Model 207 eSports Console

User Guide

Issue 2, June 2019

This User Guide is applicable for serial numbers
M207-00151 and later with application firmware 1.2 and later

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Revision History

Issue 2, June 2019:

• Documents addition of Fixed Ch 3 & 4 Level headphone feature.

Issue 1, May 2019:

• Documents miscellaneous perfomance improvements.

Issue Preliminary 1, April 2019:

• Initial release.

Introduction

The Model 207 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, rugged steel enclosure that's intended for table-top use. Its diminutive size also makes it ideal for use in space-constrained locations. Blue LED lights cast a distinctive "underglow" from the bottom of the enclosure. The Model 207 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 207'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 207 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.

Model 207 operating features are configured using the STcontroller software application. An extensive set of parameters allows the unit's functions to be tailored to meet the needs of many applications. STcontroller, compatible with version 7 and later of the Windows® operating system, is a fast and simple means of confirming and revising the unit's operating parameters.

Applications

The Model 207 on its own can provide an "all-Dante" solution for one game player location. The unit's small size makes it ideal

Figure 1. Model 207 eSports Console front and back views

for live applications where physical space for personnel is very limited. Four Dante receiver (audio input) channels supply the user with their talent cue (IFB) signals. Should the cue signal be "mix-minus" an integrated sidetone function can provide the user with a microphone confidence signal. 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 207's stereo line input. These two audio channels, typically provided by a personal computer, can also be routed to the headphone output. The four Dante output (transmitter) channels are routed via an associated local area network (LAN) to inputs on Dante-compatible devices. Two pushbutton switches, main and talkback, provide the user with direct control

over audio routing. The audio switching is performed in the digital domain and is virtually "click-free." Three rotary controls allow the user to create their own headphone audio mix.

Setup and Operation

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

A dual-channel (dual-ear or "stereo") broadcast headset can be directly connected to the unit's 5-pin female XLR connector. In addition, a 3.5 mm 4-conductor TRRS jack allows direct connection of gaming-style headsets. 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 3.5 mm 3-conductor TRS jack supports connection of a computer's analog line-level audio output. The Model 207 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 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 headphone output.

The STcontroller software application is used to configure the wide range of Model 207 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 headphone output channels.

Ethernet Data and PoE

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

The Model 207's operating power is provided by way of the Ethernet interface using the 802.3af Power-over-Ethernet (PoE) standard. This allows fast and efficient interconnection with the associated data network. To support PoE power management, the Model 207's PoE interface enumerates (reports) to the power sourcing equipment (PSE) that it's a class 2 (low power) device. If a PoE-enabled Ethernet port can't be provided by the associated Ethernet switch a low-cost PoE midspan power injector can be utilized.

Dante Audio-over-Ethernet

Audio data is sent to and received from the Model 207 using the Dante audio-over-Ethernet media networking technology. As a Dante-compliant device, the Model 207's two Dante transmitter (audio output) channels and four Dante receiver (audio input) channels can be assigned (routed or "subscribed") to other devices using the Dante Controller software application. The Dante transmitter and receiver channels are limited to supporting four Dante flows, two in each direction. The digital audio's bit depth is up to 24 with a sampling rate of 44.1 or 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 207 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 207'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 and compressor is routed to an analog-to-digital conversion (ADC) section that supports sampling rates of 44.1 and 48 kHz with a bit depth of up to 24. 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 input signals arrive via the four Dante receiver channels and pass into the Model 207's microprocessor. The supported sampling rates are 44.1 and 48 kHz with a bit depth of up to 24. Channel routing, headphone 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 phones outputs are sent to a high-performance digital-to-analog converter and then on to robust driver circuitry. High signal levels can be provided to the connected headset or earbuds with microphone.

Configuration Flexibility

The Model 207 can be configured to meet the needs of specific applications and user preferences. All configuration choices are

performed using the STcontroller software application which is compatible with version 7 and later of the Windows operating systems. Selectable parameters include microphone preamplifier gain, microphone power source on/off, button operation, headphone source routing and control operation, sidetone operation, and overall unit operation. In addition, the intensity of the LED indicators can be configured as desired. The gain of the microphone preamplifier can be selected from among five choices. This allows the Model 207 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 207'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 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 headphone output channels and front-panel rotary controls can be configured from among many choices. Each choice is unique, allowing almost any required headphone monitoring situation to be implemented.

