

Introduction

The Stereo Peak Programme Meter, type 277-400, is primarily designed for recording and broadcasting studios.

The instrument, which is designed to fulfil the most stringent international standards, features:

- High impedance balanced transformer inputs
- Very close tracking between the two channels and a number of identical peak programme meters
- Digital memory for peak programme value storage (selectable in the frontpanel)
- Controlled rise-time of display for improved readability
- Selectable integration time
- Instantaneous LED overload indication with adjustable threshold
- Integrated compatibility meter
- Selectable additional gain
- Adjustable brightness control

In addition the 277-400 provides the following external facilities:

- Additional gain
- Display of stored peak value
- Memory clearance
- Fast integration time
- Optional scale lines
- Pre-selection of integration time (Norm/Fast)

The functions are available via the Tuchel connector at the rear, to which also power supply and input signals are led (cf. 277-4002-A-3).

Construction and Mode of Operation

The Stereo Peak Programme Meter housed in an N module, A1 size, 190 x 40 x 103 mm, consists of three units: Input Board, Driver Board, and Motherboard.

The 277-400 incorporates a bar graph display. The bar graph display is a gas discharge indicator containing two separate bar graphs each consisting of 200 orange glowing segments, providing a 0.5% resolution.

The segments are illuminated by means of the "glow transfer principle" which causes the glow to be charged at the reset cathode and transferred sequentially to the required point of display by means of repetitive scanning.

Since the cathodes of both bars are connected, a common drive circuit consisting of a five-phase clock controls the scanning rate.

The cathode drive circuit scans the 200-segment array continuously, and when the bar reaches the required length, the anode voltage is turned off.

A ramp generator emits a signal from 0 to 200 which is led to two comparators (one for each channel) connected to the anode drivers (one for each channel). Input signals to be monitored are led to the other input channel of the comparator. When the ramp voltage reaches the input voltage level, the anode driver is turned off, and glowing extinguishes.

Input Board, Description of the Block Diagram

PPM Section

The input signal is led to an input stage consisting of a current transformer and an amplifier containing a 2nd-order low-pass filter.

An amplifier succeeds the low-pass filter. This amplifier is used for increasing gain to 20 dB (40 dB) by connecting the wire "Add. Gain" to ground.

The signal then passes a full-wave rectifier supplying power for the log converter which generates a DC voltage corresponding to the logarithm of the input signal. The voltage is led to a circuit generating the integration time. The circuit is controlled by a flip-flop selecting between normal and fast integration time and may be set externally.

The signal is further led to the fall-back time circuit and subsequently to a 2nd order low-pass filter. Having passed the filter, the signal is led to a reference shifting circuit adapting the signal to the driver circuit.

Compatibility Meter

The Input Board also comprises a compatibility meter. The input signal is received from the full-wave rectifiers. The non-filtered log. signal is used by the level detector to establish a threshold level below the level at which the phase detector is no longer active.

The output signal from the phase detector is led via a low-pass filter to the circuitry controlling the LEDs.

Overload Circuit

The Input Board further features an overload circuit. The overload circuit generates a DC voltage which is used as the threshold level by the overload detector.

The voltage is also used by the integration time circuit when the overload level switch is activated. Thus the bar graph displays the overload reference level independently of the current input level. The output signal from the overload detector is led via the LED driver to the overload indicator (LED).

Driver Board, Description of Block Diagram

The Driver Board contains the power supply for the various circuits in the PPM as well as the driver circuitry for the bar graph display.

The power supply consists of three separate units: A DC/DC converter generating the high voltage for the anodes and the two 3-terminal regulators supplying +12V DC and +5V DC, respectively.

The log. signal generated by the Input Board is led to a bilateral switch. In the normal position the signal is led directly to the comparator. Connecting the wire designated "display peak" to ground causes the switch to change position, and the signal is now received 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) constituting a storage for the highest voltage peaks supplied by the log. amplifier. Connecting the wire designated "reset" to ground causes the memory to be cleared. The comparators control the anode driver (one for each bar). When the voltage generated by the ramp generator reaches the level of the voltage generated by the Input Board, the comparators turn off the anode voltage causing the glow to extinguish.

The bar graph driver circuitry is controlled by the clock generator.

