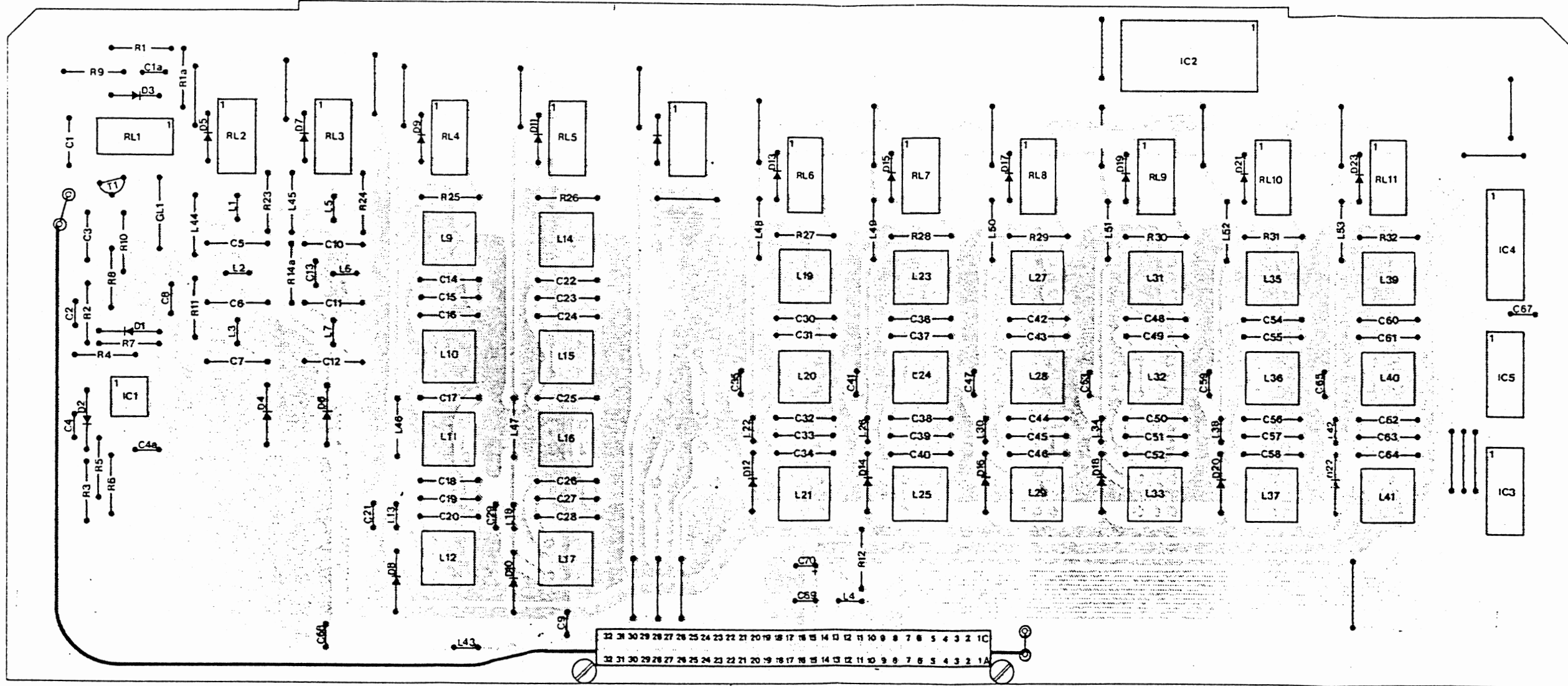


3 2 1

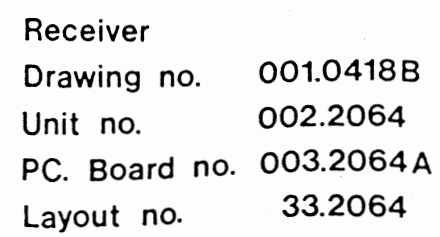


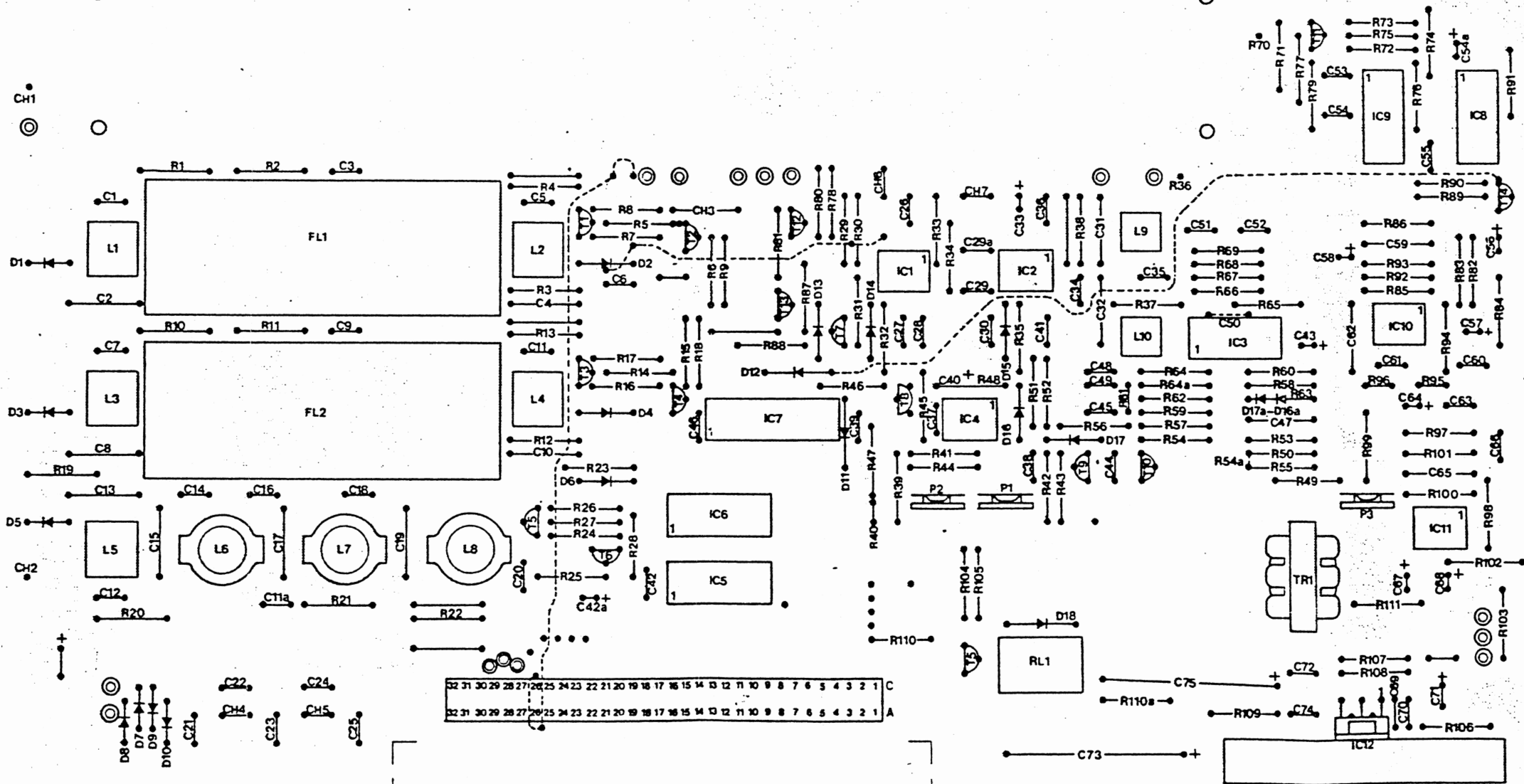


Bands unit
 Drawing no. 001.0417
 Unit no. 002.2062
 PC. Board no. 003.2062
 Layout no. 33.2062