There's even the ability to route two Dante input (receiver) channels directly to the headphone output channels. In this configuration the level of the audio signals sent to the

headphone output will 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.

The integrated sidetone function allows audio associated with the microphone input to be sent to the headphone 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 207 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 207 was designed so that its capabilities and performance can be enhanced in the future. A USB connector, 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 207 uses the Audinate Ultimo™ integrated circuit to implement the 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 207 Announcer's Console and a printed 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 four connectors located on the back of the Model 207'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 protected RJ45 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 3.5 mm 4-conductor TRRS plug can be used. (The headset's plug needs to follow the CTIA™/AHJ configuration standard.) A source of stereo unbalanced analog audio may be connected to the Model 207 using a 3.5 mm 3-conductor TRS plug.

Ethernet Connection with PoE

A 100BASE-TX Ethernet connection that supports Power-over-Ethernet (PoE) is required for Model 207 operation. This one connection will provide both the Ethernet data interface and power for the Model 207'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 207 supports 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 connector that is located on the back of the Model 207's enclosure. This allows connection by way of a cable-mounted etherCON connector or a standard RJ45 plug. The Model 207's Ethernet interface supports auto MDI/MDI-X so that a crossover cable is not required.

Headset Connections

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

Headset A

The Model 207 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 207'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
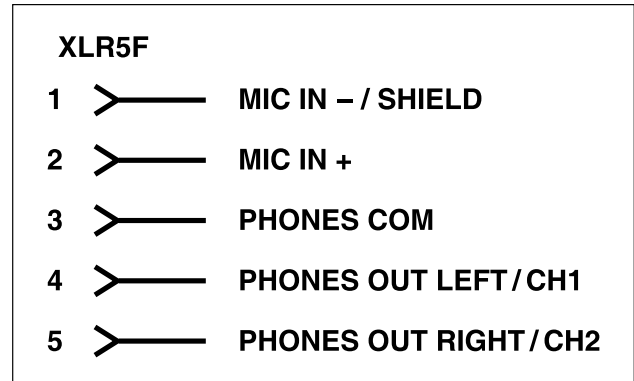

Figure 2. Headset A connection pinout chart

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 headset's connector as damage to the Model 207'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 interconnecting cable assemblies terminate the earpiece's left and right connections opposite from what the Model 207 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 headset'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 207 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 207 also allows direct connection of gaming headsets that are ubiquitous in the personal computer world. The 3.5 mm 4-conductor TRRS 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 microphones used in these headsets are electret type which require a low-voltage DC source for operation. The Model 207 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.
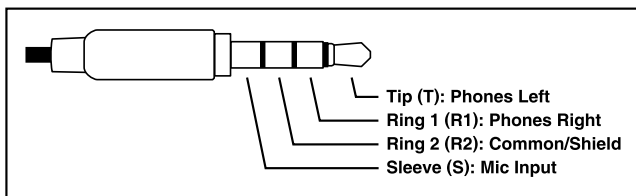

Tip (T): Phones Left
Ring 1 (R1): Phones Right
Ring 2 (R2): Common/Shield
Sleeve (S): Mic Input

Figure 3. Headset B (TRRS) connection pinout chart

Stereo Line Input

The Model 207 provides a 3.5 mm 3-conductor TRS 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 3.5 mm 3-conductor TRS plugs on each end will make interconnection very simple. As is standard for personal computers and other personal electronics the Model 207 implements the jack such that the left channel is on the tip lead, the right channel is on the ring lead, and common/shield is on the sleeve lead. Refer to Figure 4 for a detailed view of the appropriate mating plug.
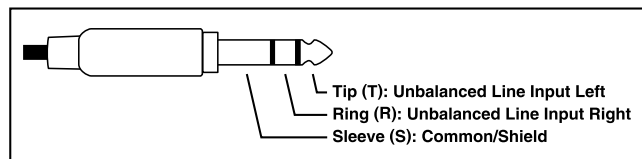

Tip (T): Unbalanced Line Input Left
Ring (R): Unbalanced Line Input Right
Sleeve (S): Common/Shield

Figure 4. Stereo line in (TRS) connection pinout chart

Dante Configuration

For audio to pass to and from the Model 207 requires that several Dante-related parameters be configured. These configuration settings will be stored in non-volatile memory within the Model 207's circuitry. Configuration will typically be done with the Dante Controller software application which is available for download free of charge at www.audinate.com. Versions of Dante Controller are available to support Windows and

OS X® operating systems. The Model 207 uses the Ultimo 4-input/4-output integrated circuit to implement the Dante functionality. The Model 207 is compatible with the Dante Domain Manager (DDM) software application. It can also be configured for AES67 operation. This requires a setting to be enabled within the Device Info section of the Dante Controller application.

