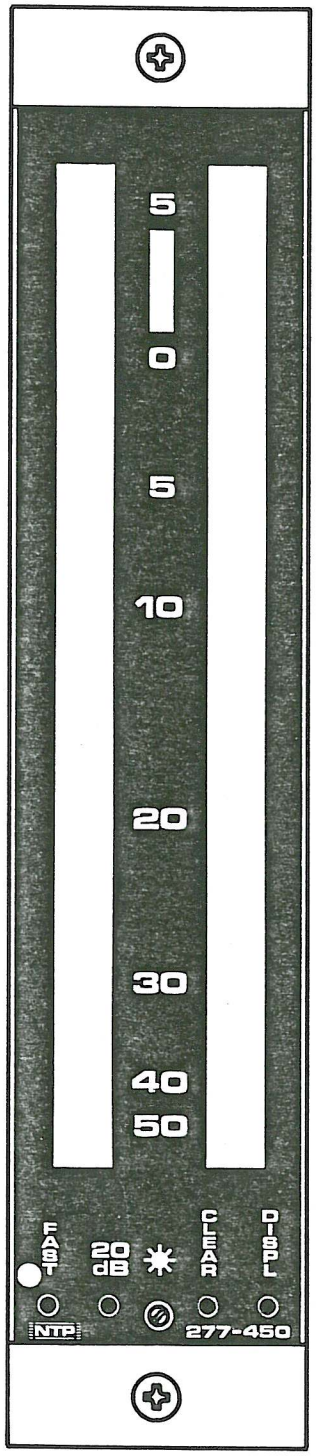
NTP ELEKTRONIK A/S

STEREO PEAK PROGRAMME METER
277-450
FRONTPLATE LAY-OUT

277-4509-A-4



23.11.84.T.L.

INTRODUCTION

The Stereo Peak Programme Meter, type 277-450, is designed primarily for recording and broadcasting studios.
The instrument which is designed to fulfil the stringest international standards, such as DIN 45406 and IEC 268-10, features:

- High impedance balanced transformer inputs.
- Very close tracking between the two channels and any number of identical peak programme meters.
- A digital memory for storing the highest peak value of the programme monitored. (Front selectable).
- Controlled rise-time of display for improved reading comfort.
- Front selectable integration time.
- Additional gain, front selectable.
- Front adjustable brightness control.

Furthermore the 277-450 has numerous external functions:

- Additional gain.
- Display of stored peak value.
- Clearing of the memory.
- Fast integration time.
- Optional scale lines.
- Preselect of integration time (Norm/Fast).

These functions can be carried out by making connections on the Tuchel connector on the rearside, to which also power supply and input signals are led. (See drawing 277-4502-A-3).

CONSTRUCTION & MODE OF OPERATION

The Stereo Peak Programme Meter, housed in a N-Module, A1 size, 190 x 40 x 103 mm, consists of three units, named Input Board, Driver Board and Mother Board.
The 277-450 makes use of a bar graph display, which is a gas discharge indicator containing two separate bar graph each composed of 200 closely spaced segments, orange glowing, providing a 0.5% resolution.
The segments are illuminated by using the "glow transfer principle", in which the glow is first established at the reset cathode and then, by using a repetition scan, the glow is transferred sequentially up to the desired point of the display.
Since the cathodes of both bars are connected together, a common drive circuit, consisting of a three-phase clock with a fourth reset phase, is used to control the transfer of glow along the panel.
The cathode drive circuit scans the entire array of 200 segments continuously, and when the bar has reached the desired length, the anode voltage is turned off.
The signal from a ramp generator, starting from zero reaching its maximum at 200, is led to two comparators (one for each channel), whose outputs are connected to the anode drivers (one for each channel). The input signals to be monitored are led to the other input on the comparator. When the ramp voltage reaches the level of the input voltage, the anode driver will be turned off and the glow will extinguish.

