



# studio-tech 362A Listen-Only Beltpack User Guide

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## studio-tech 362A Listen-Only Beltpack



## Revision History

Issue Preliminary 1, February 2022:

- Initial preliminary release.

## Introduction

The Model 362A Listen-Only Beltpack is a self- contained 2-channel user device that supports head-phone monitoring of two audio channels associated with the Dante® audio-over-Ethernet media network-ing technology. Each Model 362A is intended to be used by one user, providing them with the form factor, reliability, and features needed to be effective in a variety of applications. It's expected that most applica-tions will use multiple Model

362A units to support the individual audio monitoring needs of a group of users.

The Model 362A offers the Dante connectivity, configuration flexibility, and essential user controls in a compact, portable package. Built tough for both studio and field deployment the unit is optimized for use in broadcast sports and live entertainment events, news-gathering, and streaming broadcast applications. Leveraging the capabilities of Dante with Studio Technologies' expertise in creating excellent professional audio and broadcast products, the Model 362A allows simple deployment, application-tailored configuration choices, and reliable operation, while maintaining "pro" audio quality and an intuitive user experience. With only a Power-over-Ethernet (PoE) connection and a pair of headphones or an earpiece, a complete broadcast talent cue ("IFB") or audio monitoring location can be created.

- **Applications**

A wide range audio-monitoring applications can be supported, including sports and entertainment TV and radio events, web streaming broadcasts, corporate and government AV installations, and post- production facilities. The Model 362A can be used with other high-performance Dante-enabled products from Studio Technologies. These include a range of broadcast-oriented units such as party-line (PL) intercom and IFB interfaces, 1-, 2-, and 4-channel intercom beltpacks, on-air beltpacks, and announcer's consoles. And, of course, the Model 362A is interoperable with other Dante-enabled products from literally hundreds of other manufacturers.

- **Setup and Operation**

Setup and operation of the Model 362A is fast and simple. A Neutrik® etherCON® RJ45 jack is used to interconnect with a twisted-pair Ethernet cable associated with a port on a PoE-enabled network switch. This connection provides both power and bidirectional digital audio. Both ¼-inch and 3.5 mm 3-conductor ("stereo") headphone jacks allow connection of a wide range of stereo headphones, single- or dual-ear broadcast headsets, and stereo or monaural earpieces or earbuds. The Dante Controller personal computer application will be used to route (Dante subscribe) one or two digital audio sources to the Model 362A's Dante receiver (input) channels. The Studio Technologies' STcontroller software application is used to configure the Model 362A's functions to meet the needs of specific applications. Two push-in/push-out rotary controls ("pots") make it easy for the user to set and maintain the desired level on the 2-channel headphone output. Four LEDs provide a clear and complete indication of the unit's operating status. The Model 362A's enclosure is made from an aluminum alloy which offers both ruggedness and light weight. A stainless steel "belt clip," located on the back of the unit, allows direct attachment to a user's clothing.



Figure 1. Model 362A Listen-Only Beltpack top and bottom views

- **Dante Audio-over-Ethernet**

Audio data is sent to the Model 362A using the Dante audio-over-Ethernet media networking technology. As a Dante-compliant device, one or two audio sources will be routed (subscribed) to the Model 362A's receiver (input) audio channels using the Dante Controller software application. The Model 362A is compatible with Dante digital audio sources that have a sample rate of 44.1, 48, 88.2, or 96 kHz and a bit depth of up to 24. Two bi-color LEDs provide an indication of the status of the Dante connection.

- **Configuration Flexibility**

Several Model 362A configuration choices are available, allowing the unit to meet the needs of specific

applications and user preferences. All configuration choices are made using the STcontroller software application that communicates with the Model 362A by way of the unit's Ethernet network connection. Configurable parameters include input channel assignment, level control operation, and minimum headphone output level.

