Milab



DM-1001

Milab
Digital Microphone
Stereo System
User Manual

The DM-1001 stereo system

The DM-1001 digital microphone system is full of possibilities for the professional user. It is based on the classic Milab rectangular dual cardioid condenser capsule, followed by a 24-bit 48 kHz Sigma-Delta ADC and a 24-bit Digital Signal Processor. The signal leaves the system in AES/EBU digital format. Standard settings could be made from the phantom power unit, but the microphone is also controllable with PC software. There you have free choice of polar pattern, analog/digital gain, and frequency response tailoring using digital filters. Anything the user can control can be saved for future use, either in the PPU-10 phantom power unit or on computer hard disc.
With the stereo system and a digital recorder you will get a complete recording system.

System parts

You should have received the following DM-1001 system components:
2 DM-1001 microphones
Phantom Power Unit, PPU-10
18V AC/AC power adapter
2 Cables, 5-pol XLR
2 Elastic suspension with stand adapter
CD with Milab DM-1001 Acoustic Designer Stereo Edition software

Using the system

The relationship between the microphone, the phantom power unit and the Acoustic Designer software can be summarised as follows:

The microphones main job is to transform the acoustic signal to an electric signal and then take it further to the digital domain. It contains most of the sound shaping hardware, e.g. the DSP, the ADC etc, but has no kind of 'memory', in the sense that nothing user-specified is ever stored inside it.

The phantom power unit's first and most important job is to provide the microphone with power. The second job is to send control commands to the DSP, inside the microphone. The third job of the PPU-10 is to store user specified settings in a EEPROM. The PPU-10 will also control stereo settings and sample rate.

Finally, the Acoustic Designer software helps the user to control all features in the system. User specified settings can be downloaded into the PPU-10 or saved on computer disc for future use. It is also possible to read back the settings from the PPU-10 into the Acoustic Designer software.

It is important to realize that you don't have to use the Acoustic Designer software at all in order to use the system. The phantom power unit arrives with factory presets stored in the selector knob USER positions. The user can either use these settings or replace them from the Acoustic Designer. Once you have stored your settings in the PPU-10 you don't need the PC computer for the system to work.

Microphone connection

Install the microphones elastic suspensions on microphone stands.
Insert the DM-1001 microphones into the shock mounts.
Tighten the locking devices by turning the lower ring clockwise.
Connect the 5-pin XLR cables to the microphones.
Connect the other ends of the 5-pin XLR cables to the 'Mic1 - Mic2' input on the back of the PPU-10 phantom power unit.



NOTE! The DM-1001 microphone must ONLY be used with Milab digital microphone phantom power unit PPU01 or PPU10. NEVER connect a DM-1001 microphone to any other phantom power source. That can severely damage both the microphone and the power source !!!

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Connect the AC/AC adaptor to the '18 VAC' input on the back of the PPU-10.
Connect the 3-pin XLR cable (not included) to the output labeled 'AES out' of the phantom power unit.
Connect the other end of the 3-pin XLR cable to the AES/EBU input of for example a mixing console or a DAC (digital-to-analog converter).
NOTE! The PPU-10 phantom power unit AES out must ONLY be connected to a AES/EBU digital input. NEVER connect the PPU-10 phantom power unit to an analog microphone input or phantom power source. That can severely damage both the Microphone and the power source !!!

For connecting to other digital equipment there are also a S/PDIF output.

Connect the female end of the RS-232 cable (not included) to the 'Computer' connector on the back of the PPU-10.
Connect the other end to a free serial port on your PC computer.

If word clock is to be used, connect the synchronisation cable to 'Word Clock' input.

Software installation

In order to use the Milab Acoustic Designer software you need to have access to a PC computer running at least Microsoft Windows 95 with one free serial port (COM1 or COM2).
To install the software, turn the computer on and insert the CD. Start the setup.exe program at the CD and follow the instructions on the screen. More information is available in the readme file on the CD.



Using the PPU-10

For microphone settings there is a separate knob for each microphone.

