



## Model 201 Interpreter's Console Featuring Dante® Technology

### Key Features

- Creates complete interpreter position
- Dante audio-over-Ethernet technology
- Supports 5-pin XLR and 3.5 mm TRRS headsets
- Two interpret audio channels with feedthrough audio
- Talkback function
- Slow Down and Hot Mic functions
- Stores and replays two confirmation messages
- Excellent audio quality
- Uses STcontroller for configuration
- Power-over-Ethernet (PoE) powered

### Introduction

The Model 201 Interpreter's Console is a complete solution for supporting applications that utilize specialized personnel who perform simultaneous language interpretation. Suitable for use in single- or multi-language situations, the Dante® audio-over-Ethernet-enabled unit includes a range of features not typically provided by "off-the-shelf" interpretation equipment. The Model 201 provides both the standard and advanced features required for successful deployment in local or off-site/remote applications.

The Model 201 includes the ability to create two independent interpretation audio channels. Configuration choices allow a variety of audio content to be included in the interpretation audio; content that can be automatically muted or dimmed (reduced in level) when interpretation is active. This is especially important for off-site or Internet streaming applications. A dual-channel (stereo) headphone output can be configured to meet the needs of the interpreter. This includes selecting the audio sources, channel routing, and sidetone (confidence) signal operation. A set of buttons and rotary controls allow the user to establish the operating condition they desire. A "mic mute" button allows the connected microphone to be momentarily muted.

The frequency response of the headphone output can be selected from four equalization (EQ) settings. A talkback function allows a separate audio path to be established from the interpreter to production personnel. A slow down function allows the interpreter to signal to the presenter (the "floor" source) that speaking more slowly is warranted.



The Model 201 is extremely simple to deploy, is "pro" quality throughout, and provides an intuitive user experience. The unit's audio quality is excellent, with low distortion, low noise, and ample headroom. Careful circuit design and rugged components ensure long, reliable operation. Only a Power-over-Ethernet (PoE) connection and a headset with attached microphone is required for operation. The Model 201 supports both professional intercom-style headsets that use a 5-pin XLR connector as well as "gaming" headsets that use 3.5 mm TRRS plugs. If desired, two "custom" WAV audio files can be loaded by way of a USB flash drive. These can be used for aural confirmation of the Model 201's two interpretation audio channels.

The Model 201 supports Dante audio-over-Ethernet digital media technology for integration into contemporary applications. In addition to supporting standard Dante, the unit is compatible with AES67 and the Dante Domain Manager™ (DDM) software application. Only a single 4-pair Ethernet cable is needed to support both bi-direction data along with Model 201 DC power.

The Model 201's 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 a range of interpretation applications. The Model 201 is housed in a compact but rugged steel enclosure that's intended for table-top use. Its small size makes it ideal for applications in space-constrained locations.

While the Model 201 can be used by itself to create a simple, single language interpretation position, it can easily become part of a multi-language, feature-rich application. By utilizing Dante technology, one or more Model 201 units can integrate with other Studio Technologies' products to achieve a sophisticated voice interpretation system. Applicable companion units include the Model 391 Dante Alerting Unit, Model 5205 Mic/Line to Dante Interface, Model 5412 Audio Interface, and Model 5421 Dante Intercom Audio Engine. Other Dante-compliant products, such as audio consoles or wireless microphone systems from other manufacturers, will also directly interface with the Model 201.

## Headphone Output Channels

The Model 201 provides a 2-channel (stereo) output that is routed to both the 5-pin female XLR and 3.5 mm TRRS headset interface connectors. Two pushbutton switches and three rotary controls on the unit's front panel allow users to select their desired headphone audio sources and signal levels. One pushbutton switch and two associated LED indicators allow direct selection of either the Floor or Relay Dante receiver (input) audio channels. Floor is the term in the interpretation world for the audio channel associated with the person whose spoken text needs to be interpreted. It may also be considered to be the "original" audio channel. Relay is the term used for an intermediate audio signal that would typically be supplied by another interpreter. (A "relay" language is usually selected as an interpretation technique to support multiple languages. For example, English might be selected as the relay language.) The selected audio signal, Floor or Relay, is referred to by the Model 201 as the Main audio source and is sent to both the left and right headphone outputs. A rotary control allows the level of the Main audio signal to be adjusted.

Two additional Dante receiver (input) audio channels, named Aux 1 and Aux 2, can be used to interface the Model 201 with signal sources such as audio consoles, media playback systems, or remotely located equipment. A rotary level control is used to adjust the level of both Aux 1 and Aux 2 as they are sent to the headphone output channels. Configuration choices in the STcontroller application allow the Aux 1 and Aux 2 signals to be independently routed to the left, right, or left and right headphone output channels. This allows a variety of signal sources to be effectively routed to the desired headphone outputs.

