SPNDNT

Dante™ Network Processor

- **DSP processor with automatic mixing, gain control and delay for ASPEN and Dante digital audio channels**

- **Routes and processes final mix signals in the ASPEN bus and 32 inputs and 32 outputs in the Dante network audio flow**

- **Low latency, tightly synchronized transport of uncompressed audio over IP networks using off the shelf gigabit switches**

- **Simplified configuration management includes easy to use Dante features like automatic device discovery and plug and play networking**

- **Gigabit Ethernet transport**

- **AVB Support**

- **Redundancy via secondary network**

The processor also handles the clock synchronization for the ASPEN equipment and the Dante network. If the processor is the Dante master, it generates the clock signal for the network and the ASPEN rack. If the processor is a Dante slave, it picks up the network clock and passes it on to the ASPEN system below it. Multiple Dante equipped devices will automatically discover one another and configure the Master/Slave relationship.

Redundancy, which is required in some applications, is accomplished by connecting to a secondary network that duplicates real-time audio traffic. If the primary network fails for any reason, the secondary network's audio continues without losing a single sample.

The SPNDNT is always positioned as the Master in the ASPEN subsystem (at the top of the component stack).

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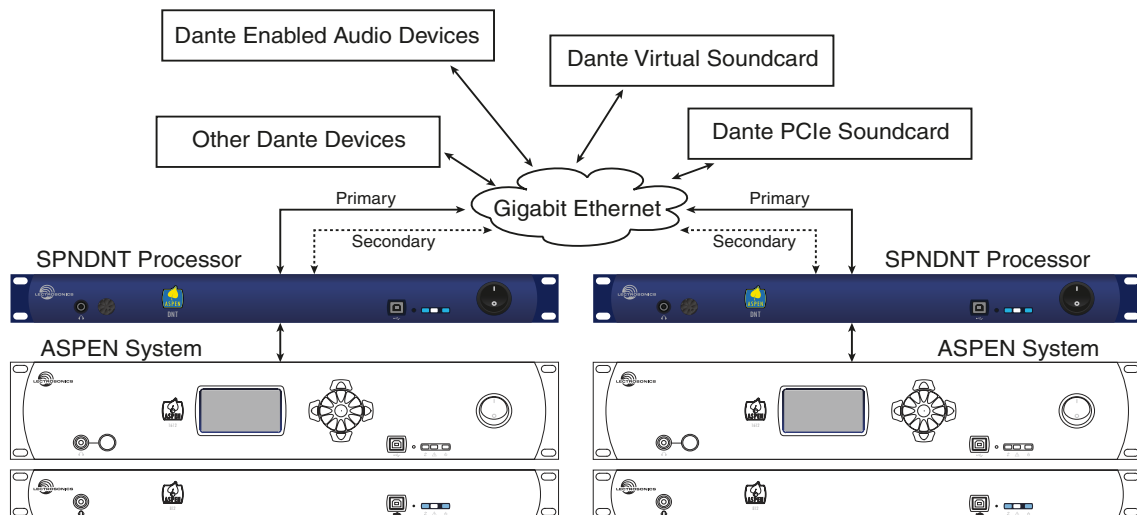
NOTE: SPNDNT processors can also be connected to each other without a network for extended length cable runs

Technology Overview

Dante delivers a no hassle, self configuring, true plug-and-play digital audio network that uses standard Internet Protocols over Gigabit Ethernet. Patent-pending Dante technology distributes digital audio plus integrated control data with sub millisecond latency, sample-accurate playback synchronization, extreme reliability and high channel counts.

> NOTE: The Dante interface will also operate over 100 Mbps connections for some applications, however, this is not sufficient bandwidth for ASPEN processors due to the high channel count, so gigabit connections are required.

Plug-and-Play Networking for Media Professionals

With Dante's Zero configuration protocol, you won't need a networking specialist to enter numerical IP or MAC addresses, or set up DNS or DHCP servers. Dante makes networking a true plug-and-play process with automatic device discovery and system configuration. Dante-enabled devices find each other on the network and will configure themselves, so you can skip those complicated, error-prone set-up procedures. Instead of "magic numbers," you label networked devices and their input and output signals with names that make sense to you.

IP Standards Based Technology

Dante is built on global networking standards including Internet Protocols — not just Ethernet. With true IP routing, Dante technology works as an IT network capable of transporting professional quality audio and high definition video with no limits on your layout options. Dante delivers sample-accurate playback synchronization, even over multiple switch hops. Latency is extremely low whether you choose to run your Dante network with fixed latency or optimized latency. Dante makes it easy to set up robust, flexible digital audio networks with performance that scales with your network.

Media Networking over Existing Infrastructure and Hardware

Dante runs on inexpensive off-the-shelf computer networking hardware, and does not require dedicated network infrastructure. Ethernet switches transmit Dante digital media streams alongside ordinary data traffic, so you can integrate professional media operations into properly designed pre-existing networks. And with Dante Virtual Soundcard (DVS), your Mac or Windows computer looks and acts like any other Dante-enabled device. Just plug in to the standard Ethernet port to use digital audio processing, recording or playback software on the network.

