

DESCRIPTION OF THE BLOCK DIAGRAM.

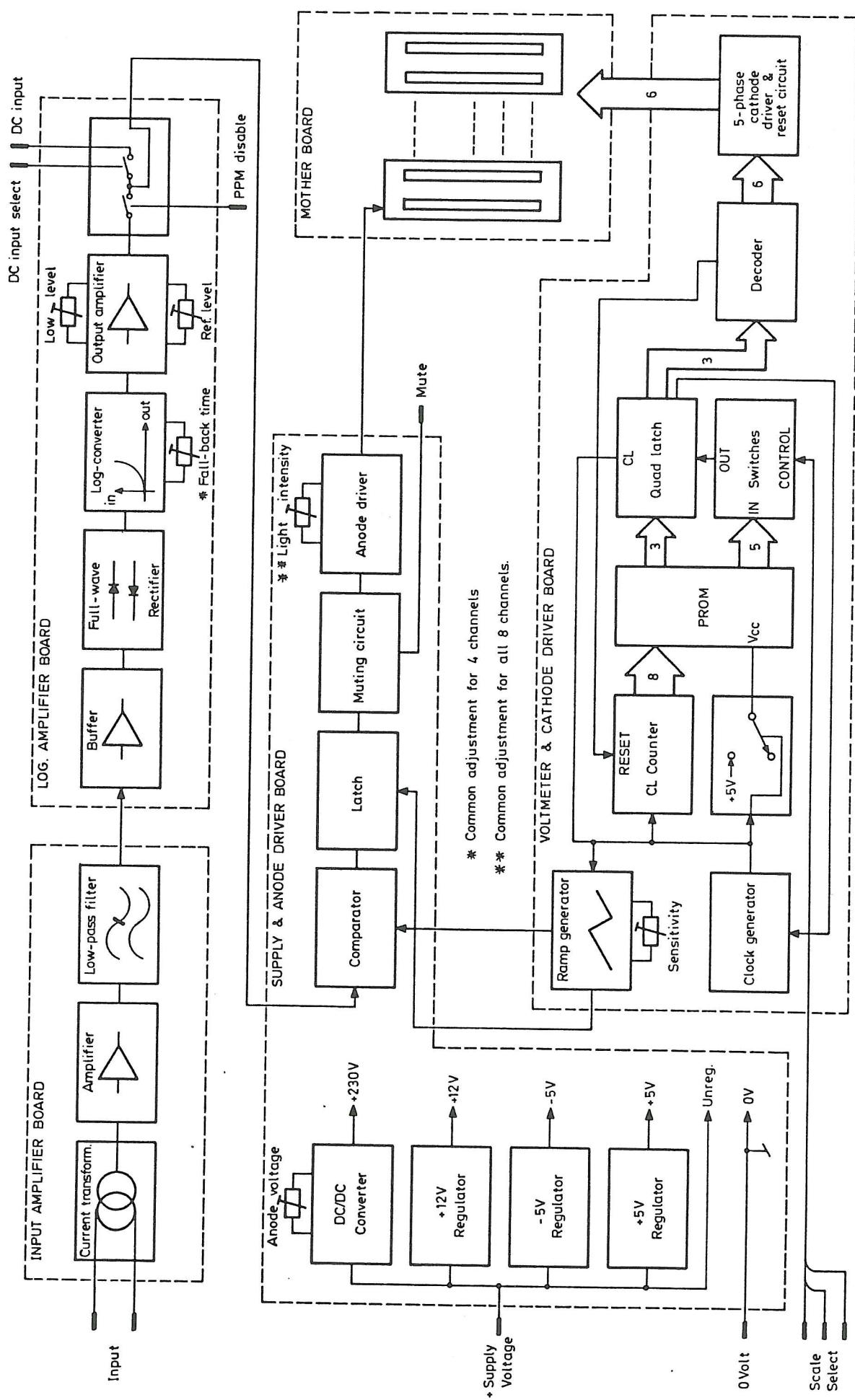
Since the block diagram to a large extent is selfexplanatory, the following remarks are intended as a guide to the use of the diagram.

The input signals are led to the Input Amplifier Board containing eight identical circuits for which reason only the circuitry for one channel is shown. The input stage consists of a current transformer giving a balanced input, followed by an amplifier and a low-pass filter providing a 12dB/octave roll-off at high frequencies.

The signal is then fed to the Log. Amplifier Board containing four identical circuits. (Two boards are used). On the board the signal is led through a full-wave rectifier supplying current to the log-converter which generates a DC-voltage corresponding to the logarithm of the input signal. This voltage is given the standardized integration and fall-back time and then led to the output amplifier which serves as buffer and gives the right slope dB/V and the reference of the output signal. This signal is led through an electronic switching circuit enabling the instrument to measure external DC-signals.

The output from the log. amplifier is fed to the Supply & Mode Driver Board. The power supply comprises a DC/DC-converter, generating the high voltage for the anodes in the bar graph displays, three 3-terminal regulators supplying +12V, -5V and +5V. The comparator receives signals from the log. amplifier and from the ramp generator. The output from the comparator is led to the anode driver via a latch and a muting circuit, where the display can be switched off, (for that channel, the anode driving contains eight identical circuits), by connecting the pin "Mute" to ground.

The bar graph cathode driver circuitry on the Voltmeter & Cathode Driver Board is controlled from the clock generator. Each element in the bar graph represents a discrete, reproducible display step which causes that each segment of the display is directly relatable to a digital number. To initiate a scan, the reset cathode is grounded by turning the transistor associated on. As the counter advances on the cathodes are sequentially grounded, causing the glow to transfer along the bar. The intensified scale marks are stored in a Programmable Read Only Memory (PROM). This factory programmed memory may also contain alternative scale patterns. These can be selected by grounding one or more of the wires named "Scale Select". In order to keep the current consumption of the instrument low, the supply voltage is only applied to the PROM, when read out is executed.



Supply voltage : 22V dc to 32V dc
 Current consumption at 24V supply : typ 330mA; 180mA to 450mA.
 dep. on displayed signal levels
 Current consumption at 30V supply : typ 280mA; 150mA to 380mA.
 dep. on displayed signal levels

Note: The supply input contains a filter to avoid high frequency noise from being induced into the supply lines. The power consumption is, however, modulated at a low frequency (approx. 50Hz), and subsequently the PPM is recommended to be wired separately to the system's power supply.

PPM characteristics:

Input impedance	: 20 k Ohms $\pm 10\%$ balanced floating		
Input common mode attenuation	: 40 dB min. at 15kHz		
Frequency range, 0.5dB point	: 20 Hz to 16kHz		
High frequency roll-off	: more than 7dB at 25kHz more than 20dB at 40kHz		
Sensitivity (Standard DIN-scale)	: +6dBm (1.55 rms sine) for 0dB reading.		
Input overload level	: +21dBu		
Measuring errors	: at +5 to -10dB below -10dB reading reading		
1kHz sine, 25°C	: ± 0.5 dB ± 1 dB		
Within full frequency range, 25°C	: $+0.5/-1$ dB $+0.5/-2$ dB		
Within full temp.range, 1kHz	: ± 1 dB ± 2 dB		
Reversibility error	: ± 0.3 dB ± 1 dB		
Integration time (standard)	: 10 ms for -1dB ± 0.5 dB		
conforming to DIN45406	5 ms for -2dB ± 1 dB		
and IEC268-10	3 ms for -4dB ± 1 dB		
	0.4 ms for -15dB ± 2 dB		
Fall-back time	: 1.5 s per 20 dB		

DC-inputs:

The instrument may be switched to measure dc signals connected to J5/J6 term 1 - 4. The control inputs J5/J6 term 8/9 are active low C-MOS inputs.