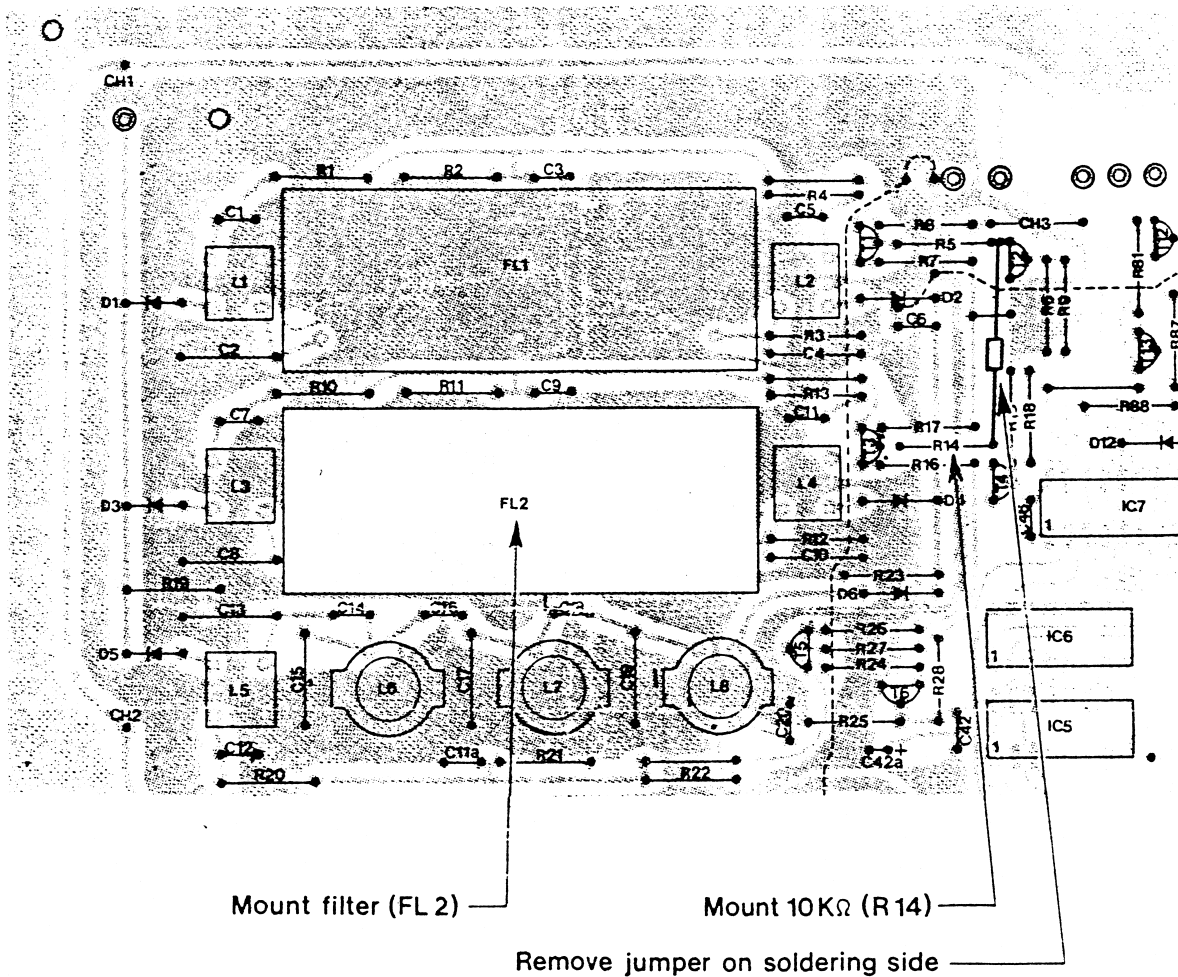


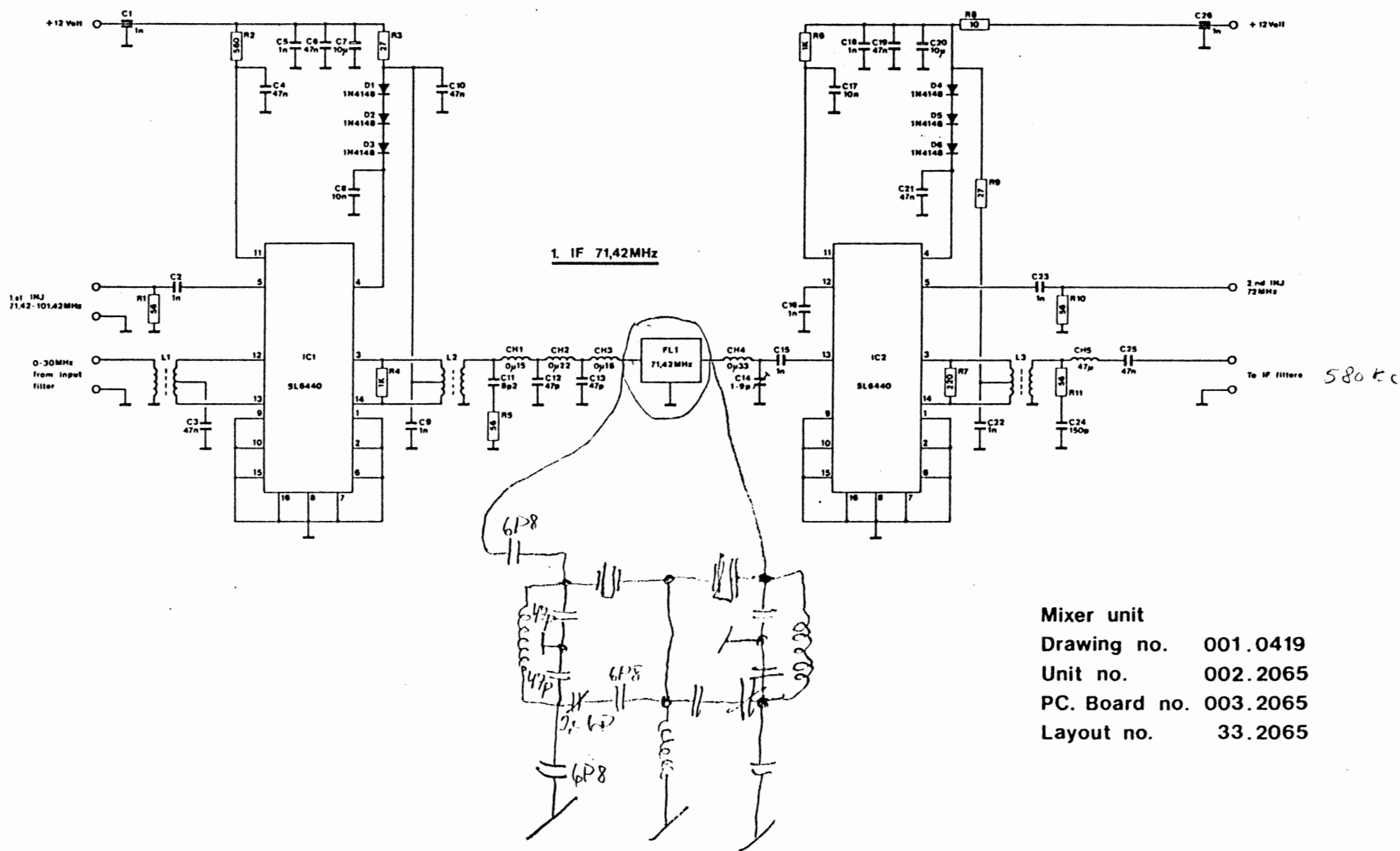
Bands unit
Layout no. 33.2062

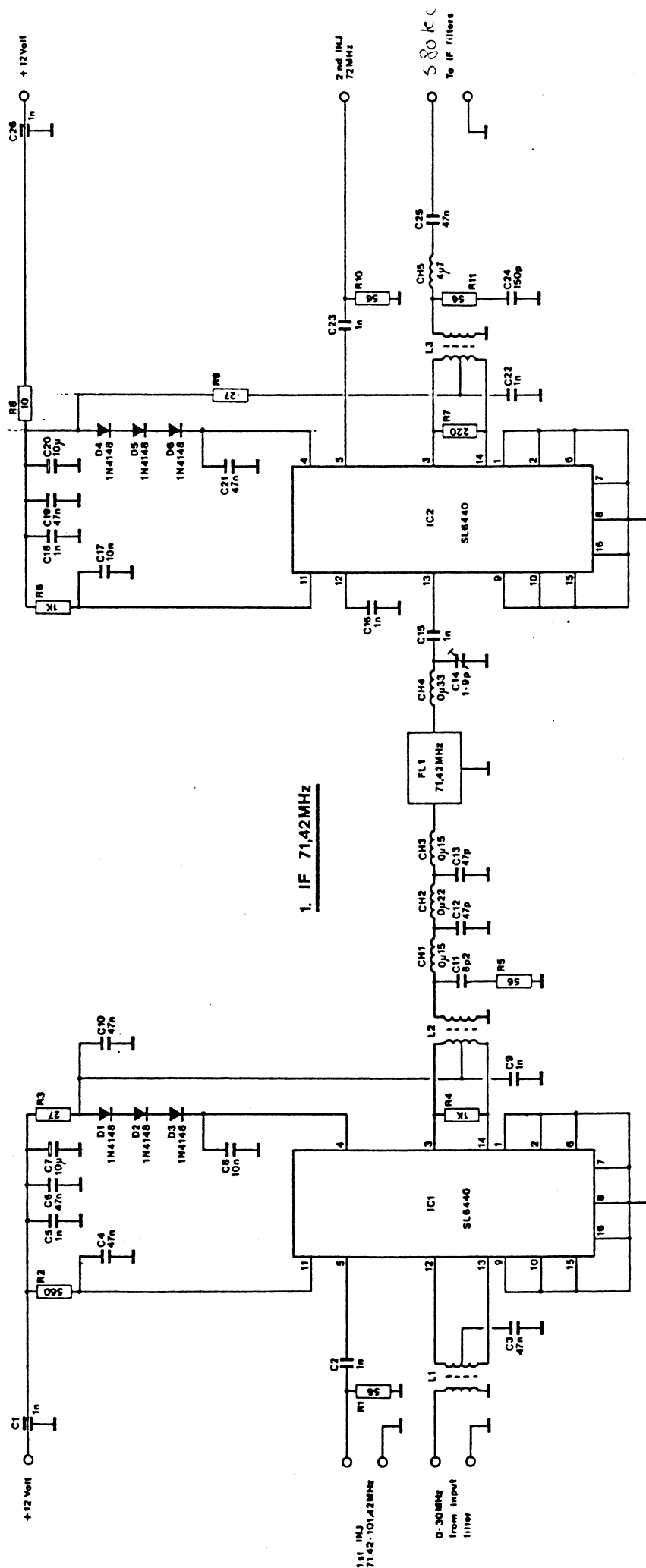




MOUNTING OF OPTION FILTER on Circuit Board no. 03.2064







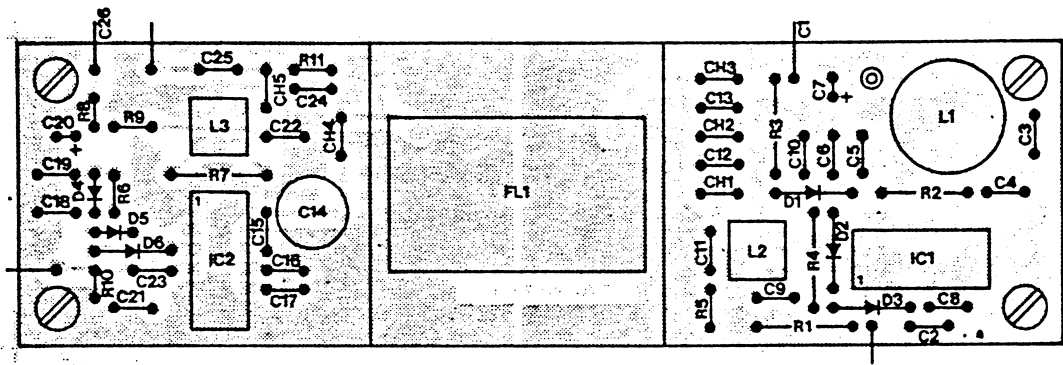
Mixer unit

Drawing no. 001.0419A

Unit no. 002.2065

PC. Board no. 003.2065A

Layout no. 33.2065



Mixer unit

Layout no. 33.2065



Plessey SL 6440 IC mixer

Den integrerte mixerkretsen SL 6440 fra Plessey ser ut til å ha interessante data. Fabrikanten angir 3. ordens output intercept point til +30 dBm, +15 dBm kompresjonspunkt (1 dB), og blandeforsterkning -1 dB ved 50 ohms last.

ARRL testet IC'en ved 200 ohms belastning, og oppnådde opp til 8 dB blandeforsterkning. En av de store fordelene ellers er at det ikke er nødvendig med så høy lokaloscillatorspenning som ved høynivå diodemixere.

Lab-oppstillingen er vist nedenfor. Tabell 1 og 2 viser hvordan måleresultatene påvirkes av lokaloscillatornivået, inngangssignalnivået og strømmen målt i serie med pin 11. Strømmen kan innstilles ved hjelp av R1. IC'en tåler 1.2 W ved 25 grader C. Maksimalverdien i tabell 2 er det den tåler uten bruk av heatsink for kjøling.

Isolasjonen mellom HF- og MF-portene ble målt til 48 dB ved 0 dBm lokaloscillatornivå og -5 dBm inngangssignal. (Fritt etter QST nr. 1/1981)

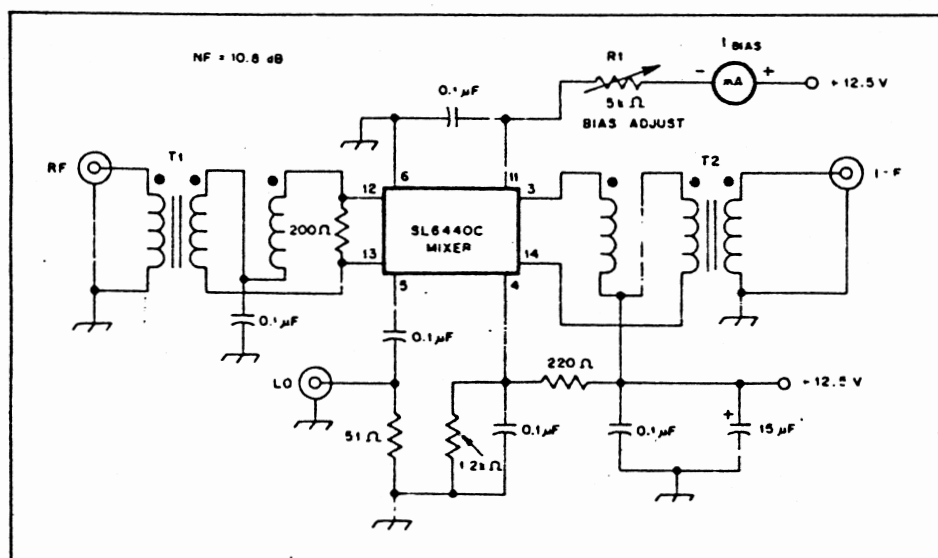
LO Level (dBm)	Input Level (PEP, dBm)	Third-Order Output Intercept (PEP, dBm)	Conversion Gain (dB)
0	+3	24	7
0	0	29	8
0	-5	31	8
0	-10	31	8
0	-15	29	8
-3	+3	25	7
-3	+1	28	8
-3	0	29	8
-3	-5	30	8
-3	-10	31	8
-3	-15	30	8
-10	+2	23	7
-10	0	29	8
-10	-5	31	8
-10	-10	31	8
-10	-15	29	8
-15	+2	25	7
-15	0	29	8
-15	-5	31	8
-15	-10	31	8
-15	-10	31	8
-15	-15	29	8

Tabell 1. Måleresultater med varierende lokaloscillator- og inngangssignal-nivå.

I_D Current (Pin 11 mA)	Conversion Gain (dB)	Third Order Output Intercept (dBm)	LO-to-RF Isolation (dB)
5.0	5.5	18	27
5.5	6.0	19	27
6.0	6.5	20	27
6.5	7.0	21	27
7.0	7.0	22	27
7.5	7.0	23	27
8.0	7.0	24	27
8.5	7.0	25	27
9.0	7.5	26	27
9.5	7.5	26	27
10.0	7.5	27	27
10.5	7.5	28	27
11.0	7.5	28	27
11.5	8.0	29	27
12.0	8.0	29	28
12.5	8.0	30	28
13.0	8.0	31	28
13.5	8.0	31	28

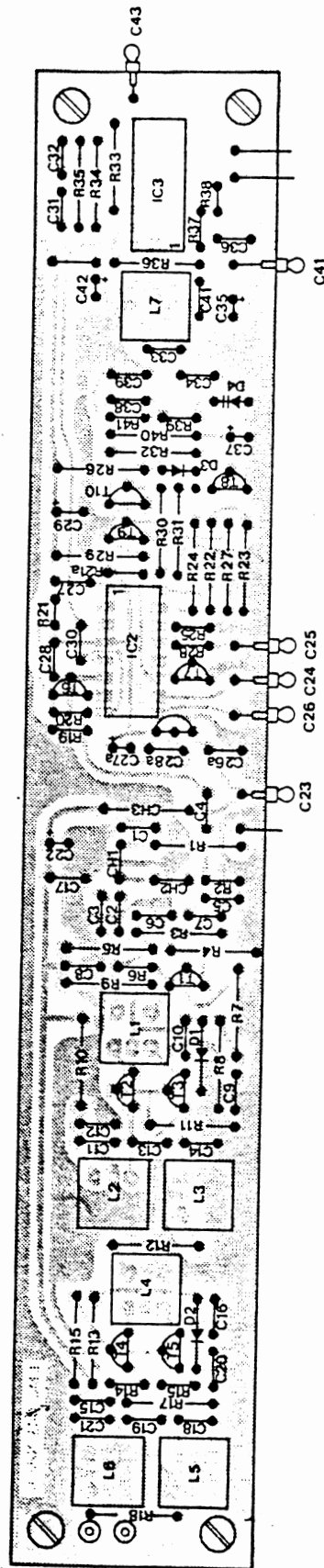
LO input = 0 dBm RF input = dBm

Tabell 2. Måleresultater som funksjon av strømmen målt i serie med pin 11.



Testoppstilling med
SL 6440C som blander.

