INSTALLATION AND STARTUP GUIDE

DNT Series

DNT16i/DNT0212 Network Processors

Dante™

A trademark of Audinate Pty Ltd.

CE

Fill in for your records:

Serial Number:

Purchase Date:

LECTROSONICS®
Rio Rancho, NM, USA
www.lectrosonics.com

Table of Contents

FCC Part 15 Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by Lectrosonics, Inc. could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at this own expense.

Important Safety Instructions

This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure -- voltage that may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

When using your equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1) Read these instructions.
2) Keep these instructions.
3) Heed all warnings.
4) Follow all instructions.
5) Do not use this apparatus near water.
6) Clean only with a dry cloth.
7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and third grounding prong. The wider blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11) Only use attachments/accessories specified by the manufacturer.
12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13) Unplug this apparatus during lightning storms or when unused for long periods of time.
14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15) **WARNING** -- TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.
16) Unit shall be connected to a MAINS socket outlet with a protective earthing connection.
17) Do not use this product near water for example, near a bathtub, washbowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
18) Use the front panel ON/OFF switch to disconnect the device from the AC MAINS. This switch should remain accessible to the user at all times.
19) Use only the power cord indicated in this manual.

SAVE THESE INSTRUCTIONS

Overview

What is Dante?

Audinate's patent pending Dante™ technology is a flexible Internet Protocol (IP) and Ethernet based digital AV network technology that eliminates the many bulky cables needed to provide point-to-point wiring for analog AV installations.

With Dante, existing infrastructure can be used for high performance audio as well as for ordinary control, monitoring or business data traffic. Digital networks utilize standard IP over Ethernet offering high bandwidth capable of transporting hundreds of high quality channels over Gigabit Ethernet.

Set-up and configuring the system is made easy as well, saving enormous installation costs and long term cost of ownership on a digital network. The physical connecting point is irrelevant: audio signals can be made available anywhere and everywhere. Patching and routing now become logical functions configured in software, not via physical wired links

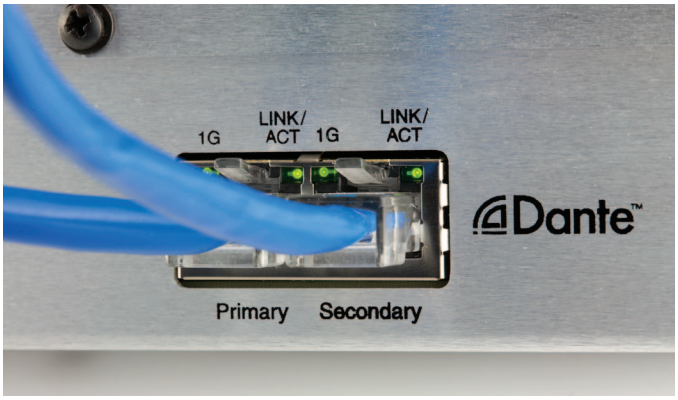
About the DNT Processors

The ***DNT16i*** is an "input" device, providing 16 analog mic/line inputs. The input signals are digitized and each channel is routed through a comprehensive set of filters, delay and dynamic processing, and the digital audio is then available as input signals to a digital matrix in the processor. The matrix in the processor provides advanced automatic mixing algorithms at 48 different crosspoints, and the final mix in each crosspoint can be routed to a Dante transmit channel.

The ***DNT0212*** is an "output" device, subscribing to Dante network transmitted channels, converting them to analog audio and providing 8 line level and 4 mic/line level outputs. An internal digital matrix with 48 crosspoints provides advanced automatic mixing algorithms of inputs from analog local sources, Dante subscriptions and foldback from its own mixes (submixes). The final mixes can then be routed to analog outputs or Dante transmit channels. Each analog output channel includes delay, filters, compressor, gain and limiter. The Dante outputs include delay, filters, compressor and gain. In addition, two analog line level inputs are available for use in applications such as local, directly connected emergency voice evacuation equipment.

Both models have internal signal generators for setup and diagnostics:

- Pink Noise
- White Noise
- Tone
- Sweep



Switched and Redundant Modes

The rear panel Dante ports allow operation in a ***switched*** mode through a single network using either jack, or in a ***redundant*** mode through two separate networks using both jacks simultaneously. Redundancy is required in some applications where it is imperative that no audio is lost due to network problems, such as in courtroom recording. The secondary network duplicates real-time audio traffic. If the primary network fails for any reason, the secondary network's audio continues without losing even a single sample.

See page 9 and also refer to the help files and documentation provided by Audinate for more information regarding the setup for switched and redundant modes.

DNT16i Front Panel

System Recovery Mode Switch

Recessed switch is used to recover after a failed firmware update.

USB Port

Standard USB connector for the setup and control from a computer using a Windows or Mac operating system. The USB port is also used for firmware updates.

Firmware Update Mode Switch

Recessed switch used to place the processor into the firmware update mode.

Status LEDs

- Comm LED - indicates USB, RS-232 and network communication
- Alert LED - blinks to indicate fault or error
- Alert LED - glows steady in firmware update mode
- Power LED - glows to indicate power ON

DNT16i Rear Panel

RS-232 Serial Port

Used for control; typically with third party products such as touch panel displays.

Ethernet Port

Used for control only. Does not pass audio.

Programmable Input and Output Port

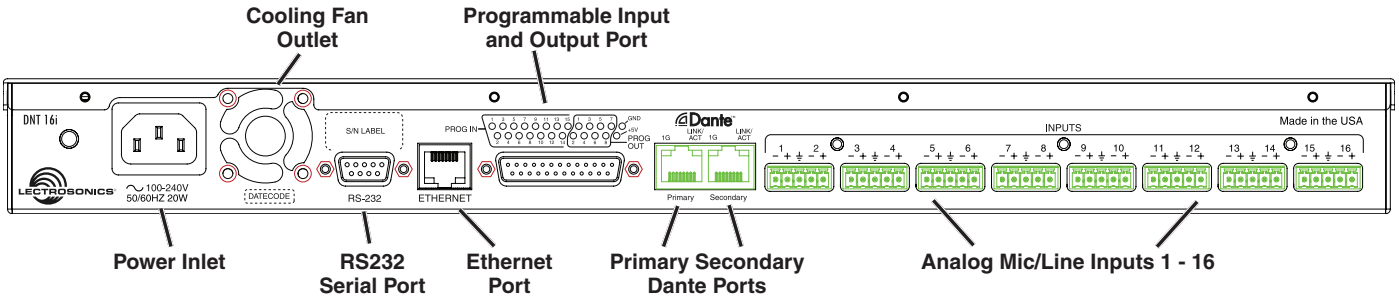
Programmable inputs and outputs used to control levels, settings, indicate the current state of a programmable input and control a variety of other parameters.