Control Input		Display Function
term 9	term 8	
NC	NC	PPM, normal operation
NC	0V	PPM, log. signal accessible on term. 1-4
0V	NC	PPM reading switched off
0V	0V	DC-reading, input term. 1-4

All even channel numbers are accessible through J5

All odd - - - - - J6.

DC-input sensitivity : 3.0V $\pm 5\%$ for max. reading

Display function : Linear

Input impedance : 100 kOhm $\pm 5\%$ ref. to 0V

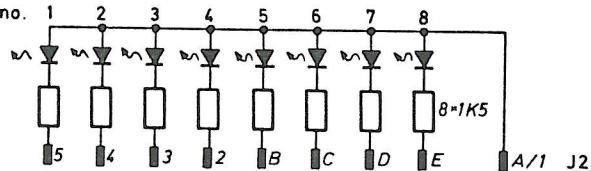
Display Control Inputs (J1).

Any displayed channel may be switched off (muted) by connecting the pins 6-9 or F - K to 0V. Connecting the MUTE/SOLO input to 0V will cause the inverse function such that all but the selected channel will be switched off. As all control-inputs are protected C-MOS inputs, external diode gating may be used, in order to obtain any desired display pattern.

Overload LED's

The LED's positioned above each bar are fully isolated from the rest of the display circuitry, and may be used for displaying overload warnings or channel assignment, etc.

Schematic diagram:



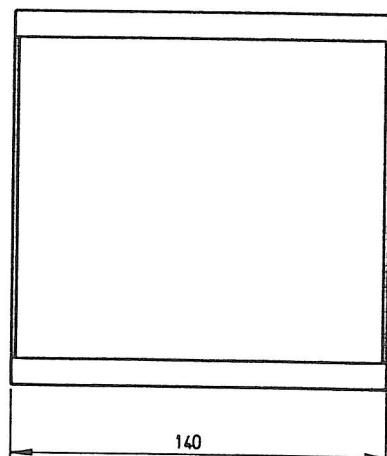
Scale marks (J2).

The intensified scale marks are stored in a read only memory which may also contain alternative scale patterns (dep. on type). These may be selected by connecting one or more of the terminals 7, 8, 9 J2 to 0 Volt.

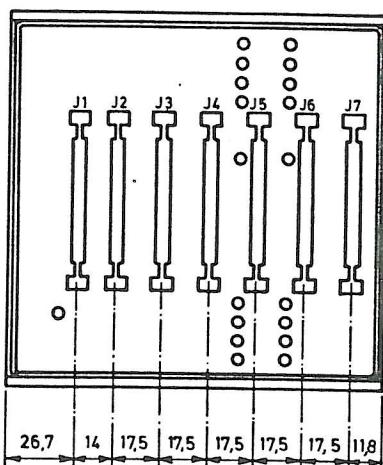
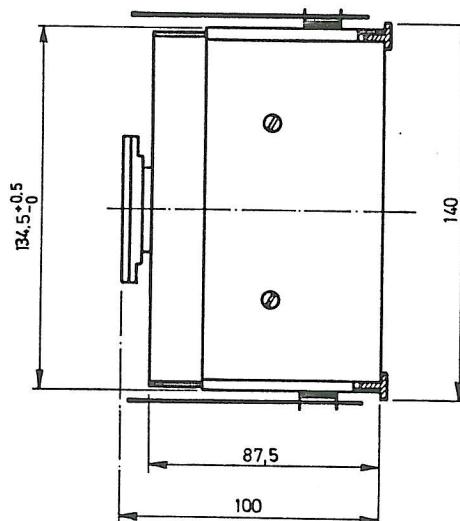
GENERAL.

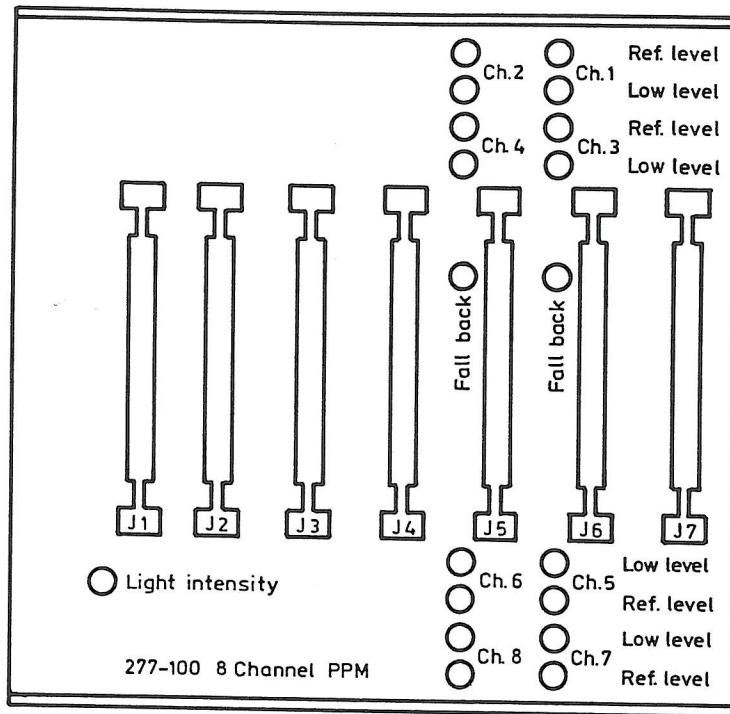
Temperature range	: 0 to 45°C amb. temp.
Mating connectors	: 20 pole (2 x 10) module 0.156" (ELCO type: 00-6007-020-450-012).
Weight	: approx. 0.950 kilos

Mechanical outline:



Front view





Rear view

J 1 :	Supply and anode driver	277-10B40
J 2 :	Voltmeter and cathode driver	277-10C40
J 3 :	Option: Overload LED driver	277-10G40
J 4 :	Not used	
J 5 :	Log. amplifier	277-10D40
J 6 :	Log. amplifier	277-10D40
J 7 :	Input amplifier	277-10E40

