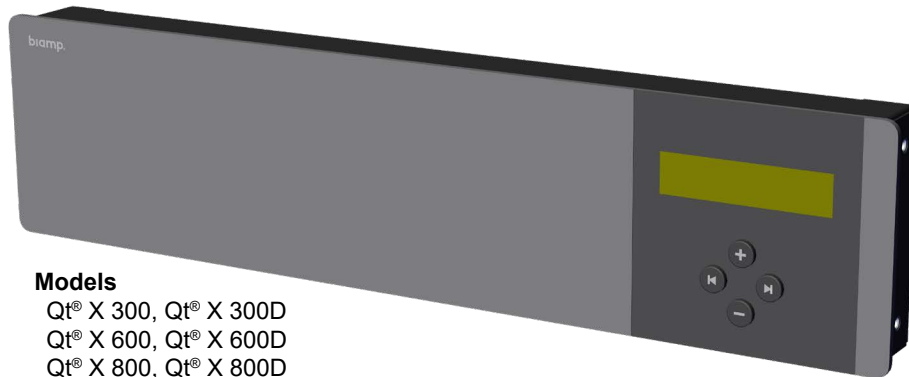# Cambridge
Qt® X Sound Masking System
Installation & Operation Guide

biamp.

Models
Qt® X 300, Qt® X 300D
Qt® X 600, Qt® X 600D
Qt® X 800, Qt® X 800D
Qt® X 805, Qt® X 805D

FEATURES

- 3, 6 or 8 outputs of sound masking coverage depending upon the model
- Wall, rack mount and plenum options
- Web-based control interface
- Desktop system design and configuration software
- Compatible with active and passive Qt® Pro emitters and 4Ω & 8Ω DS1300 level emitter/speakers (type dependent upon model)
- Qt X is easily interfaced with a building's life-safety system out of the box
- "D" models (Qt X 300D/600D/800D/805D) support distribution of Dante® as well as AVB
- NPX paging stations may be integrated into a Qt X sound masking system as discoverable devices and are configurable with Qt X software

PRODUCT DESCRIPTION

Biamp's Cambridge Qt® X Series is a complete, all-in-one sound masking solution that delivers the flexibility, reliability, and ease of installation that integrators desire. It is engineered to incorporate direct-field and indirect technologies, making the Qt X ideally suited for office environments that require both system types in a single facility. Qt X is easily interfaced with a building's life-safety system out of the box, ensuring proper coordination during emergencies.

All models of the Qt X control modules include a sound masking generator, controller, third octave band equalizer and amplifier with two analog audio inputs. This allows for distribution of audio from paging controllers and/or (background) music players, one digital media input (RJ45 Ethernet port), and 3, 6, or 8 analog output channels (depending on the Qt X model) to connect to sound masking emitters or speakers.

Qt X 300/300D and **Qt X 600/600D:** Use direct field devices (Qt Standard or Active Emitters). The emitters point downward above the listener's head for direct, unimpeded audio signal. The Qt X 300/300D control module is a compact three-output networkable controller suitable for installations of up to 36,000 square feet (3,345 m²). The Qt X 600/600D control module is identical in features and functions yet supports six outputs of sound masking and audio installations of up to 72,000 square feet (6,689 m²). Outputs can be assigned to a zone

and then the zones are adjusted for masking and audio levels and spectra. Qt X 300/600 models have "preset" optimized sound masking spectra for use with Qt Emitters. Additional configuration is available from a web-based control interface or from a remote desktop leveraging the unit's network connectivity with the Qt X software.

Qt X 800/800D and **Qt X 805/85D:** Utilize indirect 4Ω and 8Ω speakers (ex. DS1357 & DS1398) and/or direct active emitters (DS1320) as the sound masking devices. The Qt X 800/800D series is designed for the plenum space and requires a PoE+ power supply. The Qt X 805/805D controllers can be rack mounted in a centralized location. Each of the Qt X 800/805 controllers have eight outputs for individual control of each of the sound masking devices.

The "D" models of each controller (Qt X 300D/600D/800D/805D) support Dante® audio stream inputs.

Both Qt X web-based management software and Qt X control software provide an intuitive interface for designing, setup and programming of a Qt X sound masking system. For information related to these software interfaces and restful API documentation, see Qt X Web help, Qt X Software help and Qt X API help.

Unless otherwise noted, all installation, set up and use instructions apply to the Qt X family of control modules (Qt X 300/300D, Qt X 600/600D, Qt X 800/800D and Qt X 805/805D).

CONTENTS

This manual is divided into sections with installation instructions for each control module and basics regarding the sound masking devices connected to each.

IMPORTANT SAFETY INFORMATION

Install the controller away from heat sources, such as vents, radiators, and heat registers. Avoid installing near water. Do not exceed the maximum ambient operating temperature of 40-90° F (4-32° C).

If the Qt X controller is installed in a rack, the following must be observed:

- Care must be taken to ensure temperature and air flow is sufficient to allow the unit to operate safely and not exceed the maximum operating temperature stated above. The controllers must be mounted to the rack in a safe and stable manner to prevent any potential for tipping or structural failure.

- Electrical connections to the equipment must be sufficient to prevent any circuit overloading and reliable grounding of the supply circuits shall be maintained.

The controllers are UL 2043 approved for installation into a plenum space.

⚠ DANGER: The AC/DC power supply provided with this product has not been evaluated to UL 2043 and must not be installed in a plenum space. (International [multiple language] versions of this statement are <here>)

BEFORE YOU START

It is very important to understand the basics of sound masking before installing a system. Sound masking is the addition of a specifically tailored (frequency) signal which is added to a listener's environment to increase speech privacy. In open offices, the addition of sound masking decreases the distance where unwanted conversations can be clearly understood, thus reducing the distraction of those distant conversations. This is accomplished by reducing the talker's signal-to-noise ratio as experienced by the listener. (i.e. covering the talker's speech with a masking signal at the listener's location).

Sound masking signals (produced by emitters and loudspeakers) are placed where potential unwanted listeners are present. Placing masking only near a talker has no effect. In the case of enclosed spaces, it is typical to place sound masking both inside and outside an enclosed space to maintain speech privacy. Sound masking signals placed outside of the enclosed space prohibit in-room conversations from being overheard by people passing near the space. Placing sound masking inside a room helps to promote speech privacy by "protecting" conversations taking place in adjoining spaces (such as private offices).