Dante Ports

The network audio ports. Either port can be used with a single network connection. When a second network is configured for redundancy, all processors connected to the network must have consistent connections, i.e. all Primary ports connected to one network and all Secondary ports connected to the other network.

Mic/Line Inputs

Analog inputs with adjustable gain from -10 to +60 dB in 1 dB increments; balanced differential floating design (no pin 1 problem).



DNT0212 Front Panel

Headphone Monitor

Standard 1/4 inch jack and level control. Drives both channels of stereo headphones.

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Line Outputs 1 - 8

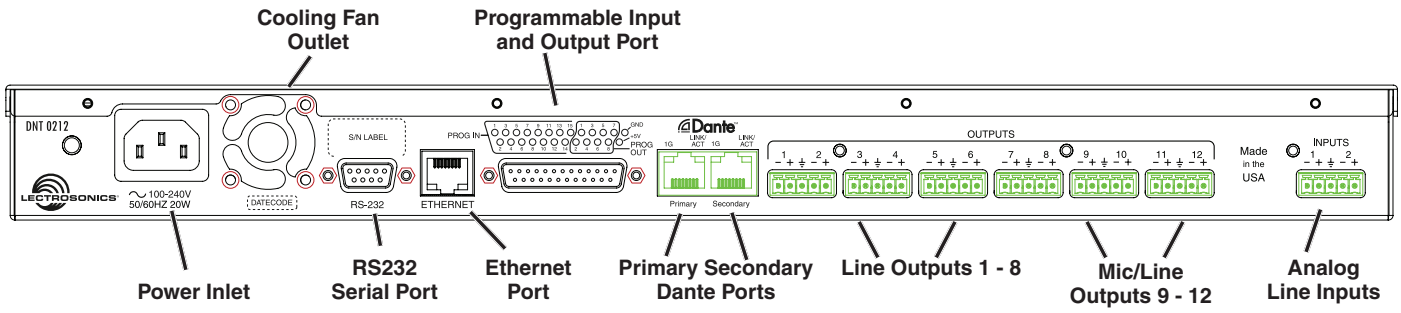
Floating, differential line level outputs.

Mic/Line Outputs 9 - 12

Floating, differential outputs, switchable from microphone to line level

Analog Line Inputs

Floating, differential line level inputs, typically used with locally connected audio sources such as voice evacuation equipment.



DNT Control Panel Software

DNT Series processors are set up and monitored using the ***DNT Control Panel*** program. The software will run on a Windows or Mac operating system.

Use the disk included with every processor to install the software, or download the installer from the web site at:

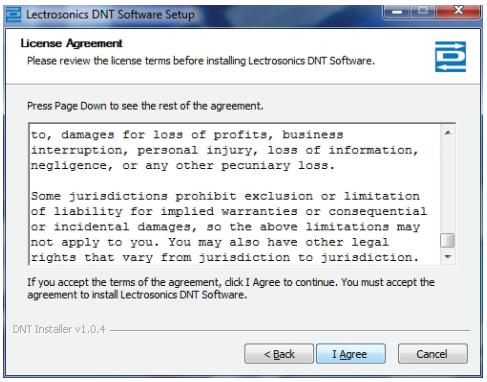
http://www.lectrosonics.com/dntsupport/

DNT Software Installation

NOTE: Uninstall previous version before installing the software.

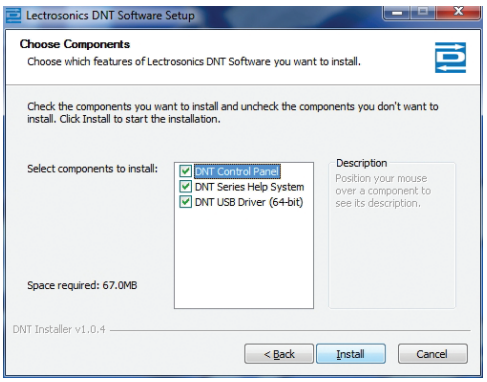
Insert the disk into the drive and wait for the ***Welcome Screen*** to appear. Click on ***Install DNT Software/USB Drivers*** to install the software.

The End User License Agreement screen appears. Click on ***I Agree***, then on ***Next*** to continue.

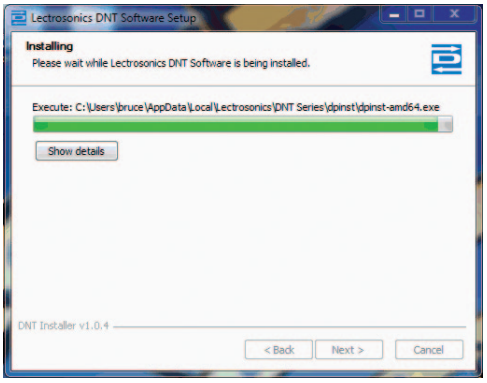


The next screen presents options on which components to install. It is recommended that you check all three so the ***Help System*** and ***USB Driver*** will be installed automatically.

Click on ***Install*** to continue.



A status bar will appear during the installation to advise you of the progress. Wait for the installation to complete, then click ***Next*** to finalize the process.

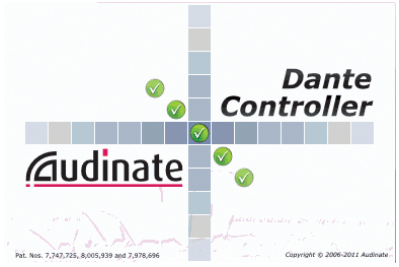


Another screen will appear during the installation, prompting for permission to install the USB drivers. Click on ***Next*** to continue.