A separate rotary control is used to adjust the level of the Model 201's microphone preamplifier signal as it is sent to the

headphone output. This is called the sidetone function and provides the interpreter with a confirmation audio signal. A configuration choice in the STcontroller application is used to select the routing of the sidetone audio as it is sent to the left and/or right headphone output channels.

The frequency response of the headphone output channels can be selected from among four choices: Flat and three equalized (modified response) settings. Flat provides an unmodified version of the selected audio signal as it is sent to the headphone output channels. Selection A causes the low-frequency contents to be removed from the headphone output channels. Selection B implements a boost to the high-frequency range that will impact voice signals. Selection C combines the low-frequency roll off of selection A along with the high-frequency boost of selection B. These four choices will allow an interpreter to optimize the headphone output signals to best support their work.

A pushbutton switch allows selection of the desired headphone audio response. Four LED indicators display the currently selected EQ setting. Unlike most interpreter console products that provide analog rotary "tone" controls, the Model 201's headphone equalization functions are created within the digital domain. This has the advantage of being very "unit-to-unit" accurate, allowing, for example, an EQ of selection B on one Model 201 to be identical with selection B on other Model 201 units.

## Interpret Channels

The Model 201 provides two Dante transmitter (output) channels that are intended for use in interpretation applications. This allows a Model 201 to support one or two independent languages or audio paths. Two pushbutton switches, one associated with each interpret channel, operate in a latching (push on/push off) manner. LED status indicators within the switches display the current status of the interpret channels. When an interrupt channel is active an 18 kHz sine-wave tone can also be added (summed) with the microphone signal. This is provided for remote (networked) applications that require an indication ("tally") that an interpretation function is active.

The STcontroller application allows selection of the button color and whether a button is lit when the function is off. In addition, a configuration selection determines if only one, or both, of the interpretation output channels can be active at any one time. A separate pushbutton switch on the Model 201's front panel allows momentary muting of the microphone signal when an interpret channel is active. This provides a "cough" function for the interpreter, allowing them to temporarily mute their microphone signal as needed.

One or two audio sources can be assigned to each interpret channel. These are called the Feedthrough Sources and can be independently selected for each channel from the choices of

Floor, Relay, Aux 1, or Aux 2. The choice of None is also available. When an interpret channel is not active (the connected microphone is not actively being routed to an interrupt channel) the selected audio sources will be “fed through” to the interpret Dante transmitter (output) channel. When the interpret channel is active (the connected microphone is being routed to an interrupt channel) an STcontroller configuration selection determines what happens to the feedthrough audio sources. They can remain at full level, be muted, or be reduced (dimmed) in level by a fix amount. This set of resources allows the interpret channels to be configured for local use or to meet the needs required by a variety of streaming and broadcast applications. Experienced users may recognize the feedthrough function as being essentially the same as a broadcast IFB (interrupted foldback) function. This can be important for contemporary interpretation applications but is normally not provided by interpretation equipment.

## **Talkback**

The Model 201 provides a talkback function, allowing an interpreter to easily communicate with production personnel. On the unit's front panel is a pushbutton switch and LED indicator dedicated to the talkback function. An independent Dante transmitter (output) audio channel is provided for the talkback function. This signal can be routed (subscribed) to the Dante input on an amplified speaker, an audio console, or even to equipment at a remote location. Whenever the talkback function is active, audio is not routed to either of the interpret Dante transmitter (output) channels.

The STcontroller application allows the operation of the talkback function to be configured to meet the needs of many applications. The function can be disabled (off) as well as selected for one of four operating modes. The pushbutton switch can operate in a momentary or latching (push on/push off) manner along with the ability to add an 18 kHz sine-wave tone in addition to the microphone signal. This tone would be appropriate when the Model 201 is used in a distributed networked audio environment where both talkback audio and a talkback function active indication (tally) is warranted.

## **Slow Down Function**

On the Model 201's front panel are a pushbutton switch and associated status LED that are utilized by the slow down function. This function is provided such that an interpreter can alert the event speaker (the person being interpreted) to speak more slowly and allow the interpreter to catch up with the speaker's voice content. Technically, when the Model 201's slow down function is activated, a high-frequency (18 kHz) sine-wave signal is sent out a Dante transmitter (output) channel. This Dante output channel would typically be routed to the receiver (input) channel on a Dante-enabled device, such as a Studio Technologies' Model 391 Dante Alerting Unit or a Model 392

Visual Indicator Unit. The high-frequency signal can activate the designated device and provide the speaker with a slow down indication. The Model 391 or Model 392 would typically be located at the speaker's lectern where its visual indicator could be readily observed. A configuration choice within the STcontroller application allows the Model 201's slow down function to be active for 1, 2, 3, 4, or 5 seconds after the slow down button is momentarily pressed. A selection also allows the function to be disabled.

