YAMAHA

I/O RACK

Rio3224-D
Rio1608-D

Owner's Manual

Keep This Manual For Future Reference.

EN

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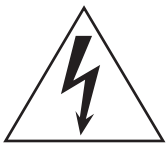
Accessories

(Please check the package contents.)

- Owner's Manual
- AC power cable
- Dante Virtual Soundcard Token leaflet



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 above warning is located on the top of the unit.
L'avertissement ci-dessus est situé sur le dessus de l'unité.

Explanation of Graphical Symbols
Explication des symboles

The lightning flash with arrowhead symbol within an 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.

L'éclair avec une flèche à l'intérieur d'un triangle équilatéral est destiné à attirer l'attention de l'utilisateur sur la présence d'une « tension dangereuse » non isolée à l'intérieur de l'appareil, pouvant être suffisamment élevée pour constituer un risque d'électrocution.

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 product.

Le point d'exclamation à l'intérieur d'un triangle équilatéral est destiné à attirer l'attention de l'utilisateur sur la présence d'instructions importantes sur l'emploi ou la maintenance (réparation) de l'appareil dans la documentation fournie.

IMPORTANT SAFETY INSTRUCTIONS

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.**

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

(UL60065_03)

PRÉCAUTIONS CONCERNANT LA SÉCURITÉ

1. **Lire ces instructions.**
2. **Conserver ces instructions.**
3. **Tenir compte de tous les avertissements.**
4. **Suivre toutes les instructions.**
5. **Ne pas utiliser ce produit à proximité d'eau.**
6. **Nettoyer uniquement avec un chiffon propre et sec.**
7. **Ne pas bloquer les orifices de ventilation. Installer l'appareil conformément aux instructions du fabricant.**
8. **Ne pas installer l'appareil à proximité d'une source de chaleur comme un radiateur, une bouche de chaleur, un poêle ou tout autre appareil (y compris un amplificateur) produisant de la chaleur.**
9. **Ne pas modifier le système de sécurité de la fiche polarisée ou de la fiche de terre. Une fiche polarisée dispose de deux broches dont une est plus large que l'autre. Une fiche de terre dispose de deux broches et d'une troisième pour le raccordement à la terre. Cette broche plus large ou cette troisième broche est destinée à assurer la sécurité de l'utilisateur. Si la fiche équipant l'appareil n'est pas compatible avec les prises de courant disponibles, faire remplacer les prises par un électricien.**
10. **Acheminer les cordons d'alimentation de sorte qu'ils ne soient pas piétinés ni coincés, en faisant tout spécialement attention aux fiches, prises de courant et au point de sortie de l'appareil.**
11. **Utiliser exclusivement les fixations et accessoires spécifiés par le fabricant.**
12. **Utiliser exclusivement le chariot, le stand, le trépied, le support ou la table recommandés par le fabricant ou vendus avec cet appareil. Si l'appareil est posé sur un chariot, déplacer le chariot avec précaution pour éviter tout risque de chute et de blessure.**

13. **Débrancher l'appareil en cas d'orage ou lorsqu'il doit rester hors service pendant une période prolongée.**
14. **Confier toute réparation à un personnel qualifié. Faire réparer l'appareil s'il a subi tout dommage, par exemple si la fiche ou le cordon d'alimentation est endommagé, si du liquide a coulé ou des objets sont tombés à l'intérieur de l'appareil, si l'appareil a été exposé à la pluie ou à de l'humidité, si l'appareil ne fonctionne pas normalement ou est tombé.**

AVERTISSEMENT
POUR RÉDUIRE LES RISQUES D'INCENDIE OU DE DÉCHARGE ÉLECTRIQUE, N'EXPOSEZ PAS CET APPAREIL À LA PLUIE OU À L'HUMIDITÉ.

(UL60065_03)

FCC INFORMATION (U.S.A.)

1. **IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!** This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Yamaha may void your authority, granted by the FCC, to use the product.
2. **IMPORTANT:** When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.
3. **NOTE:** This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

   Relocate either this product or the device that is being affected by the interference.

   Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s.

   In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable.

   If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Yamaha Corporation of America, Electronic Service Division, 6600 Orangethorpe Ave, Buena Park, CA90620

   The above statements apply ONLY to those products distributed by Yamaha Corporation of America or its subsidiaries.

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA. (class B)

COMPLIANCE INFORMATION STATEMENT (DECLARATION OF CONFORMITY PROCEDURE)

Responsible Party : Yamaha Corporation of America
Address : 6600 Orangethorpe Ave., Buena Park, Calif. 90620
Telephone : 714-522-9011
Type of Equipment : I/O RACK
Model Name : Rio3224-D/Rio1608-D

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.
See user manual instructions if interference to radio reception is suspected.

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA. (FCC DoC)

IMPORTANT NOTICE FOR THE UNITED KINGDOM

Connecting the Plug and Cord

WARNING: THIS APPARATUS MUST BE EARTHED IMPORTANT. The wires in this mains lead are coloured in accordance with the following code:

GREEN-AND-YELLOW	:	EARTH
BLUE	:	NEUTRAL
BROWN	:	LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured GREEN-and-YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol ⏚ or colored GREEN or GREEN-and-YELLOW.

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

(3 wires)

PRECAUTIONS

PLEASE READ CAREFULLY BEFORE PROCEEDING

* Please keep this manual in a safe place for future reference.

⚠ *WARNING*

Always follow the basic precautions listed below to avoid the possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

Power supply/Power cord

- Do not place the power cord near heat sources such as heaters or radiators, and do not excessively bend or otherwise damage the cord, place heavy objects on it, or place it in a position where anyone could walk on, trip over, or roll anything over it.
- Only use the voltage specified as correct for the device. The required voltage is printed on the name plate of the device.
- Use only the supplied power cord/plug.
  If you intend to use the device in an area other than in the one you purchased, the included power cord may not be compatible. Please check with your Yamaha dealer.
- Check the electric plug periodically and remove any dirt or dust which may have accumulated on it.
- Be sure to connect to an appropriate outlet with a protective grounding connection. Improper grounding can result in electrical shock.

Do not open

- This device contains no user-serviceable parts. Do not open the device or attempt to disassemble the internal parts or modify them in any way. If it should appear to be malfunctioning, discontinue use immediately and have it inspected by qualified Yamaha service personnel.

Water warning

- Do not expose the device to rain, use it near water or in damp or wet conditions, or place on it any containers (such as vases, bottles or glasses) containing liquids which might spill into any openings. If any liquid such as water seeps into the device, turn off the power immediately and unplug the power cord from the AC outlet. Then have the device inspected by qualified Yamaha service personnel.
- Never insert or remove an electric plug with wet hands.

Fire warning

- Do not put burning items, such as candles, on the unit. A burning item may fall over and cause a fire.

If you notice any abnormality

- When one of the following problems occur, immediately turn off the power switch and disconnect the electric plug from the outlet. Then have the device inspected by Yamaha service personnel.
  - The power cord or plug becomes frayed or damaged.
  - It emits unusual smells or smoke.
  - Some object has been dropped into the instrument.
  - There is a sudden loss of sound during use of the device.
- If this device should be dropped or damaged, immediately turn off the power switch, disconnect the electric plug from the outlet, and have the device inspected by qualified Yamaha service personnel.

⚠ *CAUTION*

Always follow the basic precautions listed below to avoid the possibility of physical injury to you or others, or damage to the device or other property. These precautions include, but are not limited to, the following:

Power supply/Power cord

- When removing the electric plug from the device or an outlet, always hold the plug itself and not the cord. Pulling by the cord can damage it.
- Remove the electric plug from the outlet when the device is not to be used for extended periods of time, or during electrical storms.

Location

- Do not place the device in an unstable position where it might accidentally fall over.
- Do not block the vents. This device has ventilation holes at the rear to prevent the internal temperature from becoming too high. In particular, do not place the device on its side or upside down. Inadequate ventilation can result in overheating, possibly causing damage to the device(s), or even fire.
- To avoid damage, do not install or store the device in a place subject to salty air or corrosive gas or chemicals.
- Before moving the device, remove all connected cables.
- When setting up the device, make sure that the AC outlet you are using is easily accessible. If some trouble or malfunction occurs, immediately turn off the power switch and disconnect the plug from the outlet. Even when the power switch is turned off, electricity is still flowing to the product at the minimum level. When you are not using the product for a long time, make sure to unplug the power cord from the wall AC outlet.
- If the device is mounted in an EIA standard rack, carefully read the section “Precautions for Rack Mounting” on page 7. Inadequate ventilation can result in overheating, possibly causing damage to the device(s), malfunction, or even fire.

Connections

- Before connecting the device to other devices, turn off the power for all devices. Before turning the power on or off for all devices, set all volume levels to minimum.

Maintenance

- Remove the power plug from the AC outlet when cleaning the device.

Handling caution

- Do not insert your fingers or hands in any gaps or openings on the device (vents, etc.).
- Avoid inserting or dropping foreign objects (paper, plastic, metal, etc.) into any gaps or openings on the device (vents, etc.) If this happens, turn off the power immediately and unplug the power cord from the AC outlet. Then have the device inspected by qualified Yamaha service personnel.
- Do not rest your weight on the device or place heavy objects on it, and avoid use excessive force on the buttons, switches or connectors.
- Do not use speakers for a long period of time at a high or uncomfortable volume level, since this can cause permanent hearing loss. If you experience any hearing loss or ringing in the ears, consult a physician.

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Yamaha cannot be held responsible for damage caused by improper use or modifications to the device, or data that is lost or destroyed.

NOTICE

To avoid the possibility of malfunction/ damage to the product, damage to data, or damage to other property, follow the notices below.

Handling and Maintenance

- Do not use the device in the vicinity of a TV, radio, stereo equipment, mobile phone, or other electric devices. Otherwise, the device, TV, or radio may generate noise.
- Do not expose the device to excessive dust or vibrations, or extreme cold or heat (such as in direct sunlight, near a heater, or in a car during the day) to prevent the possibility of panel disfiguration, damage to the internal components or unstable operation.
- Do not place vinyl, plastic or rubber objects on the device, since this might discolor the panel or keyboard.
- When cleaning the device, use a dry and soft cloth. Do not use paint thinners, solvents, cleaning fluids, or chemical-impregnated wiping cloths.
- Condensation can occur in the device due to rapid, drastic changes in ambient temperature—when the device is moved from one location to another, or air conditioning is turned on or off, for example. Using the device while condensation is present can cause damage. If there is reason to believe that condensation might have occurred, leave the device for several hours without turning on the power until the condensation has completely dried out.
- The rubber feet included in this package can be attached to the bottom to prevent slippage when it is to be used on a slippery surface.
- Always turn the power off when the device is not in use.

