Model 5365
Headset Interface

User Guide

Issue Preliminary 1, January 2025

This User Guide is applicable for serial numbers
M5365-00151 and later with Application Firmware 1.11 and later
and STcontroller application for Windows® version 4.02.00 and later

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Table of Contents

Revision History

Issue Preliminary 1, January 2025:

- Initial preliminary release.

Introduction

-- Pending --

Getting Started

In this section, a location will be selected for the Model 5365 Headset Interface. If desired, an optional installation kit will be used to mount a Model 5365 unit into a panel cutout, wall surface, or equipment rack. Signal interconnections can be made using the unit's four connectors, all of which are located on the back. An Ethernet data connection with Power-over-Ethernet (PoE) capability will be made using a standard RJ45 patch cable. A 3-conductor 3.5 mm jack provides access to the unit's stereo (2-channel) line input. Another 3-conductor 3.5 mm jack provides access to the unit's stereo (2-channel) line output. A dual-channel or single-channel (dual- or single-ear) headset or headset interface assembly will be connected using a cable-mounted 5-pin male XLR connector.

What's Included

Included in the shipping carton are a Model 5365 Intercom Station and instructions on how to obtain an electronic copy of this guide. Units shipped "bulk packed" will not include an instruction sheet. As a device that is Power-over-Ethernet (PoE) powered, no external power source is provided. In most applications an Ethernet switch with the required PoE capability will be utilized. An optional installation kit allows a Model 5365 to be mounted in a rectangular opening in a tabletop or attached to a flat surface. If one or two Model 5365 units are going to be mounted in a 19-inch equipment rack then having one of the optional rack-mount installation kits is required. If an installation kit was purchased it would have been shipped in a separate carton.

Locating the Model 5365

The Model 5365's location will depend on where the user or technical personnel needs access to it. Some Model 5365 units are shipped for self-contained "throw down" use, suitable for portable applications or placement in a semi-permanent location. Installed on the bottom of the chassis may be screw-affixed "bump-on" protectors (also known as rubber "feet"). These are useful if the unit is going to be placed on a surface where scratching of either the Model 5365's enclosure or the surface material could take place. However, if applicable the feet can be removed when installation in a panel cutout, wall mount, or rack enclosure is going to be performed. Model 5365 units that are shipped for OEM applications may not include the protective feet. These applications would typically install Model 5365 units in an equipment rack where the feet would not be necessary.

Once the unit's location has been established its twisted-pair Ethernet cabling must be within 100-meters (325-feet) of the Ethernet port on the associated PoE network switch. This overall length limit can be overcome by using a fiber-optic interconnection between the Model 5365-related PoE-supporting Ethernet switch and another Ethernet switch that's part of the

Figure 1. Model 5365 Headset Interface front and back views

application's local-area-network (LAN). With fiber interconnects there's no reason why a Dante-supported LAN can't be distributed over many miles or many kilometers.

Panel Cutout or Surface Mounting One Model 5365 Unit

Installation kit RMBK-10 allows one Model 5365 to be mounted in a panel cutout or onto a flat surface. The kit contains two standard-length brackets and four 6-32 thread-pitch Phillips-head machine screws. Refer to Appendix B for a visual explanation.

Get ready to install the kit by first removing the four machine screws and associated bump-on protectors, if present, from the bottom of the Model 5365's chassis. They are removed using a #1 Phillips screwdriver. Store the four machine screws and four bump-on protectors for possible later use.

To prepare the unit to mount in a cutout or other opening in a panel, use a #2 Phillips screwdriver and two 6-32 machine screws to attach one of the standard-length brackets onto the left side (when viewed from the front) of the Model 5365's enclosure. Orient the standard-length bracket such that its front is parallel to the Model 5365's front panel. The screws will mate with the threaded fasteners that can be seen on the side of the Model 5365's enclosure, near the front of the unit. Using two additional 6-32 machine screws, attach the other standard-length bracket onto the right side of the Model 5365's enclosure.

Once the two standard-length brackets have been installed the Model 5365 will be ready to be mounted into an opening. Secure the unit into the top left and right edges of the opening using two mounting screws per side.

To prepare the unit to be mounted onto a flat surface simply requires the standard-length brackets be attached to the Model 5365 at 90 degrees from how they were mounted for use in a panel cutout. Use a #2 Phillips screwdriver and two 6-32 machine screws to attach one of the standard-length brackets onto the left side (when viewed from the front) of the enclosure. Orient the bracket such that its front is parallel with the top surface of the Model 5365's enclosure. The screws will mate with the threaded fasteners that can be seen on the side of the Model 5365's enclosure, near the front of the unit. Following

the same orientation, use two additional 6-32 machine screws to attach the other standard-length bracket onto the right side of the Model 5365's enclosure.

Once the two standard-length brackets have been installed the Model 5365 will be ready to be mounted onto a flat surface. Secure the unit to the surface using two mounting screws per side.

Left- or Right-Side Rack Mounting One Model 5365 Unit

Installation kit RMBK-11 allows one Model 5365 to be mounted in the left or right side of one space (1U) of a standard 19-inch rack enclosure. The kit contains one standard-length bracket, one long-length bracket, and four 6-32 thread-pitch Phillips-head machine screws. Refer to Appendix C for a visual explanation.

Get ready to install the kit by removing the four machine screws and associated bump-on protectors, if present, from the bottom of the Model 5365's chassis. They are removed using a #1 Phillips screwdriver. Store the four machine screws and four bump-on protectors for possible later use.

To prepare the unit to mount in the left side of a rack enclosure, use a #2 Phillips screwdriver and two 6-32 machine screws to attach the standard-length bracket onto the left side (when viewed from the front) of the enclosure. The screws will mate with the threaded fasteners that can be seen on the side of the Model 5365's enclosure, near the front of the unit. Using two additional 6-32 machine screws, attach the long-length bracket onto the right side of the Model 5365's enclosure.

To prepare the unit to mount in the right side of a rack enclosure, use a #2 Phillips screwdriver and two 6-32 machine screws to attach the long-length bracket onto the left side of the enclosure. Using two additional 6-32 machine screws, attach the standard-length bracket onto the right side of the Model 5365's enclosure.

Once the standard-length and long-length brackets have been installed the Model 5365 will be ready to be mounted into the designated equipment rack. One space (1U or 1.75 vertical inches) in a standard 19-inch equipment rack is required. Secure the unit into the equipment rack using two mounting screws per side.

Rack-Mounting Two Model 5365 Units

Installation kit RMBK-12 is used to allow two Model 5365 units to be mounted in one space (1U) of a standard 19-inch equipment rack. The kit can also be used to mount one Model 5365 and one other Studio Technologies' product that is compatible with the RMBK-12, such as the Model 5421 Dante Intercom Audio Engine. The RMBK-12 installation kit contains two standard-length brackets, two joiner plates, eight 6-32 thread-pitch Phillips-head machine screws, and two 2-56 thread-pitch Torx™ T7 thread-forming machine screws. Refer to Appendix D for a visual explanation.

Get ready to install the kit by removing the four machine screws and associated bump-on protectors, if present, from the bottom of each chassis. They are removed using a #1 Phillips screwdriver. Store the eight machine screws and eight bump-on protectors for possible later use.

With assistance from a #2 Phillips screwdriver, use two of the 6-32 machine screws to attach one of the standard-length brackets onto the left side (when viewed from the front) of one of the Model 5365 units. The screws will mate with the threaded fasteners that can be seen on the side of the Model 5365's enclosure, near the front of the unit. Using two more of the 6-32 machine screws, attach one of the joiner plates onto the right side of that same Model 5365 unit.

Again using two of the 6-32 machine screws, attach the second standard-length bracket onto the right side of the second Model 5365 or another compatible unit. Using the final two 6-32 machine screws, attach the second joiner plate onto the left side of the second Model 5365 or other compatible unit with an orientation of 180 degrees from the way in which the first plate was installed.

