TASCAM

ML-32D
32ch ANALOG/DANTE CONVERTER

ML-16D
16ch ANALOG/DANTE CONVERTER
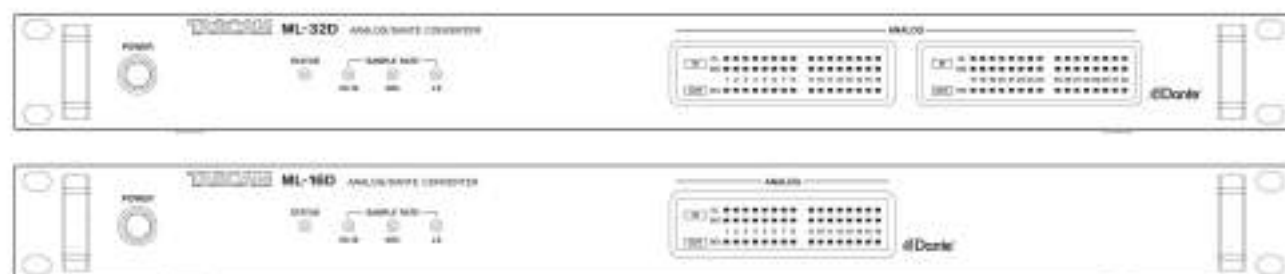
OWNER'S MANUAL	ENGLISH
MODE D'EMPLOI	FRANÇAIS
MANUAL DEL USUARIO	ESPAÑOL
BEDIENUNGSANLEITUNG	DEUTSCH
MANUALE DI ISTRUZIONI	ITALIANO
取扱説明書	日本語

OWNER'S MANUAL

⚡ **CAUTION** RISK OF ELECTRIC SHOCK DO NOT OPEN ⚠

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

⚡ The lightning flash with arrowhead symbol, within equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

⚠ The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

For U.S.A.

Declaration of Conformity
Model Number: ML-32D / ML-16D

Trade Name: TASCAM

Responsible party: TEAC AMERICA, INC.

Address: 1834 Gage Road, Montebello, California, U.S.A.

Telephone number: 1-323-726-0303

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.

INFORMATION TO THE USER

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.
a) Reorient or relocate the receiving antenna.
b) Increase the separation between the equipment and receiver.
c) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
d) Consult the dealer or an experienced radio/TV technician for help.

CAUTION

Changes or modifications to this equipment not expressly approved by TEAC CORPORATION for compliance could void the user's authority to operate this equipment.

IN USA/CANADA, USE ONLY ON 120 V SUPPLY.

For Canada

THIS CLASS B DIGITAL APPARATUS COMPLIES WITH CANADIAN ICES-003.

CET APPAREIL NUMERIQUE DE LA CLASSE B EST CONFORME A LA NORME NMB-003 DU CANADA.

CE This product complies with the European Directives request and the other Commission Regulations.

CE Marking Information
EN55103-2

a) Applicable electromagnetic environment: E1, E2, E3, E4

b) The average half-cycle r.m.s. inrush current
1. On initial switch-on: 2.91 Arms
2. After a supply interruption of 5s: 0.15 Arms

■ For European Customers

Disposal of electrical and electronic equipment

(a) All electrical/electronic equipment and waste batteries/accumulators should be disposed of separately from the municipal waste stream via collection facilities designated by the government or local authorities.

(b) By disposing of electrical/electronic equipment and waste batteries/accumulators correctly, you will help save valuable resources and prevent any potential negative effects on human health and the environment.

(c) Improper disposal of waste electrical/electronic equipment and batteries/accumulators can have serious effects on the environment and human health because of the presence of hazardous substances in the equipment.

(d) The Waste Electrical and Electronic Equipment (WEEE) symbols, which show wheeled bins that have been crossed out, indicate that electrical/electronic equipment and batteries/accumulators must be collected and disposed of separately from household waste.

(e) Return and collection systems are available to end users. For more detailed information about the disposal of old electrical/electronic equipment and waste batteries/accumulators, please contact your city office, waste disposal service or the shop where you purchased the equipment.

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 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 a third grounding prong. The wide 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.