LA9YF



Synthesizer receiver
Layout no. 33.2066

9MHz TCXO

Rx 25 KHz loop

10 KHz loop

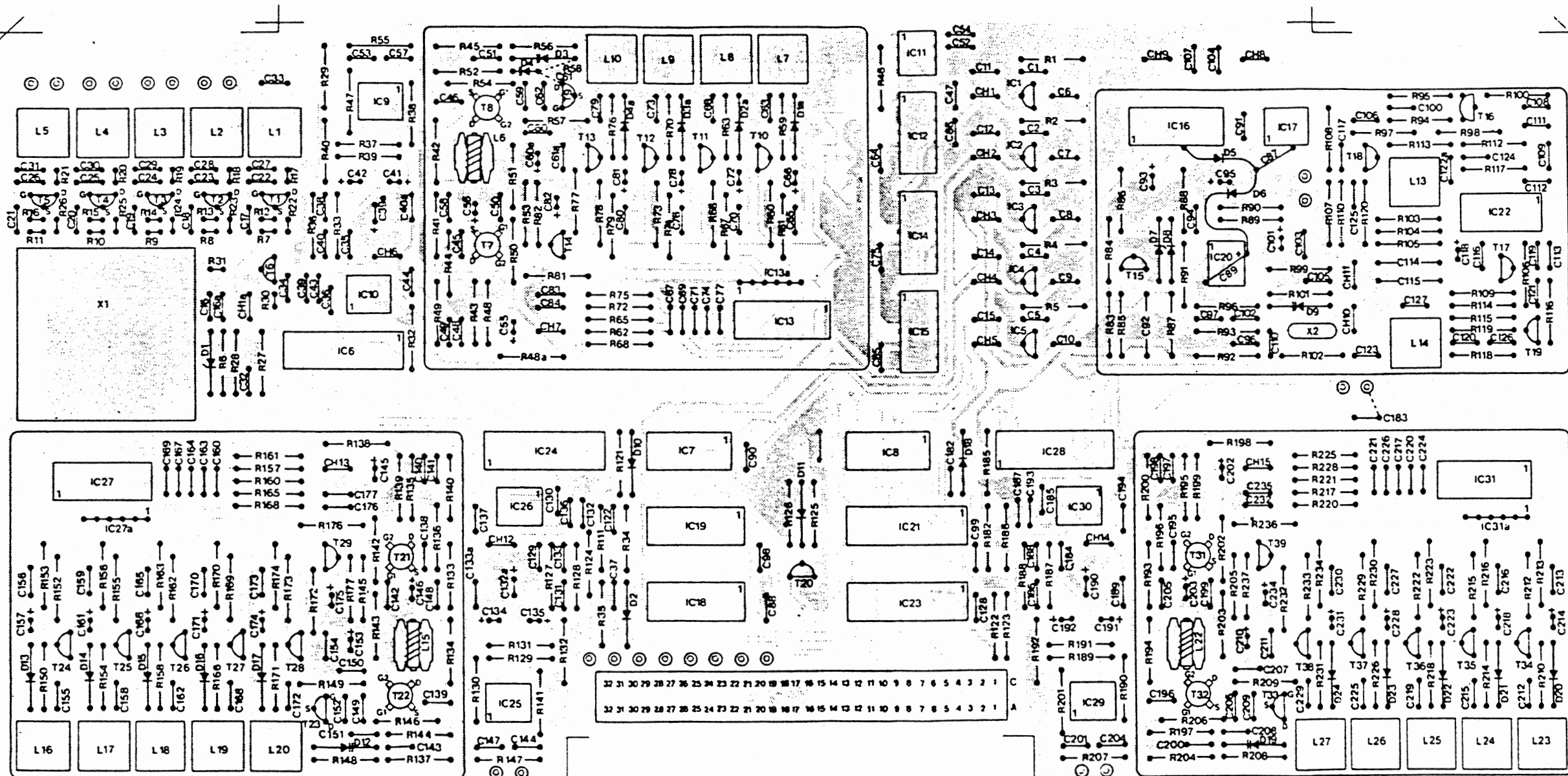
9MHz TCXO

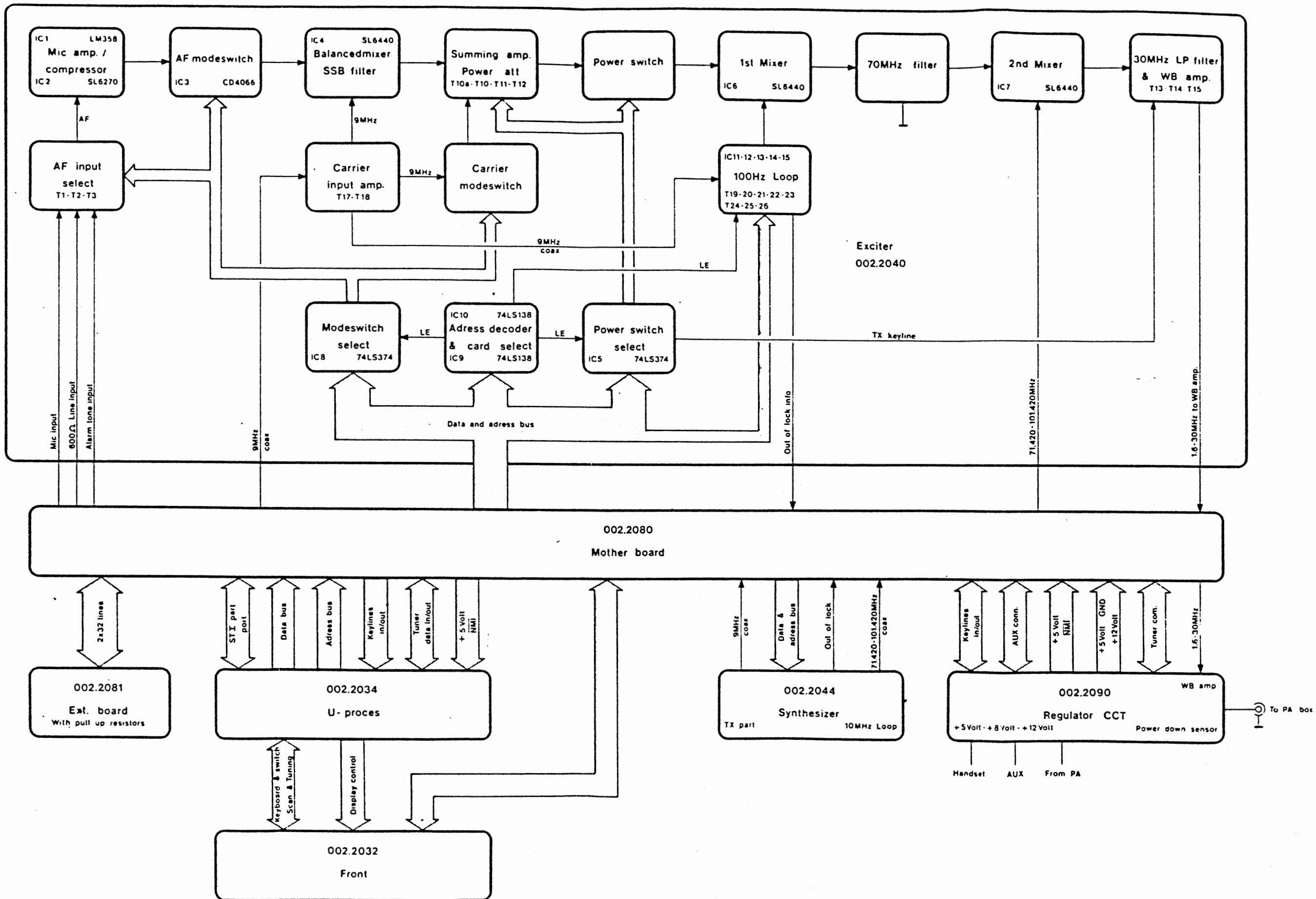
A C
 NC 0 1 NC
 NC 0 2 NC
 NC 0 3 NC
 D0 0 4 D4
 D1 0 5 D5
 D2 0 6 D6
 D3 0 7 D7
 A0 0 8 A4
 A1 0 9 A5
 A2 0 10 A6
 A3 0 11 A7
 S18 0 12 NC
 R/W 0 13 NC
 +5 Volt 0 14 +5 Volt
 +5 Volt 0 15 +5 Volt
 GND 0 16 GND
 GND 0 17 GND
 GND 0 18 GND
 GND 0 19 GND
 +12 Volt 0 20 +12 Volt
 +12 Volt 0 21 +12 Volt
 GND 0 22 TX syn out
 NC 0 23 NC
 NC 0 24 NC
 GND 0 25 GND
 GND 0 26 GND
 9MHz 0 27 GND
 NC 0 28 NC
 NC 0 29 lock into
 NC 0 30 NC
 NC 0 31 NC
 RX syn out 0 32 GND

+12 Volt
 A20
 C20
 A21
 C21

A22
 C22
 A23
 C23

Synthesizer
 Drawing no. 001.0443
 Unit no. 002.0445
 PC. Board no. 003.0445
 Layout no. 33.0445



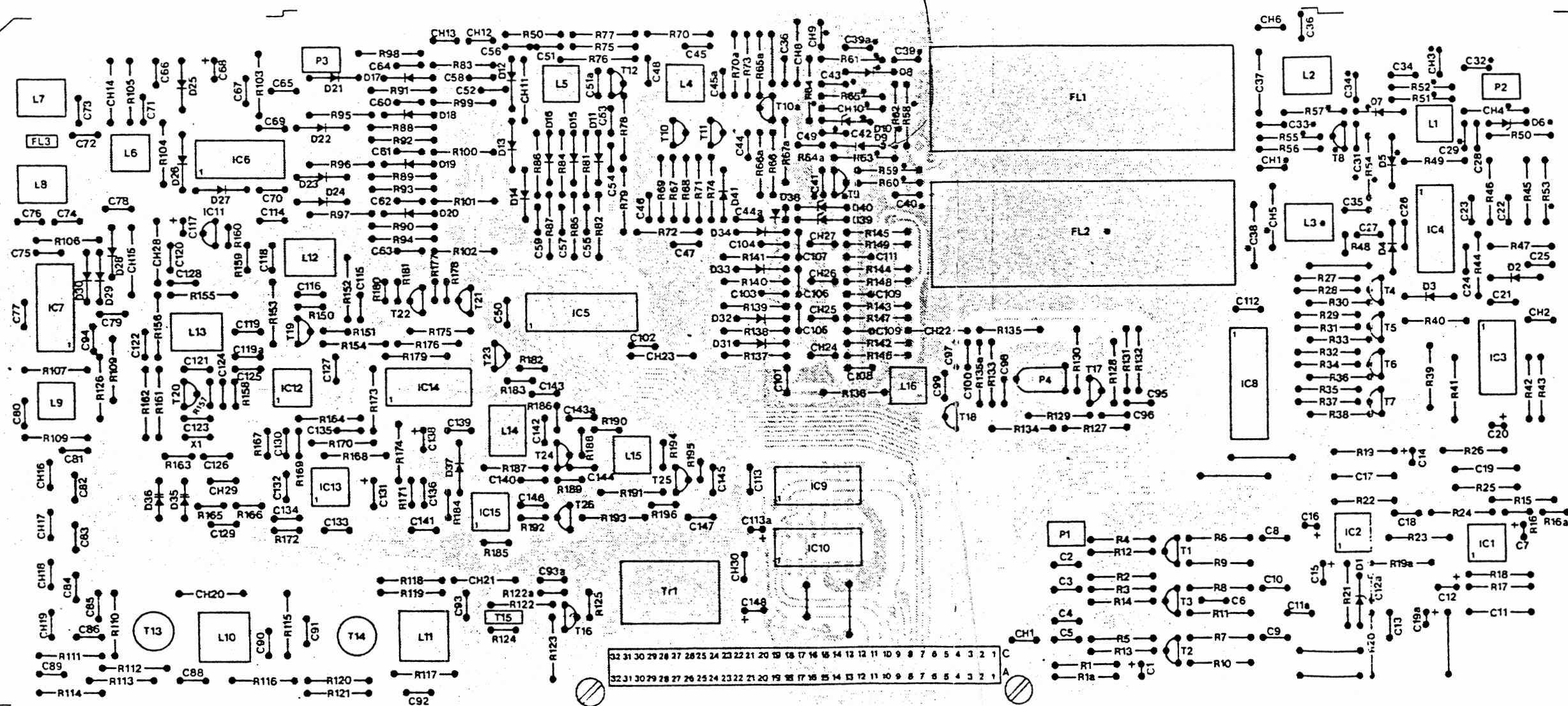


Block diagram for TX unit
Drawing no. 001.0436

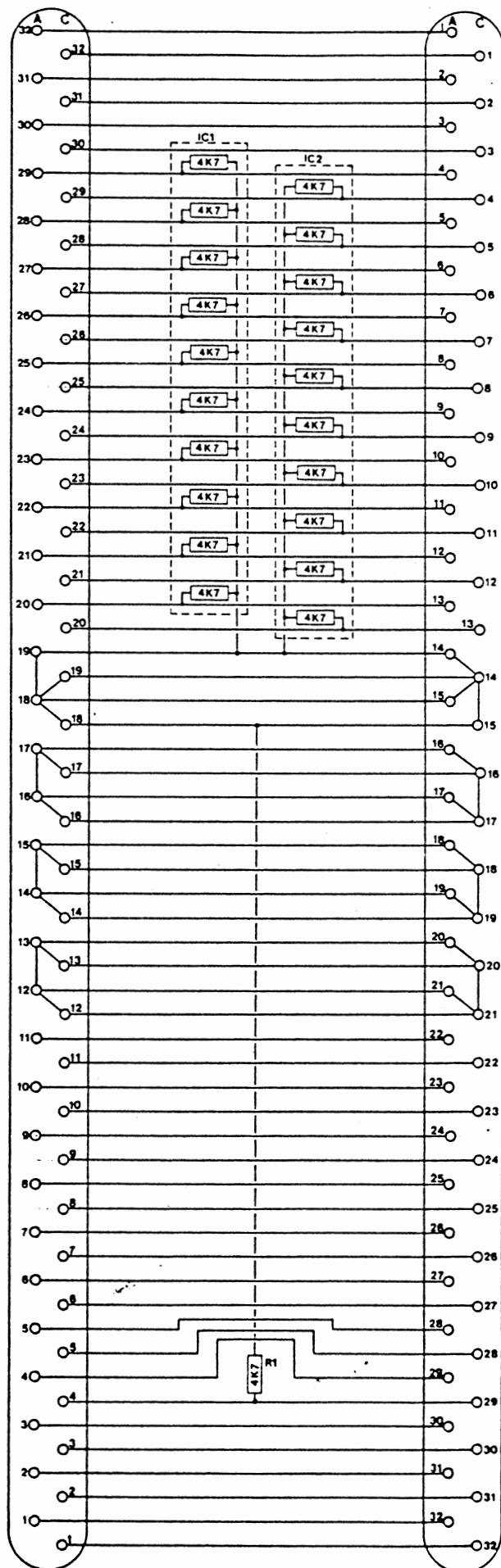


Exciter
Drawing no. 001.0412
Unit no. 002.2040
PC. Board no. 003.2040
Layout no. 33.2040

