

Merlin

Digital Loudspeaker and Network Management System



The Merlin digital loudspeaker and network management system is designed to control and drive professional, multi-channel loudspeaker systems from complex, high-end touring systems to distributed installed systems. It is a digital matrix processor configured as a 4-input/10-output, 1U device with accompanying VU-NET™ software. Any input or group of inputs can be routed to any output and VU-NET provides full control of Merlin via an intuitive graphical user interface running on a wired PC or wireless tablet.

Merlin can form the heart of a networked sound system with control of up to 254 U-NET™ equipped devices using VU-NET control software via a wired or wireless Ethernet connection. For simplicity and flexibility, Merlin can also be controlled directly from the front panel.

Merlin is the perfect front-end for line array systems, providing the full complement of loudspeaker management tools, such as crossover filters, parametric EQ, delay, gain and limiting.

Audio I/O

Merlin features 4 analogue balanced XLR inputs with A/D conversion performed by ultra-high quality 24-bit converters running at 96kHz with 64-bit processing. The 10 analogue outputs similarly feature 24-bit D/A converters running at 96kHz and are capable of driving lines in excess of 150 metres between control and amplifier locations.

To ensure the highest audio quality throughout, input and output converters with the same apparent technical specification were auditioned early in the design stage to select the ones which gave the most highly detailed, wide dynamic audio path. As an alternative to analogue, the inputs and/or outputs can be switched to operate in AES/EBU mode. In this mode, the outputs have a line drive capability of 100 metres, when driven in accordance with AES/EBU 110Ω source/receiver impedance and AES/EBU 110Ω cable.

Features

- 4 inputs/10 outputs - selectable analogue or AES/EBU
- U-NET control network using a CAT-5 based, fault-tolerant redundant ring
- Proprietary VU-NET software for computer control, via Ethernet. Can control up to 254 devices in a U-NET audio networked system
- 8 parametric filters on each input and output-peaking, shelving, or vari-Q HPF/LPF
- 6 to 48dB/oct crossover filters on each output
- High quality digital audio: ultra-low noise AD/DA converters with 24-bit resolution/96kHz sample rate. Better than 116dB dynamic range
- Mixed Point™ internal processing uses optimised mix of floating and fixed point processing in the signal path
- Fixed low latency regardless of processing: 2.8ms analogue in to analogue out, 3.47mS AES in to AES out
- Up to 1 second delay from input to output in 2.6μS (<1mm) increments
- Global mains operation
- Front panel interface for stand-alone use
- Analogue line drive capability in excess of 150m. AES3 line drive capability of 100m