- The apparatus draws nominal non-operating power from the AC outlet with its POWER or STANDBY/ON switch not in the ON position.
- The mains plug is used as the disconnect device, the disconnect device shall remain readily operable.
- Caution should be taken when using earphones or headphones with the product because excessive sound pressure (volume) from earphones or headphones can cause hearing loss.
- If you are experiencing problems with this product, contact TEAC for a service referral. Do not use the product until it has been repaired.

CAUTION

- Do not expose this apparatus to drips or splashes.
- Do not place any objects filled with liquids, such as vases, on the apparatus.
- Do not install this apparatus in a confined space such as a book case or similar unit.
- The apparatus should be located close enough to the AC outlet so that you can easily grasp the power cord plug at any time.
- If the product uses batteries (including a battery pack or installed batteries), they should not be exposed to sunshine, fire or excessive heat.
- CAUTION for products that use replaceable lithium batteries: there is danger of explosion if a battery is replaced with an incorrect type of battery. Replace only with the same or equivalent type.

WARNING

- Products with Class I construction are equipped with a power supply cord that has a grounding plug. The cord of such a product must be plugged into an AC outlet that has a protective grounding connection.

■ **RACK-MOUNTING THE UNIT**

Use the supplied rack-mounting kit to mount the unit in a standard 19-inch rack, as shown below.

Remove the feet of the unit before mounting.
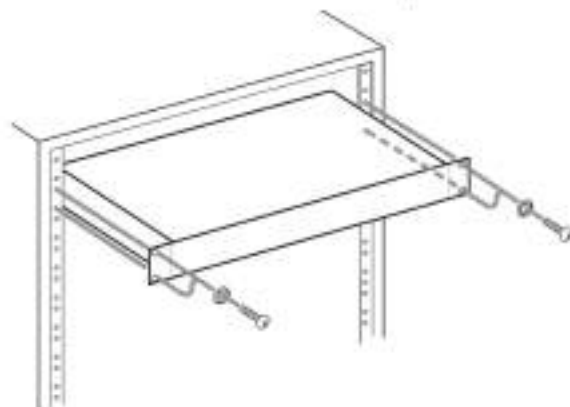
CAUTION

- *Leave 1U of space above the unit for ventilation.*
- *Allow at least 10 cm (4 in) at the rear of the unit for ventilation.*

■ **For China**

"仅适用于海拔 2000m 以下地区安全使用"

"仅适用于非熱带气候条件下安全使用"

"環境保護使用年限"

产品有毒有害物质或元素的名称及含量

机种：ML-32D / ML-16D	有毒有害物质或元素					
品名	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
1 CHASSIS 部份	○	○	○	○	○	○
2 FRONT PANEL 部份	○	○	○	○	○	○
3 螺丝部份	○	○	○	○	○	○
4 线材部份	○	○	○	○	○	○
5 PCB Assy 部份	×	○	○	○	○	○
6 电源部份	○	○	○	○	○	○
7 附属品部份	×	○	○	○	○	○
8 LABEL 部份	○	○	○	○	○	○
9 包装部份	○	○	○	○	○	○

○：表示该有毒有害物质在该部件所有均质材料中的含有量均在 GB/T26572 标准规定的限量要求以下。
×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T26572 标准规定的限量要求。
(针对现在代替技术困难的电子部品及合金中的铅)

Contents

Thank you very much for purchasing a TASCAM ML-32D 32-channel analog/Dante converter or ML-16D 16-channel analog/Dante converter. Before using this unit, read this Owner's Manual carefully so that you will be able to use it correctly and enjoy working with it for many years. After you have finished reading this manual, please keep it in a safe place for future reference.

You can also download this Owner's Manual from the TEAC Global Site (**http://teac-global.com/**).

Features

● 32ch analog line input and 32ch analog line outputs (D-sub25p) (ML-32D)

● 16ch analog line input and 16ch analog line outputs (D-sub25p) (ML-16D)

● Dante interface included as standard feature

● AES67 is also supported, so connection is possible with Ravenna and other compatible network audio technologies

● Dante primary and secondary included to support redundancy

● Flexible routing is possible using Dante Controller

● Support for sampling frequencies and bit lengths up to 96kHz and 24-bit

● LEDs for input signal/overload and output overload

● Reference level can be set

● 1U rackmount size

Included items

This product includes the following items.