Connectors

- XLR-type connectors are wired as follows (IEC60268 standard): pin 1: ground, pin 2: hot (+), and pin 3: cold (-).

Information

About copyrights

* Copying of the commercially available musical data including but not limited to MIDI data and/or audio data is strictly prohibited except for your personal use.

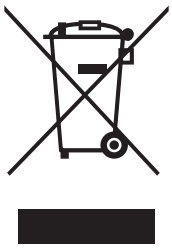
About this manual

* The illustrations and LCD screens as shown in this manual are for instructional purposes only, and may appear somewhat different from those on your device.

* The company names and product names in this manual are the trademarks or registered trademarks of their respective companies.

European Models
Inrush Current based on EN 55103-1:2009
4A (on initial switch-on)
3A (after a supply interruption of 5s)
Conforms to Environments: E1, E2, E3 and E4

Information for Users on Collection and Disposal of Old Equipment



This symbol on the products, packaging, and/or accompanying documents means that used electrical and electronic products should not be mixed with general household waste.

For proper treatment, recovery and recycling of old products, please take them to applicable collection points, in accordance with your national legislation and the Directives 2002/96/EC.

By disposing of these products correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.

For more information about collection and recycling of old products, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items.

[For business users in the European Union]

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

[Information on Disposal in other Countries outside the European Union]

This symbol is only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.

(weee_eu)

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Introduction

Thank you for choosing the Yamaha Rio3224-D/Rio1608-D I/O Rack. The Rio3224-D is a Dante-compatible I/O rack, featuring 32 analog inputs, 16 analog outputs, and 8 AES/EBU outputs. The Rio1608-D is a Dante-compatible I/O rack, featuring16 analog inputs and 8 analog outputs. To take full advantage of the superior functions and performance offered by the Rio3224-D/Rio1608-D, and to extend the useful life of the product, be sure to read this owner's manual carefully before operation.

NOTE

- Where specifications for the Rio3224-D differ from the Rio1608-D, this manual places specifications that apply only to the Rio1608-D in curly brackets { } (e.g., [INPUT] connectors 1-32 {1-16}).
- Unless otherwise noted, illustrations for the Rio3224-D are used.
- If certain specifications are common to both the Rio3224-D and Rio1608-D, both units are collectively called "Rio."

Features

Long-distance Dante Network Capability

Low-latency, low-jitter audio can be transferred over distances up to 100 meters* between devices via standard Ethernet cables using the Dante network protocol. The Rio can be used as a general-purpose I/O box for the Dante network. Supported sampling rates are 44.1 kHz, 48 kHz, 88.2 kHz, and 96 kHz.

* Maximum practical distance may vary according to the cable used.

Remotely Controllable Internal Head Amplifiers

Internal head amplifier parameters can be remotely controlled from a compatible device, such as the CL series, or from a computer application "R Remote."

Digital Outputs (Rio3224-D only)

The Rio3224-D features XLR-3-32 type balanced connectors for AES/EBU format digital audio outputs.

Gain Compensation Function

If the Rio's Gain Compensation function is enabled from a supported device that lets you set gain compensation (such as CL series products), the subsequent fluctuations in analog gain will be compensated for by internal digital gain. The audio signal will be output to a Dante network with a gain level that was fixed immediately before the Gain Compensation function was enabled. In this way, you can set the gain individually for FOH and MONITOR even if they share the same channel.

Direct Audio In/Out With a Connected Computer

Connecting the Rio with a standard Ethernet cable to a computer that has a Dante Virtual Soundcard installed enables you to directly input or output audio signals without using an audio interface device.

Firmware Updates

This product enables you to update the unit firmware to improve operations, add functions, and correct possible malfunctions. The following two types of firmware are available for the unit.

- Unit's firmware
- Dante module firmware

Details on updating the firmware are available on the following website:

http://www.yamahaproaudio.com/

For information on updating and setting up the unit, please refer to the firmware update guide available on the website.

NOTE

When you update Dante firmware on the unit, be sure to update Dante firmware on other Dante-compatible devices connected to the Rio.

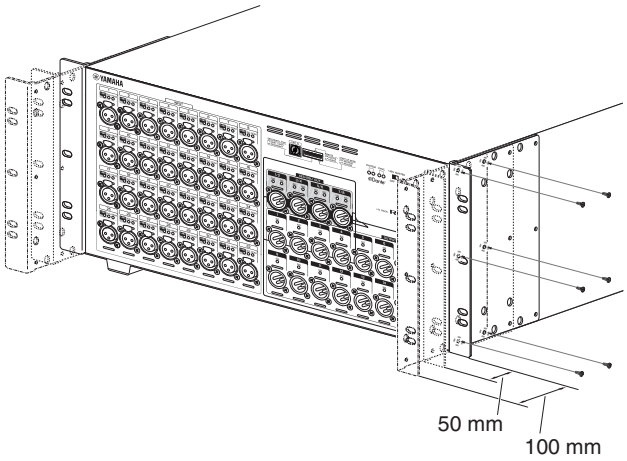
Precautions for Rack Mounting

This unit is rated for operation at ambient temperatures ranging from 0 to 40 degrees Celsius. When mounting the unit with other Rio unit(s) or other device(s) in an EIA standard equipment rack, internal temperatures can exceed the specified upper limit, resulting in impaired performance or failure. When rack mounting the unit, always observe the following requirements to avoid heat buildup:

- If three or more Rio units are mounted without space in the same rack, set the fan speeds to HIGH.
- If multiple units are mounted in the same rack with their fan speeds set to LOW, leave a 1U rack space between every two units. Also either leave the open spaces uncovered or install appropriate ventilating panels to minimize the possibility of heat buildup.
- When mounting the unit in a rack with devices such as power amplifiers that generate a significant amount of heat, leave more than 1U of space between the Rio and other equipment. Also either leave the open spaces uncovered or install appropriate ventilating panels to minimize the possibility of heat buildup.
- To ensure sufficient airflow, leave the rear of the rack open and position it at least 10 centimeters from walls or other surfaces. If the rear of the rack can't be left open, install a commercially available fan or similar ventilating option to secure sufficient airflow. If you've installed a fan kit, there may be cases in which closing the rear of the rack will produce a greater cooling effect. Refer to the rack and/or fan unit manual for details.

Recessed Installation

If you want to recess the front panel surface of the device from the front edge of the rack, you can adjust the position of the rack mount brackets to recess the device by 50mm or 100mm, as shown in the illustration below.



NOTE

When you install the brackets, use the same screws that you just removed.

About Dante

This product features Dante technology as a protocol to transmit audio signals. Dante is a network protocol developed by Audinate. It is designed to deliver multi-channel audio signals at various sampling and bit rates, as well as device control signals over a Giga-bit Ethernet (GbE) network. Dante also offers the following benefits:

- It transmits up to 512 in/512 out, for a total 1024 channels (in theory) of audio over a GbE network. (The Rio3224-D features 32 in/24 out with a 24/32-bit resolution. The Rio1608-D features 16 in/8 out with a 24/32-bit resolution.)
- Dante-enabled devices will automatically configure their network interfaces and find each other on the network. You can label Dante devices and their audio channels with names that make sense to you.
- Dante uses high accuracy network synchronization standards to achieve sample-accurate playback with extremely low latency and jitter. Five types of latency are available on the Rio: 0.25 msec, 0.5 msec, 1.0 msec, 2.0 msec, and 5.0 msec.
- Dante supports redundant connections via primary and secondary networks to defend against unforeseen difficulties.
- Connecting a computer to Dante network over Ethernet enables you to directly input or output audio signals without using any audio interface devices.

By taking advantages of these benefits, you can skip any complicated procedures to automate connections and setups of Dante-enabled devices, remotely control I/O racks or amplifiers from a mixing console, or make multi-track recordings to a DAW, such as Nuendo, installed on a computer in the network.

Visit Audinate website for more details on Dante.

http://www.audinate.com/

More information on Dante is also posted on the Yamaha Pro Audio website:

http://www.yamahaproaudio.com/

NOTE

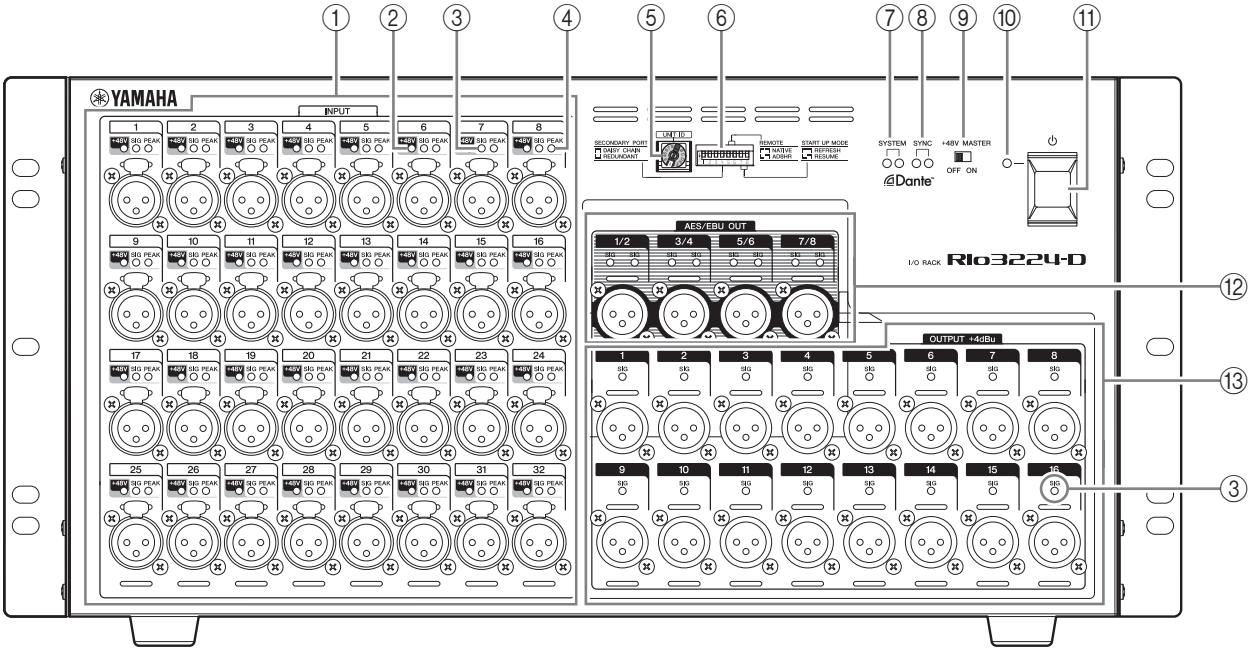
Please do not use the EEE function (*) of network switches in a Dante network.
Although power management should be negotiated automatically in switches that support EEE, some switches do not perform the negotiation properly. This may cause EEE to be enabled in Dante networks when it is not appropriate, resulting in poor synchronization performance and occasional dropouts.
Therefore we strongly recommend that:

- If you use managed switches, ensure that they allow EEE to be disabled. Make sure that EEE is disabled on all ports used for real-time Dante traffic.
- If you use unmanaged switches, make sure to not use network switches that support the EEE function, since EEE operation cannot be disabled in these switches.

