Model 48D
Dante® Bridge

STUDIO TECHNOLOGIES INC.

Key Features

- Two independent Dante network connections
- "Bridges" up to four audio channels in each direction
- High-performance sample rate conversion
- Excellent audio quality
- DDM and AES67 support
- PoE and 12 Vdc powering
- Standard connectors, simple setup
- Table-top, portable, or optional rack-mount installation

Overview

The Model 48D Dante® Bridge provides a simple yet high-performance means of interconnecting, or "bridging," Dante audio signals associated with two independent local-area-networks. The unit allows up to four audio channels to pass in each direction. Internal circuitry provides timing and bit-depth correction to ensure that audio signal integrity is maintained.

Dante audio-over-Ethernet has found wide acceptance as a network "backbone" due to its ease of use, excellent audio performance, strong interoperability, and wide adoption by a large number of equipment manufacturers. However, interconnecting audio signals on independent local-area-networks that support Dante can present a challenge. The Model 48D makes that a simple task to implement. Interconnecting a Model 48D with two Ethernet connections, along with a minimal amount of configuration, is all that's required to make the unit part of a sophisticated, networked audio system.

The Model 48D can be powered by Power-over-Ethernet (PoE) or an external source of 12 volts DC. Standard connectors are used for the Ethernet and DC power interconnections. The Model 48D's enclosure has a "1/2-rack" 1U form factor and weighs less than two pounds, making it well suited for use in portable applications. Alternately, using one of the optional rack-mounting kits one or two Model 48D units can be mounted in a single space (1U) of a standard 19-inch rack enclosure. The unit is built to professional standards and is intended for demanding 24-hour operation.

The Dante Controller software application can be used to configure all Dante network and audio parameters. Front-panel LED indicators, an LCD display, and five pushbutton switches are provided to view and revise selected operating parameters. The Model 48D is compatible with the Dante Domain Manager™ (DDM) software application and is complaint with AES67 digital audio signals.

Model 48D Front and Rear Views

Dante Audio-over-Ethernet

Audio data is sent to and received from the Model 48D using the Dante audio-over-Ethernet media networking technology. Two separate network interfaces allow completely independent configurations. Audio signals with a sample rate of 44.1, 48, 88.2, and 96 kHz and a bit depth of up to 24 are supported. Up to four audio channels in each direction can pass (be "bridged") between the Model 48D's two network interfaces. (Four channels at 48 kHz sample rate and two channels at a sample rate of 96 kHz.)

Sample rate converter (SRC) integrated circuits ensure that audio that enters on one network interface exits the corresponding network interface with correctly-aligned digital audio information. Each interface has four Dante input (receiver) and output (transmitter) channels. They are associated on a one-to-one basis with the channels both interfaces. For example, input 1 on Network A is associated with output 1 on Network B. Routing (subscribing) of the Dante input and output channels to other devices can be performed using the Dante Controller software applications.

Applications

The Model 48D's primary application is to interconnect audio channels associated with two independent networks that are supporting Dante-compliant equipment. Up to four channels of audio in each direction can be "bridged" between each network. Each Dante network can have its own master clock, bit depth, and sample rate. Circuitry within the Model 48D ensures that the audio signals can pass between the networks with minimal degradation to performance. The Model 48D's two network ports are fully metallically isolated and share very little network data. This helps to ensure that the risk of security issues is minimized. Only uncompressed PCM digital audio signals pass, by way of sample-rate-converter (SRC) integrated circuits, between the two network interfaces.

The most basic application for the Model 48D is to allow up to four audio channels on two independent Dante networks to be interconnected — there's really no simpler means of interconnecting Dante audio channels from between two separate networks. With standard connectors and PoE power, setup can be completed in just a few minutes. This makes Model 48D units effective in both fixed and portable applications. Ideal uses would include stadiums, concert venues, media production studios, and education facilities where "guests" frequently need to interconnect their Dante equipment with "house" resources. One of the Model 48D's network connections can be secured while the other remains "open" for guest use.

As the number of mobile broadcast facilities that utilize Dante-compliant equipment increases so does the need to interconnect them with a venue's resources. But maintaining isolation between the two networks can be important for reasons of both signal-integrity and security. In just minutes the Model 48D can allow audio signals in both directions to be traversing the two networks.

The Model 48D can also find use within a single Dante network. The unit's ability to link Dante audio channels that have different clocking, bit depth, and sample rate characteristics can be valuable. For example, one piece of equipment may only support a sample rate of 96 kHz, while the other devices connected to the network only support 48 kHz. In this situation the Model 48D would allow two channels in each direction to interconnect, while still maintaining the required 96 kHz and 48 kHz sample rates. In this application it's interesting to note that both of the Model 48D's Ethernet ports would be connected to the same local-area-network (LAN).

The Model 48D supports a maximum of four audio channels in each direction which can seem to be a significant limitation. But this small channel count should prove very adequate for many applications. For example, live-event venues may only need to interchange a few audio channels with OTA (over-the-air) or web streaming mobile broadcast facilities. The venue might send one or two channels of scoreboard, replay, or stadium announcer audio. While the mobile facility may only need to return program or "on-air" feeds to the "house" audio console.

DDM and AES67

The Model 48D is compliant with the Dante Domain Manager software application. However, there is no requirement that each of the two network interfaces be part of a DDM domain. One of the Model 48D's network interface's can utilize the security resources of DDM while the other remains "open." Each of the Model 48D's network interface's can be configured to support, or not support, AES67 digital audio signals. This allows a Model 48D to serve in a unique Dante-to-AES67 bridge function. However, note that when AES67 support is enabled for an interface the sample rate will be fixed at 48 KHz.

