Model 207A
eSports Console

User Guide

Issue 1, June 2023

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This User Guide is applicable for serial numbers
M207A-00151 and later with Application Firmware 1.00 and later
and STcontroller application version 3.11.15 and later.

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Revision History

Issue 1, June 2023:

- Initial release.

Introduction

The Model 207A eSports Console offers a unique combination of analog and digital audio resources specifically intended to support eSports-related live event, entertainment, and streaming broadcast applications. The unit is housed in a compact, steel enclosure that's intended for table-top use. Its compact size also makes it ideal for use in space-constrained locations. Color-configurable LED lights cast a distinctive "underglow" from the bottom of the enclosure. The Model 207A supports Dante® audio-over-Ethernet digital media technology with AES67 compatibility for integration into contemporary applications. The unit is extremely simple to deploy, is "pro" quality throughout, and provides an intuitive user experience. The Model 207A's audio quality is excellent, with low distortion, low noise, and ample headroom. Careful circuit design and rugged components ensure long, reliable operation.

The Model 207A integrates directly into both Dante audio-over-Ethernet and standard analog audio environments. With just a Power-over-Ethernet (PoE) connection, a broadcast or "gaming" headset, and a connection to a stereo line-level audio source, a complete player position can be created. If support for audio masking is desired, a set of stereo earbuds can also be connected.

An extensive set of parameters allows the Model 207A's functions to be tailored to meet the needs of a range of user and application requirements. These operating features are configured using the STcontroller software application. Available free of charge, STcontroller is a fast and simple means of confirming and revising the unit's operating parameters.

Applications

The Model 207A on its own can provide an "all-Dante" solution for one eSports game player location. The unit's small size makes it ideal for live applications where the allotted physical space for personnel is very limited. Four Dante receiver (input) channels supply the user with their talent cue (IFB) and audio masking signals. Should the cue signal be "mix-minus" an integrated sidetone function can provide the user with a microphone confidence signal.

Separate 2-channel (stereo) headphone outputs can simultaneously drive both headsets and earbuds. Some applications may utilize "masking" audio which would typically be sent to the headphone output. For masking, the Model 207A includes an integral noise source that can be selected. Alternately, an external Dante input source can be used. Full-program or mix-minus audio would normally would be sent to earbuds by way of the phones output. The phones audio sources would typically arrive in the Model 207A by way of Dante receiver (input) channels. For user confirmation, sidetone audio can be sent to either the headset or the earbud output.

Two Dante audio output channels are associated with a connected headset's microphone, one designated as main and the other as talkback. Two additional Dante outputs have signal sources derived from the Model 207A's stereo line input. These two audio channels, typically provided by an analog output of a personal computer, can also be routed to the headset or earbud outputs. The four Dante transmitter (output) channels are routed via an associated local area network (LAN) to inputs on Dante-compatible devices.
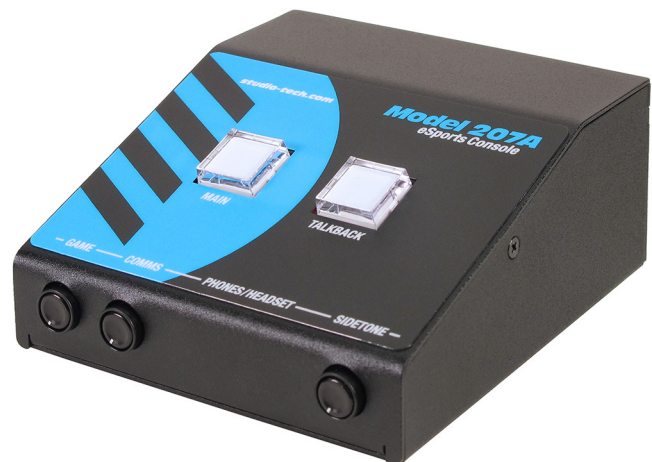

Figure 1. Model 207A eSports Console front and rear views

Two pushbutton switches, main and talkback, provide the user with direct control over their microphone audio routing. For virtually "click-free" performance, Model 207A audio switching is performed within the digital domain. Three rotary controls allow the user to create their own headphone audio mix.

Setup and Operation

Set up, configuration, and operation of the Model 207A is simple. An etherCON® RJ45 jack is used to interconnect with a standard twisted-pair Ethernet port provided by a PoE-enabled network switch. This connection supports both power and bidirectional digital audio.

A dual-channel (dual-ear or "stereo") broadcast head-set can be directly connected to the unit's 5-pin female XLR connector. Alternately, a 4-conductor (TRRS) 3.5 mm jack allows direct connection of a gaming-style headset. For each headset type, the microphone input is compatible with dynamic or electret microphones. The integrated low-voltage DC source provides power support for electret microphones. A separate 2-channel (stereo) phones output is provided on a 3-conductor (TRS) 3.5 mm jack. In most applications, users will plug earbuds in this jack.

A 3-conductor (TRS) 3.5 mm jack supports connection of a computer's analog line-level audio output. The Model 207A takes this computer audio source and makes it part of the Dante audio network by first converting it to digital and then outputting it by way of two Dante transmitter (output) channels. The audio from the stereo line input can also be configured to be part of the sidetone confirmation signal that is sent to the headset and phones (earbud) outputs.

The STcontroller software application is used to configure the wide range of Model 207A operating parameters. This allows the unit's performance to be optimized to meet the needs of specific applications.

The user is presented with two pushbutton switches and three push-in/push-out rotary level potentiometers. This makes it easy to control the status of the main and talkback outputs as well as adjusting the signals that are sent to the headset and earbud output channels.

Ethernet Data and PoE

The Model 207A connects to a local area network (LAN) by way of a standard 100 Mb/s twisted-pair Ethernet interface. The physical 100BASE-TX Ethernet interconnection is made by way of a Neutrik® etherCON RJ45 jack. While compatible with standard RJ45 plugs, this etherCON CAT5-compatible jack allows a ruggedized and locking interconnection for harsh or high-reliability environments.

The Model 207A'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 power management, the Model 207A's PoE interface enumerates (reports) to the power sourcing equipment (PSE) that it's a class 2 (low power) device.

Dante Audio-over-Ethernet

Audio data is sent to and received from the Model 207A using the Dante audio-over-Ethernet media networking technology. As a Dante-compliant device, the Model 207A's four Dante transmitter (output) channels and four Dante receiver (input) channels can be assigned (routed or "subscribed") to other devices using the Dante Controller software application. The Dante transmitter (output) and receiver (input) channels are limited to supporting four Dante flows, two in each direction. The digital audio's bit depth is up to 32 with a sampling rate of 48 kHz. Two bi-color LEDs provide an indication of the Dante connection status. An additional LED displays the status of the associated Ethernet connection.

The Model 207A is compatible with the AES67 interoperability standard. In addition, the unit is compatible with the Dante Domain Manager™ (DDM) software application.

Audio Quality

The Model 207A's audio performance is completely "pro." A low-noise, wide dynamic-range microphone preamplifier and associated voltage-controlled-amplifier (VCA) dynamics controller (compressor) ensures the headset's microphone audio quality is preserved while minimizing the chance of signal overload. The output of the microphone preamp/compressor circuit is routed to an analog-to-digital

conversion (ADC) section that supports a sampling rate of 48 kHz and a bit depth of up to 32. The audio signal, now in the digital domain, routes through a 32-bit microprocessor and on to the Dante interface section where it is packetized and prepared for transport over Ethernet.

