CL/QL Series
System Design Guide

CL SERIES
QL SERIES

Version 1.01

Audioversity

by Yamaha Pro Audio

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History

1. Introduction

When Yamaha launched the CL series of digital mixing consoles, they were the first of their kind to include Dante networking built in.   They are still among the most advanced audio networking products available.   Yet Dante can be simple enough for sound engineers to use without any specific network training.

This guide provides advice and tips for designing and starting to setup a networked audio system using Yamaha CL/QL consoles and R series i/o devices.

2. Topics

The main topics to be discussed in this guide include:

Basic advice for connecting CL/QL series and R series

1. Firmware compatibility
2. Console ID settings
3. UNIT ID settings for I/O Rack devices
4. Physical connections and redundancy
5. IP configurations and Dante Controller
6. Dante patching

Additional system design tips

1. Word clock, sample rate and latency settings
2. Limitations on mounting I/O devices
3. Remote controllable I/O devices via Dante

3. Basic Systems – Preparing CL/QL series and R series

3-1. Checking firmware versions and compatibility

Before setting up a system, please check the version compatibility of each Dante device. If any device with an incompatible version of firmware is used in the system, it may not get configured correctly, or may have unexpected behavior.   Remember that most devices have additional firmware files for their Dante modules.

<div style="border: 1px solid red; color: red;">

Make sure:

·   version compatibility of all the devices in the system
·   version compatibility of each device and its built-in Dante module

</div>

For the latest information and compatibility chart, visit the following page:

https://download.yamaha.com/files/tcm:39-1161321?_ga=2.7041458.1091912117.1544573794-440072770.1543301352

3-2. Unit ID settings

Each CL/QL console and R series I/O rack relies upon a unit ID number for device recognition, remote control functions and system management.   It is important to set the ID numbers before constructing a system.   Understanding the scope of the ID numbers helps with system design.

Console ID
There can be up to four CL/QL consoles with a unique "Console ID" in a system.   This ID number determines what each console can do, and which settings will be shared with the R series devices in the system.   Find the Console ID in the DANTE SETUP menu.
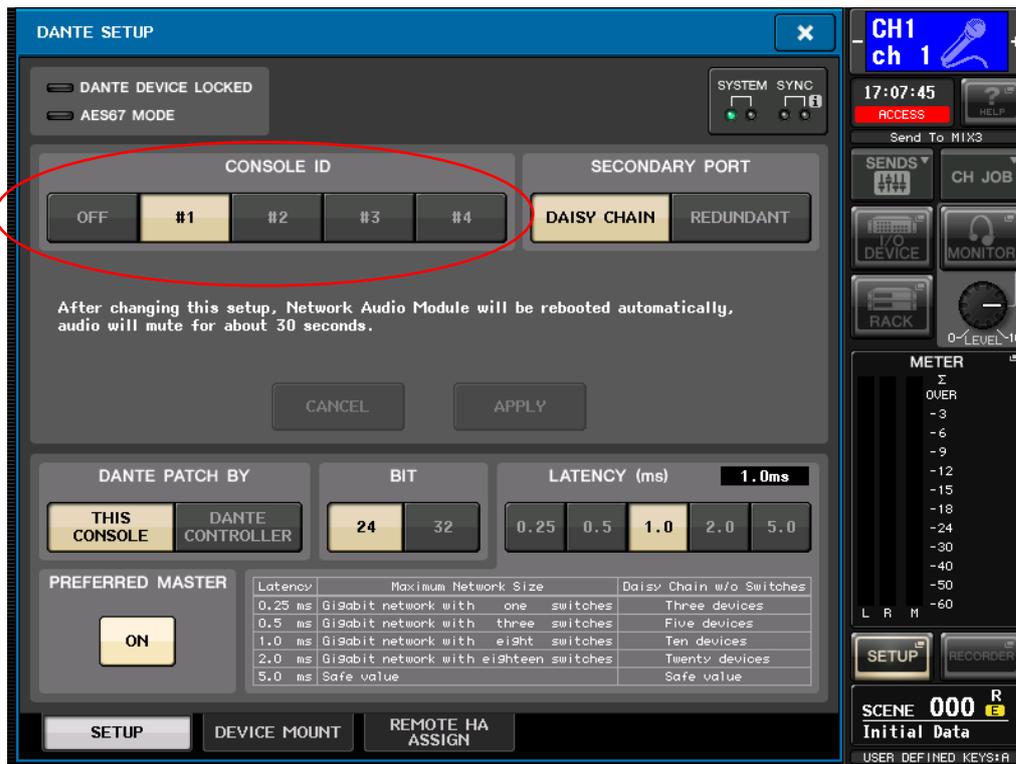
Here is how the Console ID affects operation. Because Console ID #1 controls some settings of the R series units, there should always be a console with ID #1 in the system (unless R Remote software is used instead of a mixing console):
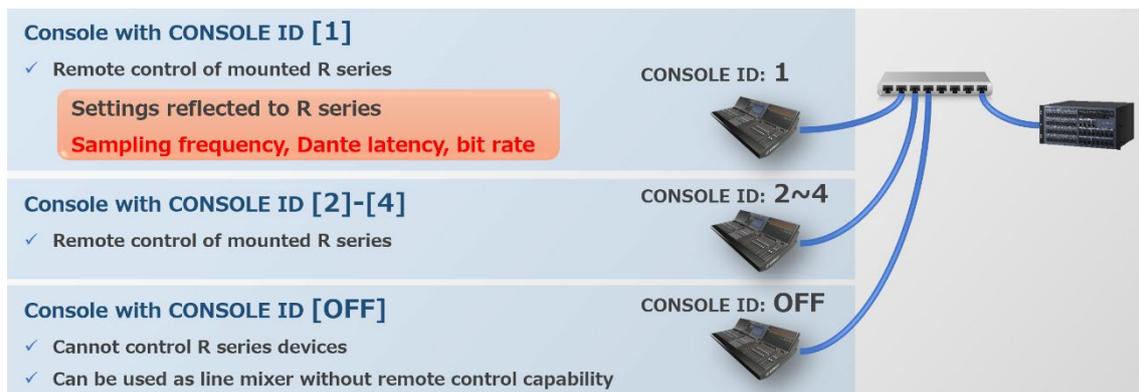
R series Unit ID

When using multiple R series I/O rack devices in the system, make sure a unique ID number is set for each device. There are many more Unit ID numbers available for R series devices: up to 32 for the original Rio, and 128 for the newer Rio-D2 range. You will notice that the ID numbers are in hexadecimal format.

