



REACTOR

MULTI-PATTERN CONDENSER

USER MANUAL & INSTRUCTIONS

PROFESSIONAL MIKING TECHNIQUES

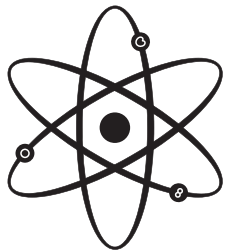
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Congratulations on your purchase of the Reactor Microphone, from Blue Microphones. You will probably notice that Reactor looks unlike any other microphone ever made, and upon first listen, you'll realize it's a sonic stand-out as well. The Reactor microphone features one of Blue Microphones' hand tuned, dual back plate, large-diaphragm condenser capsules coupled with Class A discrete electronics that deliver a clear and crisp sound usually reserved for the most serious professional studio budgets. The Reactor's unique pivoting head rotates 90° allowing you to use the Reactor in very close miking situations such as recording an electric guitar cabinet and it doubles as an easy way to adjust mic incidence angle for fine-tuning of the sonic signature or configuration of multiple microphone setups (see page 23 for more details).

The transformerless, solid-state Reactor is a great introduction to Blue's multi-pattern microphone lineup. Providing **Cardioid**, **Omnidirectional**, and **Bidirectional (Figure-8)** polar patterns, the Reactor microphone accommodates almost any recording situation. While most microphone manufacturers have treated polar pattern switches as afterthoughts, the Reactor's radial design with central pattern control invites the user to explore each polar pattern and discover a new timbre to the sound being captured. The first rule in recording is "there are no rules," so switch away and pick the pattern that you feel best fits your desired sound.



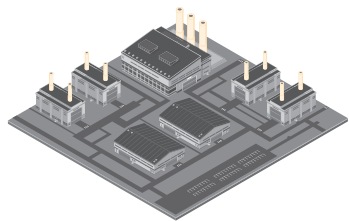
In order to provide a consistent response across all three pickup patterns, two single back plate, large diaphragm capsules are measured in an anechoic chamber, then acoustically matched for optimum performance. The result is a handcrafted and hand-tuned dual back plate capsule, delivering a modern tone with a smooth extended top end.

Though designed to achieve a world-class contemporary vocal sound, the Reactor addresses a number of different recording needs. When used in the Cardioid pattern, Reactor excels at delivering a vocal or a solo track right to the front of the mix where it belongs, with detailed high end, smooth midrange, and minimized proximity effect (a bass boost inherent in all unidirectional mics). In Omnidirectional and Bidirectional, or when miking at a distance, the Reactor delivers every nuance in the room, with finely focused resolution and clear, musical frequency response – ideal for live orchestral recording, ambient percussion miking, and choral vocal treatments.



Getting Started

The Reactor microphone system includes Blue's custom Reactor shockmount suspension system, unique magnetic pop filter system, and a hard shell carrying case that secures the Reactor and its accessories. The custom Reactor shockmount is designed to isolate the Reactor body from low frequency vibrations when mounted on a microphone stand, while Reactor's magnetic pop filter system is easily attached or removed from the microphone head and can be adjusted to the desired filter-distance from the capsule.



Reactor Shockmount

To fit the Reactor into the custom Reactor shockmount, first mount the shockmount onto a microphone stand by: **1)** aligning the small threaded mounting post on the shockmount with the threaded post on the microphone stand, **2)** hold the shockmount with one hand while turning the microphone stand post counter clockwise with the other hand until the shockmount is securely threaded onto the microphone stand post, **3)** next, align the threaded XLR barrel of the Reactor microphone with the threaded ring at the center of the custom Reactor shockmount, **4)** hold the Reactor microphone securely with one hand while turning the threaded ring on the custom Reactor shockmount with the other. Continue turning the ring until the Reactor is securely threaded into the threaded ring on the shockmount. The angle of the mount assembly can be swiveled and adjusted with the large thumbscrew, which will normally be positioned at the rear of the mic. **NOTE: Forceful positioning of the custom Reactor shockmount without loosening of the thumbscrew can result in damage to the shockmount not covered by warranty.**

Reactor Pop Filter

Installing Reactor's pop filter couldn't be simpler. The two semi-circular halves of the pop filter are designed to clamp around the microphone head, easily located by the large groove just below the microphone head. Built-in magnets provide the force necessary to maintain a firm clamp around the microphone head. To install, simply align the mesh filter with the front face of the microphone and slide the half-circle of the mount into the groove below the head. Slide the other half of the filter mount into the groove on the opposite side of the microphone head and push both halves together until the magnets are connected and the pop filter is securely clamped around the microphone head. Simply pull the two halves apart for removal or adjustment. Note that Reactor's pop filter conveniently swivels along with the rotation of the microphone's head.