Take care when opening the package to avoid damaging the items. Keep the packing materials for transportation in the future. Please contact the store where you purchased this unit if any of these items are missing or have been damaged during transportation.

● Main unit ....× 1

● Power cord..× 1

● Rackmount screw kit..× 1

● Owner's Manual (this document) including warranty.........× 1

Conventions used in this manual

In this manual, we use the following conventions:

● When we refer to buttons, connectors and other parts of this unit, we use a bold font like this: **POWER** button.

● When we show characters that appear on the display, the typeface looks like this: Off. The same format is used for characters that appear on the display of units that can be connected.

● As necessary, additional information is provided under TIP, NOTE and CAUTION headings.

TIP

These are tips about how to use the unit.

NOTE

These provide additional explanations and describe special cases.

CAUTION

Failure to follow these instructions could result in injury, damage to equipment or lost recording data, for example.

Precautions for placement and use

● The operating temperature range of this unit is 0–40 °C.

● Do not install this unit in the following types of locations. Doing so could cause malfunction.

  Locations with frequent vibrations
  Near windows or other places exposed to direct sunlight
  Near heaters or other extremely hot places
  Extremely cold places
  Very humid or poorly ventilated places
  Very dusty places

● Make sure that the unit is mounted in a level position for correct operation.

● To enable good heat dissipation, do not place anything on top of the unit.

● Do not place the unit on top of a power amplifier or other device that generates heat.

Notes about power supplies

● Insert the included power cord all the way into the AC IN connector.

● Do not connect a power supply other than one that is AC100V–240V (50–60Hz).

● Hold the power cord by its plug when connecting or disconnecting it.

Beware of condensation

Condensation could occur if the unit is moved from a cold place to a warm place, it is used immediately after a cold room has been heated or it is otherwise exposed to a sudden temperature change.

To prevent this, or if this occurs, let the unit sit for one or two hours at the new room temperature before using it.

Cleaning the unit

Use a dry soft cloth to wipe the unit clean. Do not wipe with chemical cleaning cloths, thinner, alcohol or other chemical agents. Doing so could damage the surface or cause discoloration.

Using the TEAC Global Site

You can download this Owner's Manual and the Reference Manual necessary for this unit from the TEAC Global Site (**http://teac-global.com/**).

In the TASCAM Downloads section, select the desired language to open the Downloads website page for that language.
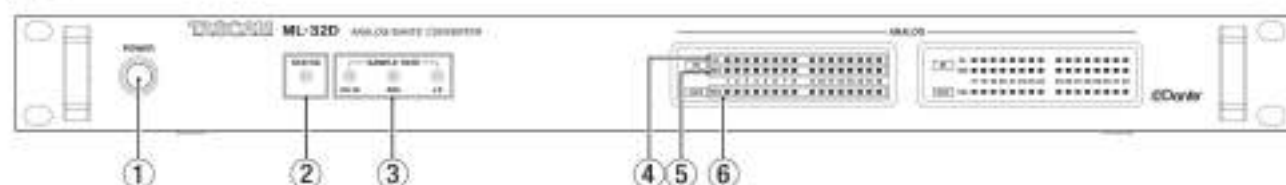
Product registration

Customers in the USA, please visit the following TASCAM website to register your TASCAM product online.
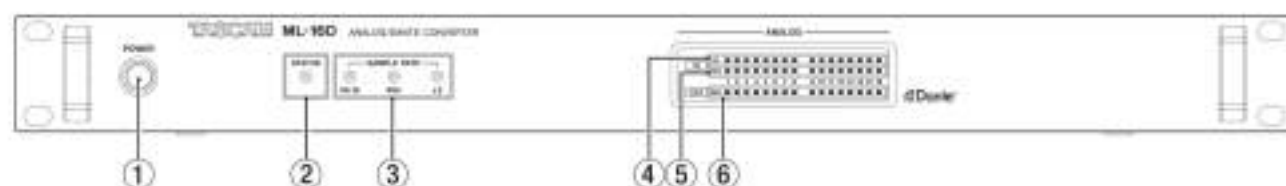
  http://tascam.com/

Names of Parts

Front panel

ML–32D

ML–16D

① **POWER button and indicator**
Press this button to turn the unit on and off.

