Dante®

Model 348 Intercom Station

STUDIO TECHNOLOGIES INC.

Overview

The Model 348 Intercom Station provides eight independent talk and listen channels that are compatible with Dante® audio-over-Ethernet networks. The desktop unit is designed to serve as an audio control center for production and support personnel in numerous applications including on-air television sports and news broadcasting, live events, theater, industrial, and corporate AV. The Model 348's channels can be part of virtual "party-lines" created with other compatible devices or be used directly in point-to-point intercom implementations. The range of resources makes it simple to use the Model 348 locally, or as part of a REMI or "At-Home" geographically diverse implementation. In addition to intercom applications, the unit can create multiple independent IFB (talent cue) channels. Other applications may benefit from the Model 348 user's ability to easily create monitor mixes from the eight input audio channels. This makes the unit a viable choice for listen-only scenarios.

Over a standard IP network, multiple Model 348 units can be used in party-line (PL) intercom applications with help from an external Dante-enabled audio matrix such as the Studio Technologies' Model 5422 Dante Intercom Audio Engine. Model 348 units can also be used "point-to-point" or interfaced with Dante-compatible matrix intercom systems. The Model 348 includes two Neutrik etherCON RJ45 connectors which allow interfacing with single or redundant Gigabit Ethernet networks. The primary network connection can provide power to the unit using a port on a Power-over-Ethernet (PoE) network switch. It can also be powered using a 12 Volt DC source that is connected using a broadcast-standard 4-pin XLR connector.

The Model 348 allows connection of broadcast- or intercom-style headsets that use a dynamic or electret (DC powered) microphone. The unit provides both 5-pin female XLR and 3.5 mm TRRS connectors which allow both traditional "pro" and contemporary gaming headsets to be utilized. In addition, the Studio Technologies' GME-3-12 electret gooseneck microphone can be directly connected using the ¼-inch jack located on the top of the unit's enclosure. A pushbutton switch allows users to directly select headset or gooseneck microphone operation. A low-noise microphone preamplifier and associated voltage-controlled-amplifier (VCA) dynamics controller (compressor) ensures excellent microphone audio quality while minimizing the chance of signal overload.

All Model 348 operating features are configured using the STcontroller software application. The 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 available, free of charge, from the Studio Technologies' website. It's a fast and simple means of configuring, revising, saving, and loading a unit's operating parameters.

The Model 348's front panel includes eight rotary controls ("encoders") which are used to adjust the level of the eight Dante monitor input signal sources. Using RGB (red-green-blue) LEDs, each control is illuminated and can display if signal is present on the associated audio channel or if the channel is muted. The user can monitor the Dante audio inputs by means of either the headset or a built-in speaker. A modern class-D amplifier integrated circuit drives the speaker efficiently while preserving audio fidelity. Two additional rotary encoders are used to control the master audio level and mute (on/off) status of the signals being sent to the headset and speaker outputs.

© by Studio Technologies, Inc.,

Extensive configuration choices allow the operation of the eight pushbutton switches and associated output channels to be optimized to meet the needs of specific applications. They can be independently configured for talk (intercom), IFB (talent cueing), call signal (20 kHz tone), and other related actions. The buttons can also be configured to provide "all-call" functions associated with talk and IFB functions.

The Model 348's pushbutton switches are illuminated to display their operating status as well as having the ability to indicate the presence of in-band (20 kHz tone) call signals. An audible alert, using the internal speaker, can also be generated in response to a call signal. For performance confirmation an integrated sidetone function allows audio coming from the headset's microphone to be returned to the headset output.

The Model 348's compact enclosure has overall dimensions of 6.5 inches wide (16.5 cm), 2.5 inches high (6.4 cm), and 4.6 inches deep (11.7 cm). Weighing 1.8 pounds (0.8 kg), the enclosure is made of steel to provide some "heft" to minimize the chance of inadvertent movement. The Model 348's main application firmware can be updated using the USB port on the back of the unit; the Dante firmware can be updated via an Ethernet connection.