The knobs on front panel the of phantom power units are used to choose between the predefined or the 4 user specified settings. The DM-1001 system delivers a standard suite of polar patterns, as Omni, Wide Cardioid, Cardioid, Super Cardioid and Figure-of-eight.

The position with two cardioid symbols is called Pass through. The front signal is sent out in the left channel and the back signal to the right channel. This makes it possible to do stereo recordings with one microphone, and also give the possibility to change the front to back ratio in the mixer. Se also under Stereo/Mono knobs.

The selector knob MUTE position mutes the digital audio output.
Turning the knob to the TEST position results in a 1 kHz sinusoidal tone (- 36 dB from full scale), being sent on both the left and right AES/EBU channels.

The LED error indicator is ON when there is a microphone error and the microphone doesn't respond to the PPU-10. For instance when the microphone is not connected.



Mono/Stereo knob:
In mono position microphone #1 is sent to output #1 and microphone #2 is sent to output #2.
In stereo position microphone #1 and microphone #2 is transformed to one AES signal with microphone #1 as left and microphone #2 as right. Found on both output #1 and #2.
In M/S stereo position the control unit would calculate the information from the microphones in a MS matrix. Microphone #1 is treated as the M microphone and microphone #2 as the S microphone. The intended setup is with microphone #2 set to figure-of-eight and angled 90 towards the sound source and microphone #1 focused on the sound source.

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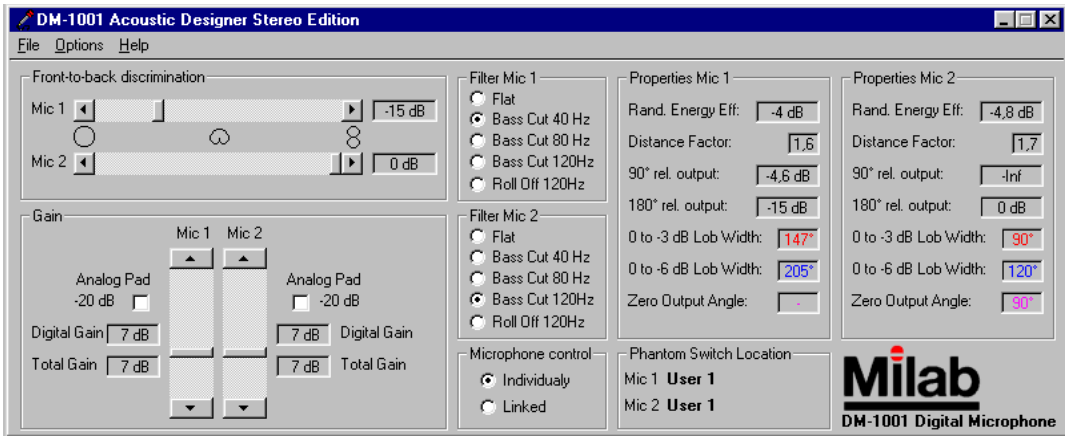
With the microphones in Pass through setting and PPU in mono position, the front capsule information would come out as left signal and the back capsule as right signal for each microphone. In stereo setting, the front capsules would be transformed to a cardioid stereo microphone setup with output on microphone #1. On the output for microphone #2 you would find the stereo setup of the back capsules. In M/S setting and using microphone #2 as a figure-of-eight and microphone #1 in Pass through the microphone #1 output would be a MS setup with the front cardioid. On microphone #2 output you find a MS setup with the microphone #1 back cardioid.

Dithering:
Use 16-bit position if you are recording to a digital media with only 16 bits, as most DAT recorders. Otherwise use 24-bit position.

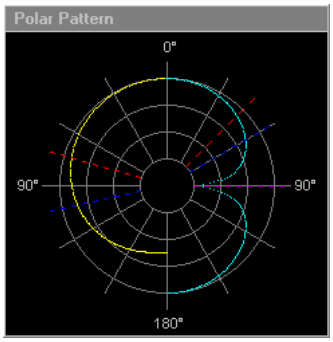
Sample rate:
For selecting between 44.1 48 96 kHz or the word clock input.
The green LED would light up when there is a detected signal on the word clock input.

