



**Digital Peak Programme Meter
478-300/310**

Users Manual



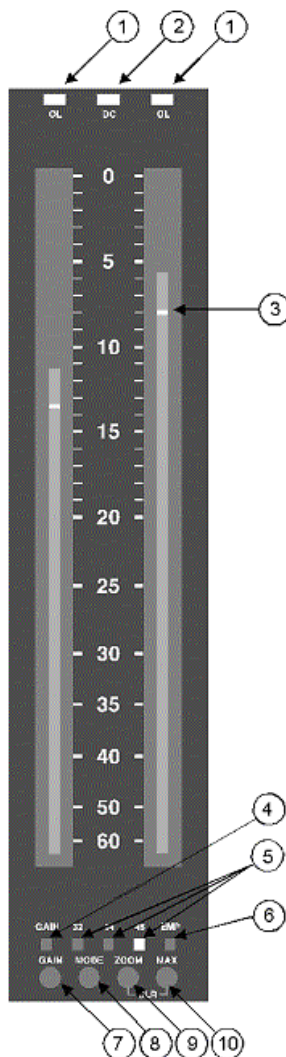
General Description.

The type 478-300 is a Digital Peak Level Meter. The input connects directly to the Serial Digital Audio Signal such as it is described in the AES3 and IEC 958 standards.

The scale on this instrument is of the "absolute" type, meaning that the scale maximum (marked "0") corresponds to maximum digital code level. Consequently the integration time for the Bargraph read-out is "FAST" and not switchable to 5 ms (10 ms). However, a number of alternative display modes can be selected, one of these providing an additional spot indication for "Normal" (5/10 ms integration time) read-out.

Generally, the digital technique poses some problems unknown in analogue designs. For instance at 48 kHz sampling frequency, the number of samples at high audio frequencies is insufficient to obtain an accurate measurement of the true audio peak level. (Not the digital coding level). Also the ability of the digital signal chain to convey a dc offset (introduced by the A/D converter) is a problem as the measurement of low level audio signals will be concealed by the dc. Both these problems have been dealt with by digital signal processing in the instrument.

Operation and Indications:



1) Overload indication.

Above each channel display is an overload LED which is triggered whenever a preselected number of contiguous samples equals maximum digital code level.

2) DC-warning.

Because of the dc-blocking in the measuring system, dc will not be displayed as part of the signal level. The dc-warning LED will indicate if such high dc levels are encoded in the digital signal that full utilisation of the dynamic range (for audio signals) is endangered.

3) Spot indication.

Depending on the actual display mode being used a spot indication is provided showing the "familiar" quasi peak indication (5/10 ms integration time).

4 & 7) Gain.

The scale range can be offset by 20 dB to extend the measuring range down to - 80 dB. The push-button (8) has alternating action and the LED will be lit when "GAIN" is selected.

5) Sample rate indicator.

The sample rate indication is based on a measurement of the actual sample rate rather on the channel status bit information.

6) Emphasis indicator.

The LED will be lit if the emphasis bit is set in the received digital signal. No frequency compensation will be introduced to the measured audio level whether the emphasis bit is set or not.

8) Mode.

To adapt to various applications the bargraph display can be operated in various modes. By holding the Gain Switch while pushing the Fast Switch the various modes (designated "a" to "e" below) are selected sequentially

a) The mode "a" is easy to distinguish from the rest by the blend-in scale markings. An illuminated background



to the peak indicating bar-graph extends to the scale mark "0" to provide the user with clear scale markings, even in dimmed light.

- b) In mode "b" there is no scale markings and no background illumination.
 - c) In mode "c" a spot within the bar indicates peak audio level measured with 5/10 ms integration time (IEC 298-10).
 - d) In mode "d" the illuminated background extends to the top of the scale and the spot operates as a peak hold indication "riding" on the top of the bar.
 - e) In mode "e" the spot "holds" the maximum reading until it has been cleared by pressing the buttons "ZOOM" and "MAX" simultaneously.
- 9) Zoom.
The zoom function will increase the display resolution by a factor of ten thus for the shown scale the bottom (-60) mark will represent - 6 dB. The GAIN LED will flash while Zoom is active.
- 10) Max. memory function.
The meter incorporates a peak memory function that continuously monitors and stores the highest peak. The memory content can be displayed by pushing the MAX-button. The memory can be cleared by pushing the ZOOM and MAX buttons simultaneously.



Instrument set-up.

Numerous parameters (like overload threshold 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]. If the instrument is used in PPM and/or Loudness mode adjustments only affect the active mode and must be performed in both modes.

Adjustment of intensified “overload” range:

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 threshold level in 1 dB steps. Scale max. equals digital FS.
3. Press [4] to increase threshold level in 1 dB steps. Scale max. equals digital FS.
4. Press [1] to save settings and resume to normal operation. (Or jump to next adjustment point 2)

Adjustment of overload indicator threshold 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 [2]. The display will be lit in the left channel with markings pr. 1dB.
3. Press [3] to lower the overload indicator threshold.
4. Press [4] to raise the overload indicator threshold.
5. Press [1] to save settings and resume to normal operation. (Or jump to next adjustment point 3)

Adjustment of overload indicator threshold timing:

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 [3] to increase the number of consecutive samples (above threshold level) to activate OL-indicator.
5. Press [3] to decrease the number of consecutive samples (above threshold level) to activate OL-indicator.
6. Press [1] to save settings and resume to normal operation. (Or jump to next adjustment point 4)

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.