Ethernet Data and PoE

The Model 348 connects to one or two local area networks (LANs) by way of two Gigabit ("GigE") twisted-pair Ethernet interfaces. The 1000BASE-T interconnections are made by way of Neutrik® etherCON RJ45 connectors. While compatible with standard RJ45 plugs, etherCON allows a ruggedized and locking interconnection for harsh or high-reliability environments. The two Ethernet interfaces can be configured, using the Dante Controller software applications, to serve in a switched or redundant mode.

The Model 348's operating power can be provided by way of the Primary Ethernet interface using the 802.3af Power-over-Ethernet (PoE) standard. PoE allows fast and efficient interconnection with the associated data network. Alternately, an external source of nominal 12 Volts DC can be connected to power the unit. If both are connected then PoE will be the active power source.

Dante Audio-over-Ethernet

Audio data is sent to and received from the Model 348 using the Dante audio-over-Ethernet media networking technology. As a Dante-compliant device, the Model 348's 11 Dante transmitter (audio output) channels and 16 Dante receiver (audio input) channels can be assigned (routed or "subscribed") using the Dante Controller software application. The Dante transmitter and receiver channels support 32 Dante flows, 16 in each direction. The digital audio's bit depth is up to 32 with a sample rate of 48 kHz. Bi-color LEDs, located on the unit's back panel, provide status indications of the Ethernet network and Dante interface performance.

The Model 348 is compliant with the AES67 interoperability standard. In addition, the unit is compatible with Audinate's® Dante Domain Manager™ (DDM) software application.

Audio Quality

The Model 348's audio performance is completely "pro." A low-noise, wide dynamic-range microphone preamplifier and associated voltage-controlled-amplifier (VCA) dynamics controller (compressor) ensure that headset and gooseneck microphone audio quality is preserved and minimizes 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 48 kHz. 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. A total of 11 Dante transmitter (output) channels are provided: one each associated with the unit's eight channels, two monitor output channels, and one "hot mic" output channel.

Audio input signals arrive via 16 Dante receiver channels and pass into the Model 348's 32-bit microprocessor. Eight channels are associated with the monitor section while the other eight are used as program sources for the IFB (talent cue) functions. All channel routing, headphone and monitor level control, IFB creation, and sidetone functions are performed within the digital domain. This provides flexibility, allows precise level control, eliminating the need for analog audio signals from having to pass through the level controls. The audio signals destined for the headphone outputs are sent to a high-performance digital-to-analog converter and then on to robust driver circuitry.

Future Capabilities and Firmware Updating

The Model 348 was designed so that its capabilities and performance can be easily enhanced in the future. A USB connector, located on the unit's back panel, allows the application firmware (embedded software) to be updated using a USB flash drive. The Model 348 uses the Broadway™ integrated circuit from Audinate to implement the Dante interface. The firmware in this integrated circuit can be updated via an Ethernet connection, helping to ensure that its capabilities remain up to date.

Model 348 Specifications

Applications: Dante-based intercom, IFB (interrupted foldback) master station, audio monitor mixer, specialized tone generator

Power Sources:
Power-over-Ethernet (PoE): class 0 (classification unimplemented, ≤12.94 watts) per IEEE® 802.3af
External: 10 to 18 volts DC, 0.65 A maximum at 10 volts DC (can be powered by optional PS-DC-02)

Network Audio Technology:
Type: Dante audio-over-Ethernet
AES67-2013 Support: yes, selectable on/off
Dante Domain Manager (DDM) Support: yes
Ethernet Interface Configuration: Switched or Redundant
Bit Depth: 16, 24, or 32
Sample Rate: 48 kHz
Dante Receiver (Input) Channels: 16
Dante Transmitter (Output) Channels: 11
Dante Audio Flows: 32; 16 transmitter, 16 receiver
Internal Digital Audio Processing: 32-bit, fixed
Input-to-Output Audio Processing Latency: <200 uSec
Nominal Input and Output Level: –20 dBFS