- **Audio Quality**

The Model 362A's performance is completely "pro" with audio quality that's more typical of high-end studio equipment. Audio signals arrive via two Dante receiver (input) channels and pass into the Model 362A's processor which allows signal routing and headphone level control to be performed within the digital domain. This provides routing flexibility, allows precise level control, and keeps the two rotary controls (pots) from directly handling analog audio signals. The audio channels destined for the two headphone output channels are sent to a high-performance digital-to-analog converter (DAC) integrated circuit and then on to a robust 2-channel output driver circuit. High audio signal levels can be provided to a variety of headphones, headsets, and earpieces.

- **Ethernet Data and PoE**

The Model 362A connects to an Ethernet local-area- network (LAN) using a standard 100 Mb/s twisted-pair Ethernet interface. The physical interconnection is made by way of an etherCON RJ45 connector. While compatible with standard RJ45 plugs, etherCON allows a ruggedized and locking interconnection for harsh or high-reliability environments. An LED displays the status of the network connection. The Model 362A's operating power is provided by way of the Ethernet interface using the 802.3af Power-over-Ethernet (PoE) standard. This allows fast and efficient interconnection with the associated data network. To support PoE power management, the Model 362A's PoE interface reports to the power sourcing equipment (PSE) that it's a class 1 (very low power) device.

- **Future Capabilities and Firmware Updating**

The Model 362A was designed such that its capabilities and performance can be easily enhanced in the future. A USB receptacle, located on the unit's main circuit board (underneath the unit's cover), allows the application firmware (embedded software) to be updated using a standard USB flash drive. The Model 362A uses an UltimoX2™ integrated circuit from Audinate to implement its Dante interface. The firmware in this integrated circuit can be updated via the unit's Ethernet connection, helping to ensure that its capabilities remain up to date.

## **Getting Started**

- **What's Included**

Included in the shipping carton are a Model 362A Listen-Only Beltpack and information on how to obtain an electronic copy of this guide. As a device that is Power-over-Ethernet (PoE) powered, no external power source is provided.

- **Connections**

In this section, signal interconnections will be made using the connectors located on the bottom of Model 362A's enclosure. An Ethernet data connection with Power-over-Ethernet (PoE) capability will be made to the Model 362A's etherCON RJ45 jack using either a standard RJ45 patch cable or an etherCON protected RJ45 plug. A set of headphones, a headset, or an earpiece will be connected to the Model 362A's headphone output by way of a ¼-inch or 3.5 mm 2- or 3-conductor plug.

- **Ethernet Connection with PoE**

A 100BASE-TX Ethernet connection that supports Power-over-Ethernet (PoE) is required for Model 362A

operation. This one connection will provide both the Ethernet data interface and power for the Model 362A's circuitry. A 10BASE-T connection is not sufficient. A 1000BASE-T (GigE) connection is not supported unless it can automatically "fall back" to the 100BASE-TX operation. The Model 362A supports Ethernet switch power management, enumerating itself as a PoE class 1 device. Any PoE source that is compliant with the IEEE® 802.3af standard will function correctly. Should the selected Ethernet switch port support Energy-Efficient Ethernet (EEE) it must be disabled to help ensure reliable Dante operation.

The Ethernet connection is made by way of a Neutrik etherCON protected RJ45 jack that is located on the bottom of the Model 362A's enclosure. This allows connection by way of a cable-mounted etherCON connector or a standard RJ45 plug. The Model 362A's Ethernet interface supports auto MDI/MDI-X which ensures that a "cross-over" or "reversing" cable will never be required.