To complete the assembly, "join" the units together by sliding each joiner plate through the other. The grooves in each joiner plate will carefully align with each other and form a relatively tight bond. Line up the two units so that the front panels form a common plane. With the aid of a Torx T7 screwdriver, use the two 2-56 Torx machine screws to secure the two joiner plates together. The screws should fit snugly into the small openings formed by the mating of the two joiner plates.

The 2-unit assembly is now ready to be mounted into the designated equipment rack. One space (1U or 1.75 vertical inches) in a standard 19-inch equipment rack is required. Secure the assembly into the equipment rack using two mounting screws per side.

Center Rack Mounting One Model 5365 Unit

Installation kit RMBK-13 allows one Model 5365 to be mounted in the center of one space (1U) of a standard 19-inch rack enclosure. The kit contains two medium-length brackets and four 6-32 thread-pitch Phillips-head machine screws. Refer to Appendix E for a visual explanation.

Get ready to install the kit by removing the four machine screws and associated bump-on protectors, if present, from the bottom of the Model 5365's chassis. They are removed using a #1 Phillips screwdriver. Store the four machine screws and four bump-on protectors for possible later use.

To prepare the unit to mount in the center of a rack enclosure, use a #2 Phillips screwdriver and two 6-32 machine screws to attach one of the medium-length brackets onto the left side (when viewed from the front) of the enclosure. The screws will mate with the threaded fasteners that can be seen on the side of the Model 5365's enclosure, near the front of the unit. Using two additional 6-32 machine screws, attach the other medium-length bracket onto the right side of the Model 5365's enclosure.

Once the two medium-length brackets have been installed the Model 5365 will be ready to be mounted into the designated equipment rack. One space (1U or 1.75 vertical inches) in a standard 19-inch equipment rack is required. Secure the unit into the equipment rack using two mounting screws per side.

Ethernet Connection with PoE

A 100BASE-TX Ethernet connection that supports Power-over-Ethernet (PoE) is required for Model 5365 operation. This one connection will provide both the Ethernet data interface and power for the Model 5365's circuitry. A 10BASE-T connection is not sufficient and a 1000BASE-T (GigE) connection is not supported unless it can automatically "fall back" to 100BASE-TX operation. The Model 5365 supports Ethernet switch power management, enumerating

itself as a PoE class 1 device. Any 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 an RJ45 jack that is located on the Model 5365's back panel. This allows connection by way of a RJ45 plug that's part of a typical Ethernet "patch cable." A crossover cable will never be required as the Model 5365's Ethernet interface supports auto MDI/MDI-X. The maximum cable distance is 100-meters (325-feet) for twisted-pair Ethernet cabling.

Stereo Line Input

A 3-conductor 3.5 mm jack is located on the Model 5365's back panel and provides access to the unit's stereo (2-channel) analog line-level audio input. This allows direct interfacing with a source of unbalanced stereo analog audio, typically provided by a personal computer's line output. The nominal input level is –10 dBu. The interconnecting cable's 3-conductor 3.5mm plug should be wired such that left channel audio is on the tip lead, right channel audio is on the ring lead, and audio shield/common is on the sleeve lead. Refer to Figure 2 for connection details. Configuration choices in the STcontroller application allow the sensitivity of the two input circuits to be individually adjusted. This allows compatibility with signal sources that have a nominal level that is significantly lower than the unit's nominal –10 dBu.

Tip (T): Unbalanced Line Input Left
Ring (R): Unbalanced Line Input Right
Sleeve (S): Common/Shield
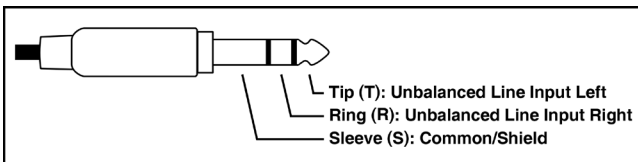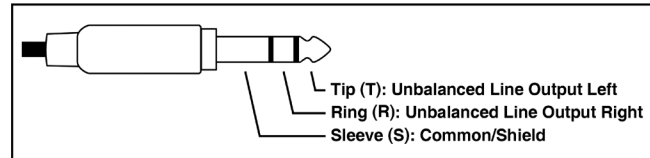
Figure 2. Connections for mating plug compatible with the Stereo Line Input 3.5 mm receptacle

Stereo Line Output

A second 3-conductor 3.5 mm jack is located on the Model 5365's back panel and provides access to the unit's stereo (2-channel) analog line-level audio output. This allows direct interfacing with an "pro-sumer" unbalanced analog stereo input connection that is typically found on a personal computer. The nominal

output level is –10 dBu. The interconnecting cable's 3-conductor 3.5mm plug should be wired such that left channel audio is on the tip lead, right channel audio is on the ring lead, and audio shield/common is on the sleeve lead. Refer to Figure 3 for connection details. Configuration choices in the STcontroller application allow the source signals and nominal level of the stereo line output to be adjusted.
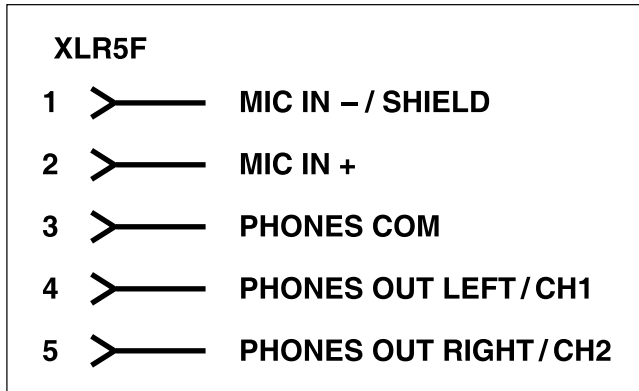

Tip (T): Unbalanced Line Output Left
Ring (R): Unbalanced Line Output Right
Sleeve (S): Common/Shield

Figure 3. Connections for mating plug compatible with the Stereo Line Output 3.5 mm receptacle

Headset Connection

The Model 5365 provides a 5-pin female XLR connector that interfaces with an intercom or broadcast-style headset. Some applications may connect the Model 5365's headset connector to a separate headset interface assembly. The headset will incorporate both a microphone and headphones. The latter will provide either a dual-ear or single-ear headphone with dual-channel (stereo) or single-channel (monaural) audio performance. The headset connector is located on the front panel for easy access by the user. Refer to Figure 4 for headset connection details. The microphone input connections are compatible with most unbalanced or electret (low-voltage DC-powered) microphones. A balanced dynamic microphone should, in most cases, also function correctly if the signal – (low) is connected to Model 5365's mic in –/shield connection. No support is provided for microphones that require P12 or P48 phantom power.