② **STATUS indicator**
The STATUS indicator shows the state of the unit by lighting blue or red or staying unlit. "STATUS indicator lighting status details" on page 7

③ **SAMPLE RATE indicator**
The three SAMPLE RATE indicators (**44.1k**, **48k** and **×2**) light to show the sampling frequency status of the unit.

	44.1kHz	48kHz	x2
44.1kHz	Lit	Unlit	Unlit
48kHz	Unlit	Lit	Unlit
88.2kHz	Lit	Unlit	Lit
96kHz	Unlit	Lit	Lit

④ **OL indicators**
These light when analog input signals overload.

⑤ **IN SIG indicators**
These light when sound is being input through the analog inputs.
Input is judged to have occurred when the signal level exceeds –60 dBFS.

⑥ **OUT SIG indicators**
These light when sound is being output through the analog outputs.
Output is judged to have occurred when the signal level exceeds –60 dBFS.

STATUS indicator lighting status details

	STATUS indicator	Note
Ordinary operation	Lit blue	
Malfunctioning (Dante)	Rapidly flashing red (four times per second)	The Dante module is malfunctioning.
Muted	Lit red	The indicator lights red when the clock is stabilizing after the unit starts up and when the sampling frequency or other Dante setting has been changed, for example.
Dante network error	Flashing red (twice per second)	The Dante network is not connected.
Dante redundancy error	Blinking blue (once per second)	Redundancy is set and the secondary is being used because the primary is unavailable.

Rear panel

ML-32D
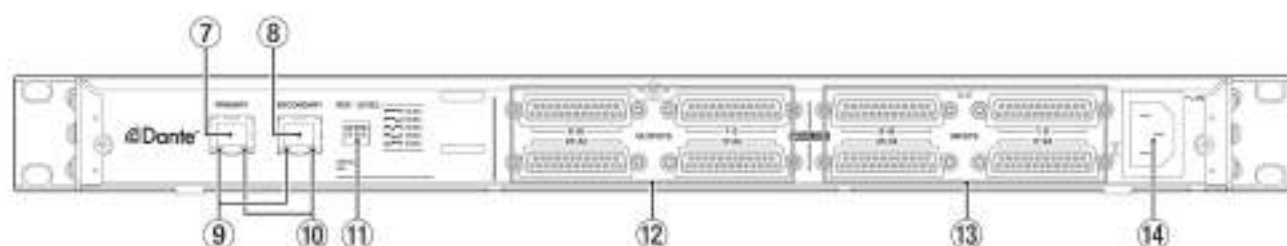
ML-16D

⑦ **PRIMARY connector**

This is the main Dante transmission connector.
Use this to connect to a Dante network all the time.

⑧ **SECONDARY connector**

This is the secondary Dante transmission connector. The use
changes depending on the mode.
When in redundant mode, this connects to the secondary
Dante network.
When in switched (daisy chain) mode, use to connect another
Dante device in the chain.

⑨ **Link status/activity indicator**

Green indicates that a link is established between the devic-
es.
Blinking indicates that signals are being transmitted between
the devices.

⑩ **Gigabit link status indicator**

Orange indicates that a gigabit Ethernet link has been estab-
lished.

⑪ **REF. LEVEL switches**

Use these to set the analog input/output reference level.

Max level/Reference level	Switch		
+24 dBu/+4 dBu	↑	↑	↑
+22 dBu/+4 dBu	↑	↑	↓
+20 dBu/+4 dBu	↑	↓	↑
+18 dBu/+4 dBu	↑	↓	↓
+15 dBu/+6 dBu	↓	↑	↑

⑫ **ANALOGOUTPUT 1-8/9-16/17-24/25-32 connectors**

These are 25-pin D-Sub balanced analog output connectors.
Use analog output D-Sub multi-cables to connect these to
external balanced analog input devices and transmit signals
for channels 1-8, 9-16, 17-24 and 25-32.
The pin assignments* of the ANALOG OUTPUTS connectors
are as shown below.
(1-8, 9-16, 17-24 and 25-32 connectors follow the same pat-
tern.)