Reactor's pop filter also allows for convenient adjustment of the distance between filter and capsule diaphragm, allowing the recordist to dial in a certain level of plosive protection or constrain how close a vocal source may get to the microphone capsule. To adjust this distance, grasp the circular pop filter in one hand and loosen the small thumbscrew with another hand. Slide the filter element forwards or backwards to the desired position and then tighten the thumbscrew while making sure that the filter is parallel to the face of the microphone.

If you wish to install a pop filter on both the front and rear of the mic head (for Bidirectional or Omni recording of vocals, for instance), additional pop filters are available from Blue and will magnetically connect to the included front pop filter.

Reactor Swivel Head

Reactor's swiveling head rotates up to 90 degrees clockwise (from top) to allow for easy placement in tight environments and quick fine tuning of frequency response or multiple-mic setups. To rotate, firmly grasp the mic head and rotate to the desired position. The swivel is friction-loaded so it does not require any additional adjustments. The stops at 0 and 90 degrees allow you to easily find the original position. As a reminder, the microphone 'address side' starts at the front of the mic, aligned with the Blue logo on the barrel body. When fully rotated, the address side is the side opposite the pattern selection control. Please be sure to avoid over-turning or excessive rotation of the head as this could damage the microphone capsule.



Reactor Pattern Selection and Capsule

When recording in the Cardioid pattern, the active, on-axis diaphragm is on the same side of the microphone as the Blue logo (unless you have the head position rotated 90°, then the active diaphragm is facing the side of the microphone opposite the polar pattern selector). The pattern selection arm is located on the side of the body, and is easily adjusted by hand, with no special tools required. When the pattern is switched, a LED will illuminate the particular pattern indicator corresponding to the pattern selected. The selected pattern will be visible in the magnifying lens located on the pattern selector. If the LED is not lit, check that the pattern selector is aligned with one of the three pattern positions (you should feel a slight 'click') and check for proper connection to your preamp.

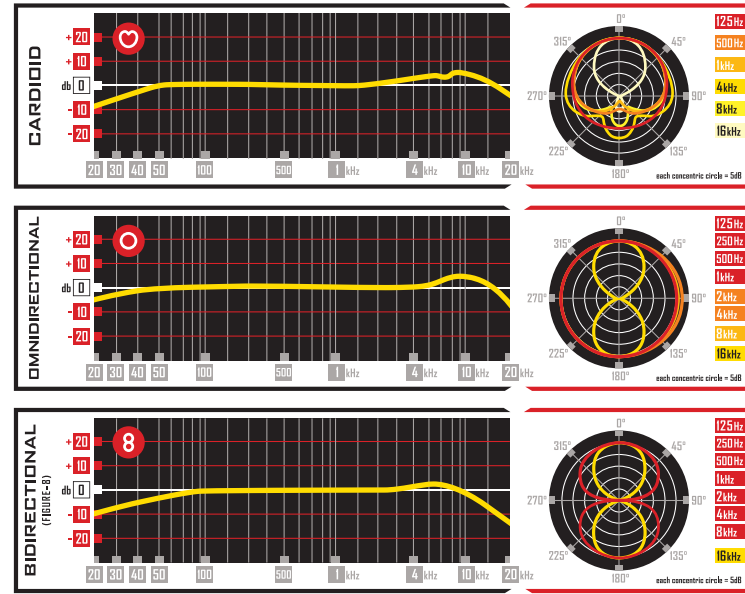
You will notice that the sound of the Reactor capsule changes slightly when the pattern is changed. In general, the Omnidirectional pattern offers the flattest frequency response, with an absence of proximity effect. When switching to the Cardioid and Bidirectional patterns, the bass frequencies will increase proportionally due to proximity effect, and subtle changes will also occur in the high end response.