To allow users of stereo (dual-earpiece or "double muff") headsets to hear a monaural version of the two headphone output channels does not require special wiring of the 5-pin male XLR mating connector. The headset's left headphone channel should always be wired to pin 4 and the right headphone channel to pin 5. Configuration choices, discussed later in this guide, can then be used to create the desired monaural output. It's important not to connect together (short) pins 4 and 5 of the Model 5365's headset connector as damage to the unit's output circuitry could result.

```
┌─────────────────────────────────────────────┐
│                                               │
│   XLR5F                                        │
│                                               │
│   1  >───────   MIC IN − / SHIELD             │
│                                               │
│   2  >───────   MIC IN +                       │
│                                               │
│   3  >───────   PHONES COM                     │
│                                               │
│   4  >───────   PHONES OUT LEFT / CH1          │
│                                               │
│   5  >───────   PHONES OUT RIGHT / CH2         │
│                                               │
└─────────────────────────────────────────────┘
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Figure 4. Headset connection pinout chart

Monaural (single-earpiece or "single muff") headsets should be wired such that its headphone is wired only to pin 4; pin 5 should be remain unused. Configuration choices, discussed later in this guide, can be used to create a monaural output.

It's possible that some beyerdynamic headset interconnecting cable assemblies terminate its earpiece's left and right connections opposite from what the Model 5365 and other broadcast equipment requires. These cable assemblies may terminate their left earpiece to pin 5 of the XLR connector and their right earpiece to pin 4. If this condition is present, it will require reversing or "flipping" the two wires in a headset's 5-pin male XLR connector such that the left earpiece connects to pin 4 and the right earpiece to pin 5.

Dante Configuration

For audio to pass to and from the Model 5365 requires that several Dante-related parameters be configured. These configuration settings will be stored in non-volatile memory within the Model 5365's circuitry. Configuration will typically be done with the Dante Controller software application which is available for download free of charge at audinate.com. Versions of Dante Controller are available to support the Windows and macOS personal computer operating systems. The Model 5365 uses the UltimoX2 2-input/2-output integrated circuit to implement its Dante interface. The unit is compatible with the Dante Domain Manager (DDM) software application. It also supports AES67 when enabled using a Dante Controller configuration setting.

Audio Routing

The two Dante receiver (input) channels associated with the Model 5365 need to be routed (connected) to Dante transmitter (output) channels on associated equipment. Configuration settings allow these two audio sources to ultimately be sent to the Model 5365's 2-channel headphone output. The Model 5365's two Dante transmitter (output) channels must be assigned to Dante receiver (input) channels on associated equipment. This achieves routing the Model 5365's two talk output audio channels to the device (or devices) that will be "listening" to them.

Within Dante Controller a "subscription" is the term used for routing a transmitter channel or flow (a group of up to four output channels) to a receiver channel or flow (a group of up to four input channels). The number of transmitter flows associated with an UltimoX2 integrated circuit is limited to two. These can either be unicast, multicast, or a combination of the two. If the Model 5365's transmitter (output) channels need to be routed using more than two flows it's possible that an intermediary device, such as the Studio Technologies' Model 5421 or Model 5422A Dante Intercom Audio Engine, can be used to "repeat" the signals.

Unit and Channel Names

The Model 5365 has a default Dante device name of **ST-M5365-** followed by a unique suffix. The suffix identifies the specific Model 5365 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 transmitter (output) channels have default names of **Ch1** and **Ch2**. The two Dante receiver (input) channels have default names of **Ch1** and **Ch2**. Using Dante Controller, the default device name and channel names can be revised as appropriate for the specific application.

Device Configuration

The Model 5365 only supports an audio sample rate of 48 kHz with no pull-up/pull-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 5365'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 5365'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 5365 can be configured for AES67 operation. This requires the AES67 Mode to be set for Enabled. By default, AES67 mode is set for Disabled. Note that in the AES67 mode the Dante transmitter (output) channels will function in multicast; unicast is not supported.

Model 5365 Clocking Source

While technically the Model 5365 can serve as a Leader clock for a Dante network (as can all Dante-enabled devices) in most cases the unit will be configured to receive "sync" from another device. As such, the check box for Preferred Leader associated with most Model 5365 units would not be enabled.

Model 5365 Configuration

