MiniSonic Mic Kit

User Manual

First Edition
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Contents

1 Introduction

The MiniSonic Mic Kit brings the precision, clarity and low noise performance of measurement microphones to your audio recordings.

The precision calibration of the microphones allows for both close miking and A-B stereo (spaced pair) recording. With quality accessories such as the custom made pop-shield and lapel clip and the adapters for mounting the mics on musicians' mic stands you're prepared for recording everything from guitar and drums to location sound and interviews.

The custom designed adapters for connecting the preamp to HDSLR cameras and camcorders mean that your videos can now sound as good as they look.

The optional stereo camera microphone attachment allows for high quality audio recording out and about.

Options for connecting the kit to your iPhone or iPad mean that you can produce fantastic sounding recordings and videos without investing in expensive equipment.

Congratulations! Now your recordings will sound fantastic.

2 Microphones

2.1 MM4

The MM4 microphone is a high-quality omni-directional electret mic. It runs off 5v power provided by the preamp and has been calibrated by placing resistors in the 3.5mm jack so that each microphone outputs -30dBu for 100dBSPL (+/-0.5dB). This means that every MM4 microphone is well matched to every other MM4, which is important for two reasons: firstly it ensures a well balanced stereo image on stereo recordings and secondly, it standardises the mics. This means that one MM4 can be substituted for another without worrying whether they have different sensitivities. It also has the benefit that you can make accurate measurements in test and measurement applications.

2.1.1 Setting up with an MM4 Mic

The MM4 is supplied with the cable wrapped around a purpose-made cardboard holder. This is not just any cardboard – this is purpose-made Lindos cardboard. Keep it forever and your cable will always be tidy.

Unwind just the necessary amount of cable to reach from the preamp to a mic holder or lapel clip and leave the rest on the cable tidy. As an alternative a number of tie-wraps are also supplied (located in the front recess underneath the left-hand microphone), which offer a more discrete option for use on video. Remember to wind the mic from the jack end

back onto the cable tidy after use, otherwise you'll have to unwind the whole cable before you can get to the mic.

If you're using mic stands set them up and the preamp before plugging the mics in. This minimises the chance of tripping over the leads or moving a mic stand beyond the reach of the cable and damaging either the mic jack or the preamp. Try to place the cables under a mat or piece of carpet or in busy environments use gaffer tape to secure the cables to the floor.

The microphones plug into either of the 3.5mm jack sockets on the rear of the MP1 preamp.

2.2 VM1 Camera Mics

The VM1 camera mics allow you to enter any environment without set-up and simply point and shoot, capturing fantastic stereo or mono sound.

The VM1 uses the same microphone capsule as the MM4. They are also calibrated to +/-0.5dB ensuring a well matched pair for stereo recording.

See section 6.2 for more detail on how these mics capture a stereo image.

2.2.1 Rotating and Extending the VM1 Mics

The camera mics are telescopic; to extend the mics out, pull gently on plastic surrounding.

The VM1 mics rotate through 180 degrees. This combined with the telescopic action allows them to fold neatly against the preamp when your camera is in its carry bag.

For stereo recording the mics should be spread at an angle of approximately 120 degrees and extended fully to give around 35cm of separation.

To record in mono, bring both arms together until they are touching. Alternatively you can turn your stereo into a mono recording by only using one of the channels in post-production.

See section 5.2 for details on fitting the mics to your Camera Adapter.

You can use just one of the VM1 mics and an MM4, which may prove useful for interview work. The mic on the VM1 can be rotated to point at the camera operator while the leaded mic runs to the interviewee for clipping to their shirt with the lapel clip. See section 7.2.1 for more information.

2.3 MM5 High Level Microphone

The MM5 has been designed for extremely loud recording environments. It looks exactly the same as an MM4 expect it has an orange band at both the mic and the jack end. It has the same frequency response as the MM4 (20Hz – 20kHz), but has been designed to cope with levels up to +148dBSPL. It is calibrated 20dB down compared to the MM4 such that it outputs -50dBu for 100dBSPL.

The main application of this mic is for the close miking of drums, particularly the bass drum, which typically produces levels in excess of 135dBSPL. Close miking of a snare drum can produce levels in excess of 142dBSPL.