Each element in the bar graph represents a discrete, reproducible display step. Thus each segment of the display is directly related to a digital figure. Scanning is initiated by turning on the transistor attached to the reset cathode. As the counter increases, the cathodes are grounded sequentially causing the glow to transfer along the bar.

NTP

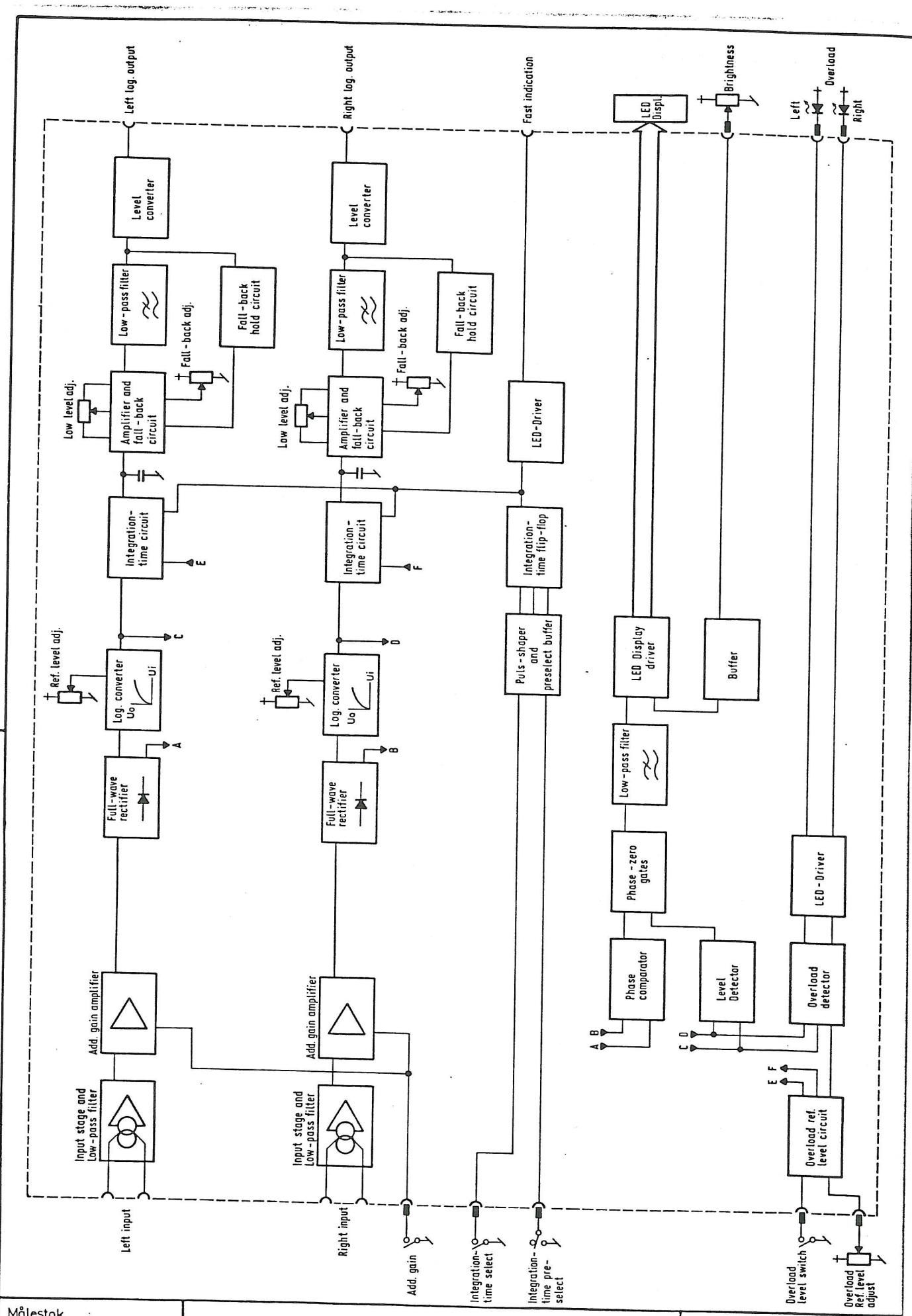
The five-phase clock as well as the reset sequence and the intensified scale marks are stored in a PROM. The PROM may also contain alternative scale patterns which can be selected by grounding one or more of the wires designated "scale select".