27 VIDE9



Exciter
Layout no. 33.2040



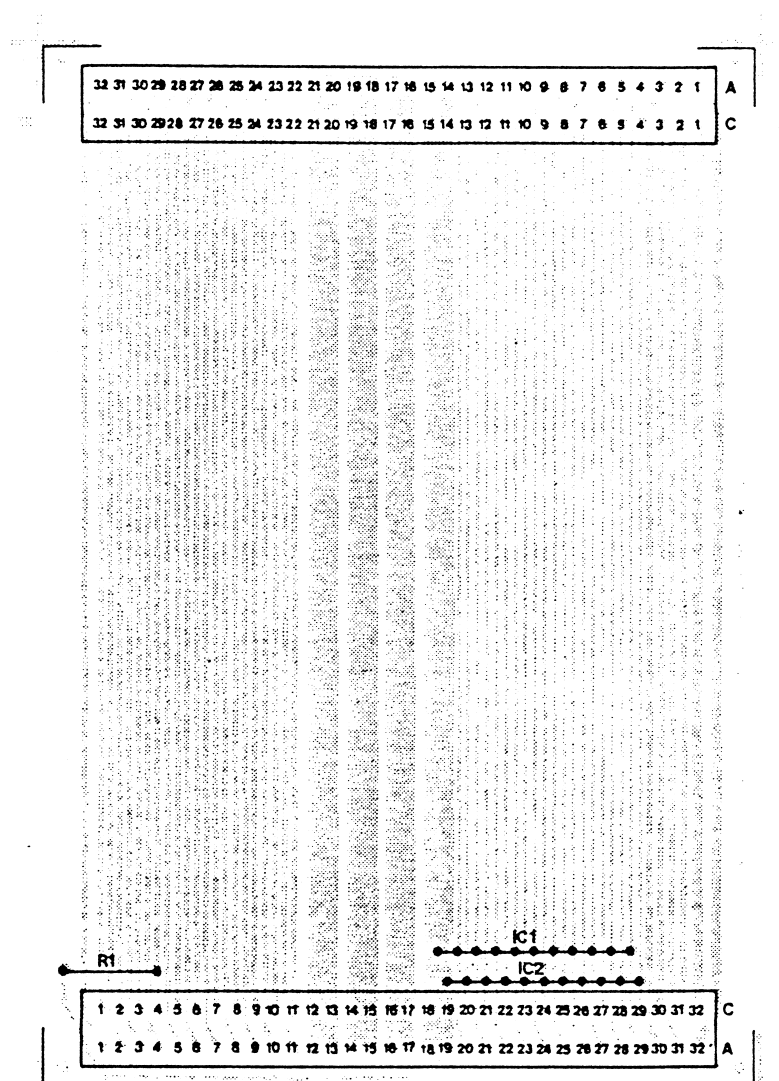
Extensionboard

Drawing no. 001.0426

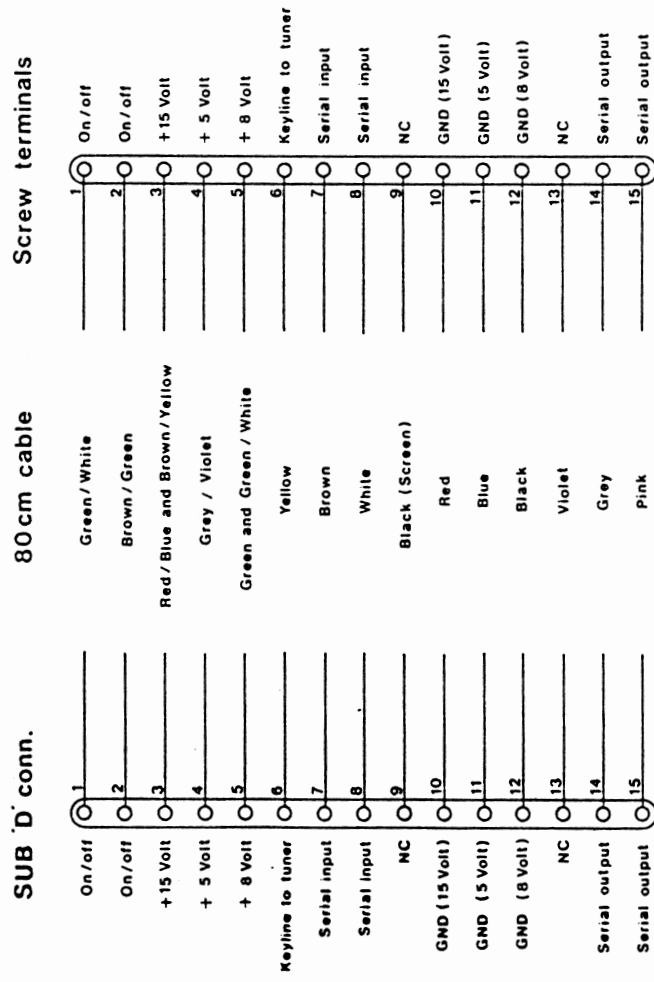
Unit no. 002.2081

PC. Board no. 003.2081

Layout no. 33.2081



Extension board
Layout no. 33.2081



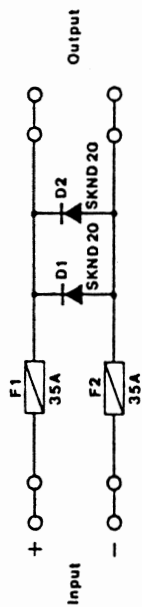
Junctionbox

Drawing no. 001.0402

Unit no. 002.2016

PC. Board no. 003.2016

Layout no. 33.2016-1



SUB 'D' conn.	80cm cable	Screw terminals
1 On/off	Green / White	1 On/off
2 On/off	Brown / Green	2 On/off
3 +15 Volt	Red / Blue and Brown / Yellow	3 +15 Volt
4 + 5 Volt	Grey / Violet	4 + 5 Volt
5 + 8 Volt	Green and Green / White	5 + 8 Volt
6 Keyline to tuner	Yellow	6 Keyline to tuner
7 Serial input	Brown	7 Serial input
8 Serial input	White	8 Serial input
9 NC	Black (Screen)	9 NC
10 GND (15 Volt)	Red	10 GND (15 Volt)
11 GND (5 Volt)	Blue	11 GND (5 Volt)
12 GND (8 Volt)	Black	12 GND (8 Volt)
13 NC	Violet	13 NC
14 Serial output	Grey	14 Serial output
15 Serial output	Pink	15 Serial output