The MM5 connects to the MP1 preamplifier in the same way as the MM4 and the gain switches still operate in 10dB steps. With the switch in the middle position the MM5 will clip at +138dBSPL, in the top position +148dBSPL and in the bottom position +128dBSPL.

3 Accessories

3.1 Attaching a Mic to a Mic Holder

The mic holders are located underneath the right hand microphone in the box and they enable a 7mm microphone to be attached to a standard musician's mic stand. They are best used with a 22mm stand clip, but larger clips will work.

Push the mic into the front of the mic holder and lay the cable in the slot. Holding the holder in one hand the cable in the other, pull gently so that the mic slides back into the foam and the cable clips into the slit in the foam at the back of the mic holder.

To remove, lift the cable out of the slit at the back of the holder and remove the mic from the front.

3.2 Attaching the Pop Shield

To remove the pop-shield from the box you first need to remove both mics and both mic holders. The pop-shield will then slide upwards and out of the box. To attach it to a mic holder, place the wire diamond shape over the end of the holder and push until you hear a click. To detach the pop-shield pull forwards in the opposite direction. Try to avoid pulling

downwards as this will splay the wires apart, but you can always bend them back into place if you need to.

3.3 Lapel Clip

The lapel clip (included with the MiniSonic Mic Kit) is stored with the windshields in the box in the rear recess underneath the left-hand microphone.

The clip locates on the groove half way along the microphone.

This is ideal for interviews and mounting the mic in awkward places, like on a violin for example.

Using two lapel clips it is also possible to record binaural recordings by clipping two mics to your ears or glasses (see section 6.2.3)

3.4 Windshields

The MiniSonic Mic Kit comes with two windshields. Located in the rear recess underneath the left-hand microphone the windshields will fit onto an MM4 or MM5 microphone or onto a VM1 camera mic. They serve two purposes: firstly they provide reasonable protection in windy conditions, and secondly they can be used in conjunction with a pop shield to provide extra protection against pops and hisses on vocal recordings. See section 7.1.2 for more details.

4 MP1 Preamplifier

The low-noise Lindos MP1 preamplifier provides power to the microphones and calibrated gain adjustment in 10dB steps. This ensures that the levels from both mics are well matched for stereo recording. The MP1 outputs at a professional line level making it suitable for professional studio environments.

4.1 MP1 Mounting Accessories

When the MP1 is purchased as part of the MiniSonic Mic Kit it is supplied with a belt clip and two stand clips. These are located underneath the preamp. If you purchase the optional camera mics these are supplied with ¼" 30mm hot shoe mount (suitable for most cameras and camcorders) that is located in the front recess underneath the middle microphone.

Note that whichever accessory is fitted, the preamp will still fit in the box. When using the belt clip place the stand clips in the foam recesses underneath the belt clip on the left and right.

4.1.1 Attaching the Stand Clips

Remove the stand clips and two M3 screws from the box. Place the preamp face down, push a screw through the hole in one of the stand clips

and locate your screwdriver in the head of the screw. Place the clip onto one of the mounting points on the back of the MP1 and locate the screw. Turn the screwdriver first anti-clockwise until you hear a click. At this point the start of the screw thread is at the start of the thread on the bush. Turn clockwise until tight and repeat for the other clip.

4.1.2 Attaching the Belt Clip

Remove the belt clip and one M3 screw from the box. Place the preamp face down. Push a screw through the holes in the belt clip and locate your screwdriver in the head of the screw. Place the clip onto the top mounting point on the back of the MP1 and locate the screw in the bush. Turn the screwdriver first anti-clockwise until you hear a click. At this point screw threads are aligned. Turn clockwise until tight.

4.1.3 Attaching the ¼" Hot Shoe Adapter

The Hot Shoe Adapter has two locking wheels. One locks the adapter into the Hot Shoe and the other locks the adapter to the preamp. First screw the Hot Show Adapter into the ¼" hole on the back panel of the preamp. Four or five turns is all that is necessary. Please note that if you screw more than 20mm of rod into the preamp or push something into the hole you could damage the electronics as the bush is not capped and the main PCB is located above.

While holding the hot shoe slightly off parallel to the edges of the preamp, tighten the locking wheel up against the base of the preamp. Tighten the last bit by turning the hot shoe itself so the it becomes parallel with the preamp.

