Overview

This Dante-compatible unit features 16 analog inputs and 8 analog outputs, enabling flexible system configuration with Yamaha digital mixers and processors. The Rio1608-D3 is housed in a sleek, sturdy chassis and features a redundant power supply that ensures serious reliability, while the newly added headphone socket and output delay provide additional versatility.

Features

- Analog I/O: 16 inputs / 8 outputs
- Dante: 10 receive / 16 transmit channels
- Comprehensive display and local control of gain, delay and other parameters.
- Dual power supply units are built in for high reliability.
- Onboard headphone socket
- Power consumption: 60 W
- Dimensions (W x H x D): 480 x 132 x 370 mm (18.9” x 5.2” x 14.6”)
- Net Weight: 9.4 kg (20.7 lb)

Specifications

General Specifications

Number of Analog Inputs		16
Number of Analog Outputs		8
AES/EBU		0
PHONES		1
Sampling Frequency	External	44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, +4.1667%, +0.1%, –0.1%, –4.0% (±200 ppm)
Signal Delay		Less than 1.7 ms Rio INPUT to Rio OUTPUT connect with DM7 using Dante, Fs = 96 kHz. Dante Receive Latency set to 0.25 msec
Power Requirements		100-240 V, 50/60 Hz
Power Consumption		60 W
Heat Dissipation		52 kcal/h
Dimensions	W x H x D	480 x 132 x 370 mm
Weight		9.4 kg
NC Value *1	Fan Speed LOW	15
	Fan Speed HIGH	25
Operating Temperature Range		Min: 0°C, Max: 40°C
Storage Temperature Range		Min: –20°C, Max: 60°C
Included Accessories		Owner's Manual, AC power cord x2, Open source Software License

*1. Measurement position: 1 m from the front of the unit

Audio Specifications 1/2

During the measurement, the output impedance of the signal generator is 150 Ω. The output load impedance is 600 Ω.

Frequency Response

Fs = 96 kHz or Fs = 48 kHz @ 20 Hz-20 kHz, reference to the nominal output level @ 1 kHz

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600 Ω	GAIN: +66 dB	–1.5	0.0	0.5	dB
INPUT 1-16	PHONES	40 Ω	GAIN: –6 dB	–1.5	0.0	0.5	dB

Total Harmonic Distortion

Fs = 96 kHz or Fs = 48 kHz

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600 Ω	+4 dBu @ 20 Hz-20 kHz, GAIN: +66 dB			0.15	%
INPUT 1-16	OUTPUT 1-8	600 Ω	+4 dBu @ 20 Hz-20 kHz, GAIN : –6 dB			0.05	%
INPUT 1-16	PHONES	40 Ω	50 mW @ 1 kHz, phones level control :max			0.15	%

* Total Harmonic Distortion is measured with a 48 dB/octave low pass filter @ 80kHz.

Hum&Noise

Fs = 96 kHz or 48 kHz, EIN = Equivalent Input Noise

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600 Ω	Rs = 150 Ω, GAIN: +66 dB		–128 EIN		dBu
					–62		dBu
INPUT 1-16	OUTPUT 1-8	600 Ω	Rs = 150 Ω, GAIN: –6 dB		–91	–88	dBu
All Inputs	OUTPUT 1-8	600 Ω	Rs = 150 Ω, GAIN: –6 dB Main fader at nominal level and all INPUT 1-16 in faders at nominal level. Measured with DM7 (or DM7 Compact) through Dante.			–73	dBu
–	OUTPUT 1-8	600 Ω	Residual output noise, Main stereo channel off. Measured with DM7 (or DM7 Compact) through Dante.			–93	dBu
–	PHONES	40 Ω	Residual output noise, Phones level control min.			–94	dBu

* Hum & Noise are measured with A-weight filter.