The four Dante transmitter (Tx) channels associated with the Model 207's Dante interface must be assigned to the desired receiver channels on associated equipment. This will route the Model 207'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 flow (a group of output channels) to a receiver flow (a group of input channels).

The number of transmitter flows associated with an Ultimo integrated circuit and, as such the Model 207, is limited to two. These can either be unicast, multicast, or a combination of the two. (Note that in the AES67 mode the four transmitter (output) channels will function in multicast; unicast is not supported.) If the Model 207's transmitter channels need to be routed to more than two flows it's possible that an intermediary device with enhanced flow capability, such as the Studio Technologies' Model 5422 Dante Intercom Audio Engine, can be used to "repeat" the signals. (Use the Model 5422's pass-thru group configuration mode to provide this resource.)

The desired audio sources need to be routed to the receiver (Rx) channels associated with the Model 207's Dante audio inputs. The unit provides four audio input channels although the exact number utilized will depend on the specific application. Following the unit's headphone source and routing configuration

selections these audio signals will be sent to the Model 207's 2-channel headphone output.

The Model 207 supports audio sample rates of 44.1 and 48 kHz with no pull-up/pull-down values available. In most cases it's anticipated that the default rate of 48 KHz will be appropriate. While technically the Model 207 can serve as a clock master 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.

The Model 207 has a default Dante device name of **ST-M207-** along with a unique suffix. The suffix identifies the specific Model 207 that is being configured. The suffix's actual alpha and/or numeric characters relate to the MAC address of the unit's Ultimo integrated circuit. The four Dante transmitter (Tx) audio output channels have default names of **Main**, **Talkback**, **Line In L**, and **Line In R**. The four Dante receiver (Rx) audio input channels have default names of **Headphone Ch1**, **Headphone Ch2**, **Headphone Ch3**, and **Headphone Ch4**. Using Dante Controller the default device name and channel names can be revised as appropriate for the specific application.

Model 207 Configuration

The STcontroller software application is used to configure the way in which the Model 207 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 (www.studio-tech.com/stcontroller-application/) and is compatible with personal computers running Windows operating systems that

are version 7 and later. STcontroller version 2.02.00 and later is required to fully support the Model 207. 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 207 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 207 units to be configured will appear in the device list. Use the Identify command to allow easy recognition of a specific Model 207 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.

Parameters

The configurable functions include:

- Microphone input – electret power on/off

- Microphone input – gain

- Stereo line input – gain

- Headphone output routing, controls, and sidetone

- Button Operation – main and talkback

- System – operating mode and LED light intensity

Changes made using STcontroller will be immediately reflected in the unit's operation; no Model 207 "reboot" is required. Each time a change is made the main and talkback buttons on the front panel will both flash orange in a distinctive pattern to indicate that a command from STcontroller has been received.

Microphone Input – Electret Power

Choices are *Enabled* and *Disabled*.

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

Note that the Model 207 cannot supply P12 or P48 phantom power that may be required for 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 are used for Model 207 applications.

Microphone Input – Gain

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

The gain of the Model 207'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 preamp gain. When a voice signal at a normal level is present on the connected headset (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 or 48 dB, a change to one of the lower values might be warranted. There's no "hard and fast" rule about which gain setting is appropriate. But unless otherwise indicated, 42 dB is typically a good initial choice for a headset that uses a dynamic microphone and 30 dB for a headset that includes an electret microphone.

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 value on STcontroller can be selected. Use the signal present/peak (SIG/PK) LEDs on the Model 207 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.

Headphone Output – Routing

Choices are *Dual-Channel Stereo*, *Dual-Channel Mono*, and *Single-Channel Mono*.