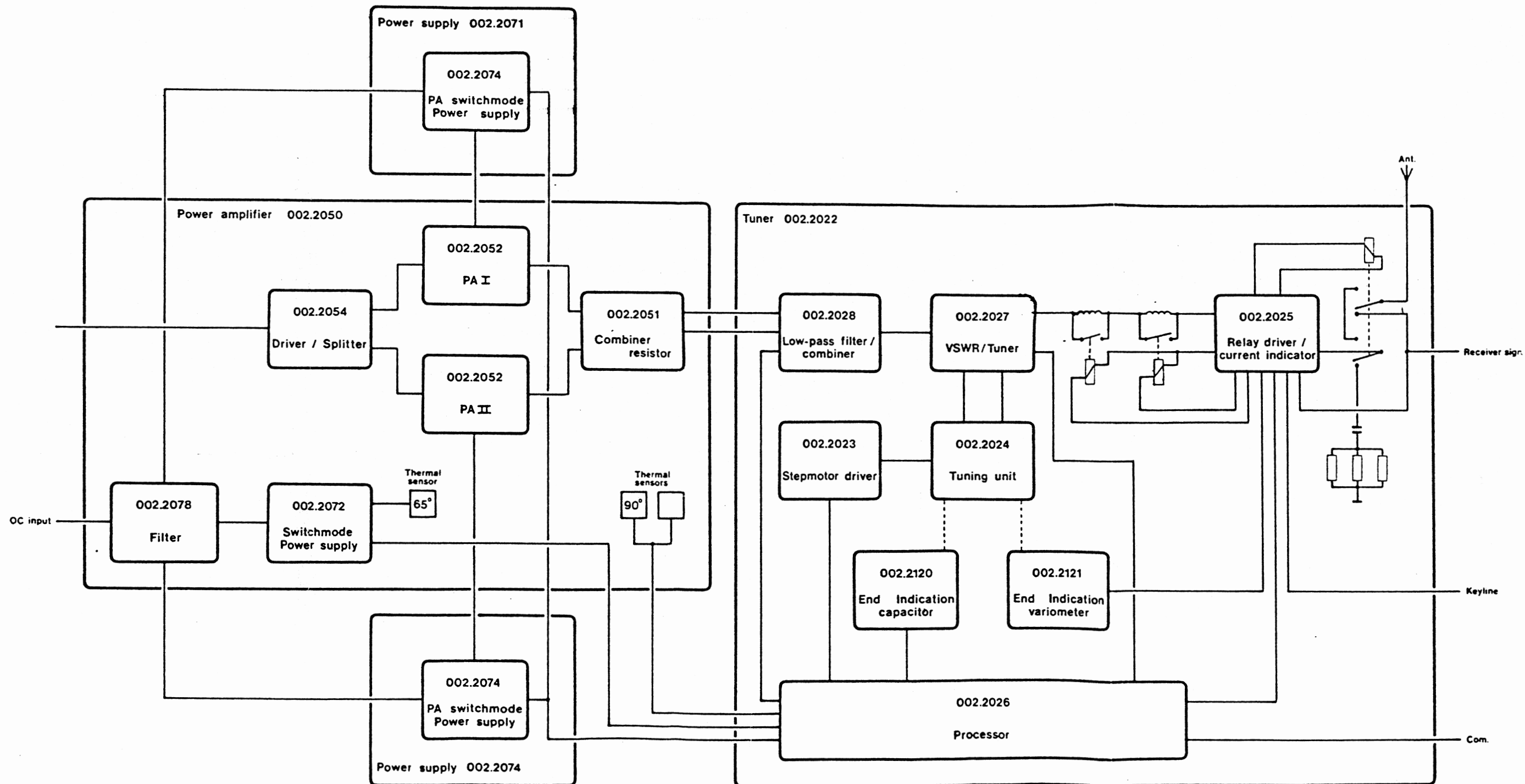
Junctionbox

Drawing no. 001.0429

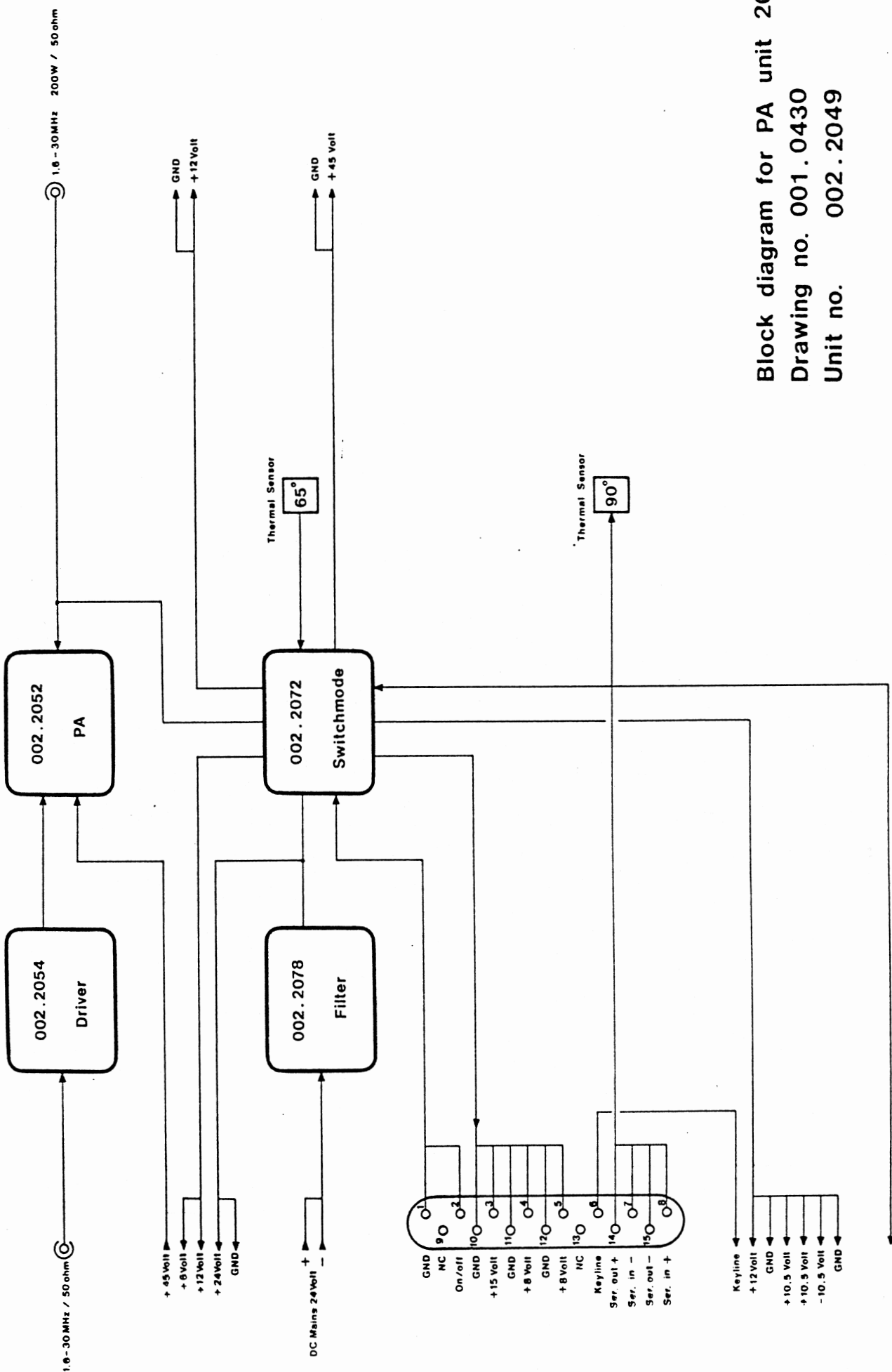
Unit no. 002.2014

PC. Board no. 003.2016

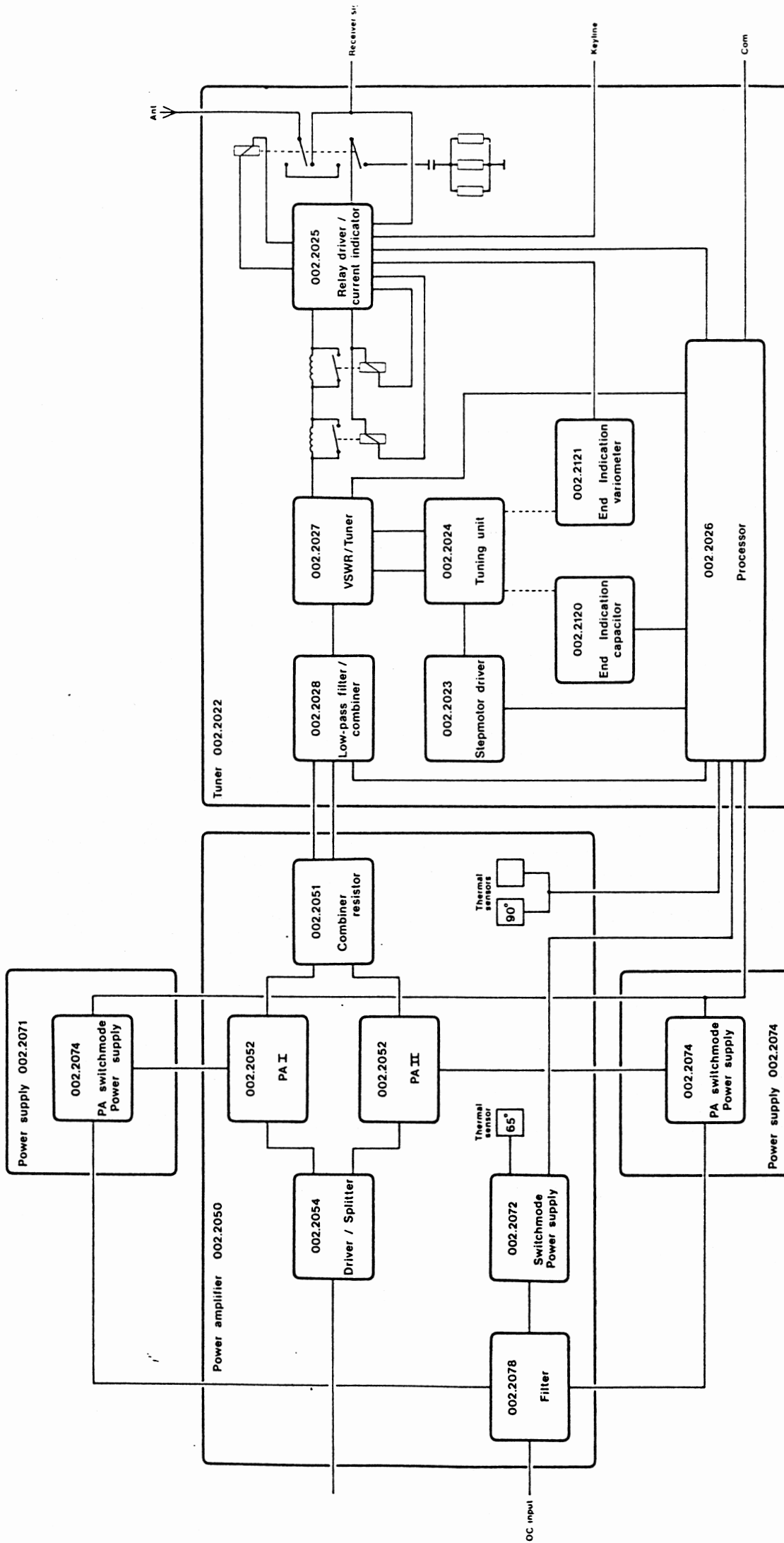
Layout no. 33.2016-2



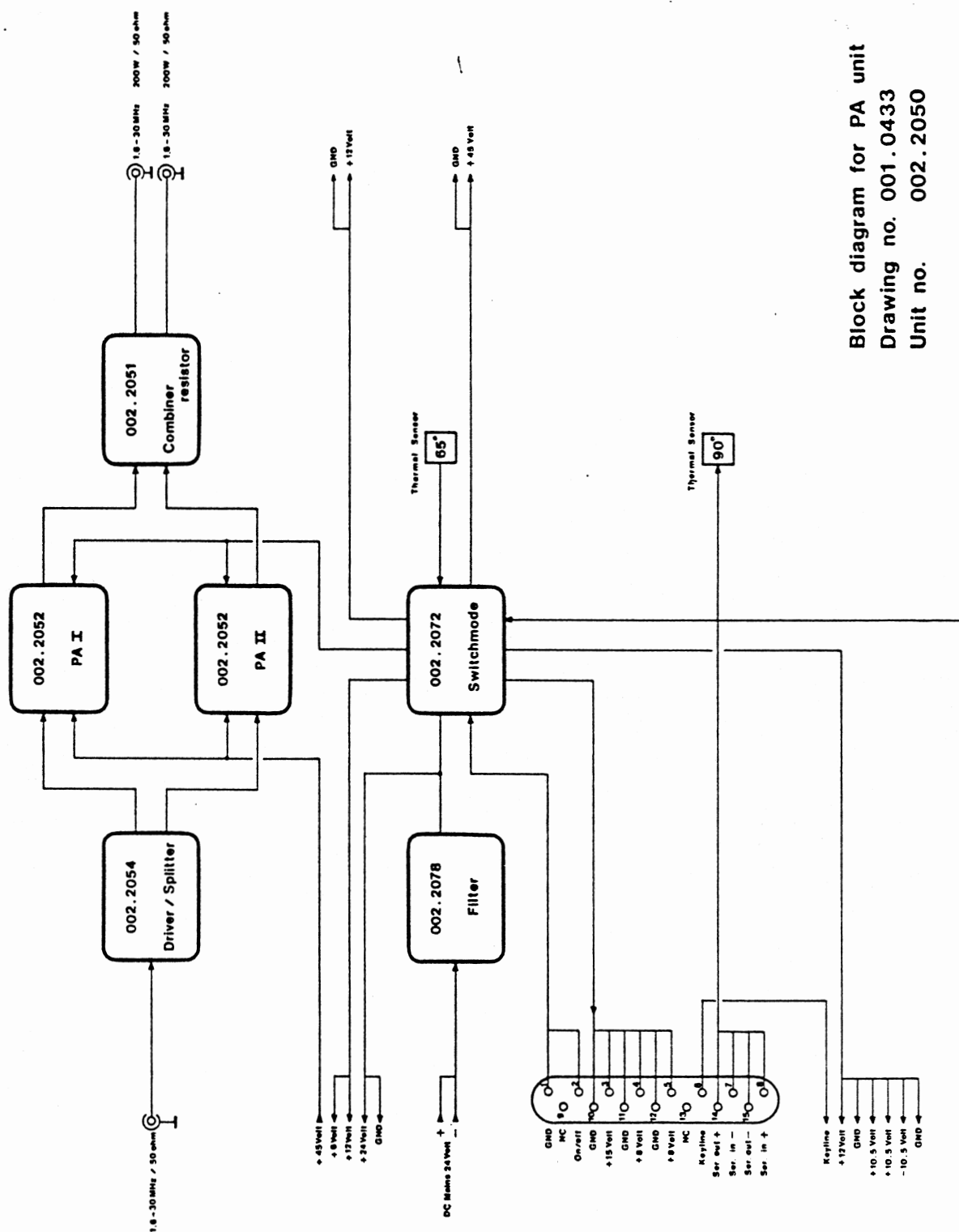
Block diagram for PA box
 Drawing no. 001.0431
 Unit no. 002.2020



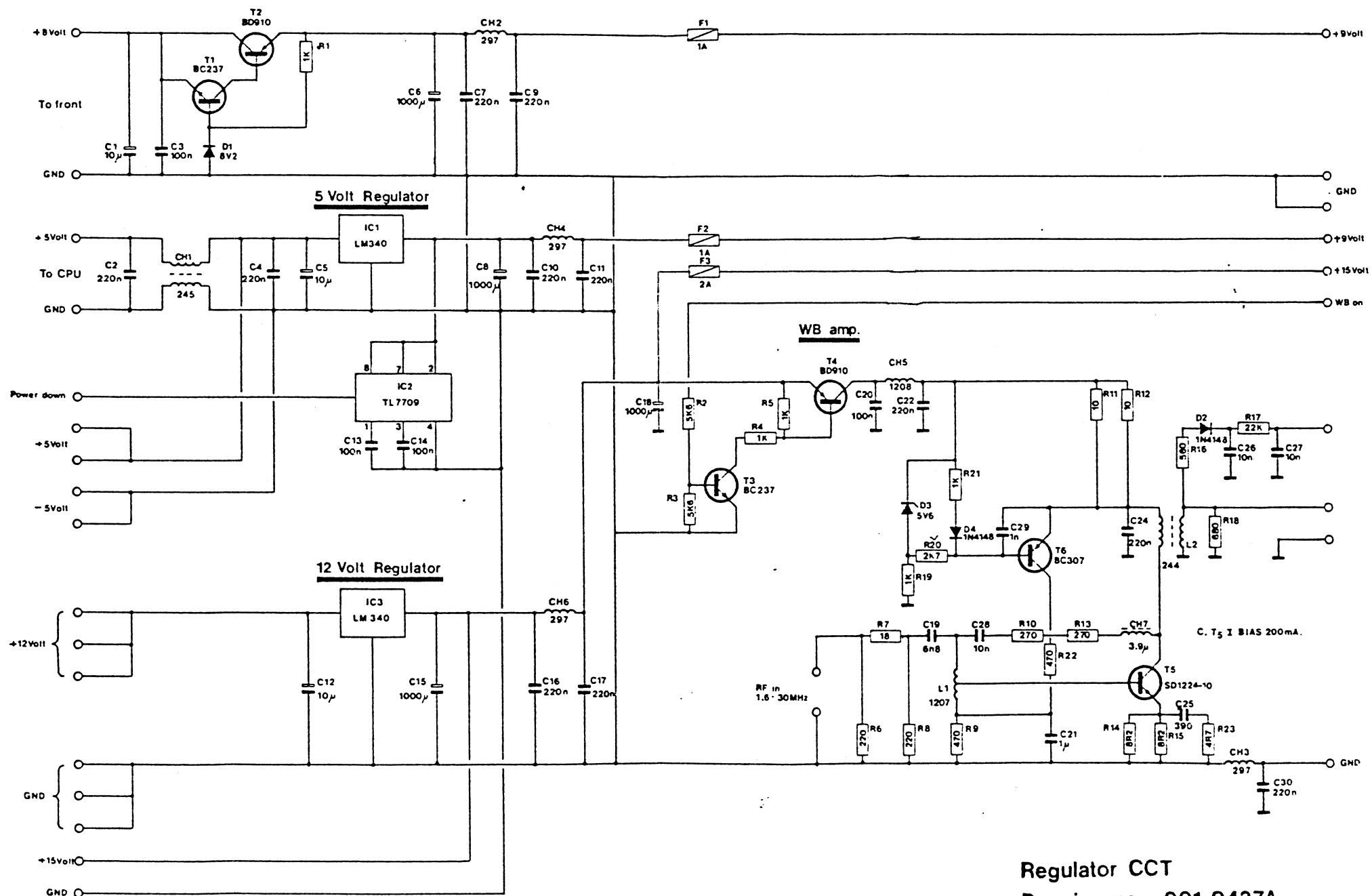
Block diagram for PA unit 200 W
 Drawing no. 001.0430
 Unit no. 002.2049

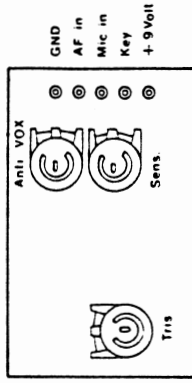
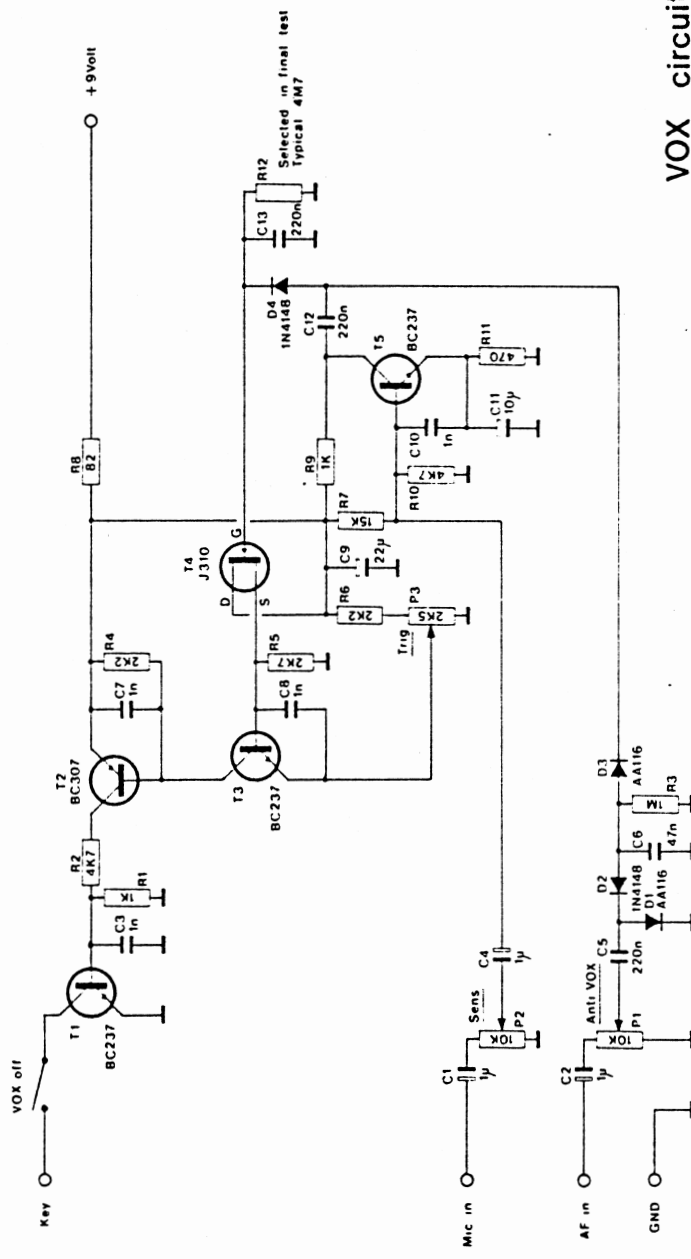


PA box
Drawing no. 001.0431
Unit no. 002.2020



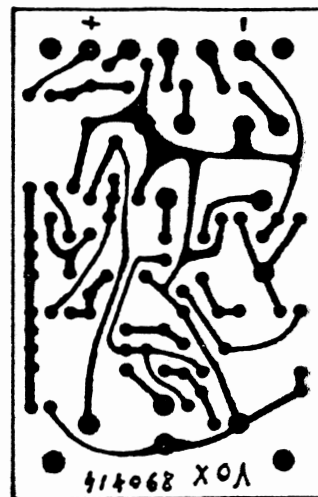
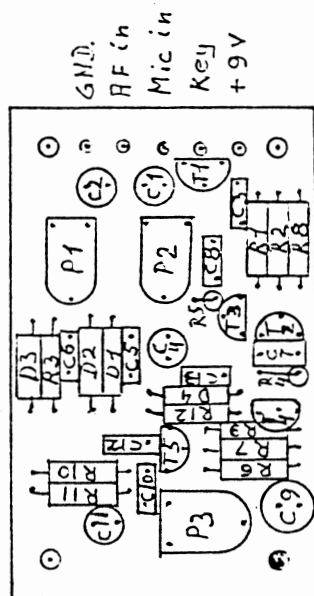
Block diagram for PA unit
Drawing no. 001.0433
Unit no. 002.2050

