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professional ducts

MM-4210 STEREO MIXER FOR PROFESSIONAL USERS

The MM-4210 is a true professional Stereo Mixer for portable use. It offers four mic/line input channels, an additional stereo line return input, built-in M-S stereo matrix for headphones, PPM metering with 2 x 9 LED's in three colours, low-noise amplifiers and power supply based on standard LR06 (AA) batteries. All this is housed in a compact, all-metal heavy-duty case.

The front panel holds all controls for the mixer. On top of the panel are toggle switches for Power, Test Tone and Battery Test. Additional switches select the headphones monitoring source (internal or external signals) and M-S stereo matrix mode. Each of the four inputs has a gain control pot and a pan pot. In addition there is a gain selector switch for 0, 25 or 50 dB gain. The gain pot adds up to 12 dB and the master pot adds another 12 dB for a total of 74 dB gain, input-to-output. There is also a toggle switch for inserting a HP-filter for bass-cut. Channels 1 and 2 may be linked to the channel 1 pot and channels 3 and 4 can be linked to the channel 3 pot.

On the right-hand side of the front panel is the PPM bar graph with 18 LED's in three colours covering the range +9 to -24 dBu in optimised step size. Here you will also find the Master pot and the Headphones pot.

The backside panel holds all sockets for input and output plus external power supply.

There are four input sockets (XLR-3F), for the input channels. Each input has its corresponding toggle switch for enabling 48 V phantom power. There are two sockets (XLR-3M) for the main outputs L and R. A 1/4" stereo socket is intended for headphones of most kinds, 32 - 2000 ohms impedance. A smaller stereo socket, 3.5 mm, is used for an optional line level return signal, i. e. for confidence monitoring in the headphones. External power supply can be used for prolonged up-time or when the mixer is used in a stationary mode. The external power should be 10 - 15 V @ 3 VA (200 - 300 mA). When powered from internal batteries, expect a total working time of 4-8 hours, depending on battery quality, temperature and up-time length. MM-4210 can also be powered from NiMH rechargeable batteries although they will supply less than 12 V.

Technical Data MM-4210

(All values are typical unless otherwise indicated)

Max. gain	74 dB (50+12+12)
Frequency range	20 Hz -20 KHz (-3 dB)
THD	<0,012% @ 1 kHz, +12 dBm
Signal-to-noise ratio	>80 dB @ 0 dB gain, A-weighted
Equiv. input ref. noise	<-128 dBu, A-weighted
Input sockets	XLR-3F
Audio input impedance	2 KΩ balanced
Audio input level	max. +20 dBu
Output sockets	XLR-3M
Audio output impedance	2 x 100 Ω balanced
Audio output level	max. +18 dBm (600 Ω)
Phones socket	1/4" 3-pole
Phones impedance	32 - 2000 Ω
Line input socket	3,5 mm 3-pole
Line input impedance	10 KΩ
Line input level	-12 ... +20 dBu
Test tone	1000 Hz +/-0,1%
Phantom power	48 V, total max = 6 mA
Power supply	8 x LR06 (AA) alkaline batteries or ext. 10-15 V DC @ 3 VA
Size W x H x D approx.	140 x 60 x 136 mm excl. sockets and knobs
Weight	approx. 900 grams

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User Instructions

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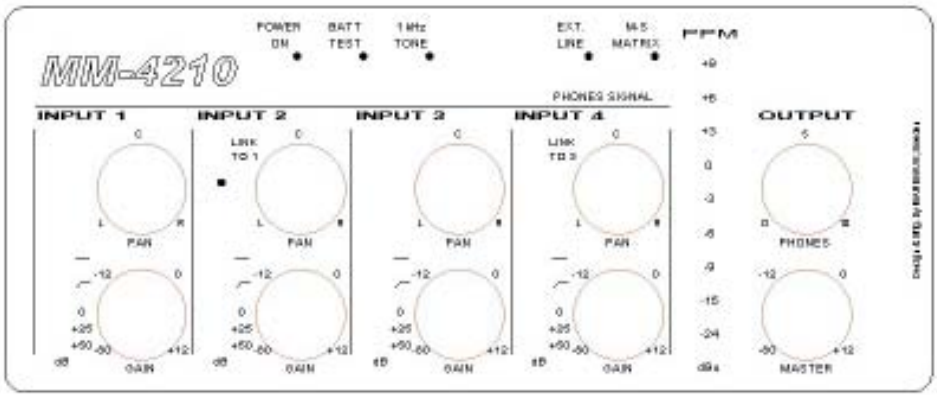