- **Headphone Output**

The Model 362A provides a 2-channel headphone output by way of both ¼-inch and 3.5 mm 3-conductor phone jacks. These jacks are electrically in common (connected in parallel or "malted") with each other, connected tip-to-tip, ring-to-ring, and sleeve-to-sleeve. Devices such as stereo headphones or stereo ("dual-muff") broadcast-style headsets can be directly connected using a 3-conductor ¼-inch or 3.5 mm plug. Following the usual convention, the left channel should be terminated on the plug's tip lead, the right channel on the plug's ring lead, and common on the plug's sleeve lead. It's also possible to use a monaural ("single-muff") headset or broadcast-type single earpiece. If a 3-conductor plug is to be used by this device it should be wired such that audio positive is on the plug's tip lead and audio common is on plug's sleeve lead; the plug's ring lead should be left unconnected. But it's also possible that the monaural device will be terminated on a 2-conductor ("tip and sleeve") plug. When this plug is inserted into one of the Model 362A's headphone jacks the Model 362A's right headphone output channel will be shorted to common since the output jack's ring lead will be shorted to its sleeve lead. This can lead to stress on the right channel headphone output circuitry as well as causing a little extra PoE current to be drawn. To prevent this condition both the Dante receiver (input) channels should both be routed only to the left headphone output channel. This will effectively disable the right headphone output channel. As such, there will be no signal on the right headphone output channel to short. The input channel routing will be performed using the controller software application. Details regarding these configuration settings are provided later in this guide.

## **Dante Configuration**

For audio signals to pass to the Model 362A requires that several Dante-related parameters be configured. These configuration settings will be stored in non-volatile memory within the Model 362A's circuitry. The configuration will typically be done using the Dante Controller software application which is available for download free of charge at [audinate.com](http://audinate.com). Versions of Dante Controller are available to support the Windows® and macOS® personal computer operating systems. The Model 362A uses the UltimoX2 2-input/2-output integrated circuit to implement its Dante interface. (Only the two input channels are utilized by the Model 362A.) The Model 362A is compatible with AES67 and the Dante Domain Manager™ (DDM) software application.

- **Audio Routing**

Two Dante transmitter (output) channels on associated equipment will typically be routed (subscribed or connected) to the Model 362A's two Dante receiver (input) channels. While it's certainly acceptable for only a single audio channel to be routed to the Model 362A, typical applications will utilize both. In most applications, these audio sources will be associated with talent cue (IFB) or related on-air broadcast or production audio channels.

- **Unit and Channel Names**

The Model 362A has a default Dante device name of ST-M362A- followed by a unique suffix. The suffix identifies the specific Model 362A that is being configured. The suffix's actual alpha and/or numeric characters relate to the MAC address of the unit's UltimoX2 integrated circuit. The two Dante receiver (input) channels have default names of Ch1 and Ch2. Using Dante Controller, the default device and channel names can be revised as appropriate for the specific application.

- **Device Configuration**

The Model 362A supports audio sample rates of 44.1, 48, 88.2, and 96 kHz with some pull-up/down values available. The audio encoding is fixed for PCM 24. Device Latency and Clocking can be adjusted if required but the default value is typically correct.

- **Network Configuration – IP Address**

By default, the Model 362A's Dante IP address and related network parameters will be determined automatically using DHCP or, if not available, the link-local network protocol. If desired, Dante Controller allows the IP address and related network parameters to be manually set to a fixed (static) configuration. While this is a more involved process than simply letting DHCP or link-local "do their thing," if fixed addressing is necessary then this capability is available. In this case, it's highly recommended that a unit be physically marked, e.g., directly using a permanent marker or "console tape," with its specific static IP address. If knowledge of a Model 362A's IP address has been misplaced there is no reset button or other method to easily restore the unit to a default IP setting.

- **AES67 Configuration – AES67 Mode**

The Model 362A can be configured for AES67 operation. This requires the AES67 Mode to be set for Enabled. By default, AES67 mode is set for Disabled.

- **Model 362A Clocking Source**

While technically the Model 362A can serve as a Leader clock for a Dante network (as can all Dante-enabled devices) in virtually all cases the unit will be configured to receive "sync" from another device. As such, the check box for Preferred Leader associated with the Model 362A would not be enabled.

## **Model 362A Configuration**

The STcontroller software application is used to configure the way in which the Model 362A's headphone output channels function. No DIP switch settings or other local actions are used to configure the unit. This makes it imperative that STcontroller be available for convenient use on a personal computer that's connected to the related LAN.

- **Installing STcontroller**

STcontroller is available free of charge on the Studio Technologies' website ([studio-tech.com](http://studio-tech.com)). Versions are available that are compatible with personal computers running selected versions of the Windows and macOS operating systems. If required, download and install STcontroller onto a designated personal computer. This personal computer must be on the same local area network (LAN) and subnet as the Model 362A units that are to be configured.