Options

The 277-400C PPM is a modified version of the standard 277-400B allowing the PPM to be connected to a plotter/recorder for level registration. The plotter output is available via pins 2 and 3 in the Tuchel connector.

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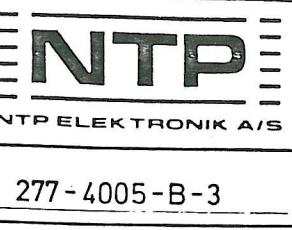
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277-4012-B-4

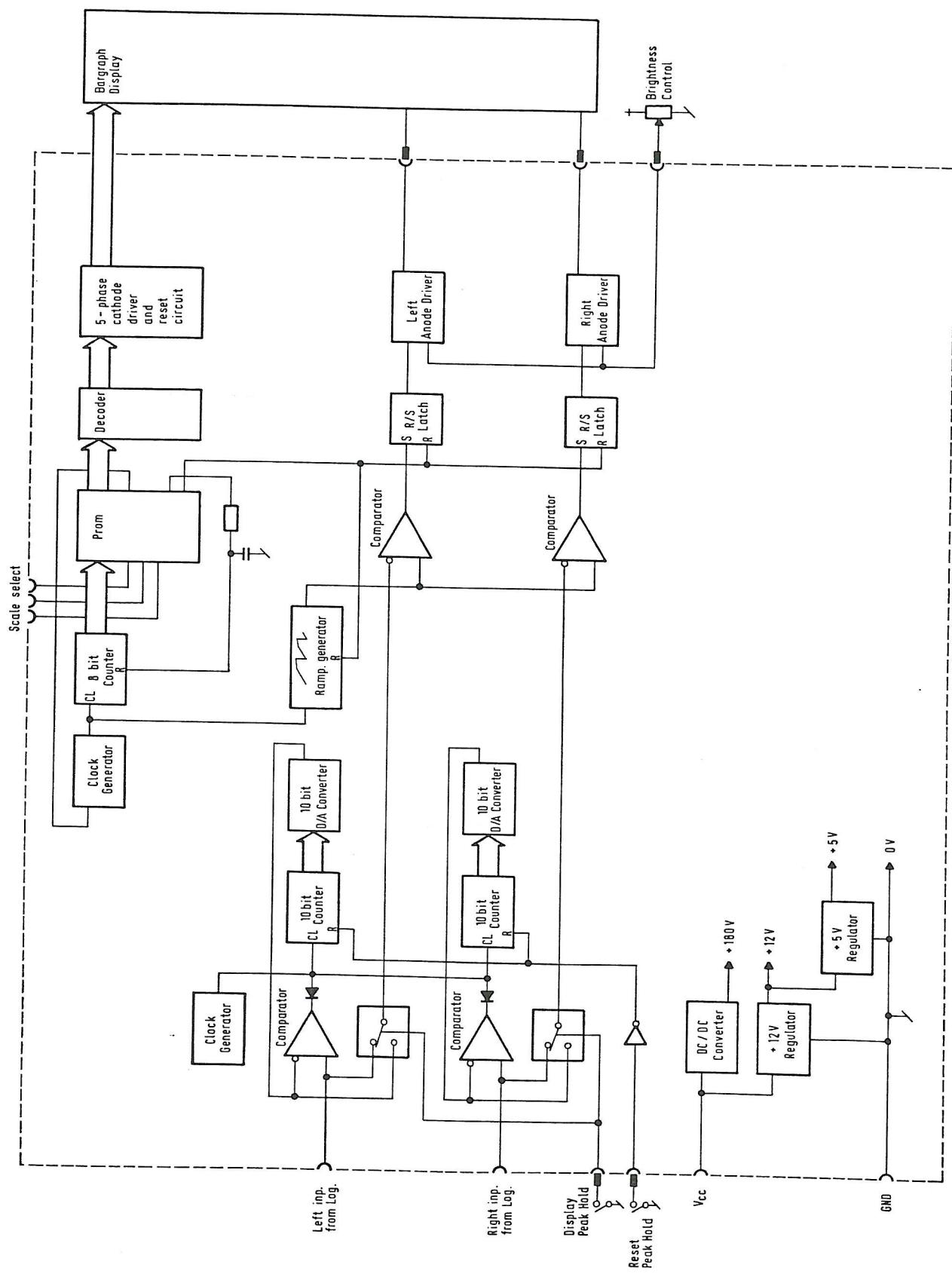


Målestok	:
Konstruktør	: P.J.
Tegnet	: 27.6.84. T.L.
Godkendt	:
Revideret	:

Peak Programme Meter
Input board
Block diagram

277-400 B





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

Peak Programme Meter 277-400B
 Driver board
 Block Diagram

NTP
 NTP ELEKTRONIK A/S
 277-4006-B-3

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 (+6dBu) 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

1kHz steady signal	: at +5 to -10dB		-10dB to -40dB
Within full frequency range	: ±0.3dB		±1dB
Polarity shift of unsymmetrical wave	: ±0.5/-1dB		±0.5/-2dB
Tracing between channels	: ±0.3dB		±1dB
10% change of supply voltage	: ±0.2dB		±0.5dB
	: ±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	
With 5kHz toneburst		: 0,4msec for -15dB ±2dB	
Integration time "Norm"	BBC	: 10msec for -2dB ±0.5dB	
		: 5msec for -4dB ±0.75dB	
		: 1.5msec for -9dB ±1dB	
Integration time "Fast"		: 0.5msec for -17dB ±2dB	
Fall-back time	DIN/NORDIC	: 0.1msec for -1dB ±0.5dB	
Fall-back time 7 to 1	BBC	: 1.5msec for 0 to -20dB	
Display rise time		: 2.5 to 3.2msec	
		: approx. 100msec	

PEAK MEMORY

Accuracy of peak memory in upper end of scale, above -30dB reading	: ±1 segment or ±25dB	
Accuracy of peak memory 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

OVERLOAD INDICATOR

Overload threshold (adjustable from front)	: -10dB to +6dB ref. to scale	
Error between viewed overload threshold and actual overload threshold	: ±0.3dB	
Response time	: < 0.2msec for 0.5dB overdrive	

COMPATIBILITY METER

Input level range	: approx. -20dBu to +21dBu	
Phase range	: -180° to 0°	

COMPATIBILITY METER (cont'd)

Resolution	: 18°
Indication:	
No signal on both inputs	: "0"
No signal on one input	: "0"
Random phase signals on both inputs	: "0"
In phase signals on both inputs	: "+1"
Out of phase signals on both inputs	: "-1"
Response time	: approx. 0.6 sec.

FRONTPATE CONTROLS

Additional gain	: increases the 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
Overload, adj., push	: brightness adjustment
	: Adjusts and displays overload level

EXTERNAL FUNCTIONS (available, when making connections externally)

Additional gain	: As on the front
Integration time select	: As on the front
Integration time preset	: selects 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"
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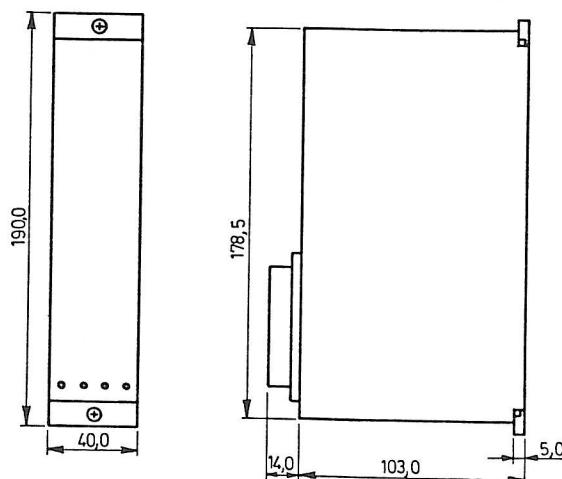
All types are available for horizontal or vertical mounting.

Number of LEDs in the compatibility meter	: 11
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)	: 100 mm

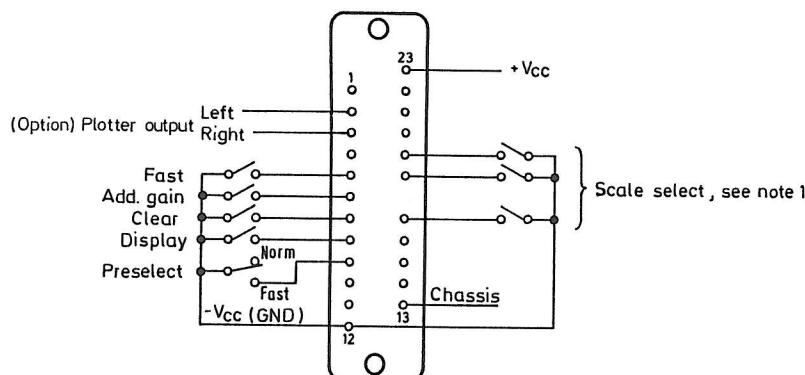
Mechanical outline:



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

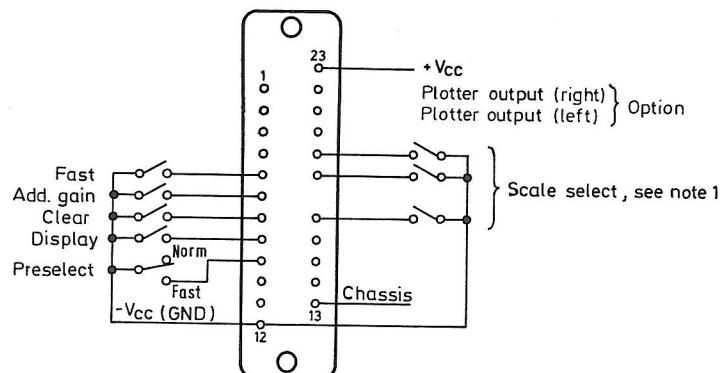
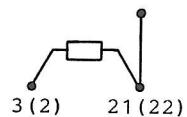
PIN NO.				OPTIONAL SCALE LINES		
19	18	17		DIN	NORDIC	BBC
1	1	1	1	Normal	Normal	Normal
2	x	x	0	1dB lines from +5 to -10dB	1dB lines from +12 to -6dB	Normal +1dB lines from "5" to "7"
3	1	0	1	1dB lines from 0 to -5dB	3dB lines from +6 to -6dB	Normal
4	0	1	1	1dB lines from 0 to -10dB	1dB lines from +6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

1) 1/16.90.20/ 4) 931208
2.) 25.6.90. BBC/l.
3) 920923

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	3,22
Input, left (upper)	11,14	(277-400C Option)	Left	2,21



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

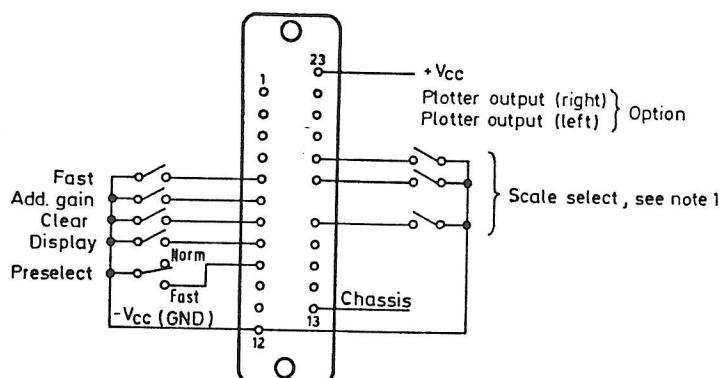
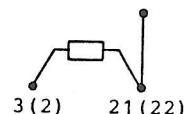
PIN NO.				OPTIONAL SCALE LINES		
	19	18	17	DIN	NORDIC	BBC
1	1	1	1	Normal	Normal	Normal
2	x	x	0	1dB lines from +5 to -10dB	1dB lines from +12 to -6dB	Normal +1dB lines from "5" to "7"
3	1	0	1	1dB lines from 0 to -5dB	3dB lines from +6 to -6dB	Normal
4	0	1	1	1dB lines from 0 to -10dB	1dB lines from +6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

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

Input, right (lower) 10,15
Input, left (upper) 11,14

Option for 277-400C

Plotter Output Right 2,22
(277-400C Option) Left 3,21



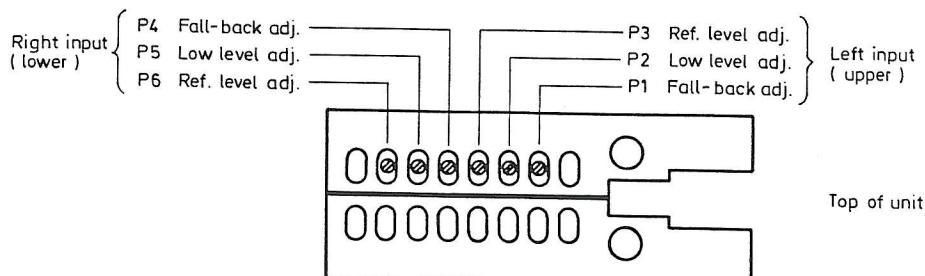
Seen from the rearside (solder side) of the mating connector (female part).