For the original R series units, set the Unit ID while the device is powered off (any change will not be detected while the unit is on).   Push dip switch 1 down to access additional ID numbers.
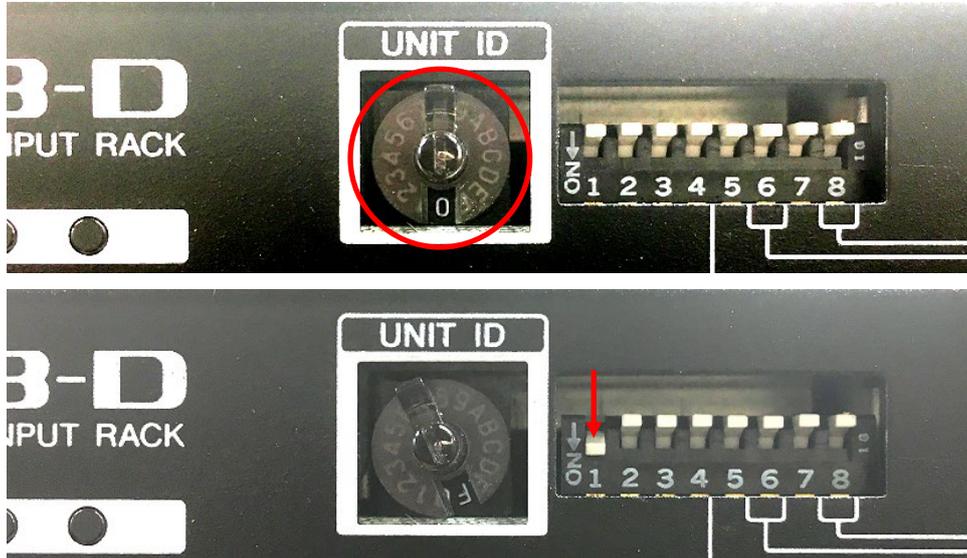
Rio-D2 Unit ID

For these devices, the Unit ID must be set while it is powered on, using the front panel display.

1. Enter the SETUP menu and press the left MENU button until the UNIT ID section is highlighted

2. Rotate the encoder until the desired ID number is shown.   It can be in the range "Y000" to "Y07F".

3. Push the encoder to set the UNIT ID number.

3-3. Unit ID Rules

- There should never be two consoles with the same CONSOLE ID in a single system.
- If there are more than four consoles in a single system, use the "ID OFF" option for the additional consoles.
- Console ID#1 and R series Unit ID#1 can exist in the same system: "Console ID" and "Unit ID" are handled independently.
- Each R series device (original Rio and newer Rio-D2) should have a unique "Unit ID" within a system.

How UNIT ID is applied to Dante device name

The UNIT ID as configured above is used as a part of its Dante device name. Each device name automatically includes "Y" followed by its UNIT ID at the beginning of its device name.   This part of the device name should never be edited, to avoid losing control of the device.   The part of the name following "Y0**-" can be freely edited.
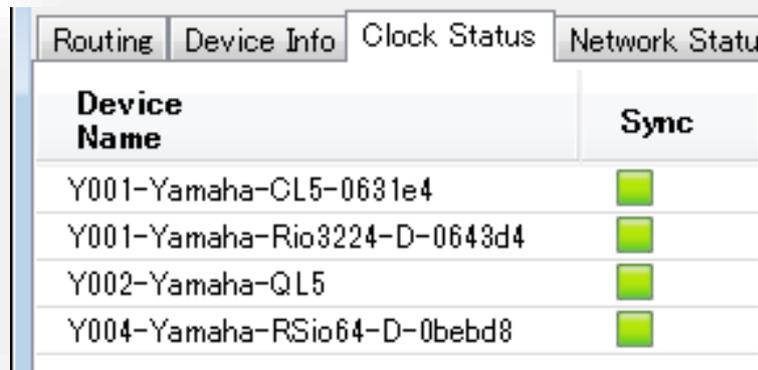
Device Name	Sync
Y001-Yamaha-CL5-0631e4	🟩
Y001-Yamaha-Rio3224-D-0643d4	🟩
Y002-Yamaha-QL5	🟩
Y004-Yamaha-RSio64-D-0bebd8	🟩

Routing | Device Info | Clock Status | Network Statu

4. Physical Connection and Redundancy

CL/QL consoles and R series devices all support two methods of connection: "Redundant" and "Daisy Chain" (or "Switched").   For the safest connection of Dante devices, utilize their two Dante ports and dual network switches to establish a redundant network in a star topology.
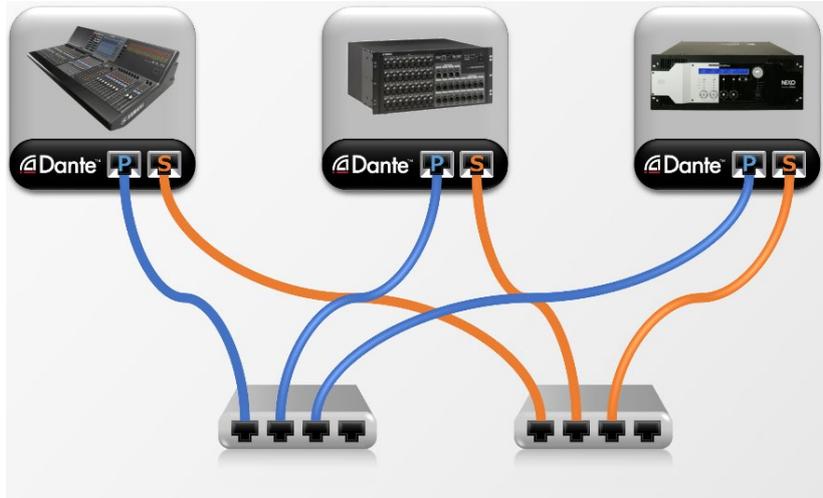
In addition, Dante networks allow a mixed combination of star topology and daisy-chain connections. In this way, lower budget daisy-chain connections can be added without using network switches, where the network redundancy is not required.