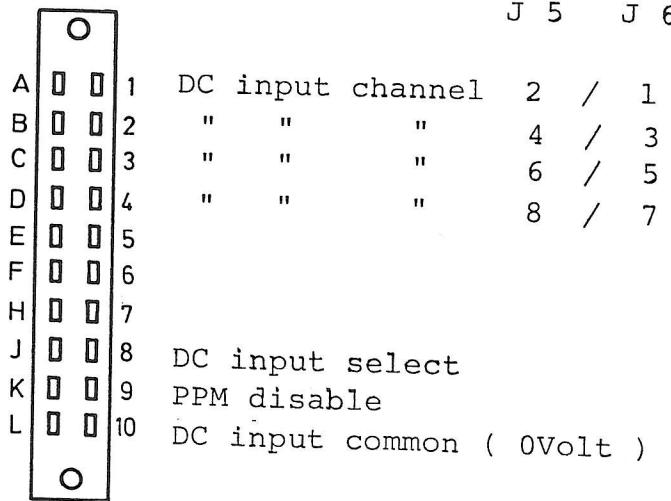
J 1

+24 Volt	A	1	+24 Volt
0 Volt	B	2	0 Volt
Chassis	C	3	Chassis
	D	4	
	E	5	
Ch.5 display control input	F	6	Ch.1 display control input
" 6	H	7	" 2
" 7	J	8	" 3
" 8	K	9	" 4
Light intensity	L	10	Mute/solo select

J 2

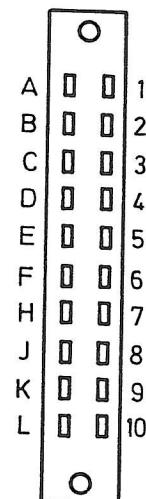
Common anode LED	A	1	Common anode LED
Channel 5 overload LED	B	2	Channel 4 overload LED input
" 6	C	3	" 3
" 7	D	4	" 2
" 8	E	5	" 1
	F	6	
	H	7	C }
	J	8	B }
	K	9	A }
	L	10	0 Volt

J 5 J 6

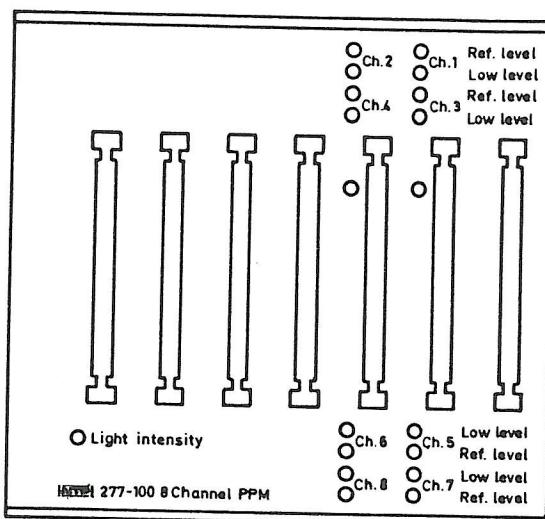


J 7

Input channel 1
 " " 2
 " " 3
 " " 4
 " " 5
 " " 6
 " " 7
 " " 8



Since the instrument is adjusted correctly on delivery, adjustment only has to be carried out in case of faulty mode of operation, i.e. when a component has failed and has been replaced.



TEST SET-UP.

1. Connect +24V DC to pin A on J1 (0 Volt to pin B on J1)
2. Feed a signal e.g. 5 kHz sinusoidal to the input terminals on input board (277-10E40) for all channels, i.e. pin A and pin 1 for channel 1, pin B and pin 2 for channel 2 a.s.o. up to pin J and pin 8 for channel 8. Adjust the amplitude of the signal for max. reading on the displays (top of the scales).

ANODE VOLTAGE ADJUST.

1. Remove the instrument from the cabinet.

CAUTION ! Be aware that when supply voltage is supplied, high voltage is on the circuits (250V DC)

2. Set P2 on the supply and anode driver board (277-10B40) to mid position.
3. Turn P1 on the supply and anode driver board (277-10B40) max. CW and then slowly CCW as far as possible without getting a flickering display.
4. Measure the current consumption.
5. Adjust P1 to obtain an increase in current consumption of approx. 10%.

LIGHT INTENSITY ADJUSTMENT.

1. Adjust P2 on the supply and anode driver board until a current consumption of 450 mA is obtained (or to desired light intensity).

VOLTMETER SENSITIVITY ADJUSTMENT.

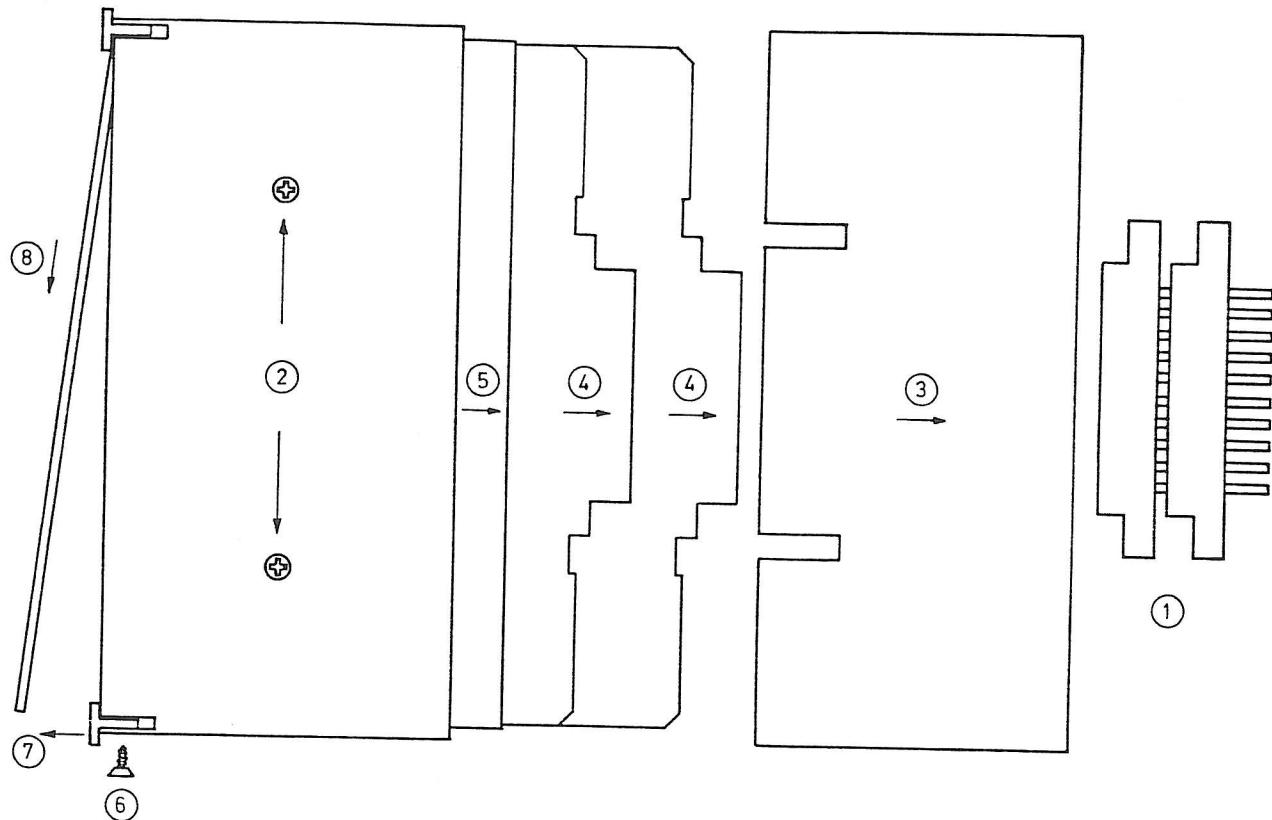
1. Connect a voltmeter to the wiper (center pin) on P1 on the voltmeter & cathode driver board (277-10C40). The voltage should be 3V. If not, adjust P1.