* EEE (Energy Efficient Ethernet) is a technology that reduces switch power consumption during periods of low network traffic. It is also known as Green Ethernet and IEEE802.3az.

Controls and Functions

Front Panel



① **[INPUT] Connectors 1–32 {1–16}**

These are the XLR-3-31 type analog balanced connectors for the input channels. The input level range is from –62 dBu to +10 dBu. +48V phantom power can be supplied to devices that require it via the input connectors.

NOTE

The PAD will be switched on or off internally when the gain of the internal head amp is adjusted between +17 dB and +18 dB. Keep in mind that noise may be generated if there is a difference between the Hot and Cold impedance of the external device connected to the INPUT connector when using phantom power.

② **[+48V] Indicators**

These indicators light when +48V phantom power is turned ON for the corresponding input channels. Phantom power supply switching can be carried out from a compatible digital mixing console or computer application. No phantom power will be supplied, however, if the [+48V MASTER] switch is OFF, even if phantom power to individual channels is turned ON (the +48V indicators will flash). The +48V indicators also function as error indicators: the indicators for all channels will flash if an error occurs.

⚠ CAUTIONS:

- Make sure that phantom power is turned OFF unless it is needed.
- When turning phantom power ON, make sure that no equipment other than phantom-powered devices such as condenser microphones are connected to the corresponding [INPUT] connectors. Applying phantom power to a device that does not require phantom power can damage the connected device.
- Do not connect or disconnect a device to an INPUT while phantom power is applied. Doing so can damage the connected device and/or the unit itself.
- To prevent possible damage to speakers, make sure that power amplifiers and/or powered speakers are turned OFF when switching phantom power ON or OFF. We also recommend setting all digital mixing console output controls to minimum when turning phantom power ON or OFF. Sudden high level peaks caused by the switching operation can damage equipment as well as the hearing of those present.

③ **[SIG] (Signal) Indicators**

These indicators light green when the signal applied to the corresponding channel reaches or exceeds –34 dBFS.

The SIG indicators also function as error indicators: the indicators for all channels will flash if an error occurs.

④ **[PEAK] Indicators**

These indicators light red when the signal level of the corresponding channel reaches or exceeds –3 dBFS.

The PEAK indicators also function as error indicators: the indicators for all channels will flash if an error occurs.

⑤ **[UNIT ID] Rotary Switch**

This rotary switch enables you to set an ID number so that connected devices will recognize the Rio. The UNIT ID must be a unique number in the network so that the Rio will be able to transmit and receive audio signals over a Dante network, or be controlled from a connected digital mixing console.

Use the rotary switch while the power to the unit is turned OFF. Otherwise, the ID setting will not be effective.

⑥ DIP Switches

These switches enable you to specify the settings related to the startup operation of the unit.

Set the DIP switches while the power to the unit is turned OFF. Otherwise, the setting will not be effective.

Refer to the following for details.

The switch illustrations indicate the setting state as follows.

Switch	Status
	Represent a status with switch toggled up.
	Represent a status with switch toggled down.

- **Switch 1 (UNIT ID)**

This switch setting determines whether the hexadecimal setting of the [UNIT ID] rotary switch will range from 0 to F or from 10 to 1F.

Switch	Setting	Description
1	UNIT ID ranging from 0 to F	The setting range of the [UNIT ID] rotary switch is from 0 to F.
1	UNIT ID ranging from 10 to 1F	The setting range of the [UNIT ID] rotary switch is from 10 to 1F.

- **Switches 2 and 3 (IP SELECT MODE)**

These specify the method of setting the IP address used when communicating with an external device such as R Remote. When connecting the R series to a computer for the first time immediately after purchase, set this to something other than STATIC IP (MANUAL). If you want to set this to STATIC IP (MANUAL), first specify the IP address from R Remote and then switch this setting to STATIC IP (MANUAL).

Switch	Setting	Description
2 3	AUTO IP	Dante networks will automatically assign the IP address.
2 3	DHCP	The IP address assigned by the DHCP server will be used.
2 3	STATIC IP (AUTO)	The IP address will be set to 192.168.0.xx (xx=UNIT ID).
2 3	STATIC IP (MANUAL)	The IP address is specified from an external device such as R Remote.

- **Switch 4 (SECONDARY PORT)**

This switch setting determines whether the rear-panel [SECONDARY] connector will be used for a daisy chain or redundant network.

With the [DAISY CHAIN] setting, you can connect multiple Dante-enabled network devices in a daisy chain without using a network switch. Refer to “Daisy Chain Network” in the “About Connections” section (see page 13) for more information about daisy chain connections.

With the [REDUNDANT] setting, the [PRIMARY] connector will be used for primary connections, and the [SECONDARY] connector will be used for secondary (backup) connections. If the unit is unable to transmit signals through the [PRIMARY] connector for some reason (e.g., due to damage or accidental removal of the cable, or a failed network switch), the [SECONDARY] connector will automatically take over communications and functions on the redundant network. Refer to “About Redundant Networks” in the “About Connections” section (see page 13) for more information on redundant networks.

Switch	Setting	Description
4	DAISY CHAIN	The [SECONDARY] connector is used for a daisy chain connection. A signal at the [PRIMARY] connector will be transmitted to the next device in the chain as is.
4	REDUNDANT	The [SECONDARY] connector is used for a redundant network. It will function as backup connection, independent of the network to which the [PRIMARY] connector is connected.

- **Switches 5 and 6 (REMOTE)**

When you plan to monitor or control the Rio from a digital mixing console, these switches determine whether to use an Rio-native device (such as a CL series product) or a non-Rio-native device. Information on which devices feature Rio-native support is available at the Yamaha pro audio website product page:

http://www.yamahaproaudio.com/products/

Switch	Setting	Description
5 6	NATIVE	An Rio-native device will control the Rio.
5 6	AD8HR	A non-Rio-native device will control the Rio as AD8HRs. In this case, Rio3224-D and Rio1608-D are recognized as four AD8HRs and two AD8HRs respectively. Set the UNIT ID number between 1 and F. The unit with any other UNIT ID numbers will not be controllable.
5 6	INITIALIZE	Initialize the settings. For details on the settings that are initialized, refer to "Initializing the Rio" (page 14).

- **Switches 7 and 8 (START UP MODE)**

These switches determine whether part of the internal memory is initialized when the unit starts up, or uses the previous settings (i.e., settings used prior to the most recent power-off).

If you plan to connect an Rio-native device, such as a CL series product, set the switches to [REFRESH]. The Rio will not input or output audio until the connected Rio-native device transmits its settings to the Rio, so that the Rio will not output audio accidentally.

Switch	Setting	Description
7 8	REFRESH	The Rio starts up with part of the internal memory initialized. The following settings are initialized. HA GAIN: –6 dB +48V: OFF HPF: OFF HPF FREQ: 80Hz Gain Compensation: OFF Dante Patch: OFF
7 8	RESUME	The unit starts up using the settings assigned prior to the most recent power-off.

⑦ [SYSTEM] Indicators

These indicators show the Rio's operating status. If the green indicator lights steadily and the red indicator turns off, the unit is operating normally.

When power to the unit is turned ON, if the green indicator turns off, or if the red indicator lights or flashes, the unit is not functioning properly. In this case, refer to the "Messages" section (see page 17).

⑧ [SYNC] Indicators

These indicators show the operating status of the Rio's internal Dante network capability.

If the green indicator lights, the unit is operating as a word clock slave and synching to the word clock.

If the green indicator flashes, the unit is operating as the word clock master.

If the power to the unit is turned on but the green indicator is turned off, the unit is not functioning properly. In this case, refer to the "Messages" section (see page 17).

If the orange indicator lights or flashes, refer to the "Messages" section.

⑨ [+48V MASTER] Switch

This is the master switch for the unit's +48V phantom power supply.

If the [+48V MASTER] switch is off, no phantom power will be supplied to the unit's input connectors even if the individual input phantom power settings are ON. In this case, the [+48V] indicators will flash on channels for which phantom power is turned ON.

⑩ Power Indicator

Lights when AC power to the unit is ON.

⑪ Power Switch (⏻)

Turns power to the unit ON or OFF.

⚠ CAUTIONS:

- Rapidly turning the unit on and off in succession can cause it to malfunction. After turning the unit off, wait for about 6 seconds before turning it on again.
- Even when the power switch is turned off, electricity is still flowing to the product at the minimum level. When you are not using the product for a long time, make sure to unplug the power cord from the wall AC outlet.

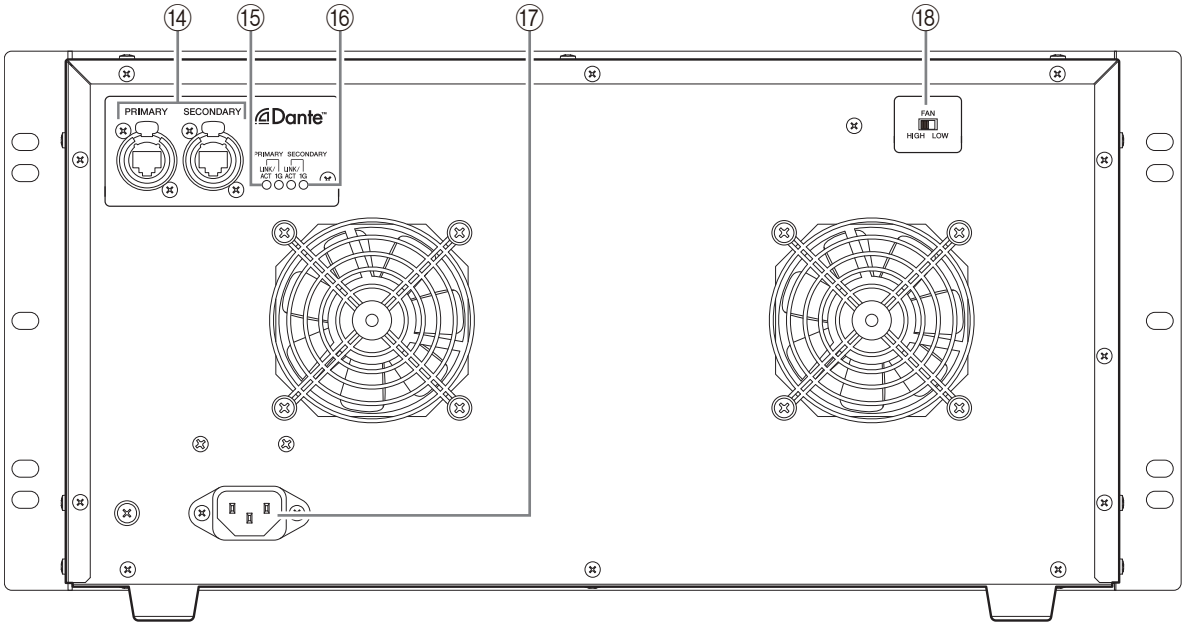
⑫ AES/EBU OUT Connectors 1/2–7/8 (Rio3224-D only)

These XLR-3-32 type balanced connectors deliver AES/EBU format digital output from the unit's corresponding output channels. Each connector outputs 2-channel digital audio.