STcontroller allows selection from among three headphone output routing modes. Each mode is distinct and careful selection will help optimize the Model 207's operation.

Dual-Channel Stereo

The Dual-Channel Stereo mode is provided for applications where two independent audio sources need to be routed to the two headphone output channels. Dante audio input channel 1 will be routed to the left headphone output channel and Dante audio input channel 2 will be routed to the right headphone output channel. Note that in this mode the sidetone audio signal will be routed to both the left and right headphone output channels.

Dual-Channel Mono

The Dual-Channel Mono mode can be useful in applications where the same audio signals need to be provided to the user on both the left and right headphone output channels. In this mode Dante audio inputs 1 and 2 are combined (mixed together or "summed") and routed to both the left and right headphone output channels. Note that in this mode the sidetone audio signal will be routed to both the left and right headphone output channels.

Single-Channel Mono

The Single-Channel Mono mode is specifically provided for applications where a 2-conductor ¼-inch plug is being used with the connected headphones, headset, or a broadcast-style earpiece. In this mode Dante audio inputs 1 and 2 are combined to monaural and routed to only the left channel of the headphone output; no audio signal is routed to the right channel of the headphone output. Note that in this mode the sidetone audio signal will be routed to only the left headphone output channel.

Headphone Output – Controls (A/B/C)

STcontroller allows selection from among nine headphone controls modes. Each mode is distinct and careful selection will help optimize the Model 207's operation for a range of applications. The listen audio sources include the four Dante input (receiver) channels, the two channels associated with the stereo line input, and audio signal coming from the microphone preamplifier/compressor which provides sidetone. There are three rotary level controls across on the bottom front of the enclosure. Starting from the left side and moving to the right side, the controls (potentiometers or "pots") are referred to as Pot A, Pot B, and Pot C.

Ch 1 & 2 Level / Line In Level / Sidetone Level

• Dante input channel 1 is routed to the left channel of the headphone output. Dante input channel 2 is routed to the right channel of the headphone output. Pot A adjusts the level of both Dante input channels 1 and 2.

• The left channel of the stereo line input is routed to the left channel of the headphone output. The right channel of the stereo line input is routed to the right channel of the headphone output. Pot B adjusts the level of both of the stereo line input channels.

• Pot C adjusts the sidetone level.

Ch 1 & 2 Level / Ch 3 & 4 Level / Sidetone Level

• Dante input channel 1 is routed to the left channel of the headphone output. Dante input channel 2 is routed to the right channel of the headphone output. Pot A adjusts the level of both Dante input channels 1 and 2.

• Dante input channel 3 is routed to the left channel of the headphone output. Dante input channel 4 is routed to the right channel of the headphone output. Pot B adjusts the level of both Dante input channels 3 and 4.

• Pot C adjusts the sidetone level.

Ch 1 & 2 Level / Ch 3 & 4 Level / Line In Level

• Dante input channel 1 is routed to the left channel of the headphone output. Dante input channel 2 is routed to the right channel of the headphone output. Pot A adjusts the level of both Dante input channels 1 and 2.

• Dante input channel 3 is routed to the left channel of the headphone output. Dante input channel 4 is routed to the right channel of the headphone output. Pot B adjusts the level of both Dante input channels 3 and 4.

• The left channel of the stereo line input is routed to the left channel of the headphone output. The right channel of the stereo line input is routed to the right channel of the headphone output. Pot C adjusts the level of both of the stereo line input channels.

Ch 1 Level / Ch 2 Level / Line In Level

• Dante input channel 1 is routed to the left channel of the headphone output. Pot A adjusts the level of Dante input channel 1.

• Dante input channel 2 is routed to the right channel of the headphone output. Pot B adjusts the level of Dante input channel 2.

• The left channel of the stereo line input is routed to the left channel of the headphone output. The right channel of the stereo line input is routed to the right channel of the headphone output. Pot C adjusts the level of both of the stereo line input channels.

Ch 1 Level / Ch 2 Level / Ch 3 & 4 Level

• Dante input channel 1 is routed to the left channel of the headphone output. Pot A adjusts the level of Dante input channel 1.

• Dante input channel 2 is routed to the right channel of the headphone output. Pot B adjusts the level of Dante input channel 2.