Both star topology and daisy-chain connections can co-exist

Daisy-chain uses each Secondary port for connecting to the adjacent device

Network redundancy is not provided in daisy-chain connections
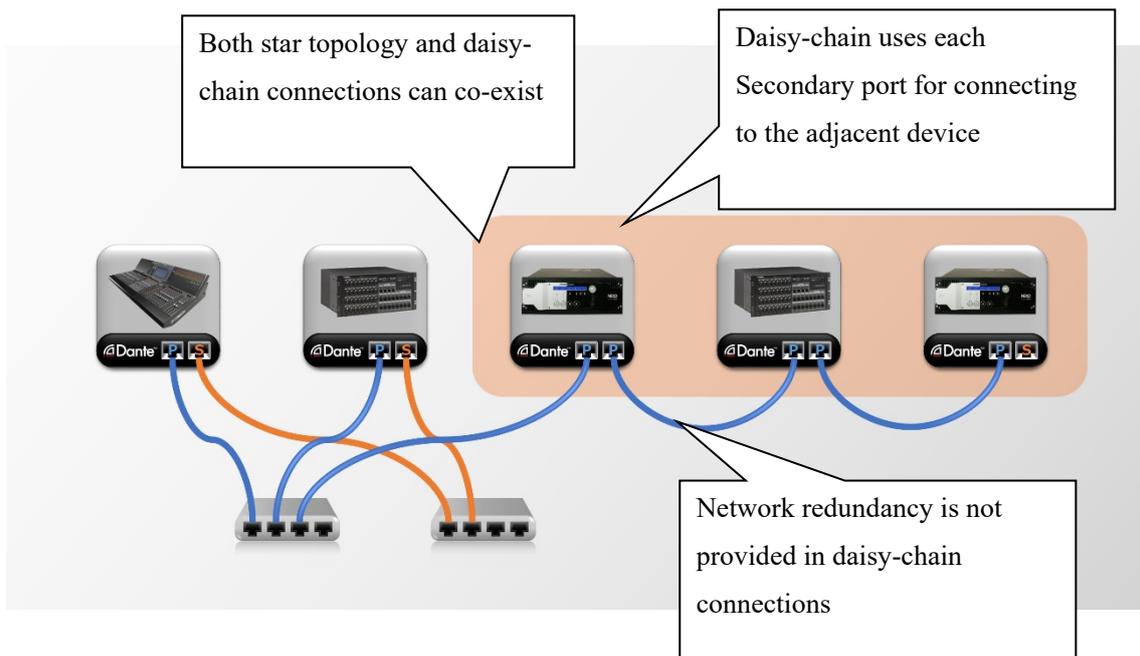
Note that daisy-chain connections can only be used in the Primary network, not the Secondary.

A common mistake: Wrong Primary/Secondary connections

It is a good idea to check the settings before joining the device to the network: use the Dante Setup menu of CL/QL, the front panel SETUP of Rio-D2 and the front panel dip switches of the original R series devices.

A device in Daisy Chain mode (both ports work as Primary port) is mistakenly connected to the Secondary network.

- This problem often occurs after the firmware update or initialization
- When devices are moved between different systems, there is a higher chance of this happening
- If this situation occurs, you may need to power cycle everything on the network, INCLUDING ALL switches. Please make sure to correct the cabling error (or change the device setup) before turning all devices back on.

5. Managing IP addresses and connecting Dante Controller

5-1. Types of IP address for CL/QL and R series

CL/QL series has three different ports and IP addresses for communicating with different external devices.

Dante port IP address 169.254.xx.yy	✔ Dante audio, PTP sync ✔ HA remote for R series
Device Control port IP address: 169.254.xx.yy	✔ HA remote for Tio1608-D ✔ Nuendo Live control
Mixer Control port IP address: 192.168.0.xxx	✔ CL/QL Editor software ✔ StageMix / MonitorMix

CL/QL series
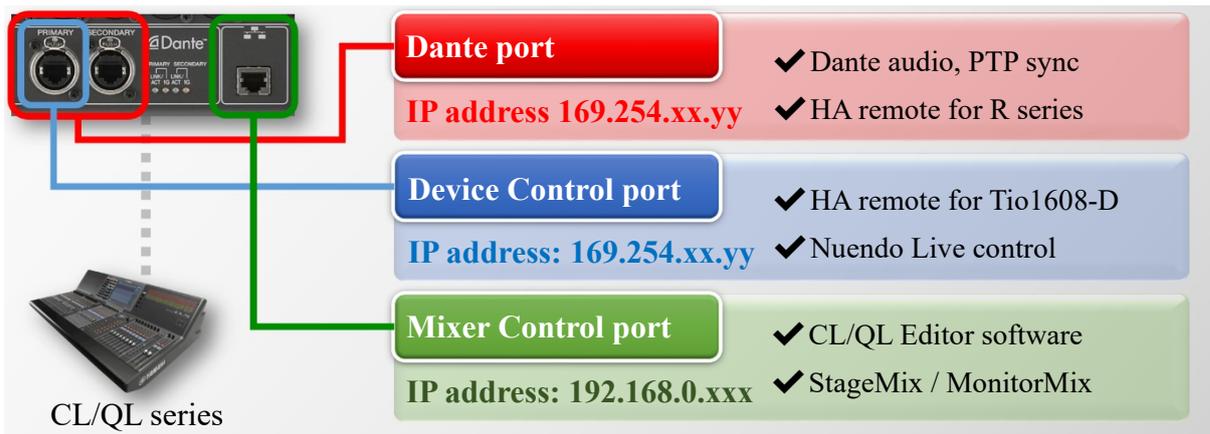
R series has two different IP addresses, and they are used for different purposes.