MM-4210 Stereo Mixer

Batteries and power supply

The battery compartment is accessible after the bottom lid has been pulled backwards. Pull the battery holder out and put in a set of 8 fresh alkaline batteries.
NOTE: the protective plastic film should fully cover the battery holder all way around. It is necessary to prevent the outside of any battery to touch the metal compartment. If the battery is poorly isolated this may cause short-circuit and leakage of battery acid.
Alternatively you can use rechargeable NiMH batteries, although they will deliver less voltage (9.6 V) and usually they will hold less mAh, around 900 mAh compared to 1500 mAh for alkaline batteries.
For estimation of useful working time from a set of batteries, calculate with 200 mA current drain. This would theoretically give 4.5 hours of total working time from a set of NiMH batteries and 7.5 hours of total working time from a set of alkaline batteries. There are also NiMH batteries that offer 1.5 V per cell. Since MM-4210 utilizes the total power of the batteries by its internal DC-DC converter, the current drain is lower at higher voltages. Toggling the BATT TEST switch enables the battery metering function. The left bar graph then displays the battery voltage:

0	*yellow*	*12 V*	*OK*
+3 to +6	*red*	*12 - 13 V*	*OK*
+9	*red*	*above 14 V*	
-3 to -15	*green*	*9 - 12 V*	*OK*
-24	*green*	*low voltage*	

If no LED comes on the voltage is below 7 V. The mixer should not be used when the -24 LED is on or if all LED's are off, until batteries has been replaced.
The +9 indication will only come on for external power supply above 14 V. This is not likely to cause damage to the mixer.
The mixer will continue to work at voltages slightly below 9 V but with reduced performance.
The external power socket is a standard DC socket with a 2,1 mm pin. It can be polarized either way. Internal circuitry protects the mixer from over-current and over-voltage by turning off external power intake after a while.
It is possible to run the mixer from both internal batteries and external power supply at the same time. Only the source with the highest voltage will be used.
There will never be charging of internal batteries from an external source or vice versa.
In order to preserve battery power always make it a good habit to switch off power when the mixer is not in use. There is no warm-up time needed after power-on.

Audio Connectors

Input sockets are XLR-3F and Output sockets are XLR-3M. Both utilize standard pin-out:

pin #	signal
1	ground
2	hot (+)
3	cold (-)

Phones output is a standard 1/4" socket:

pin #	signal
tip	left
ring	right
sleeve	common

Line input for confidence monitoring is a 3.5 mm socket:

pin #	signal
tip	left
ring	right
sleeve	common

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48 V Phantom Power

MM-4210 has an internal 48 V generator that will supply power to condenser microphones through a pair of 6.8 KΩ resistors for each input socket. Each socket has its own switch for selecting 48 V power. Note that it is possible to set this switch to ON position even when the input signal is a line level signal. This may cause damage to unprotected sources.
Dynamic microphones that are truly balanced will not detect the 48 V phantom power so you can leave the switch in on or off position.
When mixer power supply is 12 V or higher it is possible to use up to 6 mA of total phantom power current.

Test Tone

Use it for calibration purposes.
Turn all input gain controls to minimum and adjust the master level for a 0 dBu reading on the PPM meters. This corresponds to 0 dBu output level from MM-4210. The test tone has a crystal-controlled frequency of 1000 Hz +/-0,1%. THD is < 3%.

Monitoring

MM-4210 has a comprehensive monitoring system.
Output is to headphones and is level-controlled by the PHONES knob. Source is selectable: internal or external by the EXT. LINE switch. External source can be the output from a recorder.
The built-in M-S Stereo Matrix can be inserted by the M-S MATRIX switch. This can be useful for monitoring the stereo image of the sound from a M-S stereo microphone pair.
M-S stereo is a way of recording the M signal (mid) onto one channel and the S signal (side or surrounding) to the other channel. In the post-production these signals can then be conditioned in a M-S stereo matrix to end up in an L and R pair. The benefit is that the stereo width can be continuously controlled by gain control of the S signal when added to the M signal like this:

M + S = L *M - S = R*

PPM metering

The PPM (Peak Programme Meter) has a fast rise time and a short decay time in order to make transients visible. This mode is contrary to a VU meter that indicates the average value of the signal. This can cause confusion when looking at the same signal, i. e. a voice signal, on a PPM and VU in parallel. The PPM seems to indicate much higher levels than the VU meter. In other words: there is a higher risk of over-steering the recorder if the VU meter is used. Normally, use the Test Tone for calibration between the two meter types and add an offset to the VU reading that has to be tried-out for the particular recorder.
The MM-4210 PPM has 9 LED's in three colors:

0 dBu	*yellow*
+3 to +9 dBu	*red*
-3 to -24 dBu	*green*

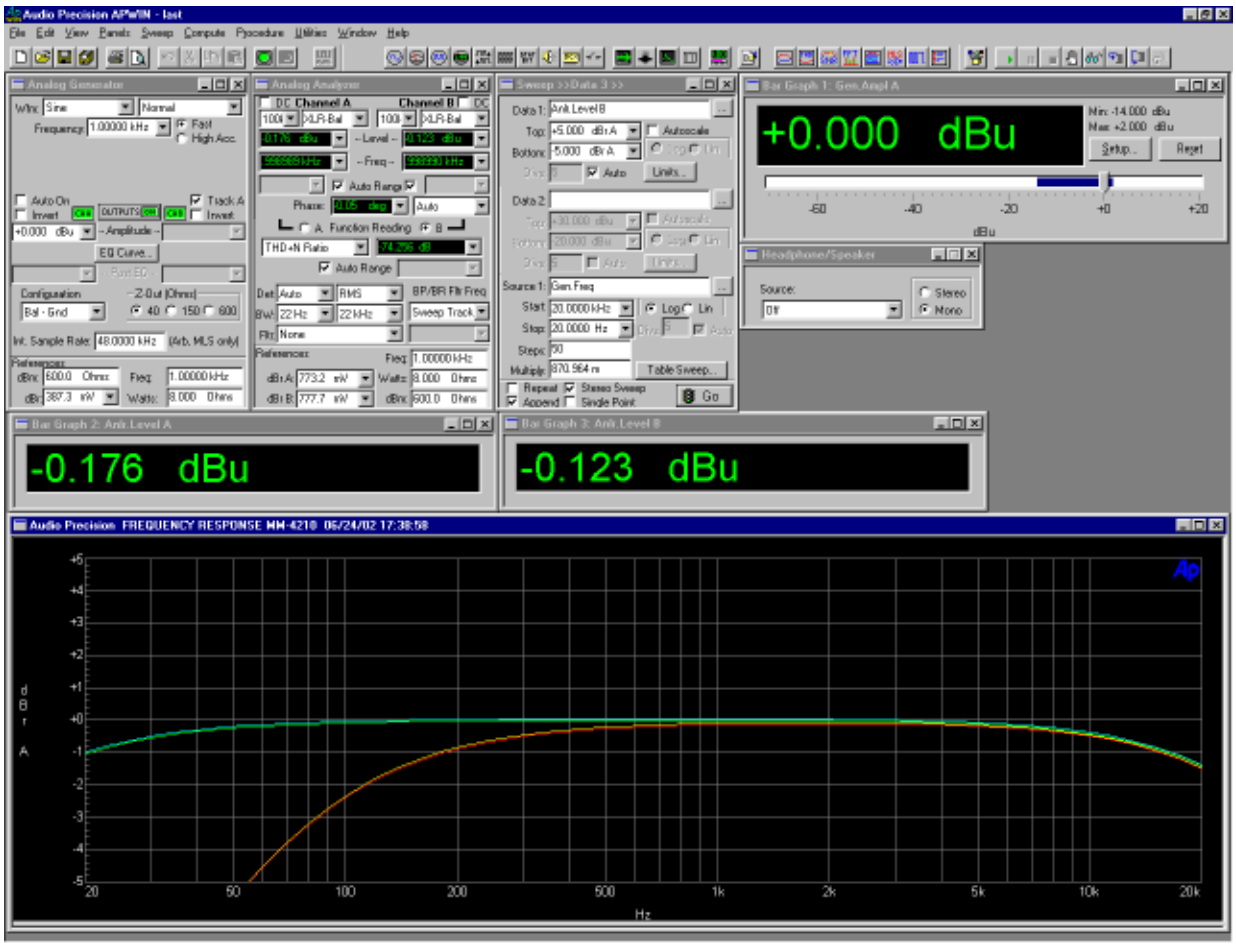
Channel controls

Each input channel has a basic gain that is selectable:

0 dB	for line levels
25 dB	for high-level mic's
50 dB	for normal mic's

In addition there is up to 12 dB gain available with the pot and another 12 dB gain with the master pot. This makes a total gain of 74 dB.
The channels 1 and 2 can be linked by the LINK TO 1 switch. Then both channels are controlled by the channel 1 level pot. Channels 3 and 4 can be linked by the LINK TO 3 switch, handing control of channel 4 over to the channel 3 pot.
Each channel also has a switch for inserting a HP filter for bass-cut below 80 Hz with a smooth 6 dB/octave roll off.
The PAN pot is used for panning the input signal between the L and R outputs. For full channel separation with a stereo-pair of microphones pan the channels 100% opposite to each other.

MM-4210 FREQUENCY PLOT



MM-4210 FFT PLOT