Sample Accurate Timing with Inaudibly Low Latency

Dante uses audio independent, high accuracy network synchronization standards to ensure all Dante devices are synchronized at all times. Sample accurate playback with extremely low latency and jitter is achieved without limiting your audio sample rates and network layout options.

Summary of Dante Benefits

Dante is a high performance digital audio networking solution that offers many benefits to users and manufactures of equipment for Live Sound, Install, Recording or other Pro Audio markets.

- Plug-and-play technology – automatic discovery and simple signal routing
- Reduced Cost & Complexity- No special skills required to set up audio networking
- Sample accurate playback synchronization
- Lowest latency available from any networking technology
- Add/remove/rearrange components at will
- Deterministic latency throughout the network
- Support mixed bit depths and mixed sample rates over one network
- Scalable, flexible network topology supporting a large number of senders and receivers
- Supports mix of 100Mbps, 1Gbps, through 10Gbps networks
- Supports a single integrated network for audio, video, control, monitoring
- Uses inexpensive, off-the-shelf computer networking equipment
- Direct connection to PCs for multi-channel recording, processing and playback using a Dante Virtual Soundcard for both PCs and Macs
- AVB Ready

Functions Added by SPNDNT Processor

Automatic mixing: auto, direct, override, background and phantom modes for use in sound reinforcement, recording and mix-minus applications.

Gain adjustment: to match levels from different audio signal sources.

Delay: to time align audio from different signal sources.

Basic Signal Flow Example

In this simplified diagram, two ASPEN systems are interconnected with two Dante processors as might be used in a overflow classroom situation. A secondary network is established with a second switch to provide redundancy in case the primary network connection fails.

> For clarity in this illustration, the ASPEN systems in this diagram are labeled as **SUB-SYSTEM A** and **SUB-SYSTEM B**, however, there is no such distinction in configuring an actual installation.

For example, SUBSYSTEM A generates mixes in its own matrix from signal sources connected to the SPNTrio processor. The SPNDNT Dante processor in this stack works as the ASPEN Master and assigns mixes from the ASPEN matrix into the Dante network matrix.

The SPNDNT Dante processor in SUBSYSTEM B can then subscribe to these mixes and add them to the ASPEN matrix in its own subsystem and processors connected below it. Signals and mixes can be sent from SUBSYSTEM B to SUBSYSTEM A in the same manner.

A second network connection is included to illustrate the equipment and connections needed to provide redundancy required in some applications.

A separate Ethernet switch is used to provide a secondary network that duplicates the flow of audio at all times. The secondary network will continue to transport the audio regardless of any primary network failure, and the audio signal flow remains seamless with no packet loss or audible artifacts.
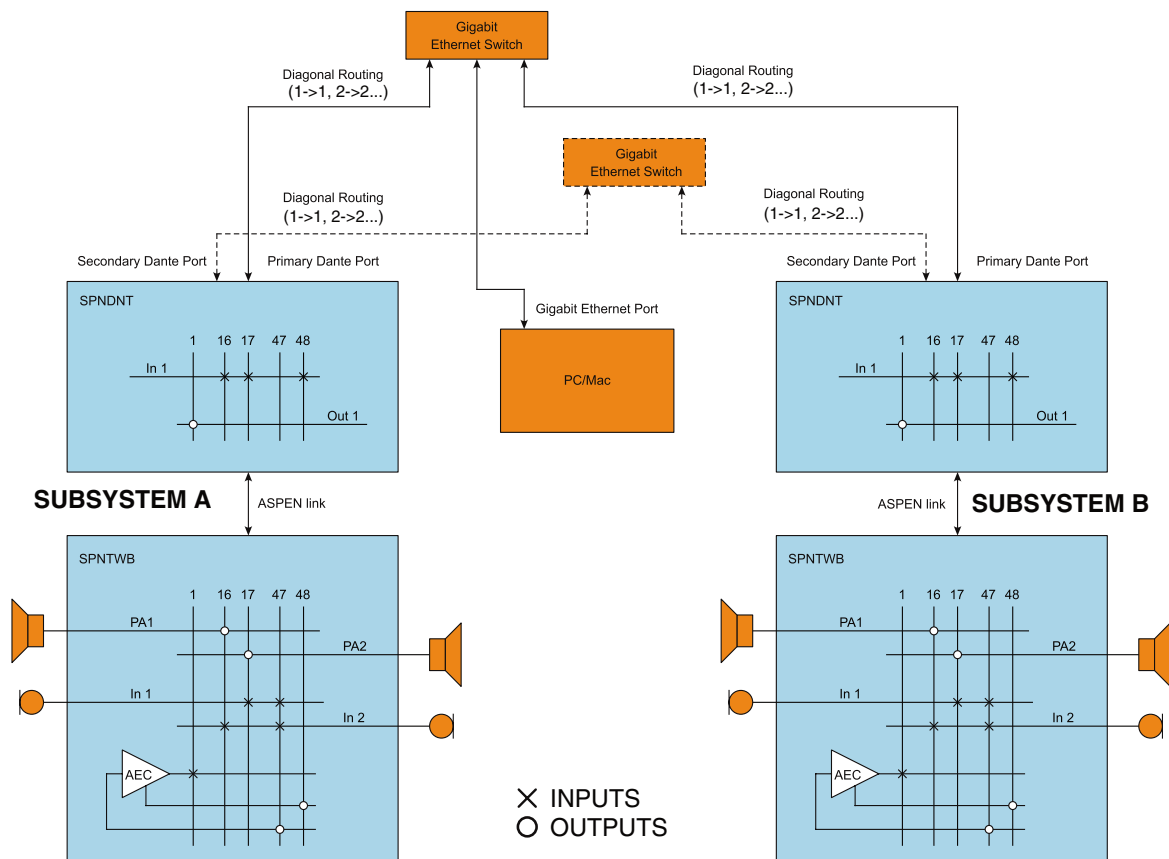