The lower wheel is to lock the adapter into your camera's hot shoe.

4.2 Battery Power

The MP1 is supplied with a PP3 battery located under the preamp in the spare battery compartment in the box. When sold separately the battery will already be in the drawer.

To open the drawer put your thumbnail in the slot (shown on the right of the picture) at the bottom of the battery holder and slide the plastic upwards. The drawer will pop forward so that you can pull it out.

Remove the protective strip from the battery, insert the battery into the drawer and replace in the MP1.

4.3 Mains Power

You can use any external power supply capable of providing between 6V and 14V to power the MP1, though be aware that the noise performance may be compromised and that our specification is quoted with our recommended power supply (available from our website, part MAINS1). In practice though even if 6dB of noise is added by the power supply the preamp noise will still be less than the electrical noise from the microphones on the highest gain setting.

When mains is connected the On/Off switch is bypassed and the preamp is always on.

4.4 Turning On

Slide the On/Off switch to the On position to turn the preamp on. A standard alkaline PP3 battery will last for approximately 35 hours. After 15-20 hours the middle triangular LED will light up indicating half charge. With approximately 6 hours left the low battery LED will turn on. When this starts to flash you have between 1 and 2 hours left. The LED will flash faster as the runs out. The LEDs turn off at 5.2V but the preamp may still function. It is not recommended to continue using the preamp at this point as headroom may be compromised.

4.5 Choosing the Mic Gain Setting

The L and R switches on the preamp control the preamp's gain. The lowest position is the most sensitive and the scale indicates the sound pressure level at which the preamp will overload. In the bottom position this is 108dBSPL and you should use this setting for recording acoustic guitar, speech and other quiet sounds. The middle setting is appropriate for acoustic bands, close miked vocals and parties, while the top setting is reserved for loud sounds - bands with drums, clubs, gigs etc.

4.5.1 Clipping Lights

If one or both of the clipping lights turn on then the preamp is overloading and you need to change the range. Slide the switch forwards to the next range.

If you've selected the least sensitive range (+128) and the lights are still coming on then you're in a very loud situation (you should probably consider wearing ear protection). If the lights are only coming on occasionally just on the peaks (when recording a live performance for example) then the recordings will more than likely still sound fine and you wont hear any distortion when listening back. If you need to capture the high levels from a close miked bass drum, saxophone or a very loud band then consider purchasing a Lindos MM5 high level mic. This has the same frequency response as the MM4, but has been designed to cope with levels up to +148dBSPL. It is calibrated 20dB down such that it outputs -50dBu for 100dBSPL.

4.6 The UniSon System

The MP1 outputs on a 9-way UniSon connector which allows two balanced channels to be connected using less space than two XLR sockets would. It also allows both channels to be carried down a single cable which keeps cabling neat and minimises tangles. This is especially helpful for video work. If you're in a recording studio that's wired for XLRs, then simply breakout straight to XLRs using LEAD6 and connect using standard XLR leads.

For those of you who like the idea of neater cabling the following breakout cables are available from Lindos:

LEAD4 - UniSon to UniSon lead

5m UniSon to UniSon lead. Extends a breakout lead, useful for most recording situations.

LEAD5 - UniSon to 1/4" jack lead
1.5m stereo female UniSon to 1/4" balanced jack lead. For connecting the MP1 to sounds cards and mixing desks.

LEAD6 - UniSon to XLR lead
1.5m stereo female UniSon to male XLR lead. For connecting the MP1 to sounds cards and mixing desks.

LEAD7 - UniSon to 3.5mm jack lead
1.5m stereo female UniSon to 3.5mm jack lead for connecting the MP1 to a computer sound-card.

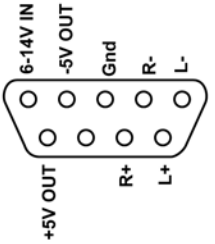
LEAD8 - 1.5m stereo female UniSon to phono lead.

LEAD9 - UniSon to XLR lead
1.5m stereo male UniSon to female XLR for connecting mixing desks and other professional audio outputs to a Camera adapter

Please contact us if you require a different connector, or (if you have the know-how and equipment) wire one yourself…

4.6.1 Wiring Your Own Leads

Connections are shown on the right. For single-ended connectors connect Gnd, R+ and L+ only. For a balanced connection connect Gnd, L+, L-, R+, R-. The output is centre-grounded and has a source impedance of 10ohm.