- Dante input channel 3 is routed to the left channel of the headphone output. Dante input channel 4 is routed to the right channel of the headphone output. Pot C adjusts the level of both Dante input channels 3 and 4.

Ch 1 Level / Ch 2 Level / Sidetone Level

- Dante input channel 1 is routed to the left channel of the headphone output. Pot A adjusts the level of Dante input channel 1.

- Dante input channel 2 is routed to the right channel of the headphone output. Pot B adjusts the level of Dante input channel 2.

- Pot C adjusts the sidetone level.

Ch 1 & 2 Level / Balance / Line In Level

- Dante input channel 1 is routed to the left channel of the headphone output. Dante input channel 2 is routed to the right channel of the headphone output. Pot A adjusts the level of both Dante input channels 1 and 2.

- Pot B adjusts the relative level of Dante input channel 1 versus Dante input channel 2 as they are routed to the headphone output left and right channels, respectively.

- The left channel of the stereo line input is routed to the left channel of the headphone output. The right channel of the stereo line input is routed to the right channel of the headphone output. Pot C adjusts the level of both of the stereo line input channels.

Ch 1 & 2 Level / Balance / Ch 3 & 4 Level

- Dante input channel 1 is routed to the left channel of the headphone output. Dante input channel 2 is routed to the right channel of the headphone output. Pot A adjusts the level of both Dante input channels 1 and 2.

- Pot B adjusts the relative level of Dante input channel 1 versus Dante input channel 2 as they are routed to the headphone output left and right channels, respectively.

- Dante input channel 3 is routed to the left channel of the headphone output. Dante input channel 4 is routed to the right channel of the headphone output. Pot C adjusts the level of both Dante input channels 3 and 4.

Ch 1 & 2 Level / Balance / Sidetone Level

- Dante input channel 1 is routed to the left channel of the headphone output. Dante input channel 2 is routed to the right channel of the headphone output channel. Pot A adjusts the level of both Dante input channels 1 and 2.

- Pot B adjusts the relative level of Dante input channel 1 versus Dante input channel 2 as they are routed to the headphone output left and right channels respectfully.

- Pot C adjusts the sidetone level.

Headphone Output – Fixed Ch 3 & 4 Level
Choices are *Off*, *Low*, *Medium Low*, *Medium*, *Medium High*, and *High*.

When Dante input (receiver) channels 3 and 4 have not been assigned to the rotary controls they can be sent to the headphone output channels at a fixed level. Select from among the five level choices to achieve the desired level in the headphone outputs. Select Off if inputs 3 and 4 are not to be utilized. The ability to send input channels 3 and 4 to the headphone outputs at a fixed level is provided specifically for gaming applications where a masking signal needs to be sent to Model 207 users.

Headphone Output – Sidetone Mode

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

This configuration parameter specifies when the sidetone function will be active. Sidetone is audio associated with the output of the microphone preamplifier and compressor that is sent to the headphone output channels. This can be important, allowing the user to "hear" themselves for performance confirmation and comfort. Three sidetone modes are available:

Main Active

In this mode the sidetone function will be active whenever the main output function is active and microphone input audio is present on the Dante main output channel.

Talkback Active

In this mode the sidetone function will be active whenever the talkback function is active and microphone input audio is present on the Dante talkback output channel.

Main or Talkback Active

In this mode the sidetone function will be active whenever the main or talkback functions are active. In this case audio signal associated with the microphone input will be present on either or both the Dante main and talkback output channels.

Headphone Output – Fixed Sidetone Level

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

When sidetone has not been assigned to one of the rotary controls the fixed sidetone function is active. The user will be presented with sidetone audio at a fixed audio level established by this parameter. Making a specific selection will depend on the needs of the application. If a "full mix" is being provided to one of the Model 207's Dante inputs then locally provided sidetone won't be needed

and the Off configuration should be selected. (The user will hear themselves by way of audio signals being routed to the Dante input channels.) But if "mix-minus" audio is being supplied to the Model 207 then selecting a suitable fixed sidetone level can be an important means of establishing user confidence.

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

If this mode is 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

If this mode is 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

If this mode is 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 207 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 207 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

If this mode is 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

If this mode is selected the talkback function will alternate between the active and inactive states whenever the talkback button is pressed. 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 207 power up the talkback button will be in its inactive state and its LED will not be lit.