⑬ **ANALOG INPUTS 1-8/9-16/17-24/25-32 connectors**

These analog input connectors are balanced D-Sub 25-pin.
Use analog input D-Sub multi-cables to connect these to ex-
ternal balanced analog output devices and transmit signals
for channels 1-8, 9-16, 17-24 and 25-32.
The pin assignments* of the ANALOG INPUTS connectors are
as shown below.
(1-8, 9-16, 17-24 and 25-32 connectors follow the same pat-
tern.)

* Pin assignments adhere to the TASCAM DB-25 Pinout Stan-
dard (AES59-2012)
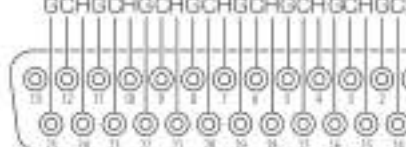
⑭ **AC IN connector**

Plug the included power cord in here.

Notes about Dante

Dante is a transmission protocol developed by Audinate.
Using networks based on gigabit Ethernet standards, it enables multichannel (512 IN/512 OUT) transmission and high precision, for example.
Check the Audinate website for details about Dante.

https://www.audinate.com/

Connecting to a Dante network

In order to set up and use this card, you must also set up the Ethernet network that it is connected to, a computer that runs Dante Controller and other devices that support Dante.

LAN cables used for connections

Use STP cables that are category 5e or higher.
Both crossover and straight cables can be used.

CAUTION

This unit is not compatible with 100Mbps Ethernet switching hubs. Always use switching hubs that support Layer 2 and Gigabit Ethernet.
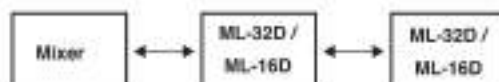
NOTE

- Set the computer to set the IP address automatically.
- Restarting the computer might be necessary if a previous network setting is still active on the computer.

Switched (daisy chain) connection

Dante devices can be daisy-chained when there are few connected devices and when not using a switching hub. Connect them as shown below.

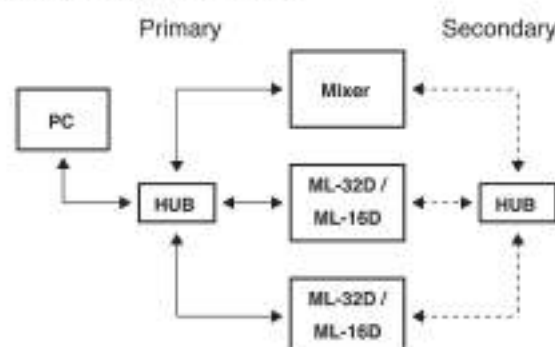**Switched (daisy chain) connection example**

NOTE

- When using a switched (daisy chain) connection, connect to either the **PRIMARY** or **SECONDARY** connector.
- If the number of connected devices increases, raising the latency setting will be necessary.

Redundant connection

For recording situations where retakes are not possible, including live performances, a connection set up like the following uses two completely independent primary and secondary networks.

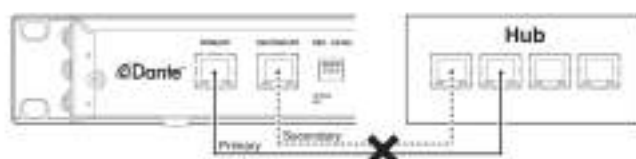**Redundant connection example**

NOTE

Settings for switched (daisy chain) and redundant connections do not change automatically. Change the settings on the Dante Controller Network Config screen.

CAUTION

- The primary and secondary networks cannot be connected to each other in any way.
- Do not connect the primary and secondary networks to the same switching hub.

Using Dante Controller

Dante Controller overview

This unit uses the Dante Controller application, which is available at the Audinate website, to connect with other devices that support Dante.

Download the latest version of the Dante Controller application and an operation manual from the Audinate website.