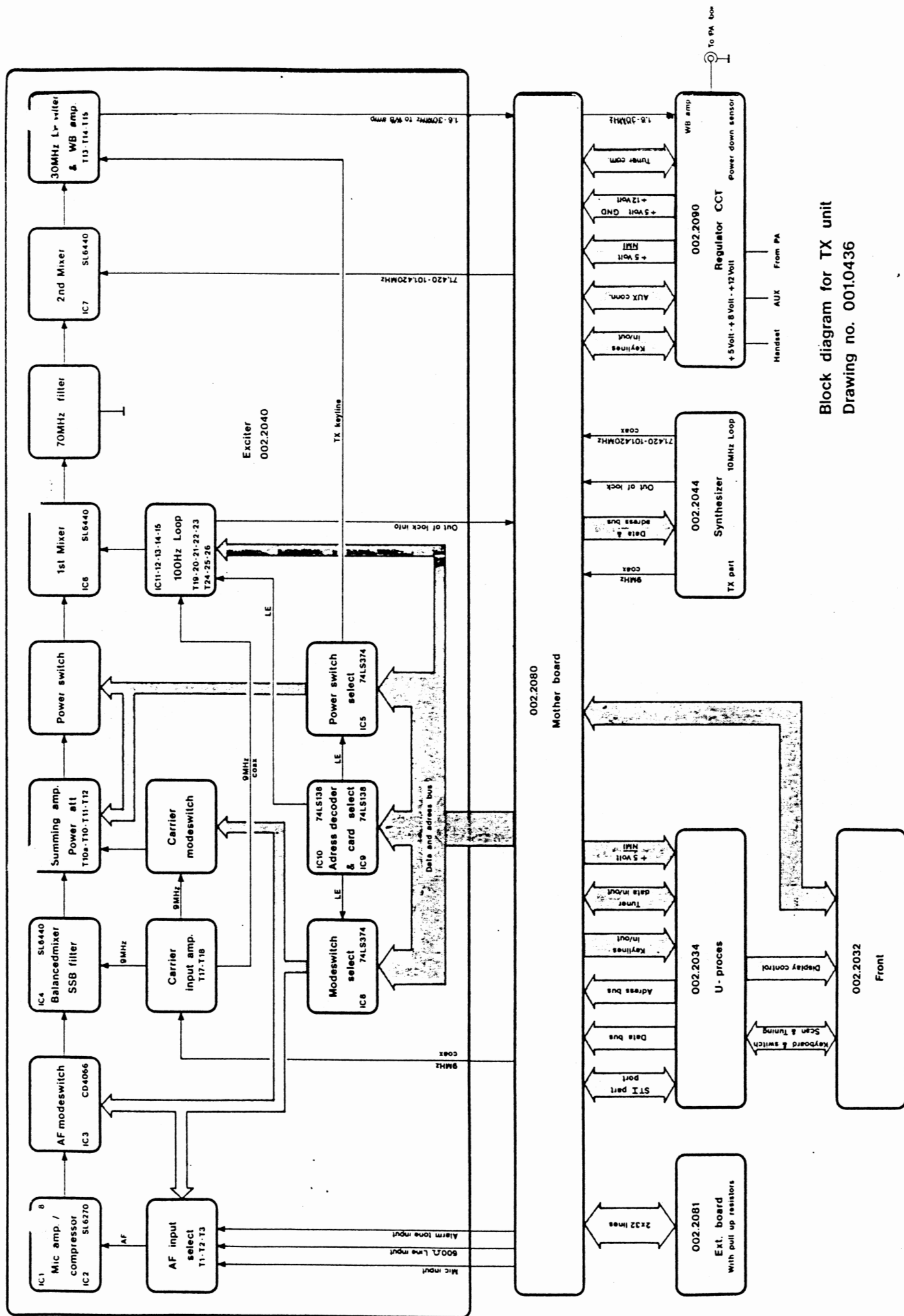




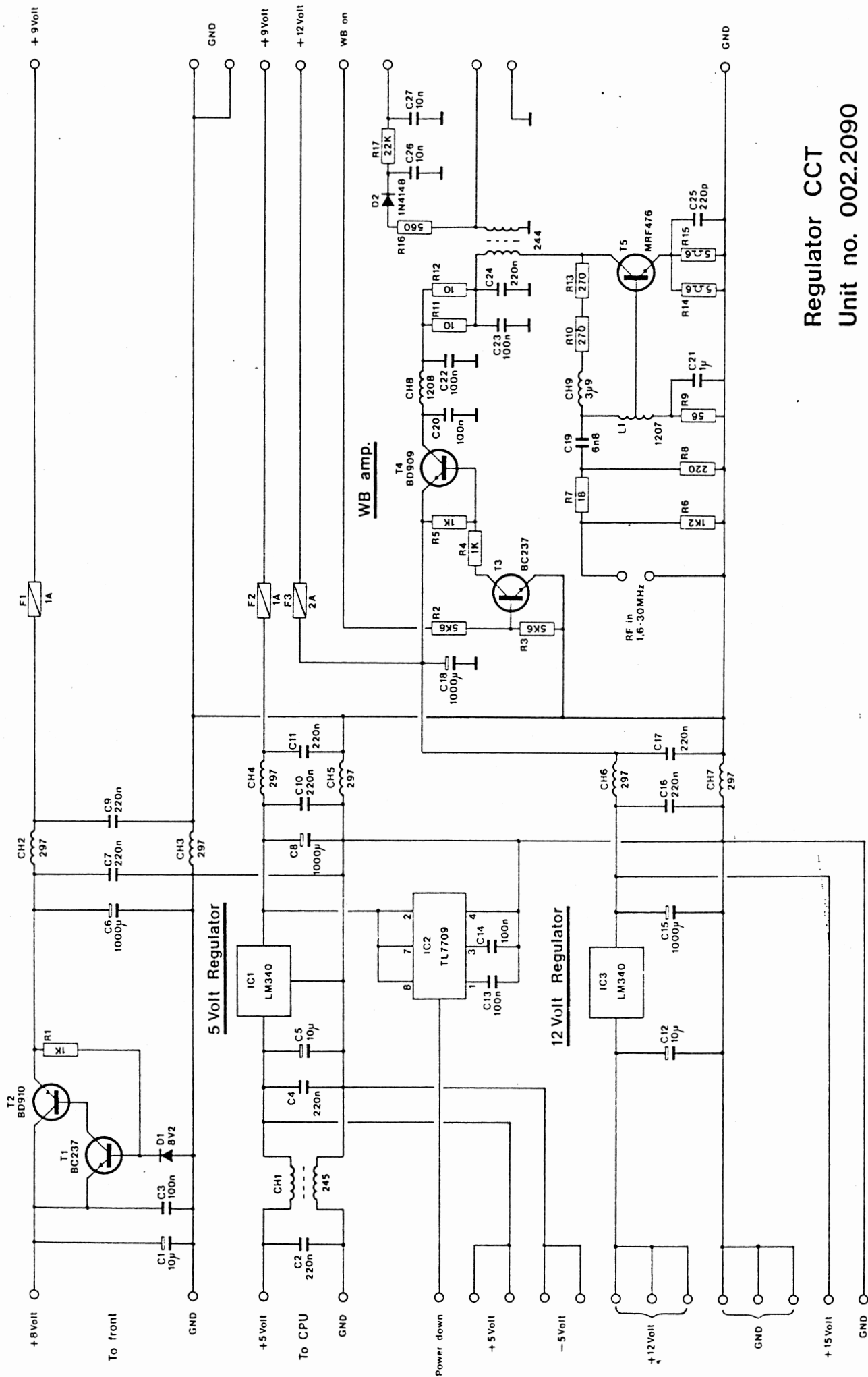
VOX circuit

Drawing no. 001.0428
 Unit no. 002.2096
 PC. Board no. 003.2096
 Layout no. 33.2096

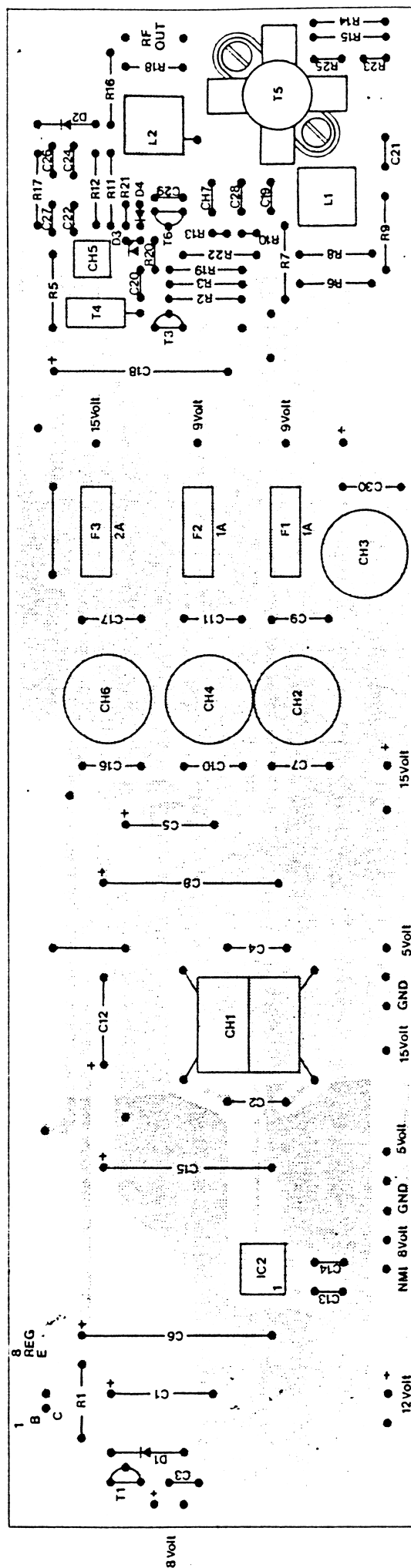




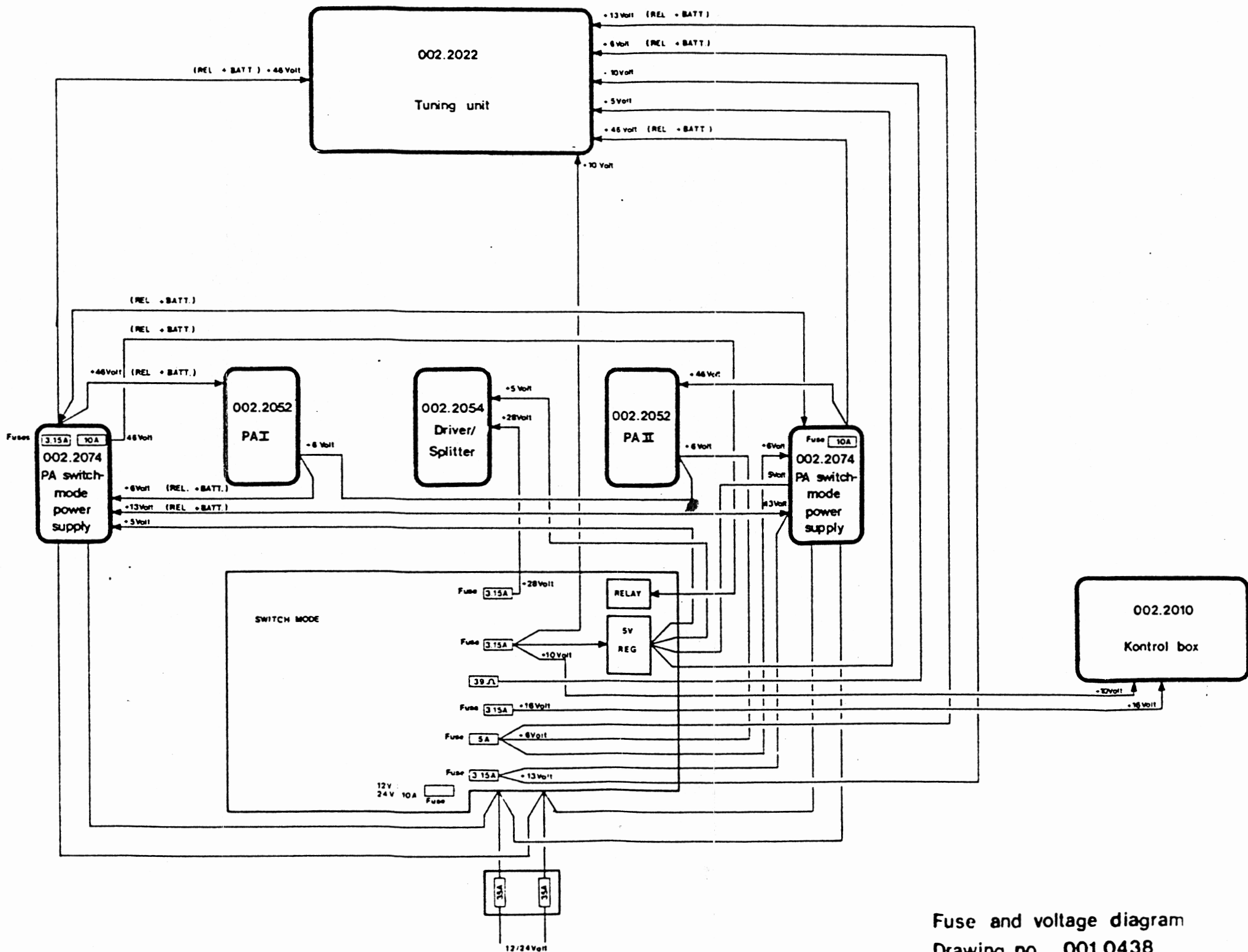
Block diagram for TX unit
Drawing no. 001.0436