⑬ OUTPUT +4 dBu Connectors 1–16 {1–8}

These XLR-3-32 type balanced connectors deliver analog output from the unit's corresponding output channels. Nominal output level is +4 dBu.

Rear Panel



⑭ [PRIMARY]/[SECONDARY] Connectors

The Rio can be connected to other Dante-compatible devices (such as a CL-series product) via these etherCON (RJ45) connectors using standard Ethernet cables (CAT5e or better recommended).

If DIP switch 4 on the front panel is set upward (to DAISY CHAIN), audio signals coming into one of these connectors will be output from the other. Refer to "Daisy Chain Network" in the "About Connections" section (see page 13) for more information on daisy chain connections.

If DIP switch 4 on the front panel is set downward (to REDUNDANT), the [PRIMARY] connector will be used for primary connection, and the [SECONDARY] connector will be used for secondary (backup) connection. If the unit is unable to transmit signals through the [PRIMARY] connector for some reason (e.g., due to damage or accidental removal of the cable, or a failed network switch), the [SECONDARY] connector will automatically take over the connection. Refer to "About Redundant Networks" in the "About Connections" section (see page 13) for more information on redundant networks.

NOTE

- The use of Ethernet cables with Neutrik EtherCon CAT5e compatible RJ-45 plugs is recommended. Standard RJ45 plugs can also be used.
- Use STP (shielded twisted pair) cable to prevent electromagnetic interference. Make sure that the metal parts of the plugs are electrically connected to the STP cable shield by conductive tape or comparable means.
- Connect only Dante-compatible devices or GbE-compatible devices (including a computer).

⑮ [LINK/ACT] Indicators

These indicators show the communication status of the [PRIMARY] and [SECONDARY] connectors.

They flash fast if the Ethernet cables are connected properly.

⑯ [1G] Indicators

These indicators light when the Dante network is functioning as Giga-bit Ethernet.

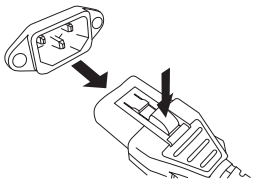
⑰ AC IN Connector

Connect the supplied AC power cord here. First, connect the power cord to the device, then insert the power cord plug into the AC outlet.

The supplied power cord features a special latching mechanism (V-LOCK) to prevent the power cord from being accidentally disconnected. Connect the power cord by inserting the power cord fully until it is locked.

⚠ CAUTION:

Be sure to turn the power off before connecting or disconnecting the power cord. Press the latch button on the plug to disconnect the power cord.



⑱ [FAN] Switch

Sets the internal cooling fan to operate at either [HIGH] or [LOW] speed.

This switch is set to [LOW] when the unit is initially shipped from the factory. As long as the unit is operated within the specified ambient temperature range either the [LOW] or [HIGH] setting can be used. The [HIGH] setting is recommended if the ambient temperature is high, if the unit is in direct sunlight even if the ambient temperature is within the specified operating range, and in any situation in which fan noise is not a problem.

If two or more Rio units are mounted in the same rack and the fan speed is set to [LOW], leave a 1U rack space between every two units. Also either leave the open spaces uncovered or install appropriate ventilating panels to minimize the possibility of heat buildup. If three or more Rio units are mounted without space in the same rack, set the fan speeds to [HIGH].

About Connections

There are two ways to connect the Rio to a Dante network.

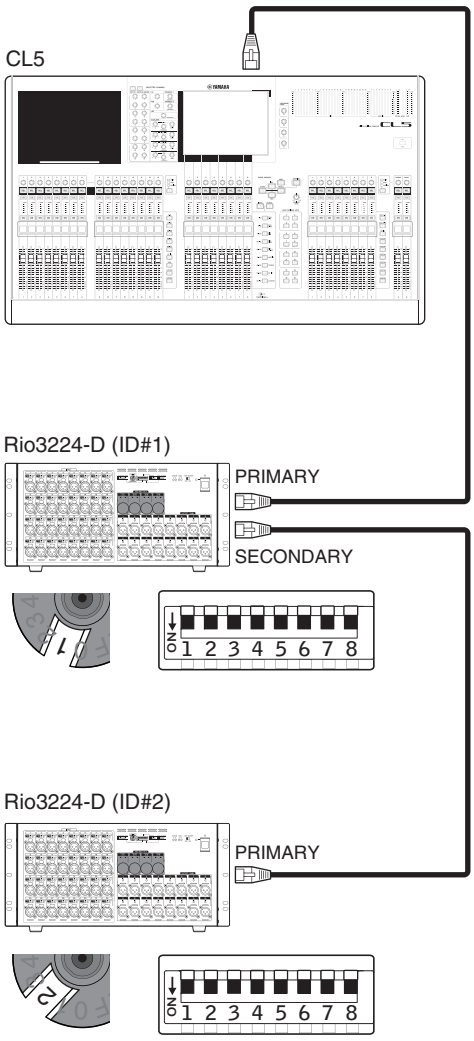
NOTE

A daisy chain connection is suitable for a simple system with a small number of devices.
Use a star network if a large number of devices are connected.

Daisy Chain Network

A daisy chain is a wiring scheme in which multiple devices are connected together in sequence. In this way, networking is simple and requires no network switches.

If you connect a large number of devices, you must set a higher latency value to avoid skipping audio that could be caused by an increased delay in signal transfer among the devices. Also, if a connection is broken in a daisy chain network, the signal flow is interrupted at that point and no signal will be transferred beyond that point.



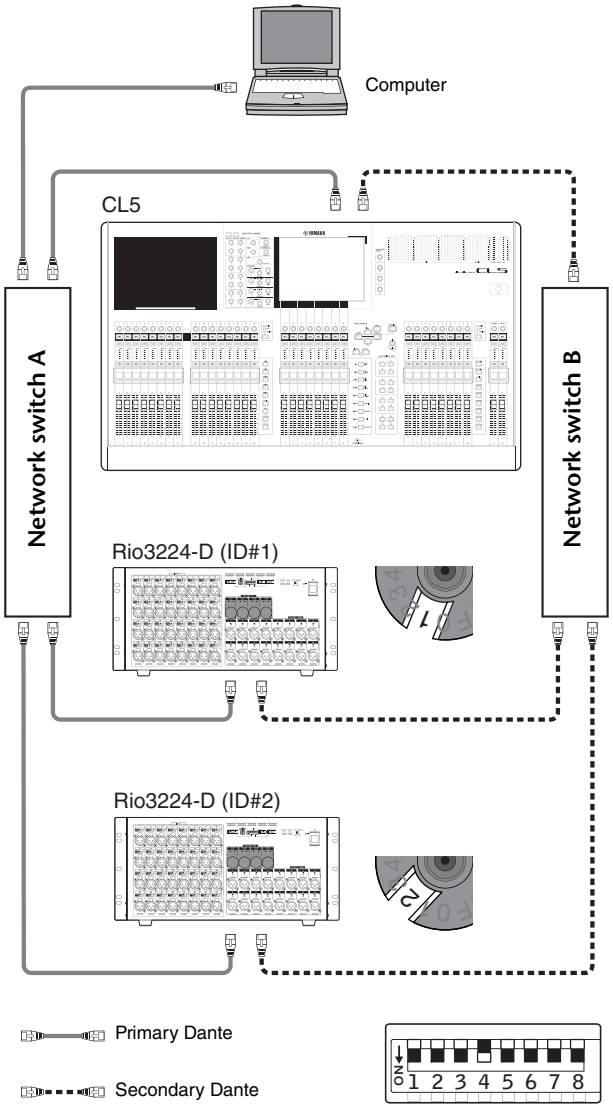
Star Network

In a star network, each device is connected to a central network switch. Using a GbE-compatible network switch enables you to configure a wide-band, large-scale network. We recommend a network switch that features various functions to control and monitor the network (such as Qos, the ability to assign priority to data flows - e.g., clock synchronization or audio transmission on certain data circuits.)

With this topology, it is common to configure a redundant network so that an unexpected network problem will not affect any audio or otherwise stable communications.

About Redundant Networks

A redundant network consists of two circuits, a primary circuit and a secondary circuit. Normally, the network operates on the primary circuit. However, if the primary connection is broken, the secondary circuit will automatically take over communications. Therefore, using a redundant network with a star topology would increase communication stability relative to a daisy chain network.



About Dante Controller

Dante Controller is a software application that allows configuration and audio routing of Dante networks. Use this application if you plan to connect or set up Dante-enabled devices that do not feature Rio-native support. Please download the Dante Controller application from the website listed below.

Please note that Dante Controller Version 3.2.1 or later supports Rio.

http://www.yamahaproaudio.com/

To run Dante Controller, a computer must feature a GbE-compatible Ethernet connector.

Refer to the Dante Controller owner's manual for details on Dante Controller.

In Dante Controller, make the following basic settings:

- [Network View] → [Routing] → I/O patching
- [Network View] → [Clock Status] → Word clock master setting
- [Device View] → [Config] → Sampling rate setting

Initializing the Rio

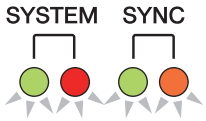
To return (initialize) the internal memory to its factory-set state, for example if you move the unit to a different location, proceed as follows.

1. Turn the unit off.

2. On the front panel, set DIP switch 5 and 6 down (INITIALIZE).

3. Turn the unit on.

During initialization, the [SYSTEM] and [SYNC] indicators remain turned off. When initialization is complete, each indicator lights up.