Audinate download page

https://www.audinate.com/products/software/dante-controller

Make at least the following settings using a computer that has Dante Controller installed.

● Set the audio routing.

● Adjust the sampling frequency and bit depth of each Dante device.

NOTE

Settings made using Dante Controller are stored in the built-in memory of each Dante device.

Unless settings are modified, connections will not change even if Dante Controller is quit or the computer is disconnected from the Dante network.

Audio routing settings

When Dante Controller is launched, the Network View screen shown below will open.

On this screen, you can set and monitor conditions related to the Dante network.
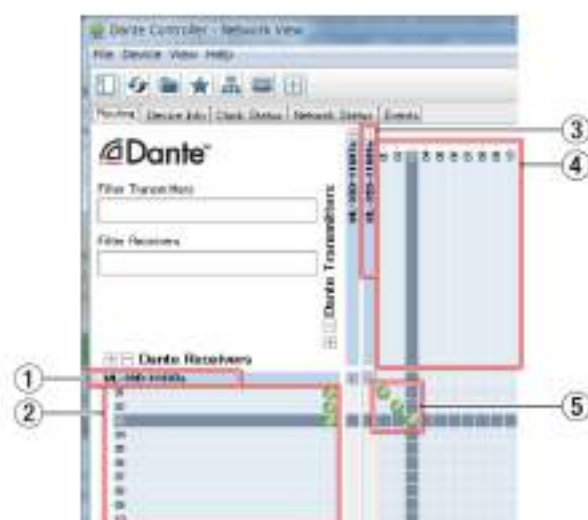
① **Receiving device name**
This is the name of a receiving device on the Dante network.

② **Receiving device channels**
These are the names of the channels of the receiving device on the Dante network.

③ **Transmitting device name**
This is the name of a transmitting device on the Dante network.

④ **Transmitting device channels**
These are the names of the channels of the transmitting device on the Dante network.

⑤ **Audio routing**
Route the audio channels of the transmitting and receiving devices that you want to connect here.
Left-click the intersection of the channels you want to connect on the matrix to connect them.

NOTE

While pressing the computer keyboard Ctrl key, left-click the "-" at the intersection of device names to connect all connectable channels at once.

Changing sampling frequencies and bit depths with Dante Controller

Double-click a device name on the Network View screen to open the Device View screen.

On this screen, you can set and monitor conditions related to devices on the Dante network.

Click the Device Config tab to open the page where you can change the sampling frequency, bit rate and other settings of the device selected in ① shown in the illustration below.
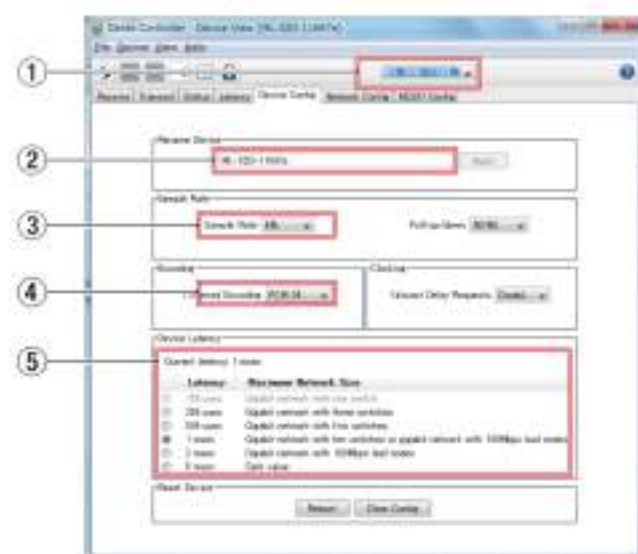
① **Device name**
This is the name of the device that can have its settings changed in the current Device View.

② **Change device name**
Edit the device name.

③ **Sampling frequency**
Set the sampling frequency.

④ **Bit depth**
Set the bit depth.

⑤ Latency setting

Set the latency.
Use the following guidelines to change the latency setting.