Immediately after starting STcontroller the application will locate all the Studio Technologies' devices that it can control. The one or more Model 362A units to be configured will appear in the device list. Use the Identify command to allow easy recognition of a specific Model 362A unit. Double-clicking on a device name will cause the associated configuration menu to appear. Review the current configuration and make any changes that are

desired. Changes made using ST-controller will be immediately reflected in the unit's operation; no Model 362A reboot is required. Each time a change is made the power LED on the Model 362A's front panel will flash green in a distinctive pattern to indicate that command from STcontroller has been received.

- **Headphone Output Configuration**

STcontroller allows four configuration choices to be set. They ensure that the Model 362A will perform optimally for a wide range of applications.

- **Channel 1 Input Routing**

Choices are Left, Right, and Left and Right.

This configuration choice allows the audio signal associated with Dante receiver (input) channel 1 to be routed to the desired headphone output channel or channels.

**Left:** If this choice is selected, channel 1 audio will be sent only to the left headphone output channel.

**Right:** If this choice is selected, channel 1 audio will be sent only to the right headphone output channel.

**Left and Right:** When selecting this choice channel 1 audio will be sent to both the left and right headphone output channels.

- **Channel 2 Input Routing**

Choices are Left, Right, and Left and Right.

This configuration choice allows the audio signal associated with Dante receiver (input) channel 2 to be routed to the desired headphone output channel or channels.

**Left:** If this choice is selected, channel 2 audio will be sent only to the left headphone output channel.

**Right:** If this choice is selected, channel 2 audio will be sent only to the right headphone output channel.

**Left and Right:** When selecting this choice channel 2 audio will be sent to both the left and right headphone output channels.

- **Level Control Operation**

Choices are Ch 1 Level/Ch 2 Level, Left Level/Right Level, and Stereo Level/Balance.

This configuration choice determines how the two rotary level controls (pots) will function. Please review the choices carefully as the differences between the first and the second are somewhat subtle.

**Ch 1 Level/Ch 2 Level:** When this choice is selected, the controls will independently impart the level of the Dante receiver (input) channels. The control on the left, labeled A, will impact the level of Dante receiver (input) channel 1. A previous configuration determined the output channel or channels that input 1 was going to be routed to: left only, right only, or left and right. Control A will determine the level as input 1 is sent to either or both headphone output channels. The control on the right, labeled B, will impact the level of Dante receiver (input) channel 2. Again, it will impact the level of channel 2 as it is routed to the left only, right only, or the left and right headphone output channels.

**Left Level/Right Level:** This choice impacts the left and right headphone output channels. The control on the left, labeled A, will impact the level of the left headphone output channel. The way in which the Dante receiver (input) channels are routed (left only, right only, or left and right) doesn't impact how to control A functions. The control on the right, labeled B, will impact the level of the right headphone output channel.

**Stereo Level/Balance:** This choice impacts the head-phone output channels and is intended to support applications where a stereo source is connected to the input channels. The control on the left, labeled A, will impact the level of both the left and right headphone output channels. The control on the right, label B, will adjust the level balance of the left and right headphone output channels. Setting control B to its middle (50% of rotation) setting will provide an approximately equal output level for the left and right headphone output channels.

- **Minimum Level**

Choices are –40 dB and Full Mute.

This configuration setting determines the minimum level of the left and right headphone output channels. In the –40 dB setting the minimum headphone output level is approximately 40 dB below maximum; the headphone output channels will never fully mute. This ensures that audio signals, when present on the inputs, will always be present on either or both of the headphone output channels. In most on-air broadcast applications, this is the appropriate setting, ensuring that some level of signal is always present. When full mute is selected moving either potentiometer to its fully counterclockwise position will cause its associated headphone channel (or channels) to fully mute. If a potentiometer is set to serve as a balance control, moving control B to either its fully counterclockwise or fully clockwise position will cause the associated headphone channel to fully mute. Selecting the full mute mode may be appropriate for applications where minimizing the chance of audio “leakage” is important. This could occur when the connected headphones or headset are at times placed on a desk or tabletop, leaving audio emanating from them to travel in “free space” to an active or “live” microphone.