To get the most out of the Reactor, or any quality microphone, it is essential to pair it with a good microphone preamplifier. Most professional recordists prefer to have outboard preamps on hand, and will choose solid-state or vacuum tube models based on their unique characteristics or preferences. To maintain the integrity

of your signal, try using Blue's Dual or Quad high definition mic cable along with Blue's outstanding Class-A vacuum tube mic preamp, Robbie. And, whenever possible, connect your pre's output directly to your recorder or A/D converter, bypassing the mixing board and any unnecessary components.

The Reactor microphone requires +48V phantom power, which is provided by most mic preamps, mixing consoles, or separate phantom power supplies. It is important to note that some units, though rated at 48 volts, may supply insufficient or unstable phantom power, which can result in distortion and/or degraded performance when used with the Reactor.

To avoid damage to audio components when connecting phantom power, follow this simple procedure: 1) turn down the mic preamp gain, headphone volume, and your studio monitor volume, 2) connect your microphone cable to the Reactor and microphone input jack, 3) turn on phantom power, 4) turn up the mic preamp gain, etc. To disconnect or re-route the Reactor, 1) turn down the mic preamp gain, headphones, and your studio monitors, 2) turn off phantom power and wait 10 seconds before disconnecting the mic.



Polar & Frequency Response Charts

These frequency charts are only a beginning. They provide the recordist a basic understanding of the sound provided. How the microphone reacts in a particular application will differ greatly because of many variables. Room acoustics, distance from sound source (proximity), tuning of the instrument and mic cabling are only a few of the interacting issues. For an artist or an engineer, how the microphones are used creates the basis of the sound.



Recording Applications

Vocals

A little-known secret in the recording world is that vocalists love singing into beautifully engineered microphones like the Reactor. Put it in front of any singer and you're guaranteed to get a truly inspired vocal performance. The Reactor was developed especially to enhance the airiness and detail in a voice, while diminishing the proximity-induced lows which can cloud a mix or produce compression artifacts. The Reactor is also outstanding for narration and voice-over work.

For a "big" vocal sound with maximum presence, get the vocalist within one to three inches of the capsule. There is no need to worry about overloading the microphone, but be sure to use Reactor's custom pop filter to protect the diaphragm from plosives at close distances. Tilt the Reactor up (toward the forehead) for more projection and head tone, straight on the mouth for maximum brightness and intelligibility, or down toward the chest for more robust lows and smoother highs.

Conventional vocal recording is almost always done using a Cardioid pickup pattern. But the multi-pattern control lets you experiment with the timbre changes which occur with the different patterns. Whenever possible, spend a few moments exploring these tonal shifts before recording your vocal to decide which sound best fits your recording.

The Bidirectional pattern is useful for recording two singers on one mic, or for a "hotter" solo vocal with increased proximity effect (i.e. a typical radio announcer voice). The Omnidirectional pattern on the Reactor can also be put to unique effect, whether recording a roomy, distant vocal track, capturing an unusual room ambience in combination with a close vocal mic, or on large group vocals.

Acoustic Guitar

For a balanced sound with plenty of sparkling high end, position the Reactor facing the guitar neck, right where the neck joins the body (usually around the 12th-14th frets). For starters, use the Cardioid pattern, keep the capsule as close as

possible, and angle it toward the sound hole to capture a blend of low end and pick sound. Feel free to experiment with Reactor's swiveling head to make quick adjustments to the microphone's angle and fine-tune the sound.

If you need more lows, move the capsule closer to the sound hole, or for more high-end detail, move the Reactor farther from the guitar, either at the same neck position, or above the instrument up by the guitarist's head. An Omnidirectional pattern setting allows very close placement to the sound hole without boomy lows, and distant placement of three feet or more can produce interesting results with any of the three pickup patterns.

Electric Guitar

For many guitar amplifier recording applications, recordists want to get the microphone capsule as close to the face of the cabinet as possible, and for that reason, Reactor microphone has incorporated a unique pivoting head to allow recordists to get the Reactor microphone's capsule as close as possible to the face of the amplifier.