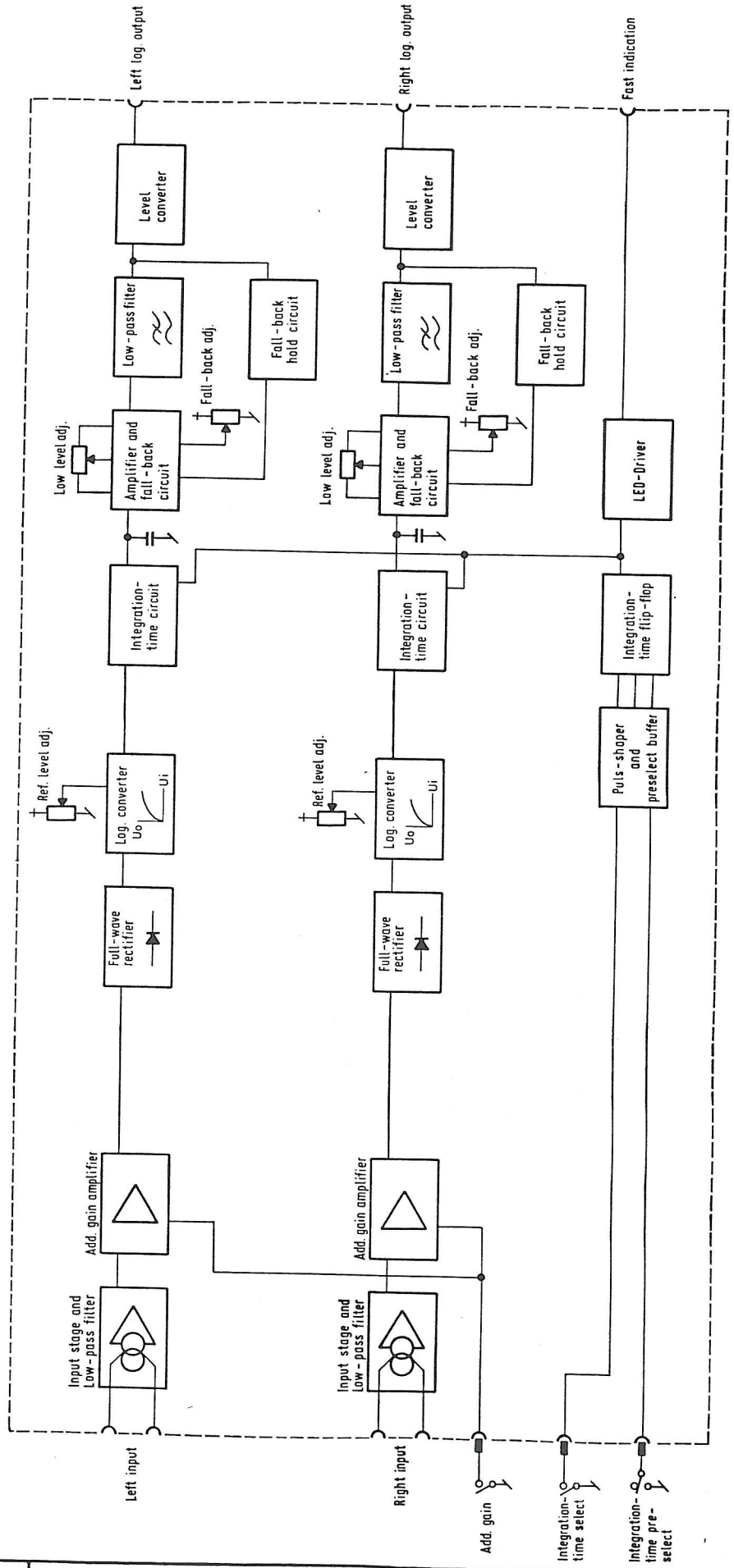
INPUT BOARD, DESCRIPTION OF THE BLOCK DIAGRAM

Since the block diagram (277-4505-A-3) to a large extent is self-explanatory, the following remarks are intended as a guide to the use of the diagram.
The input signal is led to an input stage consisting of a current transformer followed by an amplifier which contains a 2nd order low-pass filter.
Then follows an amplifier, in which the gain can be increased 20dB (40dB) by connecting the wire "Add. Gain" to ground.