The 6-14V, -5V and +5V connections are there for use by future products. The 5V regulator can provide up to 150mA and the preamp consumes 20mA.

4.7 Connecting to your Recording Device

The preamp outputs at a professional line level up to +18dBu, which means that if you're using professional recording equipment with a professional interface then you can simply plug in using the XLR or 1/4" Jack leads and you're ready to record.

To record to a HDSLR camera or a camcorder you can use one of our Camera Adapters (see section 3 for details) and connection to an iPad or iPhone is discussed online at:

www.lindos.co.uk/microphones/phone

4.7.1 Connecting to non-professional equipment

This requires a little more caution as the device may not be able to handle professional levels. This means that its inputs may clip on high levels. There is no standardisation within the consumer industry on levels but tests have shown that most consumer sound-cards/hand-held recorders will cope with up to +8dBu. To solve the problem we offer a 10dB attenuator lead that links between the preamp and the breakout cables for interfacing to consumer equipment. Part number is AD-10.

If you need to use a piece of equipment that does not supply a specification for its maximum input level then the only real solution is to test its performance before including it in the recording chain. Lindos offers various pieces of audio test and measurement equipment, and the MS20 is ideally

suited to this task. Capable of evaluating a two channel system in terms of frequency response, phase response, headroom, noise, distortion, crosstalk and delay in less than 30 seconds, it can also sit in the recording chain providing a two channel PPM (Peak Programme Meter) for level monitoring, adjustable level headphone monitoring and precision gain control in 1dB steps.

If you don't think your application warrants investing in an MS20 but you would still like to have your equipment tested, then please contact us about our testing service.

A good resource to consult before purchasing new equipment is our Test Results Database; this contains test results for everything from speakers and iPods to sound-cards and microphones.

Visit http://www.lindos.co.uk/SOURCE=Results.

5 Camera Adapters

The camera adapter can either be connected directly to the preamp (for mounting the VM1 camera mics to) or to the end of LEAD4 (5m UniSon to UniSon LEAD). When used this way you are free to move while the camera is connected to the preamp on a mic stand.

5.1 Attaching the Preamp to a Camera

First, plug the camera adapter into the nine way UniSon connector on the preamp. The mics can be mounted either way round, as can the preamp on a camera, but we recommend mounting the preamp with the battery compartment facing forwards in the same direction the camera's lens. This minimises intrusion over the viewfinder on most HDSLRs. Fit the Hot Shoe Adapter as described in section 4.1.3 to the preamp and then slide the hot shoe adapter on to your camera's hot shoe mount. Tighten the wheel against the hot shoe to fix the preamp in place.

5.2 Attaching the VM1 Camera Mics

With your camera on a flat surface, hold the preamp in one hand and slide the VM1's bracket over the UniSon connector. Press down so that the foam compresses and slide the bracket further until it is flush with the edge of the UniSon connector. Take care to plug the left mic into the left

channel and the right mic into the right channel on the preamp.

5.3 Connecting to the Camera

Plug the jack to the mic input on your camera and read the instructions that came with your camera adapter for details on optimal settings for your specific camera model. In general though, turn AGC and wind filtering off, set minimum gain and check the levels are coming through on the camera's monitor bars by tapping the mics gently or clapping.

Take care not to catch the jack as this could damage your camera's mic input. When using the adapter connected to a 5m UniSon lead use one of the tie wraps to secure the cable to your tripod or shoulder mount. Attempting to secure the adapter to a steady cam is possible but challenging as the spring of the cable tends to upset the steady cam's balance.

5.4 Headphone Monitoring

Headphone monitoring is available as an optional extra for all our camera adapters. It is designed for use with low impedance headphones (100 – 200ohm). Very low impedance ear buds will not work well and high impedance headphones will sound quiet.

You can measure the impedance of your headphones by connecting a ohm meter between the screen and either the ring or tip on the 3.5mm jack.

6 Microphone Placement

There are several options for placing your microphones, giving a variety of great effects. They fall into two categories: close miking and stereo miking.