Selectable latency value	Connected network setup guideline
250usec	The transmission route from the transmitting device to the receiving device passes through 1 gigabit switching hub.
500usec	The transmission route from the transmitting device to the receiving device passes through 5 gigabit switching hub.
1msec	The transmission route from the transmitting device to the receiving device passes through 10 gigabit switching hub.
2msec	The transmission speed of the transmitting device is 100 Mbps.
5msec	Use this maximum selectable latency value when creating a large-scale network.

CAUTION

- Changing the name of a device will clear audio routing settings. For this reason, we recommend changing device names to names that are easy to identify before setting audio routings.
- Depending on network connection conditions, setting the latency to a value higher than the guideline might be necessary.

NOTE

When using a switched (daisy chain) connection that does not use a switching hub, set the latency according to the number of Dante devices that signals pass through as shown below.

Switched (daisy chain) connection example

Passes through 2 devices

| Transmitting device | → | 1st device | → | 2nd device | → | Receiving device |

Passes through 1 devices

| Transmitting device | → | 1st device | → | Receiving device |

Specifications

Ratings

Formats

44.1/48 kHz, 16/24 bit
88.2/96 kHz, 16/24 bit

Input/output ratings

PRIMARY/SECONDARY connectors

Connector: RJ-45
Transmission protocol: Dante
Gigabit Ethernet standard: 1000BASE-T (IEEE 802.3ab)
Cables: category 5e or faster STP cables

ANALOG OUTPUTS connectors

Connector: D-sub 25-pin
Locking screws: No. 4-40 UNC (inch type)
Nominal output levels: +4 dBu, +6 dBu (only when maximum output level is +15 dBu)
Maximum output levels: +24 dBu, +22 dBu, +20 dBu, +18 dBu, +15 dBu (set by **REF. LEVEL** switches)
Output impedance: 200 Ω or lower
Applicable load impedance: 2 kΩ or higher

ANALOG INPUTS connectors

Connector: D-sub 25-pin
Locking screws: No. 4-40 UNC (inch type)
Nominal input levels: +4 dBu, +6 dBu (only when maximum input level is +15 dBu)
Maximum input levels: +24 dBu, +22 dBu, +20 dBu, +18 dBu, +15 dBu (set by **REF. LEVEL** switches)
Input impedance: 10 kΩ or higher

● 0 dBu=0.775 Vrms

Audio performance

● **ANALOG IN ➡ DANTE OUT**

Frequency response

+0.1 dB/-0.5 dB: 20 Hz/20 kHz
(-16 dBFS input, 44.1/48 kHz sampling frequency, JEITA)
+0.1 dB/-0.5 dB: 20 Hz/40 kHz
(-16 dBFS input, 88.2/96 kHz sampling frequency, JEITA)

Distortion (THD+N)

0.001% or less
(-1 dBFS input, 1 kHz, 44.1/48/88.2/96 kHz sampling frequency, JEITA)

S/N ratio

113 dB or higher
(44.1/48/88.2/96 kHz sampling frequency, JEITA)

Crosstalk

115 dB or higher
(1 kHz, 44.1/48/88.2/96 kHz sampling frequency, JEITA)

● DANTE IN → ANALOG OUT

Frequency response

+0.1 dB/-0.5 dB: 20 Hz/20 kHz
(-16 dBFS input, 44.1/48 kHz sampling frequency, JEITA)
+0.1 dB/-1.0 dB: 20 Hz/40 kHz
(-16 dBFS input, 88.2/96 kHz sampling frequency, JEITA)

Distortion (THD+N)

0.001% or less
(-1 dBFS input, 1 kHz, 44.1/48/88.2/96 kHz sampling frequency, JEITA)

S/N ratio

110 dB or higher
(44.1/48/88.2/96 kHz sampling frequency, JEITA)

Crosstalk

115 dB or higher
(1 kHz, 44.1/48/88.2/96 kHz sampling frequency, JEITA)

Other

Power

AC100-240 V, 50/60 Hz

Power consumption

22W (ML-32D)
14W (ML-16D)

Dimensions (width × height × depth)