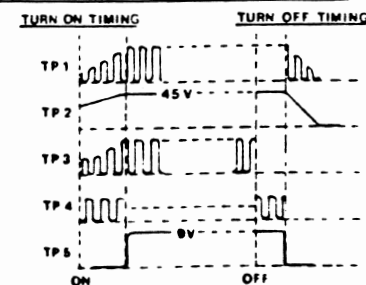
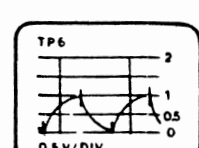
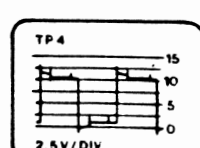
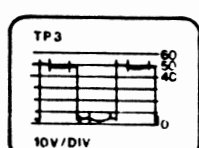
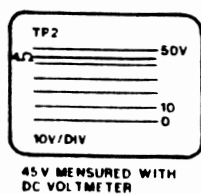
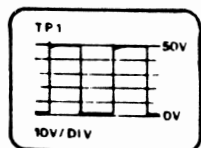
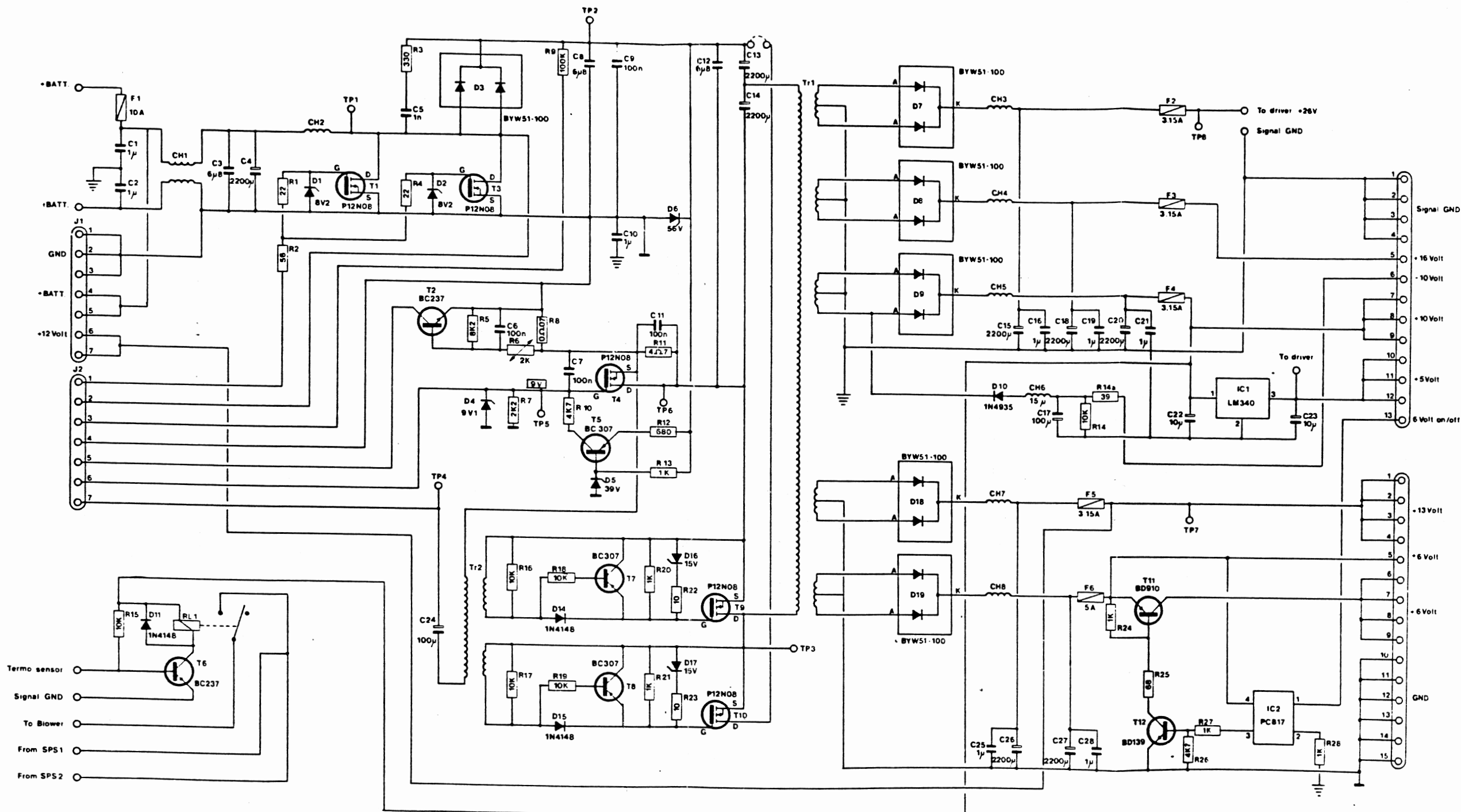
Regulator CCT
Unit no. 002.2090



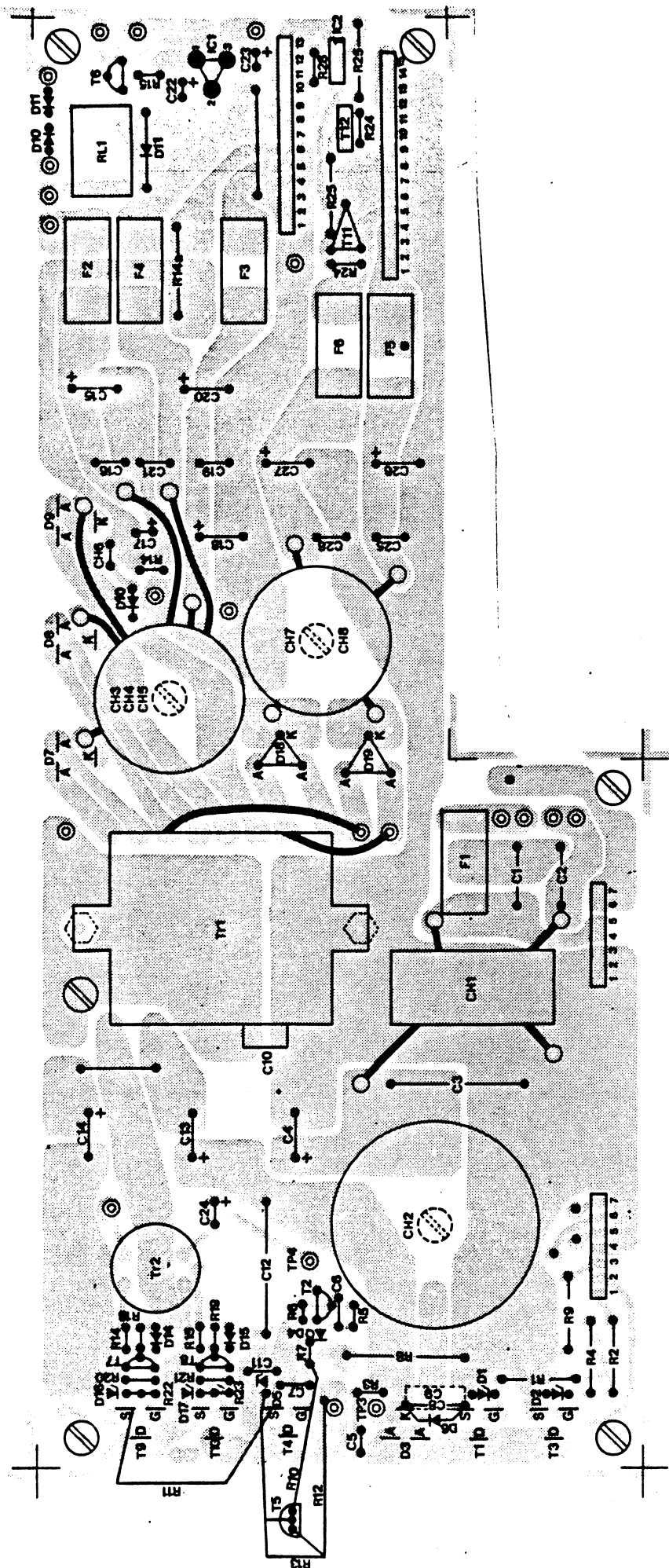
Regulator CCT
Layout no. 33.2090



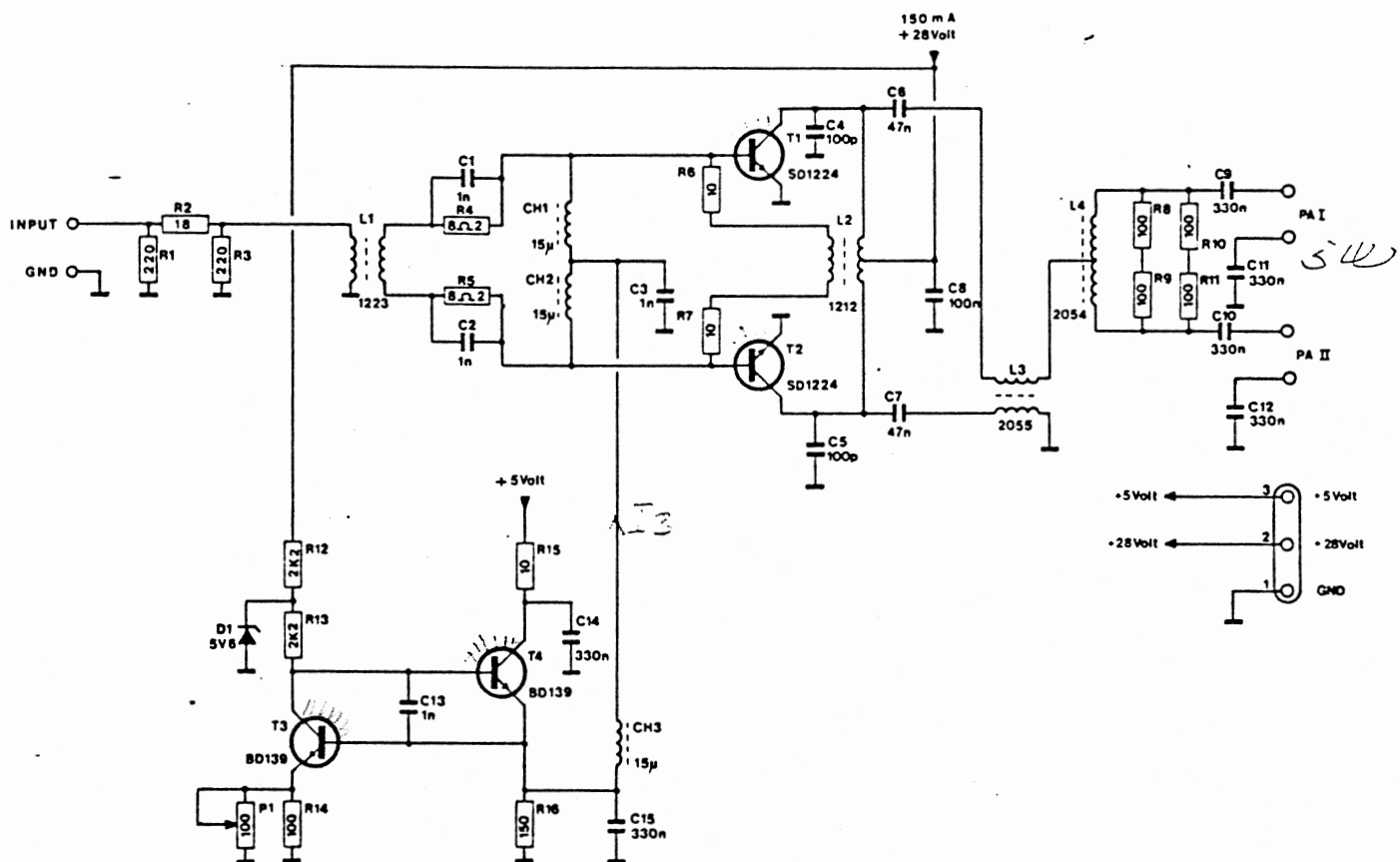
Fuse and voltage diagram
Drawing no. 001.0438



Switchmode
 Drawing no. 001.0421A
 Unit no. 002.2072
 PC. Board no. 003.2072 B
 Layout no. 33.2072