The Windows version of the STcontroller software application is used to configure the way in which the Model 5365 functions. No DIP switch settings or other local actions are used to configure the unit. This makes it imperative that STcontroller for Windows 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). Versions are available that are compatible with personal computers running selected versions of the Windows and macOS operating systems. However, the Model 5365 requires use of the Windows version. If required, download and install STcontroller for Windows onto a designated personal computer. This personal computer must be on the same local area network (LAN) and subnet as the Model 5365 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 5365 units to be configured will appear in the device list. Use the Identify command to allow easy recognition of a specific Model 5365 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 STcontroller will be immediately reflected in the unit's operation; no Model 5365 reboot is required. Each time a change is made the LEDs on the Model 5365's front panel will flash in a distinctive pattern to indicate that a command from STcontroller has been received.

Menu Page
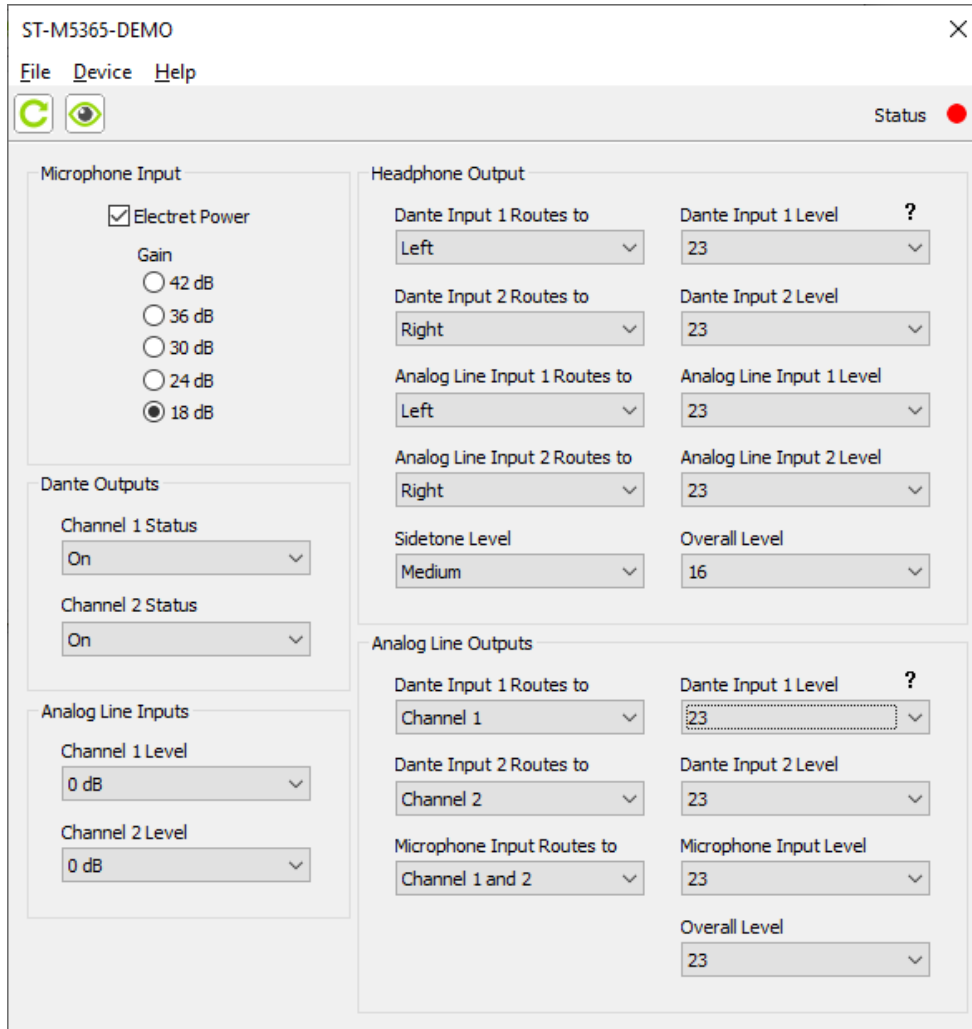
The following configuration selections are available.

Microphone Input – Electret Power

Choices are *Enabled* or *Not Enabled* (box checked or not checked).

Enable the Electret Power check box if the connected headset has an electret microphone that requires a source of low-voltage DC power for operation. If the associated headset has a dynamic (non-powered) microphone do not select the Electret Power check box. The electret power on/off status is displayed by way of an LED, labeled power, that is located on the left side of the Model 5365's front panel.

Note that the Model 5365 supplies approximately 8.6 volts DC for microphone power. It cannot supply the P12 or P48 phantom power that may be required

to support a balanced condenser (capacitor) microphone. This should not pose an issue as this type of microphone is essentially never associated with a headset that would be used for intercom or general communications applications.

Microphone Input – Gain

Choices are *18 dB*, *24 dB*, *30 dB*, *36 dB*, and *42 dB*.

Dynamic microphones have an output level that is typically lower than that provided by electret microphones. As such, the 36 dB or 42 dB gain settings will probably be appropriate for them. Electret microphones often have internal circuitry which provides a relatively high output level. The 18 dB and 24 dB gain settings will typically be appropriate with this type of microphone.

According to the information provided in the previous paragraph, when a dynamic microphone associated with a headset is connected to the Model 5365 the 36 dB gain setting may be correct. Setting the gain for 42 dB may be helpful in some applications, such as with headsets that have a low microphone output level. Electret microphones typically have a higher output level due to their internal preamplifier circuitry. As such, less preamplifier gain may be required. Selecting the 18 dB or 22 dB gain setting will probably be appropriate in these cases.

The headset microphone level LED, visible on the front panel, can act as a guide when setting the microphone preamplifier gain. It will light green when the internal level is equal to or exceeds at –40 dBFS, orange when the level is equal to or exceeds –15 dBFS, and red when the level is equal to or exceed –5 dBFS. These values are all referenced to the Model 5365's –20 dBFS nominal level. During normal talk operation the level LED should light green intermittently. If, for example, with a dynamic microphone the LED rarely lights and the preamp gain is set to 36 dB it might be a good idea to change it to 42 dB. If the LED often lights orange during normal talking the preamplifier gain should be reduced. If the LED ever lights red it indicates that the preamplifier gain is set too high and, accordingly, it should be reduced.

Dante Outputs – Channel 1 Status

Choices are *Off* and *On*.

The output of the Model 5365's microphone preamplifier can exit the Model 5365 by way of two Dante transmitter (output) channels. Each channel can be selected to be on or off. If it's desired for channel 1 to be active then the choice of *On* should be selected.

Dante Outputs – Channel 2 Status

Choices are *Off* and *On*.

The output of the Model 5365's microphone preamplifier can exit the Model 5365 by way of two Dante transmitter (output) channels. Each channel can be selected to be on or off. If it's desired for channel 2 to be active then the choice of *On* should be selected.

Analog Line Inputs – Channel 1 Level

Choices are 0 dB, *+6 dB*, and *+12 dB*.

The Model 5365 provides a 2-channel (stereo) analog line input. The nominal input level of both input channels is –10 dBu. It's possible that the level of a source signal connected to channel 1 might be significantly less than the unit's nominal. If this is the case then two configuration choices allow gain to be added to the circuitry associated with the channel 1 analog line input.

Analog Line Inputs – Channel 2 Level

Choices are 0 dB, *+6 dB*, and *+12 dB*.

The Model 5365 provides a 2-channel (stereo) analog line input. The nominal input level of both input channels is -10 dBu. It's possible that the level of a source signal connected to channel 2 might be significantly less than the unit's nominal. If this is the case then two configuration choices allow gain to be added to the circuitry associated with the channel 2 analog line input.

Headphone Output – Dante Input 1 Routes to

Choices are *Left*, *Right*, and *Left and Right*.

The Model 5365 has two Dante receiver (input) channels. Each can be routed (sent) to either or both of the headphone output channels. For this configuration, selecting *Left* will send Dante input 1 to only the left headphone output channel. Selecting *Right* will send Dante input 1 to only the right headphone output channel. Selecting *Left and Right* will send Dante input 1 to both the left and right headphone output channels.

Headphone Output – Dante Input 2 Routes to

Choices are *Left*, *Right*, and *Left and Right*.

The Model 5365 has two Dante receiver (input) channels. Each can be routed (sent) to either or both of the headphone output channels. For this configuration, selecting *Left* will send Dante input 2 to the left headphone output channel. Selecting *Right* will send Dante input 2 to the right headphone output channel. Selecting *Left and Right* will send Dante input 2 to both the left and right headphone output channels.