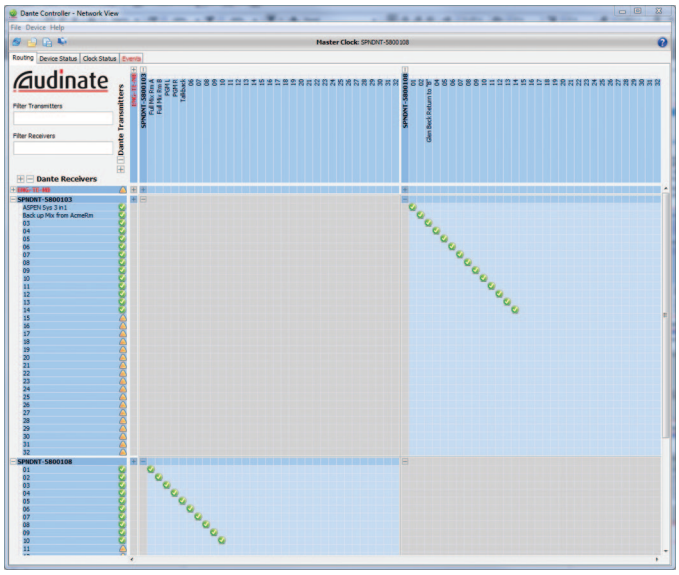
When the installation is complete the final screen will appear. Click on ***Finish*** to close the installer.

About Dante Software

Dante Controller is a second software package needed to route network audio signals between the processor and other nodes on a network. The software is downloaded from the Audinate web site and will run on Windows and Mac platforms.



Dante Controller is used to assign the transmit and receive signals between multiple Dante devices. When a device is set to receive a signal from another device that is transmitting, it is said to ***subscribe*** to the transmitted signal. These ***subscriptions*** appear in the Dante Controller window as green check marks.



Browser based Help Files are provided to explain various icons and setup tabs.

Download the software from: http://www.audinate.com

The installation is quick and simple.

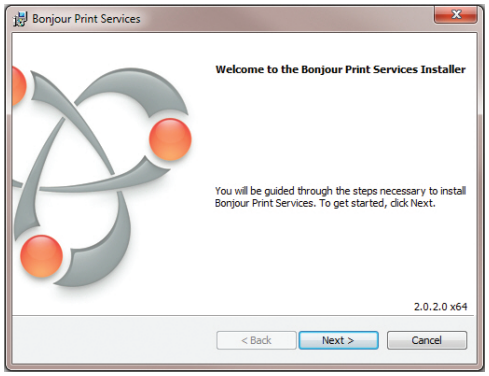
Dante™ Software Installation

Bonjour Print Services (for Windows only)

Download the Bonjour Print Services for Windows installer into a temporary folder on your PC.

http://support.apple.com/kb/DL999

Double click on the file to open the installer. If the Security Warning dialog box opens, click on ***Run*** to launch the installer and follow the on screen prompts.



Set Up Audinate Account and Download the Dante Controller Installer

Set up an account with Audinate to gain access to the free Dante Controller software. Click on ***Login*** at the top of the screen and the forms page will open.

http://www.audinate.com

After your account is set up, return to the home page and click on Support->Software Downloads->Dante Controller. Log In on the next page and follow the on screen prompts to download the installer and store the file on your local drive.

Install Dante Controller

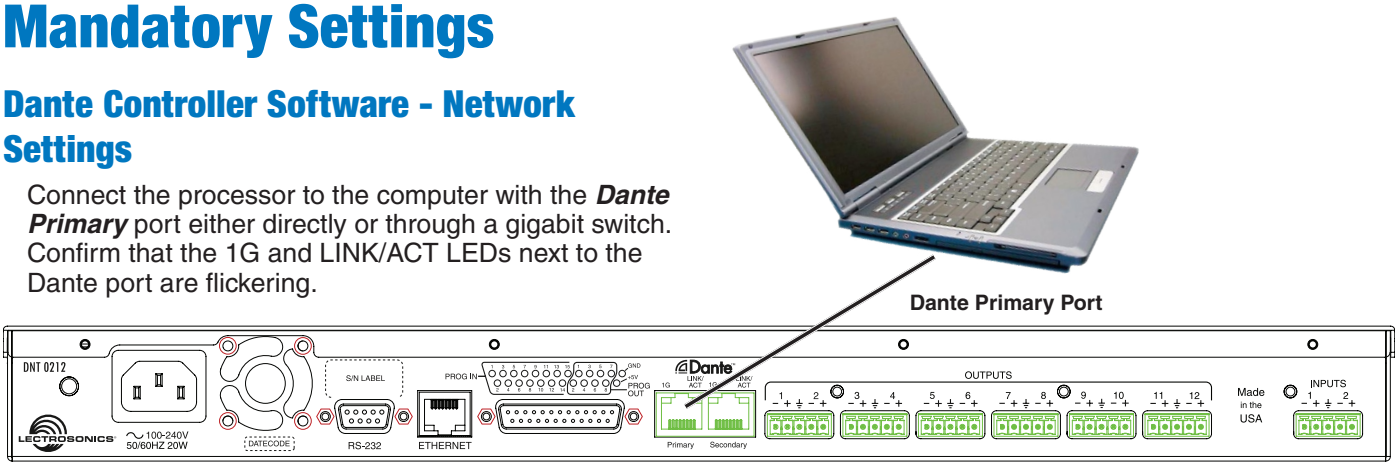
NOTE: Install ***Bonjour Print Services for Windows*** before installing ***Dante Controller***.

Double click on the downloaded file to open the installer. If the Security Warning dialog box opens, click on ***Run*** to launch the installer and follow the on screen prompts.

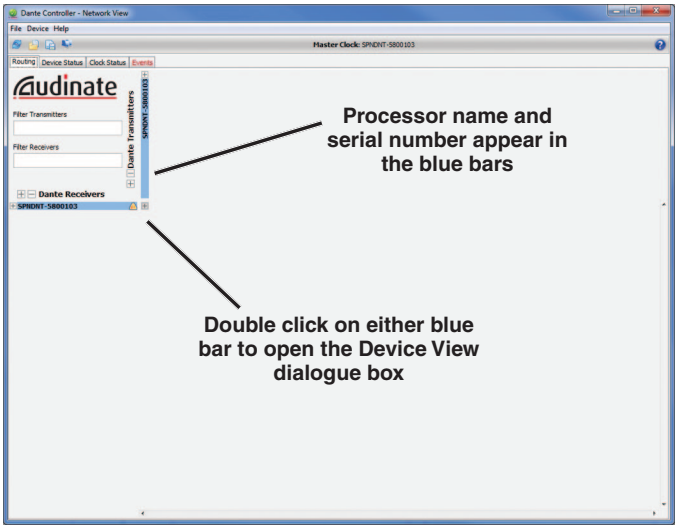
Mandatory Settings

Dante Controller Software - Network Settings

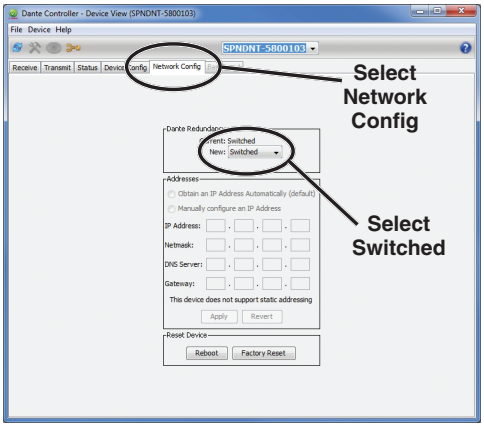
Connect the processor to the computer with the ***Dante Primary*** port either directly or through a gigabit switch. Confirm that the 1G and LINK/ACT LEDs next to the Dante port are flickering.