Using the Acoustic Designer Software

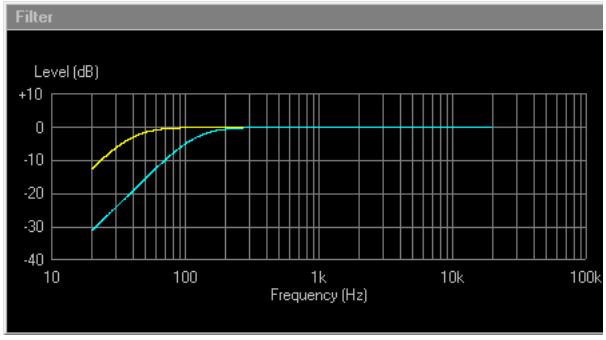
The Acoustic Designer software was designed to give the user total control of all the microphones features. The user interacts with three windows, the main window, the polar pattern window and the filter window.



Main Window
Used to modify the microphone performance.



Polar Pattern Window
Presents the directional



Filter Window
Presents the frequency response of the current digital filter.

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The main window is divided into 8 frames with different tasks as followed.

Front-to-back discrimination
Set up the polar pattern. The printed value indicates the attenuation of the back signal in dB. The polar pattern window will present the graph. Yellow for microphone #1 and blue for microphone #2.

Gain
Setting of the microphone gain. The analog pad will make it possible to record high levels, up to 144 dB.
Use the digital gain to adjust the level in the digital domain. In MS settings the gain for microphone #2 would work as the stereo width.

Phantom Switch Location
Indicate the PPU-10 switch position. Also indicate Mic Error or if the computer and PPU don't have any connection or if no Com port is selected.

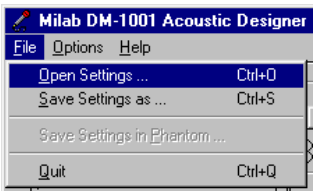
Filter
Buttons for selection of digital filter. The filter window will present the filter curve. Yellow for microphone #1 and blue for microphone #2.

Microphone Control
With the PPU-10 in 'User position' and 'Linked', the two microphones would follow each other when changing the settings for one of them.

Properties
Information about the acoustic behaviour of the microphones.

Random Energy Efficiency (REE): Reduce of the random (off-axis) signal level, relative to the desired (on-axis) signal. Omni = 0 dB, Cardioid = - 4.8 dB.
Distance factor (DF): The distance, with the omni pattern as unity, at which the directional pattern may be used for the same Random Energy Efficiency. Omni = 1, Cardioid = 1.7
90° rel. Output: Sound coming in at 90° relative to 0° in dB.
180° rel. Output: Sound coming in at 180° relative to 0° in dB. -Inf = infinity (total attenuation).
0 to –3 dB Lob Width: The open angular that the sound is between 0 and –3 dB relative 0°. Marked in the polar pattern graph with red lines.
0 to –6 dB Lob Width: The open angular that the sound is between 0 and –6 dB relative 0°. Marked in the polar pattern graph with blue lines.
Zero Output Angle: The angle where the sound is rejected to zero. Symmetric relative on-axis. Marked in the polar pattern graph with magenta lines.

Program Menus



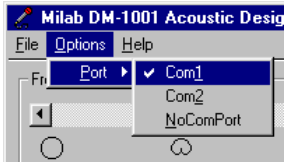
File

Open Settings… (Ctrl+O)
Open a saved microphone setting.

Save Settings as… (Ctrl+S)
The settings will be saved in a session file ending with '.mi2'.

Save Settings in Phantom…
Store the last setting in the PPU-10 EEPROM. Makes it possible to use favourite settings in the user positions without a computer. Would light up when the PPU and computer have connection.

Options
Port select **Com1** or **Com2** for actual connection or **NoComPort** if the program is indented to run alone.



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APPENDIX NOTE

This equipment is tested and found to comply with the **EN 55103-1** and **EN 55103-2** environments **E4**. (EMC controlled broadcasting and recording studios.)
This product is not intended for home use!



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