



**Audio Level Meter
PPM-2
| Manual |**

Version 1.00

Table of contents

1. GENERAL DESCRIPTION	1
2. CONNECTIONS	2
2.1 POWER SUPPLY	2
2.2 ANALOG INPUTS	2
2.3 DIGITAL INPUTS	2
3. USER INTERFACE	3
3.1 DEFAULT VIEW	3
3.2 MAIN MENU	4
3.2.1 <i>INPUT</i>	4
3.2.2 <i>DIGITAL TERMINATION</i>	4
3.2.3 <i>MEASURE</i>	5
3.2.4 <i>RMS INTEGRATION FACTOR</i>	5
3.2.5 <i>REFERENCE</i>	5
3.2.6 <i>SCALE RESOLUTION for left and right channels</i>	5
3.2.7 <i>SCALE START</i>	5
3.2.8 <i>MAX HOLD</i>	5
3.2.9 <i>MAX DISPLAY</i>	6
3.2.10 <i>VIEW</i>	6
4. TECHNICAL SPECIFICATIONS	7

1. General description

The ppm-2 audio level meter is a simple way of measuring audio levels of both analog and digital signals. The meter has two analog inputs (balanced or unbalanced), AES/EBU and S/PDIF.

The unit is highly configurable via a multifunction knob and easy to read via the high contrast, high viewing angle OLED-display. The instrument is housed in a durable aluminum cabinet.



2. Connections

2.1 Power supply

The 1.9mm power jack on the back of the unit accepts 15 VDC, minimum 200 mA. The polarity can be switched without damaging the meter.

Input voltage: 15 VDC

Minimum input current: 200 mA

! Caution: Voltages above the recommended supply voltage can damage the device.

2.2 Analog inputs

The meter accepts both balanced and unbalanced analog audio but not at the same time. This means that if the user feeding the unit with signals from both the balanced and the unbalanced input the meter won't display the right level. The analog inputs are internally sampled with 48 kHz. The pin configuration of the analog inputs is shown in table 2.1. and table 2.2.

Balanced analog audio input	
Connector type	XLR Female
Ground	Pin 1
Hot	Pin 2
Cold	Pin 3

Table 2.1.

Unbalanced analog audio input	
Connector type	RCA Female
Hot	Center
Ground	Chassis

Table 2.2.

2.3 Digital inputs

The digital inputs accept both balanced digital audio according to IEC-60958 Type I (AES/EBU) and unbalanced digital audio according to IEC-60958 Type II (S/PDIF). The two different connectors are separated which means that the user can connect both inputs simultaneously. The two S/PDIF connectors are internally connected allowing the user to pass the signal to other devices. If the user uses the loop thru function, the input termination resistance shall be disabled (*Chapter 3. User interface*). The allowed sampling frequency is 32 kHz to 192 kHz. The pin configuration of the digital interfaces is shown in table 2.3. and table 2.4.

Balanced digital audio input	
Connector type	XLR Female
Ground	Pin 1
Hot	Pin 2
Cold	Pin 3

Table 2.3.

Unbalanced digital audio input (Output pass thru)	
Connector type	2 x RCA
Hot	Center
Ground	Chassis

Table 2.4.

3. User interface

3.1 Default view

The user interface consists of one multifunction knob, one OLED-Display, one clear button and one ON/OFF switch. The multifunction knob is used to navigate in the menu. When the device is switched on it instantly starts to measure the audio level on the selected input. The default screen is illustrated in figure 3.1.

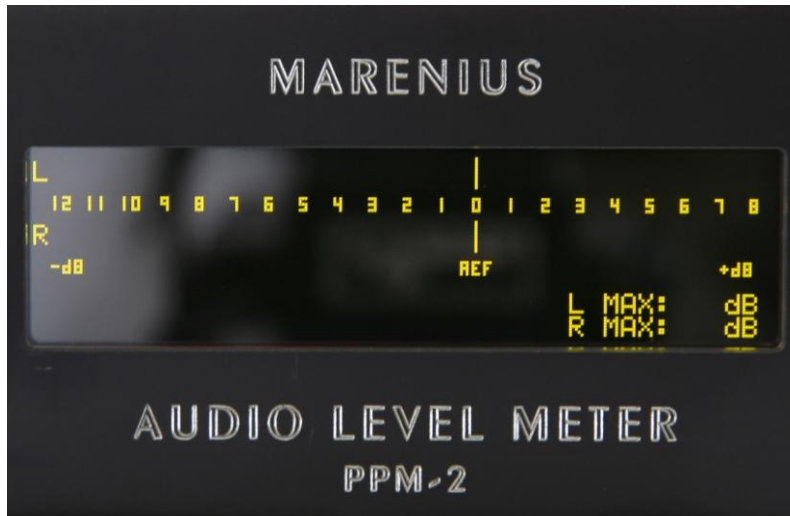


Figure 3.1.