Dante port IP address 169.254.xx.yy	✔ Dante audio ✔ HA remote from CL/QL/RIVAGE
Device Control port IP address: 169.254.xx.yy	✔ HA remote from TF series ✔ HA remote from R Remote

R series
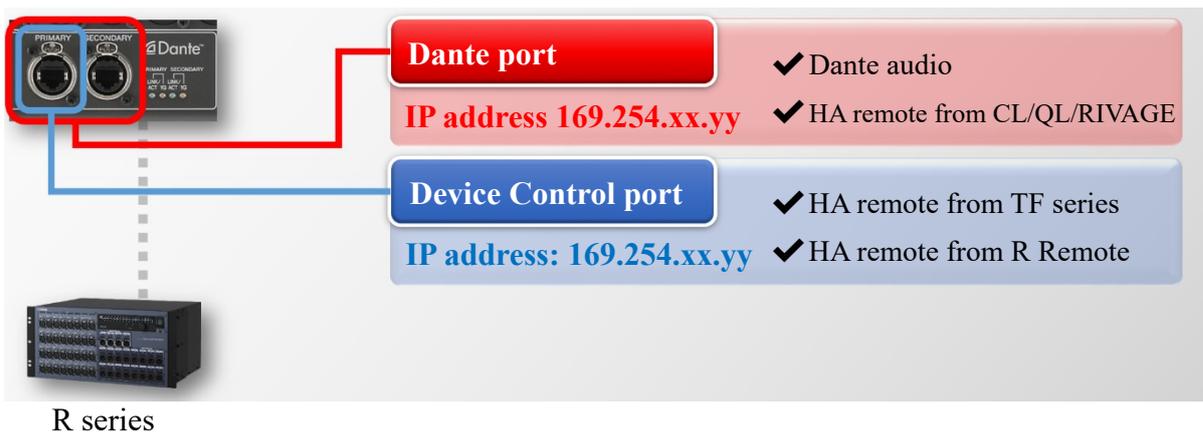
5-2. How to set an IP address for each port

Each type of port has different way of setting its IP address, and certain ports allow automatic assignment of IP addresses, while others require manual settings.   Manual assignment of IP addresses to the Dante port will require the use of Dante Controller software.   Manual assignment of IP addresses to the Device Control port of R series devices will require the use of R Remote software.

Below is a chart for illustrating different scopes of IP address, how they are configured and how easy they are to manage.   (Here, we recommend the default link-local addresses unless there is a specific reason for choosing the others).

Link-local addressing – the IP address is automatically assigned without any manual settings, as in the example below.

169.254.230.181

LINK LOCAL ADDRESS

169.254.xx.yy

169.254.212.197

Keep the IP configuration of your PC Auto or DHCP, and a link-local address will be automatically assigned.

169.254. 12.34

Primary Address

169.254.212.197
169.254.230.181
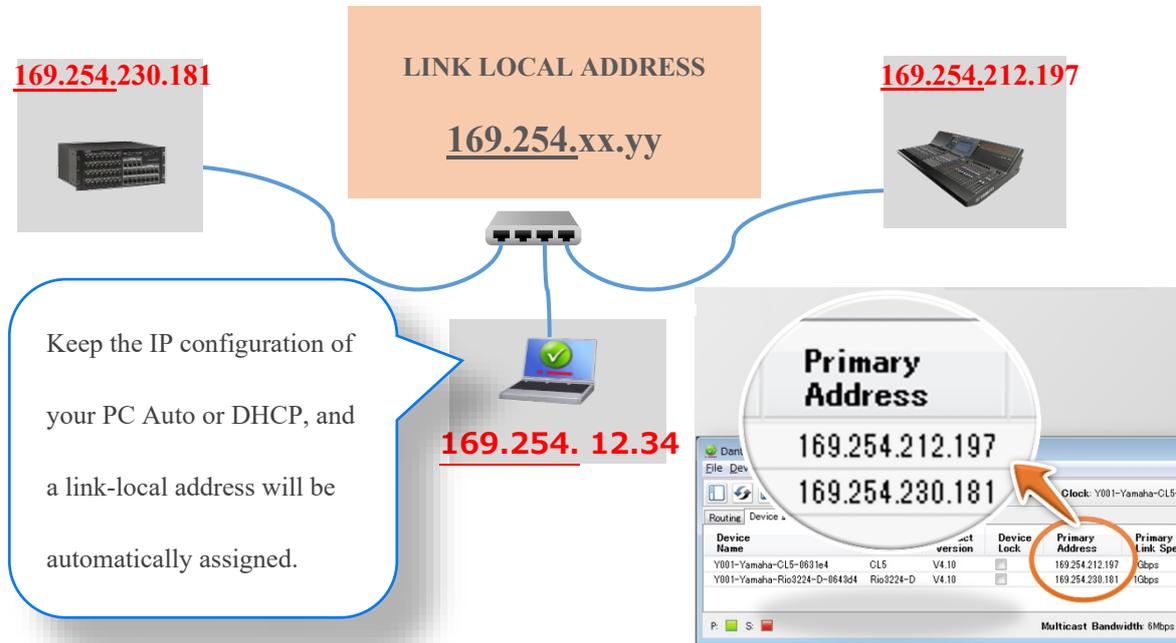
5-3. Direct Dante patching by mounting R series units

By "mounting" R series to a CL/QL console, it allows the console to control the R series or make Dante patching without needing a PC (Dante Controller software).