Audio signals arrive via four Dante receiver (input) channels and pass into the Model 207A's microprocessor integrated circuit. The supported sampling rate is 48 kHz with a bit depth of up to 32. Channel routing, headphone audio sources and level control, and sidetone creation are performed within the digital domain. This provides flexibility, allowing precise control and keeping the three level potentiometers from having to directly handle analog audio signals. The audio channels destined for the headset and phones (earbud) outputs are sent to high-performance digital-to-analog converters and then on to robust driver circuitry. High signal levels can be independently provided to the connected headset and earbuds.

Configuration Flexibility

The Model 207A can be configured to meet the needs of specific applications and user preferences. All configuration choices are performed using the STcontroller software application. Selectable parameters include microphone preamplifier gain, microphone power source on/off, button operation, headset and phones (earbud) source selection, sidetone operation, and overall unit operation. In addition, the intensity of the user LED indicators can be configured as desired. The gain of the microphone preamplifier can be selected from among five choices. This allows the Model 207A to match the output sensitivity of a range of headset-associated microphones. A source of low-voltage DC power can be enabled if required to support electret microphones.

The main and talkback pushbutton switches can be individually configured. The main button can be selected to operate from among six modes while the talkback button can be selected from among four. These choices allow the Model 207A's operation to be tailored to meet the specific needs of many applications. As an example, for an on-air application the main button might need to be configured to provide a push to mute (cough) function. The microphone signal routed to the Dante main transmitter (output)

channel would remain active unless a game player needs to momentarily disable it. The talkback button would most likely be set to the push to talk mode as its use would be intermittent.

The audio sources and the way in which they are assigned to the headset and phones output channels and front-panel rotary controls can be configured from among many choices. Each choice is unique, allowing almost any required monitoring situation to be implemented.

There's even an integral noise source that can be routed to the headset output channels. A separate configuration choice allows this noise source to be sent to the headset output at a fixed (non-changeable) level; its audio level would not be impacted by the rotary controls. This capability is included specifically to support gaming applications where a masking audio signal needs to be sent to each player's headset, helping to minimize the chance that venue audio will reach an eSports player.

The integrated sidetone function allows audio associated with the microphone input to be sent to the phones (earbud) and/or the headset output. This is important as different applications may provide either a "full mix" or a "mix-minus" talent cue signal. If a full mix cue signal is provided then sidetone audio will not be needed and the function can be disabled. In the case where a mix-minus signal is present, providing the user with sidetone can be an important means of confirming the signal that's coming from the connected microphone.

Three system modes select the overall way in which the Model 207A functions. The on-air mode is optimized for applications where strict separation between on-air and production audio channels is required. Other applications will benefit from the two available production modes.

Future Capabilities and Firmware Updating

The Model 207A was designed so that its capabilities and performance can be 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 USB flash drive.

The Model 207A uses an Audinate UltimoX4™ integrated circuit to implement its Dante interface. The firmware in this integrated circuit can be updated via the 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 207A eSports Console and instructions 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. In most applications, an Ethernet switch with PoE capability will be utilized.

Connections

In this section, signal interconnections will be made using the five connectors located on the back of the Model 207A's enclosure. An Ethernet data connection with Power-over-Ethernet (PoE) capability will be made using either a standard RJ45 patch cable or an etherCON CAT5-compatible plug. A dual-channel or single-channel (dual- or single-ear) headset will be connected using a cable-mounted 5-pin male XLR connector. Alternately, a headset with a 4-conductor (TRRS) 3.5 mm plug can be used. (The headset's plug needs to follow the CTIA™/AHJ configuration standard.) A separate set of stereo earbuds can be connected using a 3-conductor (TRS) 3.5 mm plug. A source of stereo unbalanced analog audio (typically from a personal computer) may be connected to the Model 207A using a 3-conductor (TRS) 3.5 mm plug.

Ethernet Connection with PoE

A 100BASE-TX Ethernet connection that supports Power-over-Ethernet (PoE) is required for Model 207A operation. This one connection will provide both the Ethernet data interface and power for the Model 207A'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 207A supports PoE PSE Ethernet switch power management, enumerating itself as a PoE class 2 device.

The Ethernet connection is made by way of a Neutrik etherCON protected RJ45 jack that is located on the back of the Model 207A's enclosure. This allows connection by way of a standard RJ45 or cable-mounted

etherCON CAT5-compatible plug. The Model 207A's Ethernet interface supports auto MDI/MDI-X so that a crossover cable is not required.

Headset Connections

The Model 207A allows two different types of headsets to be connected. A 5-pin female XLR connector, located on the Model 207A's back panel, allows connection of a standard broadcast- or intercom-style communications headset. A 4-conductor (TRRS) 3.5 mm jack, also located on the back panel, allows a computer gaming headset to be directly connected. The Model 207A's two headset connectors are electrically wired in parallel. As such, only one type of headset should be connected at one time.

The use of the headphone portion of the connected headset will depend on the exact needs of an application. In some cases, program audio would be sent to the headphone portion of a connected headset. In other cases, masking audio may be sent to a game participant. This could be in the form of a random noise source. The actual audio source for the headset's headphone channels will be configured using the STcontroller application. A variety of sources will be available.

Headset A

The Model 207A provides a 5-pin female XLR connector that interfaces with the microphone and headphone connections of a single- or dual-ear intercom or broadcast-style headset. The connector is labeled Headset A. Refer to Figure 2 for connection details. The microphone input connections are compatible with most unbalanced dynamic or electret (low-voltage DC-powered) microphones. A balanced dynamic microphone should, in most cases, also function correctly if its signal – (low) is connected to Model 207A'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

Figure 2. Headset A connection pinout chart

the desired monaural output. It's important not to connect together (short) pins 4 and 5 of the headset's connector as damage to the Model 207A's output circuitry could result.

A monaural (single-earpiece or "single-muff") headset 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 inter-connecting cable assemblies terminate the earpiece's left and right connections opposite from what the Model 207A and other broadcast equipment require. These cables may terminate the left earpiece to pin 5 of the 5-pin male XLR connector and the right earpiece to pin 4. If this condition is present, it will require reversing or "flipping" the two wires in a head-set's connector such that the left earpiece connects to pin 4 and the right earpiece to pin 5.

If a separate microphone and pair of headphones need to be connected an adapter cable assembly should be fabricated. It would consist of a 5-pin male XLR connector wired to both a 3-pin female XLR connector for the microphone and a ¼-inch or 3.5 mm TRS jack for the headphones. In this scenario, the microphone would in most cases be a dynamic type as the Model 207A provides only low-voltage DC electret power. Phantom-powered (P12 or P48) microphones would not be compatible. Most hand-held or "stick" microphones are dynamic and should function correctly.