Pro Audio Quality

The Model 48D's audio circuitry was designed to meet the demands of professional audio applications. Audio data passing between the two network interfaces remains within the digital domain. To achieve audio data synchronization between the two networks high-performance sample-rate-converter (SRC) integrated circuits are utilized. This allows compatibility between widely-divergent sample rates while maintaining low-distortion, low-noise, and high headroom.

Status LEDs and LCD Display

On the front panel the Model 48D provides four LED indicators, a 2-line back-lit LCD display, and five pushbutton switches. Two of the LEDs indicate the status of the input power sources. The other two LEDs are associated with the two network interfaces. The LCD display allows a number of operating conditions to be monitored, including firmware version numbers, network parameters, and Dante operating characteristics. The pushbutton switches can be used to select which menu page is displayed as well as allowing key network parameters to be revised. These include the IP configuration methods, IP addresses, and subnet mask values. Six LEDs on the back panel indicate the status of the two network connections and associated Dante interfaces.

Ethernet Data and Power Source

The Model 48D interconnects with two independent local-area-networks (LANs) using standard 100 Mb/s twisted-pair Ethernet signals. The physical connections are made by way of two Neutrik® etherCON RJ45 receptacles. While compatible with standard RJ45 plugs, etherCON allows a ruggedized and locking interconnection for harsh or high-reliability environments. The Model 48D's operating power can be provided by a Power-over-Ethernet (PoE)-compliant Ethernet signal that's connected to the Model 48D's Network A interface. For network management purposes the interface will report to the power sourcing equipment (PSE) that it is a class 1 (very low power) device. If PoE is not available the unit can also be powered using an external source of 12 volts DC.

Simple Installation

The Model 48D is housed in a rugged yet lightweight aluminum enclosure that is designed to be "field tough." It can be used as a standalone portable unit, supporting what's known in the broadcast world as "throw-down" applications. Optional rack-mounting installation kits are available to allow one or two units to be mounted in one space (1U) of a standard 19-inch rack enclosure. As previously mentioned the Model 48D uses standard connectors to allow fast and convenient interconnections. Two Ethernet signals are connected using Neutrik etherCON RJ45 receptacles. Operation will commence immediately if Power-over-Ethernet (PoE) is available on the Ethernet connection associated with the Network A interface. A 12 volt DC power source can also be connected by way of a 4-pin XLR connector.

Future Capabilities and Firmware Updating

The Model 48D was designed so that its performance and capabilities can be enhanced in the future. A USB connector, accessible on the unit's back panel, allows the main firmware (embedded software) to be updated using a USB flash drive. To implement its Dante interfaces the Model 48D uses two of Audinate's Ultimo™ integrated circuits. The firmware in these integrated circuits can be updated via the unit's two Ethernet connections, helping to ensure that the Dante capabilities remain up to date.

Model 48D Specifications

Power Sources:
Power-over-Ethernet (PoE): class 1 (low power, ≤3.84 watts) per IEEE® 802.3af
External: 10 to 18 volts DC, 0.15 A maximum (can be powered by optional PS-DC-02)

Network Interfaces: 2
Type: 100BASE-TX, twisted-pair Ethernet, Power-over-Ethernet (PoE) supported
Data Rate: 100 Mb/s (10 Mb/s and 1000 Mb/s "GigE" not supported)

Network Audio Technology (each Network Interface):
Type: Dante audio-over-Ethernet
AES67-2013 Support: yes
Dante Domain Manager (DDM) Support: yes
Bit Depth: up to 24
Sample Rate: 44.1, 48, 88.2, 96 kHz
Number of Transmitter (Output) Channels: 4 (44.1 and 48 kHz sample rate), 2 (88.2 or 96 kHz sample rate)
Number of Receiver (Input) Channels: 4 (44.1 and 48 kHz sample rate), 2 (88.2 or 96 kHz sample rate)
Dante Audio Flows: 4; 2 receiver, 2 transmitter

Audio Performance:
Type: fully-digital paths between network interfaces (by way of sample-rate-converter integrated circuits)
Dynamic Range: 147 dB at 48 kHz sample rate, 148 at 96 kHz sample rate, A-weighted
Distortion (THD+N): –140 dB at 48 kHz sample rate, –143 dB at 96 kHz sample rate, measured at –1 dBFS, 1 kHz

Connectors:
Ethernet: Neutrik NE8FBH etherCON RJ45 receptacles
External DC: 4-pin male XLR
USB: type A receptacle (used only for main firmware updates)

Environmental:
Operating Temperature: 0 to 50 degrees C (32 to 122 degrees F)
Storage Temperature: –40 to 70 degrees C (–40 to 158 degrees F)
Humidity: 0 to 95%, non-condensing
Altitude: not characterized

Dimensions – Overall:
8.7 inches wide (22.1 cm)
1.72 inches high (4.4 cm)
8.3 inches deep (21.1 cm)

Mounting Options: single-unit (RMBK-11) and dual-unit (RMBK-12) rack-mounting installation kits (purchased separately) use one space (1U) in a standard 19-inch rack

Weight: 1.8 pounds (0.80 kg); rack-mounting installation kits add 0.2 pounds (0.09 kg)

Specifications subject to change without notice.

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Skokie, Illinois USA
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