6.1 Close Miking

As the name suggests this technique involves placing the microphone(s) close to the sound source. This means that maximum sound energy is being converted to electrical energy at the mic, which has two benefits:

- It ensures that the mic's output is high compared to the electrical noise from the microphone
- It minimises the pick-up of reflected sound from the room's walls and ceiling

In many situations this is the best miking option, giving crystal clear, uncoloured recordings.

Refer to section 7 for information on the close-miking of a range of different instruments.

6.2 Stereo Miking with Omnis

Stereo miking provides a way to recreate the position of sounds on a recording. There are two basic mechanisms by which a stereo image can be created using two speakers:

1. The sound can be reproduced louder from one speaker than the other.

2. The sound can be reproduced at slightly different times from one speaker than the other. This time delay produces phase differences that the human ear can detect and use for location.

6.2.1 Narrow Spaced Omnis

A-B Stereo or Spaced pair miking uses two spaced omni-directional mics to capture a stereo image. With a small distance (15-60cm) between the two microphones the primary stereo effect captured is the difference in time of arrival at the two mics. (Using a wider spacing will increase the contribution of amplitude differences as one mic will be closer to some sound sources than the other).

The human ear interprets time differences between the two ears and uses them to locate low frequency sounds (25Hz - 700Hz). Reproducing these delays enables the listener to "capture the space" in a recording, and experience a stereo image. Above 700Hz the phase information becomes increasingly unreliable and the brain concentrates more on level differences and the transfer function of the pinna (the outer part of the ear) for positioning cues. For accurate phase capture the time delay must be smaller than the wavelength of the highest frequency you wish to reproduce phase information for, because phase shifts greater than 360 degrees will cause the frequency to flip from one side of the sound image to the other.

Therefore to maintain accurate phase up to 1kHz (above which the level information has a far greater precedence than phase), the maximum delay between the channels should be is 1.0ms and therefore an **optimal spacing of 35cm.**

There are two other factors however:

1. The brain is used to interpreting phase differences based on a separation distance of a head's width. If it identifies this separation the brain will engage an extra level of interpretation. Smaller distances comparable to a head

width (15-20cm) are often used and are worth exploring, especially for binaural recording - see section 6.2.3 for details. Using the VM1 camera mics without extending the telescopic part gives this separation distance

2. At first sight time delayed stereo relies on the listener being positioned centrally between the two playback speakers, otherwise a small movement of the head will cause the phase differences to be drastically altered. This is true, but the human auditory system exhibits something called the precedence effect, which means that if the same sound signal arrives time delayed at a listener from different directions, only the direction of the first arriving sound signal is perceived. It is an important tool for filtering out echoes in everyday conversation. The precedence effect is most apparent on delays of around 14ms (5m), but a 1ms (35cm) delay will still produce approximately a 3dB perceived attenuation of the delayed signal and this helps to provide positioning cues to the brain even when the phase information is muddled.

6.2.2 Wide Spaced Omnis

When the mics are placed further apart, the time difference information is still captured but the frequency at which phase difference exceeds 360 degrees will lower. The stereo positioning in the recording will become increasingly effected by the proximity of the mics in relation to the sound sources. The further apart the mics are the more this comes into play. Note that level differences provide a much more solid image in stereo as the listener's position between the speakers is not so critical. Also, the greater the spacing the greater the delay and the more precedence effect will come into play. A 2ms delay gives a 6dB precedence, which is a doubling of perceived loudness.

In general most engineers will choose a **spacing of between one third and a half of the sound stage**.

The reality is that the science of spaced omni recording is not fully understood. In any given set-up there will be a combination of proximity, precedence and phase effects which are difficult to anticipate. Placement is important: familiarise yourself with the information above, but above all experiment. The more techniques you try the greater a sense of intuition you'll develop.

Generally the results are very impressive: spaced techniques allow the engineer to take advantage of the inherent quality of omnidirectional microphones in stereo recordings, particularly their extended and even low-frequency response, and their smooth off-axis pick up. The only problem to be aware of is the potential for comb-filtering effects when spaced microphones are combined in a mix, and the more the mics, the worse the effect is likely to be, although it is very hard to predict the audible results. This is not a problem so long as the mics are panned hard left and right, but attempting to mix the channels may cause problems. A good option for mono broadcast requirements is to use one channel from the recording or arrange both mic to be in the same position (with the camera mics they can be rotated until they meet and point forwards).