There are several items that you need to know and have in place prior to installing a Qt X sound masking system:

- Live network connectivity - Make Cat 6 cabling runs to all controller locations - 1-2 per controller

- For installation of Qt X 300/600 systems, an understanding of how runs to the standard and active emitters are laid out to prevent signal interference - see explanations in the emitter wiring and layout section (pgs 17-22)

- Familiarity with the Qt X software <here> and/or basic network installation best practices. PC should be running Windows® 10 OS v1809 or newer.

- You should have the design plan / layout from the Biamp Design Team noting device, output and zone locations. This will allow you to plan the cabling runs and controller locations.
  Reach the Design Team here: https://cambridgesound.com/quote/

SYSTEM INSTALLATION CHECKLIST

Suggested order of operations for installation & commissioning a typical sound masking system.

- ❑ Mount, Install and Cable all components
- ❑ Power & test emitters/speakers
    - ❑ Define emitter/speaker type per output *(must be connected to the controller via Qt X software or* Qt X *web interface)*
    - ❑ Adjust Zone on front panel to a low but audible level as necessary
    - ❑ Walk emitter / loudspeaker locations to verify sound masking signal is present at each
- ❑ Attach peripherals (paging, audio sources, life safety panel…)
    - ❑ Verify proper operation of each source and contact closures
- ❑ Discover controllers connected to the network
- ❑ Configure the system using Qt X Software or the web interface
    - ❑ Configure controller's IP Address, Network Operation Mode (single / dual network cable)
    - ❑ Add all controllers by serial number to proper location (Qt X *software)*
    - ❑ Add NPX paging stations to the system with physical device and controller proxy assignment (Qt X *software)*
    - ❑ Update firmware for all controllers / devices *(NPX devices must be updated via Qt X software)*
    - ❑ Create zones as required
    - ❑ Assign controller outputs to zones
    - ❑ Assign appropriate loudspeaker type(s) to each controller's output
    - ❑ Create music paging Audio Sources and assign to Zones (ensure emitter / loudspeaker type in use supports audio sources)
    - ❑ Define behaviors of input and outputs

- ❑ Set zone sound masking levels (42dBA SPL to 48dBA SPL) using a calibrated sound pressure meter. Measure at 4ft. (1.2m)
- ❑ Adjust masking spectrum equalizer for each output as necessary to meet project requirements
- ❑ Create / configure page codes associated with NPX paging stations and assign them to zones
- ❑ Set system security / user levels and document passwords
    Important: Record the admin user name and password and keep with the system documentation. If the Admin level ID and password is lost there isn't a means to recover it.
- ❑ Go through each zone testing / adjusting levels, checking behavior
    - ❑ Set Audio Source levels
    - ❑ Capture final sound masking spectrum and sound pressure level measurements for reporting if required
    - ❑ Set background music and paging levels, and confirm paging behavior for each zone (if applicable)
- ❑ Set soft start, schedules, etc., as necessary
- ❑ Document the schedules on a copy of the System Information Worksheet (on page 40 of this guide) and leave it with the system administrator
- ❑ Save / backup system configuration using Qt X software

Installation Considerations

Qt X 300/600 systems

- Output runs must have the same device type (Standard or Active Emitters) and will share the same sound masking settings. The cabling runs must be configured to prevent any signal interference among the 4 channels along the layout. (Refer to illustrations pages 21-22).

- Differences in ceiling height of more than 6" (152mm) need to be connected as separate outputs because sound masking levels will be different.

- Each output's sound masking levels can be individually controlled and then assigned to networked zones with additional controls applied to the whole zone.

Qt X 800/805 systems

- Each Qt X 800/805 controller has eight (8) outputs. Class 2 speaker output runs are limited to single* 4Ω and 8Ω speakers (DS1357, DS1398) or DS1320 active emitters.

- The Qt X 805/805D has an additional set of 8 line level outputs (mirroring the Class 2 outputs) that can be connected to amplifiers to run DS1339 / DS1390 70V sound masking loudspeakers.

- The Qt X 800/800D is designed for installation in the plenum space and requires a PoE+ power supply (not included) for operation. The Qt X 805/805D is a rack mounted unit and comes with a power supply.

- Since the controllers are networked, multiple outputs sharing the same environmental, area and sound masking characteristics can be combined in the same zone, which can then be configured in the software or via the web interface.

Note: Two DS1357 or DS1398 speakers may be daisy-chained on a single output for specific coverage scenarios but are not able to be controlled/tuned individually in this instance.

Cable	Cabling Type	Qt Passive emitter (Max Distance from Qt X)	Qt Active Emitter (Max Distance from Qt X)	DS1357, DS1398 or DS1320 (Max Distance from Qt X)
Signal Cable	Cat 3, 5, 5e, 6 - 4-pair (8-conductor) 24 AWG Solid CMP (EIA/TIA 568B standard termination)	1000 ft (304.8 m) from Controller to last emitter	**1000 ft (304.8 m) from Controller to last emitter of the longest pathway (including the powered signal cable length)	2-conductor 16 AWG - 55 ft (16.8m) 18 AWG - 40 ft (12.2m)
Powered Signal Cable	Cat 3, 5, 5e, 6 - 4-pair (8-conductor) 24 AWG Solid CMP (EIA/TIA 568B standard termination)	—	400 ft (121.9 m) from Injector Output to last Active Emitter	
Power Cable	14 AWG, 2-conductor Stranded CMP	—	400 ft (121.9 m) from Power Supply to Injector Input	
Maximum Number of Standard or Active Emitters (Qt X 300/600)	—	Qty 60 per Output run (A or B) Qty 120 per Output total (A+B)	Qty 25 per Injector Output Qty 50 per Injector Qty 100 per paired (A/B) outputs - requires 2 Injectors	
Maximum Number of DS Speakers (Qt X 800)	14 /16 /18 AWG, 2-conductor Stranded CMP	—	—	One 4Ω or 8Ω speaker per Output (preserves individual control and tuning)
Maximum Number of DS Speakers (Qt X 805)	14 /16 /18 AWG, 2-conductor Stranded CMP	—	—	One 4Ω or 8Ω speaker per Class 2 Output Line Level outputs: Max Number of 70V/100V speakers is limited to 80% of rated amplifier channel (speaker tap at 1W)

** Signal Length = 1000 ft (304.8m) Longest "Powered Signal" length

QT X 300/300D & QT X 600/600D

Qt X 300/300D or Qt X 600/600D Front Panel

Qt X 300/300D or Qt X 600/600D Rear Panel

(Qt X 600 panel shown)

1. LCD Display
The LCD display indicates system statuses and parameters. Users may navigate through the display to view the current IP address and network mask of the device, view current operating mode of the device (unconfigured, configured, updating firmware, etc.) and view any faults present.