## Operation

At this point, everything should be ready and Model 362A operation can commence. An Ethernet connection with Power-over-Ethernet (PoE) capability should have been made. A pair of headphones, a headset, an earbud, or an earpiece should have been connected.

The Model 362A's Dante configuration settings should have been selected using the Dante Controller software application. In this way, the Dante transmitter (output) channels on associated equipment can be routed to the Model 362A's two Dante receiver(input) channels. The STcontroller software application should have been used to select the desired operating Model 362A configuration.

### • Initial Operation

The Model 362A will start to function as soon as a Power-over-Ethernet (PoE) power source is connected. However, it may take 20 to 30 seconds for full operation to commence. Upon initial power up the three status LEDs, located on the bottom panel below the RJ45 jack, will begin to light as network and Dante connections are established. The power LED on the top panel will most likely light on and off green as the application firmware begins to function. Once that has completed the power LED will light solid green. After the power-up sequence has completed and the Dante connection has been established full operation will begin.

### • Ethernet and Dante Status LEDs

Three status LEDs are located below the ether-CON RJ45 connector on the Model 362A's bottom panel. The LINK//ACT LED will light green whenever an active 100 Mb/s Ethernet connection has been established. This LED will then flash green in response to Ethernet data packet activity. The SYS and SYNC LEDs will display the operating status of the Dante interface and associated network. The SYS LED will light red upon Model 362A power up to indicate that the Dante interface is not ready. After a short interval it will light green to indicate that it is ready to pass data with another Dante device. The SYNC LED will light red when the Model 362A is not synchronized with a Dante network. It will light solid green when the Model 362A is synchronized with a Dante network and an external clock source (timing reference) is being received. It will slowly flash green when the Model 362A is serving as the Leader clock on the associated Dante network. It's possible that up to 30 seconds may be required for the SYNC LED to reach its final state.

### • How to Identify a Specific Model 362A

Both the Dante Controller and STcontroller software applications offer an Identify command that can be used to help locate a specific Model 362A. When the Identify command is selected it will send a command to a single Model 362A unit. On that specific unit the power LED, located on the unit's top panel, will flash green

approximately eight times. In addition, the SYS and SYNC status LEDs, located directly below the etherCON RJ45 connector on the bottom panel, will slowly flash green. After a few seconds the LED identification patterns will cease and normal Model 362A power LED and Dante status LED operation will resume.

- **Headphone Listen Level**

The power LED, located on the Model 362A's top panel, will light green during normal operation. The user is provided with two rotary level controls (pots), labeled A and B, that are located on the unit's top panel. How these controls function will depend on the configuration settings were made in the STcontroller software application.

The Model 362A's two Dante receiver (input) channels can be independently selected to route to the left headphone output channel, the right headphone output channel, or both the left and right headphone output channels. How the two level controls function can be selected from among three choices. When the Ch 1 Level/Ch 2 Level mode has been selected the control on the left, labeled A, will impact the level of Dante receiver (input) channel 1. No matter how the input is routed (left, right, or left and right) the control will adjust the level of the input. The control on the right, labeled B, will impact the level of Dante receiver (input) 2, again no matter if it is routed to the left only, the right only, or both the left and right headphone output channels. To clarify, the level controls will directly impact the two input signals rather than the headphone output channels. As an example, if Dante receiver (input) channel 1 is routed to both the left and right headphone output channels, control A will impact this one audio signal as it is presented to both the left and right headphone output channels. When selected for the Left Level/Right Level mode, the level controls will impact the headphone output channels (rather than the input channels). The control on the left, labeled A, will impact the level of the signal (or signals) present on the left channel of the headphone output. The control on the right, labeled B, will impact the level of the signal (or signals) present on the right headphone output channel. As previously discussed, the signal being sent to the left and right headphone output channel is dependent on the configuration of the input routing. For example, if Dante receiver (input) channel 1 and Dante receiver (input) channel 2 are both routed only to the left headphone output channel, control A will impact the level of both inputs as they are combined and sent out the left headphone output.