Disabled

If this mode is 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 system mode configures the overall manner in which the Model 207 operates. Specifically, it determines how the Dante main output channel operates vis-à-vis the talkback function. Understanding how each specifically impacts Model 207 operation will help ensure the desired operation is obtained and that maximum usability will occur.

On-Air

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

Production

When the system mode is 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 talkback 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 the mode is configured for Production with Dim, the unit will function in a manner very similar to the Production mode. The difference is that the headphone 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 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 207.

System – Button Backlight Intensity

Choices are *Low* and *High*.

The caps (top surfaces) of the two pushbutton switches are able to be lit using internal LEDs, one red and one green. When they light and with what color depends on the configuration of the Model 207 and the current operating condition. The intensity of these LEDs can be adjusted to perform optimally in relation to the amount of ambient light present in the Model 207's location.

System – Underglow Intensity

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

Two sets of blue LEDs will illuminate the surface directly below the left and right sides of the Model 207's enclosure. This "underglow" is provided strictly as an "image" feature but may also help a user locate the Model 207 when used in a dark area. Three configuration choices allow the intensity of the LEDs to be selected. In addition, the LEDs can be disabled.

Operation

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

The Model 207's Dante configuration settings should have been selected using the Dante Controller software application. In this way the unit's four Dante audio output channels (Dante transmitter channels) and four Dante audio input channels (Dante receiver 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 207's configuration should have been selected to meet the needs of the specific application.

Initial Operation

The Model 207 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 stereo line input, will light green and red as part of the power-up test sequence. The microphone power 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 push-button 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 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 207

Functions within the Dante Controller and STcontroller software applications allow a specific Model 207 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 207 unit. On that unit both the main and talkback buttons' red and green LEDs (which together 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 connector on the back panel, will slowly flash green. After a few seconds the LED identification pattern will cease and normal Model 207 button LED and Dante status LED operation will resume.

Ethernet and Dante Status LEDs

Three status LEDs are located below the etherCON RJ45 connector on the Model 207's back panel. The LINK ACT LED will light green whenever an active connection to a 100 Mb/s Ethernet network has been established. It will then flash in response to all Ethernet data packet activity. The SYS

and SYNC LEDs display the operating status of the Dante interface and its associated network activity. The SYS LED will light red upon Model 207 power up to indicate that the Dante interface is not ready. After a short interval it will light green to indicate that it is ready to pass data with another Dante device. The SYNC LED will light red when the Model 207 is not synchronized with a Dante network. It will light solid green when the Model 207 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 207 is part of a Dante network and is serving as the clock master. 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 microphone input 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 audio compressor function. This function controls the dynamic range of the audio signal associated with the microphone input source. 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 an associated microphone. But 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 utilized by the stereo line input. The 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 input gain configuration probably needs to be revised to a greater value. If the LEDs light red frequently then the 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 two Dante output channels. The button labeled MAIN controls the audio signal that can be sent to the Dante main 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 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 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 207's system configuration.

Main Button Modes

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

If this mode is selected the audio signal associated with the microphone input will normally be active on the Dante main output channel. The audio signal will mute whenever the main pushbutton is pressed and held.

Push to Talk

If this mode is selected the audio signal associated with the Dante main output channel will normally be muted. The audio signal will become active whenever the main pushbutton is pressed and held.

Latching

If this mode is selected the audio signal associated with the Dante main output channel will alternate between the active and muted states whenever the main pushbutton is pressed. Upon Model 207 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 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 207 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 output channel will mute. It will stay in this condition until the main button is released. Upon Model 207 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 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 Modes

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

Push to Talk

If this mode is selected the audio signal associated with the Dante talkback 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

If this mode is selected the audio signal associated with the Dante talkback 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 207 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 output channel will become active until the pushbutton is released. If a talkback pushbutton is momentarily "tapped" the audio signal on the Dante talkback output channel will change state. The button's green LED will be lit when the talkback function is active. Upon Model 207 power up the audio signals on the Dante talkback output channel will be in its muted state.