4. Verify that initialization is completed, and turn the unit off.

5. Set DIP switches 5 and 6 (REMOTE) according to your setup.

6. Turn the unit on.

The Dante settings and HA parameters will be initialized.

	Parameter	Initialized setting
Dante	Word Clock	48kHz (slave) Pull up/down None
	Latency	1.0ms
	Encoding	PCM 24bit
	SECONDARY Port	Daisy Chain
	IP Address	Auto (Link Local)
	Primary IP address	0.0.0.0
	Secondary IP address	0.0.0.0
	Device Label	Y0xx-Yamaha-Rio3224-D (Rio1608-D)-nnnnnn *1
	Channel Label	<channel number>
HA	HA GAIN	-6dB
	+48V	Off
	HPF	Off, 80Hz
	GAIN COMPENSATION	Off, -6dB

*1 "xx" refers to a UNIT ID value, and "nnnnnn" refers to the lower six digits of the Dante Primary MAC Address.

Head Amp Control

The Rio head amplifiers can be remotely controlled from a host device, such as a compatible Yamaha digital mixing console.

Control from an Rio-native Device

The Rio head amplifiers can be controlled remotely from an Rio-native digital mixing console, such as a CL series product.

The connected Rio-native device displays the model name and UNIT ID number of the corresponding Rio unit to be controlled.

If you plan to connect a device that features Rio native support to monitor and control the head amplifiers, refer to the owner's manual for the corresponding device.

Control from a Device That Does Not Feature Rio-Native Support

This section explains how to configure the Rio settings that are required to control the Rio as AD8HR units from a device that does not feature Rio-native support.

For more information, please refer to the "Dante-MY 16-AUD & R Series HA Remote Control Guide" that is downloadable from the website listed below.

http://www.yamahaproaudio.com/

NOTE

The following Yamaha non-Rio-native devices enable you to control the Rio as AD8HRs. To connect such a device, first install a Dante-MY16-AUD card (firmware version 3.3.8 or later) into the Mini-YGDAI slot.

M7CL, LS9, DM1000, DM2000, PM5D/DSP5D, DME64N/24N

Setting the DIP Switches

While the power to the unit is off, flip DIP switch 5 down and DIP switch 6 up.

NOTE

If REMOTE has been set to [AD8HR], START UP MODE will be set to [RESUME] regardless of the DIP switch setting.

Setting the UNIT ID

The Rio3224-D will be assigned four virtual IDs (as AD8HR Device IDs) if the DIP switches are set to [AD8HR]. The Rio1608-D will be assigned two virtual IDs if the DIP switches are set to [AD8HR].

If you combine Rio3224-D and Rio1608-D or add an AD8HR or SB168-ES in the network, make sure that the virtual IDs or Device IDs are all unique. The Rio UNIT IDs and virtual IDs are organized as follows:

UNIT ID (Hexadecimal)	Virtual ID (Hexadecimal)	
	Rio3224-D	Rio1608-D
1	1, 2, 3 ,4	1, 2
2	5, 6, 7, 8	3, 4
3	9, A, B, C	5, 6
4	D, E, F, 10	7, 8

Set the Rio correctly so that you can control it as AD8HRs. In addition, scene recall can be used to recall all head amplifier settings at once. Refer to the digital mixing console owner's manual for details on head amplifier control.

Head Amplifier Parameters That Can be Monitored and Controlled

Parameter	Description
+48V	Turns +48V phantom power ON or OFF for each channel.
HA GAIN	Adjusts gain from –6 dB to 66 dB in 1-dB increments.
HPF	Turns the high-pass filter ON or OFF.
HPF FREQ	Adjusts the cutoff frequency of the high-pass filter (12 dB/Oct.) from 20 Hz to 600 Hz in 60 steps.
METER (Rio-native device only)	Displays a level meter for each input channel.
Device ID	Displays the automatically assigned Device ID numbers 1–3C (corresponding to AD8HR device ID numbers). Four ID numbers are assigned to each Rio3224-D unit and two numbers to each Rio1608-D unit.
+48V Master SW	Displays the [+48V MASTER] switch ON/OFF status of the +48V phantom power supply.
Gain Compensation (Rio-native device only)	Turns the Gain Compensation ON or OFF.

Troubleshooting

Troubleshooting

Symptom	Cause	Possible Solution
The power won't turn on. The power indicator doesn't light.	The power cable is connected improperly.	Connect the power cable properly (see page 12).
	The [POWER] switch is not turned ON.	Turn the [POWER] switch ON. If the power still will not come on, refer the problem to your Yamaha dealer.
The unit is not receiving an input signal.	The input cables are not connected properly.	Connect the cables properly.
	The source device is not delivering an appropriate signal.	Output a signal from the source device and make sure that the SIG indicators on the appropriate channels will light.
	The internal head amplifier gain is not set to an appropriate level.	Set the internal head amplifier gain to an appropriate level.
	The DIP switches are set to REFRESH, but the Rio-native device has not started up.	Start the Rio-native device to send the setting to the Rio.
The input level is too low.	A condenser microphone is connected.	Turn the [+48V MASTER] switch ON.
		Turn phantom power for the corresponding channel(s) ON from the Rio-native device.
	The internal head amplifier gain is not set to an appropriate level.	Set the internal head amplifier gain to an appropriate level.
No sound is heard.	The cables are not connected properly.	Connect the cables properly.
	The DIP switches are set to REFRESH, but the Rio-native device has not started up.	Start the Rio-native device to send the setting to the Rio.
	Output is muted.	Unmute the output on the Rio-native device.
The head amp cannot be controlled.	The Rio has not been mounted on the RACK of the Rio-native device.	Mount the Rio on the RACK of the Rio-native device.
Adjusting the internal head amp gain does not change the audio level.	The Gain Compensation function is turned on.	If you are not using the Gain Compensation function, turn it off.
Adjustment of the [UNIT ID] rotary switch or DIP switch settings seems to be ineffective.	You may have adjusted the setting while the power is ON.	Turn the power OFF, then change the setting.
The Dante Controller does not recognize an R-series unit.	An incorrect value is assigned to the IP address for Dante.	Use the DIP switches to initialize the unit.

Messages

Errors, warnings, and certain other types of information are displayed via the Rio front panel indicators. Messages are also displayed in the Dante Controller Error Status field.

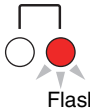
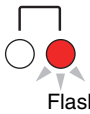
Each indicator lights or flashes as described below:

No call-out	The indicator is off.
Light	The indicator remains lit steadily.
Flash	The indicator continues to flash.
Flash x2	The indicator flashes twice cyclically.
Flash x3	The indicator flashes three times cyclically.

Error Messages

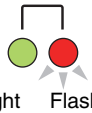
If one of the following errors has occurred, the device will not operate. Until the error is resolved, the green SYSTEM indicator will be turned off, and all indicators for all I/O channels will continue to flash.

In addition, certain errors will cause the red SYSTEM indicator to light or flash.

SYSTEM Indicators	Description	Possible Solution
SYSTEM  Flash x2	An internal error has occurred.	The device has failed. Contact your Yamaha dealer for repair.
SYSTEM Flash x3	Communication cannot occur because the MAC address setting has been corrupted.	
SYSTEM Light	UNIT ID is not unique.	Set a unique UNIT ID number within the Dante network.
SYSTEM  Flash	The device's DIP switches are not set correctly.	Check the DIP switch settings, and set them correctly.

The following errors affect the settings or the hardware. However, the device will still be usable. The green SYSTEM indicator will light, and all indicators for all I/O channels will work normally.

In addition, certain errors will cause the red SYSTEM indicator to light or flash.

SYSTEM Indicators	Description	Possible Solution
SYSTEM Light Flash	The number of Dante transmit flows exceeded the limit.	Reduce the number of flows by, for example, using Dante Controller to change some of the transmit flows to multicast.
SYSTEM Light Flash x2	The cooling fan has stopped.	Check that nothing is caught in the fan. If the problem persists, consult your Yamaha dealer.
SYSTEM  Light Flash x3	The internal memory has been corrupted.	When using the unit in [NORMAL] mode, if the problem persists even after turning the power off and on again, consult your Yamaha dealer.
SYSTEM Light Light	You changed the positions of the device setting DIP switches or rotary switch, or changed the Dante settings from Dante Controller. Therefore, the positions of the device setting DIP switches do not match the actual Dante settings.	If the Device Lock setting was enabled from Dante Controller, disable the setting, or check the device setting DIP switch positions, and set them to accommodate the current situation.

Warning Messages

The indicators will light and/or flash as shown until the cause is resolved.

If the green [SYNC] indicator is unlit, the unit's clock is unconfirmed.

SYNC Indicators	Description	Possible Solution
SYNC Flash	The word clock is not set correctly.	Set the clock master and sampling frequency correctly on the Rio-native device or in Dante Controller.
SYNC Flash x2	Dante Network circuit is broken.	Make sure that the Ethernet cables are not removed or short-circuited.
SYNC Flash x3	Other Dante-compatible devices cannot be found due to an incorrectly-wired Dante Network.	Make sure that the Ethernet cables are connected correctly.

If the green indicator is flashing, the unit is the clock master.

If the green indicator is lit, the unit is the clock slave and the clock is synchronized.

SYNC Indicators	Description	Possible Solution
SYNC Light or flash / Light	A non-GbE-compatible device is connected.	When transferring audio via Dante, use device that supports GbE.
SYNC Light or flash / Flash	The [SECONDARY] connector has taken over communications during redundant network operation.	Check the circuit connected to the [PRIMARY] connector.
SYNC Light or flash / Flash x2	An abnormality has occurred on the circuit connected to the [SECONDARY] connector during redundant network operation.	Check the circuit connected to the [SECONDARY] connector.

Information Messages

The indicators will remain lit and/or flashing cyclically to report the status.

If the orange [SYNC] indicator is unlit, the unit is operating normally.

If the green [SYNC] indicator is unlit, the unit's clock is unconfirmed.

SYNC Indicators	Description	Explanation
SYNC Light	Synchronizing on a Dante network	Please wait until started has completed or until the unit has finished synchronization. It may take up to 45 seconds for completion.
	Waiting to receive setting data	If START UP MODE is set to REFRESH on the R-series unit, the input/output will be muted until the unit receives setting data after it starts up.
SYNC Flash	The unit is functioning correctly as the word clock master.	The unit is operating as the word clock master.
SYNC Light	The unit is functioning correctly as the word clock slave.	The unit is operating as the clock slave and the clock is synchronized.