Selecting the stereo level/balance mode will impact the headphone output channels. The level control on the left, labeled A, will adjust the level of both the left and right headphone output channels. The control on the right, labeled B, will adjust the level balance between the left and right headphone output channels; when control B is set to its mid-rotation (50%) position the level of the left and right headphone output channels will be approximately equal.

The level controls (pots) are a push-in/push-out type which allow their associated knobs to be in their "out" position when adjustment is required and in their "in" position when protection from an unwanted change is desired. A setting in STcontroller allows the minimum level of the headphone output channels to be selected. One setting selects a maximum attenuation of 40 dB, ensuring that audio can always be present on the headphone output channels. This configuration setting will prevent an audio signal from being fully attenuated (muted) when its associated level control is set to its fully counterclockwise position. This can be useful for broadcast talent cueing (IFB) applications when users always need to hear at least a minimal amount of audio content. Note that users who are not aware of this capability might infer that the Model 362A has audio "leakage" or crosstalk but it's really related to a configuration choice. The headphone output can also be selected for full mute operation. This will ensure that a headphone output will be fully attenuated (muted) when its associated level control is in its fully counterclockwise position. This can be useful in applications where leakage from headphones, headsets, or earpieces might be detected by an active microphone.

Users should find the headphone output audio quality to be excellent, with high maximum output level and low



distortion. Analog audio signals do not pass directly through the level pots. The position of the pots is recognized by the Model 362A's processor which then adjusts the signal level within the digital domain.

## Technical Notes

### • IP Address Assignment

By default, the Model 362A's Ethernet interface will attempt to automatically obtain an IP address and associated settings using DHCP (Dynamic Host Configuration Protocol). If a DHCP server is not detected an IP address will automatically be assigned using the link-local protocol. This protocol is known in the Microsoft® world as Automatic Private IP Addressing (APIPA). It is also sometimes referred to as auto-IP (PIPPA). Link-local will randomly assign a unique IP address in the IPv4 range of 169.254.0.1 to 169.254.255.254. In this way, multiple Dante-enabled devices can be connected together and automatically function, whether or not a DHCP server is active on the LAN. Even two Dante-enabled devices that are directly interconnected using an RJ45 patch cord will, in most cases, correctly acquire IP addresses and be able to communicate with each other.

An exception does arise when trying to directly interconnect two Dante-enabled devices that each use the Ultimo integrated circuit to implement Dante. The Model 362A uses the Ultimo "chip" and, as such, direct one-to-one interconnection to another Ultimo-based product is not supported. An Ethernet switch linking the two units is required to successfully interconnect two Ultimo-based devices. The technical reason that a switch is required relates to the need for a slight latency (delay) in the data flow; an Ethernet switch will provide this. Using the Dante Controller software application, the Model 362A's IP address and related network parameters can be set for a fixed (static) configuration. While this is a more involved process than simply letting DHCP or link-local "do their thing," if fixed addressing is necessary then this capability is available. In this case, it's highly recommended that every unit be physically marked, e.g., directly labeled using a permanent marker or "console tape," with its specific static IP address. If knowledge of a Model 362A's IP address has been misplaced there is no reset button or other method to easily restore the unit to a default IP setting. In the unfortunate event that a device's IP address is "lost," the Address Resolution Protocol (ARP) networking command can be used to "probe" devices on a network for this information. For example, in Windows OS the `arp -a` command can be used to display a list of LAN information that includes MAC addresses and corresponding IP addresses. The simplest means of identifying an unknown IP address is to create a "mini" LAN with a small PoE-enabled Ethernet switch connecting a personal computer to the Model 362A. Then by using the appropriate ARP command the required "clues" can be obtained.

### • Optimizing Network Performance

For best Dante audio-over-Ethernet performance a network that supports VoIP QoS capability is recommended. This can typically be implemented on virtually all contemporary managed Ethernet switches. There are even specialized switches that are optimized for entertainment-associated applications. Refer to the Audinate website ([audinate.com](http://audinate.com)) for details on optimizing networks for Dante applications.