Headset B

The Model 207A also allows direct connection of gaming headsets that are ubiquitous in the per-sonal computer world. The 4-conductor (TRRS) 3.5 mm jack, labeled Headset B, is compatible with the CTIA™/AHJ configuration standard which has the headphone left channel on the tip connection, the headphone right channel on the ring 1 connection, common/shield on the ring 2 connection, and the microphone on the sleeve connection. Compatible headsets are readily available, typically described as personal computer or gaming headsets. The micro-phones used in these headsets are electret type which require a low-voltage DC source for operation. The Model 207A is able to provide this power and requires only that the appropriate setting in STcontroller be selected. Refer to Figure 3 for a detailed description of the compatible TRRS plug.
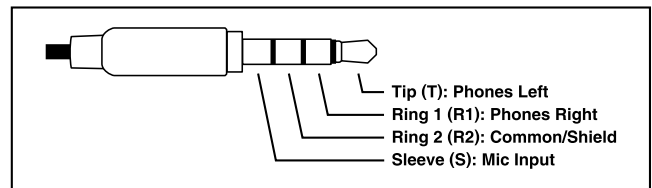
Figure 3. Headset B (TRRS) connection pinout chart

Phones Output

The Model 207A allows connection of a pair of stereo earbuds. (Of course, headphones will also function correctly, but the intended application is for use with earbuds.) The 3-conductor (TRS) 3.5 mm jack, labeled Phones Out, follows the headphone connec-tion standard which has the left channel on the tip lead, right channel on the ring lead, and common/shield on the sleeve lead. Refer to Figure 4 for a detailed description of the compatible TRS plug.

Figure 4. Phones Out (TRS) connection pinout chart
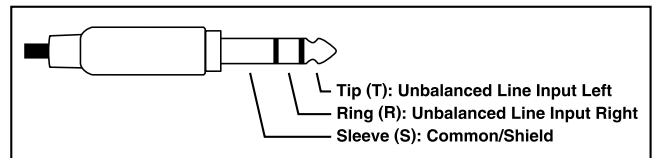
Stereo Line Input

The Model 207A provides a 3-conductor (TRS) 3.5 mm jack for interfacing with a source of unbalanced stereo line-level audio. The nominal level of the unbalanced source is expected to be in the area of –15 dBV. An STcontroller configuration setting allows the stereo line input to be compatible with signals that have a fairly wide nominal level range.

Located on the back panel, the jack is labeled Stereo Line In and is specifically provided to allow direct interconnection with a personal computer's analog line output. (This is typically the light-green-colored jack on a personal computer.) Using a standard patch cord with 3-conductor (TRS) 3.5 mm plugs on each end will make interconnection very simple. As is standard for personal computers and other personal electronics, the Model 207A implements the jack such that left channel audio is on the tip lead, right channel audio is on the ring lead, and common/shield is on the sleeve lead. Refer to Figure 5 for a detailed view of the appropriate mating plug.
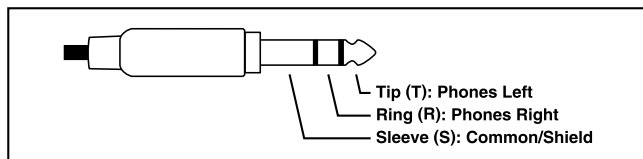

Tip (T): Phones Left
Ring (R): Phones Right
Sleeve (S): Common/Shield

Figure 5. Stereo line in (TRS) connection pinout chart

Dante Configuration

To integrate the Model 207A into an application requires that a number of Dante-related parameters be configured. These configuration settings will be stored in non-volatile memory within the Model 207A's Dante interface circuitry. Configuration will typically be done using 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 207A uses the UltimoX4 4-input/4-output integrated circuit to implement its Dante interface. The Model 207As Dante interface is compatible with AES67 as well as the Dante Domain Manager™ (DDM) software application.

Audio Routing

Four Dante transmitter (output) channels on associated equipment can be routed (subscribed) to the Model 207A's four Dante receiver (input) channels. Following the unit's headphone source and routing configuration selections in STcontroller, these audio input signals can be sent to the Model 207A's headphone outputs. The Model 207A's four transmitter (output) channels can be routed (subscribed) to four Dante receiver (input) channels on associated equipment. This will route the Model 207A's four 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 (output) channel or a flow (a group of up to four output channels) to a Dante receiver (input) channel or a flow (a group of up to four input channels). The number of transmitter flows associated with an UltimoX4 integrated circuit is limited to two. These can either be unicast, multicast, or a combination of the two. If the Model 207A'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 5422A Dante Intercom Audio Engine, can be used to "repeat" the signals.

Device and Channel Names

The Model 207A has a default Dante device name of **ST-M207A-** followed by a unique suffix. The suffix identifies the specific Model 207A that is being configured. The suffix's actual alpha and numeric characters relate to the MAC (media access control) address of the UltimoX4 integrated circuit that's present in the specific Model 207A. The four Dante receiver (input) channels have the default names of **Headphone Ch1**, **Headphone Ch2**, **Headphone Ch3**, and **Headphone Ch4**. The four Dante transmitter (output) channels have the default names of **Main**, **Talkback**, **Line In L**, and **Line In R**. Using Dante Controller, these names can be revised as appropriate for the specific application.

Device Configuration

The Model 207A supports an audio sample rate of 48 kHz with no pull-up/pull-down values available. Encoding choices are *PCM 24*, *PCM 16,* and *PCM 32,* but in virtually all cases the default selection of *PCM 24* would be appropriate. Clocking and Device

Latency can be adjusted if required but the default values are typically correct.

Network Configuration – IP Address

By default, the Model 207A'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.

AES67 Configuration – AES67 Mode

The Model 207A can be configured for AES67 operation. This requires that the AES67 mode 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.

Clocking Source

While technically the Model 207A 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 207A would not want to be enabled.

Model 207A Configuration

The STcontroller software application is used to configure the way in which the Model 207A functions. 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 in a personal computer that's connected to the related LAN.

Installing STcontroller

STcontroller is available free of charge on the Studio Technologies' website. 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 207A unit or units that are to be configured. Immediately after starting STcontroller the application will locate the devices that it can control. The one or more Model 207A units to be configured will appear in the device list. Use the Identify command to allow easy recognition of a specific Model 207A 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 207A "reboot" is required. Each time a change is made, both the main and talkback buttons on the front panel will flash orange in a distinctive pattern to indicate that a command from STcontroller has been received.

Headset Mic Input – Electret Power

Choices are *Off* (selection box not checked) and *On* (selection box checked).

Enable the Electret Power check box if the connected headset has an electret microphone which requires

a source of low-voltage DC power for operation. In virtually all cases, a gaming or computer headset that uses a 3.5 mm TRRS plug will have an electret microphone element which will require microphone power. If the associated headset has a dynamic

(non-powered) microphone do not enable the Electret Power selection box. Most broadcast headsets that terminate on 5-pin male XLR connectors will have a dynamic microphone element and will not require microphone power. The on/off status of microphone power is displayed by way of an LED, red in color, that is located on the Model 207A's back panel adjacent to the Headset A connector.

Note that the Model 207A cannot supply P12 or P48 phantom power that may be required to support balanced condenser (capacitor) microphones. In almost all cases, this should not pose an issue as phantom-powered microphones are essentially never associated with headsets that would be used for Model 207A applications.

Headset Mic Input – Gain

Choices are *24 dB*, *30 dB*, *36 dB*, *42 dB*, and *48 dB*.