2. Function/Navigation Buttons
Function/navigation buttons allow navigating through information provided in the LCD display.

3. Factory Reset
Insert pin to depress the switch, press and hold for 10 seconds. This will return the unit to factory settings, cause all configuration to be cleared and the device to reboot.

⚠️ **WARNING:** Doing this will take the device back to its unconfigured state and delete any associated input / output device settings from local memory.

4. Power Connector
Connection for an external (included) 24V 90W power supply.

⚠️ **IMPORTANT:** Always plug / unplug the power supply at the wall outlet.

5. Network Control / Media Ports - 2 ports
RJ45 Gigabit Ethernet port connectors support AVB and Dante media streams (Dante is only supported on 300D/600D models). In dual cable mode the left one (#1) the default media port, but in single cable mode it can be both control and media. The right (#2) port is the default control port in dual cable mode. Port 2 is disabled in single cable mode.

6. 4-Pin Logic I/O - 2 ports
Triggers for zone muting, indication for paging application or to initiate a recorded page. See page 13 for additional information.

7. 4-Pin Contact Closure - 2 inputs
This contact closure is provided in order to mute audio and sound masking in the zone or system in the event of a fire emergency or request to page. These inputs should be connected to the fire alarm panel (port 1) or paging system (port 2 - configured as Push-to-Talk).

8. 4-Pin Privacy Light Output - 2 outputs
The privacy lights ports enable connections to (2) privacy lights panels which indicate when sound masking is enabled in a certain zone. Each can be assigned to a different zone when configuring the system in the software or web interface.

9. 3-Pin MIC/Line Audio Inputs - 2 inputs
Two MIC/line audio inputs may be connected to an external audio source such as a music player or an external paging controller. This allows distribution of networked audio throughout the configured zones.

10. Outputs
The Qt X 300/300D supports three outputs of sound masking and audio while the Qt X 600/600D has six outputs. Emitter connections are made via CAT5e cable from the output RJ45 connectors (6 and 12 RJ45 connectors respectively). Each output can accommodate two cable runs (A&B) that can carry up to half of the emitter total for the output. Both A&B runs on a single output must share the same type of emitter (either Standard or Active). Both runs on an output are matched in all settings and are detailed on pages 20-22.

Installation

The Qt X 300/300D and Qt X 600/600D may be installed on a wall with the included hardware. An optional Rack Mount accessory kit is available to install the unit in a rack (Instructions can be found on pages 34-35).

NOTE: It is up to the installer to determine the safest, most secure means of installing the Qt X on to a wall or other vertical surface. Consult any local building/safety codes as required.

NOTE: Equipment installation should be planned such that audio and network sources are in place prior to Qt X and emitter installation. Emitters should be tested upon installation with sound masking audio active to ensure proper functionality.

Wall-mount installations:

1. Place the wall mount where it is to be mounted and mark the hole locations. The control module hinges forward for wall mounting and cable installation. To hinge forward, loosen the screws on both sides, lift it up to disengage the top screws, and rotate forward as shown (Figure1).

   IMPORTANT: If using the wall mount bracket as a template to drill into the wall, remove the bracket from the Qt X prior to drilling to avoid getting debris in the Qt X connectors and ports.

2. If installing into drywall/sheet rock, drill the mounting holes with a 1/4" drill bit, and insert plastic mounting anchors into the drywall/sheet rock.

3. Install the screws into the plastic anchors leaving enough room for the bracket to be hung on the screw heads. Place the bracket so the screw heads fit into the keyholes and then move the bracket down to capture the screws. Tighten the screws to secure the bracket to the wall.

   NOTE: If the Qt X was removed from the wall bracket, reinstall the screws that secure it to the wall bracket. The controller can be rotated down to make it easier to tighten the mounting screws.

4. Connect all wiring/cabling as described in Wiring & Connections. Rotate the Qt X up and move down into the operating position to lock into place. Tighten the side screws to secure it to the bracket. See Figure 2.
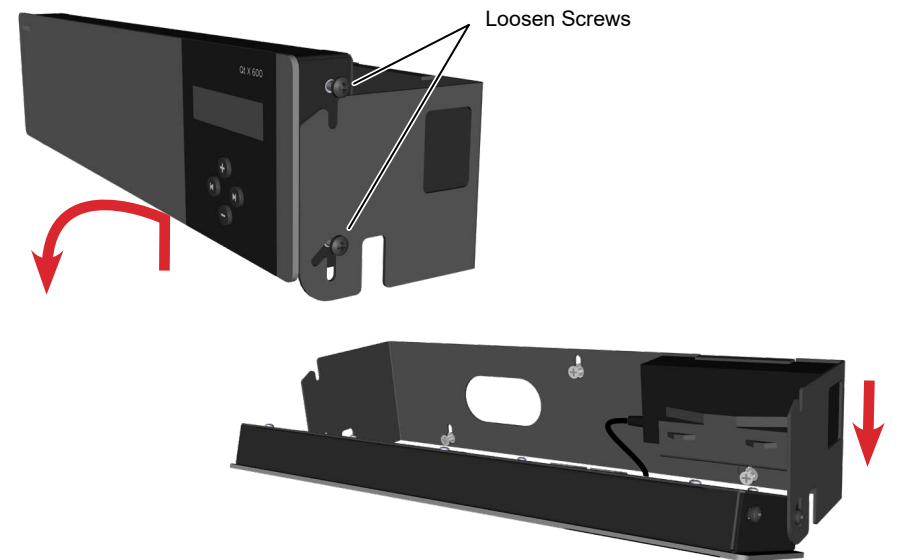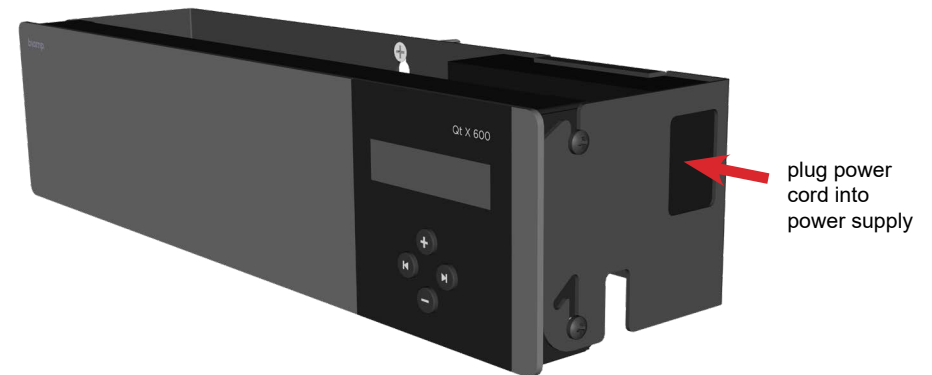
Loosen Screws