The default screen contains a level indicator for left and right channels, a decibel scale, left and right maximum value and two small dB symbols with different signs. The -dB and +dB is used to indicate if the scale starts or ends at negative or positive values. It is important that the user is aware of that the dB value presented has different references depending on what is measured.

The clear button is user to reset the maximum value; it also freezes the current value while the user is holding the clear button down. If the user turns off the device, the current settings are saved. However if the user turns of the device by pulling the power supply cable, the settings will be discarded.

3.2 Main menu

The main menu consists of 10 different main items, which allows the user to configure the meter in different modes. The main menu is entered when the user presses the knob; the press function is also used to step thru the menu. To change the current menu item simply turn the knob clockwise or counterclockwise. The menu items are listed below in order of appearance.

- INPUT
- DIGITAL TERMINATION
- MEASURE
- RMS INTEGRATION FACTOR
- REFERENCE
- SCALE RESOLUTION
- SCALE START
- MAX HOLD
- MAX DISPLAY
- VIEW

3.2.1 INPUT

The input selection is used to select the audio source, the available options are:

- Analog (dBu)
- S/PDIF (dbFS)
- AES/EBU (dBFS)

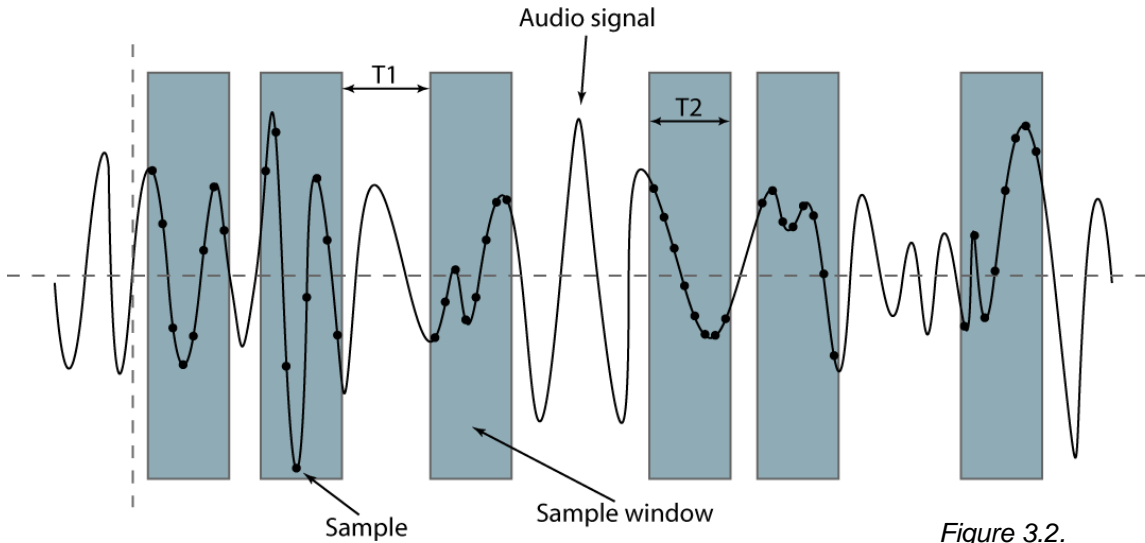
If the “analog (dBu)” input is selected either balanced or unbalanced audio is measured. When measuring analog audio the values are presented as dBu (0.7746 V_{rms} reference) which means that 0 dB is 0 dBu. When measuring digital signals (AES/EBU or S/PDIF) the 0 db is 0 dBFS which is the maximum allowed value.

3.2.2 DIGITAL TERMINATION

The digital termination allows the user to disconnect the cable termination on the digital interfaces. This is used when the signal is used to drive multiple devices. If the only the ppm-2 is connected to the signal source, the termination shall be on.

3.2.3 MEASURE

The ppm-2 can measure peak or RMS of the signal. The measurement is realized thru a manufacturer specific algorithm combining random interleaved sampling with burst sampling, which is illustrated in figure 3.2. where T2 is the sample window and T1 is the time between the sample windows. As shown in the figure T1 is alternating between predefined times.



3.2.4 RMS INTEGRATION FACTOR

The integration factor only applies to RMS measurements. The integration factor represents how many sample windows (*section 3.2.3*) are being used to compute the RMS value. If the factor is increased the attack and release time of the meter is slightly increased. When a high factor is used the meter behavior is similar to an old style VU-meter.