The gain of the Model 207A's microphone preamplifier can be selected from among five choices. The compressor active LED, located adjacent to the headset A connector, can act as a guide when setting the preamplifier gain. When a voice signal at a normal level is present on the connected headset (using connector A or B), the compressor active LED should light intermittently. If, for example, it rarely lights and the gain is set to 36 dB, it might be a good idea to change the setting to 42 dB. If the compressor LED is lit fully during normal talking and the gain is set for 42 dB or 48 dB, a change to one of the lower gain values might be warranted. There's no "hard and fast" rule about which microphone preamplifier gain setting is appropriate. Unless otherwise indicated, 30 dB is typically a good initial choice for a headset that includes an electret microphone. For a headset that uses a dynamic microphone, 42 dB would typically be a good initial choice for the preamplifier gain.

Stereo Line Input – Gain

Choices are *–3 dB*, *0 dB*, *3 dB*, *6 dB*, *9 dB*, and *12 dB*.

The gain of the circuitry associated with the stereo line input can be selected from among six choices. Two bi-color LEDs, located adjacent to the stereo line input's 3.5 mm connector, can serve as a guide when selecting the gain value. The LEDs serve in a signal present and peak role, lighting green for signals that are in the normal audio range and red when they approach or reach audio "clipping."

The first step to achieving optimal audio performance is to confirm and, if required, revise the level of the source. This will typically be the unbalanced stereo analog audio output of a personal computer. A software configuration setting associated with the personal computer's operating system should allow adjustment of the output level, typically over a range of 0 (mute) to 100 (full level). While there is no standard for what these settings represent, selecting 100 can be a good starting point. Tests that Studio Technologies performed on multiple personal computers never found that a full level setting had resulted in audio degradation ("clipping"). However, if issues do arise, revise the output level downward, first trying 90, then 80, then 70, etcetera, until good audio performance is obtained.

Once the source level has been established, the stereo line input gain value in STcontroller can be selected. Use the signal present/peak (SIG/PK) LEDs on the Model 207A's back panel as a reference when adjusting the gain value. The LEDs, one for each input channel, should light green when signals in an acceptable range are present. The LEDs should never light red as this indicates imminent or active distortion of the audio signal.

Headset/Phones Outputs – Game Audio Source

Choices are *Dante 1/2*, *Dante 3/4*, and *Stereo Line In*.

The rotary control on the left side of the Model 207A's front panel is used to adjust the level of the game audio source as it is sent to the headset or headphones output. There are three choices as to what signal is selected as the game audio source.

Dante 1/2: When selected, Dante receiver (input) channel 1 is routed to the left channel of the headset or headphones output; Dante receiver (input) channel 2 is routed to the right channel of the headset or headphones output.

Dante 3/4: When selected, Dante receiver (input) channel 3 is routed to the left channel of the headset or headphones output; Dante receiver (input) channel 4 is routed to the right channel of the headset or headphones output.

Stereo Line In: When selected, the left channel (tip lead of the 3.5 mm jack) is routed to the left channel of the headset or headphones output; the right channel

(ring lead of the 3.5 mm) is routed to the right channel of the headset or headphones output.

Headset/Phones Outputs – Game Audio Destination

Choices are *None*, *Headset*, and *Headphones*.

This configuration choice specifies where the selected game audio source will be sent after its level is adjusted using the rotary control labeled Game. There are three choices

None: When selected, the game audio source is disabled and will not be sent to either the headset or headphones output.

Headset: When selected, the game audio source will be sent to the left and right channels of the headset output.

Headphones: When selected, the game audio source will be sent to the left and right channels of the headphones output.

Headset/Phones Outputs – Comms Source

Choices are *Dante 1/2* and *Dante 3/4*.

The rotary control in the center of the Model 207A's front panel is used to adjust the level of the selected communications audio source as it is sent to the headset or headphones output. There are two choices for which signal source is selected.

Dante 1/2: When selected, Dante receiver (input) channel 1 is routed to the left channel of the headset or headphones output; Dante receiver (input) channel 2 is routed to the right channel of the headset or headphones output.

Dante 3/4: When selected, Dante receiver (input) channel 3 is routed to the left channel of the headset or headphones output; Dante receiver (input) channel 4 is routed to the right channel of the headset or headphones output.

Headset/Phones Outputs – Comms Destination

Choices are *None*, *Headset*, and *Headphones*.

This configuration choice selects where the source selected for communications audio is sent after its level is adjusted using the rotary control labeled Comms. There are three choices.

None: When selected, the comms audio signal is disabled and will not be sent to either the headset or headphones output.

Headset: When selected, the left channel of the comms audio signal will be sent to the left channel of the headset output; the right channel of the comms audio signal will be sent to the right channel of the headset output.

Headphones: When selected, the left channel of the comms audio signal will be sent to the left channel of the headphones output; the right channel of the comms audio signal will be sent to the right channel of the headphones output.

Headset/Phones Outputs – Sidetone Source

Choice is fixed for *Headset Mic*.

The rotary control on the right side of the Model 207A's front panel, labeled Sidetone, is used to adjust the level of the sidetone audio source as it is sent to both the left and right channels of either the headset or headphones output. There is only one sidetone source available. It is the output of the microphone preamplifier associated with the microphone portion of the connected headset. The sidetone source selection field is "grayed out" to indicate that it cannot be changed.

Headset/Phones Outputs – Sidetone Destination

Choices are *None*, *Headset*, and *Headphones*.

This configuration choice selects where the sidetone source is sent after its level is adjusted by the rotary control labeled Sidetone. There are three choices.

None: When selected, the sidetone audio signal is not sent to the either channel of the headset or headphones output.

Headset*:* When selected, the sidetone audio signal will be sent to both the left and right channels of the headset output.

Headphones: When selected, the sidetone audio signal will be sent to both the left and right channels of the headphones output.

Sidetone can be important, allowing the user to "hear" themselves for performance confirmation and

comfort. If a full mix is being provided to the Model 207A and routed to the headset or headphones, locally provided sidetone won't be needed and the *None* configuration should be selected. The user will hear themselves by way of audio signals arriving via Dante receiver (input) channels. However, if mix-minus audio is being supplied to the Model 207A, selecting an applicable sidetone destination will be an important means of establishing user confidence.

Headset/Phones Outputs – Sidetone Mode

Choices are *Main Active*, *Talkback Active*, and *Main and Talkback Active*.

The sidetone mode allows selection of when audio from the microphone preamplifier will be routed to the selected destination (either the headset or headphones output). Making a specific selection from among the three available choices will depend on the needs of the application. The sidetone mode configuration will establish exactly when sidetone audio will be sent to the left and right channels associated with the headset or headphones outputs.

Main Active: When selected, the sidetone function will be active whenever the main pushbutton function is active.

Talkback Active: When selected, sidetone will be active whenever the talkback function is active.

Main and Talkback Active: When selected, the sidetone function will be active whenever either or both the main and talkback functions are active.

Headset/Phones Outputs – Noise Source

Choices are *Dante 1/2*, *Dante 3/4*, and *White (Internally Generated)*.

This configuration selects the audio signal that will serve as the unit's noise source. This audio signal, providing an acoustic masking function, is sent to the headset or headphones output at a fixed level. There are three choices for what source is selected.