Headphone Output – Analog Line Input 1 Routes to

Choices are *Left*, *Right*, and *Left and Right*.

The Model 5365 has two analog line input channels that are physically connected using one 3.5 mm TRS jack. Each can be routed (sent) to either or both of the headphone output channels. For this configuration, selecting *Left* will send analog line input 1 to only the left headphone output channel. Selecting *Right* will send analog line input 1 to only the right headphone output channel. Selecting *Left and Right* will send analog line input 1 to both the left and right headphone output channels.

Headphone Output – Analog Line Input 2 Routes to

Choices are *Left*, *Right*, and *Left and Right*.

The Model 5365 has two analog line input channels that are physically connected using one 3.5 mm TRS jack. Each can be routed (sent) to either or both of the headphone output channels. For this configuration, selecting *Left* will send analog line input 2 to the left headphone output channel. Selecting *Right* will send analog line input 2 to the right headphone output channel. Selecting *Left and Right* will send analog line input 2 to both the left and right headphone output channels.

Headphone Output – Sidetone Level

Choices are *High*, *Medium High*, *Medium*, *Medium Low*, *Low*, and *Off*.

For user assistance, the Model 5365 includes a sidetone function that allows microphone audio coming from the microphone preamplifier and associated compressor circuit to be sent to both the left and right channels of the headphone output. This serves as a confirmation signal that they are actively sending audio out either or both of the unit's Dante output channels. (Sidetone audio will only be routed to the headphone output when at least one of the Dante output channels is active.)

The level of the sidetone audio can be selected from among five values. The correct value is simply the one that makes the user most comfortable. Sidetone audio can also be disabled by selecting *Off*. Selecting *Off* would be useful only in special applications such as during troubleshooting or where user talk audio

is being sent to the headphone output by way of the Dante or analog input channels. The four configuration parameters for the Dante inputs and analog line inputs will not impact the sidetone level as it is sent to the headphone output channels. The overall level configuration setting will impact the sidetone level.

Headphone Output – Dante Input 1 Level

Choices are *2* through *31*.

This configurable parameter allows the level of the circuitry associated with Dante input 1 to be adjusted. Selecting a value of *2* would make the input circuitry the least sensitive. Selecting a value of *31* would make the input circuitry the most sensitive, in effect having the most gain. Select a value that best supports the application.

Headphone Output – Dante Input 2 Level

Choices are *2* through *31*.

This configurable parameter allows the level of the circuitry associated with Dante input 2 to be adjusted. Selecting a value of *2* would make the input circuitry the least sensitive. Selecting a value of *31* would make the input circuitry the most sensitive, in effect having the most gain. Select a value that best supports the application.

Headphone Output – Analog Line Input 1 Level

Choices are *2* through *31*.

This configurable parameter allows the level of the circuitry associated with analog line input 1 to be adjusted. Selecting a value of *2* would make the analog input circuitry the least sensitive. Selecting a value of *31* would make the analog input circuitry the most sensitive, in effect having the most gain. Select a value that best supports the application.

Headphone Output – Analog Line Input 2 Level

Choices are *2* through *31*.

This configurable parameter allows the level of the circuitry associated with analog line input 2 to be adjusted. Selecting a value of *2* would make the analog input circuitry the least sensitive. Selecting a value of *31* would make the analog input circuitry the most sensitive, in effect having the most gain. Select a value that best supports the application.

Headphone Output – Overall Level

Choices are *2* through *31*.

This parameter allows the overall level of the Model 5365's 2-channel headphone output to be adjusted. Selecting a value of *2* would make the headphone output be at its lowest level. Selecting a value of *31* would make the headphone output be at its highest level. Select a value that best supports the application.

Analog Line Outputs – Dante Input 1 Routes to

Choices are *Channel 1*, *Channel 2*, and *Channel 1 and 2*.

The Model 5365 includes a 2-channel analog line output that is interfaced using a 3.5 mm TRS jack. This configuration allows Dante input 1 to be routed (sent) only to channel 1, only to channel 2, or to both channels 1 and 2. Selecting *Channel 1* will send Dante input 1 to channel 1 of the analog line output. Selecting *Channel 2* will send Dante input 1 to channel 2 of the analog line output. Selecting *Channel 1 and 2* will send Dante input 1 both channels 1 and 2 of the analog line output.

Analog Line Outputs – Dante Input 2 Routes to

Choices are *Channel 1*, *Channel 2*, and *Channel 1 and 2*.

The Model 5365 includes a 2-channel analog line output that is interfaced using a 3.5 mm TRS jack. This configuration allows Dante input 2 to be routed (sent) only to channel 1, only to channel 2, or to both channels 1 and 2. Selecting *Channel 1* will send Dante input 2 to channel 1 of the analog line output. Selecting *Channel 2* will send Dante input 2 to channel 2 of the analog line output. Selecting *Channel 1 and 2* will send Dante input 2 both channels 1 and 2 of the analog line output.

Analog Line Outputs – Microphone Input Routes to

Choices are *Channel 1*, *Channel 2*, and *Channel 1 and 2*.

The output of the Model 5365's microphone preamplifier and associated dynamics controller (compressor) circuit can be routed (sent) to the analog line outputs. Selecting *Channel 1* will send microphone audio