LOW LEVEL & REF. LEVEL ADJUSTMENT.

1. Connect a signal of -40dB to input terminals.
2. Adjust the low level potmeter for all channels to obtain reading (-40 on the DIN-scale).
3. Change the signal to ref.level and adjust the ref.level potmeters for all channels to obtain correct reading (0 on DIN-scale).
4. Repeat 1-3.

FALL-BACK TIME ADJUSTMENT.

1. Connect a burst generator e.g. NTP type 507-100 to input terminals.
2. Adjust the fall-back potmeters to obtain recommended fall-back time (1.5 sec. from "0" to "-20" on DIN-scale)

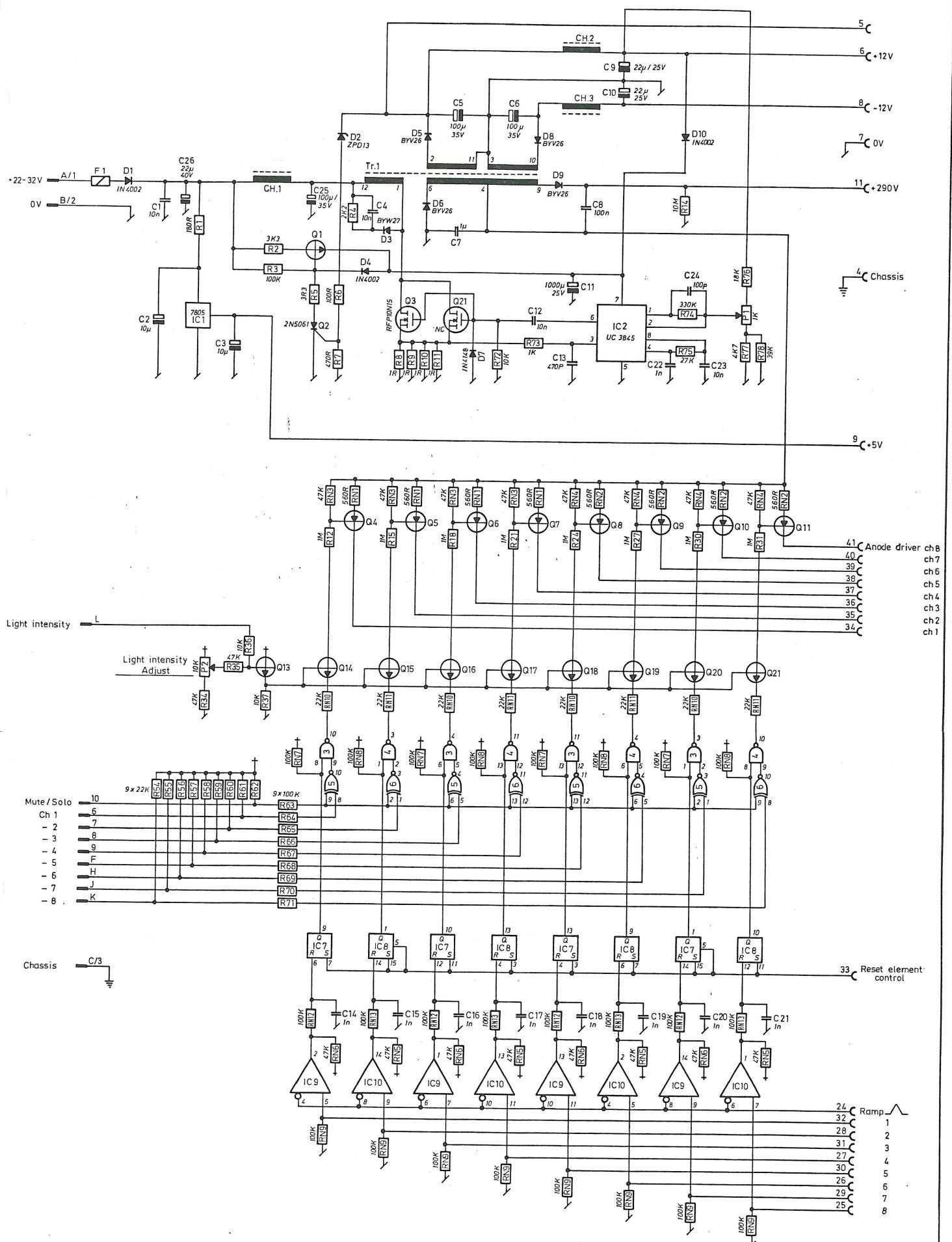


Disassembling of the 277-900.

1. Remove the 20-pole edge connectors ①
2. Loosen the four screws (two on each side) ②
3. Remove the rearplate-section ③
4. Remove the four screws ② and the lockplates.
5. Pull out the Printed Circuit Boards ④
6. Pull out the motherboard ⑤ or pull out the motherboard together with the other PCB's.

If the frontplate must be replaced:

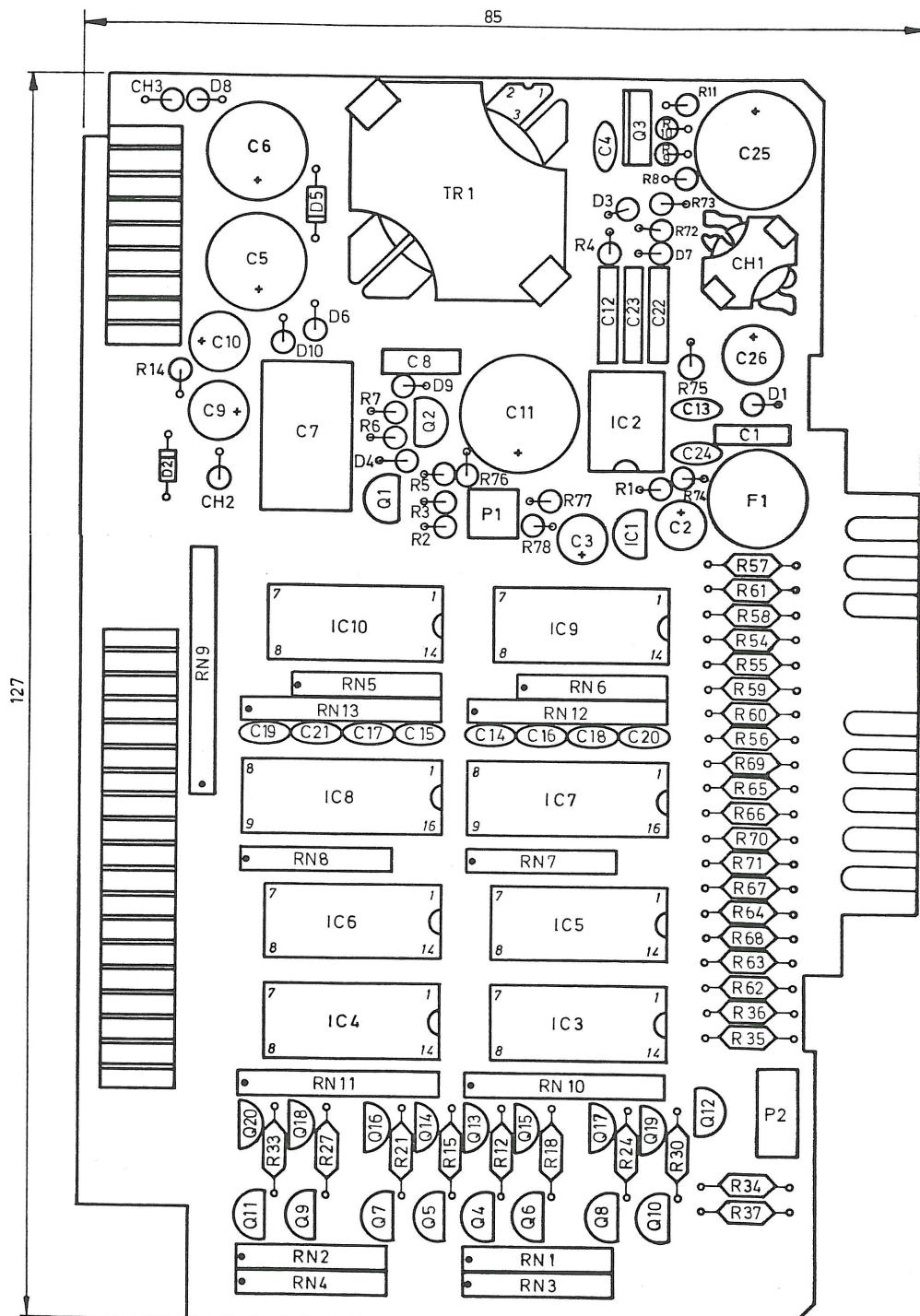
1. Remove the three screws ⑥
2. Pull out the front panel ⑦
3. Remove the frontplate ⑧



Pos.:	Antal:	Materiale:	Behandl.:	Del af:
Målestok :				
Tolerancé : ± mm				
Tegnet : 3.8.87.B5/bh				
Godekendt:				
Revideret: 3/920827				
8 Channel PPM 277-100C Supply & Anode Driver Board Schematic Diagram				
NTP NTP ELEKTRONIK A/S				
277-10B30 - C-2				



vertical mounted diodes



Målestok : 2 : 1

Konstruktør :

Tegnet : 6.8.87/bh

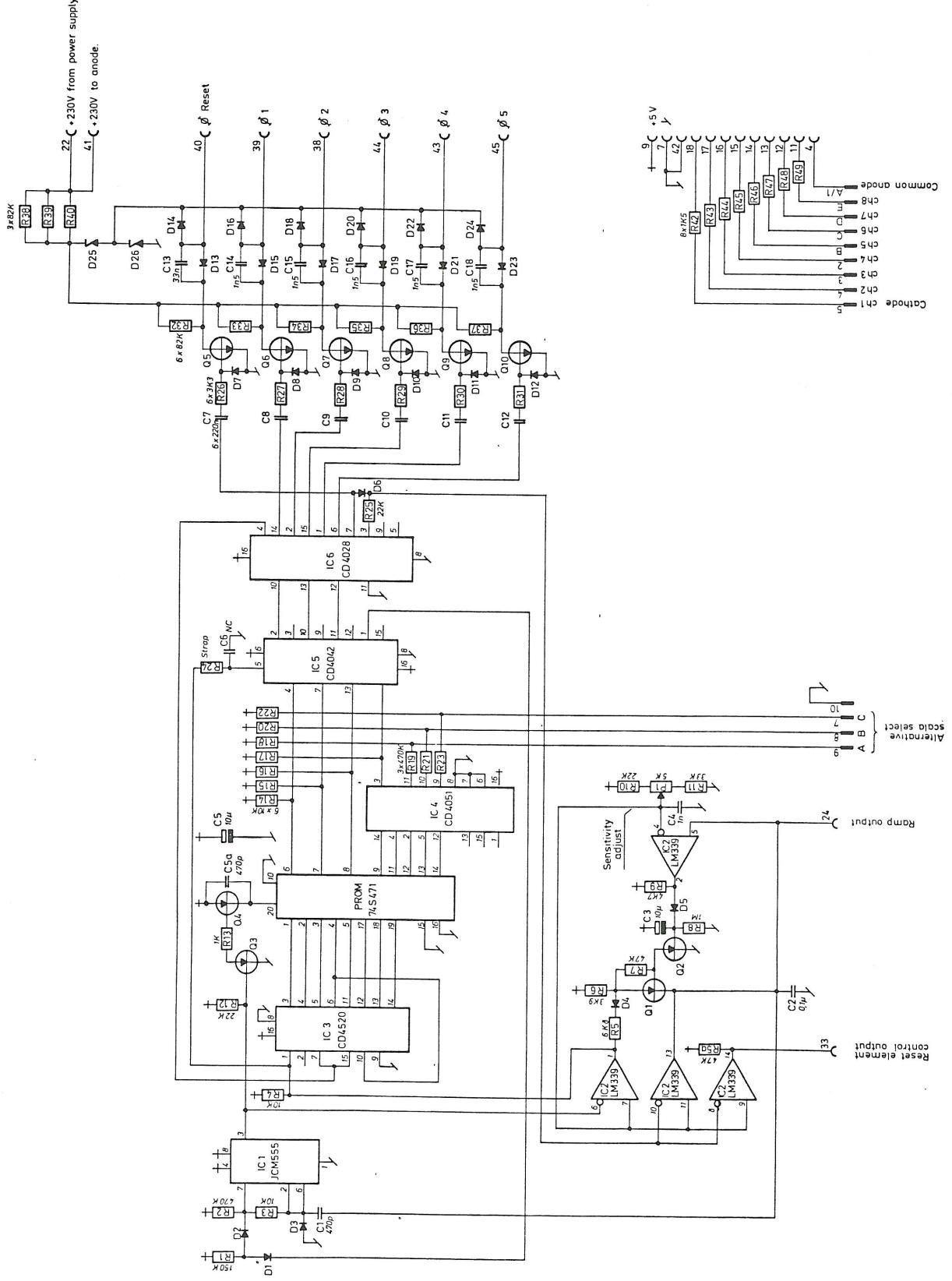
Godkendt :