Specifications

General Specifications

Sampling Frequency	Internal	44.1kHz 48kHz 88.2kHz 96kHz	
	External	44.1kHz +4.1667%, +0.1%, –0.1%, –4.0%	±200ppm
		48kHz +4.1667%, +0.1%, –0.1%, –4.0%	±200ppm
		88.2kHz +4.1667%, +0.1%, –0.1%, –4.0%	±200ppm
		96kHz +4.1667%, +0.1%, –0.1%, –4.0%	±200ppm
Signal Delay	Less than 3ms INPUT to OUTPUT, connect with CL5 using Dante, Dante Receive Latency set to 0.25ms (one way), Fs=48kHz		
Frequency Response	+0.5, –1.5dB 20Hz-20kHz, refer to +4dBu output @1kHz, INPUT to OUTPUT, Fs= 44.1kHz, 48kHz +0.5, –1.5dB 20Hz-40kHz, refer to +4dBu output @1kHz, INPUT to OUTPUT, Fs= 88.2kHz, 96kHz		
Total Harmonic Distortion*1	Less than 0.05% 20Hz-20kHz@+4dBu into 600Ω, Fs= 44.1kHz, 48kHz Less than 0.05% 20Hz-40kHz@+4dBu into 600Ω, Fs= 88.2kHz, 96kHz INPUT to OUTPUT, Input Gain= Min.		
Hum&Noise*2	–128dBu typ., Equivalent Input Noise, Input Gain= Max. –88dBu Residual output noise, ST master off.		
Dynamic Range	112dB typ., DA Converter, 108dB typ., INPUT to OUTPUT, Input Gain= Min.		
Crosstalk@1kHz	–100dB*3, adjacent INPUT/OUTPUT channels, Input Gain= Min.		
Dimensions (WxHxD) and Net Weight	Rio3224-D: 480mm x 232mm*4 x 361.5mm, 12.4kg Rio1608-D: 480mm x 144mm*4 x 361.5mm, 8.8kg		
Power Requirements (wattage)	Rio3224-D: 120W Rio1608-D: 70W		
Power Requirements (voltage and hertz)	US/Canada: 120V 60Hz Japan: 100V 50/60Hz China: 110-240V 50/60Hz Korea: 220V 60Hz Other: 110-240V 50/60Hz		
Temperature Range	Operating temperature range: 0 - 40°C Storage temperature range: –20 - 60°C		
Included Accessories	Owner's Manual, Power Cord, Dante Virtual Soundcard Token leaflet		

*1. Total Harmonic Distortion is measured with 18dB/octave filter @80kHz
*2. Hum & Noise are measured with A-Weight filter.
*3. Crosstalk is measured with a 30dB/octave filter @22kHz
*4. Including rubber feet.

Analog Input Characteristics

Input Terminals	GAIN	Actual Load Impedance	For Use With Nominal	Input Level		Connector
				Nominal	Max. before clip	
INPUT 1-16	+66dB	7.5kΩ	50-600Ω Mics & 600Ω Lines	–62dBu (0.616mV)	–42dBu (6.16mV)	XLR-3-31 type (Balanced)*1
	–6dB			+10dBu (2.45V)	+30dBu (24.5V)	
INPUT 17-32*2	+66dB	7.5kΩ	50-600Ω Mics & 600Ω Lines	–62dBu (0.616mV)	–42dBu (6.16mV)	XLR-3-31 type (Balanced)*1
	–6dB			+10dBu (2.45V)	+30dBu (24.5V)	

*1. XLR-3-31 type connectors are balanced.(1=GND, 2=HOT, 3=COLD)
*2. Rio3224-D only
* In these specifications, 0dBu = 0.775 Vrms.
* All input AD converters are 24bit linear, 128times oversampling.
* +48V DC (phantom power) is supplied to INPUT XLR type connectors via each individual software controlled switch.

Analog Output Characteristics

Output Terminals	Actual Source Impedance	For Use With Nominal	Max.Output Level Select SW*1	Output Level		Connector
				Nominal	Max. before clip	
OUTPUT 1-8	75Ω	600Ω Lines	+24dB (default)	+4dBu (1.23 V)	+24dBu (12.3V)	XLR-3-32 type (Balanced)*2
			+18dB	–2dBu (616mV)	+18dBu (6.16V)	
OUTPUT 9-16*3	75Ω	600Ω Lines	+24dB (default)	+4dBu (1.23 V)	+24dBu (12.3V)	XLR-3-32 type (Balanced)*2
			+18dB	–2dBu (616mV)	+18dBu (6.16V)	

*1. There are switches inside the body to preset the maximum output level.
*2. XLR-3-32 type connectors are balanced. (1=GND, 2=HOT, 3=COLD)
*3. Rio3224-D only
* All output DA converters are 24bit, 128times oversampling.
* There are switches inside the body to preset the maximum output level.

Digital I/O Characteristics

Terminals	Format	Data length	Level	Audio	Connector
Primary/Secondary	Dante	24bit or 32bit	1000Base-T	32ch (Rio3224-D to other devices) 24ch (Other devices to Rio3224-D) 16ch (Rio1608-D to other devices) 8ch (Other devices to Rio1608-D)	EtherCON Cat5e

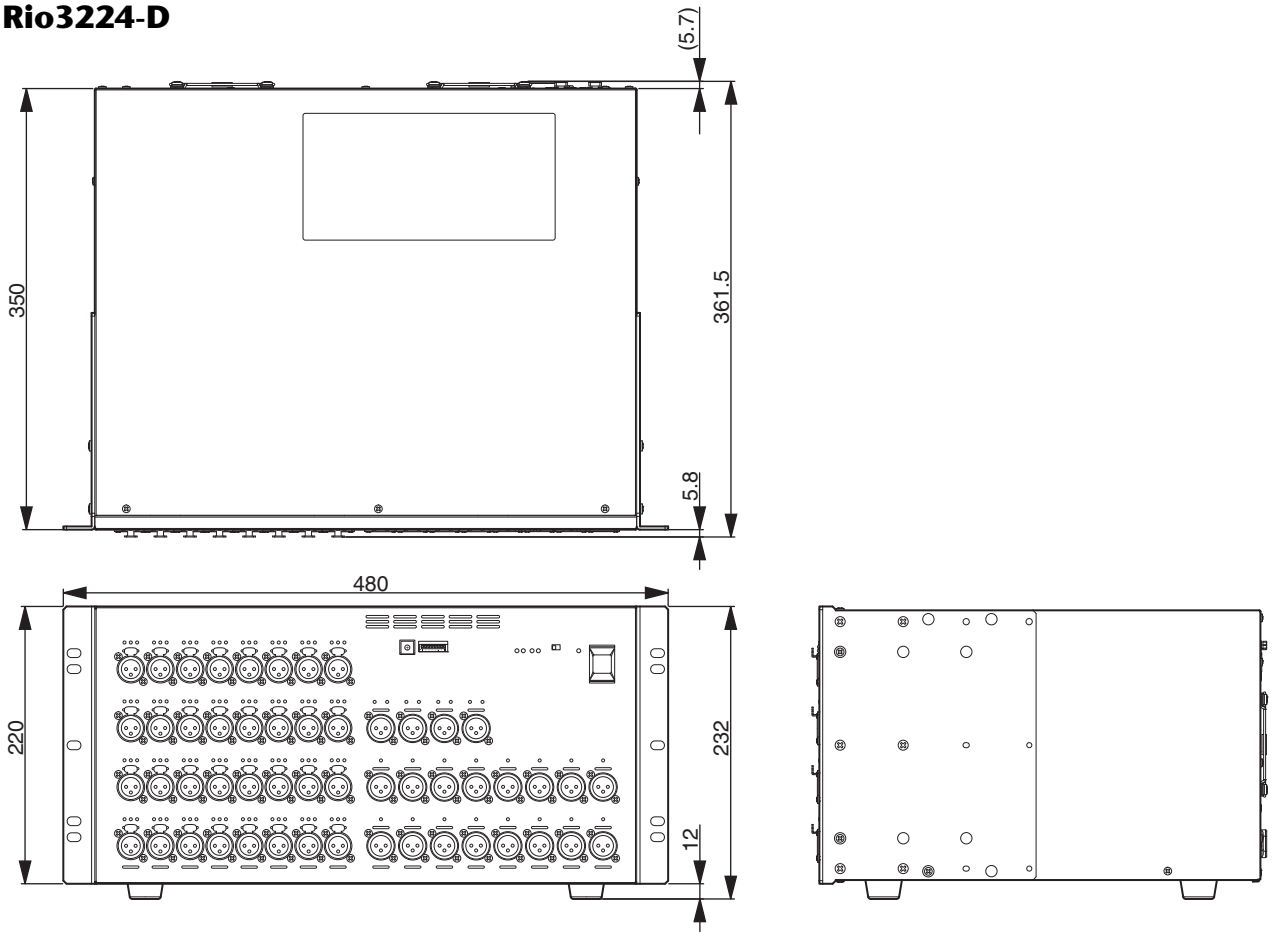
Digital Output Characteristics

Terminal		Format	Data Length	Level	Connector
AES/EBU OUT 1-4*1	AES/EBU	AES/EBU Professional use*1	24bit	RS422	XLR-3-32 type (Balanced)*2