Switchmode
Layout no. 33.2072A



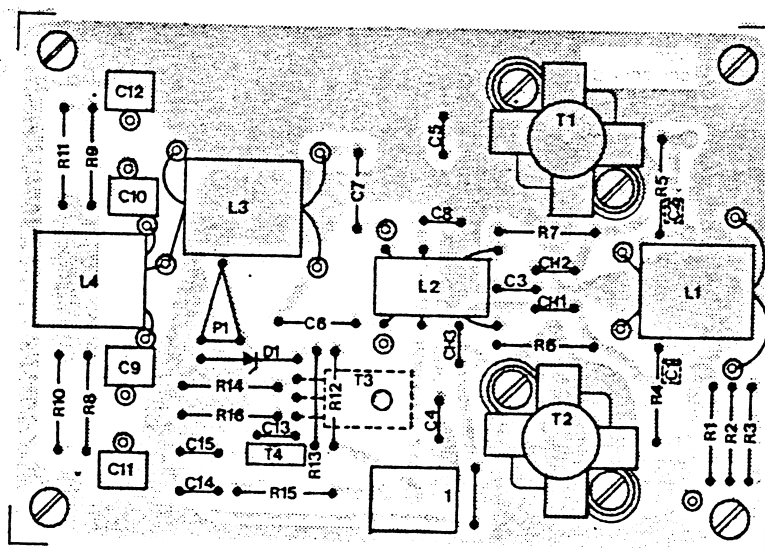
Driver

Drawing no. 001.0416A

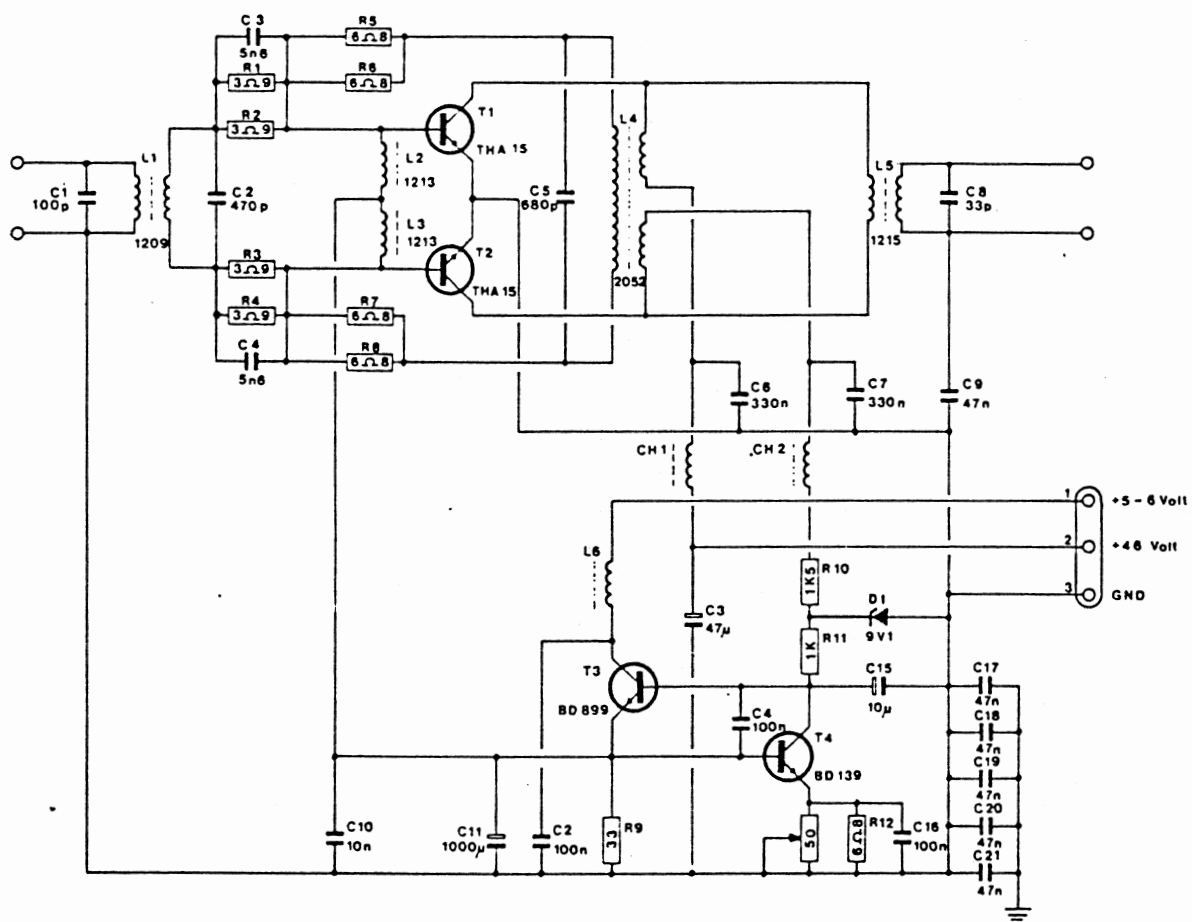
Unit no. 002.2054

PC. Board no. 003.2054D

Layout no. 33.2054



Driver
Layout no. 33.2054



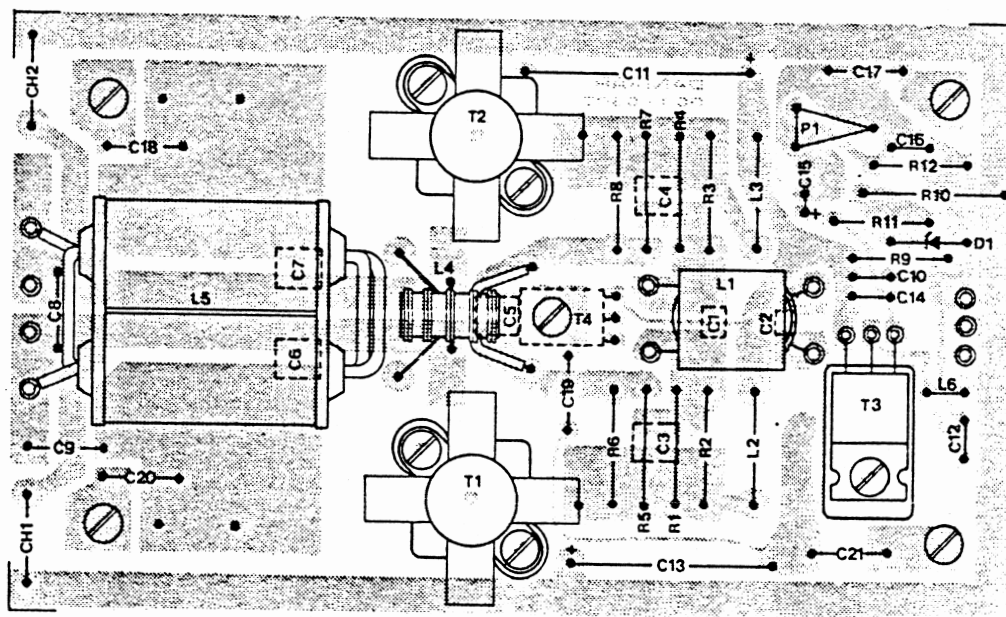
PA unit

Drawing no. 001.0415

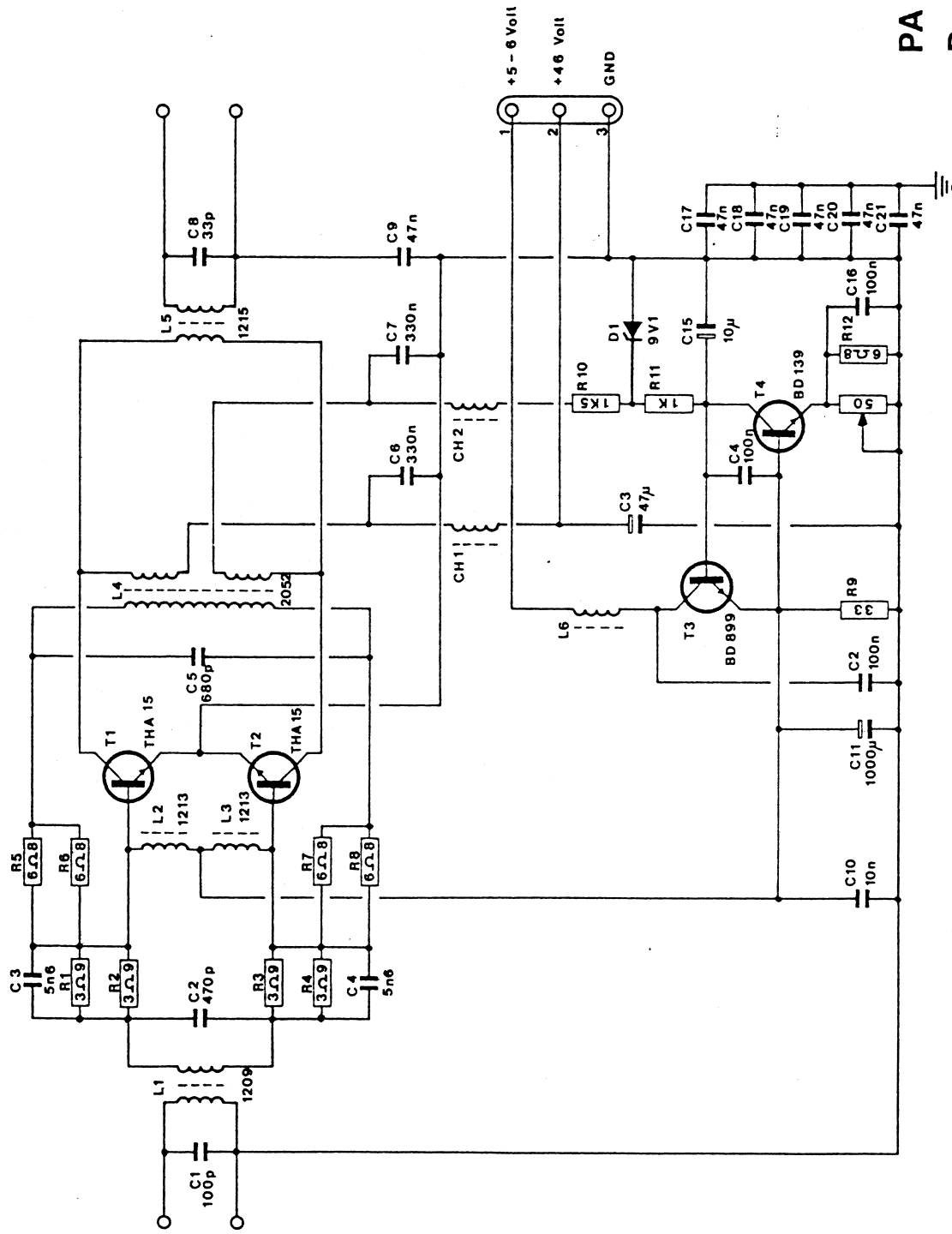
Unit no. 002.2052

PC. Board no. 003.2050

Layout no. 33.2050



PA. Unit
Layout no. 33.2050



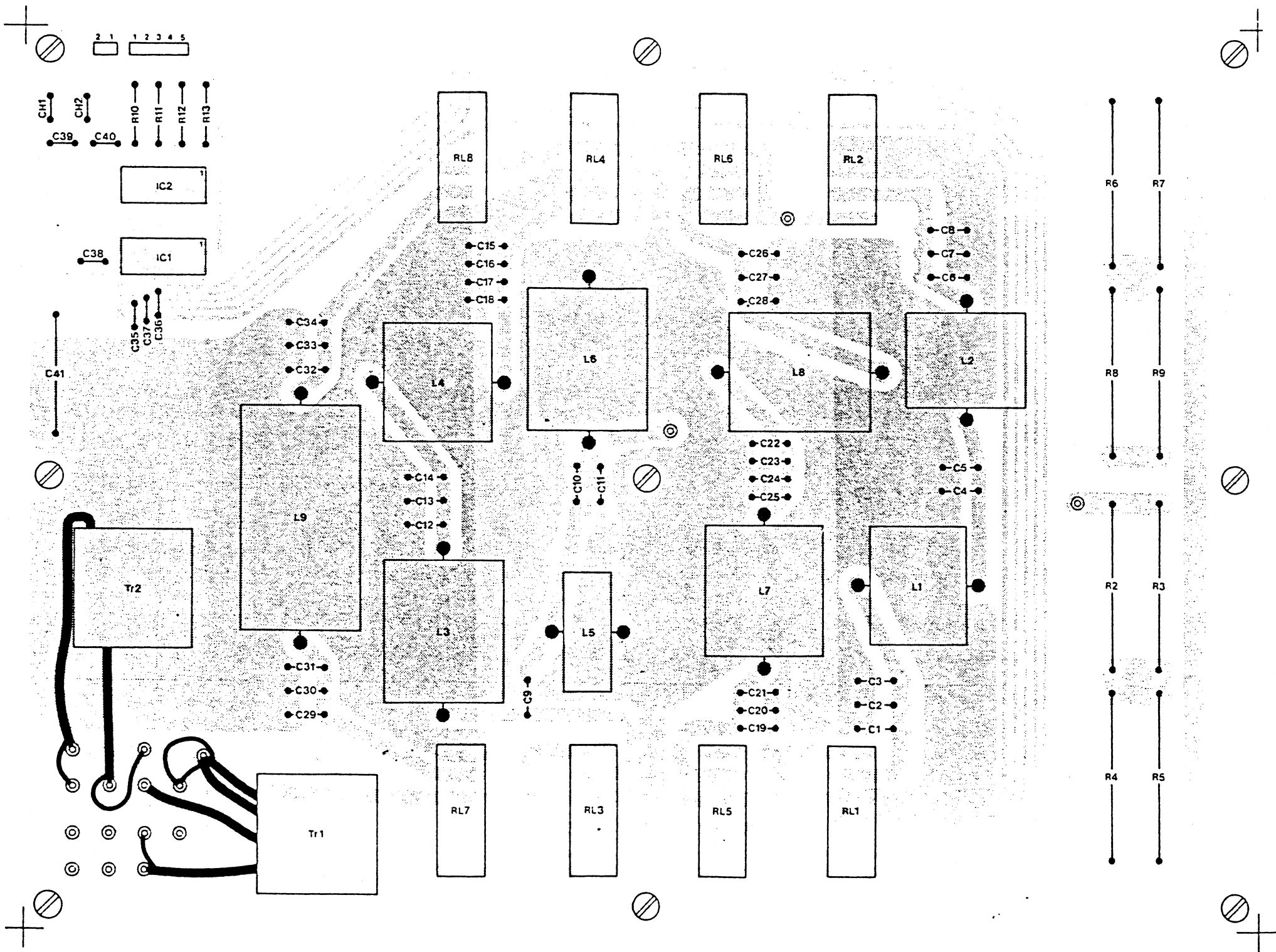
PA unit

Drawing no. 001.0415

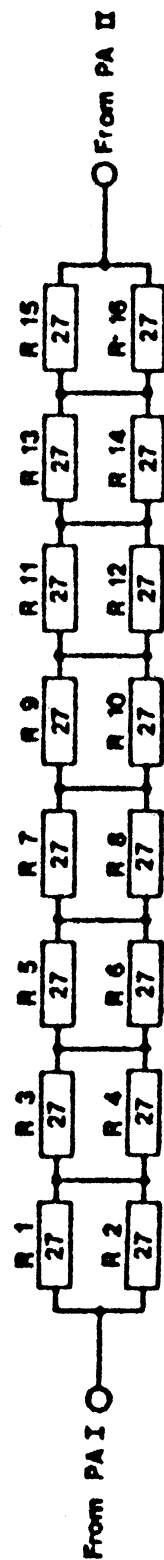
Unit no. 002.2052

PC. Board no. 003.2052

Layout no. 33.2052



Low-pass filter
Layout no. 33.2028



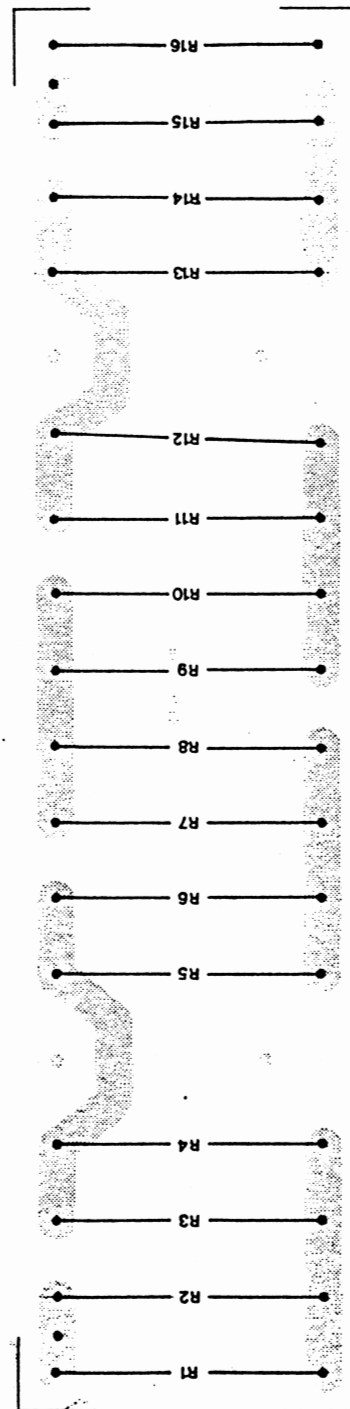
Combiner resistor

Drawing no. 001.0414

Unit no. 002.2051

PC. Board no. 003.2051

Layout no. 33.2051



Combiner resistor
Layout no. 33.2051