The signal is then led through a full-wave rectifier supplying current for the log-converter which generates a DC-voltage corresponding to the logarithm of the input signal. This voltage is led to a circuit giving the integration time. The circuit is controlled by a flip-flop which can select the standardized (Norm) integration time or a fast one. The controlling circuit can be preset externally, so the device will start either in the "norm" position or in the "fast" position, when power is applied.
From the integration time circuit the signal is led to the fall-back time circuit. From here the signal is led to a 2nd order low-pass filter which removes small variations in the signal in order to achieve a more pleasant visual impression. Not to let this feature influence at the shown peak value, a hold circuit is installed, holding the fall-back circuit, until the output voltage from the filter is equal to the input voltage.
From the filter the signal is led to a reference shifting circuit, adapting the signal to the driver circuit.

DRIVER BOARD, DESCRIPTION OF THE BLOCK DIAGRAM

Since the block diagram (277-4506-A-3) to a large extent is self-explanatory, the following remarks are intended as a guide to the use of the diagram.
The Driver Board comprises the power supply for the circuits in the instrument and the driver circuitry required for the bar graph display.
The power supply consists of three parts: A DC/DC converter generating the high voltage for the anodes and two 3-terminal regulators supplying +12V DC and +5V DC.
The log. signal coming from the Input Board is led to a two position electronic switch. In its normal position the signal is led directly to the comparator. When the wire "Display peak" is connected to ground, the switch changes position, and the signal is now fetched from the peak storage circuit.
The peak storage circuit consists of a comparator, a counter and a 10-bit D/A-converter (R-2R network) forming a memory for the highest voltage peaks supplied from the log.-amplifier. When the wire "Reset" is connected to ground, the memory is cleared.
The two comparators control the anode drivers (one for each bar). When the voltage from the ramp generator reaches the level of the voltage coming from the input board, the comparators will turn the anode voltage off causing the glow to extinguish.
The bar graph driver circuitry is controlled from the clock generator.
Each element in the bar graph represents a discrete, reproducible display step which means 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, the cathodes are sequentially grounded, causing the glow to transfer along the bar.
The three phase clock + reset sequence as well as 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"



Målestok	:
Konstruktør	: P. J.
Tegnet	: 27.6.84. T.L.
Godkendt	:
Revideret	:

Peak Programme Meter 277-300 / 450

Input board

Block diagram

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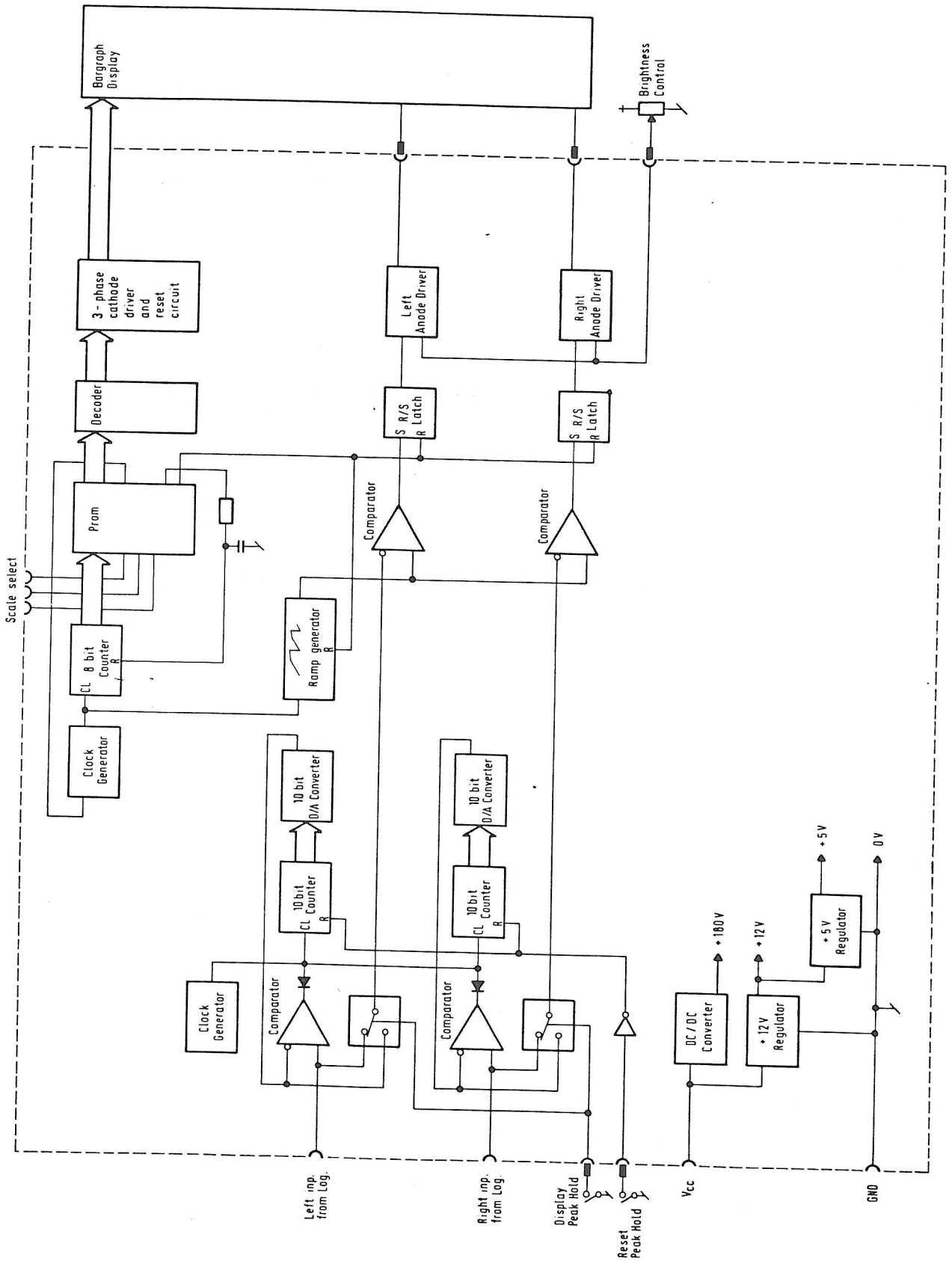
277-3005-A-3



Målestok	Peak Programme Meter 277-450	NTP ELEKTRONIK A/S
Konstruktør P. J.	Driver board	
Tegnet 7.8.84. T.L.	Block Diagram	277-4506-A-3
Godkendt		
Revideret		

GENERAL SPECIFICATION

Supply voltage	:	22-32V DC
Current consumption	:	100-200mA depending on reading
Temperature range	:	0 to +45°C ambient temperature

INPUT

Frequency range, 0.5dB point	:	20Hz to 20kHz
High frequency roll-off	:	12dB/oct. above 20kHz
Input impedance	:	20kOhm ±10% balanced, floating
Input CMRR	:	>60dB at 15kHz
Reference input voltage	:	DIN : 1.55V rms sine (+6dB) for 0dB reading
		NORDIC: 1.55V rms sine (+6dBu) for +6dB reading
		BBC : 1.94V rms sine (+8dBu) for "6" reading
Input overload level	:	8.6V rms sine (+21dBu)
Dynamic measuring range	:	DIN : 55dB
		NORDIC: 50dB
		BBC : 38dB