Dynamic Range

Fs = 96 kHz or 48 kHz

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1–16	OUTPUT 1–8	600 Ω	GAIN: –6 dB		115		dB
–	OUTPUT 1–8	600 Ω	DA Converter		120		dB

* Dynamic Range are measured with A-weight filter.

Crosstalk (@ 1kHz)

From/To	To/From	Conditions	Min.	Typ.	Max.	Unit
INPUT N	INPUT (N-1) or (N+1)	INPUT 1-16, adjacent inputs, GAIN: –6 dB			–100	dB
OUTPUT N	OUTPUT (N-1) or (N+1)	OUTPUT 1-8, input to output			–100	dB

Crosstalk is measured with a 30 dB/octave filter @ 22 kHz.

Audio Specifications 2/2

Analog Input Standards

Input Terminal	GAIN	Actual Load Impedance	For Use With Nominal	Input Level			Connector
				Sensitivity*1	Nominal	Max. before clip	
INPUT 1-16	+66 dB	7.5 kΩ	50-600 Ω Mics & 600 Ω Lines	–82 dBu (0.062 mV)	–62 dBu (0.616 mV)	–42 dBu (6.16 mV)	XLR-3-31 type (Balanced)*2
	–6 dB			–10 dBu (245 mV)	+10 dBu (2.45 V)	+30 dBu (24. 5 V)	

0 dBu = 0.775 Vrms.
+48 V DC (phantom power) is supplied to the [INPUT] 1-16 connectors via each individual software-controlled switch.
*1. Sensitivity is the minimum level needed to output +4 dBu (1.23 V) or the specified level when the gain is set to maximum. (All faders and level controls are set to maximum.)
*2. 1 = GND, 2 = HOT, 3 = COLD

Analog Output Standards

Output Terminal	Actual Source Impedance	For Use With Nominal	Output Level*1		Connector
			Nominal	Max. before clip	
OUTPUT 1-8	75 Ω	600 Ω Lines	+4 dBu (1.23 V)	+24 dBu (12.3 V)	XLR-3-32 type (Balanced)*2
PHONES	10 Ω	8 Ω Lines	60 mW*3	60 mW	TRS PHONE (6.3 mm) (STEREO PHONE) (Unbalanced)
		40 Ω Lines	60 mW*4	100 mW	

0 dBu = 0.775 Vrms.
*1. You can change the output level for the [OUTPUT +4 dBu] 1-8 connectors. Contact your Yamaha dealer.
*2. 1 = GND, 2 = HOT, 3 = COLD
*3. The [PHONES] level knob is set to 12 dB below maximum.
*4. The [PHONES] level knob is set to 10 dB below maximum.

Digital Input & Output Standards

Terminal	Format	Data Length	Level	Audio	Connector
Dante Primary, Secondary	Dante	24 bit/32 bit	1000Base-T	32ch (Rio3224-D3 to other devices) 26ch (Other devices to Rio3224-D3)	etherCON CAT5e