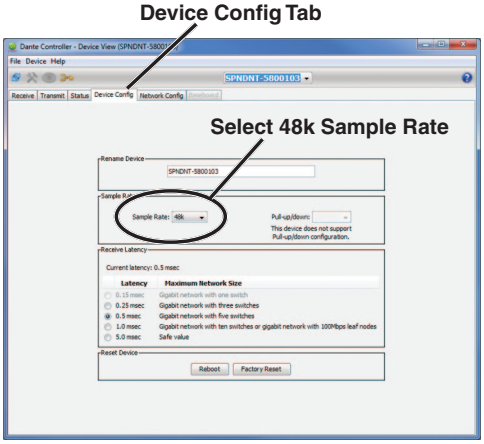
Launch the ***Dante Controller*** software. A brief splash screen appears, followed by the ***Network View/Routing*** screen. The serial number of the connected processor will appear in the bars labeled ***Receivers*** and ***Transmitters***.



Double click on the processor name/serial number to open the ***Device View*** dialog box. Under the ***Network Config*** tab, select ***Switched***.



Select the ***Device Config*** tab, then set the sample rate to 48k. The sample rate MUST be 48k so the DSP (filters, etc.) will operate as they should.



Latency can be adjusted under the same tab. The setting depends upon the number of switches in the network.

The other tabs in the Device View dialog box are used to rename channels and check the status of several parameters.

Consult the ***Help*** menu for details and explanations of ***Dante Controller*** software.

NOTE: Once everything is set up and audio is flowing to and from the network, a second gigabit switch and network can be added and the mode can be changed to ***Redundant***.

DNT Control Panel Software - Signal Flow Configuration

In each processor:

The following signal connections and routing must be configured before the processor will pass signals.

- Inputs
- Matrix crosspoints
- Outputs

In the Dante Network:

- Transmit Channels (device outputs)
- Subscriptions (device receive channels)

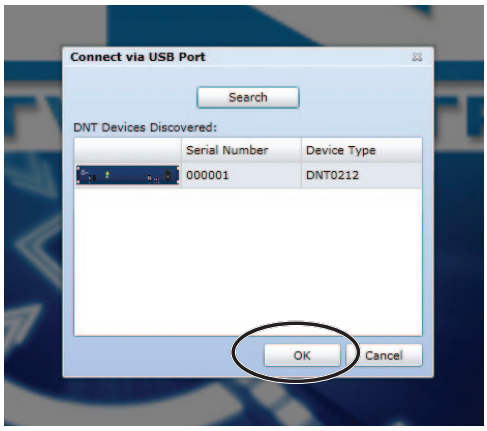
Be sure to save your settings into a Preset within the processor and to a file on the computer as a backup.

Follow the instructions below to make a connection to the processor.

DNT Software - USB Connection

Connect the processor to the computer via the front panel USB jack. Launch ***DNT Control Panel*** and click on ***Connect -> Connect via USB...*** in the upper left corner of the screen.

When the next screen opens, the connected processor will appear in the screen. Click on ***OK*** to continue.

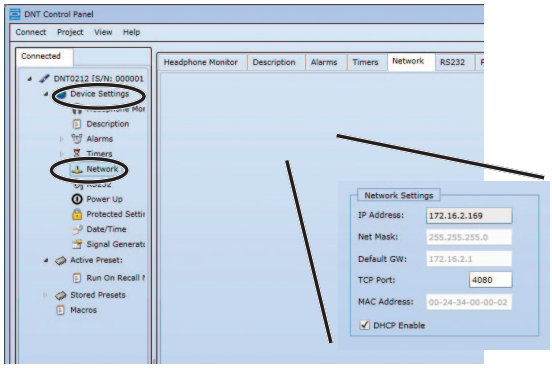


DNT Software - Ethernet Connection

Connect the processor to the network via the rear panel Ethernet jack. The easiest way to establish an Ethernet connection is to first connect to the processor via the USB port to discover or assign the IP address.

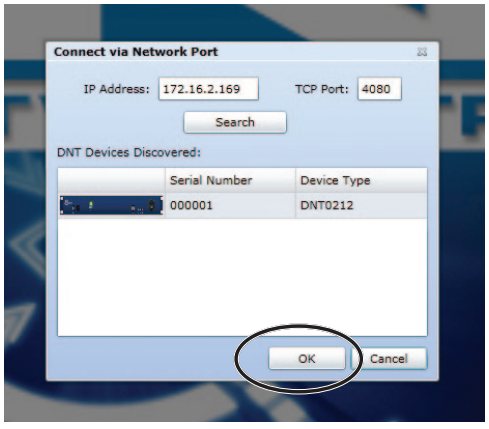
If DHCP is enabled and the IP address is assigned by a network server, the address will appear in the ***Network Settings*** dialog box. Otherwise a static IP address may be entered into the same dialog box. See page 10 for detailed network port setup instructions.

Launch ***DNT Control Panel*** and then open the setup screen for the processor. Click on ***Device Settings -> Network***. A dialog box will open displaying the IP address and TCP Port number.



Once the ***IP address*** and ***TCP Port*** number are verified, launch ***DNT Control Panel*** and click on ***Connect -> Connect via Network...*** in the upper left corner of the screen.

In the next screen, verify or enter the IP address of the processor in the upper part of the screen, then click on ***Search***. The processor will appear. Click on ***OK*** to continue.



Hardware Connections

Installing the chassis into a rack

Install the chassis so that the cooling fan vent is not blocked. Mount with 4 rack screws using the appropriate mounting holes. Use nylon washers to prevent damage to the front panel's finish when tightening the mounting screws.

DNT rack mount processors have internal switching power supplies that can tolerate voltages ranging from 100 to 240 VAC. Use an approved power cord with an IEC 60320 C13 connector.

