

# B.L ACOUSTICS – NOISE MASKING SYSTEM

The principle of "Noise Masking" involves the production of a noise that effectively competes with that recognised as a problem source, thus constituting annoyance to the recipient.

The quality of life, well being and efficiency can be vastly improved within both a working or leisure environment by the installation of the BLA-NMS, Noise Masking System to combat irritating or intolerable levels of "nuisance noise" by introducing a comfortable, private environment.

Noise Masking is essentially a method of removing a recognisable sound activity by conversion, for example:

- Speech articulation to unintelligible
- Disturbing fluctuating noise/sound to harmonious level fluctuations
- Sensitive conversation in open areas to security or privacy



The BLA-NMS Noise Masking System is unique in that it provides THE total system solution to noise masking problems by offering a philosophy of full forward compatibility with:

- A modular built unit with flexible architecture offering single to four completely independent channel operation
- Compatible with 19" rack or wall mounting
- Powered by separate amplification and loud speakers as necessary
- Configurable for Public Address/Voice Alarm interfacing and Level Control features
- Complementing Public Address/Voice Alarm systems by offering uniform intelligible sound coverage for announcements with highly intelligible results (subject to ceiling type)

## B.L.A NOISE MASKING SYSTEM - SPECIFICATION

### Amplifier performance:

Input sensitivity Public Address	Nominal – 70, -10 & 0dB
Input impedance	10K $\Omega$ (-70dB) 100K $\Omega$ (-10dB & 0dB)
Output level	Nominal 0dB
Frequency operation	
Noise input & PA input/output	30Hz to 10kHz
Total harmonic distortion	
Non-attenuated conditions	Better than 1% 1kHz

### Physical:

Material	Anodised aluminium chassis Front panel - black Rear panel/cover - clear anodised
Width	430mm
Height	44mm
Depth	200mm (behind front panel)
Weight	3kgs

### Power Supply:

AC input	230VAC +/- 20%
Power consumption	3.4 Watts
DC Auxiliary Output	Nominal 12V, 1A minimum

### Fuses:

Mains inlet	1A, 250V, 20mm HRC
Internal	Electronically self re-setting fuse 1.1A

### System Configuration:

<b>NMS-1R</b>	System controller for Articulation Control, 1U 19" Rack mounting system (inc.NMC-3 module)
<b>NMS-2-R</b>	System controller for Noise Masking, 1U 19" Rack mounting system (inc.NMC-4&5 modules)
<b>NMS-3-R</b>	System controller Noise Masking Multi-Channel, 1U 19" Rack mounting system (modules required)

### *Alternatively, above systems available in wall mounted cabinet*

<b>NMC-3</b>	Articulation Controller module
<b>NMC-4</b>	Mixer module
<b>NMC-5</b>	Digital Pink/White noise generator module
<b>NMC-6</b>	EQ7 Equalisation module
<b>NMC-7</b>	Filter module
<b>NMC-8</b>	Twin 120 Watt amplifier module
<b>NMC-9</b>	Fade up/down timer module
<b>NMC-10</b>	Gain control unit module
<b>NMC-11</b>	Remote sound sensing system microphone
<b>NMC-12</b>	VA application bypass module

***For individual module specifications please refer to additional specification sheets***

# NOISE MASKING SYSTEM SPECIFICATION SHEET

## NMC 3 – Articulation Controller Module Performance

Input sensitivity Public Address	Nominal – 70 – 10 & 0dB
Input impedance	100K $\Omega$ (-70dB) 100K $\Omega$ (-10dB & 0dB)
Output level	Nominal 0dB
Frequency operation	
Noise input & PA input/output	30Hz to 10kHz
Low pass filter option	Optional
Total harmonic distortion	
Non-attenuated conditions	Better than 1% 1kHz

## NMC4 – Mixer Module Performance

Input sensitivity Public Address	Nominal -70, -10 & 0dB
Input impedance	10K $\Omega$ (-70dB) } 100K $\Omega$ (-10dB & 0dB) }
Output level	Nominal 0dB
Frequency operation	
Noise input & PA input/output	30Hz to 10kHz
Total harmonic distortion	
Non-attenuated conditions	Better than 1% 1kHz
Tone controls:	
Bass	+/-12dB
Treble	+/-12dB
Master volume control	
Threshold level (adjustable)	
Trigger level (adjustable)	
All internal controls and settings (set on commissioning)	
Fully balanced input	
Fully balanced output	

## NMC 5 – Digital Pink/White Noise Generator Module Performance

Output level	Nominal 0dB
Frequency operation	
Noise output (as standard)	30Hz to 10kHz
High pass filter	Optional components
Pre-set output shaper	Optional components
Adjustable level output	
Adjustable clock rate and bandwidth	

## NMC 6 – EQ7 Equalisation Module Performance

Input sensitivity Public Address	Nominal -70, -10 & 0dB
Input impedance	10K $\Omega$ (-70dB) 100K $\Omega$ (-10dB & 0dB)
Output level	Nominal 0dB
Frequency operation	
Noise input & PA input/output	30Hz to 10kHz
Total harmonic distortion	
Non-attenuated conditions	Better than 0.1% 1kHz
Adjustable level output	
Centre frequencies	60Hz, 150Hz, 400Hz, 1kHz, 2.4kHz, 6kHz, 15kHz
Range	+/-12dB
Cascade	+/-24dB – Max