Disabled

When this mode is selected talkback operation is not allowed. As expected, if the button is not pressed neither of the LED's 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 207. 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 the system operating mode has been selected to on-air the main button function will be forced to be inactive whenever the talkback function is active. The on-air mode will be appropriate for all on-air broadcast-oriented applications where it's imperative that the audio signal on the Dante main output channel be muted whenever on-air talent uses the talkback function to communicate with production personnel.

Production

When set for the production operating mode the status of the main button function will never be impacted by the status of the talkback 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 and talkback output channels can be used independently, with activation of any of them not impacting any of the others. 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. But it's not appropriate for on-air use!

Production with Dim

This operating mode functions the same as the production operating mode except with one addition. The level of the headphone output is dimmed (reduced in level or attenuated) by 18 dB whenever the main or talkback functions are active. In this way, the headphone output 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 set of headphones) will be automatically reduced in level whenever the main or talkback functions are active.

Button Backlight Intensity

As previously discussed, the main and talk-back buttons will light green or red depending on the activity of the Model 207. A configuration choice allows the intensity of the LEDs to be selected. In most cases the High setting will be appropriate. But in environments with little ambient light or within camera view the Low choice might be preferred.

Underglow Intensity

Included in the Model 207 are LEDs, blue in color, that when lit shine out of the left and right bottom surface of the enclosure. They provide a "mood" effect and offer an "underglow" reminiscent of some custom automobile lighting. A configuration choice allows the LED intensity to be selected as well as being able to disable the LEDs from lighting at all. Once a choice has been selected the LEDs will always follow that setting; the LED intensity will never change in response to a Model 207 operating condition.

Headphone Output

The three rotary potentiometers (pots), located on the Model 207's front panel, allow level adjustment of the Dante audio input channels, stereo line input, and, if selected, sidetone (local microphone) audio signal as they are sent to the 2-channel headphone output. How the potentiometers function will depend on the selected audio sources along with the configuration of the routing and controls. Refer to the Model 207 Configuration section of this guide for details. Three routing and nine control modes are available and determine the specific performance. With that much flexibility it's important that users are educated as to how the controls are functioning.

It's possible that Dante input (receiver) channels 3 and 4 will be configured such that they route directly to the left and right headphone output channels. In this configuration the rotary controls will not impact the output levels of audio content being received on input channels 3 and 4. The level of those signals will have to be controlled at their source. This ability is provided primarily for applications when white noise or other masking audio signals need to be sent to the headphone output channels at a fixed level.

Another configuration choice selects when sidetone audio will be sent to the headphone output. 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 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 207'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 207'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 inter-connected 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 207 uses Ultimo 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 207'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. But 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 207'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 207'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 207. 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 (www.audinate.com) for details on how to optimize a network for Dante applications.

Application Firmware Version Display

There are two ways in which the version number of the Model 207's application firmware (embedded software) can be identified. One requires only the Model 207 unit and involves a button-press sequence performed upon power up. The other method utilizes the Model 207 and the STcontroller software application. Either method may prove to be useful when working with factory personnel on application support and troubleshooting.

As part of the Model 207's power-up sequence the unit's application firmware can be directly displayed. Before connecting the PoE-enabled Ethernet cable, press and hold the talkback button. Then connect the Ethernet cable. Upon application of PoE power

the Model 207 will not go through its normal power-up sequence but instead will display the firmware version. The green LED associated with the main button will "flash" to display the major version number. Then the red LED associated with the talkback button will "flash" to display the minor version number. The LEDs will then remain off until the talkback button is released. Once the talkback button is released normal operation will then take place. As an example of what would be a typical firmware display, if the main button's LED "flashes" green once followed by the talkback button's LED "flashing" red twice it would indicate that application firmware version 1.2 is present in the Model 207.

A selection in the STcontroller software application allows the Model 207's application firmware version to be identified. Connect the Model 207 unit to the network, let it power up, and it will begin to function. Start STcontroller, review the list of identified devices, and select the specific Model 207 from which you want to determine its application firmware version. Then select **Version** under the **Device** tab. A page will then display that will provide a lot of useful information. This includes the application firmware version and well as details on the Dante interface firmware.

Application Firmware Update Procedure

It's possible that updated versions of the application firmware (embedded software) that is utilized by the Model 207'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 interface. The Model 207 implements a USB host function that directly supports connection of a USB flash drive. The Model 207's MCU updates its firmware using a file named **m207.bin**.

