



Analogue Peak Programme Meter 477-100

Users Manual



General Description.

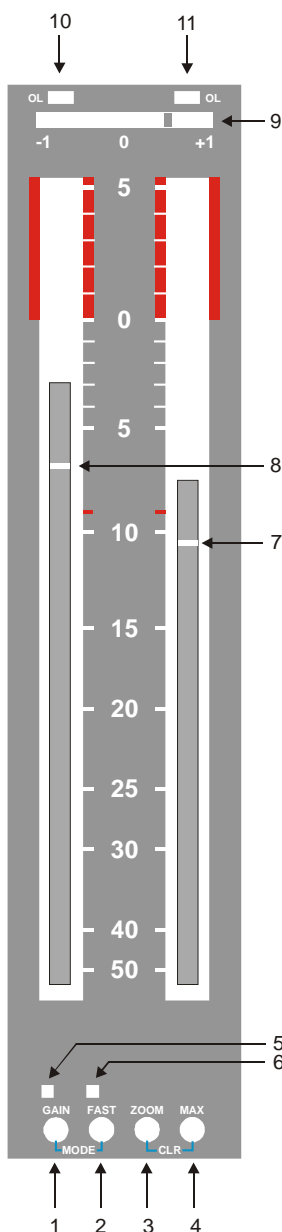
The 477-100 is a customized version of 478-series of audio level measuring instruments. It is a member of a family of instruments designed to take up the heritage of the previous series of 477-series PPM's.

The prime function of this series is to measure the peak level of an analogue audio signal. Based upon one of today's most powerful DSP's it offers all of its predecessors appreciated qualities like a bright, high definition bar graph display with a multitude of display modes. In addition to that it provides a platform for realizing new functions like **loudness indication (not implemented)** and others not even thought of today.

It facilitates both measurements with 10/5 ms integration time in accordance with the IEC 268-10 and measurements with "zero" integration time. Numerous other display functions are available including peak hold, memory, zoom, and an optional compatibility / phase meter.

The instrument is housed in a ruggedized aluminium cabinet with a high contrast, non-glare scale.

Operating Instructions.



1. **GAIN.** The scale can be offset by 20 dB to extend the measuring range down to -70 dB. The push button [1] has alternating action and the LED [5] will be lit when GAIN is selected.
2. **FAST.** Either "Fast" or normal (5/10ms) integration time may be selected. The sw.1 has an additional MODE function. By holding sw.1 depressed while pressing sw.2 various display modes (designated "a" to "e" below) are selected sequentially.

Display modes:

- a: The mode "a" is easy to distinguish from the rest by the blend-in scale markings. An illuminated background extends to the scale mark "0" to provide clear scale markings, even in dimmed light.
 - b: In mode "b" a spot indication (10 & 11) is provided below the peak reading of the bar graph. The spot responds to the fastest peaks on the signal ("0" integration time). The calibration of the spot reading is such that the mark "0" (or the start of "overload range") equals digital full-scale level. This means that the distance between the spot indication and the mark "0" on the shown scale represents the true "head room" before digital clipping. This means that even with an analogue type scale and 10ms integration time the true digital peak level can be monitored.
 - c: In mode "c" a spot will have a "peak hold" action. Otherwise the function is equal of that of mode "b".
 - d: In mode "d" the spot displays the content of the peak memory. The spot appears either as a dark spot in the bar or as a bright spot in the background above the bar. The spot is calibrated such that the upper end of the background illumination corresponds to digital full-scale level.
 - e: In mode "e" the illuminated background extends to the top of the scale and the spot acts as a peak hold indication "riding" on the top of the bar. The integration time is the same as the one selected for the bar.
3. **ZOOM.** The zoom function will increase the display resolution by a factor of ten. Thus for the shown scale the -50 mark will represent -5 dB and the $+5$ mark will represent $+0,5$ dB. The LED 5 "GAIN" will flash as a warning in this mode.
 4. **MAX.** The meter facilitates a peak memory that continuously stores the highest peak (since last clear). The stored level may be displayed by pressing the MAX button (4). The memory can be cleared by pressing 3&4 simultaneously.
 5. **Gain LED.** See point 1
 6. **FAST LED.** See point 2.
 7. See display modes, "b"
 8. See display modes, "b"
 9. **Phase indication.** (Compatibility). On some models only.
 10. **Overload LED.** Overload indication, left channel.
 11. **Overload LED.** Overload indication, right channel.