Dante 1/2: When selected, Dante receiver (input) channel 1 is routed to the left channel of the headset or headphones output; Dante receiver (input) channel 2 is routed to the right channel of the headset or headphones output.

Dante 3/4: When selected, Dante receiver (input) channel 3 is routed to the left channel of the headset or headphones output; Dante receiver (input) channel 4 is routed to the right channel of the headset or headphones output.

White (Internally Generated): When selected, an internally generated white noise signal is sent to both the left and right channels of the headset or headphones output. (White noise is defined as a random signal with equal energy per frequency.)

Headset/Phones Outputs – Noise Destination

Choices are *None*, *Headset*, and *Headphones*.

This configuration choice selects where the selected noise source is sent. There are three choices.

None: When selected, the noise source will not be sent to the headset or headphones output.

Headset: When selected, the noise source will be sent to both the left and right channels of the headset output.

Headphones: When selected, the noise source will be sent to both the left and right channels of the headphones output.

Headset/Phones Outputs – Noise Level

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

This configuration selects the output level of the noise source that is routed to the selected output destination (headset or headphones). Its level will be at one of three fixed values and cannot be adjusted by the user. (No front-panel level control is provided.) The noise level can also be disabled by selecting *Off*.

Button Operation – Main

Choices are *Push to Mute*, *Push to Talk*, *Latching*, *Push to Talk/Tap to Latch*, *Push to Mute/Tap to Latch*, and *Always On*.

STcontroller allows the configuration of the main button to be selected.

Push to Mute: When selected, the main button function will normally be active and its green LED lit. The microphone audio signal associated with the connected headset will be routed to the Dante main output channel. Whenever the main button is pressed

the audio signal will mute on the Dante main output channel and the button's LED will change from green to red.

Push to Talk: When selected, the main button function will normally be inactive and the button's red LED will be lit. The microphone audio signal associated with the connected headset will not be routed to the Dante main output channel. Whenever the main button is pressed the audio signal will become active on the Dante output channel and the button's green LED will light.

Latching: When selected, the main button's function will alternate between its active and inactive states whenever the main button is pressed. Upon power up, the function will be in its inactive state and the red LED associated with the button will be lit.

Push to Talk/Tap to Latch: This mode is a combination of the Push to Talk and Latching modes. It's similar to the way talk pushbutton switches function on user stations associated with broadcast or production intercom systems. If the main button is pressed and held, the main button's function will be active. It will stay active until the main button is released. If the main button is momentarily "tapped," the main button's status will change, either from inactive-to-active or from active-to-inactive. Upon Model 207A power up, the main button will be in its inactive state and its red LED will be lit.

Push to Mute/Tap to Latch: This mode is a combination of the Push to Mute and Latching modes. Whenever the main button is momentarily "tapped" the main button's status will change, either from active-to-inactive or inactive-to-active. When the main button function is active its green LED will be lit. The audio signal associated with the microphone input will be routed to the Dante main output channel. Whenever the main button is pressed and held the audio signal will mute on the Dante main output channel and the button's LED will change from green to red. It will stay in this condition until the main button is released. Upon Model 207A power up, the main button will be in its inactive state and its red LED will be lit.

Always On: This mode is basically a button inactive function. The audio signal associated with the microphone audio signal will always be routed to the Dante main output channel and the button's green LED will be lit. Pressing the button will not impact operation nor cause its associated LED to change color.

Button Operation – Talkback
Choices are *Push to Talk*, *Latching*, *Push to Talk/Tap to Latch*, and *Disabled*.

The manner in which the talkback button functions can be configured.

Push to Talk: When selected, the talkback function will normally be inactive and the LED associated with the talkback button will not be lit. Whenever the talkback button is pressed the talkback function will become active and its green LED will light.

Latching: When selected, whenever the talkback button is pressed the talkback function will alternate between its active and inactive states. The button's green LED will be lit whenever the talkback function is active. Upon power up, the talkback function will be in its inactive state and its button LED will not be lit.

Push to Talk/Tap to Latch: This mode is a combination of the Push to Talk and Latching modes. It's similar to the way talk pushbutton switches function on user stations associated with broadcast or production intercom systems. If the talkback button is pressed and held the talkback function will be active. It will stay active until the talkback button is released. If the talkback button is momentarily "tapped" the status of the talkback function will change, either from inactive-to-active or from active-to-inactive. The button's green LED will be lit whenever the talkback function is active. Upon Model 207A power up, the talkback button will be in its inactive state and its LED will not be lit.

Disabled: When selected, the talkback function will be disabled and the LED associated with the talkback button will not be lit. If the talkback button is pressed the red LED will flash four times as a warning, indicating that the function has been disabled.

System – Operating Mode
Choices are *On-Air*, *Production*, and *Production with Dim*.

The operating mode configures the overall manner in which the Model 207A operates. Specifically, it determines how the Dante main output channel operates vis-à-vis the talkback function. Understanding how

each specifically impacts Model 207A operation will help ensure the desired operation is obtained and that maximum usability will occur.

On-Air: When selected, audio on the Dante main output channel will always be muted whenever the talkback function is active. The *On-Air* mode should be selected for all on-air broadcast or production applications when it's imperative that the "on-air" audio signal be muted whenever the talent or game players uses the talkback function to communicate with production personnel.

Production: When set for *Production*, the audio signal on the Dante main output channel is never muted in response to talkback activity. The main button's function operates independently of the talk-back button's function. This mode allows the Dante main output channel to be used, for example, as an additional talkback output. In this way, the Dante main output channel and the talkback output channel can be used separately and not impact each other. This also allows both the main and talkback pushbuttons to be used simultaneously. When selected for the correct application, the *Production* mode can prove to be very useful. But it's not appropriate for on-air use!

Production With Dim: When configured for *Production with Dim*, the unit will function in a manner very similar to the Production mode. The difference is that the headset and headphones output channels will dim (reduce in level) whenever either or both the main and talkback functions are active. This is provided for applications where the left and right channels of the headset and/or headphone outputs are being connected to inputs on an audio power amplifier or a set of amplified speakers. The dim action can help prevent acoustical feedback and/or sonic interference from loudspeakers associated with the Model 207A.

System – Button Backlight Intensity
Choices are *Low* and *High*.

The button caps (top surfaces) of the two pushbutton switches are able to be lit using internal LEDs, one red and one green. The intensity of these LEDs can be adjusted to perform optimally in relation to the amount of ambient light present in the Model 207A's location.

System – Underglow Color
Choices are *Blue* and *Red*.

Light from LED indicators project out holes in the bottom of the Model 207A enclosure. This is called the unit's underglow and the LEDs' color can be selected to be either be blue or red. This is provided as an "image" feature but may also help users locate Model 207A units when used in a dark area. It can also be useful to identify which "team"-specific Model 207A units have been assigned.

System – Underglow Intensity
Choices are *Off*, *Low*, *Medium*, and *High*.

Three configuration choices allow the intensity of the underglow LEDs to be selected. In addition, the LEDs can be disabled. The correct setting will depend on the needs of a specific application.