Figure 1. Mount unit / wall bracket

plug power cord into power supply

Figure 2. Controller in operating position

QT X 800/ 800D

Qt X Qt X800/800D Front Panel

Qt X 800/800D Rear Panel

1. LCD Display
The LCD display indicates system statuses and parameters. Users may navigate through the display to view the current IP address and network mask of the device, view current operating mode of the device (unconfigured, configured, updating firmware, etc.) and view any faults present.

2. Function/Navigation Buttons
Function/navigation buttons allow navigating through information provided in the LCD display.

3. Factory Reset
Insert pin to depress the switch, press and hold for 10 seconds. This will return the unit to factory settings, cause all configuration to be cleared and the device to reboot.

4. Power Connector
Connection for an external 48V power supply (not included).

5. Network Control Port (PoE+)
The RJ45 port connector for a PoE+ Class 4 power supply must be ordered separately (Biamp part# 900.0004 POE29U-1AT(PL)D-R). Power can also be supplied by a Type 2 PoE+ enabled network switch. In dual cable mode this is the media port, but in single cable mode it carries both control and media.

6. Network Media Port
RJ45 Gigabit Ethernet port connectors support AVB and Dante media streams (Dante is only supported on 800D models). In dual cable mode this is the default control port. In single cable mode this port is disabled.

7. 4-Pin Logic I/O - 2 ports
Triggers for zone muting, indication for paging application or to initiate a recorded page. See for additional information.
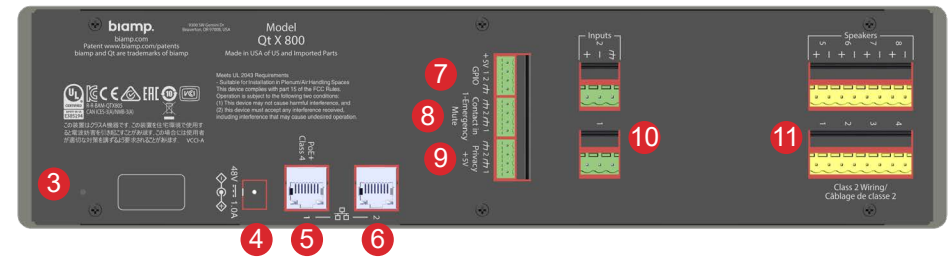
8. 4-Pin Contact Closure - 2 inputs
This contact closure is provided in order to mute audio and sound masking in the zone or system in the event of a fire emergency or request to page. These inputs should be connected to the fire alarm panel (port 1) or paging system (port 2 - configured as Push-to-Talk).

9. 4-Pin Privacy Light Output - 2 outputs
The privacy lights ports enable connections to (2) privacy light panels which indicate when sound masking is enabled in a certain zone. Each can be assigned to a different zone when configuring the system in the software or web interface.

10. 3-Pin MIC/Line Audio Inputs - 2 inputs
Two MIC/line audio inputs may be connected to an external audio source such as a music player or an external paging controller. This allows distribution of networked audio throughout the connected zones.

11. Speaker Outputs (x8)
The Qt X 800 supports up to eight outputs of sound masking and audio. Speaker connections are made 2-wire connections to the yellow euroblock connectors. Each output can accommodate (1) 4Ω DS1320 active emitter or (1-2) 8Ω DS1357 or (1) 4Ω DS1398 speaker (when using 2 loudspeakers, they must be connected in parallel for a single 4Ω output).

> **VERY IMPORTANT:** When installing the Qt X 800 controllers in a plenum space it is **critical** that the serial numbers be recorded on the design drawing as they are installed. Also, the loudspeakers must be documented as they are placed and plugged into the corresponding output ports on the controller. The ceiling will likely be closed up when the system is commissioned so visual verification of a device location isn't possible. It is very important to know exactly which controller, output and loudspeaker is being addressed when setting sound masking or EQ levels as you are moving around the facility. Once the system devices are discovered with the software or web UI, it is also important to name them (and the outputs) appropriately - referencing the location and/or drawing designation.
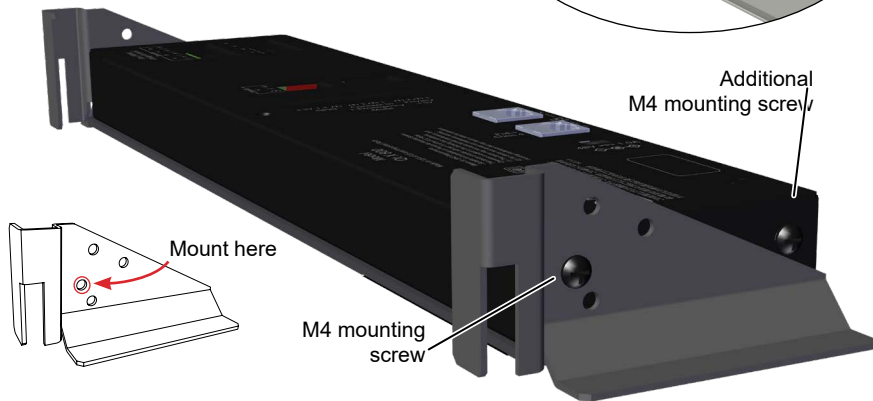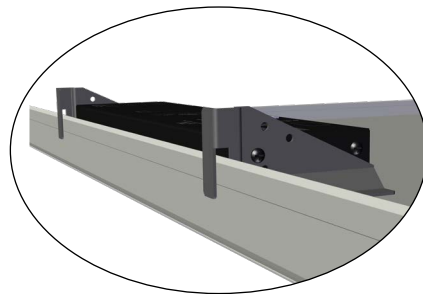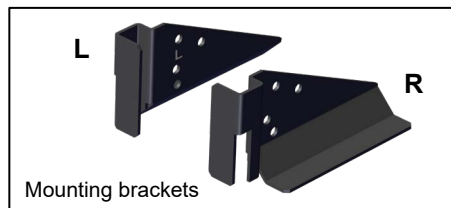

