

The Voice Tracker™ II Array Microphone



The Voice Tracker™ II starts with Acoustic Magic's unique, customer proven, patented scanning beam array microphone technology, which spatially filters undesired sounds and noise over a 360° field of view. But it has been designed to enhance its applicability for video and audio conferencing, while retaining its attributes for meeting and lecture recording, speech recognition, voice control, and security monitoring.

Effective at Long-Range

The Voice Tracker™ II creates an exceptional signal to noise ratio by increasing its signal pickup while reducing room noise. It accomplishes room noise reduction through a two-stage process. First, it minimizes unwanted background noise and reverberation by beamforming. Its digital signal processor creates a "listening beam" (like a searchlight) that automatically and electronically focuses on the talker, spatially filtering sound from other directions. Then its proprietary noise reduction algorithms diminish the remaining background noise and reverberations. The Voice Tracker™ II increases its sensitivity by constructively adding the output from its six "always on" microphone elements. As a result, the Voice Tracker™ II has a range of more than 20 feet for conferencing, meeting recording, and home automation applications; and a range of several feet for hands-free/headset free full vocabulary automatic speech recognition applications.

Full Duplex operation for VoIP and conventional conferencing

The Voice Tracker™ II has a high performance acoustic echo canceller built in. This AEC, combined with a mute button, and the Voice Tracker™ II's long-range, make it ideal for conferencing and telephony (speakerphone) applications.

Portable

The Voice Tracker™ II is half the size of the original Voice Tracker™, and fits easily into a briefcase. It can be powered through its USB connection, eliminating the need to carry a wall power converter and making it operable in any country.

Easy to use

Our patented beam steering technology, noise reduction algorithms, and AEC, all operate from an internal DSP. No software needs to be loaded on your PC, and there is no drain on your computer's processing capability. There are no moving parts, so the Voice Tracker™ II is rugged and reliable.





Features

- Automatic electronic steering of “listening beam” to talker location
- 360° field of view
- Long-range:
 - 20+ feet for conferencing/meeting recording/home automation voice control applications
 - 3 feet for desktop full vocabulary automatic speech recognition applications
- Six “always on” microphone elements
- Two-stage noise reduction (spatial filtering followed by conventional noise reduction)
- Full-duplex operation through internal Acoustic Echo Cancellation algorithm.
- Mute button
- USB audio output/microphone power
- Analog audio output jack, switchable between mic level and line level output
- 5 element LED display to indicate location of chosen talker and mute mode
- Talker location signal (serial-RS 232).

Specifications

Microphone:

Dimensions: 12” X 1.5” X 1.5”

Weight: 2 Lbs

DSP sample rate 48kHz

Frequency response: 100HZ- 11.25 KHZ

Analog Output level: mic level or line level, unbalanced

Analog output impedance: 200 Ohms

Acoustic Echo Cancellation:

Conforms to ITU-T G.167 Standard

Convergence speed: <100ms

Single Talk Acoustic Echo Cancellation: 70dB

Double Talk Acoustic Echo Cancellation: 40dB

Tail Length: 100ms

Algorithm sample rate: 48KHz

Connections

Main Connection: Mini USB

3.5mm mono jack for analog audio output

3.5mm jack for far end talker reference

DB9 jack for serial talker location signal

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Voice Tracker™ II INSTRUCTIONS

Included Components

The Voice Tracker II comes with a USB cable (primary audio connection), one 6 ft audio cable and a 3.5mm splitter (for the AEC reference connection) and a ceiling mount. A second audio cable, a USB wall power supply, and a DB9 serial cable are options, which may be required for certain application configurations.

General Microphone Setup

For simple microphone operation, just connect the Voice Tracker II array microphone to a computer using the USB cable. Power for the Voice Tracker II is provided from the computer through the USB connection. Audio output is through the USB connection: the PC's audio record setup must be configured to receive USB audio input from the "Voice Tracker II" connection.

Full Duplex VoIP telephony/conferencing Setup

If the Voice Tracker II is connected to a computer running a VoIP application like Skype or Adobe Connect, it will enhance the telephony/conferencing experience by eliminating acoustic echo. Acoustic Echo occurs when the far end talker's voice is picked up by the open mic and sent back to him as an echo. For full duplex operation, a sample of the far end talker signal must be transmitted to the Voice Tracker II (for acoustic echo cancellation) by the audio cable. This signal is obtained by using the included splitter so part of signal from the speaker out jack on the PC goes to the Voice Tracker's reference in jack, and the other part goes to an external speaker.

Make the reference connection to the VT II before the USB (or analog audio) connection so that the USB "connect sound" turns on the AEC. Otherwise, AEC may take a few seconds to engage.

For optimum echo cancellation, the loudspeaker should be at least 1 Meter from the Voice Tracker.

A view of the connections for full duplex operation is shown in figure 1. Note: connection can alternatively be made thru analog cable from audio out jack

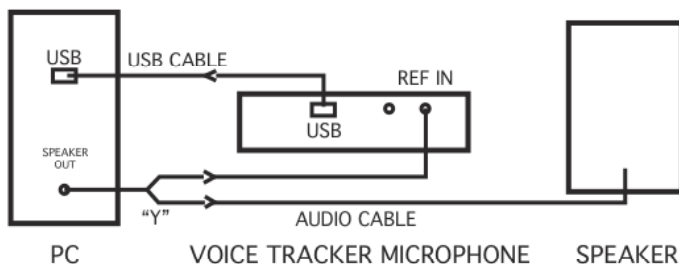


Figure 1 – Audio and AEC Connections

Setup for Analog output

If the Voice Tracker II is to be connected to devices that require an analog signal (such as a handheld recorder or video camera), its output is available in analog format at mic level or line level through the "Audio Out" 3.5 mm jack. The included audio cable could be used for this connection if AEC isn't used; otherwise, a 2nd audio cable will be required.