The Reactor is useful for any clean amp sound, ranging from bright rhythm chords to warm jazzy tones. Angle the capsule toward the center of the speaker to capture more highs, or turn it toward the edge of the cone for a fuller sound with



more low end. For overdriven or distorted tones, move the mic towards the outer edge of the cone, or back it away from the amp a foot or more to add a little room sound and soften the extreme high end.

For even more control over definition and room tone on electric guitar tracks, it is common practice to use an ambient room mic in addition to a close mic on the amp. The Omnidirectional or Bidirectional patterns on the Reactor are highly recommended for distant room miking applications on any amplified instruments, including bass, organ, and blues harmonica.

Piano

Pop and jazz piano recording is usually accomplished with a pair of microphones placed inside a grand piano, either close to the hammers for a defined, percussive sound, or roughly in the middle of the piano body to get a more resonant and blended tone. When using these methods, it is conventional to employ a coincident stereo pair, with one microphone capsule oriented to pick up the treble strings, and the other focused on the bass range of the instrument.

A less common, though very useful technique, is to position a stereo pair or single Reactor microphone just outside of the piano, either in the curve of a grand, above an upright, or a few feet away for a classically-oriented sound with a significant amount of natural room reverberation.

Saxophones and Reeds

For soprano sax, clarinet and related instruments, position the mic about a foot away, directly above and in front of the keys between the middle of the horn and the lowest pads. Try rotating the capsule or moving the mic up or down along the length of the body to adjust the balance of airy highs (toward the mouthpiece) and cutting midrange (toward the bell).

For other members of the saxophone family, start by placing the capsule two to six inches in front of the lip of the bell. Turn the capsule up toward the mouthpiece, or raise the microphone above the bell to capsule more air, brightness, and high notes. For a more mellow sound, rotating the microphone toward the floor emphasizes the low range of the sax, and tames the biting upper mids that project straight out of the bell, particularly on alto saxophone. The Omnidirectional pickup pattern tends to soften the edge of close-miked saxophone tracks, while Cardioid and Bidirectional patterns emphasize high-end detail, cutting power, and warmth.

Brass

All members of the brass family need to be miked from in front of the bell. But for studio recording it is not necessary to aim the microphone capsule right down the center of the bore, or place it too closely. The trumpet, with its directional characteristics, high sound pressure level, and limited frequency range, will yield a clear, cutting tone at distances ranging



from 6 inches to 2 feet. The trombone and tuba can be approached similarly, although closer miking toward the outer edge of the bell (4 to 8 inches), and the enhanced proximity effect of Cardioid and Bidirectional pickup patterns will help offset a thin or overly bright timbre.

Capturing a mellow, rounded tone is a challenge. To avoid buzzy highs and transient overloading, persuade the player to blow at less than peak stage volume. Cornet and flugelhorn usually have a softer, more intimate sound, are played at lower volume, and can be miked at a distance of 2 to 6 inches.

Drums

For kit and hand drums, begin by positioning the capsule two to four inches above the rim or hoop (where the head is secured to the shell). Angle the capsule toward the player's stick or hand to pick up more attack and definition. Turning the capsule toward the shell will soften the sharp attack of a hand drum, or pick up more of the bright, crackling buzz from a snare. Moving the microphone closer to a drum generally increases the low end, shell resonance, and separation from other sound sources, while more distant placement emphasizes the interaction of the drum and the environment, producing a blended, airier sound.

Many modern recordists have benefited from the unique sound of minimalist drum miking, where one to three microphones are strategically placed to capture the entire set, along with the characteristics of a well-tuned studio room. The Reactor will make a perfect centerpiece to a minimalist drum miking arsenal, with its pickup pattern versatility, easily adjustable head, and ability to handle compression and processing without creating unwanted artifacts.

Percussion

On tambourine, shaker, bells, clave, and orchestral percussion, the Reactor offers astounding clarity and realism, and can be positioned quite close to a percussive source without distortion or undue proximity effect. Start by placing the Reactor about a foot from percussive instruments. Selecting the Cardioid pickup pattern, or moving the mic closer to the source will emphasize detail and tone, as well as decreasing the proportion of ambient room sound on a track. More distant placement, or the use of the Omnidirectional or Bidirectional pattern will yield a natural, roomy sound that blends easily with other rhythm instruments.