### • Application Firmware Version Display

A selection in the STcontroller software application allows the Model 362A's application firmware version to be identified. This can be useful when determining if the application firmware needs to be updated. It can also be important when working with factory personnel on application support and troubleshooting. To identify the firmware version, begin by connecting the Model 362A unit to the network (via Ethernet with PoE). Then wait until the unit starts to function and a Dante connection has been established. Using the STcontroller software

application, review the list of identified devices and select the specific Model 362A for which you want to determine its application firm-ware version. Then select Version and Information under the Device tab. A page will then display that will provide lots of useful information. This includes the application firmware version and well as details on the Dante interface firmware.

#### • **Application Firmware Update Procedure**

It's possible that updated versions of the application firmware (embedded software) that is utilized by the Model 362A's microcontroller (MCU) integrated circuit will be released to add features or correct issues. The unit has the ability to load a revised file into the MCU's non-volatile memory by way of a USB interface. The Model 362A implements a USB host function that directly supports connection of a standard USB flash drive. The Model 362A's MCU updates its firmware using a file named

**M362AvXrXX.stm** m where the Xs are decimal digits that represent the version number. Refer to the Studio Technologies' website for the latest application firmware file.

The update process begins by preparing a USB flash drive. The flash drive doesn't have to be empty (blank) but must be in the personal-computer-standard FAT32 format. The USB host function implemented in the Model 362A is compatible with USB 2.0-, 3.0-, and 3.1-compliant flash drives. Save the new firmware file in the drive's root folder using the name **M362AXrXX.stm**. Studio Technologies will supply the application firmware file inside a .zip archive file. While the actual firmware file inside of the zip file will adhere to the naming convention required by the Model 362A, the name of the zip file itself will include the file's version number. For example, a file named

**M362Av1r00MCU.zip** would indicate that version 1.00 of the application firmware (M362Av1r00.stm) is contained within this zip file. Once the USB flash drive is inserted into the USB type A receptacle, located on the main circuit board under the cover, the unit must be powered off and again powered on. At this point, the file will automatically load. The following steps will document the precise procedure that is required:

- Disconnect the power source from the Model 362A. This will entail removing the Ethernet connection that is providing PoE power.
- Remove the cover from the Model 362A. Begin by using a Phillips screwdriver with a #1 tip to remove four Phillips head screws, two of which are located on each side of the cover. Be certain to save the screws so that re-assembly will be fast and painless. Then carefully slide the cover forward to separate it from the level controls and LED and then lift it off.
- Locate the USB type A receptacle on the main circuit board. It's near the front of the unit, directly between the two rotary controls (pots). Insert the prepared USB flash drive into the receptacle.
- Apply power to the Model 362A by connecting to a Power-over-Ethernet (PoE) Ethernet source.
- After a few seconds, the Model 362A will run a "boot loader" program that will automatically load the new application firmware file (M362AvXrXX.stm). The loading process will take only a few seconds. During this time period, the power LED, located on the front of the circuit board, will slowly flash green. Once the entire loading process is over, taking approximately 10 seconds, the Model 362A will restart using the newly loaded application firmware.
- At this time, the Model 362A is functioning with the newly loaded application firmware and the USB flash drive can be removed. But to be conservative, remove the PoE power, then remove the USB flash drive, then re-apply the PoE Ethernet connection.
- Confirm that the desired firmware version has been correctly loaded. This can be done using the STcontroller software application.

**Note** that upon power being applied to the Model 362A if a connected USB flash drive doesn't have the correct file name (M362AvXrXX.stm) in its root folder no harm will occur. In this case, the power LED will

flash green rapidly for a few seconds to indicate an error condition and then normal operation using the unit's existing application firmware will begin.