## NMC7 – Filter Module Performance

Input sensitivity Public Address	Nominal -70, -10 & 0dB
Input impedance	10K $\Omega$ (-70dB) 100K $\Omega$ (-10dB & 0dB)
Output level	Nominal 0dB
Frequency operation	
Noise input PA input/output	30Hz to 10kHz
Total harmonic distortion	
Non-attenuated conditions	Better than 0.1% 1kHz
Adjustable output	
Pre selectable filter usage	
Cascade facility	

## NMC8 – Twin 120 Watt Amplifier Module Performance

Input sensitivity Public Address	Nominal -70, -10 & 0dB
Input impedance	10K $\Omega$ (-70dB) 100K $\Omega$ (-10dB & 0dB)
Output level	Nominal 0dB
Frequency operation	
Noise input PA input/output	30Hz to 10kHz
Total harmonic distortion	
Non-attenuated conditions	Better than 1% 1kHz
Adjustable output	
Low impedance output	8W (or option 100V line output)

## NMC9 – Fade Up/Down Timer Module

Input sensitivity Public Address	Nominal -70, -10 & 0dB
Input impedance	10K $\Omega$ (-70dB) 100K $\Omega$ (-10dB & 0dB)
Output level	Nominal 0dB
Frequency operation	
Noise input PA input/output	30Hz to 10kHz
Total harmonic distortion	
Non-attenuated conditions	Better than 1% 1kHz
Adjustable attack time	} Remote Monitoring
Adjustable level output	}
Adjustable fall rate	}
Optional day / night time module	}

## NMC10 – Gain Control Unit Module Performance

Input sensitivity Public Address	Nominal -70, -10 & 0dB
Input impedance	10K $\Omega$ (-70dB) 100K $\Omega$ (-10dB & 0dB)
Output level	Nominal 0dB
Frequency operation	
Noise input PA input/output	30Hz to 10kHz
Total harmonic distortion	
Non-attenuated conditions	Better than 1% 1kHz
Adjustable attack	
Adjustable fall rates	
Adjustable level set	

## NMC11 – Remote Sound Sensing System Module Performance

Input sensitivity Public Address	Nominal -70, -10 & 0dB
Input impedance	10K $\Omega$ (-70dB) 100K $\Omega$ (-10dB & 0dB)
Output level	Nominal 0dB
Frequency operation	
Noise input PA input/output	30Hz to 10kHz
Total harmonic distortion	
Non-attenuated conditions	Better than 1% 1kHz
Adjustable level setting	
Adjustable response	
Adjustable refresh times	
Averaged sound monitor levels	
Interrogation means	

# IMPLICATIONS OF COMBINED N.M. AND PUBLIC ADDRESS SYSTEMS

It is common knowledge that a PA systems needs are considered the reciprocal to the needs of a N.M. system. The combining of these two system types, often under engineered, forces it to function with poor overall results.

## Frequency response of PA system Voice / Music

The response is limited to Mid to Hi frequency responses for voice systems to get the most power out of the loudspeaker and amplifier combination. The Music is often low sound level background music (BGM) that only extends the low frequencies marginally.

## Loudspeaker performances

Loudspeakers are very different between LOW/MID to Hi frequencies and provide a typically steady increase in directivity above 2kHz.

## Frequency response of N.M. system

The N.M. systems require far more sound energy at low frequencies to not be disturbing and yet effective, (dependant on the task).

## Frequency response of a combined system

When combining the system we use controllers that silently introduce frequency response change.

### Think about this.....

We have to acknowledge important factors and accentuate the positive in both.

PA systems require directional sound, usually due to the reverberant environment, so we should avoid masking for a reverberant environment.

The N.M. system requires evenly distributed, un-discernable directivity of sound. This is to give no clues to the systems existence. This is achieved in many different ways, but must always be considered as a system that can be directionally recognized will heighten complaint, effectively lowering the level it can comfortably work at, and be less efficient in it's objective.

If we provide a wide dispersion Omni-directional loudspeaker at most frequencies, we can further distance the loudspeaker by facing upwards and it will still have a wave front radiating from it. As long as the room below is not reverberant we can expect intelligible sound to evenly emit from the ceiling. Ceiling tiles have an effect on the high frequency response and need further adjustment and consideration for the overall design.

Often, using traditional loudspeakers provide directional output at high frequencies and will instantly be at a disadvantage.

## Noise Types

**Pink or White.** Probably the least important to be specified, the traditional systems use white random noise to produce the basic hissing noise and tailor the system to provide cut and boost at appropriate frequencies. We provide a noise generator with band limited responses. This then fields a stable signal with anti-bottoming out circuitry giving a pleasant linear output.

## Fade In and Fade out

We have identified the importance of keeping the masking systems identity / existence low profile and fade in / fade out reduces the noise content for the announcement and then slowly increments back to the 'as before' condition.

## Voice Alarm Applications

The N.M. system is muted for any VA announcements, allowing the best environment for intelligible announcements.

## Occupied / Unoccupied areas

If you were the last man in the office and the system was responding to compete with a different scenario, i.e. half or full room and associated noises, you would soon latch on to the noise masking being an annoyance. To overcome this regular factor, we have noise sensing microphones that listen to the area and report back the noise being produced by the occupant (partially removing its own noise source to heighten the response). This information is then used to slowly adjust the noise level to optimize against the intended use of the system.