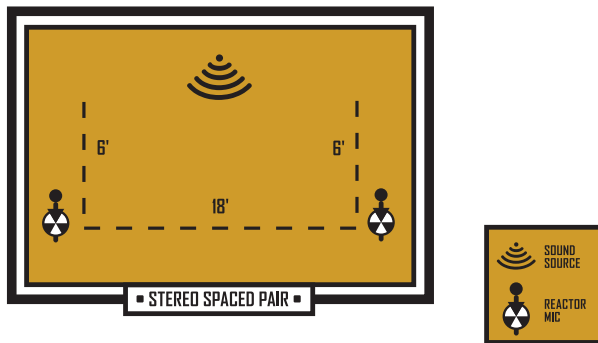
Multi-microphone setups

Reactor's multiple pattern capabilities, swiveling head, and audiophile circuitry make it an excellent platform to use for exploring multiple microphone setups. There are many options of multi-mic configurations that have been created and refined in some of the world's most sophisticated recording environments, each developed to capture an instrument, an ensemble, a vocal, or an ambient recording in a way which is both sonically intriguing and useful. The concept is relatively simple: combine the output of multiple microphones arranged in different ways to capture a totally new sound. We suggest using multiple Reactor microphones to experiment with a few of the most common and useful techniques. We've provided an introductory overview to get you started with here. As always, exploration and having fun is the key to finding an exciting new palette of sound.



Stereo Spaced Pair

The Stereo Spaced Pair is a great technique for capturing a realistic soundstage on sources like bands, drum overheads, pianos or guitars. The configuration is simple — set up two Reactor microphones, use the same pattern for each, and position them equidistant from the sound source with the capsules swiveled to point at the desired sound source. You can try each of Reactor's three patterns to achieve a different sound — Omni will provide a very roomy sound, Cardioid will bring a more present sound, while Bidirectional will yield a sound somewhere between the other two patterns. With stereo



spaced pairs, the relative distances between the mics themselves and the source are critical to avoid phasing issues. The general rule is to maintain at least the same distance between the microphones and the source, or up to a 3:1 ratio of distance between mics and mics to source (pictured). However, feel free to experiment with microphone placement to achieve the sound that is appropriate for your recording. Large sources, like bands, should be captured with mics at least six feet apart, while bringing mics closer to the source will reduce the airiness or ambience in the signal.

Spaced pairs are also useful for capturing specific instruments — in fact, many of your favorite piano or acoustic guitar recordings were probably captured using spaced pairs. Another example is drum overheads. Getting a wide image from a drum sound can be very difficult with single mic solutions, but stereo pairs can make a great sound very simple to achieve. A good rule of thumb is to point your microphones directly at the snare, while maintaining an equal distance between each microphone and the snare. With a Reactor pair you can find a great drum sound in a fraction of the usual time required with other microphone setups.

X-Y Recording

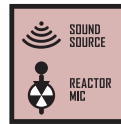
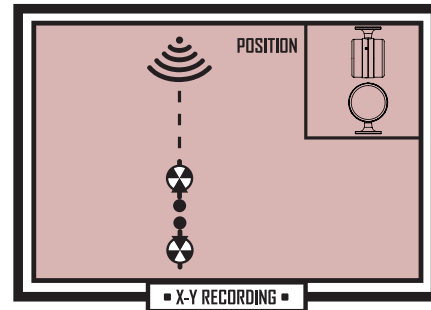
The X-Y Recording technique takes its name from the standard stereo spread pattern, but emphasizes subtle variations that can be easily achieved with a pair of Reactor microphones. The setup requires two Reactor microphones in Cardioid, offset from each other at a given angle, with the sound source aligned at the midpoint between the two microphones. X-Y recording methods are tremendously useful for most any recording method where you want to capture a focused sound for an instrument, a vocal ensemble, a drum kit, or most any other purpose. This is also a go-to method for recording a life-like acoustic guitar. Further, this setup avoids most major 'phasing' issues because the mics are equidistant from the sound source.