to channel 1 of the analog line output. Selecting *Channel 2* will send microphone audio to channel 2 of the analog line output. Selecting *Channel 1 and 2* will send microphone audio to both channels 1 and 2 of the analog line output.

Analog Line Outputs – Dante Input 1 Level

Choices are *2* through *31*.

This configurable parameter allows the level of the circuitry associated with Dante input 1 as it is sent to the analog line output (or outputs) to be adjusted. Selecting a value of *2* would make the input circuitry the least sensitive. Selecting a value of *31* would make the input circuitry the most sensitive, in effect having the most gain. Select a value that best supports the application.

Analog Line Outputs – Dante Input 2 Level

Choices are *2* through *31*.

This configurable parameter allows the level of the circuitry associated with Dante input 2 as it is sent to the analog line output (or outputs) to be adjusted. Selecting a value of *2* would make the input circuitry the least sensitive. Selecting a value of *31* would make the input circuitry the most sensitive, in effect having the most gain. Select a value that best supports the application.

Analog Line Outputs – Microphone Input Level

Choices are *2* through *31*.

The output of the microphone preamplifier and associated dynamics controller (compressor) circuit can be sent to either or both of the analog line output channels. (The routing follows a separate configuration.) The overall level of the microphone signal as it is sent to the analog line output channel (or channels) can be adjust by way of this configurable parameters. Selecting a value of *2* would set the microphone level to its lowest value. Selecting a value of *31* would set the microphone level to its maximum value. Select a value that best supports the application.

Analog Line Outputs – Overall Level
Choices are *2* through *31*.

This parameter allows the overall level of the Model 5365's 2-channel analog line output to be adjusted. Selecting a value of *2* would make the two analog line output channels be at their lowest level. Selecting a value of *31* would make the analog line output channels be at their highest level. Select a value that best supports the application.

Operation

-- Pending --

Technical Notes

Dante Identification Function

The Model 5365 will respond visually and aurally when a Dante identification command is received. This command can be generated by the Dante Controller or STcontroller for Windows software applications. It can also be created by a personal computer sending out the correct command via UDP. When an identification is received two actions will occur. The two LED indicators associated with the units RJ45 jack, link and act, will flash on and off for approximately six seconds. In addition, six short bursts of 500 Hz sine wave tone will also be sent out the headphone output channels for a total interval of six seconds. The tone will be added (summed) with the usual headphone audio signal. Once the identification action has ended, normal Model 5365 operation will resume.

IP Address Assignment

By default, the Model 5365's Dante-associated 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 use Ultimo integrated circuits to implement Dante. The Model 5365 uses an UltimoX4 "chip" and, as such, a direct one-to-one interconnection between it and another Ultimo-based product would typically not be supported. An Ethernet switch linking these units would be required to successfully interconnect the 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. This wouldn't typically prove to be an issue as the Model 5365 uses Power-over-Ethernet (PoE) to provide its operating power. As such, in most cases a PoE-enabled Ethernet switch would be utilized to support Model 5365 units.

Using the Dante Controller software application, the Model 5365's IP address and related network parameters can be set for a manual (fixed or 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 using a permanent marker or "console tape," with its specific static IP address. If knowledge of a Model 5365'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 5365. 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. In applications that utilize multicast Ethernet traffic enabling IGMP snooping can be valuable. (In this case, ensure that support for PTP v1 timing messages is still available.) These protocols can 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) for details on optimizing networks for Dante applications.

Application Firmware Version Number

The Model 5365 provides two methods of determining the version number of the unit's application firmware. Knowing the version number can be helpful when working with the factory on troubleshooting or application issues.

The easiest method of determining the firmware version number is to use the STcontroller software application. To identify the firmware version, begin by connecting the Model 5365 unit to the network (via Ethernet with PoE) and wait until the unit starts to function. Then, after starting STcontroller, review the list of identified devices and select the specific Model 5365 for which you want to determine its application firmware version. Selecting the **Device** tab, then **Version and Information** will result in a page displaying a number of parameters, including the application firmware version as well as details on the Dante interface firmware.

The second method is a little more cryptic but doesn't require the use of STcontroller. Upon power up, LEDs on the Model 5365's front panel will light in a unique "bit map" pattern to identify the version number. Upon power being applied to the Model 5365, the ten front-panel LEDs will go through a start-up sequence, each lighting red and green to indicate their functionality. Following a brief pause, four of the LEDs will either be off or will light green to indicate the major version number; TX2 representing 8, TX2 representing 4, RX1 representing 2, and RX2 representing 1. If only RX2 lights that will indicate that 1 is the major version number. If TX2 and RX2 light that would indicate that the major version number is 5 (TX2 being 4 and RX2 being 1. Add them up and