6.2.3 Binaural Recordings

Binaural recording is a method of recording sound that uses two microphones, with the intent of capturing 3-D stereo positioning information. This effect is often created using a technique known as "dummy head recording", which uses a mannequin head with a microphone in each ear. Binaural recording is intended for replay using headphones and will not translate properly over stereo speakers.

We do not currently offer a dummy head as part of our product range, but a similar effect is achieved by using two lapel clips and clipping the mics to the ends of glasses. If you're really keen you could put the mics in your ears, but we don't recommend this!

Binaural recordings are extremely realistic, capturing not only the attenuation effects of the head on high frequencies, but also the transfer function of the pinna. Unfortunately because replay is limited to headphones binaural recordings are of limited commercial use.

6.3 Room Acoustics

Recording with microphones will always capture a degree of the room's response. Being omni-direction, our mics will pick-up more room than unidirectional mics. This combined with the fact that they have an extended bass response compared to most unidirectional mics means that the room's acoustics are of particular importance.

Stereo recording techniques using omnis are best suited to anechoic/semi anechoic studio environments and rooms with a nice acoustic. If your recordings are sounding boomy on a particular note then there's probably a room resonance at that frequency. The smaller the room the higher (and more intrusive) the resonant frequencies will be. Various acoustic treatment options are available from self install kits with bass traps and acoustic panels to specialist firms who will test and treat a room for you. Or, there's always the DIY option of covering the room in eggs boxes or hanging duvets on the walls!

Recording in a very echoic space (like a church) can produce results with an exaggerated room presence. This is because the ear is directional to high frequencies and therefore picks up less reflections from the rear than an omni will.

7 Applications Advice

7.1 Music Recording

7.1.1 Classical or Acoustic Guitar

Does the guitar sound right for the music you're recording? Do any of the frets buzz? When were the strings last changed? Is it in tune? Is the guitarist wearing anything that could knock against the guitar while they're playing? These questions may sound obvious but it's important to consider them before each recording session.

When it comes to mic placement, tests have shown that placing one mic around 20-30cm from the guitar with the capsule aimed at the point where the guitar's neck joins the body works well. This produces a well-balanced sound with about the right levels of sound from the neck, body, strings, sound hole and the room.

Pointing directly at the sound hole produces a bassy sound and is to be avoided for studio recording. In general, moving the mic further towards the neck will brighten the sound, while moving closer to the sound hole will add bass. Moving the mic further away from the guitar will increase the proportion of room acoustic and the relative level of electrical noise from the mic, while moving in will reduce the contribution from the guitar's body and the room giving a dryer sound - this can be useful in small rooms with a poor

acoustic as you can always add reverb afterwards. That said, be aware of room resonances in small rooms as they can be more intrusive on recordings than with larger rooms. If you hear bass notes popping out of the recording - treat the room or hang some duvets on the walls! See section 4.3 for more information on room acoustics. For a more in-depth look at mic placement we recommend reading Paul White's excellent article in Sound On Sound magazine entitled 'Recording Acoustic Guitar'.

7.1.2 Vocals

The MiniSonic Mic Kit comes with two important accessories for the singer, a pop-shield and a windshield. When a singer sings hard consonants like 'p' or 'k' a short, fast burst of air is created. If this rush of air contacts the diaphragm of a microphone directly it creates a popping sound and ruins the recording. The pop shield breaks up this air flow without colouring the sound and protects the mic's diaphragm. For particularly loud/expressive singers you may also need to use the foam windshield as extra protection. Tests have shown that foam shields used directly add a hissing sound as the air passes through the foam, but by first softening the initial impact using the pop screen before passing it through the foam windshield this is avoided completely. This combination provides very effective protection against plosives and sibilants without compromising frequency response.

7.1.2.1 Choirs and Quartets

Spaced omni recording is ideally suited to the recording of choirs, capturing the voice and room with clarity and purity and a natural sounding stereo image. In general a wide spacing is to be preferred, between one third and a half of the sound stage. Using the MM4s in mic holders on

microphone stands allows to this. Try to match the height of the mic stand to mouths of the singers and space the mic stands approximately half the separation distance away from the front of the sound stage.