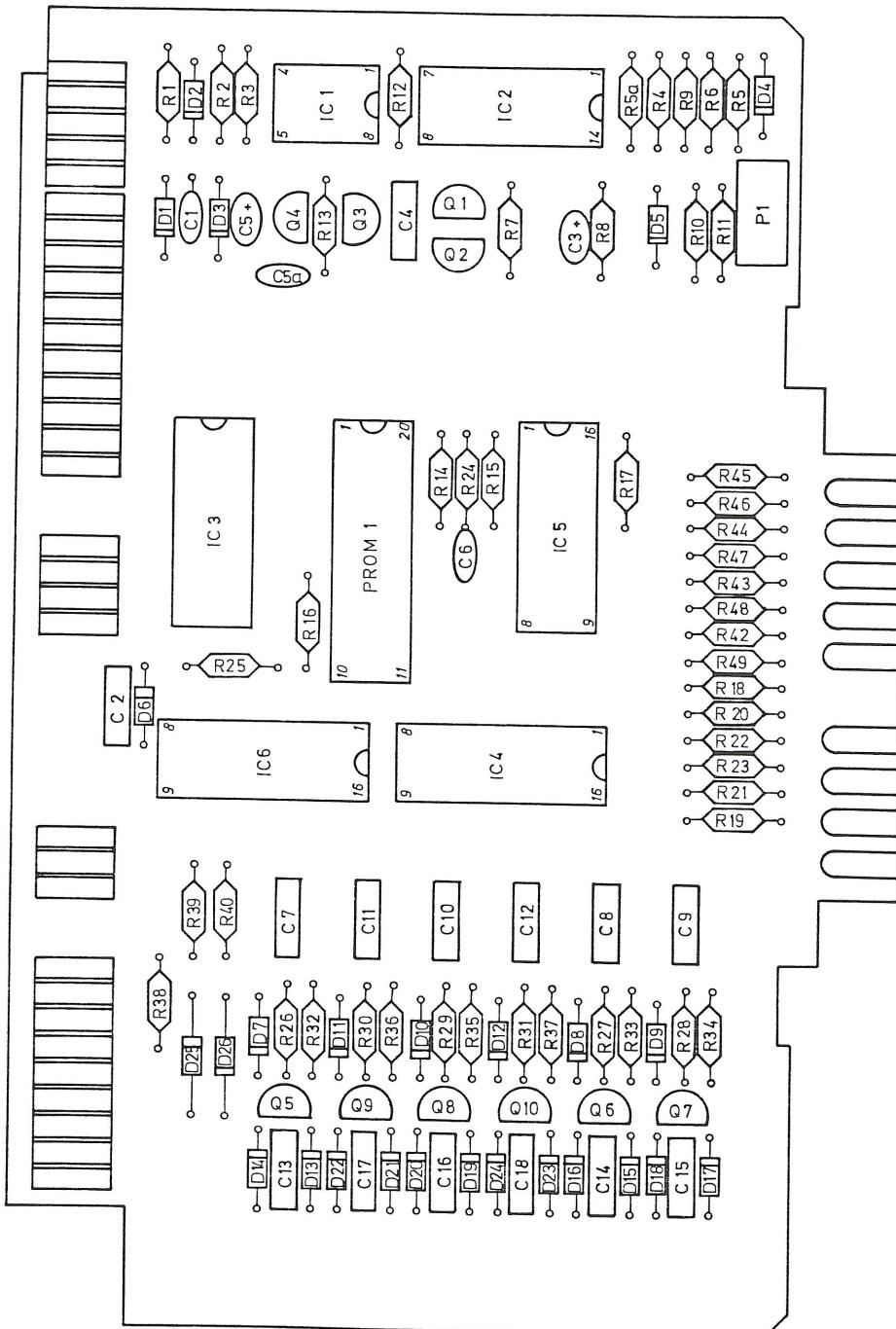
Revideret : 2 / 24.2.88.

8 Channel PPM 277-100C
Supply & Anode Driver Board
Components Layout

NTP
NTP ELEKTRONIK A/S

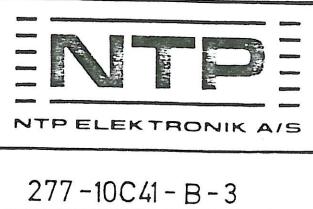
277 - 10B41 - C - 3



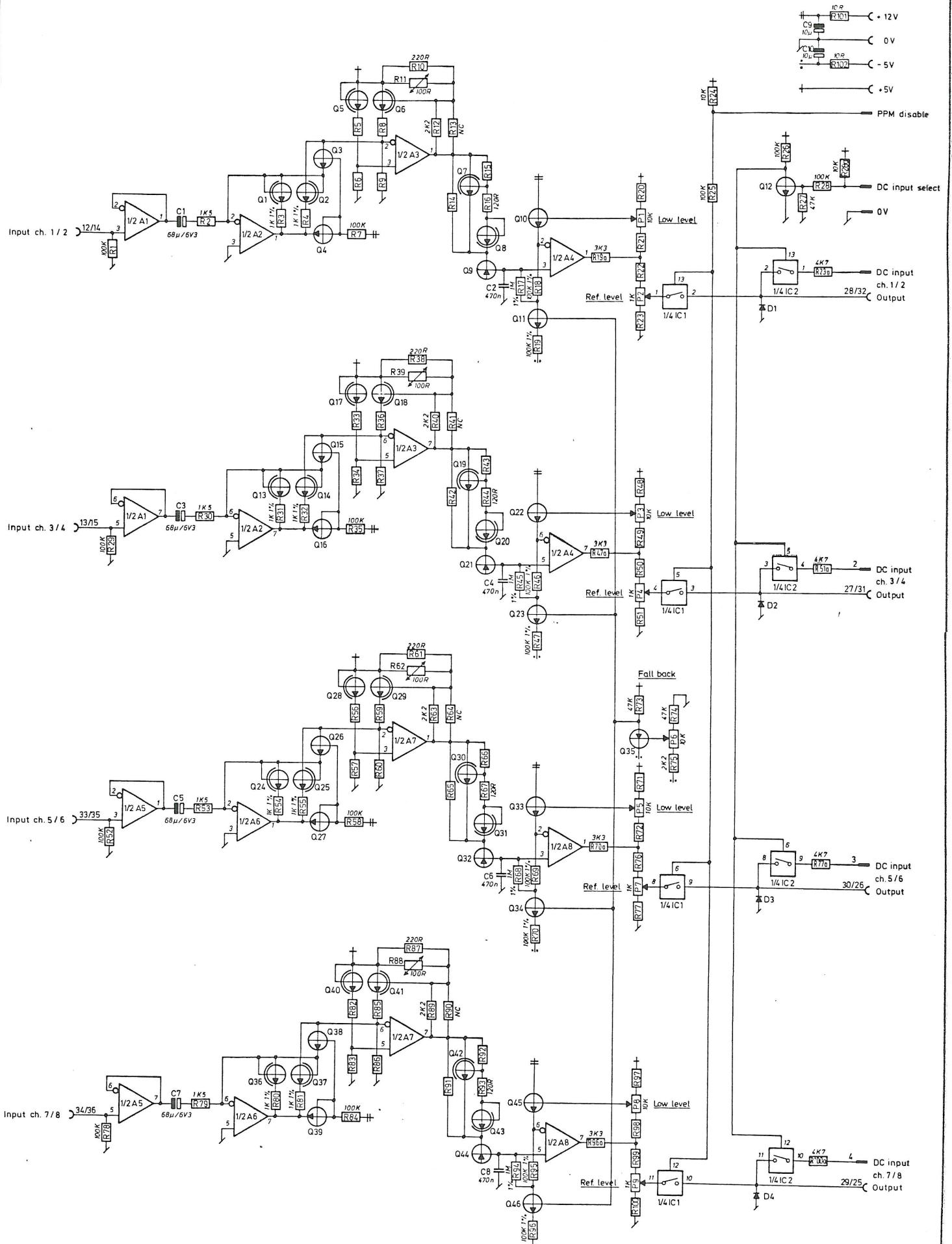


Målestok :	
Konstruktør :	
Tegnet :	270783. LS.
Godkendt :	
Revideret :	