one gets 5). After a short pause, the same four LEDs will either be off or light red to indicate the sub-version number. As an example, if TX1, RX1, and RX2 light red that would indicate a sub-version number of 11. (TX1 being 8, RX1 being 2, and RX2 being 1. Add them up and one gets 11.)

Application Firmware Update Procedure

It's possible that updated versions of the application firmware (embedded software) that is utilized by the Model 5365's microcontroller (MCU) integrated circuit will be released to add features or correct issues. Refer to the Studio Technologies' website for the latest application firmware file. The unit has the ability to load a revised file into its MCU's non-volatile memory by way of a USB receptacle. The Model 5365 implements a USB host function that directly supports connection of a USB flash drive. The Model 5365's MCU updates its application firmware using a file named **M5365XvXX.stm** where *X*s are decimal digits that represent the version number.

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 processor in the Model 5365 is compatible with USB 2.0, USB 3.0, and USB 3.1-compliant Flash drives. Save the new firmware file in the root folder with a name of **M5365vXrXX.stm** where *XrXX* is the actual version number. Studio Technologies will supply the application firmware file inside a .zip archive file. While the firmware file inside of the zip file will adhere to the naming convention required by the Model 5365, the name of the zip file itself will include the file's version number. For example, a file named **M5365v1r11MCU.zip** would indicate that version 1.11 of the application firmware (**M5365v1r11.stm**) is contained within this zip file along with a readme (.txt) text file.

Once the USB flash drive is inserted into the USB receptacle, located on the back panel of the Model 5365, the unit must be powered off and again powered on. At this point, the file from the USB flash drive will automatically load. The precise steps required will be highlighted in the next paragraphs.

To install the application firmware file, follow these steps:

1. Disconnect power from the Model 5365. This will entail removing the Ethernet connection that is made to the RJ45 jack on the back panel.

2. Locate the USB receptacle on the back of the unit. Insert the prepared USB flash drive into it.

3. Apply power to the Model 5365 by connecting an Ethernet signal that has Power-over-Ethernet (PoE) present to the RJ45 jack.

4. After a few seconds the Model 5365 will run a "boot loader" program that will automatically load the new application firmware file (**M5365v***XrXX***.stm**). This loading process will take only a few seconds. During this time period the green LED that's located adjacent to the USB receptacle will flash slowly. Once the entire loading process is over, taking approximately 10 seconds, the Model 5365 will restart using the newly loaded application firmware.

5. At this time, the Model 5365 is functioning with the newly loaded application firmware and the USB flash drive can be removed. But to be conservative, remove the PoE Ethernet connection first and then remove the USB flash drive. Re-connect the Ethernet signal to restart the unit.

6. Using STcontroller, confirm that the desired application firmware version has been correctly loaded.

Note that upon power being applied to the Model 5365 if a connected USB flash drive doesn't have the correct file (**M5365v***XrXX***.stm**) in its root folder no harm will occur. Upon power up the adjacent green LED will flash on and off rapidly for a few seconds to indicate this condition and then normal operation using the unit's existing application firmware will begin.

Ultimo Firmware Update

As previously discussed, the Model 5365 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 5365's Ethernet port. Performing the update process is easily accomplished using an 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 5365 firmware file, with a name in the form of **M5365v***XrXrX***.dnt**, is always available on the Studio Technologies' website as well as being part of Audinate's product library database. The latter allows the Dante Updater software application that is included with Dante Controller to automatically query and, if required, update the Model 5365's Dante interface.

Restoring Factory Defaults

A command in the STcontroller software application allows the Model 5365's defaults to be reset to the factory values. From STcontroller select the Model 5365 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 5365's factory defaults.

Configuration using UDP Messages

It's possible to send the Model 5365 User Datagram Protocol (UDP) messages to configure the unit's operating characteristics. The factory has created a document that provides details regarding the use and format of the UDP messages. This document is available for download on the Studio Technologies website under the Other Documentation section of the Model 5365 Headset Interface webpage.

Specifications

Power Source:

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

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)

Network Audio Technology:

Type: Dante audio-over-Ethernet

AES67-2018 Support: Yes

Dante Domain Manager (DDM) Support: Yes

Bit Depth: up to 24

Sample Rate: 48 kHz

Pull-Up/Down Support: No

Dante Transmitter (Output) Channels: 2

Dante Receiver (Input) Channels: 2

Dante Audio Flows: 4; 2 transmitter, 2 receiver

Transmitter (Output) and Receiver (Input) Nominal Level: –20 dBFS

Microphone Input:

Compatibility: analog dynamic or electret microphones

Type: unbalanced

Electret Microphone Power: 8.5 volts DC via 1 k (1000) ohms series resistance, selectable on/off

Gain: 18, 24, 30, 36, or 42 dB, selectable

Frequency Response: 40 Hz to 20 kHz, –3 dB, nominal

Distortion (THD+N): <0.03%, 1 kHz, 24 dB gain

Noise Floor: –96 dBFS, A-weighted, electret power off