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. In the root directory, save the new firmware file with the name specified as **m207.bin**. 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 207, the name of the zip file itself will include the file's version number. For example, a file named **m207v1r2MCU.zip** would indicate that version 1.2 of the application firmware (**m207.bin**) is contained within this zip file.

Once the USB flash drive is inserted into the USB interface, located on the main circuit board under the cover, the unit must be powered off and again powered on. At this point the file will automatically load. The precise steps required will be highlighted in the next paragraphs of this guide.

To install an application firmware file follow these steps:

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

2. Remove the cover from the Model 207. 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 connector on the main circuit board. It's near the front of the unit, directly between rotary control A and rotary control B. Insert the prepared USB flash drive into the connector.

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

5. After a few seconds the Model 207 will run a "boot loader" program that will automatically load the new application firmware file (**m207.bin**). During this time period an LED, located adjacent to the USB connector, will slowly flash green. Once the loading process is over, taking approximately 10 seconds, the Model 207 will restart using the newly loaded application firmware.

6. At this time the Model 207 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. Confirm that the desired firmware version has been correctly loaded. This can be done by pressing and holding the talkback button, applying power to the Model 207, and then "reading" the application firmware version number by first observing the main button's green LED and then observing the talkback button's red LED. Alternately, the STcontroller software application can be used to identify the application firmware version number. Whatever method you use, ensure that the desired version is present.

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

Note that if a connected USB flash drive doesn't have the correct file (**m207.bin**) in its root folder no harm will occur if power is applied to the Model 207. Upon power up the LED adjacent to the USB connector 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 in this guide, the Model 207 implements Dante connectivity using the 4-input/4-output Ultimo integrated circuit from Audinate. The Dante Controller software application can be used to determine the version of the firmware (embedded software) that resides in Ultimo. The STcontroller software application can also be used to identify the firmware version. (Use the **Version** selection under the **Device** tab.) The Dante Firmware Update Manager (FUM) application program has traditionally been used to install the Ultimo firmware. The Dante Controller software application also includes an automated method of updating Ultimo firmware. Both applications are available, free of charge, on the Audinate website (www.audinate.com).

Restoring Factory Defaults

A command in the STcontroller software application allows the Model 207's defaults to be reset to the factory values. From STcontroller select the Model 207 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 207's factory default values.

Specifications

Power Source:

Power-over-Ethernet (PoE): class 2 (low power, ≤6.49 watts)

Network Audio Technology:

Type: Dante audio-over-Ethernet

AES67-2013 Support: yes

Dante Domain Manager (DDM) Support: yes

Bit Depth: up to 24

Sample Rate: 44.1 and 48 kHz

Number of Transmitter (Output) Channels: 4 (Main, Talkback, Line In L, Line In R)

Number of Receiver (Input) Channels: 4 (Headphone Ch1, Headphone Ch2, Headphone Ch3, Headphone Ch4)

Dante Audio Flows: 4; 2 transmitter, 2 receiver

Network Interface:

Type: 100BASE-TX, twisted-pair Ethernet, Power-over-Ethernet (PoE) supported

Data Rate: 100 Mb/s (10 Mb/s and 1000 Mb/s "GigE" Ethernet not supported)

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

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

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

Ethernet: Neutrik NE8FBH etherCON RJ45 receptacle

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

Configuration: requires Studio Technologies' STcontroller software application, version 2.02.00 and later

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)

Deployment: intended for tabletop applications

Weight: 1.2 pounds (0.55 kg)

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

Appendix A

STcontroller default Model 207 configuration values:

Microphone Input – Electret Power: Off

Microphone Input – Gain: 36 dB

Headphone Output – Routing: Dual-Channel Stereo

Headphone Output – Controls (A/B/C): Ch 1 & 2 Level/Line In Level/Sidetone Level

Headphone Output – Sidetone Mode: Main Active

Headphone Output – Fixed Sidetone Level: Medium

Headphone Output – Fixed Ch 3 & 4 Level: Off

Stereo Line Input – Gain: 0 dB

Button Operation – Main: Push to Mute

Button Operation – Talkback: Push to Talk

System – Operating Mode: On-Air

System – Button Backlight Intensity: High

System – Underglow Intensity: High