A BEGINNER'S GUIDE TO

– MICROPHONES –

in the security industry

LOUROE ELECTRONICS
World Leader in Audio Monitoring Technology

THE WORLD LEADER IN AUDIO MONITORING TECHNOLOGY

MADE IN USA

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A Brief Overview of Audio and Sound

Not every microphone is designed or engineered equally.

While some microphones are designed to capture audio from all directions (omni-directional), others are designed for directional capture (directional).

Additionally, audio frequency varies from low frequencies to high frequencies. Think of the deep rumble in a late-night radio DJ's voice and the high-pitched screams found on a school playground.

As you might imagine, audio is more complex than it seems. Due to the variety and specialization of microphones, selecting the right audio equipment for your project is more complex than you'd imagine.

Fortunately, this e-book will cover everything from audio basics to microphone and pickup pattern essentials.

> We have five senses for a reason and they are equally important.

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Audio Frequencies

Before we go any further, let's cover one important aspect of audio: **Audio frequencies.**

At its core, sound is produced by the vibrations that carry sound through waves in the air. These waves produce a frequency which can be measured in hertz (Hz) in terms of "sound waves per second".

The higher pitched the sound, the greater the hertz.

Certain sounds fall under a specific frequency range. Let's use the human voice as an example: both male and female voices fall somewhere between **100 Hz – 8kHz.**

Audio products that are sensitive to this frequency range are ideal for commercial and security applications.

Imagine an apartment complex that uses two-way audio in access control. Ideally, you'd want a product that will pick up a person's voice and not the sound of the surrounding city. Another great example? A police station using audio in an interrogation room.

Note: Louroe microphones are designed to be sensitive to this frequency range, a feature known as **Speech Intelligibility**.

Now that we've covered some audio basics, let's talk pickup ranges.

Speech Intelligibility refers to the sensitivity of a microphone to the human voice.

Audio provides much needed evidence and expands monitoring ability.

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Pickup Patterns & Polar Patterns

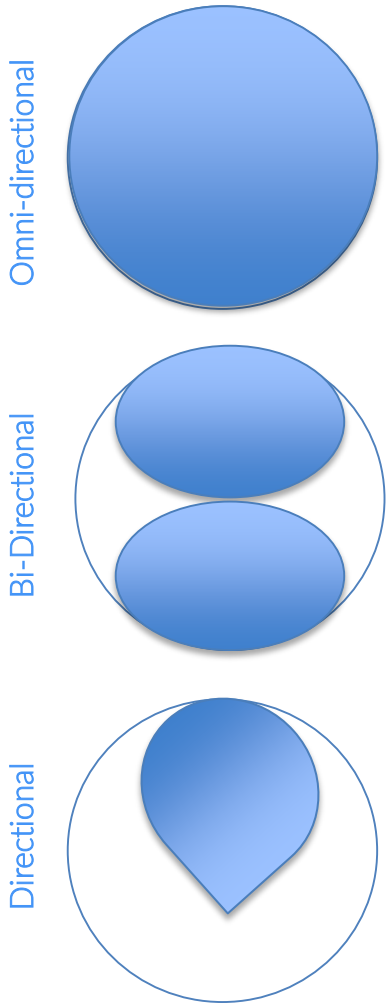
Microphones are designed to be sensitive to specific **polar patterns**.

Polar patterns, in turn, affect the overall **pickup pattern** of a given microphone. So what is a polar pattern?

- A polar pattern refers to the "directionality", or sensitivity of a given microphone relative to the sound source.
    - **Omni-directional** microphones are equally sensitive to sounds from all angles.
    - **Bi-directional** microphones are sensitive to sound from two angles.
    - **Directional** microphones are sensitive to sound from one particular direction.

For example, to capture audio in the middle of a classroom or store, you'd use an omni-directional microphone. If you wanted to capture audio from two directions like a bank teller's window, then a bi-directional microphone would be ideal.

Depending on the type of microphone in use, pickup ranges will be affected.



Shown: Graph displaying common polarity patterns of microphones.

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Pickup Ranges

Without thinking about it -- you may have noticed that sound (audio) travels slower and shorter distances than light (visual). This has to do with the fact that sound travels at a rate of about 1,100 feet per second while light travels at 186,000 miles per second.

While the difference between the two is quite dramatic, sound is further affected by a governing law of physics known as the Inverse Square Law:

- Sound is reduced by 6dB (decibels) when the distance between sound sources is doubled.

Given that humans typically speak somewhere in the range of 60dB, we can see that sound can only travel a certain distance. Because of the speed, distance, and other environmental factors affecting audio, we can see that audio is quite sensitive to external factors and audio capture close to the sound source is important.

Translating this to audio in security, the further away from the sound source, the further the sound level decreases. In turn, audio quality diminishes.

For the sake of this e-book, we'll use Louroe products to describe pickup ranges.

Omni-directional microphones like the Verifact A have a range of 15 ft in each direction for a total range of 30 ft.

While directional microphones can capture audio for about 8 – 12 ft in one direction, this doesn't mean you won't be able tp capture audio beyond 15 ft. However, it does mean that audio beyond 15 ft will be affected.

Most microphones can pick up audio for 10 - 15 ft in each direction.

Security without audio is akin to watching a silent movie.

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Louroe Microphones

Verifact® A

Type: Omni-directional
The Verifact A is an indoor, omni-directional microphone used throughout commercial and security application. Think of this as the jack-of-all trades microphone.
Pickup range: 30 ft

Verifact® K

Type: Directional
The Verifact K is designed for areas with excess background noise. Think police stations, lobbies, banks, or transportation vehicles.
Pickup range: 12 ft

Verifact® L-DT

Type: Bi-directional
Designed for healthcare and banking environments, the Verifact L-DT is a bi-directional microphone designed to pickup sound from the front or back of the housing. The device is best suited for police interview rooms, inside of bank teller booths, and in registration areas in hospitals.
Pickup range: 10 ft

Digifact A

Type: Omni-directional
The Digifact is an omni-directional smart IP microphone. Like the Verifact A, the Digifact is usually installed inside classrooms, police stations, or other interior environments where sound can come from any direction.
Pickup range: 30 ft

Verifact® DV

Type: Omni-directional
Similar to the Verifact A, the DV is an omni-directional microphone for vandal-prone areas. Think classrooms and inside of correctional and law enforcement facilities. The microphone itself is housed in a vandal resistant faceplate which can limit the pickup range of the mic.
Pickup range: 15 ft

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While this beginner's guide is only intended to help you learn the basic of sound and audio products in the security industry, we'll be more than happy to help with any questions. If you're interested in learning more about Louroe audio products or have a question related to audio, contact us below.

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