Compensation for “ghost” spot. (Only required if display is replaced.

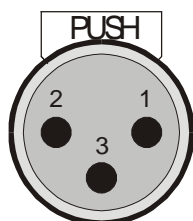
1. Press [1+3] and hold for more than 1.6 s. The display will be lit in both channels with markings pr. 1 dB.
2. Press [1] and hold for more than 6 s. All LED's are lit in sequence for inspection.
3. Press [2] The display will be lit in both channels with a falling spot in the right channel.
4. Press [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.



Terminal Connections.

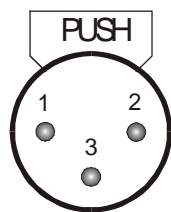
The instrument is available with various connector types.

XLR – female.



Term. no.	
1	Scrn. (Chassis)
2	AES3 input a
3	AES3 input b

XLR –male.

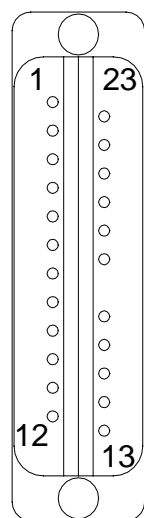


1	Scrn. (Chassis)
2	AES3 loop through output a
3	AES3 loop through output b

Note: If loop through connection is not used the cable termination should be set to 110 Ω by means of the switch placed between the two XLR connectors.

Terminal connections when fitted with optional Tuchel type T-2700 connector.

The mating part (type T-2701)
Seen from rear (soldering) side.



N.C.	1		
N.C.	2	23	+ Vcc
N.C.	3	22	N.C.
N.C.	4	21	N.C.
N.C.	5	20	N.C.
N.C.	6	19	N.C.
N.C.	7	18	N.C.
N.C.	8	⌘	
N.C.	9	17	N.C.
N.C.	10	16	N.C.
Input screen	10	15	N.C.
Digital input (-)	11	14	Digital input (+)
- Vcc	12	13	Chassis



Technical Specifications:

Supply voltage..... 20 - 32 V dc
 Current consumption, @ 24V supply 160 mA typ. @ VCC = 24 V (max. 200 mA)

Signal input:

Input type Serial digital audio interface (IEC 958/AES3)
 Input impedance High impedance, floating, ($Z_i > 1 \text{ k}\Omega$) 1) (Versions fitted with XLR connectors have switchable input termination.)
 Minimum input signal $V_{\min} = 200 \text{ mV}$, $T_{\min} = 0.5 \times T_{\text{nom}}$ (IEC 958)
 Sampling rates 96 kHz, 48 kHz and 44.1 kHz

Measuring characteristics:

Main reading (bargraph):

Integration time "0" ms
 Return time 1.7 s (0 to - 20 dB) (IEC 268-10, 1991-03)
 Reference level Scale max. corresponds to maximum digital code level.
 Overload indication The display intensity is increased within overload range.
 Low frequency cut-off DC-blocking; Cut-off frequency $< 0.3 \text{ Hz}$
 "Anal. Reference Level" marker selectable 0 to 31 dB below max. digital code.

Secondary reading (spot):

Integration time 5 ms @ -2 dB (10ms @ -1dB) IEC 298-10, 1991-03
 Return time 1.7 s (0 to - 20 dB) (IEC 268-10, 1991-03)

Additional functions:

Gain: Additional 20 dB gain selectable on front.
 Mode: The Bar-Graph display can be operated in various modes.
 For more details see "Front Layout" , § "9 Mode".
 Memory: A peak memory is provided. Read-out and memory clear is push-button controlled on the front.
 Zoom: To enable extremely accurate reading around "0 dB" the scale may be expanded by a factor of ten.

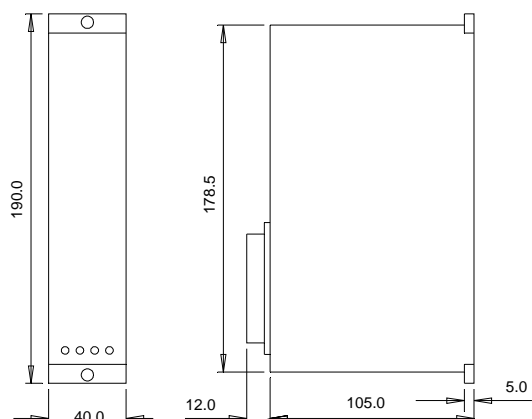
Mechanical outline:

Indicators:

Flashing LEDs on top of each bar indicates (instantaneously) digital overload.
 Excessive DC-content in either channel is indicated on LED
 Gain is indicated on LED when selected.
 Sampling rate and possible preemphasis is indicated on LEDs

Notes:

1) The 478-300 has been designed with high input impedance to allow for paralleled (daisy-chain) connection. If used without other line termination a termination resistor (75Ω or 110Ω) must be mounted on the mating connector.



Weight approx. 0,6kg