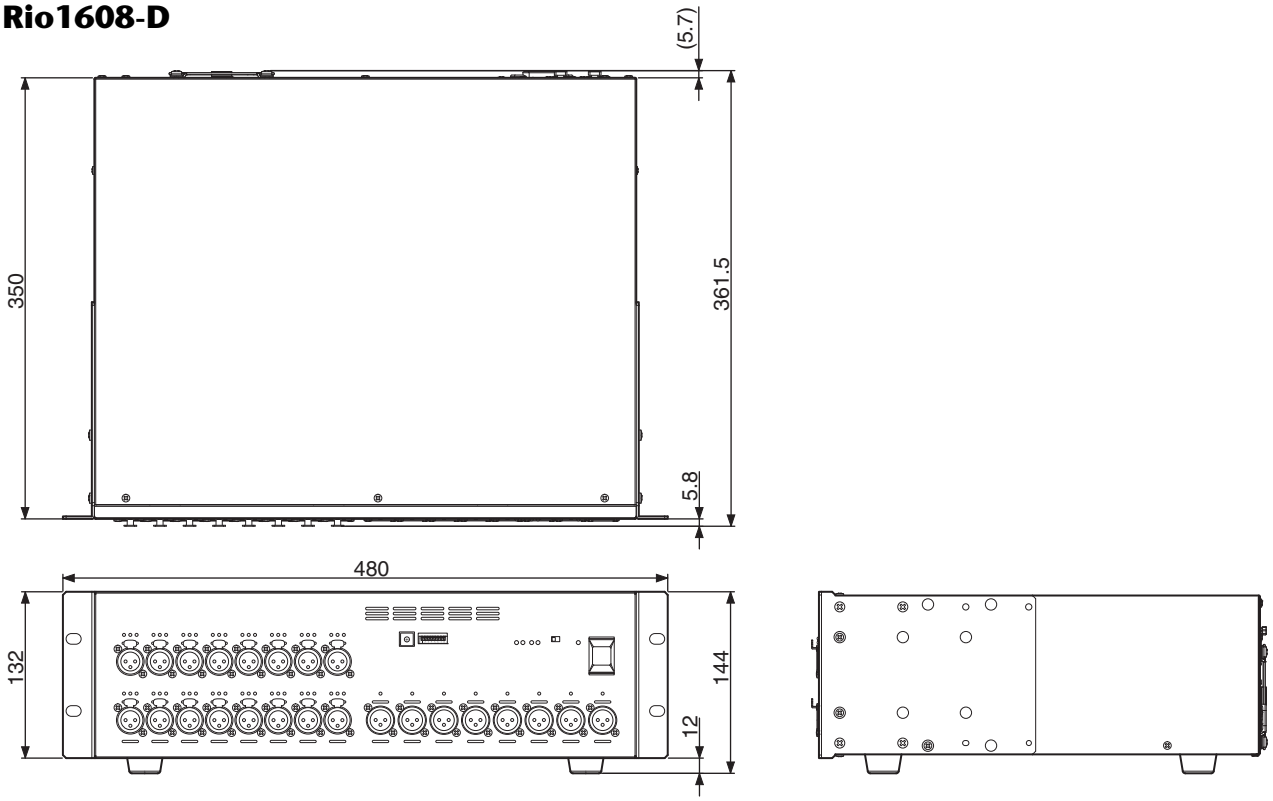
*1. Rio3224-D only
*2. XLR-3-32 type connectors are balanced. (1= GND, 2= HOT, 3= COLD)

Dimensions

Rio3224-D



Rio1608-D



Unit: mm

* The contents of this manual apply to the latest specifications as of the publishing date.
To obtain the latest manual, access the Yamaha website then download the manual file.

Important Notice: Guarantee Information for customers in European Economic Area (EEA) and Switzerland

English

Important Notice: Guarantee Information for customers in EEA* and Switzerland

For detailed guarantee information about this Yamaha product, and Pan-EEA* and Switzerland warranty service, please either visit the website address below (Printable file is available at our website) or contact the Yamaha representative office for your country. * EEA: European Economic Area

Deutsch

Wichtiger Hinweis: Garantie-Information für Kunden in der EWR* und der Schweiz

Für nähere Garantie-Information über dieses Produkt von Yamaha, sowie über den Pan-EWR*- und Schweizer Garantieservice, besuchen Sie bitte entweder die folgend angegebene Internetadresse (eine druckfähige Version befindet sich auch auf unserer Webseite), oder wenden Sie sich an den für Ihr Land zuständigen Yamaha-Vertrieb. *EWR: Europäischer Wirtschaftsraum

Français

Remarque importante: informations de garantie pour les clients de l'EEE et la Suisse

Pour des informations plus détaillées sur la garantie de ce produit Yamaha et sur le service de garantie applicable dans l'ensemble de l'EEE ainsi qu'en Suisse, consultez notre site Web à l'adresse ci-dessous (le fichier imprimable est disponible sur notre site Web) ou contactez directement Yamaha dans votre pays de résidence. * EEE : Espace Economique Européen

Nederlands

Belangrijke mededeling: Garantie-informatie voor klanten in de EER* en Zwitserland

Voor gedetailleerde garantie-informatie over dit Yamaha-product en de garantieservice in heel de EER* en Zwitserland, gaat u naar de onderstaande website (u vind een afdrukbaar bestand op onze website) of neemt u contact op met de vertegenwoordiging van Yamaha in uw land. * EER: Europese Economische Ruimte

Español

Aviso importante: información sobre la garantía para los clientes del EEE* y Suiza

Para una información detallada sobre este producto Yamaha y sobre el soporte de garantía en la zona EEE* y Suiza, visite la dirección web que se incluye más abajo (la version del archivo para imprimir esta disponible en nuestro sitio web) o póngase en contacto con el representante de Yamaha en su país. * EEE: Espacio Económico Europeo

Italiano

Avviso importante: informazioni sulla garanzia per i clienti residenti nell'EEA* e in Svizzera

Per informazioni dettagliate sulla garanzia relativa a questo prodotto Yamaha e l'assistenza in garanzia nei paesi EEA* e in Svizzera, potete consultare il sito Web all'indirizzo riportato di seguito (è disponibile il file in formato stampabile) oppure contattare l'ufficio di rappresentanza locale della Yamaha. * EEA: Area Economica Europea

Português

Aviso importante: informações sobre as garantias para clientes da AEE* e da Suíça

Para obter uma informação pormenorizada sobre este produto da Yamaha e sobre o serviço de garantia na AEE* e na Suíça, visite o site a seguir (o arquivo para impressão está disponível no nosso site) ou entre em contato com o escritório de representação da Yamaha no seu país. * AEE: Área Econômica Européia

Ελληνικά

Σημαντική σημείωση: Πληροφορίες εγγύησης για τους πελάτες στον ΕΟΧ* και Ελβετία

Για λεπτομερείς πληροφορίες εγγύησης σχετικά με το παρόν προϊόν της Yamaha και την κάλυψη εγγύησης σε όλες τις χώρες του ΕΟΧ και την Ελβετία, επισκεφτείτε την παρακάτω ιστοσελίδα (Εκτυπώσιμη μορφή είναι διαθέσιμη στην ιστοσελίδα μας) ή απευθυνθείτε στην αντιπροσωπεία της Yamaha στη χώρα σας. * ΕΟΧ: Ευρωπαϊκός Οικονομικός Χώρος

Svenska

Viktigt: Garantiinformation för kunder i EES-området* och Schweiz

För detaljerad information om denna Yamahaprodukt samt garantiservice i hela EES-området* och Schweiz kan du antingen besöka nedanstående webbaddress (en utskriftsvänlig fil finns på webbplatsen) eller kontakta Yamahas officiella representant i ditt land. * EES: Europeiska Ekonomiska Samarbetsområdet

Norsk

Viktig merknad: Garantiinformasjon for kunder i EØS* og Sveits

Detaljert garantiinformasjon om dette Yamaha-produktet og garantiservice for hele EØS-området* og Sveits kan fås enten ved å besøke nettadressen nedenfor (utskriftsversjon finnes på våre nettsider) eller kontakte kontakte Yamaha-kontoret i landet der du bor. *EØS: Det europeiske økonomiske samarbeidsområdet

Dansk

Vigtig oplysning: Garantioplysninger til kunder i EØO* og Schweiz

De kan finde detaljerede garantioplysninger om dette Yamaha-produkt og den fælles garantiserviceordning for EØO* (og Schweiz) ved at besøge det websted, der er angivet nedenfor (der findes en fil, som kan udskrives, på vores websted), eller ved at kontakte Yamahas nationale repræsentationskontor i det land, hvor De bor. * EØO: Det Europæiske Økonomiske Område

Suomi

Tärkeä ilmoitus: Takuutiedot Euroopan talousalueen (ETA)* ja Sveitsin asiakkaille

Tämän Yamaha-tuotteen sekä ETA-alueen ja Sveitsin takuuta koskevat yksityiskohtaiset tiedot saatte alla olevasta nettiosoitteesta. (Tulostettava tiedosto saatavissa sivustollamme.) Voitte myös ottaa yhteyttä paikalliseen Yamaha-edustajaan. *ETA: Euroopan talousalue

Polski

Ważne: Warunki gwarancyjne obowiązujące w EOG* i Szwajcarii

Aby dowiedzieć się więcej na temat warunków gwarancyjnych tego produktu firmy Yamaha i serwisu gwarancyjnego w całym EOG* i Szwajcarii, należy odwiedzić wskazaną poniżej stronę internetową (Plik gotowy do wydruku znajduje się na naszej stronie internetowej) lub skontaktować się z przedstawicielstwem firmy Yamaha w swoim kraju. * EOG — Europejski Obszar Gospodarczy

Česky

Důležité oznámení: Záruční informace pro zákazníky v EHS* a ve Švýcarsku

Podrobné záruční informace o tomto produktu Yamaha a záručním servisu v celém EHS* a ve Švýcarsku naleznete na níže uvedené webové adrese (soubor k tisku je dostupný na našich webových stránkách) nebo se můžete obrátit na zastoupení firmy Yamaha ve své zemi. * EHS: Evropský hospodářský prostor

Magyar

Fontos figyelmeztetés: Garancia-információk az EGT* területén és Svájcban élő vásárlók számára

A jelen Yamaha termékre vonatkozó részletes garancia-információk, valamint az EGT*-re és Svájcra kiterjedő garanciális szolgáltatás tekintetében keresse fel webhelyünket az alábbi címen (a webhelyen nyomtatható fájlt is talál), vagy pedig lépjen kapcsolatba az országában működő Yamaha képviseleti irodával. * EGT: Európai Gazdasági Térség

Eesti keel

Oluline märkus: Garantiiteave Euroopa Majanduspiirkonna (EMP)* ja Šveitsi klientidele

Täpsema teabe saamiseks selle Yamaha toote garantii ning kogu Euroopa Majanduspiirkonna ja Šveitsi garantiiteeninduse kohta, külastage palun veebisaiti alljärgneval aadressil (meie saidil on saadaval prinditav fail) või pöörduge Teie regiooni Yamaha esinduse poole. * EMP: Euroopa Majanduspiirkond

Latviešu

Svarīgs paziņojums: garantijas informācija klientiem EEZ* un Šveicē

Lai saņemtu detalizētu garantijas informāciju par šo Yamaha produktu, kā arī garantijas apkalpošanu EEZ* un Šveicē, lūdzu, apmeklējiet zemāk norādīto tīmekļa vietnes adresi (tīmekļa vietnē ir pieejams drukājams fails) vai sazinieties ar jūsu valsti apkalpojošo Yamaha pārstāvniecību. * EEZ: Eiropas Ekonomikas zona

Lietuvių kalba

Dėmesio: informacija dėl garantijos pirkėjams EEE* ir Šveicarijoje

Jei reikia išsamios informacijos apie šį „Yamaha" produktą ir jo techninę priežiūrą visoje EEE* ir Šveicarijoje, apsilankykite mūsų svetainėje toliau nurodytu adresu (svetainėje yra spausdintinas failas) arba kreipkitės į „Yamaha" atstovybę savo šaliai. *EEE – Europos ekonominė erdvė