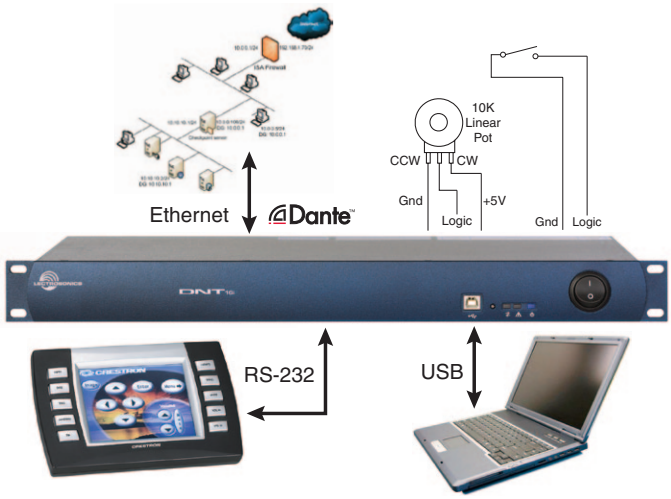
Connecting via USB for the First Time

NOTE: Install DNT USB drivers before connecting a processor.

The computer operating system will automatically detect and configure a USB port for the processor when it is connected and turned on the first time. Wait for the screen message that advises that the new device has been configured and is ready for use.

Setup and Control Port Connections

Numerous options are available for setup and control using a variety of devices and interfaces.

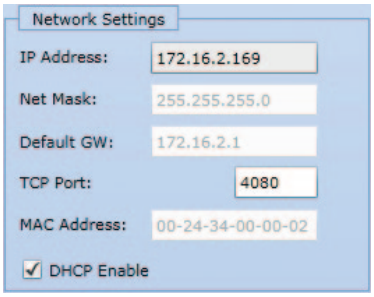


These interfaces combined with a powerful macro language and simultaneous multi-point control provide outstanding flexibility to adapt to the specific requirements of almost any application.

The ***RS-232*** serial control port is a common interface with LCD touch panel control systems such as Crestron® and AMX®. The wiring diagram for DB-9 connectors is shown on the next page. The baud rate is adjustable using the ***DNT Control Panel Software***.

The ***Ethernet*** network control port is used with the control panel software for setup, monitoring, control and diagnostics. It does not transport audio. The Ethernet port is also used with third party control devices such as LCD touch panels.

To configure the network interface, connect to the device via USB and click on ***Device Settings -> Network***. The ***Network Settings*** dialog box will open.



Each DNT device has a unique IP address, but offers two TCP ports at this address, the ***Primary*** port and the ***Secondary*** port. The ***TCP Port*** number in the dialog box is the Primary port number. The Secondary port number is the Primary port number + 1, which in this example is 4081.

DHCP is supported. If the device is connected to a network with DHCP service and ***DHCP Enable*** is checked in the control panel window, the IP address, Net Mask and Default Gateway address will be automatically obtained when the device is powered up.

If DHCP is not used, then ***DHCP Enable*** is unchecked and a "static" IP address, Net Mask and Default Gateway address must be entered.

Consult with the network administrator or system designer to determine the proper settings for each DNT device in the network.

NOTES: The default ***TCP Port*** number is 4080. To avoid conflicts with other devices on the network, it should not be changed.

The ***MAC Address*** is assigned at the factory and cannot be changed.

When network settings are changed, the device must be powered down then back up for the new settings to take effect.

The ***Dante*** network audio I/O ports connect to network switches. Multiple DNT processors can also be connected directly to each other through these ports when the units are operating in the ***Switched*** mode. See ***Mandatory Settings*** on page 8 for details on selecting this mode.

The ***USB*** port is used primarily for setup and firmware updates.

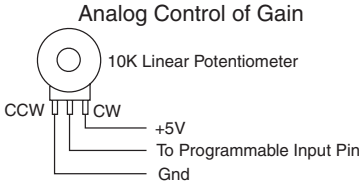
Hard-wired pots can be wired directly to the logic control port on the rear panel to provide volume controls

Hard-wired switches can be wired to the logic control port on the rear panel for muting, incremental changes in volume or to activate macros.

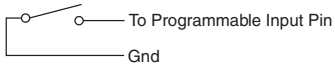
Programmable Inputs

Programmable inputs are provided to enable external control over a variety of parameters. Each input can respond to a contact closure, a DC voltage source, or the variable voltage output from a potentiometer. The following illustrates common connections to the programmable input pins.

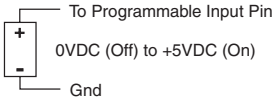
Potentiometer Connection for Analog Control of Gain

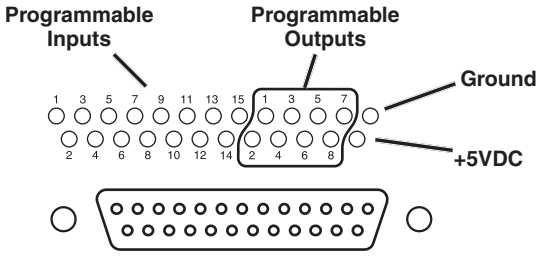


Contact Closure as Programmable Input

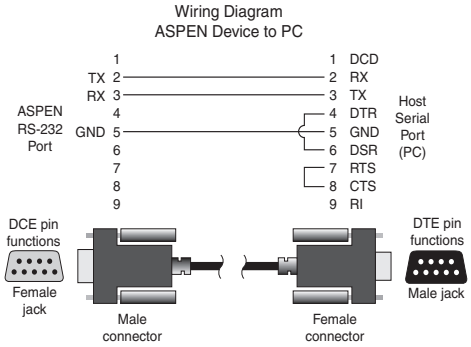


DC Voltage Source as Programmable Input

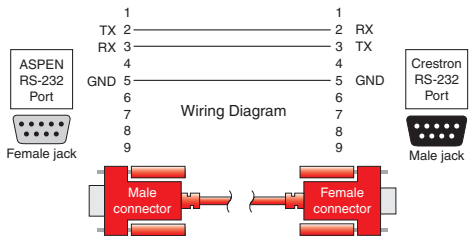




RS-232 Serial Port Wiring



Crestron® RS-232 Port Wiring



Programmable Outputs

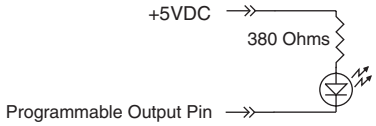
Programmable outputs are used for several purposes:

- indicate the current state of a programmable input
- monitor activity on audio input channels
- monitor active preset changes

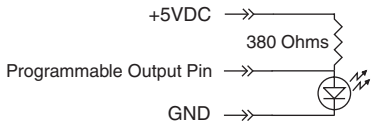
Each programmable output is the electrical equivalent of a contact closure to ground. When a programmable output is “active” it conducts current to ground. When the programmable output is “inactive,” no current flows to ground. The maximum usable voltage for the programmable outputs is 40 V and they will safely conduct up to 100 mA DC continuous.