To set up for this technique, simply mount two Reactor microphones with one upside down directly over the lower microphone and set both for the Cardioid pattern. Using Reactor's swiveling head, you can easily adjust the angle between microphone capsules — ranging from 0-90 degrees if the microphone bodies are parallel, and 90-180 degrees if the microphone bodies are perpendicular.

While naming conventions vary, X-Y generally implies an angle of less than 90 degrees between microphones, stereo-sonic is 90 degrees exactly, and a variant called DRTF is around 120-170 degrees of spread between microphone capsules.

In all cases, the sound source should be located in the middle of the two head angles. Smaller angles will produce a narrower stereo spread while larger angles (around 150 degrees) will more closely approximate the stereo image we are accustomed to hearing through human ears.

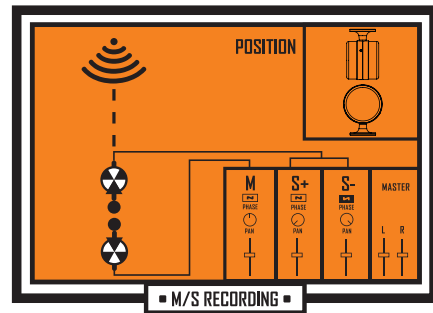
With the microphones properly configured, you can further tune the output in post processing by hard panning the left and right signals, or even panning signals to the opposite sides to 'flip' the instrument, allowing it to better sit in a busy track. The X-Y configuration is a powerful and easy to use configuration that is frequently used by top recording engineers, and Reactor's swiveling head makes it an excellent tool for quickly finding the right sound.



M/S Recording

M/S or Middle-Side Recording is a technique that is excellent for making great stereo recordings of small ensembles, acoustic trios, jazz groups, bluegrass, classical small strings, or simple live recordings — any time you want to capture a performance as it would sound if you were in the room. Because this technique intentionally captures some of the staging, room effects, and time delays inherent in a live environment, it's not an ideal technique for capturing vocals.

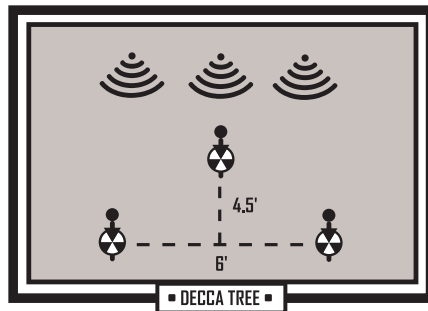
Start with two Reactor multi-pattern microphones. While it is possible to use different microphones for this setup, we have found that utilizing paired microphones with uniform capsules and consistent frequency response eliminates the chance of harsh or unpleasant peaks in the combined signal. Set one Reactor microphone to the Bidirectional pattern and the other to the Cardioid pattern. Place both microphones at the approximate height of the sound source, with the Bidirectional microphone oriented perpendicular to the sound source and the Cardioid microphone mounted directly over the center of the lower microphone, capsule oriented directly at the sound source. Make sure that both microphone capsules are as close to each other as possible and verify that the microphone setup is far enough away from the sound source such that the capsule can 'see' the source you want to capture.



One of the neat tricks about this technique is the flexibility it allows the recordist in post processing. The signal from the Bidirectional microphone should be split to the left and right channels, with one channel thrown out of phase. These two channels should then be mixed hard left and right with the Cardioid channel up center to your stereo output. Think of the Cardioid channel as your focus, while the Bidirectional signals become your ambience or width. The precise amount of stereo soundstage can be dialed-in by controlling the mix between the Cardioid signal and the two Bidirectional channels, allowing you to achieve a sound ranging from broad and lively to present and controlled.

Decca Tree

The Decca Tree has been used for years as an industry-standard technique for the recording of symphonies, rock bands, group ensembles, choral recording, and film scoring. The Decca Tree is also known as an “LCR” array for “left, center, right.” This technique requires three identical Reactor microphones set to the Omni position and placed in a triangular array in front of the sound source. The left and right mics are placed approximately six feet apart on the same horizontal and vertical plane, just as in a spaced pair. The center is placed directly in between the left and right mics, but approximately 4.5 feet in



front of them, forming the “point” of the triangle. This array can be constructed using three separate mic stands but commercially-available Decca Tree fixtures are available and allow for ease of setup and precise placement.