8 Channel PPM 277 - 100
 Voltmeter & cathode driver board.
 Component Lay - out.

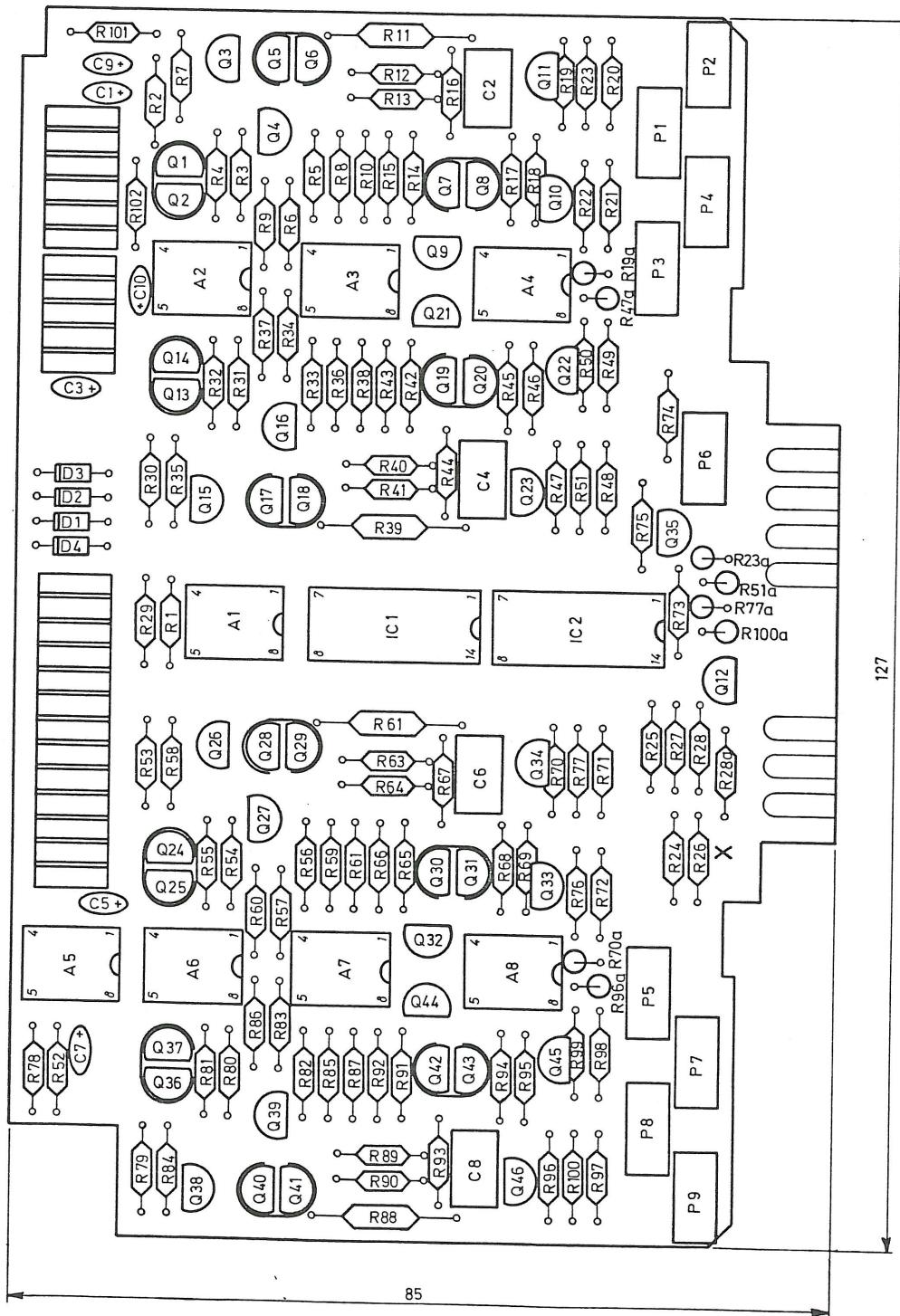


277 - 10C41 - B - 3



	A1-AB	IC1, IC2
+12V	8	
+5V		14
0V		7
-5V	4	

Pos.	Antal	Materiale	Behandl.	Deltat
Materiale				
Tolerans	± mm			
Tegnet	8 10 80 JS			
Godkendt				
Revideret				
8 Channel PPM Log Amplifier Board Schematic Diagram	277-100			
NTP				
NTP ELEKTRONIK A/S				



Version dependent components:

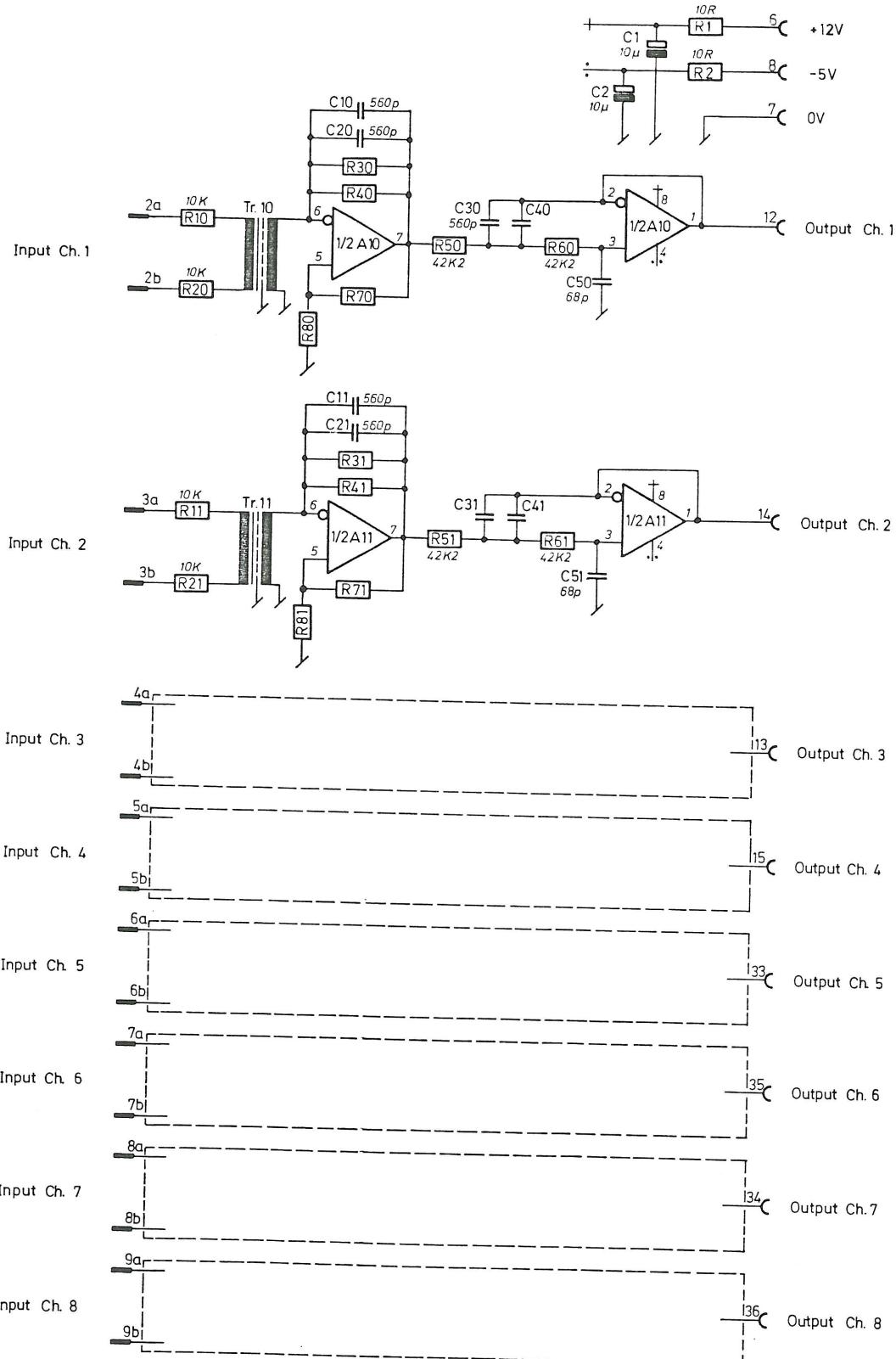
R15, 22, 43, 50, 66, 76, 92, 99, 14, 42, 65, 91, 6, 34, 57,
R83, 21, 49, 72, 98, 20, 48, 71, 97, 9, 37, 60, 86, 5, 8, 33,
R36, 56, 59, 82, 85

Målestok :	
Konstruktør :	B.S.
Tegnet :	31.3.80. T.L.
Godkendt :	
Revideret :	4/ 900720 bb

8 Channel PPM 277-100
Log. Amplifier Board
Components Lay-out



277-10 D41 - A-3



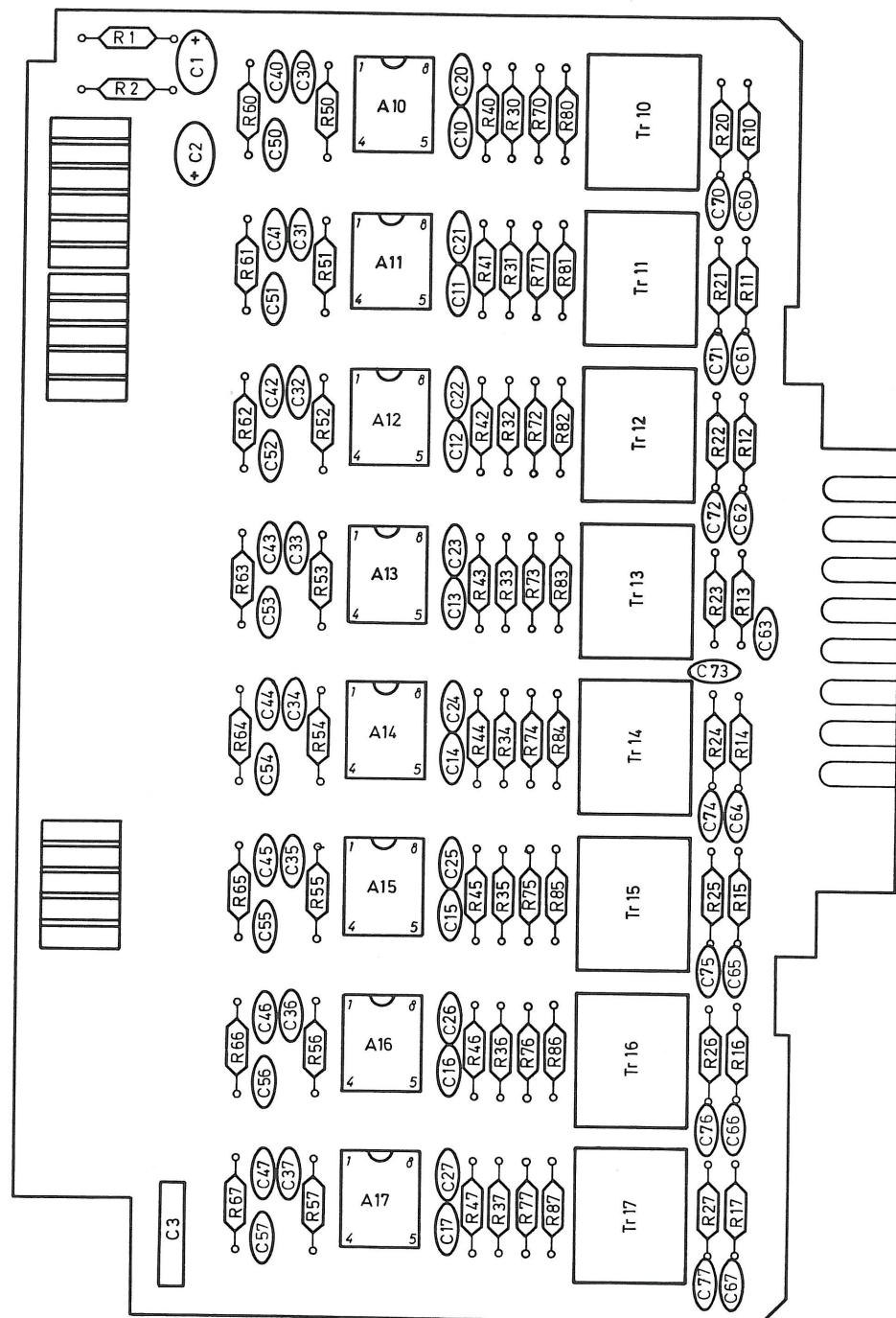
Målestok :	
Konstruktør:	BS.
Tegnet :	10. 4. 80 JS
Godkendt :	
Revideret :	2

8 Channel PPM
Input amplifiers
Schematic Diagram

277-100



277-10E30-A-3



Målestok :
Konstruktor : B.S.
Tegnet : 31.3.80. T.L.
Godkendt :
Revideret : 31 931028

8 Channel PPM 277-100
Input Amplifier Board
Components Lay-out

NTP
NTP ELEKTRONIK A/S

277-10E41-A-3