NOTE: On some versions the buttons 1-4 have been omitted for simplicity reasons.



Instrument set-up.

Instrument set-up.

Numerous parameters (like ref. level etc.) may be set by means of the four buttons on the front.

Normally the standard parameters set by the factory will be satisfactory and therefore no adjustments are needed.

Any adjustment should be done by skilled personnel following the instructions below.

In the following the buttons are referred to by numbers (1,2,3,4) where “1” is the leftmost button (or upper on horizontal scales). Press button 1 is written: [1]. Two buttons may be pressed simultaneously i.e. [1+3].

Adjustment of reference level:

1. Press [1+3] and hold for more than 1.6 s. The display will be lit in both channels with markings pr. 1 dB.
2. Press [3] to decrease reference level in 1 dB steps. Scale max. equals +20dBu (internal digital FS).
3. Press [4] to increase reference level in 1 dB steps. Scale max. equals +20 dBu (internal digital FS).
4. Press [1] to save settings and resume to normal operation. (Or jump to next adjustment point 2)

Activating / deactivating display ballistics:

1. Press [1+3] and hold for more than 1.6 s. The display will be lit in both channels with markings pr. 1 dB.
2. Press [2]. The display will be lit in the left channel with markings pr. 1dB.
3. Press [2]. The display will be lit in the right channel with markings pr. 1sample.
4. Press [2]. The left overload LED will be lit.
5. Press [3] or [4] to toggle display ballistics on/off. Ballistics is on when the right overload LED is lit.
6. Press [1] to save settings and resume to normal operation.

Fine adjustment of input gain.

1. Press [1+3] and hold for more than 1.6 s. The display will be lit in both channels with markings pr. 1 dB.
2. Press [2]. The display will be lit in the left channel with markings pr. 1dB.
3. Press [2]. The display will be lit in the right channel with markings pr. 1sample.
4. Press [2]. The left overload LED will be lit.
5. Press [2]. The left channel will be lit with 0.1 dB markings
6. Press [3] to reduce input gain in the left channel
7. Press [4] to increase input gain in the left channel
8. Press [2]. The right channel will be lit with 0.1 dB markings
9. Press [3] to reduce input gain in the right channel
10. Press [4] to increase input gain in the right channel
11. Press [1] to save settings and resume to normal operation.

Factory tests/calibration.

The following operations should only be performed by maintenance personnel.

LED and display tests:

1. Press [1+3] and hold for more than 1.6 s. The display will be lit in both channels with markings pr. 1 dB.
2. Press [1] and hold for more than 6s. All LED's are lit in sequence for inspection.
3. Press [2]. The display will be lit in both channels with a falling spot in the right channel.
4. Press [3] if a bright “ghost” of the spot appears in the left channel.
5. Press [4] if a dark “ghost” of the spot appears in the left channel.
6. Press [1] to save settings and resume to normal operation.



Auto calibration.

A signal source of 1kHz and accurate 0 dBu = 0.77 V rms. must be connected to the inputs.

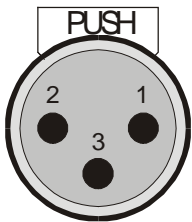
NOTE: Before performing the Auto Calibration, make sure that the gain is set to zero in both channels in the “Fine adjustment of input gain” procedure.

1. Press [1+3] and hold for more than 1.6 s. The display will be lit in both channels with markings pr. 1 dB.
2. Press [1] and hold for more than 6s. All LED's are lit in sequence for inspection.
3. Press [2]. The display will be lit in both channels with a falling spot in the right channel.
4. Press [2] The display will indicate the internal headroom with reference to the 0 dBu input signal.
5. Press [2] The display will indicate ???.
6. Press [2]. The left overload LED will flash while auto-calibration goes on and will stop flashing when auto-calibration is completed
7. Press [3+4] to accept.
8. Press [1] to save and resume to normal operation.

Terminal connections.

Analogue input (left or right).

XLR – female



1. Screen
2. Analogue input +
3. Analogue input -

Power connector.

Power is supplied through the coaxial low voltage socket. A mating connector should have an outer diameter of 5.5mm and a hole diameter of 2.1mm. Either a 24V dc or a 18V ac supply should be used.

Remote Control (Optional).

Remote control and additional power connection is accessible through the 9pole male D-sub connector on the rear side.