If analog output is used, power needs to be provided by connecting the USB cable to an optional USB wall power converter, like our part 201. Getting power from a PC can introduce noise in the analog audio signal

The toggle switch on the unit allows selection of mic level or line level analog output, or close range/long range USB audio output. If the switch is used to change output levels, the Voice Tracker II must be rebooted (powered off and then on).

Position Lights

The green position lights provide feedback on the operation of the array. They indicate where the array's listening beam is pointing. When the array recognizes a relevant sound, one of the 5 lights will be illuminated. For example, if a talker is directly in front of the array, the middle light will be illuminated. If the talker is to one side, a light on that side will turn on. If the talker moves across the field of view of the array, the lights will track the talker's motion. When two users are sharing the array, the light will indicate the direction of the active talker. When there is no active talker, the LEDs will be off.

Controls

The Voice Tracker II has a pushbutton mute switch. Press the button once to put the Voice Tracker II into mute mode. The five green LEDs will blink (continuously), indicating that the microphone is in mute mode. Press the button again to return to microphone to listening mode (the LEDs will indicate the active talker).

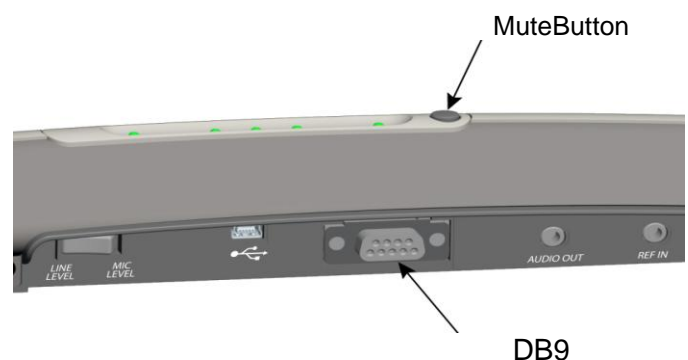


Figure 2 – Mute Button and Connectors

Positioning

The Voice Tracker II scanning listening beam can pick up sound from a full 360° field of view. However, the Voice Tracker II is more sensitive to sound in front than from behind.

For use with a PC (speech recognition or VoIP telephony/conferencing) the Voice Tracker II can be placed under or next to the display.

In a conferencing application, it is best to place the Voice Tracker II on one end of the table with its front pointing towards the far end.

Voice Tracker II can also be mounted (with an optional bracket) on walls or on the ceiling to reduce clutter.

To maximize acoustic echo cancellation, use only one loud speaker, and place it to one side of the Voice Tracker II.

Talker location signal

Since the Voice Tracker automatically points a “listening beam” at the loudest talker, it knows the location. This signal is made available as a digital word through the DB9 connector (cable is optional).

The RS 232 serial output signal consists of 8 bit words, no parity, 1 stop bit; commonly referred to as 8,N,1. 2400 baud.

Data is between 0 and 250, corresponding to talkers from the far left in front of the Voice Tracker (0) to the far right (250). If the talker is directly in front of the Voice Tracker, the data will read 125.

Note that the Voice Tracker picks up sound from the behind. So a reading of 125 could mean the talker is directly in front or directly behind the Voice Tracker.

When the Voice Tracker detects no talker, the location signal reads 255.

The user will have to create application SW to calibrate these signals into degrees.

Applications

Speech Recognition

Since the Voice Tracker™ operates differently from other types of microphones or audio input devices, you should retrain your speech recognition software (enroll a new user). Be sure to select USB Array Microphone during the “New User” setup. Personalized vocabulary can usually be transferred to the retrained “User”.

Conferencing

The Voice Tracker II can be connected to non-PC-based conferencing systems. Some of the systems require an XLR (balanced) connection. An inexpensive adapter (like the Radio Shack 274-017C Adapter/Transformer) can be

used to convert the Voice Tracker II’s unbalanced low impedance output to “balanced” XLR.

Meeting Recording

The Voice Tracker II can be connected to a PC with meeting recording SW, or directly to a handheld digital recorder using the 3.5 mm analog audio output jack and wall power supply.

Security Monitoring

The Voice Tracker II can often connect directly to the microphone input jack of video cameras/dial-up/Internet transmission systems. Choose the analog output level that matches the camera requirements.

Trouble Shooting:

Acoustic echo cancellation.

If the ref signal is too strong or too weak, AEC will not work well. Make sure the playback level in the PC is set to midscale. Turn up the volume on the (external) speaker itself if more loudness is desired.

No Audio

Check whether the LEDs track the talker. If not, reboot (repower). If so, the problem is probably in the computer setup. Make sure it is looking for recording input where the Voice Tracker is connected (USB, Mic in, or Line in).

Analog or USB Audio too strong.

Make sure the output level switch is set to mic level

Analog or USB Audio too weak.

Make sure the output switch is set to line level

FCC Compliance

This equipment has been tested and found to comply the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against interference when the equipment is operated in a commercial environment. This unit generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference with radio communications. Changes or modifications not expressly approved by Acoustic Magic could void the user’s authority to operate the equipment.



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