Mounted R series units

✔ HA remote (HA Gain, +48V, HPF)

✔ Dante patching and remote control

✔ WITH RECALL option available

✔ Settings of CONSOLE ID 1 reflected

Remote Control

Configurable from console (PC not required)

Unmounted R series units

✔ Dante synchronization and audio only

PC required (Dante Controller, R Remote)
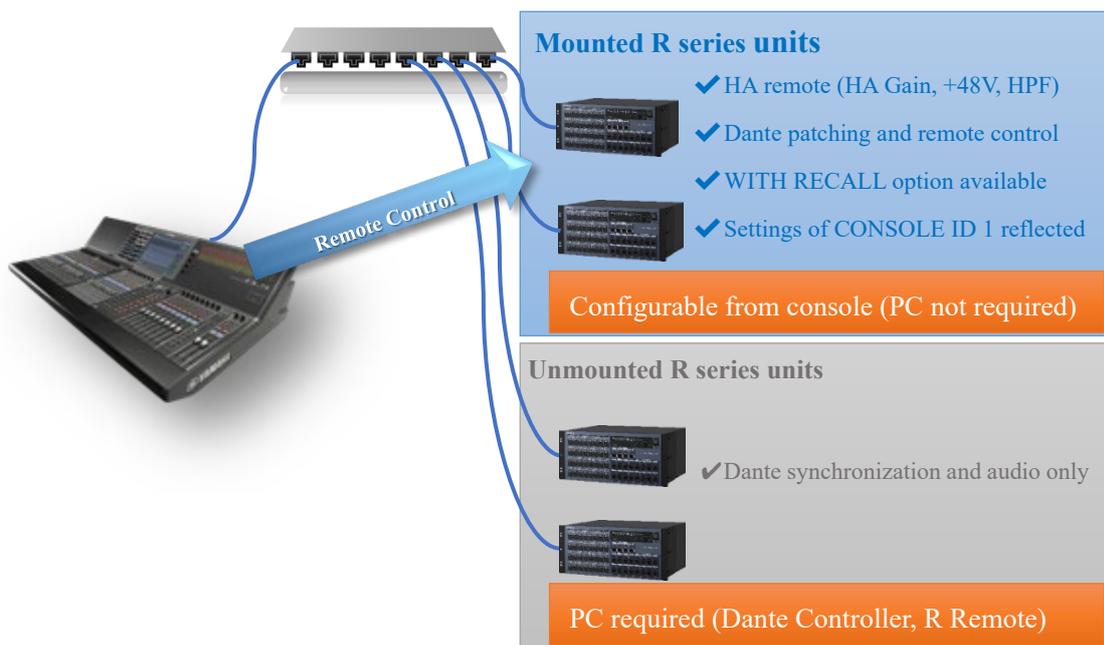
Once each R series device is mounted in the console, the AUTO SETUP function in the DANTE INPUT PATCH screen makes Dante patching very easy, following the order of units and input ports. However, manual patching is possible for more advanced setups, and allows a large variation of connections between the console and the mounted R series devices.
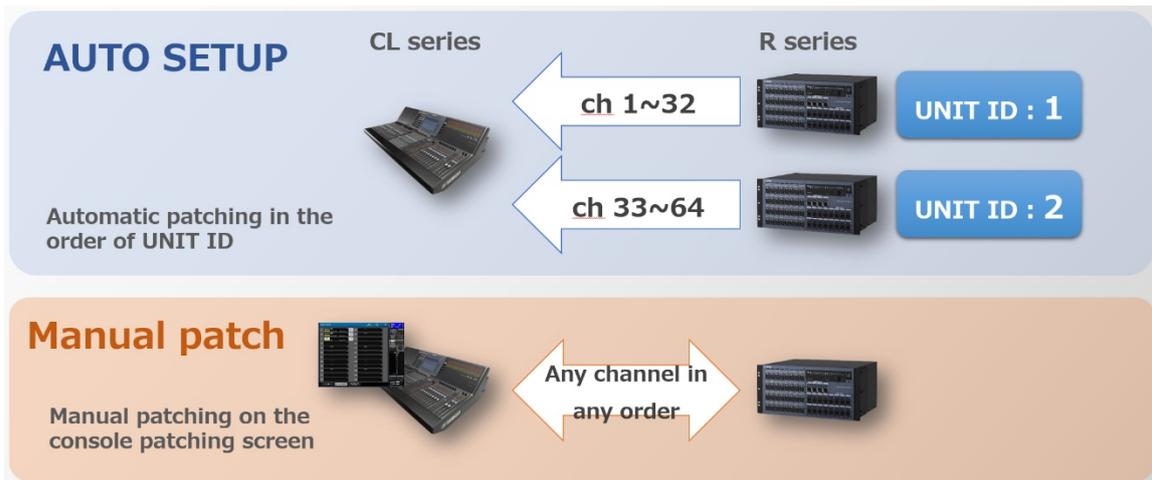
5-4. Dante patching by using Dante Controller

Devices which do not support the console Device Mount function require Dante Controller for patching, as do systems which don't include a CL/QL console.   An advantage of using Dante Controller is that it includes a full system overview, and it includes several intuitive patching short-cuts.
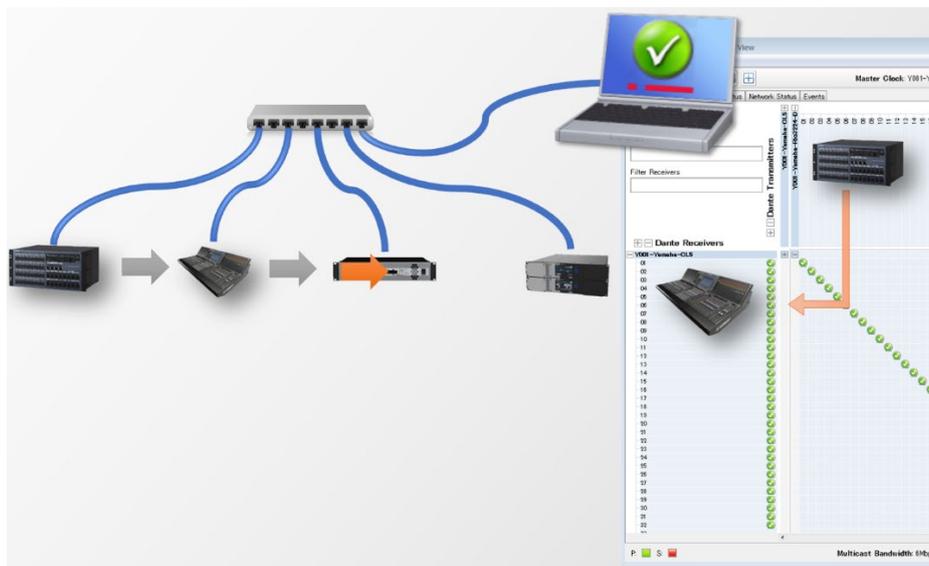
6. Additional Design Tips

6-1. Managing the Dante Network

To design and operate a stable Dante system, it is necessary to understand a few key concepts about Dante networking.