Close harmony groups can be recorded in the same way, though the small group allows for other techniques to be tried as well. Consider arranging the singers in a circle (as they often practice this way) and hang a single mic in the middle. You could also consider hanging a pair of camera mics with a 35cm spacing in the centre of the group. To do this connect a 5m UniSon to UniSon lead to the preamp and fit the camera mics onto the UniSon connector. Hang the preamp and mics carefully by the UniSon lead from a mic stand or pole. Extend the mics and angle them to give 35cm of separation above the singers. This captures a lovely viewpoint, sounding as if you're right in the middle of the group.

7.1.3 Drums

Coming soon!

7.1.4 Amplified Instruments

A guitar or bass cabinet is essentially a loudspeaker. A single loudspeaker is directional and displays different frequency characteristics at different angles and distances. On-axis placement at the centre of a speaker produces maximum treble, while off-axis or edge placement of the microphone produces less treble giving a duller sound. Cabinets containing more than one driver unit require further consideration because of the potential for cone filtering when close-miked.

Generally the musician's preferred sound develops at a distance away from the speaker. However, the most common approach is to close-mic off-axis with the centre of the cone. This is a habit developed from live sound miking techniques. In the live sound environment, most audio sources are close-miked using unidirectional mics to reduce the potential for feedback and off-axis pick-up.

In the recording environment, the loudspeaker cabinet can be isolated and miked from further away to capture a more representative sound. By using both a close and a distant (2-4 feet) mic placement at the same time, it is possible to record a sound which has a controllable balance between “presence” and “ambience”.

Placement of loudspeaker cabinets is also important. Putting the cabinet on carpets reduces the treble, while raising them off the floor reduces bass.

Open-back cabinets can be miked from behind as well as from the front. The distance from the cabinet to walls or other objects can also vary the sound. Most importantly, move the instrument and the mic(s) around until you achieve something that you like.

7.1.5 Other Instruments

Wind, brass and other stringed instruments can all be recorded using MiniSonic Mic Kit. The lapel clip may prove useful for fixing the mic to a violin, saxophone or other instrument.

Currently our experience with some instruments is limited, so please share your experiences with us either by emailing info@lindos.co.uk or via Facebook.

You may find that a particular third party accessory helps to mount the mic to your instrument or have recording tips. Please let us know so that we can pass on your knowledge to others.

7.2 Video Use

7.2.1 Interviews

There are a number of different options for interview work:

1. If the camera operator is the interviewer, rotate one of the VM1 camera mics to point at the camera operator and point the other mic at the interviewee.

2. Use one VM1 camera mic and one MM4 leaded mic with a lapel clip.

3. Use two leaded mics both with lapel clips on both the interviewer and the interviewee

4. Consider hanging an MM4 in the middle of the room using a suitable mic stand. STAND2 is ideal for this purpose as the boom extends to 1m and the height to 1.8m. This technique can also be combined with another mic either hung, on a lapel clip or on top of the camera.

To minimise camera noise on the recordings use the highest gain setting on the preamp (+108).

Consider using the windshields and/or the a mic holder and pop shield to protect the mics from plosives.

7.2.2 Videoing Live Music

7.2.2.1 VM1 Camera Mics

The MiniSonic Mic Kit is ideal for capturing any form of music performance. Using the VM1 camera mics you can enter any environment without set-up and simply point and shoot, capturing fantastic stereo sound.

Since the VM1 captures the stereo positioning of the sound sources, the mics will be capturing the sound from the perception of the camera operator. This means that if you turn away from the sound stage with the camera, to film the audience for example, the sound will be heard to pan round to some degree. Because the mics are omnis (like our ears) this actually creates a very realistic effect – especially on headphones.

When recording an acoustic band the sound is coming directly from the instruments; as you turn around the location will be heard to move from one side to other. However, most gigs are amplified through a mono PA in which case turning around will have minimal effect as both speakers are producing the same sound.

(In fact, omnis have a better frequency response from behind than our ears, because when we turn to face away from a sound source the high frequencies are attenuated by the pinna.)

Using the VM1 Camera Mics in Mono Configuration
Angling the mics together to point forwards ensures that the same signal is received by both mics. This may be useful for some broadcast situations were the material is to be broadcast in mono. An alternative solution for avoiding

possible cone filtering problems is to use just one audio channel in the edit.