Installation

A pair of mounting brackets and M4 screws are included with the Qt X 800/800D model. They can be positioned as shown below in any of 3 configurations to fit over a ceiling rail (shown in the smaller inset images). Chose the orientation that best fits your application (Figures 3-5). Orient brackets as shown matching the marked right (R) and left (L) brackets to the unit enclosure (also marked R/L).

Secure each bracket with a screw threaded in the appropriate hole as noted on the smaller bracket drawing for each configuration. Both brackets must be installed in the same configuration to adequately secure the panel. Tighten the screws so that the controller doesn't move in the brackets.

A safety cable may be threaded through any of the open holes to prevent movement and/or further secure the unit in the ceiling.

Important Notes:
1. If the panel is installed in the face down position (below), an additional M4 screw must be installed in the lower holes on each side to prevent panel movemen**t.**
2. All wiring must be plenum rated if it is installed in a plenum space.
3. The installer is responsible for sourcing and installing the proper safety cable to meet all applicable local building codes and standards.

Mount here
M4 mounting screw

Figure 4. Base of controller is flush with the bottom of the brackets

L
R
Mounting brackets

Additional M4 mounting screw
Mount here
M4 mounting screw

Figure 3. Controller is face down against the ceiling tile
Installation Note: An additional M4 screw must be installed in the lower holes on each side to prevent panel movement

Mount here
M4 mounting screw
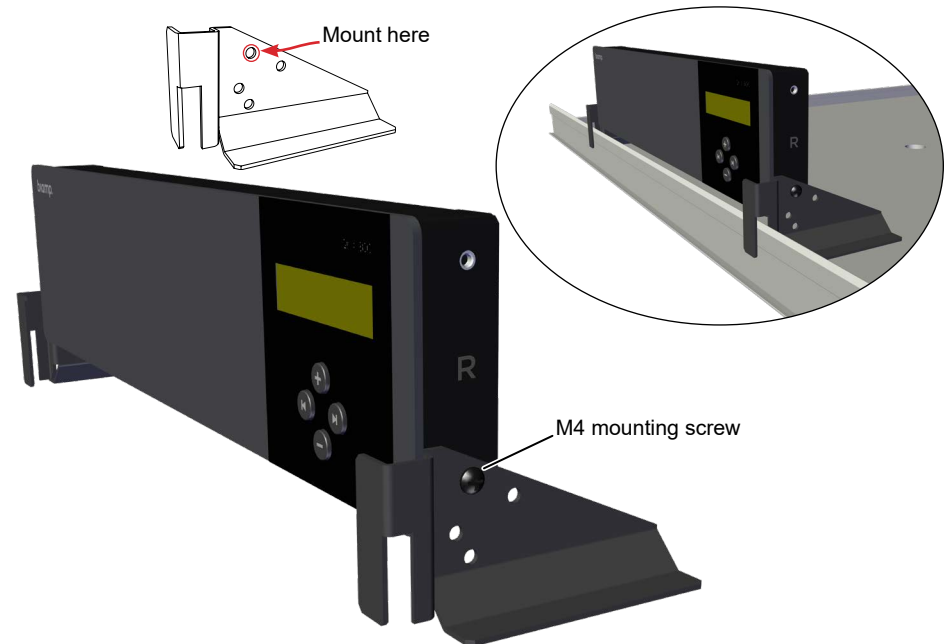
Figure 5. Controller is raised above the rail

QT X 805/ 805D

Qt X 805/805D Front Panel

Qt X 805/805D Rear Panel

1. LCD Display
The LCD display indicates system statuses and parameters. Users may navigate through the display to view the current IP address and network mask of the device, view current operating mode of the device (unconfigured, configured, updating firmware, etc.) and view any faults present.

2. Function/Navigation Buttons
Function/navigation buttons allow navigating through information provided in the LCD display.

3. Factory Reset
Insert pin to depress the switch, press and hold for 10 seconds. This will return the unit to factory settings, cause all configuration to be cleared and the device to reboot.

4. Power Connector
Connection for an external (included) 48V power supply.

5. Network Control & Media Ports - 2 ports
RJ45 Gigabit Ethernet port connectors support AVB and Dante media streams (Dante is only supported on 805D models). In dual cable mode the left one (#1) the default media port, but in single cable mode it can be both control and media. The right (#2) port is the default control port in dual cable mode. Port 2 is disabled in single cable mode.

6. 4-Pin Logic I/O - 2 ports
Triggers for zone muting, indication for paging application or to initiate a recorded page. See page 13 for additional information.

7. 4-Pin Contact Closure - 2 inputs
This contact closure is provided in order to mute audio and sound masking in the zone or system in the event of a fire emergency or request to page. should be connected to the fire alarm panel (port 1) or paging system (port 2 - configured as Push-to-Talk).

8. 4-Pin Privacy Light Output - 2 outputs
The privacy lights ports enable connections to (2) privacy lights panels which indicate when sound masking is enabled in a certain zone. Each can be assigned to a different zone when configuring the system in the software or web interface.

9. 3-Pin MIC/Line Audio Inputs - 2 inputs
Two MIC/line audio inputs may be connected to an external audio source such as a music player or an external paging controller. This allows distribution of networked audio throughout the connected zones.