In this additional chapter, we will go through various suggested settings and tips for successfully operating Yamaha digital mixing systems with Dante audio networking.


6-2. Word clock and latency settings

Many Dante devices have two separate clocks: one is for the internal audio processing and digital conversion, and the other is inside the built-in Dante module.   Care must be taken to keep all clocks synchronized.
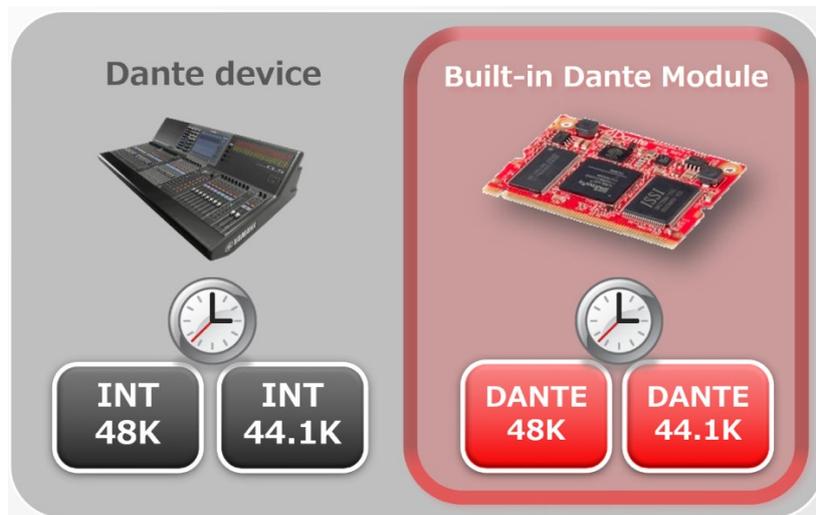
For CL/QL consoles, the default setting is to use DANTE 48k as the clock Master.   This is the best setting for most systems.

Latency settings can be adjusted, depending on the number of network switches positioned between the devices, and the initial value is 1.0msec.   The latency value can be changed by either Dante Controller or the Dante Setup screen of CL/QL consoles.   Lower latencies will be useful in smaller live performance systems.   It would be very unusual to require a latency higher than 1.0msec.
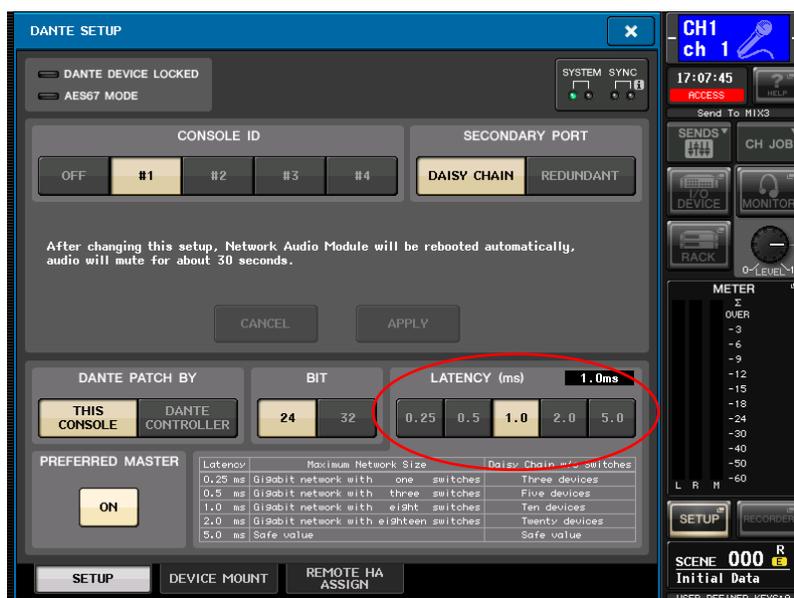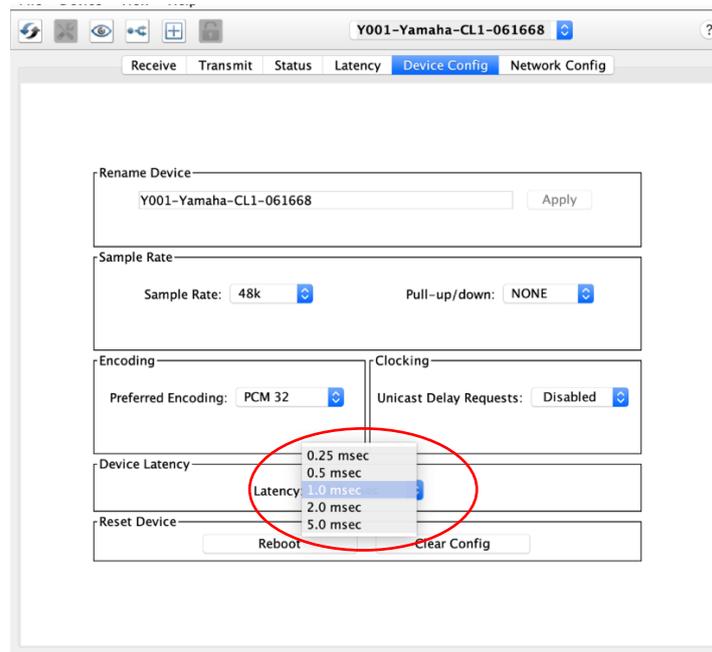
6-3. Mixed Sampling Frequencies