The name slow down can at first view be misleading. The slow down function actually requires a complete implementation, consisting of a Model 201, a Dante network, and a means of displaying a slow down request. Activating the Model 201's slow down function simply provides an 18 kHz sine-wave tone on the Slow Down/Hot Mic Dante transmitter (output) channel. This Dante channel would be subscribed (routed) to the input on a display device such as the Studio Technologies' Models 391 or 392.

## **Hot Mic Output**

An “always on” microphone output function is provided for use in special applications. Called hot mic, it provides access to the Model 201's microphone audio signal. It can be useful for production personnel who need to hear the interpreter at all the times. It can also be used as a dedicated channel for the recording of all audio coming from an interpreter location. A configuration choice in the STcontroller application allows the function to be off (default) or on. The hot mic audio signal shares the Dante transmitter (output) channel that is also used for the slow down function.

## **Confirmation Messages**

Deployment of one or more Model 201 Interpreter's Consoles in an application may benefit from utilizing the unit's ability to store and playback WAV audio files. Two audio files, each up to 40 seconds in length, can be created in a high-quality 16-bit monaural WAV format and then loaded into a Model 201 using a standard USB flash drive. It's expected that these messages will provide identification information regarding the specific interpretation channels. This can prove useful during system setup and operation. They can be especially helpful when multiple Model 201 units are utilized in a single application. The ability to provide a unique aural channel confirmation signal for each audio channel may be extremely helpful to production personnel. For example, the operator of an audio console could readily identify specific interpretation channels and confirm that they are ready for use.

The on/off status of each confirmation message is controlled using either a button-press sequence or the STcontroller application. When enabled, a message will play continually, repeating each time the end of the file is reached. The messages can find



use locally and in remote interpretation applications, ensuring that the correct interpretation audio signal is being provided. No longer will “silent” audio channels be designated for interpretation, with technical personnel hoping that they will function correctly when they need to.

## Setup and Operation

Set up, configuration, and operation of a Model 201 are simple. An RJ45 jack is used to interconnect the unit with a twisted-pair Ethernet port associated with a PoE-enabled network switch. This connection provides both power and bidirectional digital audio. A dual-channel or single-channel (dual- or single-ear) headset can be connected using a cable-mounted 5-pin male XLR connector. Alternately, a gaming or computer headset with a 3.5 mm 4-conductor TRRS plug can be used.

One or two “custom” audio files can be created and loaded into the Model 201. They utilize the common WAV file format supported by many personal computer applications. The STcontroller software application is used to configure the wide range of Model 201 operating parameters. This allows the unit’s performance to be optimized to meet the needs of specific applications.

The user is presented with seven pushbutton switches and three push-in/push-out rotary potentiometers. LEDs provide status indications of the Model 201’s various functions. All user controls are clearly labeled and simple to operate.

## Ethernet Data and PoE

The Model 201 connects to a local area network (LAN) by way of a 100 Mb/s twisted-pair Ethernet interface. The unit’s physical 100BASE-TX interconnection is made by way of a Neutrik® etherCON® RJ45 jack. While compatible with standard RJ45 plugs, an etherCON CAT5-compatible plug allows a ruggedized and locking interconnection for harsh or high-reliability environments. The Model 201’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 201’s PoE interface enumerates (reports) to the power sourcing equipment (PSE) that it’s a class 1 (very low power) device.

## Dante Audio-over-Ethernet

Audio data is sent to and received from the Model 201 using the Dante audio-over-Ethernet media networking technology. As a Dante-compliant device, the Model 201’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. On the Model

201’s back panel, 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 201 is compatible with the AES67 interoperability standard. When configured in Dante Controller to support AES67, the unit’s four transmitter (output) channels will function only in multicast; unicast is not supported. In addition, the Model 201 is compatible with the Dante Domain Manager (DDM) software application.

## Audio Quality

The Model 201 provides excellent audio performance. A low-noise, wide dynamic-range microphone preamplifier and associated voltage-controlled-amplifier (VCA) dynamics controller (compressor) ensures that headset 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 a sampling rate of 48 kHz with a bit depth of up to 32.

As previously discussed, the Model 201 can store and replay two audio files. These uncompressed PCM audio signals utilize the high-quality 16-bit, monaural, WAV format. Front-panel buttons or the STcontroller application are used to control the playback status of the confirmation messages.