Compressor:

Threshold: 1.5 dB above nominal level (–18.5 dBFS)

Slope: 2:1

Headphone Output:

Type: 2-channel

Compatibility: intended for connection to stereo (dual-channel) or monaural (single-channel) headsets with nominal impedance of 50 ohms or greater

Maximum Output Voltage: 2.6 Vrms, ref 1 kHz and 150 ohms load

Frequency Response: 10 Hz to 20 kHz, –2 dB

Distortion (THD+N): <0.04%, ref 1 kHz and +10 dBu output

Dynamic Range: >85 dB

Analog Line Inputs:

Number of Channels: 2

Type: unbalanced, capacitor coupled

Impedance: 12.5 k ohms

Nominal Level: –10 dBu

Dynamic Range: 98 dB, A-weighted

Distortion (THD+N): <0.008%, ref 1 kHz and +13 dBu input

Frequency Response: +0/-2 dB, 20 Hz to 20 kHz

Analog Line Outputs:

Number of Channels: 2

Type: unbalanced

Source Impedance: 50 ohms

Nominal Level: –13 dBu

Dynamic Range: 94 dB, A-weighted

Distortion (THD+N): <0.04%, ref 1 kHz and +9 dBu output

Frequency Response: ±0.7 dB, 10 Hz to 20 kHz

Identification Tone Output:

Destination: headphone output channels

Type: 500 Hz, sine-wave

Duration: sequence of six tone "bursts" over six seconds (500 mSec On/500 mSec Off)

Nominal Level: –13 dBu

Enable Signal: Dante identification command

Connectors:

Ethernet: RJ45 jack

Headset: 5-pin female XLR

Analog Line Inputs: 3-conductor (TRS) 3.5 mm jack

Analog Line Outputs: 3-conductor (TRS) 3.5 mm jack

USB: type A receptacle (used only for updating application firmware)

Configuration: requires Studio Technologies' STcontroller for Windows software application

Software Updating: USB flash drive used for updating application firmware; Dante Updater application for updating Dante interface firmware

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):

8.7 inches wide (22.1 cm)

1.72 inches high (4.4 cm)

4.2 inches deep (10.7 cm) (includes XLR5F latch)

Weight: 0.95 pounds (0.42 kg); rack-mounting installation kits add approximately 0.2 pounds (0.09 kg)

Deployment: intended for tabletop applications. Four optional mounting kits are also available:

RMBK-10 allows one unit to be mounted in a panel cutout or on a flat surface

RMBK-11 allows one unit to be mounted in the left- or right-side of one space (1U) of a standard 19-inch rack

RMBK-12 allows two units to be mounted in one space (1U) of a standard 19-inch rack

RMBK-13 allows one unit to be mounted in the center of one space (1U) of a standard 19-inch rack

Specifications and information contained in this User Guide subject to change without notice.

Appendix A–STcontroller Default Configuration Values

Microphone Input – Electret Power: On (select box checked)

Microphone Input – Gain: 18 dB

Dante Outputs – Channel 1 Status: On

Dante Outputs – Channel 2 Status: On

Analog Line Inputs – Channel 1 Level: 0 dB

Analog Line Inputs – Channel 2 Level: 0 dB

Headphone Output – Dante Input 1 Routes to: Left

Headphone Output – Dante Input 2 Routes to: Right

Headphone Output – Analog Line Input 1 Routes to: Left

Headphone Output – Analog Line Input 2 Routes to: Right

Headphone Output – Sidetone Level: Medium

Headphone Output – Dante Input 1 Level: 23

Headphone Output – Dante Input 2 Level: 23

Headphone Output – Analog Line Input 1 Level: 23

Headphone Output – Analog Line Input 2 Level: 23

Headphone Output – Overall Level: 16

Analog Line Outputs – Dante Input 1 Routes to: Channel 1

Analog Line Outputs – Dante Input 2 Routes to: Channel 2

Analog Line Outputs – Microphone Input Routes to: Channel 1 and 2

Analog Line Outputs – Dante Input 1 Level: 23

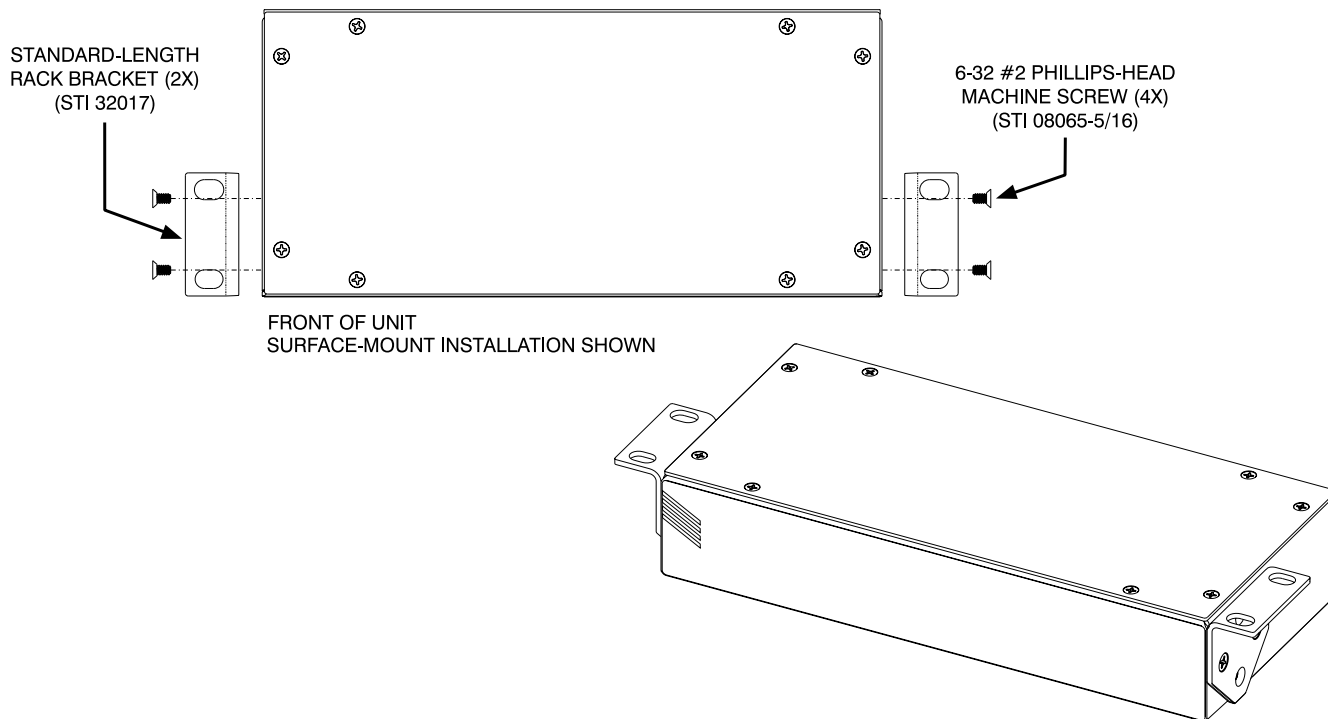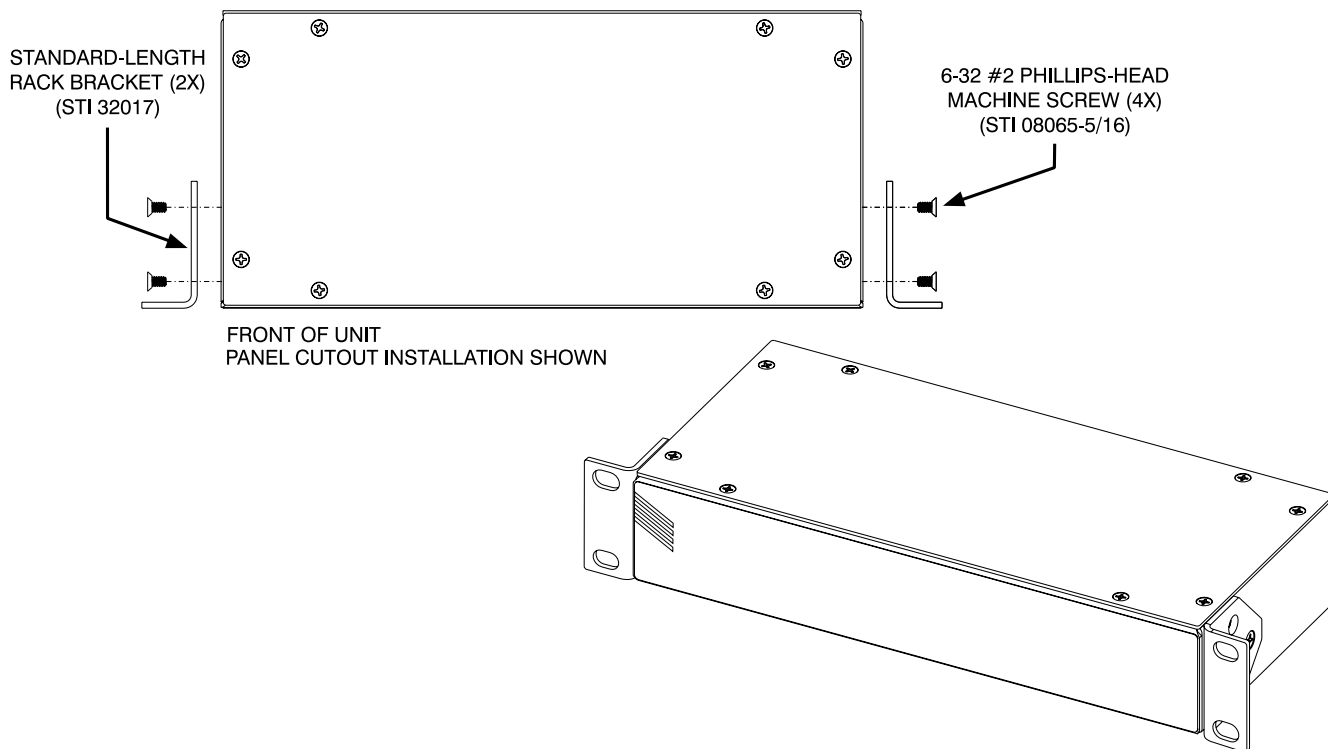Analog Line Outputs – Dante Input 2 Level: 23

Analog Line Outputs – Microphone Input Level: 23

Analog Line Outputs – Overall Level: 23

Appendix B–Graphical Description of the Installation Kit for Panel Cutout or Surface-Mounting Use *(Order Code: RMBK-10)*

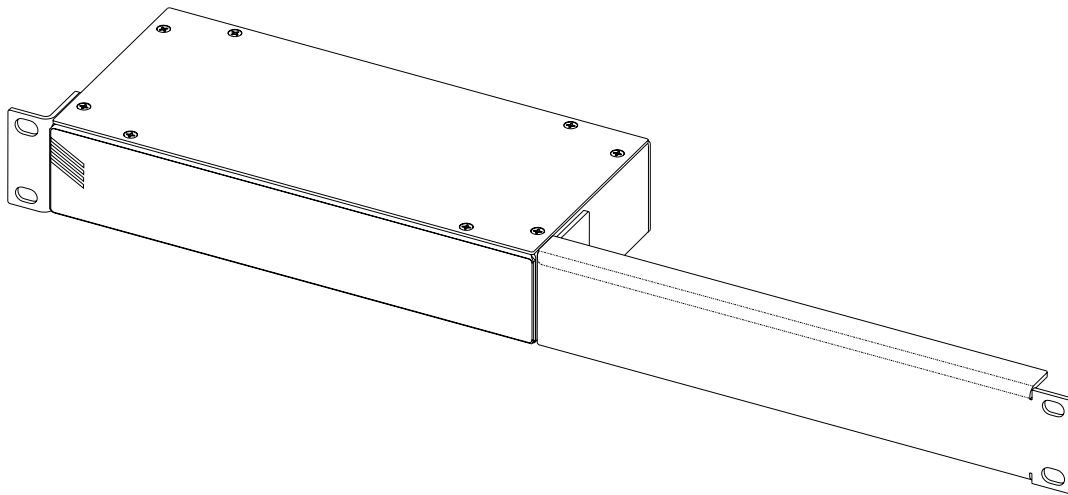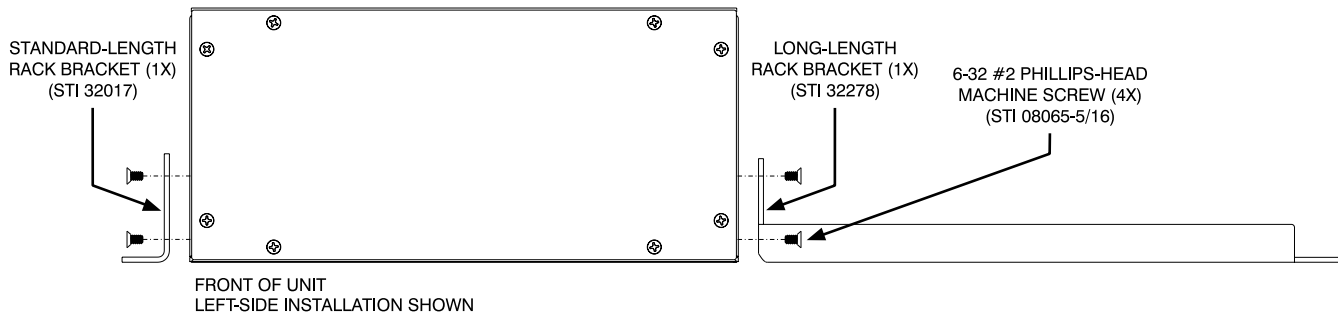This installation kit is used for mounting one Model 5365 unit into a panel cutout or flat surface.

STANDARD-LENGTH
RACK BRACKET (2X)
(STI 32017)

6-32 #2 PHILLIPS-HEAD
MACHINE SCREW (4X)
(STI 08065-5/16)

FRONT OF UNIT
PANEL CUTOUT INSTALLATION SHOWN

STANDARD-LENGTH
RACK BRACKET (2X)
(STI 32017)

6-32 #2 PHILLIPS-HEAD
MACHINE SCREW (4X)
(STI 08065-5/16)

FRONT OF UNIT
SURFACE-MOUNT INSTALLATION SHOWN

Appendix C–Graphical Description of Left- or Right-Side Rack-Mount Installation Kit for One "1/2-Rack" Unit *(Order Code: RMBK-11)*
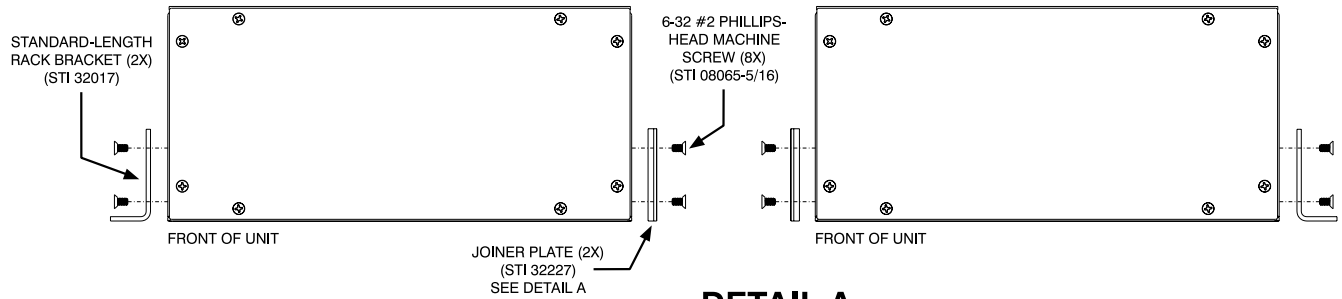
This installation kit is used for mounting one Model 5365 unit into one space (1U) of a 19-inch equipment rack. Unit will be located on the left- or right-side of the 1U opening.
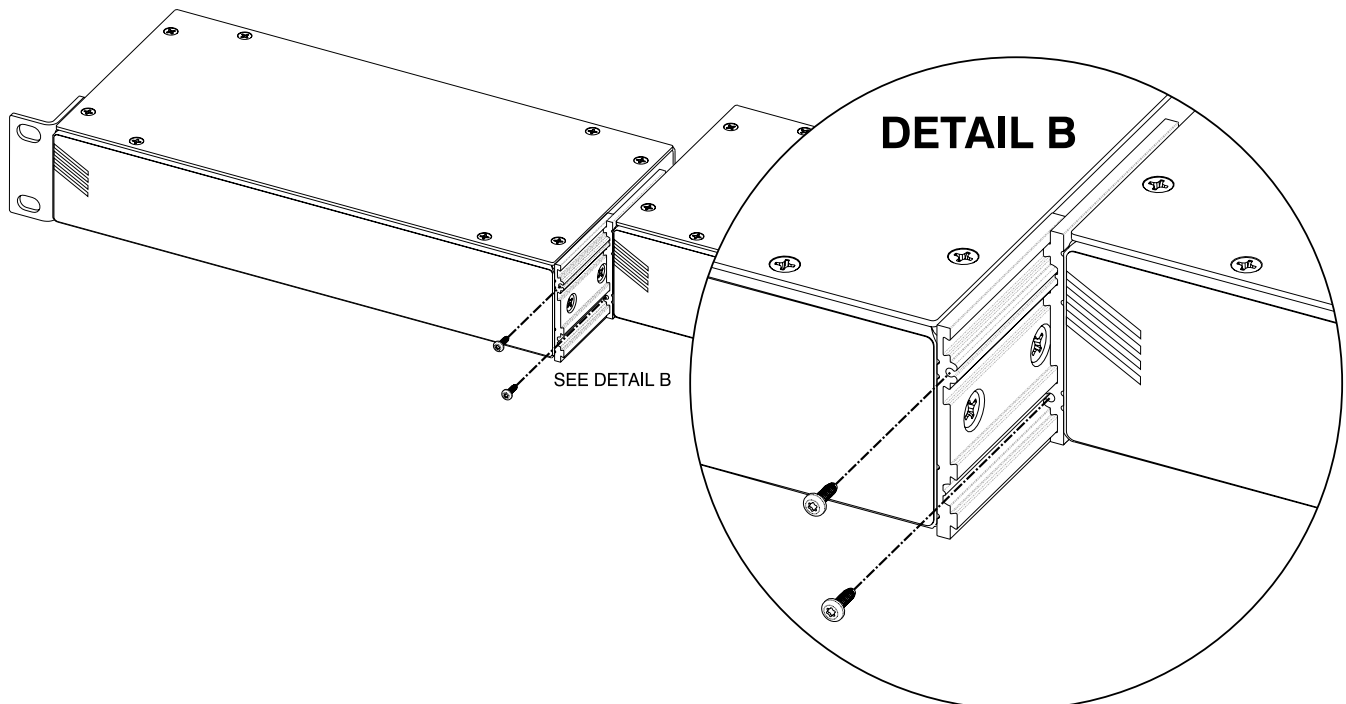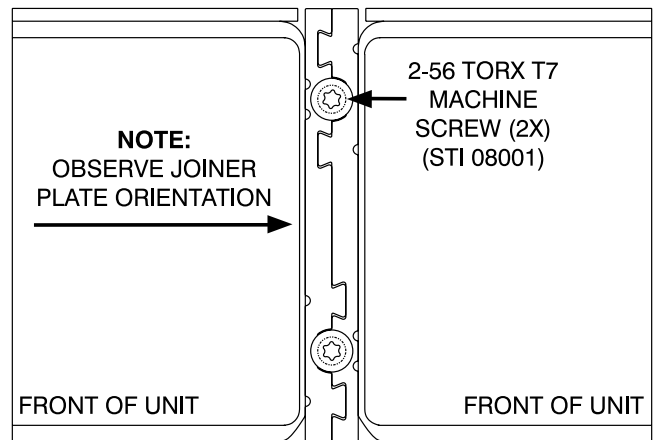

STANDARD-LENGTH
RACK BRACKET (1X)
(STI 32017)

LONG-LENGTH
RACK BRACKET (1X)
(STI 32278)

6-32 #2 PHILLIPS-HEAD
MACHINE SCREW (4X)
(STI 08065-5/16)

FRONT OF UNIT
LEFT-SIDE INSTALLATION SHOWN

Appendix D–Graphical Description of Rack-Mount Installation Kit for Two "1/2-Rack" Units *(Order Code: RMBK-12)*

This installation kit can be used to mount two Model 5365 units or one Model 5365 unit and another product that is compatible with the RMBK-12 (such as the Studio Technologies' Model 5421 Dante Intercom Audio Engine) into one space (1U) of a 19-inch equipment rack.

STANDARD-LENGTH RACK BRACKET (2X) (STI 32017)

6-32 #2 PHILLIPS-HEAD MACHINE SCREW (8X) (STI 08065-5/16)

FRONT OF UNIT

JOINER PLATE (2X) (STI 32227) SEE DETAIL A

FRONT OF UNIT

DETAIL A

NOTE: OBSERVE JOINER PLATE ORIENTATION

2-56 TORX T7 MACHINE SCREW (2X) (STI 08001)

FRONT OF UNIT

FRONT OF UNIT

DETAIL B

SEE DETAIL B

Appendix E–Graphical Description of Center Rack-Mount Installation Kit for One "1/2-Rack" Unit *(Order Code: RMBK-13)*

This installation kit is used for mounting one Model 5365 unit into one space (1U) of a 19-inch equipment rack. Unit will be located in the center of the 1U opening.

MEDIUM-LENGTH
RACK BRACKET (2X)
(STI 32434)

6-32 #2 PHILLIPS-HEAD
MACHINE SCREW (4X)
(STI 08065-5/16)

FRONT OF UNIT