10. Line Level Outputs
The Qt X 805 supports up to eight individual channels of sound masking and audio. These line level outputs should be used when utilizing an external 70V/100V amplifier sized for a distributed loudspeaker load. Speaker connections are made via 3-wire connections to black euroblock connectors. Each output can be connected to an amplifier channel or 3rd party component (i.e. Tesira) with line level inputs.

11. Class 2 Speaker Outputs
The Qt X 805 supports up to eight outputs of sound masking and audio. Speaker connections are made 2-wire connections to yellow euroblock connectors. Each output can accommodate (1) 4Ω or (2) 8Ω DS1300 speakers.

IMPORTANT: The Qt X 805/805D is limited to 8 individual channels of sound masking outputs. Either the Line Level or Class 2 types should be assigned to an individual numbered output. The settings are mirrored on each of the same numbered outputs so it is possible (but not recommended) to connect to the same numbered output on both types.

Rack Mount installations

Hardware to attach the controller to the rack is not supplied. The unit will not rotate forward when attached to the rack ears so input/output and speaker connections should be made prior to attaching it to the rack.

1. Make all emitter, network and audio connections as required in Wiring & Connections.

2. Plug the power supply into your power source and then into the back of the controller. The front LCD panel will light up and you can review basic unit information and operation by navigating through the menu.

3. Secure the Qt X device to the rack via the rack ears as shown in Figure 6.
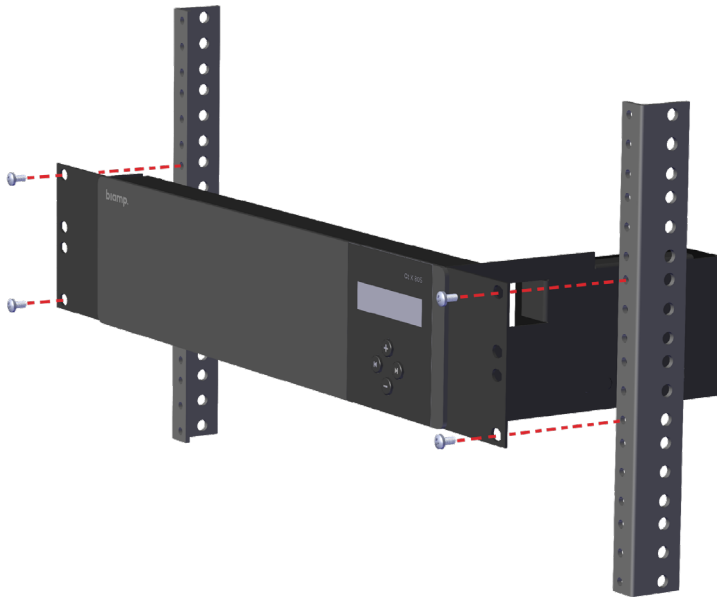
Figure 6. Attach the controller to the rack

WIRING & CONNECTIONS

Wiring / Cabling

Qt X **300/600:** Cabling for Active and Passive emitters is included in designated lengths (16, 22 or 30 feet) dependent upon emitter bundle ordered. Sort the cables by length and label by output and run for installation ease. If you need to make a custom length cable, please note the following:

- Use solid conductor 24 AWG CAT-3, 5, 5e, 6, or 7 cable that meets local code requirements.

- If the system is installed in a return air plenum, the cable must be plenum rated.

- Shielding is not required. Unshielded twisted pair (UTP) cable is acceptable.

- Snagless boots are not required.

- RJ-45 plugs must use the "bent 3-tine" RJ-45 plugs intended for use with solid core CAT wire. Three-tine plugs can be purchased at a hardware store and from most CAT cable suppliers. DO NOT USE the "aligned two-tine" type intended for stranded wire, as they provide improper contact and may yield intermittent system operation. The diagram below shows the cross section view of both types.

Correct
RJ-45 Connector
with bent type

Incorrect
RJ-45 Connector
with aligned type
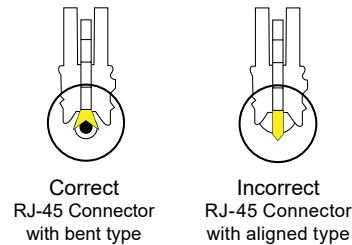
- Field test each cable after fabrication with the RJ-45 connectors (before final installation), with a standard network LAN tester to check for continuity, shorts, and 1:1 (straight through) connection before installation.

- Factory Cables are terminated using EIA/TIA568B standard pinout.

Qt X **800/805:** Loudspeaker connections from Qt X 800/805 are facilitated with 18 gauge two conductor stranded audio cable for runs up to 40' (12.2m) in length and 16 gauge two conductor stranded audio cable for runs up to 55' (16.8m) in length. Ensure all cabling meets local building code requirements.

Panel Connections

Network Ports

All Qt X controllers are equipped with two RJ45 network ports for Media and Control. The left RJ45 control port (#1) on the Qt X 800/800D is specifically configured for PoE+ connection.
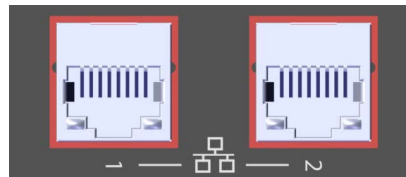
All Qt X controllers can be configured to use single or dual cable modes. Single cable mode is the default with all information carried on Port 1.

Network Ports (continued)

Single Cable Mode: Control network and Media network are combined using the same network infrastructure. Both Media and Control information share the same switch port. In this mode the #2 port is disabled.

Control / Media Network

Qt X Controllers in
Single Cable Mode
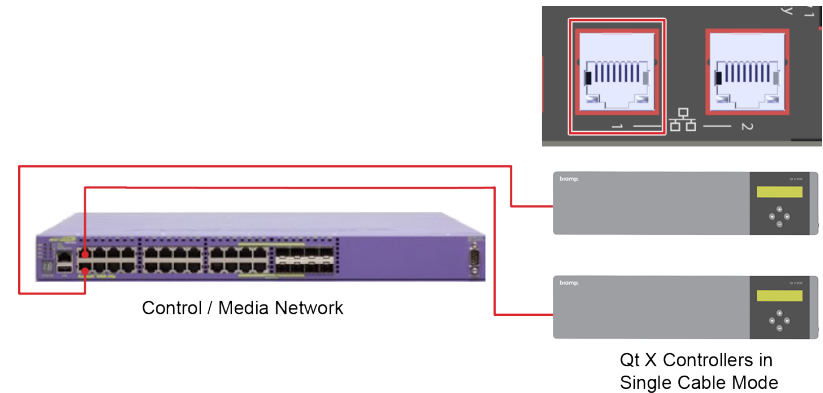
Dual Cable Mode: Control network and Media network traffic are on different networks - Control from an enterprise network for management; Media is physically on a separate network. More information about AVB & Dante switch requirements can be found in our Cornerstone Knowledge Base <here>.