3.2.5 REFERENCE

The user can change the reference mark, however this is only a visual reference level that can be used to clarify if the signal level passes the reference mark. The reference mark on the level indicator shall not be confused with the reference level (absolute or relative) used in decibel measurements such as dBu, dBFS and dBV.

3.2.6 SCALE RESOLUTION for left and right channels

The scale resolution can be switched between 1dB, 3dB and 6dB, which allow the user to look at a small interval or a more general view of the signal level.

3.2.7 SCALE START

This option enables to move the visual level interval, the interval range is depending on the scale resolution. The scale start can be set to any value within -60dB and -10dB.

3.2.8 MAX HOLD

In many audio measurements it's important to see the maximum level within a defined time range or even an infinite time. The "max hold" can set the hold time for max indication between 0 to 5 seconds. There is also an option that causes the maximum value to not fall back until the user pressed the CLR button on the front of the instrument. The maximum value is the maximum value for the current measurement (peak or RMS).

3.2.9 MAX DISPLAY

This option can change the way the maximum indication disappears. The options are “fade away” and “fall off”. When “fade away” is selected the maximum indication fades away at the current position and when “fall off” the maximum indication falls off (moving towards the left). The maximum indication is also presented as a numerical value illustrated in figure 3.3.

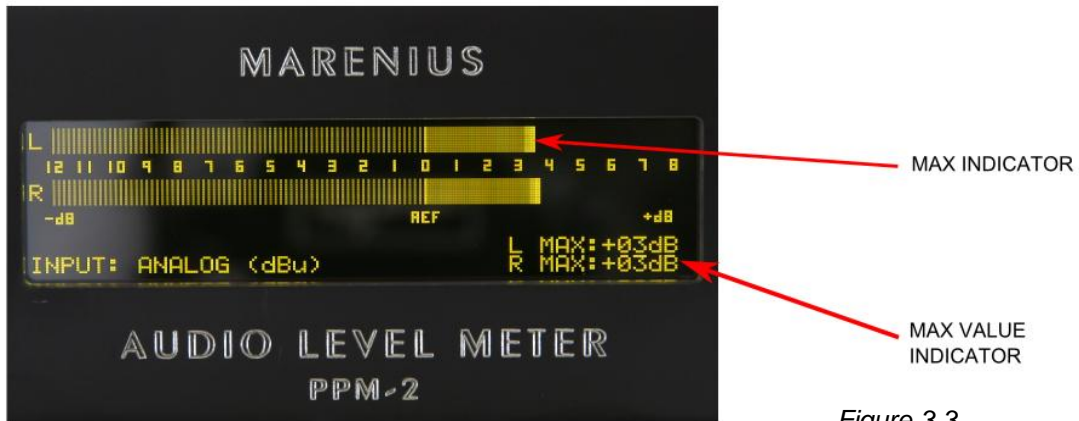


Figure 3.3.

3.2.10 VIEW

The “view” option can change which data is being presented in the lower right area of the display. The user can change between “none” that simply clears the area, “max” which is illustrated in figure 3.3. or current sample rate. When “max” is viewed the lower right area of the display holds information about the current maximum value (*section 3.2.9 and 3.2.8*). The sample rate option displays the current sample rate. This option is useful when measuring digital signals that can be transmitted in different sample rates. The instrument is only displays the sample rate if it is a standard sample rate (*see technical specifications*). If the user is measuring an analog signal the sample rate is fixed to 48 kHz.



4. Technical specifications

Power supply

Supply voltage	15 VDC
Current consumption	150 mA typ.

Balanced analog input

Connector	XLR Female
Input impedance	20k Ω
Reference input level.....	-10dBu
Maximum input level.....	+20dBu
Frequency range	20Hz – 20kHz
Dynamic range.....	60dB

Unbalanced analog input

Connector	RCA Female
Input impedance	10k Ω
Reference input level.....	-10dBu
Maximum input level.....	+20dBu
Frequency range	20Hz – 20kHz
Dynamic range.....	60dB

AES/EBU input

Connector	XLR Female
Input type	IEC 60958 Type 1
Input impedance	High Z or 110 Ω
Standard sampling rates	44.1kHz, 48kHz and 96kHz

S/PDIF input

Connector	RCA x2 (pass thru)
Input type	IEC 60958 Type 2
Input impedance	High Z or 75 Ω
Sampling rates	44.1kHz, 48kHz and 96kHz

Measuring characteristics

Maximum level error (1kHz steady signal)	\pm 1dB
Maximum unregistered pulse length (worst case).....	\approx 6ms*
Falloff time (peak mode, scale resolution = 3dB)	3dB/60ms
Maximum integration time (rms mode).....	\approx 500ms*

(*) Depends on the input signal.