Once arranged, the array is generally placed slightly above the sound plane at a significant distance from the sound source. The benefit to the Decca Tree is its ability to provide a strong center image while at the same time providing excellent spatial cues both horizontally across the stereo field as well as a sense of depth. The Decca Tree also stands up very well to various surround-processing systems, making it a favorite of film scoring and mixing engineers.

Effects Multi-Miking

A variant of microphone pair recording is effects recording, where you would use two microphones to capture different tones out of the instrument and, rather than panning those signals left to right, the signals are blended to achieve a unique tone that can sit well within the mix. Here are some common examples of effects multi-mic setups.

Piano: you can get an amazingly multi-dimensional sound out of a grand or baby grand piano by placing one mic at the lower end and one mic at the higher end of the piano. You can use the technique on an upright piano, placing one mic at the

top of the lid and one at the bottom where the pedals are located. With both microphones in Cardioid mode, you can slightly rotate each head to find their best placement on strings and achieve the right balance of tone versus hammer. Also, try swiveling Reactor's head 90 degrees to allow for incredibly close placement to the strings for a powerful tone.

Acoustic guitar: Place one mic at the fretboard and the other at the soundhole or center of the guitar to easily tune the balance of tone and string sound. Alternatively you can aim both microphones at the soundhole for a highly focused and intense stereo spread, again, using the swivel heads to tune in exactly the desired image.

We hope this brief introduction to multi-mic recording concepts provides the inspiration to experiment with some of these techniques on your own projects. Many of the world's most famous recordings were created without the use of advanced processing but instead the clever use of multiple multi-pattern microphones. The practical result is a very natural and pleasing recording that sounds great at any level. Your new Reactor microphone incorporates the professional performance and convenience features that make it the perfect tool to make the next generation of truly great recordings.



Technical Specifications

Transducer Type: **Condenser, Pressure Gradient**

Polar Pattern: **Cardioid, Omnidirectional, Bidirectional (Figure-8)**

Sensitivity: **Cardioid: 22mV/Pa; Omni & Bidirectional (Figure-8): 18mV/Pa**

Output Impedance: **50Ω**

Rated Load Impedance: **Not less than 1kΩ**

Maximum SPL: **138 dB SPL**

S/N Ratio: **84.5 dB-A (IEC651)**

Noise Level: **Cardioid: 7.5 dB-A; Omni & Bidirectional (Figure-8): 8.5 dB-A**

Dynamic Range: **Cardioid: 130.5 dB; Omni & Bidirectional (Figure-8): 129.5 dB**

Power Requirement: **+48V DC Phantom Power (IEC268-15)**

Weight: **1.5 lbs (.68 kg)**

Dimensions: **9.45" x 4.14" x 2" (24.1cm x 10.5cm x 5cm)**

Included Accessories:

- Custom designed metal case
- Custom shockmount suspension system
- Custom adjustable magnetic pop filter
- Reactor setup and multi-miking techniques guide

Recommended Optional Accessories:

- Blue Microphone Dual or Quad high-definition mic cable
- Blue's Robbie the Mic Pre Class-A vacuum tube mic preamplifier

Warranty

This Microphone or related part is warranted under the conditions outlined below to its original, registered owner, provided the purchase was made from an authorized Baltic Latvian Universal Electronics (BLUE) Dealer. This Microphone or related part is guaranteed to remain free from operating defects for three years from the date of purchase. In the event that service is required, all necessary parts and labor will be furnished free of charge during this period except for tubes, which are guaranteed for 90 days against defects. This warranty is void if the serial number has been altered, removed or defaced. The warranty is void if the equipment is altered, misused, mishandled, maladjusted, or is serviced by any parties not authorized by Baltic Latvian Universal Electronics (BLUE). That warranty does not include transportation costs incurred because of the need for service unless arranged for in advance. Baltic Latvian Universal Electronics (BLUE) reserves the right to make changes in design and improve upon its products without obligation to install these improvements in any of its products previously manufactured. This warranty is in lieu of any or all expressed or implied.

In keeping with our policy of continued product improvement, Baltic Latvian Universal Electronics (BLUE) reserves the right to alter specifications without prior notice.

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