Dante devices configure themselves automatically as soon as they are connected into the network, with a single unit being chosen as Master to generate the system clock and the others configured as Slaves.

ASPEN processors automatically configure themselves as Master and Slaves as determined by the interconnect cabling between the processors.

The SPNDNT processor is connected in the uppermost position in the ASPEN system stack so it will function as the ASPEN Master for the units connected directly below it. This enables it to either generate the synchronization clock for the network and ASPEN system when it is the Dante Master, or receive the network clock and pass it on to the ASPEN units below it when it is a Dante Slave.

This automatic setup of the synchronization clock simplifies the installation and saves time by eliminating errors.
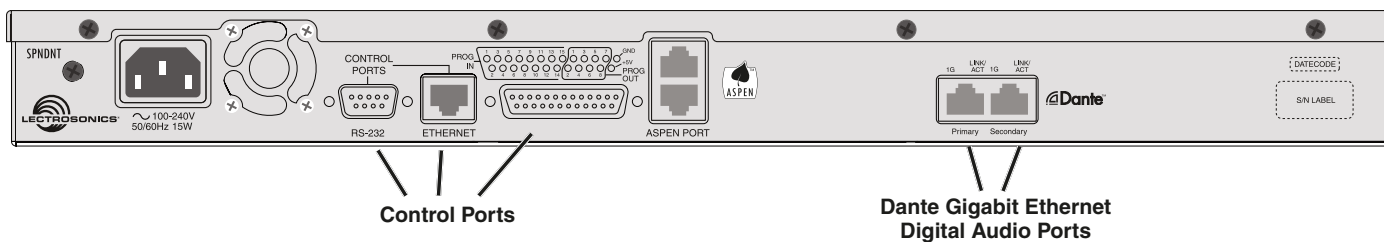
Control Ports

Dante Gigabit Ethernet Digital Audio Ports

The audio signal flow in the processer follows the same pattern as other ASPEN processors. Digital audio signals from the Dante network are gathered by the Brooklyn II module and delivered to the digital matrix, where they are then added to signals from the slave unit below to create the Final Mixes. The Final Mixes then feed the Brooklyn II module for network distribution and also return to the slave units for use in the local sound system.

Gain and Delay are provided on the inputs and outputs of the Brooklyn II module. Redundant digital audio ports are included to satisfy requirements in some applications. A headphone output is provided on the front panel of the processor for monitoring and diagnostics.

Specifications

Digital Inputs;	32
Digital Outputs:	32
Monitor output (1/4" headphone jack)	
Signal source:	Any of the 48 final mixes
Output power:	50 mW (<50 ohm impedance recommended)
Matrix Access:	• 32 inputs from Dante matrix • 48 mixes in ASPEN matrix
Input Processing:	Gain: -69 to +20 dB in 1 dB increments Delay: .5 to 100ms in .5ms increments
Output Processing:	Gain: -69 to +20 dB in 1 dB increments Delay: .5 to 250ms in .5ms increments
Crosspoint Mixing Modes:	• Auto • Direct • Override • Background • Phantom
Internal Signal Generator:	
Swept sine:	Modes: single sweep, continuous sweep
Waveforms:	Sawtooth (up or down), triangle
Sweep rate:	Linear, logarithmic
Parameters:	Start freq, stop freq, level [dBu], sweep time [sec]
White noise:	Parameter: level [dBu]
Pink noise:	Parameter: level [dBu]
Tone (sine wave):	Parameters: level [dBu], frequency
Power Requirements:	100-240 VAC, 50/60 Hz
Power Consumption:	15 Watts
Dimensions:	1.75 x 19.00 x 7.70 inches
Weight:	3.64 lbs., 1651 grams