As described above, the sampling frequency of Console ID #1 is reflected to all R series devices. Note that R series devices can work at 96kHz in case Console ID #1 is a RIVAGE PM series. However, a CL/QL console will not operate at 96kHz, so it would remain silent in this situation.   To construct a system where RIVAGE PM consoles work at 96kHz and CL/QL consoles work at 48kHz, a "sample-rate converter" device is needed.   There are two options: use a HY144-D-SRC card in the RIVAGE system to output 144 Dante channels at 48kHz; or use a Yamaha RSio64-D containing Dante-MY16-AUD2 cards, which can convert 32 Dante channels from 96kHz to 48kHz.
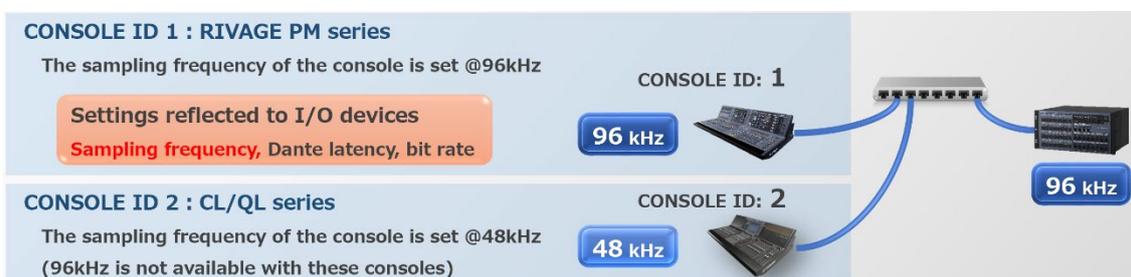
6-4. Limits on the number of connectable Dante devices

There are certain limits on the number of I/O devices that can be discovered from the console, the number of I/O devices that can be mounted per console, and the number of I/O devices with HA remote control.

The maximum number of	RIVAGE PM Series	CL Series	QL Series
I/O devices that can be discovered from the console	127	63	127
I/O devices that can be mounted (per console)	48 *	24	
I/O devices with HA remote control (per console)	48 *	8	

* To mount 25 or more I/O devices on RIVAGE PM, two or more HY144-D/-SRCs must be inserted into the DSP engine. However, up to 24 I/O devices can be mounted on RIVAGE PM V3 or older.

Please note, while up to 24 I/O devices can be mounted on CL/QL series consoles, each console can remotely control HA of up to 8 I/O devices.   To use the HA remote control feature, assign the I/O devices on the REMOTE HA ASSIGN window.

If more than the maximum number of I/O devices that can be discovered from the console are connected to a single network, some of the mounted I/O devices cannot be discovered, and may not be controlled.   To mount and control I/O devices such as Rios, make sure that the total number of I/O devices connected to the Dante network does not exceed the number of I/O devices that can be discovered from the console.

* This includes non-Dante compatible devices that can be controlled from the console.

6-5. Determine if a device can be remotely controlled

CL/QL series consoles can remotely control various setting such as head-amp gain and so on, from compatible Yamaha and 3rd party I/O devices. When selecting a device in the DANTE SETUP -> DEVICE MOUNT menu, if you see a "REMOTE" sign below the product image, it indicates that the device is enabled for remote control.
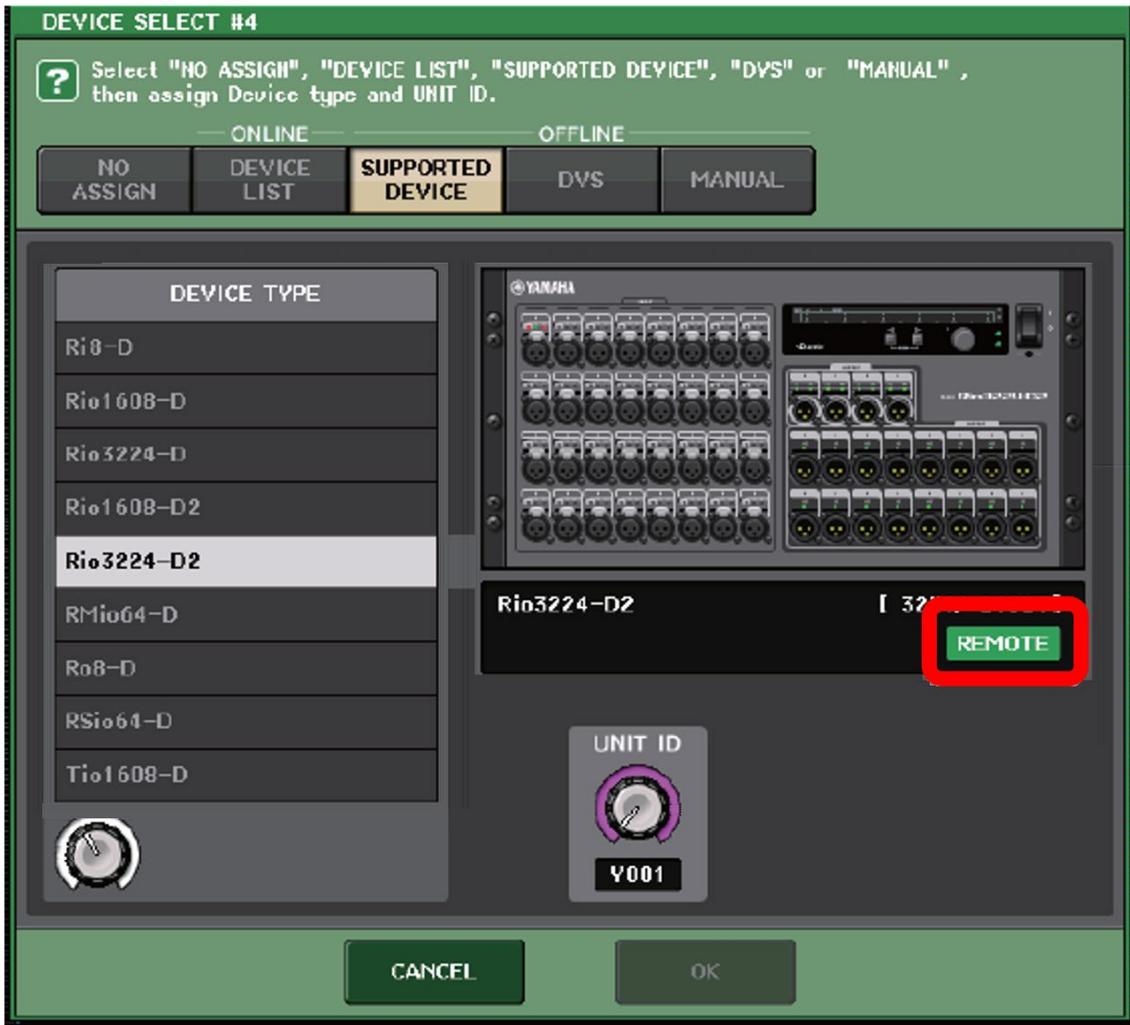
## 6-6. Possible device combinations for remote control