MEASURING ERRORS, PPM

		at +5 to -10dB	-10dB to -40dB
1kHz steady signal	:	±0.3dB	±1dB
Within full frequency range	:	+0.5/-1dB	+0.5/-2dB
Polarity shift of unsymmetrical wave	:	±0.3dB	±1dB
Tracking between channels	:	±0.2dB	±0.5dB
10% change of supply voltage	:	±0.2dB	±0.2dB

INTEGRATION & FALL-BACK TIME, PPM

Integration time "NORM" DIN, NORDIC	:	10msec for -1dB ±0.5dB
Conforming to DIN 45406 and IEC 268-10	:	5msec for -2dB ±1 dB
Integration time is measured	:	3msec for -4dB ±1 dB
	:	0.4msec for -15dB ±2dB
Integration time "Norm" BBC	:	10msec for -2dB ±0.5dB
	:	5msec for -4dB ±0.75dB
	:	1.5msec for -9dB ±1dB
	:	0.5msec for -17dB ±2dB
Integration time "Fast"	:	0.1msec for -1dB ±0.5dB
Fall-back time DIN, NORDIC	:	1.5sec for 0 to -20dB
Fall-back time BBC	:	1.5 to 3.2sec
Display rise time	:	approx. 100msec

PEAK MEMORY

Accuracy of peak memory		
in upper end of scale, above -30dB reading	:	±1 segment or ±0.25dB
in lower end of scale, below -30dB reading	:	+2/-1 segment or ±1dB (whatever is greatest)

ADDITIONAL GAIN

Scale according to DIN 45406 and BBC	:	+20dB ±0.2dB
Nordic scale	:	+40dB ±0.5dB

FRONTPLATE CONTROLS

Additional gain	:	increases to gain 20dB (40dB)
Integration time select	:	Selects the norm. integration time or a "fast" indicated by the LED
Display	:	Displays the peak storing
Clear	:	Clears the peak memory
	:	Brightness adjustment

Rette

EXTERNAL FUNCTIONS (Available when making connections externally).

Additional gain	:	as on the front
Integration time select	:	as on the front
Integration time preset	:	select which position norm/fast the device is in, when power is put on
Clear	:	As on the front
Display	:	As on the front
Scale select	:	Optional scale lines

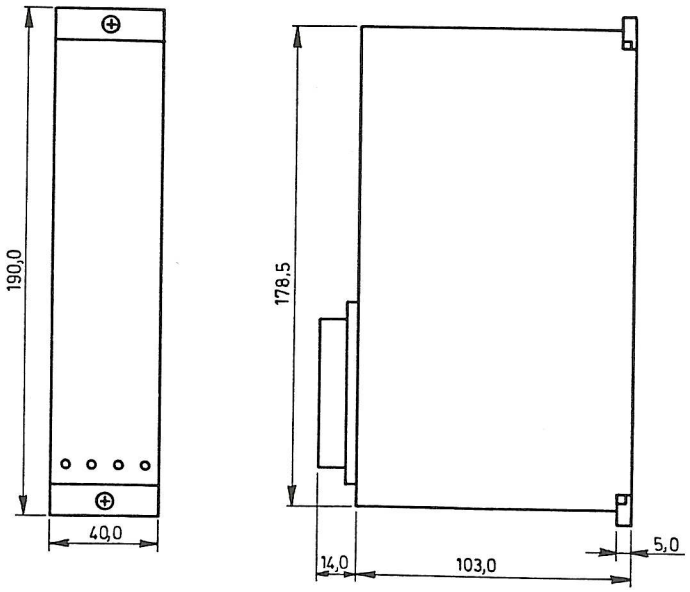
GENERAL DATA

Standard scales	:	DIN +5 to -50dB NORDIC +9 to -36dB BBC "7" to "1"
All types are available for horizontal or vertical mounting		
Number of single elements in each PPM bar	:	200
Overload and scale lines indication	:	3 times increase of light intensity
Connector	:	Amphenol-Tuchel 2700-000