Operation

At this point, all connections and configuration steps should have been completed and everything should be ready for Model 207A operation to commence. A 100BASE-TX Ethernet connection with Power-over-Ethernet (PoE) capability should have been made. A headset with microphone should have been interfaced using either the Headset A or Headset B connector. In some applications, a pair of earbuds will be connected to the headphone output jack. And often a source of analog audio will have been connected to the stereo line input jack.

The Model 207A's Dante configuration settings should have been selected using the Dante Controller software application. In this way, the unit's four Dante transmitter (output) audio channels and four Dante receiver (input) audio channels should have been routed, by way of Dante "subscriptions," to the receiver and transmitter channels on associated Dante-enabled equipment. Using the Studio Technologies' STcontroller software application, the Model 207A's configuration should have been selected to meet the needs of the specific application.

Initial Operation

The Model 207A 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 back panel below the RJ45 jack, will begin to light as network and Dante connections are established. The compressor (COMP) LED, adjacent to the Headset A connector, may or may not flash momentarily. The signal present/peak (SIG/PK) LEDs, associated with the two channels of the stereo line input, will light green and red as part of the power-up test sequence. The microphone power (MIC PWR) LED, located adjacent to the Headset A connector, will flash once in red to indicate that it is functioning. The green and red LEDs within the main and talkback pushbutton switches will also light in a short test sequence. The lighting of the various LEDs will indicate that the application firmware (embedded software) has started. Once that start-up sequence has completed and the Dante connection has been established, full operation will begin. The various LEDs will then become operational, displaying the status of their designated functions.

How to Identify a Specific Model 207A

Functions within the Dante Controller and STcontroller software applications allow a specific Model 207A unit to be identified. Each application provides an "eyeball" icon that when clicked will activate the Identify function. When *Identify* is selected it will send a command to a specific Model 207A unit. On that unit, both the main and talkback buttons' red and green LEDs (which, when lit at the same time, appear orange) will "flash" approximately eight times; the actual on/off status of the buttons will not change. In addition, the SYS and SYNC status LEDs, located directly below the etherCON RJ45 jack on the back panel, will slowly flash green. After a few seconds the LED identification pattern will cease and normal Model 207A button LED and Dante status LED operation will resume.

Ethernet and Dante Status LEDs

Three status LEDs are located below the etherCON RJ45 jack on the Model 207A's back panel. The LINK ACT LED will light green whenever an active connection to a 100BASE-TX (100 Mb/s) Ethernet network has been established. It will flash green in response to Ethernet data packet activity. The SYS and SYNC LEDs display the operating status of the Dante interface and associated network activity. The SYS LED

will light red upon Model 207A power up to indicate that the Dante interface is not ready. Typically, 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 207A is not synchronized with a Dante network. It will light solid green when the Model 207A is synchronized with a Dante network and an external clock source (timing reference) is being received. It will slowly flash green when this specific Model 207A is part of a Dante network and is serving as the Leader clock. It's possible that up to 30 seconds may be required for the SYNC LED to reach its final state.

Microphone Power Status LED

An LED indicator is located on the back panel adjacent to the Headset A connector. It is labeled MIC PWR and will light red whenever the microphone input's electret power source is active and providing low-voltage DC power to the microphone connections on the Headset A and Headset B connectors.

Compressor Active LED and Mic Preamp Gain

An LED indicator, orange in color, is located on the back panel adjacent to the Headset A **connector.** It is labeled COMP and displays the status of the microphone preamplifier audio compressor. This function controls the dynamic range of the audio signal associated with the microphone that is connected by way of the Headset A or Headset B **connector**. The compressor LED will light whenever the input level from the microphone, along with the configured microphone preamplifier gain, is such that the dynamic range of the signal is being actively controlled. It's perfectly acceptable for this LED to light intermittently whenever a user is talking at a normal voice level into the associated microphone. However, if the COMP LED lights solid while a user is talking at a normal voice level this will typically indicate that the microphone preamplifier gain setting should be reduced. Conversely, if the COMP LED almost never lights when normal talking is taking place, it's possible that changing the gain to a higher value would be beneficial. Note that due to the design of the circuitry, the compressor active LED will function whether or not the main or talkback functions are active.

Stereo Line Input

Two LEDs, labeled SIG/PK L and R, are located adjacent to the 3.5 mm 3-conductor (TRS) jack that is labeled STEREO LINE IN (TRS). The two LEDs are dual color, lighting green and red. The LEDs will light green as a signal present indication and light red to indicate a peak condition. During normal operation, the LEDs should light green most of the time with an occasional flash of red acceptable. If the LEDs rarely light green then the stereo line input gain configuration probably needs to be revised to a greater value. If the LEDs light red frequently then the stereo line input gain configuration should be reduced to a lower level.

Main and Talkback Buttons

Two pushbutton switches are used to select how the microphone signal is routed to the Dante main and Dante talkback transmitter (output) channels. The button labeled MAIN controls the audio signal that can be sent to the Dante main transmitter (output) channel. How the button functions will depend on the configuration choice that has been made using STcontroller. When the main button's green LED is lit audio will be present on the Dante main output channel. When the main button's red LED is lit audio will not be present on the Dante main transmitter (output) channel. One configuration choice available to the main button, *Always On*, forces the button to remain in its on state. As such, it will always light green, no matter if the button is pressed or not.

The talkback function allows the microphone audio signal to be routed to the Dante talkback transmitter (output) channel. When the talkback function is active the button's green LED will be lit. When the talkback function is not active its button will not be lit. How the talkback button specifically functions and whether it impacts the main button's functioning depends on the Model 207A's system configuration.

Main Button Operating Mode

There are six ways that the main pushbutton switch can function. The way in which it specifically operates depends on its selected configuration.

Push to Mute: When selected, the audio signal associated with the microphone input will normally be active on the Dante main transmitter (output) channel. The audio signal will mute whenever the main pushbutton is pressed and held.

Push to Talk: When selected, the audio signal associated with the Dante main transmitter (output) channel will normally be muted. The audio signal will become active whenever the main pushbutton is pressed and held.

Latching: When selected, the audio signal associated with the Dante main transmitter (output) channel will alternate between the active and muted states whenever the main pushbutton is pressed. Upon Model 207A power up, the audio signal will be in its muted state.

Push to Talk/Tap to Latch: This mode is a combination of the Push to Talk and Latching actions. It's similar to the way in which talk pushbuttons function on user stations associated with broadcast or production intercom systems. If the main pushbutton is pressed and held, the audio signal associated with the Dante main transmitter (output) channel will become active and remain active until the pushbutton is released. If the main pushbutton is momentarily "tapped," the audio signal will change state. Upon Model 207A power up, the audio signal will be in its muted state.

Push to Mute/Tap to Latch: This mode is a combination of the Push to Mute and Latching modes. Whenever the main button is momentarily "tapped," its status will alternate between active and muted. When the main button's function is active and the main button is pressed and held, the audio signal on the Dante main transmitter (output) channel will mute. It will stay in this condition until the main button is released. Upon Model 207A power up, the main button will be in its muted state and its red LED will be lit.

Always On: In this state, microphone audio will always be sent out the Dante main transmitter (output) channel. The main button's green LED will always stay lit to indicate that the main output is active. Pressing the main button will not cause any action to take place.