Both LEDs and 5V relay coils can be powered by the +5 V DC pins on the programmable input connector, as long as the maximum combined current for all LEDS and relay coils does not exceed 100 mA.

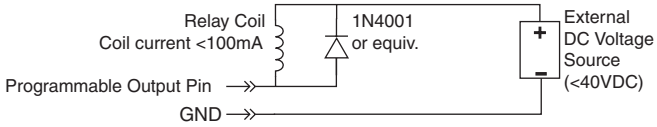
LED is ON when the programmable output is active



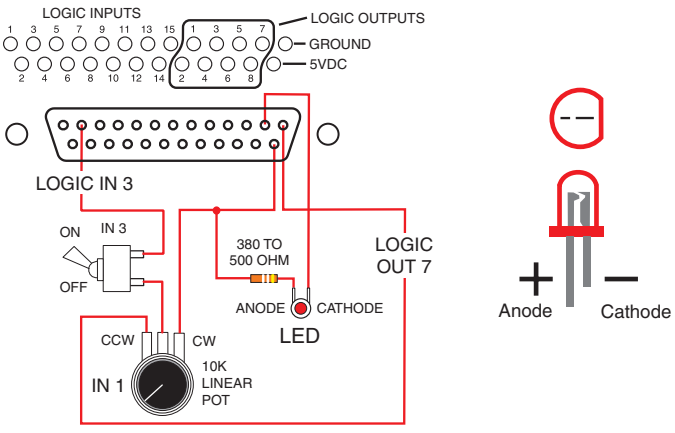
LED is OFF when the programmable output is active



Relay is on when the programmable output is active

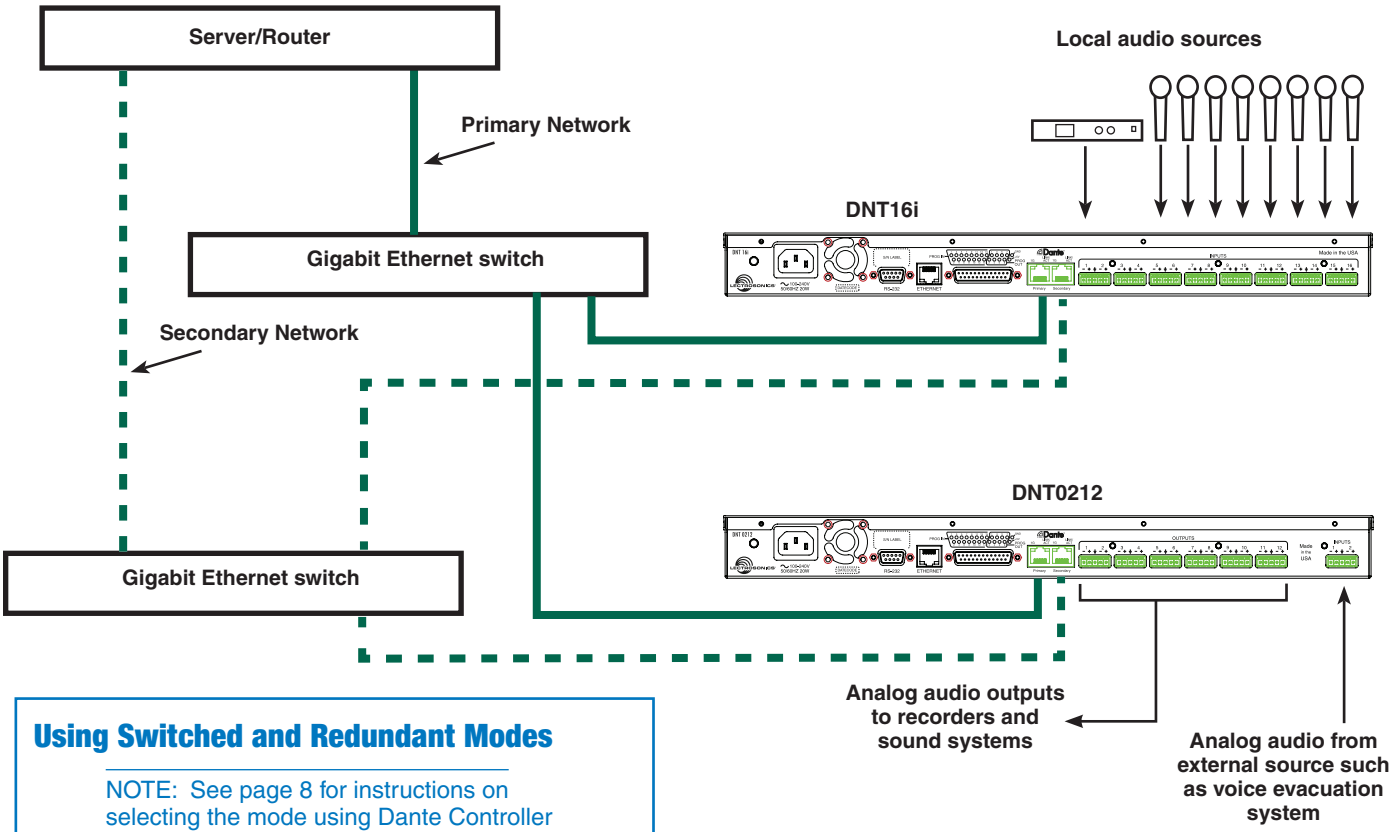


Note: The diagram above shows an external DC source powering the relay coil. This is necessary whenever coil voltages exceed 5 volts.



Network and PC Connections

The DNT processors send and receive audio via the Dante network, and to and from local devices connected directly to them.