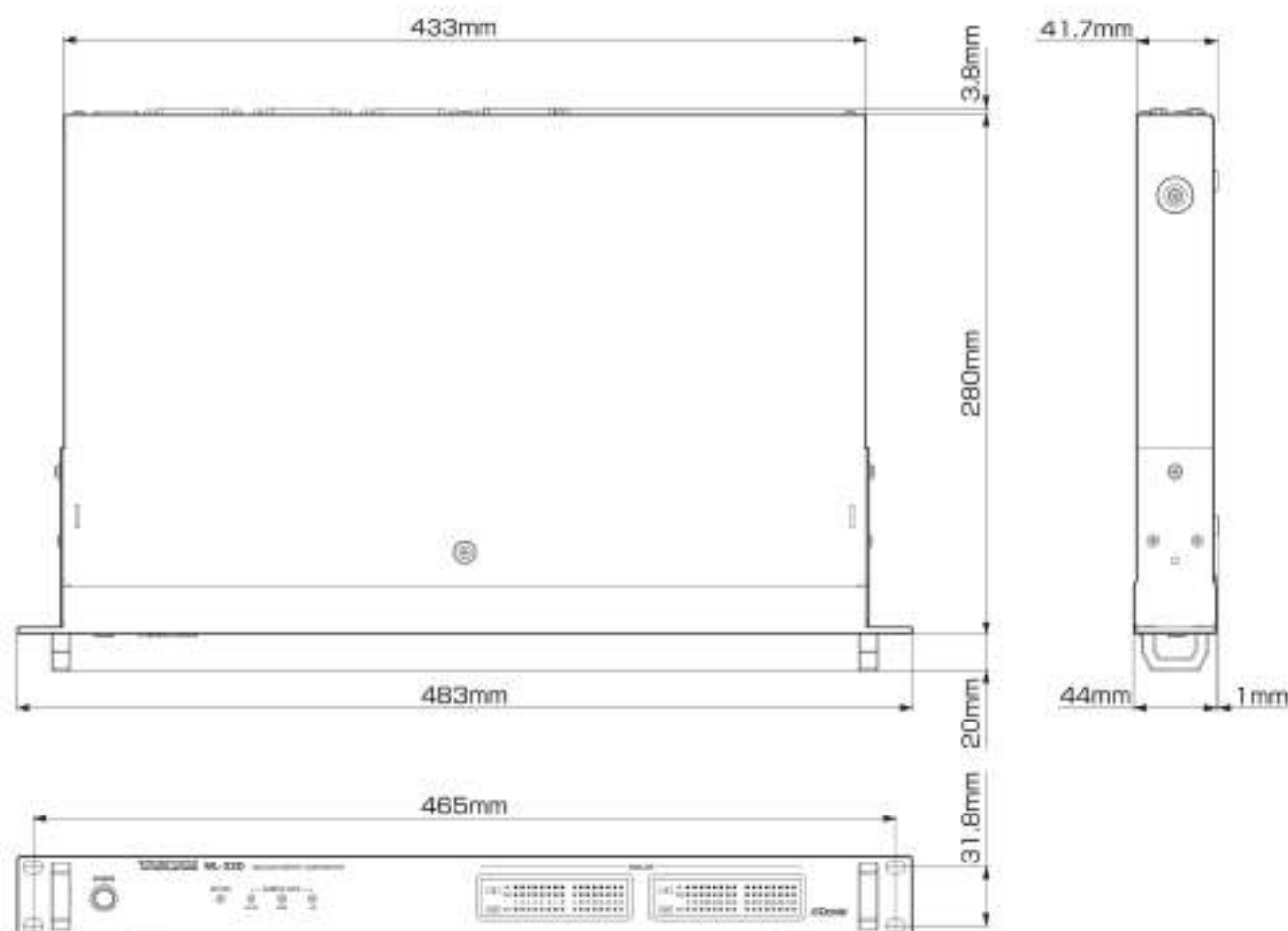483 × 45 × 303.8 mm (W x H x D)

Weight

3.5 kg (ML-32D)
3.3 kg (ML-16D)

Operating temperature range

0–40° C

Dimensional drawings

- Illustrations in this manual might differ in part from the actual product.
- Specifications and external appearance might be changed without notification to improve the product.