Talkback Button Operating Mode

Depending on the selected configuration, the talkback pushbutton will function in one of four possible modes:

Push to Talk: When selected, the audio signal associated with the Dante talkback transmitter (output) channel is normally muted and neither LED in the talkback button will light. The audio signal will become active whenever the talkback pushbutton is pressed

and held. When talkback is active, the button's green LED will be lit.

Latching: When selected, the audio signal associated with the Dante talkback transmitter (output) channel will alternate between its active and muted states whenever the talkback pushbutton is pressed. The button's green LED will be lit whenever the talkback function is active. Upon Model 207A power up, the Dante talkback output channel will be in its muted state.

Push to Talk/Tap to Latch: This mode is a combination of the Push to Talk and Latching actions. If the talkback pushbutton is pressed and held the audio signal associated with the Dante talkback transmitter (output) channel will become active until the pushbutton is released. If a talkback pushbutton is momentarily "tapped," the audio signal on the Dante talkback transmitter (output) channel will change state. The button's green LED will be lit when the talkback function is active. Upon Model 207A power up, the audio signals on the Dante talkback output channel will be in its muted state.

Disabled: When selected, talkback operation is not allowed. As expected, if the button is not pressed neither of the LEDs in the talkback button will be lit. If the button is pressed the red LED will flash to indicate the function cannot be enabled.

System Operating Mode

The system operating mode configuration is used to select the overall operating mode of the Model 207A. Specifically, the system operating mode determines how the main function will operate vis-à-vis the talkback function. In addition, the system operating mode will also determine if the level of the headphone output is impacted by pushbutton activity. Understanding how the three available system operating modes impact overall system operation will ensure correct operation and maximum usability.

On-Air: When selected, the main button function will be forced to be inactive whenever the talkback function is active. The *On-Air* mode will be appropriate for on-air or live-production applications where it's imperative that the audio signal on the Dante main transmitter (output) channel be muted whenever on-air talent uses the talkback function to communicate with production personnel.

Production: When set for Production, the status of the main button function will never be impacted by the status of the talkback function. This mode allows the Dante main transmitter (output) channel to be used, for example, as an additional talkback output. In this way, the Dante main and talkback transmitter (output) audio channels can be used independently, with activation of one not impacting the other. This also allows both pushbutton switches to be used simultaneously. When selected for the appropriate application, the Production operating mode can prove to be very useful. However, it's not appropriate for on-air or live-production use!

Production with Dim: This operating mode functions the same as the Production operating mode except with one addition. The level of the headset and headphones outputs are dimmed (reduced in level or attenuated) by 18 dB whenever the main or talkback functions are active. In this way, the headset or headphones outputs can be connected to amplified loudspeakers without the risk of acoustical feedback. The selection of this operating mode will be clearly evident as speakers (or a connected headset or set of headphones) will be automatically reduced in level whenever the main or talkback functions are active.

Button Backlight Intensity

As previously discussed, the top surface of the main pushbutton switch will light red or green depending on the status of the function. The top surface of the talkback button will light green when it's active. A configuration choice allows the intensity of the button LEDs to be selected. In most cases, the *High* setting will be appropriate. In environments with little ambient light or within camera view the *Low* choice might be preferred.

Underglow Color and Intensity

The Model 207A includes a set of LED indicators that, when lit, shine down onto the surface below the unit's enclosure. These provide a "mood" effect and offer an underglow reminiscent of some custom automobile lighting. Configuration choices allow selection of the LED color and intensity. In addition, the LEDs can also be disabled from lighting at all. Once color and intensity choices have been made, the LEDs will always follow those settings; the LED color or intensity will never change in response to a Model 207A operating condition.

Headset and Headphone Outputs

The Model 207A allows audio monitoring by means of two stereo outputs. One provides a left and right channel output that is sent to a headset that is connected to the either the HEADSET A connector or the HEADSET B jack. The second output provides a left and right channel output that is sent to the PHONES output jack. Multiple audio sources, along with their audio destinations, can be configured using STcontroller for their routing to the two outputs. The audio sources include four Dante receiver (input) channels, the Model 207A's analog stereo line input, sidetone (output of the microphone preamplifier), and an internally generated white noise source. The destinations are named Game Audio, Comms, Sidetone, and Noise. Three rotary potentiometers (pots) are located on the Model 207A's front panel and can allow level adjustment of the selected sources. How the pots will function depends on the selected configuration. It's also possible that a noise source will be selected and it will be sent to the configured destination at a fixed level. Refer to the Model 207A Configuration section for details on each setting. With the amount of flexibility available, it's important that users are educated as to how the two monitor outputs are configured.

A configuration choice selects whether sidetone audio will be sent to the headset or headphone outputs. Sidetone audio can be present when the main function is active, the talkback function is active, or when the main and talkback functions are both active.

Users should find the headset and headphone audio quality to be excellent, with high maximum output level and low distortion. Analog audio signals do not pass directly through the potentiometers. The position of each potentiometer is recognized by the Model 207A's processor which then adjusts the appropriate signal source or sources within the digital domain. The potentiometers are "push-in/push-out" type which allow their associated knobs to be in the "out" position when adjustment is desired and placed in the "in" position when protection from an unwanted change is beneficial.

Technical Notes

IP Address Assignment

By default, the Model 207A'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 many cases, correctly acquire IP addresses and be able to communicate with each other.

An exception does arise when trying to directly interconnect two devices that use Ultimo integrated circuits to implement Dante. The Model 207A uses UltimoX4 and, as such, a direct one-to-one interconnection to another Ultimo-based product is not supported. An Ethernet switch that links the two Ultimo-based Dante units is required for successful interconnection. The technical reason that a switch is required relates to Ultimo's need for a slight latency (delay) in the data flow; an Ethernet switch will provide this.

The Model 207A's IP address and related network parameters can be set for a fixed (static) configuration using the Dante Controller software application. 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 207A'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 specific Model 207A'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 207A. 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 (Voice-over-Internet-Protocol quality of service) 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) for details on how to optimize a network for Dante applications.

Application Firmware Version Display

A selection in the STcontroller software application allows the Model 207A's application firmware version to be identified. This can be useful when working with factory personnel on application support and troubleshooting. To identify the firmware version, begin by connecting the Model 207A 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 207A for which you want to determine its application firmware version. Then select **Version and Information** under the **Device** tab. A page will then show that will provide lots of useful information. This includes the application firmware version as 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 207A's processor (microcontroller or 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 the MCU's non-volatile memory by way of a USB receptacle. The

Model 207A's MCU updates its application firmware using a file named **M207Av*XrXX*.stm** where the *X*s are decimal digits that represent the actual firmware 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 USB interface in the Model 207A is compatible with USB 2.0-, USB 3.0-, and USB 3.1-compliant flash drives. Save the new application firmware file in the root directory of the flash drive with a name of **M207Av*XrXX*.stm** where the *XrXX* is the actual version number. Studio Technologies will supply the application firmware file inside of a .zip archive file. The name of the zip file will reflect the application file's version number and will contain two files. One file will be the actual application file and the other a readme (.txt) text file. It's recommended that the readme (.txt) file be reviewed as it will contain details about the associated application firmware. The application firmware file inside of the zip file will adhere to the required naming convention.