- **Ultimo Firmware Update**

As previously discussed, the Model 362A implements its Dante connectivity using the UltimoX2 integrated circuit from Audinate. The Dante Controller software application can be used to determine the version of the firmware (embedded software) that resides in this integrated circuit. The firmware (embedded software) residing in the UltimoX2 can be updated using the Model 362A's Ethernet port. Performing the update process is easily accomplished using the automated method called Dante Updater that's included as part of the Dante Controller application. This application is available, free of charge, from the Audinate website (audinate.com). The latest Model 362A Dante firm-ware file, with a name in the form of M362AvXrXrX.dnt, is available on the Studio Technologies' website as well as being part of Audinate's product library database. (Note that XrXrX will be the actual version number.) The latter allows the Dante Updater software application that is included with Dante Controller to automatically query and, if required, update the firmware in the Model 362A's Dante interface.

- **Restoring Factory Defaults**

A command in the STcontroller software application allows the Model 362A's configuration to be reset to the factory default values. From STcontroller select the Model 362A for which you want to restore its defaults. Select the Device tab and then the Factory Defaults selection. Then click on the OK box. Refer to Appendix A for a list of the Model 362A's factory defaults.

## Specifications

- **Power Source:**

Power-over-Ethernet (PoE): class 1 (very low power, ≤3.84 watts) per IEEE® 802.3af

- **Network Audio Technology:**

- **Type:** Dante audio-over-Ethernet
- **AES67-2018 Support:** yes, selectable on/off Dante Domain Manager (DDM)
- **Support:** yes Bit Depth: up to 24
- **Sample Rates:** 44.1, 48, 88.2 and 96 kHz including some pull-up/down values
- Dante Receiver (Input) Channels: 2
- **Dante Audio Flows:** 2, receiver Receiver (Input) Nominal Level: -20 dBFS

- **Network Interface:**

- Type: 100BASE-TX, Fast Ethernet per IEEE 802.3u (10BASE-T and 1000BASE-T (GigE) not supported)
- Power-over-Ethernet (PoE): Per IEEE 802.3af Data Rate: 100 Mb/s (10 Mb/s and 1000 Mb/s not supported)

- **Headphone Output:**

- **Type:** Dual-channel
- **Compatibility:** intended for connection to mono or stereo headsets or earpieces with nominal impedance of 50 ohms or greater
- **Maximum Output Voltage:** 3.8 Vrms, 1 kHz, with 150 ohms load
- **Frequency Response:** 20 Hz to 20 kHz, +0/-2 dB Distortion (THD+N): <0.002%  
Dynamic Range: >100 dB

- **Connectors:**

- **Headphone Output:** ¼-inch 3-conductor jack and 3.5 mm 3-conductor jack  
Ethernet: Neutrik etherCON RJ45
- **USB:** type A receptacle (located inside Model 362A's enclosure and used only for updating application firmware)
- **Configuration:**
- uses Studio Technologies' STcontroller personal computer application
- **Environmental:**
  - Operating Temperature: 0 to 50 degrees C (32 to 122 degrees F)
  - Storage Temperature: –40 to 70 degrees C (–40 to 158 degrees F)
  - Humidity: 0 to 95%, non-condensing Altitude: not characterized
- **Dimensions (Overall):**
  - 3.1 inches wide (7.9 cm)
  - 1.5 inches high (3.8 cm) without belt clip,
  - 1.8 inches (4.6 cm) with belt clip
  - 4.0 inches deep (10.2 cm)
- **Weight: 0.5 pounds (0.2 kg)**
- **Deployment:**  
intended for portable applications; contains integral belt clip Specifications and information contained in this User Guide subject to change without notice.

**Appendix A–STcontroller Default Configuration Values**

- Headphone Output – Channel 1 Input Routing: Left
- Headphone Output – Channel 2 Input Routing: Right
- Headphone Output – Level Control Operation: Ch 1 Level/Ch 2 Level
- Headphone Output – Minimum Level: –40 dB

**Documents / Resources**

	<a href="#">studio-tech 362A Listen-Only Beltpack</a> [pdf] User Guide 362A, Listen-Only Beltpack
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**References**

-  [Audinate - Maker of Dante, Pro AV's Leading Networking Technology](#)
-  [Home - Studio Technologies, Inc.](#)