Below is a diagram showing which consoles and the R remote application can remotely control each I/O device listed.
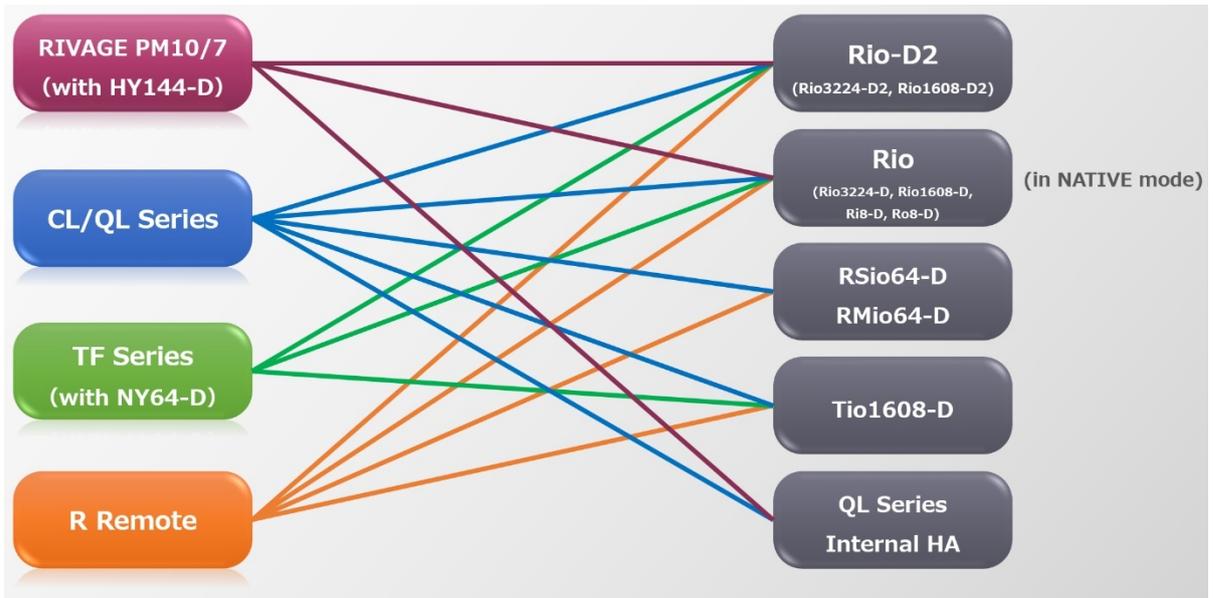
As this indicates, CL/QL series can control all R series devices as well as Tio1608-D, and even the internal HA of QL series.　However, the others have some limitations, so please be careful to use the right console for remotely controlling the selected I/O devices.

6-7. Controlling 3rd party I/O devices

One advantage of using CL/QL consoles is that they allow the control of various I/O devices such as wireless receivers and mic preamps from 3rd party manufacturers, including Shure, Sennheiser, Sony, Focusrite, Stagetec and Rupert Neve Designs.   This provides more options for choosing suitable I/O devices to work with a Yamaha audio system.
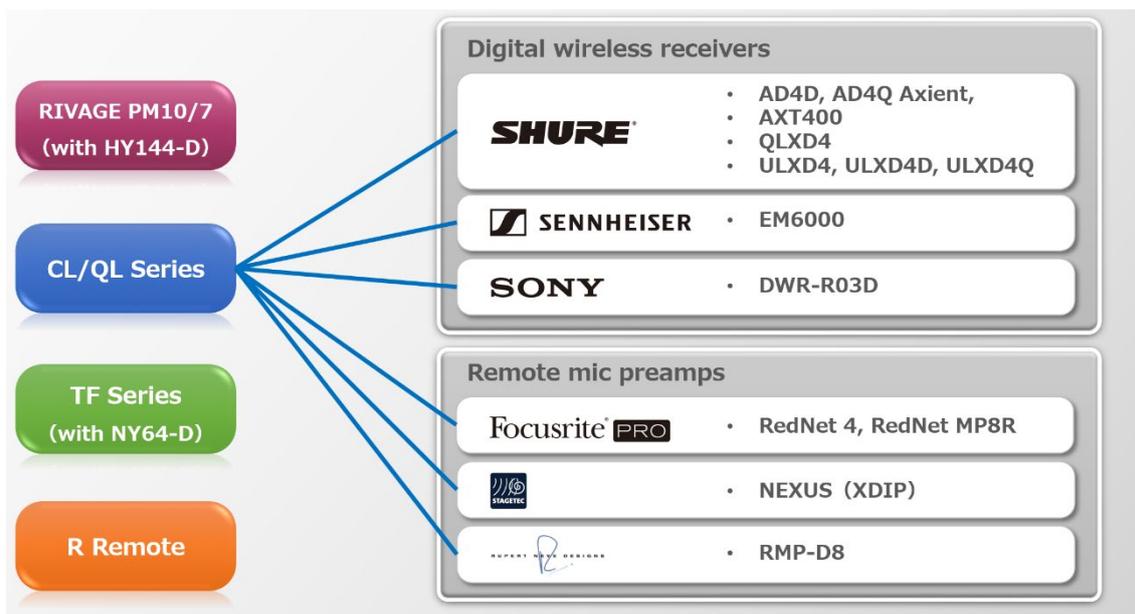
Enjoy the versatility and convenience that Yamaha's CL and QL consoles provide: not just high quality audio mixing consoles, but the centre of an advanced, networked audio control system.

Find more details at the Professional Audio product pages of www.yamaha.com

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