To install the application firmware file, follow these steps:

1. Disconnect power from the Model 207A. This will entail removing the Ethernet connection that is providing PoE power.

2. Remove the cover from the Model 207A. Use a #1 Philips-head screw driver to remove six machine screws, two on the top edge of the back panel, one on each side of the unit, and two on the front edge of the bottom surface. Be certain to save the screws so that re-assembly will be fast and painless. Then carefully slide the cover forward, rotating it forward 180 degrees once it has cleared away from the three level potentiometers. Be very careful not to kink or damage the small ribbon interconnecting cable.

3. Locate the USB receptacle on the main circuit board. It's near the front of the unit, directly between the Game and Comms rotary controls. Insert the prepared USB flash drive into the connector.

4. Apply power to the Model 207A by connecting a Power-over-Ethernet (PoE) Ethernet source.

5. After a few seconds, the Model 207A will run a "boot loader" program that will automatically load the new application firmware file (**M207Av*XrXX*.stm**). During this time period, an LED, located adjacent to the USB receptacle, will slowly flash green. Once the process has completed, taking approximately 10 seconds, the Model 207A will restart using the newly loaded application firmware.

6. At this time, the Model 207A is functioning with the newly loaded application firmware and the USB flash drive can be removed. But to be conservative, remove PoE power first and then remove the USB flash drive.

7. Once the update process has been completed, reverse the steps and re-attached the cover using the six machine screws.

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

Note that if a connected USB flash drive doesn't have the correct file (**M207Av*XrXX*.stm**) in its root folder no harm will occur if power is applied to the Model 207A. Upon power up, the green LED adjacent to the USB receptacle will flash on and off rapidly for a few seconds to indicate that a valid file was not found after which normal operation using the unit's existing application firmware will begin.

Ultimo Firmware Update

As previously discussed, the Model 207A implements its Dante connectivity using the UltimoX4 integrated circuit from Audinate. The STcontroller or Dante Controller software applications 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 UltimoX4 can be updated by way of the Model 207A'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 207A firmware file, with a name in the form of **M207Av*XrXrX*.dnt**, is 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 207A's Dante interface.

Restoring Factory Defaults

A command in the STcontroller software application allows the Model 207A's defaults to be reset to the factory values. From STcontroller select the Model 207A for which you want to restore its defaults. Select the **Device** tab and then select the **Factory Defaults** feature. Then click on the **OK** box. Refer to Appendix A for a list of the Model 207A's factory default values.

Specifications

Power Source:

Power-over-Ethernet (PoE): class 2 (low power, ≤6.49 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 (GigE) Ethernet not supported)

General Network Audio:

Type: Dante audio-over-Ethernet

AES67-2018 Support: yes, selectable on/off

Dante Domain Manager (DDM) Support: yes

Bit Depth: 16, 24, or 32

Sample Rate: 48 kHz

Dante Receiver (Input) Channels: 4

Nominal Level: –20 dBFS

Dante Receiver Audio Flows: 2

Dante Transmitter (Output) Channels: 4

Nominal Level: –20 dBFS

Dante Transmitter Audio Flows: 2

Compatibility – Headset A: single- or dual-ear broadcast-style with dynamic or electret (low-voltage DC-powered) microphone: pin 1 mic common; pin 2 mic; pin 3 phones common; pin 4 phones left; pin 5 phones right

Compatibility – Headset B: CTIA™/AHJ configuration (typically uses electret powered mic): tip phones left; ring 1 phones right; ring 2 common; sleeve mic

Microphone Input:

Compatibility: dynamic or electret (low-voltage DC-powered) microphones

Type: unbalanced

Electret Microphone Power: 5 volts DC via 2.21 k resistor, selectable on/off

Impedance: 1 k ohms, nominal, microphone power off; 690 ohms, nominal, microphone power on

Gain: 24, 30, 36, 42, 48 dB, selectable

Frequency Response: 50 Hz to 20 kHz, +0/–2 dB

Distortion (THD+N): <0.07%, measured at –20 dBFS, 22 Hz to 22 kHz bandwidth, 36 dB of gain

Dynamic Range: >96 dB, A-weighted, 24 dB gain

Compressor:

Application: applies to Dante main and talkback transmitter (output) channels and sidetone audio

Threshold: 2 dB above nominal level (–18 dBFS)

Slope: 2:1

Status LED: compressor active

Headset Headphone Output:

Type: 2-channel (stereo)

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

Maximum Output Voltage: 3.8 Vrms, 1 kHz, 150 ohm load

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

Distortion (THD+N): <0.002%

Dynamic Range: >100 dB

Headphone Output:

Type: 2-channel (stereo)

Compatibility: intended for connection to stereo ear-buds with a nominal impedance of 50 ohms or greater

Maximum Output Voltage: 3.8 Vrms, 1 kHz, 150 ohms load

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

Distortion (THD+N): <0.002%

Dynamic Range: >100 dB

Stereo Line Input:

Type: stereo (2-channel), analog, unbalanced

Impedance: 10 k ohms, nominal

Nominal Level: –16 dBu (–18 dBV) (0.13 Vrms)

Gain: –3, 0, 3, 6, 9, or 12 dB, selectable

Frequency Response: 20 Hz to 20 kHz, +0/ –0.7 dB

Distortion (THD+N): <0.008%, measured at 0 dB gain

Dynamic Range: >105 dB, A-weighted

Connectors:

Headset A: 5-pin female XLR

Headset B: 4-conductor (TRRS) 3.5 mm jack, per Japanese standard JEITA/EIAJ RC-5325A

Headphone Output: 3-conductor (TRS) 3.5 mm jack, per Japanese standard JIS C 6560

Stereo Line Input: 3-conductor (TRS) 3.5 mm jack, per Japanese standard JIS C 6560

Ethernet: Neutrik NE8FBH etherCON RJ45 jack (compatible with standard RJ45 plug or etherCON CAT5-compatible plug)

USB: type A receptacle (located inside Model 207A's enclosure and used only for updating firmware)

Configuration: requires Studio Technologies' STcontroller software application

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

4.3 inches wide (10.9 cm)

2.1 inches high (5.4 cm)

5.1 inches deep (13.0 cm)

Weight: 1.2 pounds (0.55 kg)

Deployment: intended for tabletop applications

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

Appendix A–STcontroller Default Configuration Values

Headset Mic Input – Electret Power: Off (select box not checked)

Headset Mic Input – Gain: 36 dB

Stereo Line Input – Gain: 0 dB

Headset/Phones Outputs – Game Audio Source: Stereo Line in

Headset/Phones Outputs – Game Audio Destination: Headset

Headset/Phones Outputs – Comms Source: Dante 1/2

Headset/Phones Outputs – Comms Destination: Headset

Headset/Phones Outputs – Sidetone Source: Headset Mic

Headset/Phones Outputs– Sidetone Destination: Headset

Headset/Phones Outputs – Sidetone Mode: Main Active

Headset/Phones Outputs – Noise Source: White (Internally Generated)

Headset/Phones Outputs – Noise Destination: None

Headset/Phones Outputs – Noise Level: Medium

Button Operation – Main: Push to Mute

Button Operation – Talkback: Push to Talk

System – Operating Mode: On-Air

System – Button Backlight Intensity: High

System – Underglow Color: Blue

System – Underglow Intensity: High