Using Switched and Redundant Modes

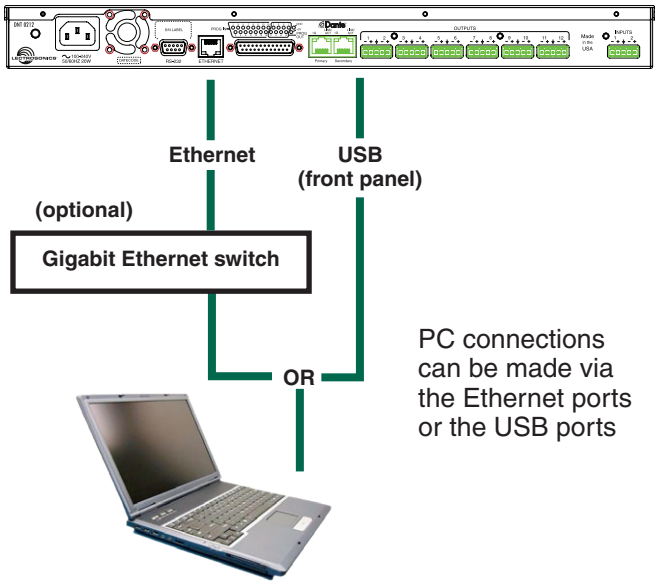
NOTE: See page 8 for instructions on selecting the mode using Dante Controller software.

Set processors to the ***Switched*** mode for setup.

In the ***Switched*** mode, the ***Primary*** and ***Secondary*** ports can be connected in any combination since there is an ethernet switch in the hardware.

In the ***Redundant*** mode, the ***Primary*** ports on all processors must be connected to the first network and the ***Secondary*** ports on all processors must be connected to the second network.

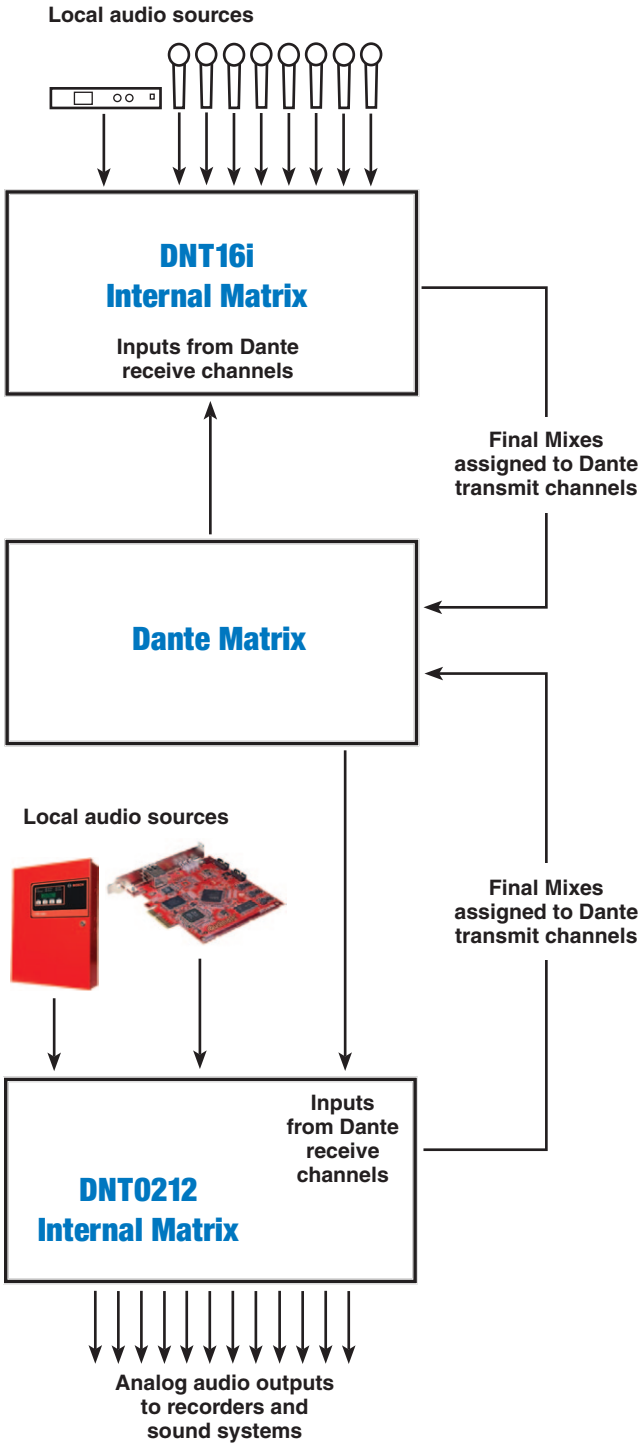
After all connections and settings are completed and the system is passing audio through the network, connect the second network and set the processors to the ***Redundant*** mode.



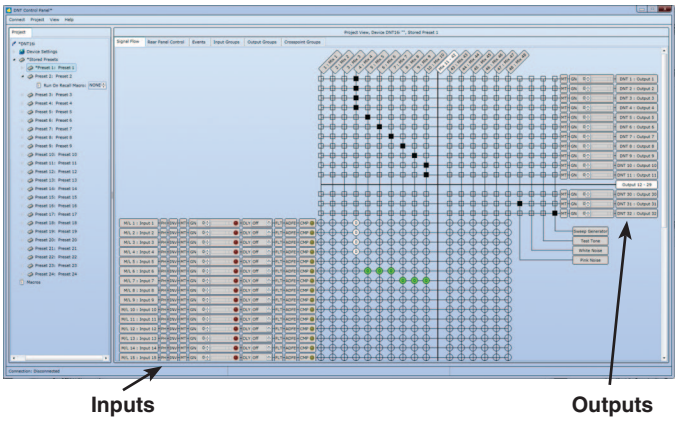
PC connections can be made via the Ethernet ports or the USB ports

Signal Routing

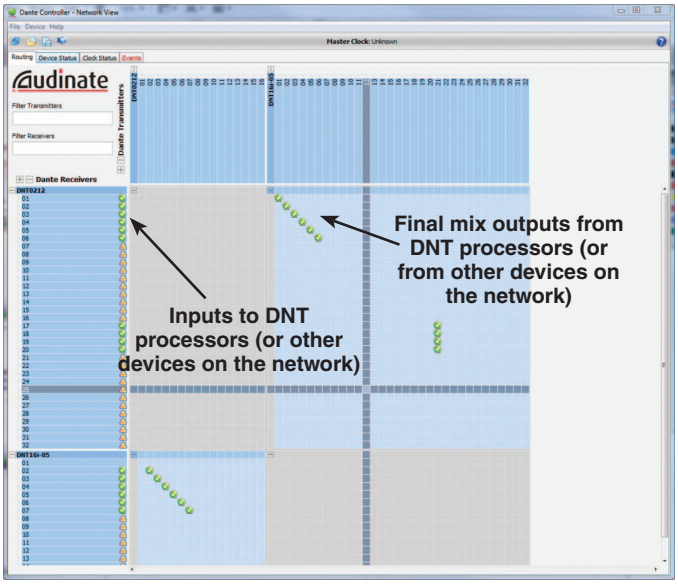
Each DNT processor has an internal matrix that can connect to local audio devices and Dante transmit and receive channels. The mixes created in this matrix are assigned to Dante transmit channels so they are then available to any Dante enabled device on the network. Every device on the network can subscribe to any one or more of the transmit channels.