MECHANICAL DATA

The instrument is housed in a cabinet	:	190 mm
Width	:	40 mm
Depth	:	103 mm
Weight	:	650 g
Total scale length (PPM bar)	:	127 mm

MECHANICAL OUTLINE:



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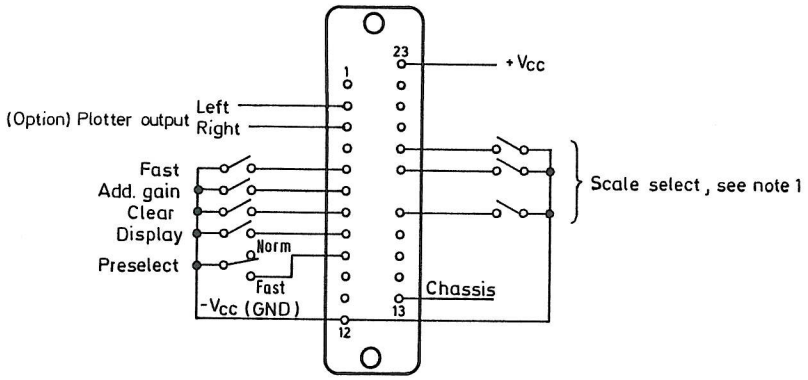
PEAK PROGRAMME METER 277-400 /450

CONNECTIONS, REAR OF INSTRUMENT

277-4002-B-3

The instrument is terminated with a 23 pole Amphenol-Tuchel connector, male, type 2700-000.
The mating part is 2701-000.

		Option for 277-400C		
Input, right (lower)	10,15	Plotter Output	Right	3
Input, left (upper)	11,14	(277-400C Option)	Left	2



Seen from the rearside (solder side) of the mating connector (female part).

Note 1:

0 : connected to -Vcc (GND)
1 : open
x : don't care

	PIN NO.			OPTIONAL SCALE LINES		
	19	18	17	DIN	NORDIC	BBC
1	1	1	1	Normal	Normal	Normal
2	x	x	0	1dB lines from +5 to -10dB	1dB lines from +12 to -6dB	Normal +1dB lines from "5" to "7"
3	1	0	1	1dB lines from 0 to -5dB	3dB lines from +6 to -6dB	Normal
4	0	1	1	1dB lines from 0 to -10dB	1dB lines from +6 to -6dB	Normal
5	0	0	1	Test lines -9 and -21dB	3dB lines from +6 to -36dB	Normal

Rettet 1) 14.6.90 BB/jl. 4) 931208
2) 25.6.90. BB/jl.
3) 930923

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PEAK PROGRAMME METER 277-400 /450

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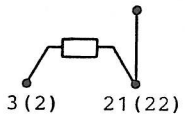
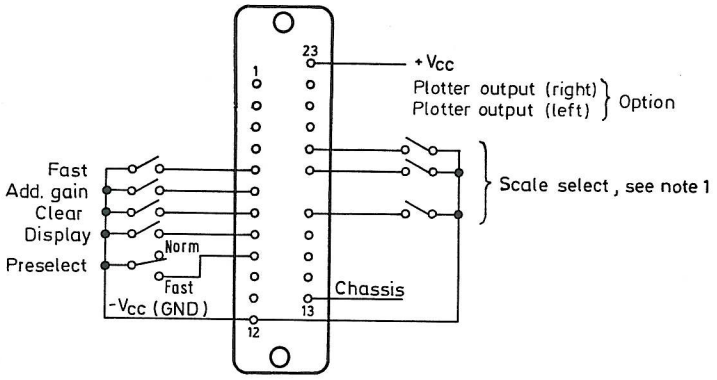
		Option for 277-400C		
Input, right (lower)	10,15	Plotter Output	Right	3,22
Input, left (upper)	11,14	(277-400C Option)	Left	2,21





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2) 25.6.90 BBJ
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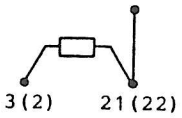