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PIN NO.				OPTIONAL SCALE LINES		
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1	1	1	1	Normal	Normal	Normal
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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

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 (22-32V 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, 24.5 mV 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" mark lights up with same intensity as the adjacent segment (below).

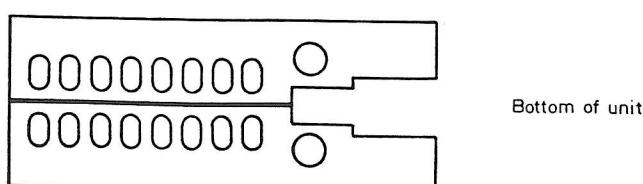
Repeat, if necessary, the Ref.level & Low level adjustments.

FALL-BACK TIME ADJUST / DIN, NORDIC.

1. Connect a burst generator, e.g. NTP type 507-100, with a setting: 300ms 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.

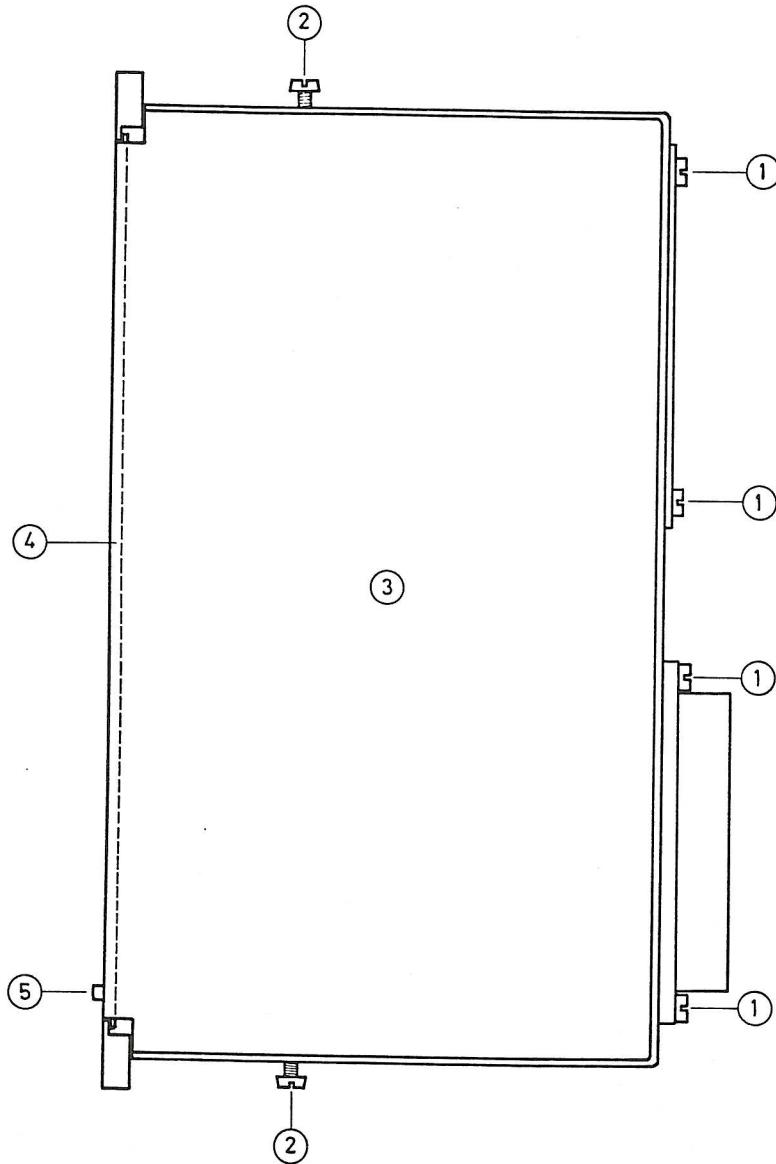
FALL-BACK TIME ADJUST / BBC.

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