Network Interfaces: 2, Primary-PoE and Secondary
Type: 1000BASE-T (Gigabit Ethernet ("GigE")) per IEEE 802.3ab (10 and 100 Mb/s not supported)
Power-over-Ethernet (PoE): per IEEE 802.3af (applicable to Primary-PoE network only)

Microphone Input – Headset:
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
Type: unbalanced
Impedance: 1 k ohms, nominal, microphone power off; 690 ohms, nominal, microphone power on
Gain: 26, 32, 38, 44, 50 dB, selectable
Frequency Response: –4 dB at 30 Hz, –2.6 dB at 40 Hz, –1.8 dB at 50 Hz, –2.4 dB at 10 kHz, –3.8 dB at 20 kHz
Distortion (THD+N): <0.09%, measured at –20 dBFS, 22 Hz to 22 kHz bandwidth, 38 dB of gain
Dynamic Range: >93 dB, A-weighted, 26 dB gain

Microphone Input – Gooseneck:
Compatibility: Studio Technologies' GME-3-12
Microphone Power: 5 volts DC via 4.99 k resistor
Impedance: 3.3 k ohms, nominal
Gain: 12, 18, 24, 30, 36 dB, selectable
Frequency Response: –3.0 dB at 40 Hz, –2.0 dB at 50 Hz, –2.0 dB at 16 kHz, –3.0 dB at 20 kHz
Distortion (THD+N): <0.04%, measured at –20 dBFS, 22 Hz to 22 kHz bandwidth, 36 dB of gain
Dynamic Range: >97 dB, A-weighted, 12 dB gain

Compressor:
Application: applies to headset and gooseneck microphone audio
Threshold: 1 dB above nominal Dante output level (–19 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: 3.0 Vrms, 1 kHz, 150 ohm load
Frequency Response: 20 Hz to 20 kHz, +0/–1 dB
Distortion (THD+N): <0.02%
Dynamic Range: >93 dB

Speaker Monitor Output:
Type: single-channel (monaural)
Speaker: 1.3-inch (32 mm) diameter
Maximum Power: 4 watts RMS, nominal
Frequency Response: 150 Hz to 20 kHz, ±3 dB

18 kHz and 20 kHz Tone Outputs:
Type: sine wave
Level: –20 dBFS
Frequency Accuracy: <10 ppm
Distortion: <0.0001%

Call Function:
Receive Frequency: 20 kHz, ±800 Hz, within audio channel
Receive Level: –27 dBFS minimum
Send Frequency: 20 kHz
Send Level: –20 dBFS
Audible Alert: 3-burst sequence, 524 Hz, sine wave, selectable level range

Connectors:
Headset A: 5-pin female XLR
Headset B: 3.5 mm 4-conductor TRRS jack, per Japanese standard JEITA/EIAJ RC-5325A
Gooseneck Microphone: ¼-inch 3-conductor with 7/16-20 UNF threaded bushing; 4-40 hex head socket set screw allows microphone to be secured into bushing
Ethernet: Neutrik NE8FBH etherCON RJ45 receptacles
External DC: 4-pin male XLR (pin 1 negative, pin 4 positive)
USB: type A receptacle (used only for updating firmware)

Configuration: requires Studio Technologies' STcontroller software application, version 2.06.00 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

Spare Connector Location: 1
Allows a Studio Technologies' cable assembly or option module to be installed. Also compatible with Neutrik NC*D-L-1 connectors (*=3F, 3M, 5M, 6F, 6FS, etc.).

Dimensions (Overall):
6.5 inches wide (16.5 cm)
2.9 inches high (7.4 cm)
4.9 inches deep (12.5 cm)

Deployment: intended for tabletop applications

Weight: 2.1 pounds (0.95 kg)

Specifications and information subject to change without notice.

Studio Technologies, Inc.
Skokie, Illinois USA
© by Studio Technologies, Inc., January 2020

studio-tech.com