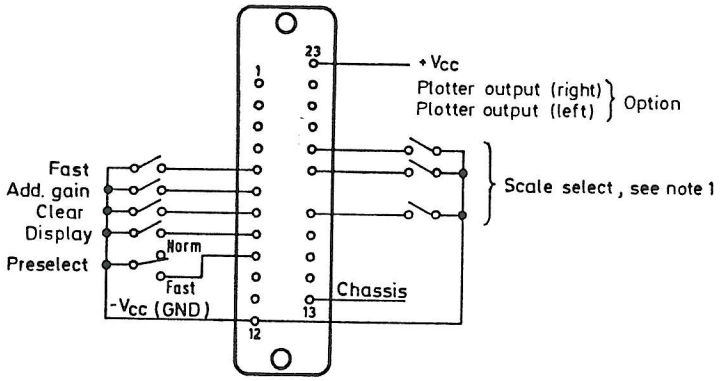

Seen from the rearside (solder side) of the mating connector (female part).

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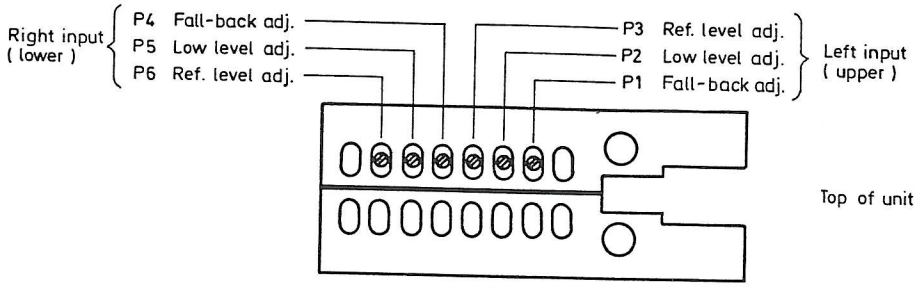
PEAK PROGRAMME METER 277-450
CHECKING AND ADJUSTING PROCEDURE

277-4522-A-3

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 the supply voltage (22-32C DC) on pin 23 (0 volt on pin 12).

REF. LEVEL ADJUSTMENT.

1. Feed a signal of 1.55V rms (+6dBu) DIN/NORDIC, 1.94V ms (+8dBu) BBC, 1kHz sine to the input terminals.
2. Adjust P3 and P6 until the first overload-segment lights up with same intensity as the adjacent segment (below).

LOWER LEVEL ADJUSTMENT.

1. Feed a signal of 15.5mV rms (-34dBu) DIN, 24.5mV rms (-30dBu) NORDIC, 194.5mV rms (-12dBu) BBC, 1kHz sine to the input terminals.
2. Adjust P2 and P5 so the segment at the (DIN) -40dB, (NORDIC) -30dB, (BBC) "1" lights up with same intensity as the adjacent segment (below).

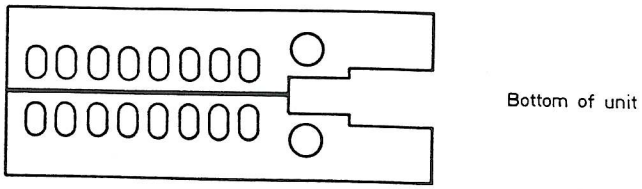
Repeat, if necessary, the Ref.level & Low level adjustments.

FALL-BACK TIME ADJUST / DIN, NORDIC.

1. Connect a burst generator, e.g. NTP type 507-100, with a setting: 300 ms burst (5kHz, +6dBu) and 1.5 sec. pause to the input terminals.
2. Adjust P1 and P4 so the two columns just exactly reach down to -20dB, DIN (-14dB, NORDIC) in the pause.