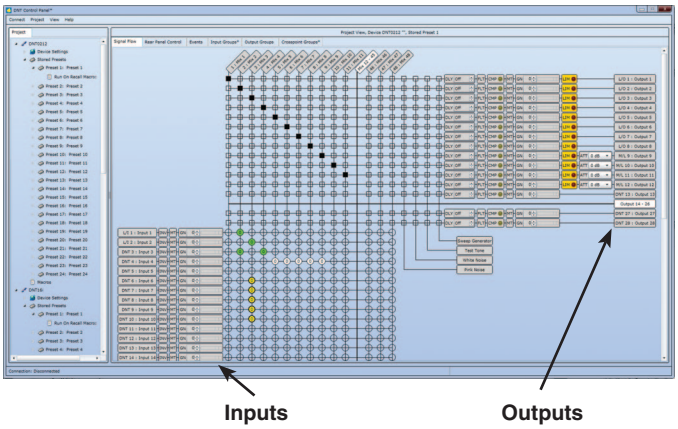
The signal flow screen of the DNT16i processor provides an overview with access to individual settings directly or by double clicking on an element.



The outputs of the internal matrix are assigned to Dante transmit channels. The Dante matrix is used for routing only, with no mixing or signal processing, so each transmit channel can be assigned to only one processor output.



The signal flow screen of the DNT0212 processor provides an overview with access to individual settings directly or by double clicking on an element.



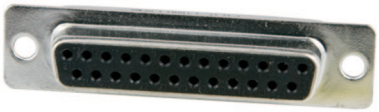
Replacement Parts and Accessories

Replacement Parts

DNTDISK DNT Software CD

21499 Power Cord

21558 DB-25 Connector



21580 5-pin Phoenix Connector

21713 USB Cable

35679 Screwdriver

Accessories

21553 DB-9 Plug

21554 DB-9 Shell Kit

21559 DB-25 Shell Kit

Service and Repair

If your system malfunctions, you should attempt to correct or isolate the trouble before concluding that the equipment needs repair. Make sure you have followed the setup procedure and operating instructions. Check the interconnecting cables and then go through the **Troubleshooting** section in this manual.

We strongly recommend that you **do not** try to repair the equipment yourself and **do not** have the local repair shop attempt anything other than the simplest repair. If the repair is more complicated than a broken wire or loose connection, send the unit to the factory for repair and service. Don't attempt to adjust any controls inside the units. Once set at the factory, the various controls and trimmers do not drift with age or vibration and never require readjustment. **There are no adjustments inside that will make a malfunctioning unit start working**.

LECTROSONICS' Service Department is equipped and staffed to quickly repair your equipment. In warranty repairs are made at no charge in accordance with the terms of the warranty. Out-of-warranty repairs are charged at a modest flat rate plus parts and shipping. Since it takes almost as much time and effort to determine what is wrong as it does to make the repair, there is a charge for an exact quotation. We will be happy to quote approximate charges by phone for out-of-warranty repairs.

Returning Units for Repair

For timely service, please follow the steps below:

A. DO NOT return equipment to the factory for repair without first contacting us by e-mail or by phone. We need to know the nature of the problem, the model number and the serial number of the equipment. We also need a phone number where you can be reached 8 A.M. to 4 P.M. (U.S. Mountain Standard Time).

B. After receiving your request, we will issue you a return authorization number (R.A.). This number will help speed your repair through our receiving and repair departments. The return authorization number must be clearly shown on the **outside** of the shipping container.

C. Pack the equipment carefully and ship to us, shipping costs prepaid. If necessary, we can provide you with the proper packing materials. UPS or FEDEX is usually the best way to ship the units. Heavy units should be "double-boxed" for safe transport.

D. We also strongly recommend that you insure the equipment, since we cannot be responsible for loss of or damage to equipment that you ship. Of course, we insure the equipment when we ship it back to you.

Lectrosonics USA:

Mailing address:
Lectrosonics, Inc.
PO Box 15900
Rio Rancho, NM 87174
USA

Shipping address:
Lectrosonics, Inc.
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Rio Rancho, NM 87124
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Telephone:
(505) 892-4501
(800) 821-1121 Toll-free
(505) 892-6243 Fax

Web:
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Suite 303A
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(877) 753-2876 Toll-free
(877-7LECTRO)
(416) 596-6648 Fax

E-mail:
Sales: colinb@lectrosonics.com
Service: joeb@lectrosonics.com

LIMITED THREE YEAR WARRANTY

The equipment is warranted for three years from date of purchase against defects in materials or workmanship provided it was purchased from an authorized dealer. This warranty does not cover equipment which has been abused or damaged by careless handling or shipping. This warranty does not apply to used or demonstrator equipment.

Should any defect develop, Lectrosonics, Inc. will, at our option, repair or replace any defective parts without charge for either parts or labor. If Lectrosonics, Inc. cannot correct the defect in your equipment, it will be replaced at no charge with a similar new item. Lectrosonics, Inc. will pay for the cost of returning your equipment to you.

This warranty applies only to items returned to Lectrosonics, Inc. or an authorized dealer, shipping costs prepaid, within three years from the date of purchase.

This Limited Warranty is governed by the laws of the State of New Mexico. It states the entire liablility of Lectrosonics Inc. and the entire remedy of the purchaser for any breach of warranty as outlined above. NEITHER LECTROSONICS, INC. NOR ANYONE INVOLVED IN THE PRODUCTION OR DELIVERY OF THE EQUIPMENT SHALL BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, CONSEQUENTIAL, OR INCIDENTAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THIS EQUIPMENT EVEN IF LECTROSONICS, INC. HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE LIABILITY OF LECTROSONICS, INC. EXCEED THE PURCHASE PRICE OF ANY DEFECTIVE EQUIPMENT.

This warranty gives you specific legal rights. You may have additional legal rights which vary from state to state.

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(505) 892-4501 • (800) 821-1121 • fax (505) 892-6243 • sales@lectrosonics.com

2 April 2014