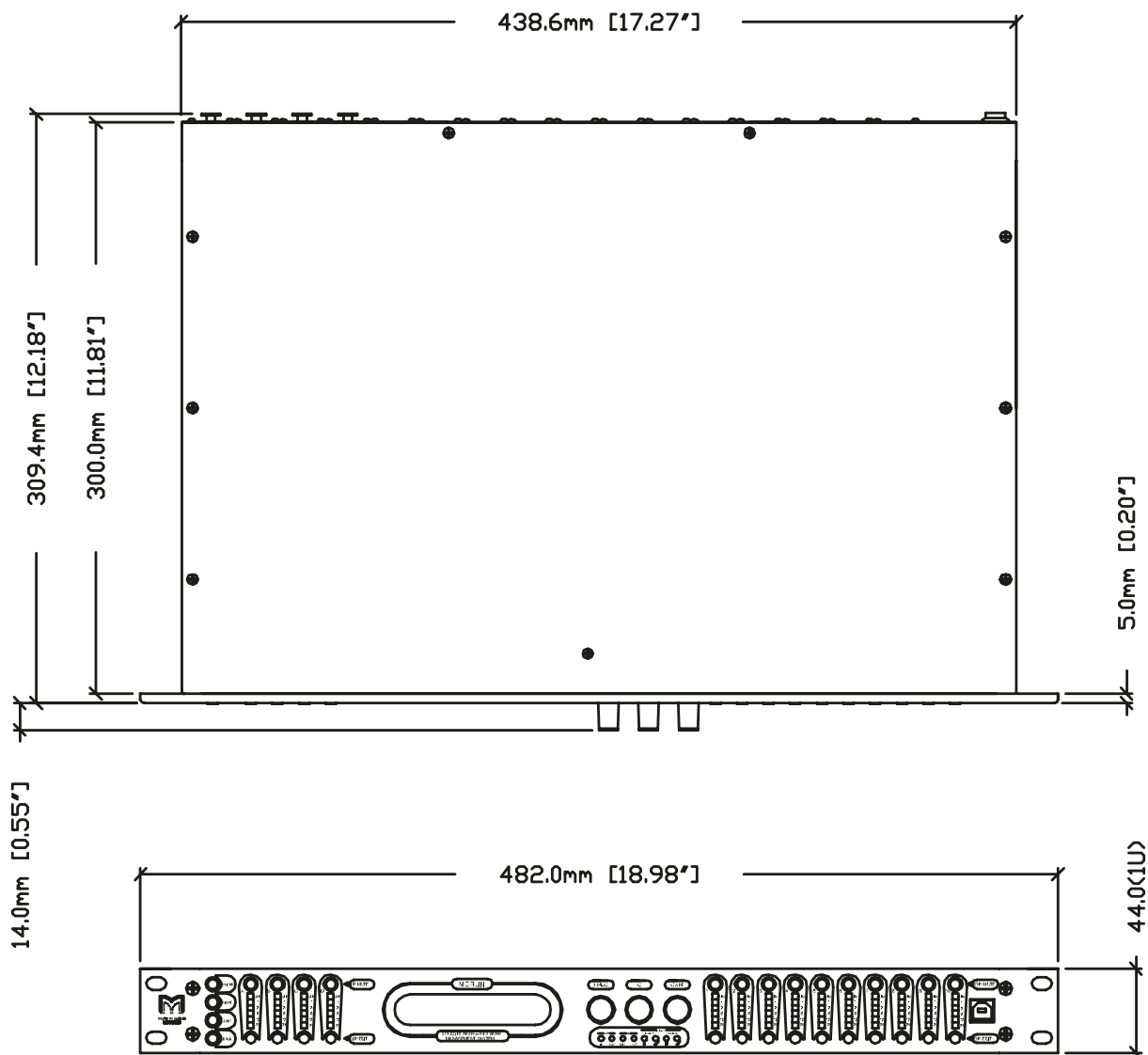
Applications

- Line array loudspeaker management
- Distributed loudspeaker system management
- Control of U-NET devices

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Technical Drawing



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Technical Specifications

INPUTS	4 electronically balanced analogue, or AES/EBU
CMRR	>67dB @10kHz
OUTPUTS	10 electronically balanced analogue, or AES/EBU
SOURCE IMP.	47Ω
MIN. LOAD IMP.	500Ω
MAX. O/P LEVEL	+22dBu
FREQ RESPONSE	20Hz to 20kHz ±0.2dB
DYNAMIC RANGE	>116dB
MAXIMUM DELAY	1 second from any input to output
MIN STEP SIZE	2.6µs (1mm)
INPUT GAIN	-40 to +6dB
OUTPUT GAIN	-40 to +15dB
PARAMETRIC EQ	8 on each input and output channel
FILTERS	
FILTER GAIN	-40dB to +15dB
FREQ RANGE	20Hz to 32kHz
FILTER Q	0.4 to 128
SHELVING	20Hz to 32kHz Hi/Lo shelf, Q 0.4 to 1
VARI-Q HPF/LPF	Q of 0.4 to 3
CROSSOVER FILTERS	
HPF	10Hz to 32kHz
LPF	10Hz to 32kHz
SLOPES	6dB/oct Butterworth, 18dB/oct Butterworth or Bessel 12/24/48dB/oct Butterworth, Bessel, Linkwitz-Riley
LIMITERS	
THRESHOLD	-10dBu to +22dBu
ATTACK TIME	0.3 to 90ms
RELEASE TIME	1,2,4,8,16,32 multiple of attack time
DISPLAY	2 x 24 character black LCD
METERS	6 LED ladder type
CONNECTORS	
INPUTS/OUTPUTS	3 Pin XLR
U-NET	2 x EtherCon®
ETHERNET	RJ45
POWER	Captive mains lead with BS1363 13A plug
MAINS INPUT	90-264V @ 50/60Hz
DIMENSIONS	(W) 482mm x (H) 44mm x (D) 310mm (W) 19ins x (H) 1.75ins (1U) x (D) 12ins
WEIGHT	4.6kg (10.1lbs)

U-NET control network

Multiple Merlin systems can be remotely controlled from a PC or wireless tablet running VU-NET control software with its intuitive graphical interface.

U-NET is a redundant ring, fault-tolerant protocol carrying control/monitoring data. Up to 254 devices such as U-NET enabled powered loudspeakers, can be linked and controlled by VU-NET. For even more ambitious systems, VU-NET can control multiple U-NET rings, each comprising up to 254 devices.

Front panel operation

As well as incorporating sophisticated networking capabilities, Merlin can also be operated as a stand-alone unit without using a computer - with front panel controls laid out to make live operation quick and intuitive. Each of the 4 input channels as well as each of the 10 output channels has a six-segment LED ladder meter, mute and edit buttons. Three high-resolution encoders perform parameter adjustments, which are viewed on the backlit liquid crystal display.

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Merlin DSP

Mixed Point™ processing – an optimised mix of floating point and fixed point processing – is used to deliver an effective 64-bit arithmetic resolution from the onboard SHARC® processor.

Merlin's processing functions include the provision of up to 1 second of delay for each input and output, in 2.6µs (<1mm) increments and many types of filtering. Each input and output has 8 parametric filters available, configurable as peaking, shelving, or vari-Q high-pass/low-pass filters. All outputs have 6-48dB/octave crossover filters of Butterworth, Bessel and Linkwitz-Riley types.

Since Martin Audio loudspeaker systems focus on correct acoustic design and involve minimal equalisation of individual acoustic elements within the loudspeaker, the main role for Merlin equalisation filters is for equalisation of the whole system.

An example of this is the overall shaping of the system response and equalisation of the various acoustic interaction effects which result from the physical presence of neighbouring enclosures within an array.

Advanced two-stage limiting on every output protects connected amplifiers and loudspeakers from being over-driven, whilst maintaining audio transparency. A peak limiter protects loudspeakers from short term overload conditions. In order to protect amplifiers from being driven into momentary clipping, a look-ahead clip limiter prevents a signal exceeding a user-defined level.

Merlin's 10 outputs also provide increased capability for the configuration and control of multi-cabinet, directional bass arrays.



Control software

VU-NET control software gives users complete visibility and control of Merlin's range of processing tools. The PC based graphical user interface is intuitive and presents the user with an easy to follow signal path. It also monitors and displays input and output signal level and limiter status in real time.



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