Control Network (enterprise)

Media Network

Qt X Controllers in
Dual Cable Mode
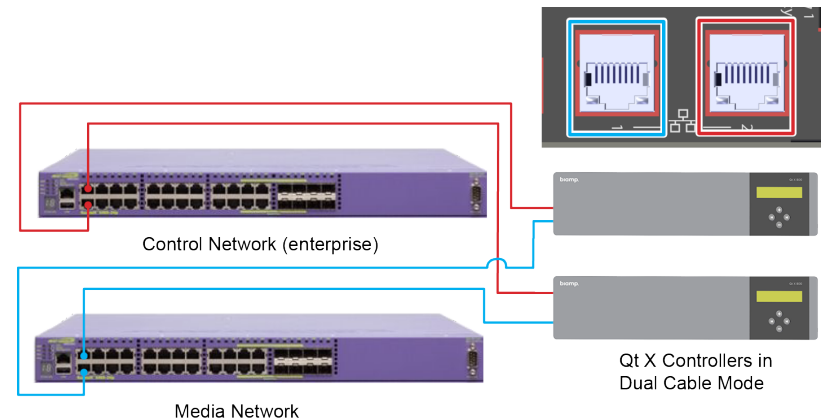
Panel Connections *(continued)*)

Contact Closures

The Qt X provides a mute capability for masking and audio. #1 position is configured for Fire or Emergency panel input, and a contact closure will Mute All throughout the system. The contact closure utilizes the same style green euroblock connector as the privacy lights and GPIO (4-pin). See Figure 7.

- To instantly mute sound masking, connect a two-conductor cable to the two contact closure connectors, labeled (1-Gnd).
- To use this feature with audio, configured as Push-to-Talk (Input 2 only), connect a two-conductor cable to the two connectors, labeled (2-Gnd).

The opposite end of the above-described connections (treated as pairs/circuits) are terminated at a closure mechanism:

- To disable sound masking, the circuit should be "closed".
- To resume sound masking, the circuit should be "open".

> ⚠ **IMPORTANT:** When a Qt X system comprised of multiple controllers is configured and connected via a network connection, only one "emergency mute" connection is required to a single controller location. A single contact trigger will propagate to all controllers included in the system.
> If any GPIO port connections are configured as Output / Mute, an Emergency Mute contact closure will result in +5 VDC from that designated GPIO port. It will be a system-wide mute (to all zones).
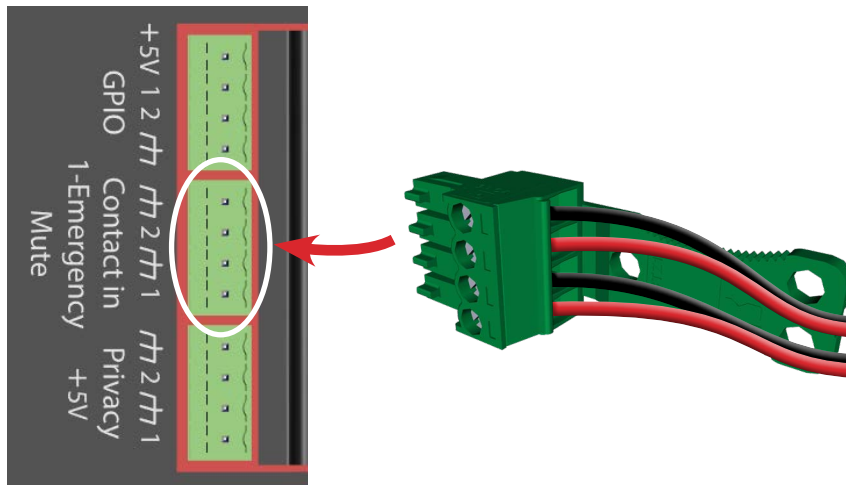
Figure 7. Contact closure connection / wiring

Panel Connections *(continued)*

GPIO (General Purpose Input Outputs)

The logic port connections can be configured as either an input or output trigger in either "Active Low" or "Active High" states. This is useful for applications where events may be triggered to offer functionality inside Qt X (as an Input) or indicate a condition within Qt X (as an Output). Checking the "Active Low" box changes the default 'Active High' to an "Active Low" state. See Figure 8.
NOTE: The top socket labeled +5V is reserved for future use.

Input / Mute Function: When an incoming contact is closed in an "Active Low" state, the selected zones will mute all sound masking, background music, and paging sources. Changing the state to "Active High" will mute all sources of the zones when the contact is open.

Input / Push-to-Talk (PTT) Function: When an incoming contact is closed ("Active Low") the audio source shown will be sent to all the selected zones. The background music is then muted in the selected zones and the chosen audio source can be adjusted the Zone Paging Level control. Changing the state to "Active High" will route the selected audio source to the selected zone(s) when the contact is open.

Input / Logic Page: When an incoming contact is closed ("Active Low") the chosen page will be sent to all selected zones. This also results in background music being muted in the selected zones. The chosen page is adjustable on the Zone Paging Level control. Keeping the state at the default "Active High" will route the recorded page to the selected zone(s) when the contact is open. Most common uses will be in the "Active Low" state.

Output / Mute: Provides indication of a GPIO Input Mute condition present on a specific zone. When in "Active High" state a mute initiated by the GPIO input on any of the selected zone(s) will result in +5VDC being present across Pin 1 or 2 (dependent on IO Output port) and GND. Switching the output to "Active Low" indicates the selected zone is unmuted.