Slovenčina

Dôležité upozornenie: Informácie o záruke pre zákazníkov v EHP* a Švajčiarsku

Podrobné informácie o záruke týkajúce sa tohto produktu od spoločnosti Yamaha a garančnom servise v EHP* a Švajčiarsku nájdete na webovej stránke uvedenej nižšie (na našej webovej stránke je k dispozícii súbor na tlač) alebo sa obráťte na zástupcu spoločnosti Yamaha vo svojej krajine. * EHP: Európsky hospodársky priestor

Slovenščina

Pomembno obvestilo: Informacije o garanciji za kupce v EGP* in Švici

Za podrobnejše informacije o tem Yamahinem izdelku ter garancijskem servisu v celotnem EGP in Švici, obiščite spletno mesto, ki je navedeno spodaj (natisljiva datoteka je na voljo na našem spletnem mestu), ali se obrnite na Yamahinega predstavnika v svoji državi. * EGP: Evropski gospodarski prostor

Български език

Важно съобщение: Информация за гаранцията за клиенти в ЕИП* и Швейцария

За подробна информация за гаранцията за този продукт на Yamaha и гаранционното обслужване в паневропейската зона на ЕИП* и Швейцария или посетете посочения по-долу уеб сайт (на нашия уеб сайт има файл за печат), или се свържете с представителния офис на Yamaha във вашата страна. * ЕИП: Европейско икономическо пространство

Limba română

Notificare importantă: Informaţii despre garanţie pentru clienţii din SEE* şi Elveţia

Pentru informaţii detaliate privind acest produs Yamaha şi serviciul de garanţie Pan-SEE* şi Elveţia, vizitaţi site-ul la adresa de mai jos (fişierul imprimabil este disponibil pe site-ul nostru) sau contactaţi biroul reprezentanţei Yamaha din ţara dumneavoastră . * SEE: Spaţiul Economic European

http://europe.yamaha.com/warranty/

URL_4

ADDRESS LIST

NORTH AMERICA

CANADA
Yamaha Canada Music Ltd.
135 Milner Avenue, Toronto, Ontario,
M1S 3R1, Canada
Tel: +1-416-298-1311

U.S.A.
Yamaha Corporation of America
6600 Orangethorpe Avenue, Buena Park, CA 90620,
U.S.A.
Tel: +1-714-522-9011

CENTRAL & SOUTH AMERICA

MEXICO
Yamaha de México, S.A. de C.V.
Av. Insurgentes Sur 1647 Piso 9, Col. San José
Insurgentes, Delegación Benito Juárez, México,
D.F., C.P. 03900, México
Tel: +52-55-5804-0600

BRAZIL
Yamaha Musical do Brasil Ltda.
Rua Fidêncio Ramos, 302 – Cj 52 e 54 – Torre B – Vila
Olímpia – CEP 04551-010 – São Paulo/SP, Brazil
Tel: +55-11-3704-1377

ARGENTINA
Yamaha Music Latin America, S.A.,
Sucursal Argentina
Olga Cossettini 1553, Piso 4 Norte,
Madero Este-C1107CEK,
Buenos Aires, Argentina
Tel: +54-11-4119-7000

PANAMA AND OTHER LATIN AMERICAN COUNTRIES/ CARIBBEAN COUNTRIES
Yamaha Music Latin America, S.A.
Edif. Torre Banco General, Piso 7, Urbanización
Marbella, Calle 47 y Aquilino de la Guardia,
Ciudad de Panamá, República de Panamá
Tel: +507-269-5311

EUROPE

THE UNITED KINGDOM/IRELAND
Yamaha Music Europe GmbH (UK)
Sherbourne Drive, Tilbrook, Milton Keynes,
MK7 8BL, U.K.
Tel: +44-1908-366700

GERMANY
Yamaha Music Europe GmbH
Siemensstrasse 22-34, 25462 Rellingen, Germany
Tel: +49-4101-303-0

SWITZERLAND/LIECHTENSTEIN
Yamaha Music Europe GmbH, Branch
Switzerland in Thalwil
Seestrasse 18a, 8800 Thalwil, Switzerland
Tel: +41-44-3878080

AUSTRIA/BULGARIA/ CZECH REPUBLIC/HUNGARY/ ROMANIA/SLOVAKIA/SLOVENIA
Yamaha Music Europe GmbH
Branch Austria
Schleiergasse 20, 1100 Wien, Austria
Tel: +43-1-60203900

POLAND/LITHUANIA/LATVIA/ESTONIA
Yamaha Music Europe GmbH
Sp.z o.o. Oddział w Polsce
ul. Wielicka 52, 02-657 Warszawa, Poland
Tel: +48-22-880-08-88

MALTA
Olimpus Music Ltd.
Valletta Road, Mosta MST9010, Malta
Tel: +356-2133-2093

NETHERLANDS/BELGIUM/ LUXEMBOURG
Yamaha Music Europe Branch Benelux
Clarissenhof 5b, 4133 AB Vianen, The Netherlands
Tel: +31-347-358040

FRANCE
Yamaha Music Europe
7 rue Ambroise Croizat, Zone d'activités de Pariest,
77183 Croissy-Beaubourg, France
Tel: +33-1-6461-4000

ITALY
Yamaha Music Europe GmbH, Branch Italy
Via Tinelli N.67/69 20855 Gerno di Lesmo (MB),
Italy
Tel: +39-039-9065-1

SPAIN/PORTUGAL
Yamaha Music Europe GmbH Ibérica, Sucursal en España
Ctra. de la Coruna km. 17,200, 28231
Las Rozas de Madrid, Spain
Tel: +34-91-639-88-88

GREECE
Philippos Nakas S.A. The Music House
19th klm. Leof. Lavriou 190 02 Peania – Attiki,
Greece
Tel: +30-210-6686168

SWEDEN/FINLAND/ICELAND
Yamaha Music Europe GmbH Germany filial Scandinavia
JA Wettergrensgata 1, 400 43 Göteborg, Sweden
Tel: +46-31-89-34-00

DENMARK
Yamaha Music Denmark,
Fillial of Yamaha Music Europe GmbH, Tyskland
Generatorvej 8C, ST. TH. , 2860 Søborg, Denmark
Tel: +45-44-92-49-00

NORWAY
Yamaha Music Europe GmbH Germany - Norwegian Branch
Grini Næringspark 1, 1332 Østerås, Norway
Tel: +47-6716-7800

RUSSIA
Yamaha Music (Russia) LLC.
Room 37, entrance 7, bld. 7, Kievskaya street,
Moscow, 121059, Russia
Tel: +7-495-626-5005

OTHER EUROPEAN COUNTRIES
Yamaha Music Europe GmbH
Siemensstrasse 22-34, 25462 Rellingen, Germany
Tel: +49-4101-3030

AFRICA

Yamaha Music Gulf FZE
JAFZA-16, Office 512, P.O.Box 17328,
Jebel Ali FZE, Dubai, UAE
Tel: +971-4-801-1500

MIDDLE EAST

TURKEY
Yamaha Music Europe GmbH
Merkezi Almanya Türkiye İstanbul Şubesi
Maslak Meydan Sodak, Spring Giz Plaza Bagimsiz
Böl. No:3, Sariyer Istanbul, Turkey
Tel: +90-212-999-8010

CYPRUS
Yamaha Music Europe GmbH
Siemensstrasse 22-34, 25462 Rellingen, Germany
Tel: +49-4101-303-0

OTHER COUNTRIES
Yamaha Music Gulf FZE
JAFZA-16, Office 512, P.O.Box 17328,
Jebel Ali FZE, Dubai, UAE
Tel: +971-4-801-1500

ASIA

THE PEOPLE'S REPUBLIC OF CHINA
Yamaha Music & Electronics (China) Co.,Ltd.
2F, Yunhedasha, 1818 Xinzha-lu, Jingan-qu,
Shanghai, China
Tel: +86-400-051-7700

INDIA
Yamaha Music India Private Limited
P-401, JMD Megapolis, Sector-48, Sohna Road,
Gurgaon-122018, Haryana, India
Tel: +91-124-485-3300

INDONESIA
PT. Yamaha Musik Indonesia (Distributor)
Yamaha Music Center Bldg. Jalan Jend. Gatot
Subroto Kav. 4, Jakarta 12930, Indonesia
Tel: +62-21-520-2577

KOREA
Yamaha Music Korea Ltd.
8F, Dongsung Bldg. 21, Teheran-ro 87-gil,
Gangnam-gu, Seoul, 06169, Korea
Tel: +82-2-3467-3300

MALAYSIA
Yamaha Music (Malaysia) Sdn. Bhd.
No.8, Jalan Perbandaran, Kelana Jaya, 47301
Petaling Jaya, Selangor, Malaysia
Tel: +60-3-78030900

SINGAPORE
Yamaha Music (Asia) Private Limited
Block 202 Hougang Street 21, #02-00,
Singapore 530202, Singapore
Tel: +65-6740-9200

TAIWAN
Yamaha Music & Electronics Taiwan Co.,Ltd.
2F., No.1, Yuandong Rd., Banqiao Dist.,
New Taipei City 22063, Taiwan (R.O.C.)
Tel: +886-2-7741-8888

THAILAND
Siam Music Yamaha Co., Ltd.
3, 4, 15, 16th Fl., Siam Motors Building,
891/1 Rama 1 Road, Wangmai,
Pathumwan, Bangkok 10330, Thailand
Tel: +66-2215-2622

VIETNAM
Yamaha Music Vietnam Company Limited
15th Floor, Nam A Bank Tower, 201-203 Cach
Mang Thang Tam St., Ward 4, Dist.3,
Ho Chi Minh City, Vietnam
Tel: +84-8-3818-1122

OTHER ASIAN COUNTRIES
Yamaha Corporation
Sales & Marketing Division
10-1, Nakazawa-cho, Naka-ku, Hamamatsu,
Japan 430-8650
Tel: +81-53-460-2312

OCEANIA

AUSTRALIA
Yamaha Music Australia Pty. Ltd.
Level 1, 99 Queensbridge Street, Southbank,
VIC 3006, Australia
Tel: +61-3-9693-5111

COUNTRIES AND TRUST TERRITORIES IN PACIFIC OCEAN
Yamaha Corporation
Sales & Marketing Division
10-1, Nakazawa-cho, Naka-ku, Hamamatsu,
Japan 430-8650
Tel: +81-53-460-2312

HEAD OFFICE **Yamaha Corporation, Commercial Audio Business Division**
10-1, Nakazawa-cho, Naka-ku, Hamamatsu, Japan 430-8650

Yamaha Pro Audio global website
http://www.yamahaproaudio.com/

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