Pin connections:

- 1** Remote control #1 (RC#1)
- 2** Power input (24V dc or 18V ac)
- 3** Supply GND
- 4** Remote control #3 (RC#3)
- 5** Overload indication output.
- 6** Remote control #2 (RC#2)
- 7** Supply GND
- 8** Power input (24V dc or 18V ac)
- 9** Remote control #4 (RC#4)



Remote Control.

All the functions of the front buttons are available through the 9pole D connector remote control connector. Previous users of the NTP477-series instrument will find the same possibilities in this 477-100 series although the needed external connections have changed.

In addition to the remote control of operating functions (i.e. "Disp. Peak"), also a number of operating parameters (i.e. ref. level) can be programmed externally.

Restricting the number of control inputs to just four prohibits the use of simple external on/off connections. Instead specific resistance values must be used in series with the external switches/connections. The switches "common side" must all be connected to GND (Pin 4).

Remote Control input 1 (RC#1)

This input facilitates an alternative way of controlling the PPM reference level. If this input is left open the reference level is set as described under **Operating Parameter Settings** . If however a resistor is connected to 0V the preset reference level will be overruled. The resistor value required to obtain a given reference level can be found in table 1. It may be necessary to use resistors in parallel or series to obtain a specific value to within +/-2%

Table 1.

Reference level	Resistor value (ohms)	Reference level	Resistor value (ohms)
Reserved	0	+4 dBu	10625
+20 dBu	313	+3 dBu	12000
+19 dBu	645	+2 dBu	13571
+18 dBu	1000	+1 dBu	15385
+17 dBu	1379	0 dBu	17500
+16 dBu	1786	-1 dBu	20000
+15 dBu	2222	-2 dBu	23000
+14 dBu	2692	-3 dBu	26667
+13 dBu	3200	-4 dBu	31250
+12 dBu	3750	-5 dBu	37143
+11 dBu	4348	-6 dBu	45000
+10 dBu	5000	-7 dBu	56000
+9 dBu	5714	-8 dBu	72500
+8 dBu	6500	-9 dBu	100000
+7 dBu	7368	-10 dBu	155000
+6 dBu	8333	-11 dBu	320000
+5 dBu	9412	Preset level	N.C.

Remote Control input 2 (RC#2)

This input is reserved for controlling the reference level loudness mode. (Not implemented in this version)

Remote Control input (RC#3) is reserved for future use.



Remote Control input 4 (RC#4)

This input is designed to substitute all the functions also accessible as push buttons on the front of the instrument. The remote switches must have momentary action and a series resistor according to table 3 must be used. The switches “common side” must all be connected to GND (Pin 3).

Table 3

Function	Resistor value (ohms)
Additional Gain	0
Integration time. Fast/Normal	645
Mode	1379
Zoom	2222
Display max.	3200
Clear max.	4348

Technical specifications.

Supply voltage.....20-32 V dc or 18V ac
 Current consumption, @ 24V supply210 mA typ. (Max. 250 mA)

Signal input:

Input typeAnalogue stereo (two channel)
 Input impedance> 20 kΩ, electronically balanced.

Measuring characteristics:

Main reading (bar graph):

Integration time5/10 ms (IEC 268-10, 1991-03)
 Return time.....1.5 s (0 to - 20 dB) (IEC 268-10, 1991-03)
 Reference level0 dBu (Factory setting) See “Instrument set-up” to change reference level.
 Frequency range3 Hz – 20 kHz
 Overload indicationThe bar intensity is increased within overload range.

Secondary reading (spot):

Integration time "zero"
 Return time.....1.5 s (0 to - 20 dB) (IEC 268-10, 1991-03).
 Scale max.Scale max. equals the lower limit of intensified bar range.
 Reference levelScale max. corresponds to max. digital code level.

Phase indication:(option)0 to 180°. - Resolution: 18°.

Additional functions:

Gain: Additional 20 dB gain selectable on front.
 Mode The Bar-Graph display can be operated in various modes.
 Memory: A peak memory is provided. Reset is controlled from a push-button on the front.
 Zoom: To enable extremely accurate reading around "0 dB", the scale may be expanded by a factor of 10.

LED Indicators:

Flashing LEDs on top of each bar for overload indication.
 Gain, when selected.

Remote overload indication.

Output for remote overload indication is accessible through the 9-pola D-sub connector. The output is an open collector in series with an internal 2.2 k Ω resistor. The output is common to both channels.