Up to four audio sources can arrive in the Model 201 by way of Dante receiver (input) channels. The supported sampling rate is 48 kHz with a bit depth of up to 32. These signals pass into the Model 201’s 32-bit microcontroller integrated circuit and then, following the unit’s configuration and operator action, can be routed to the headset output channels. The four sources can also be used by the interpret channels as feedthrough sources.

Depending on the unit’s configuration and operating state, the audio content of the interpret Dante transmitter (output) channels can consist of headset microphone audio only or a combination of headset microphone and Dante receiver (input) sources. It’s also possible to select the stored WAV files as the source for the interpret output channels. The selected interpret audio signals remain in the digital domain and are routed through the 32-bit logic circuitry and on to the Dante interface section where they are packetized and prepared for transport over Ethernet.

## Configuration Flexibility

The Model 201 can easily be configured to meet the needs of specific applications and user preferences. All configuration choices are performed using the STcontroller software application. Versions of STcontroller are available to support the WinOS® and macOS® operating systems. Selectable configurable parameters include microphone power and preamplifier gain, headphone operation, button LED indicator intensity and color, and overall system operation. In addition, operation of the two interpret channels can be independently configured.

Of special interest is the configuration choice that allows selection of how the pushbutton switch LEDs will light under various operating conditions. This capability is provided to assist users who have trouble observing the differences between colors, typically issues differentiating between red and green. This “color blindness” condition is not uncommon in men and can make effective use of some electronic equipment difficult. The Model 201’s ability to control the talk pushbutton switches’ colors can also be useful for supporting international applications where compliance to specific regulatory requirements is required. This may dictate which LED color is associated with a function being “on” and which color is associated with a function being “off.”

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## Model 201 Specifications

**Applications:** Dante-based simultaneous interpretation

**Power Source:** Power-over-Ethernet (PoE), class 1 (very low power,  $\leq 3.84$  watts), per IEEE 802.3af

**General Audio:**

Internal Digital Audio Processing: 32-bit, fixed

Nominal Digital Input and Output Level:  $-20$  dBFS

**Network Audio Technology:**

Type: Dante audio-over-Ethernet

AES67-2018 Support: yes

Dante Domain Manager™ (DDM) Support: yes

Bit Depth: 16, 24, or 32

Sample Rate: 48 kHz

Nominal Level:  $-20$  dBFS

Number of Transmitter (Output) Channels: 4

Number of Receiver (Input) Channels: 4

Dante Audio Flows: 4; 2 transmitter, 2 receiver

**Network Interface:**

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

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

Compatibility – Headset A: single or dual-ear broadcast- or intercom-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)

Type: unbalanced

Electret Microphone Power: 3.3 volts DC via 2 k resistor, selected on/off

Impedance: 1 k ohms, nominal, microphone power off; 680 ohms, nominal, microphone power on

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

Frequency Response:  $-3$  dB at 40 Hz,  $-1$  dB at 16 kHz

Distortion (THD+N): 0.022%, measured at  $-20$  dBFS, 22 Hz to 22 kHz bandwidth, 24 dB of gain

Noise Floor:  $-95$  dBFS, A-weighted, 24 dB of gain

Dynamic Range:  $>76$  dB, A-weighted, measured at 24 dB of gain

**Compressor:**

Threshold: 3 dB above nominal Dante output level ( $-17$  dBFS),  $\pm 1$  dB

Slope: 2:1

Status LED: compressor active

## Future Capabilities and Firmware Updating

The Model 201 was designed so that its capabilities and performance can be enhanced in the future. The unit implements a USB host function which allows the application firmware (embedded software) to be updated using a standard USB flash drive. And, as previously discussed, the USB receptacle is also used to load two WAV audio files. The Model 201 uses the 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 the unit’s capabilities remain up to date.

**Confirmation Message Audio:**

Number of Channels: 2, field updatable using USB flash drive  
Source Type: 16-bit monophonic, 48 kHz sample rate, WAV (.wav) files, stored in non-volatile memory

Level:  $-20$  dBFS nominal

Duration: up to 40 seconds per WAV file

Distortion:  $<0.0001\%$

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

**Feedthrough Capability:**

Number of Channels: 2, individually configurable

Sources: 4 Dante receiver (input) channels (Floor, Relay, Aux 1, Aux 2), configurable

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

Audio Attenuation (Dim): 0, 5, 10, 15, 20 dB, Full Mute, configurable

**Connectors:**

Headset A: 5-pin female XLR

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

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

USB: type A receptacle (used for updating main firmware and WAV audio files)

**Configuration:** Studio Technologies’ STcontroller personal computer application

**Software Updating:** USB flash drive used for updating main firmware and WAV audio files; Dante Controller’s 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: 5 to 95%, non-condensing

Altitude: not characterized

**Dimensions:**

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 (055 kg)

Specifications and information subject to change without notice.

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