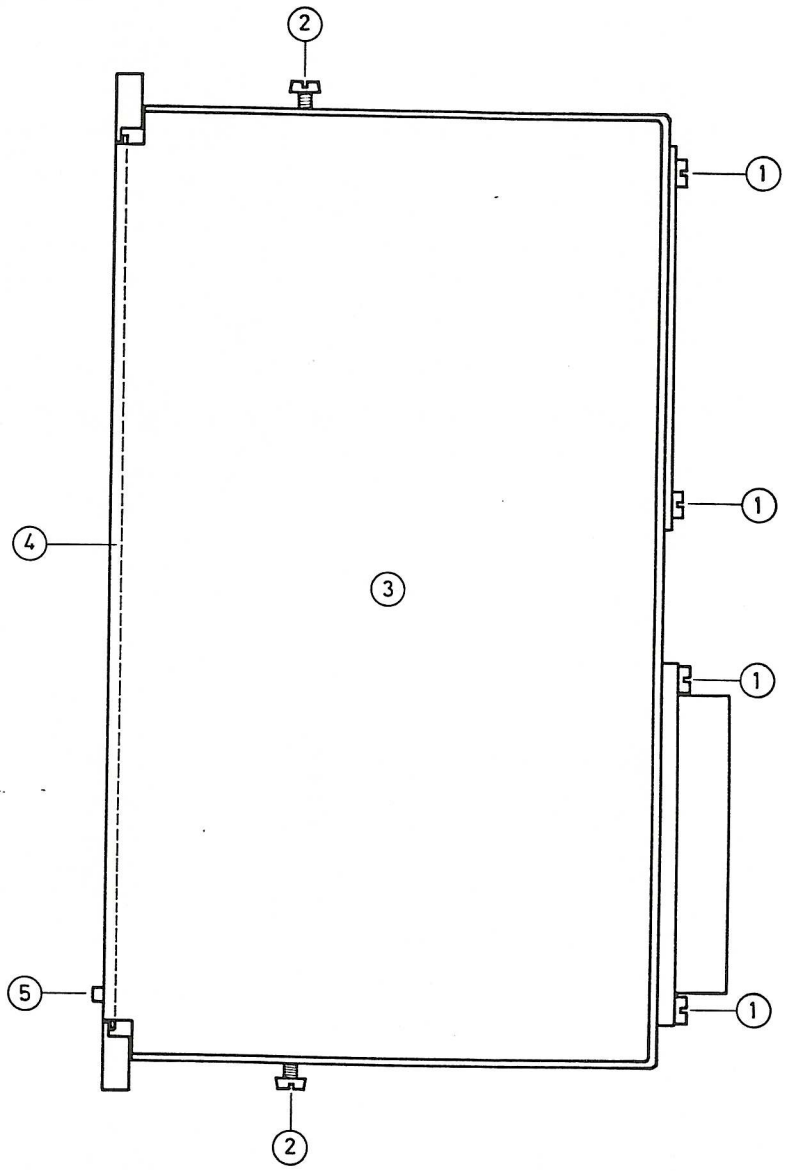
FALL-BACK TIME ADJUST / BBC.

1. As for DIN/Nordic, but with +12dBu and 2.8 sec pause
2. As for DIN/Nordic, but down to "1"



CMRR ADJUST.

1. Feed a signal of 4.89V rms (+16dBu), 15kHz sine to both input terminals (pin 11 and 14 for left (upper) channel and pin 10 and 15 for right (lower channel) with respect to ground (pin 12).
2. Adjust C1 and C51 to obtain minimum reading (max. -50dB).
   (Access to C1 and C51 can be obtained from bottom of the unit).



DISASSEMBLING THE 277-400.

1. Loosen the four screws (1)
2. Remove the two screws (2) (in the upper part of the cover)
3. Now the upper part of the two part cover can be removed (3) and the whole unit can be removed.

REPLACEMENT OF FRONTPLATE.

1. Access to the frontplate is obtained by following the procedure described above.
2. When removing the frontplate (4) Beware of the pushbuttons (5)