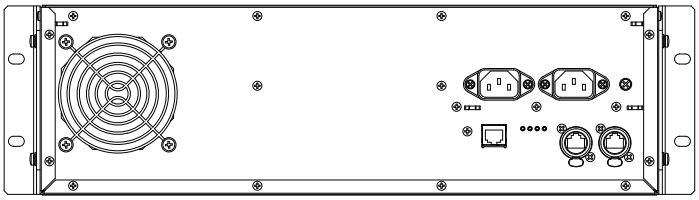
Control I/O Standards

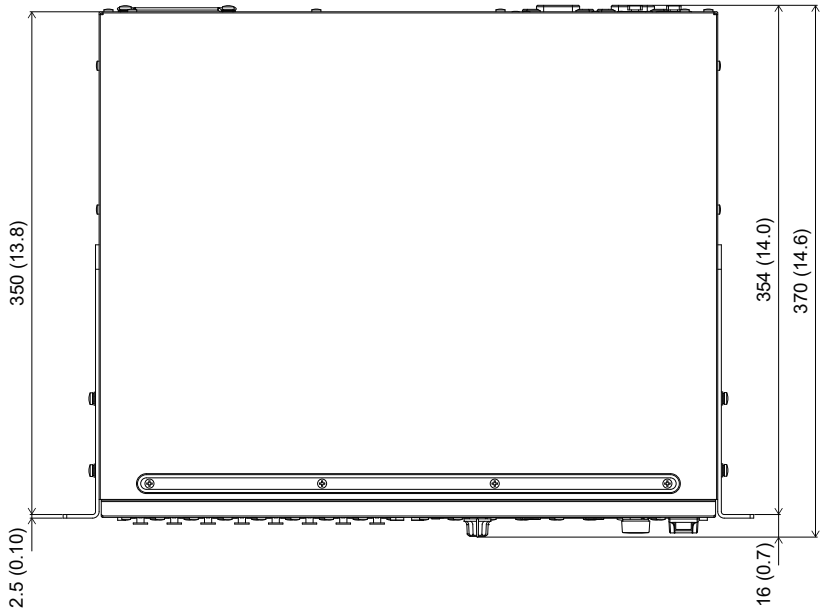
Terminal	Format	Level	Connector
NETWORK	IEEE802.3	1000Base-T/100Base-TX	RJ45

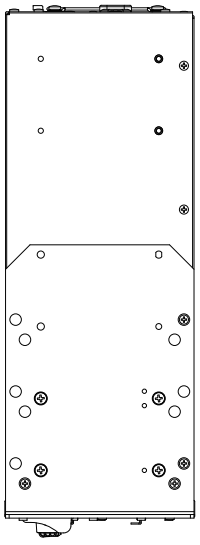
Use STP cables for connections.

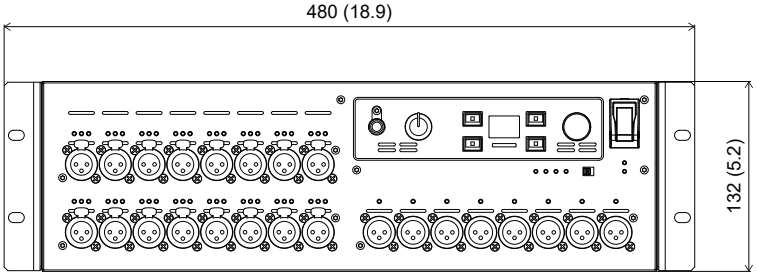
Dimensions

Unit: mm (inch)









Software

- R Remote

Architectural and Engineering Specifications for Rio1608-D3

The Yamaha Rio1608-D3 shall be a 3U-size I/O rack with 16 balanced analog mic/line inputs and 8 balanced analog line outputs. It shall have built-in Dante digital audio networking capability with primary and secondary network connections for reliable, flexible system setup and configuration. A third network port shall be provided for remote control and monitoring. Rio1608-D3 shall include a headphone socket on the front panel with the ability to monitor any input or output channel's audio signal. The head amplifiers in multiple Rio1608-D3 I/O rack units shall be remotely controllable from compatible Yamaha digital mixing consoles. An LCD display and rotary encoder shall be provided for direct editing and confirmation of Dante, gain, high-pass filter, phantom power, and other settings from the I/O rack interface. The display shall also provide metering functionality. The Rio1608-D3 shall include a Gain Compensation function that digitally compensates for analog gain changes so that audio can be sent to the network at a constant level. Phase reverse and adjustable delay parameters shall be provided for all output channels of Rio1608-D3. An "R Remote" software application that allows remote control of R series I/O rack head amplifiers from a computer shall be provided. Dual redundant power supplies shall be built in to maximize reliability and minimize the chance of downtime due to power loss. Power consumption shall be 60 W. Dimensions shall be 480 (W) x 132 (H) x 370 (D) mm. Weight shall be 9.4 kg.

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