7.2.2.2 MM4 Mics and Accessories

Mount the preamplifier on a mic stand and connect to the camera via a 5m UniSon to UniSon lead and camera adapter. This allows you the freedom to move around whilst still capturing studio quality audio to the camera.

The balanced output allows multiple 5m leads to be daisy chained without compromising the signal.

Signal splitters are also available from Lindos for feeding the output of the preamp to multiple devices. For example one output could connect to a camera and the other to a portable audio recorder.

7.2.2.3 Multi Cameras, Mixers and Multi Mics

Using multiple preamplifiers allows for the close miking of more than two sound sources. Consider the recording of a typical band with a singer, guitarist, bass and drums. With six mics a comprehensive recording set up is achieved, one for vocals (with pop-shield and wind-shield), three on the drums (two overheads and a high-level MM5 on the bass drum), one for the guitar amp and one for the bass amp.

At this point there are a number of options. Using a basic mixer provides a mixed feed to the musicians via headphones and to your recording device. This limits the options in post-production so it is vital that you spend time balancing the levels well before recording.

If you have multiple recording devices (camera, iPhones, Audio Recorder) or multi-channel recording devices (e.g.

sound-card) then take each stereo pair through a mixer to its recording device. Use the mixer to provide headphone monitoring to the musicians.

If you need to provide PA monitoring to the musicians then you can still close-mic the guitar, bass and drums, but it may be necessary to substitute the vocal mic for a directional cardioid type to minimise feedback. It all depends on how loud the singer needs his or her vocal monitoring to be. DI-ing the guitar and bass into the mixer is also an option.

LEAD9 provides the necessary male UniSon to female XLR connections for connecting a mixer's output to a camera adapter.

7.3 Sound Reinforcement (live use)

Using omnis in live-sound applications is not for the faint-hearted, but it’s not impossible. The rejection of spill (and room reflections) from the PA is the major challenge, but if the mics and PA can be well separated, and if the PA has a tightly controlled radiation pattern (with minimal reflections getting back to the stage) across the entire frequency range, then omnis can be used.

Use as drum overheads and bass drum miking has proven to work well; since the drums are generally the loudest instrument in a live band situation, less gain is needed at the mixer and the potential for feedback is reduced.

8 Specifications

8.1 MM4 and VM1 – Microphones

Frequency response: Typically ±2dB, 20Hz-20kHz (±1dB 40Hz-15kHz)

Sensitivity: -30dBu (±0.5dB) out for 100dBSPL at 1kHz (12mV/PA)

Noise Level: 36dBSPL 468-weighted, 24dBA(SPL) typical

Clipping Level: 130dBSPL (Distortion: -32dB 468-weighted)

Distortion: -46dBu (wtd) at 100dBSPL, -40dB (wtd) at 110dBSPL, -37dB (wtd) at 115dBSPL

Cable Length: 3m

Connector: Gold plated 3.5mm jack

8.2 MM5 – High Level Mic

Frequency response: Typically ±2dB, 20Hz-20kHz (±1dB 40Hz-15kHz)

Sensitivity: -50dBu (±0.5dB) out for 100dBSPL at 1kHz (12mV/PA)

Noise Level: 36dBSPL 468-weighted, 24dBA(SPL) typical

Clipping Level: 130dBSPL (Distortion: -32dB 468-weighted)

Distortion: -46dBu (wtd) at 100dBSPL, -40dB (wtd) at 110dBSPL, -37dB (wtd) at 115dBSPL

Cable Length: 3m

Connector: Gold plated 3.5mm jack

8.3 MP1 – Preamplifier

Size: 116 x 60 x 35mm

Power:

- Via PP3 battery - included (35hrs use - Alkaline battery)
- Via External 12V power supply (6-14V) (2.1mm power jack)
- Via UniSon connector (6-9v)

Outputs: two-channel (10ohm source impedance) ,balanced, centre-grounded UniSon on 9-pin D-type plug. Unbalanced with phono or jack leads

Max Output Level: +18dBu

Flatness: ±0.02dB typical from 20Hz to 20kHz

Noise: -72dBu (ITU-R 468 weighted) -84dBu (unweighted) - measured on +30dB gain setting (middle position)

Distortion: -70dBu (ITU-R 468 weighted) (-82dBu/0.01% THD) at 1kHz (22Hz-22kHz bandwidth) - measured on +30dB gain setting (middle position)