Output / Talk Now: Provides indication of the state of the Push-to-Talk (Contact Input #2) or any available IO port configured as an Input Push-to-Talk. Selection of associated port is done by selecting from the Page Control drop down. This functionality is useful to indicate that a person can now speak into an active microphone by illuminating an LED (+5 VDC) when a specific Push-to-Talk contact is active. Connect Pin 1 or 2 (dependent on IO Output Port) and GND Pin in an "Active High" state and the LED will illuminate when the associated Push-to-Talk input is active. Selecting the "Active Low" checkbox will provide +5VDC voltage to the "Talk Now" output port when the associated Push-to-Talk input is inactive, indicating a paging microphone is in a ready condition.

> **WARNING:** Mute functionality should only be used in situations where it is permissible to disable a zone in very select instances. (i.e. a conference room with audio conferencing technology) *It is never acceptable to mute sound masking in areas when building occupants might be present.*
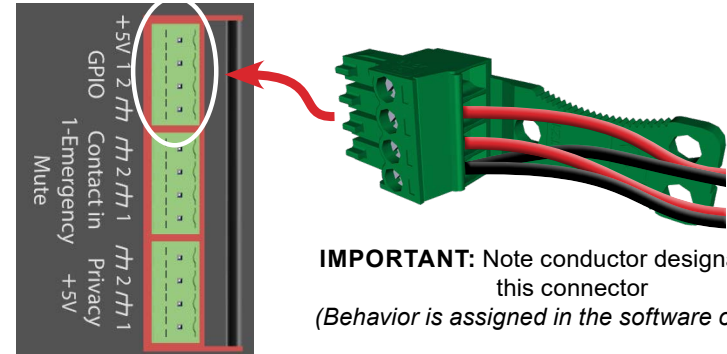
IMPORTANT: Note conductor designations for this connector
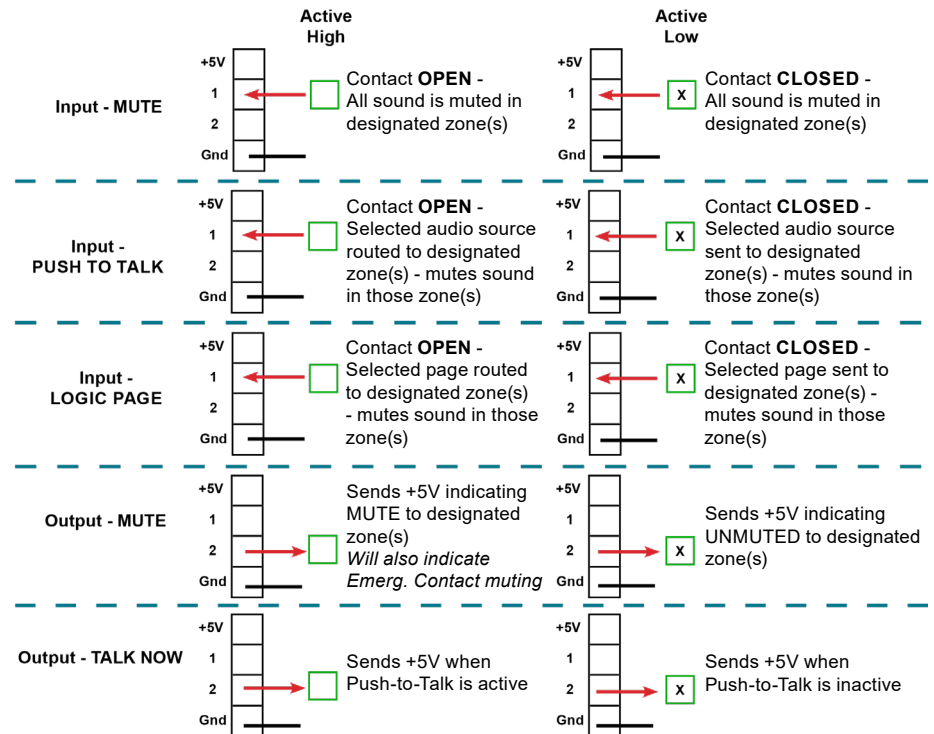*(Behavior is assigned in the software or web UI)*

Figure 8. GPIO connection / wiring

Panel Connections *(continued)*

Privacy Lights Outputs

Two ports are provided to interface with privacy lights panels. They may be designated to 2 different zones and should be home run from the controller to the privacy panel. See Figures 9-10.

5 VDC outputs are available to indicate sound masking is active on a specific zone as indicated by privacy lights. The functionality is as follows;

Privacy 1 - Connect the positive lead of a privacy sign to Pin 1 and GND (observe polarity). Select a zone in the Zone Name dialog to associate the Privacy light to a specific sound masking zone. When the zone is active (above -20dB in level) the privacy light will illuminate.

Privacy 2 – Same behavior as indicated above with privacy sign connections to Pin 2 and GND.
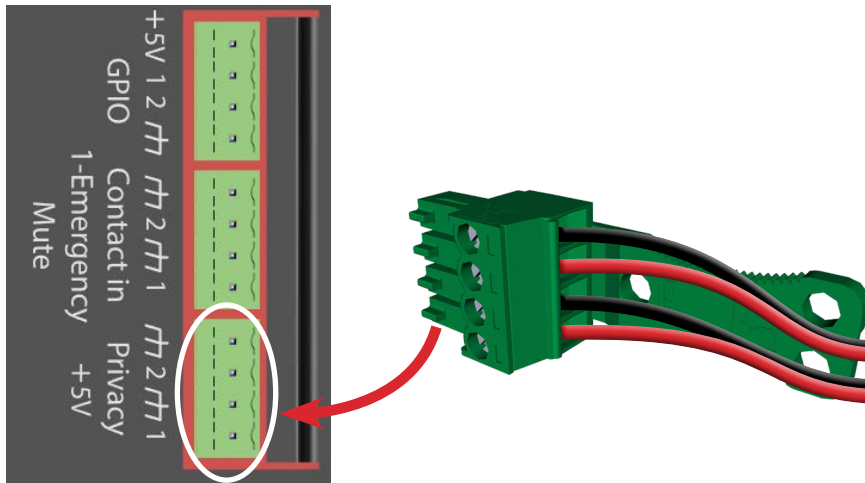
Figure 9. Privacy lights connection / wiring

Contact Connections (source)

Follow the instructions provided with the privacy sign to make sure that the unit is connected to the controller inputs correctly.

SPEECH PRIVACY PROTECTION

Next Generation Sound Masking
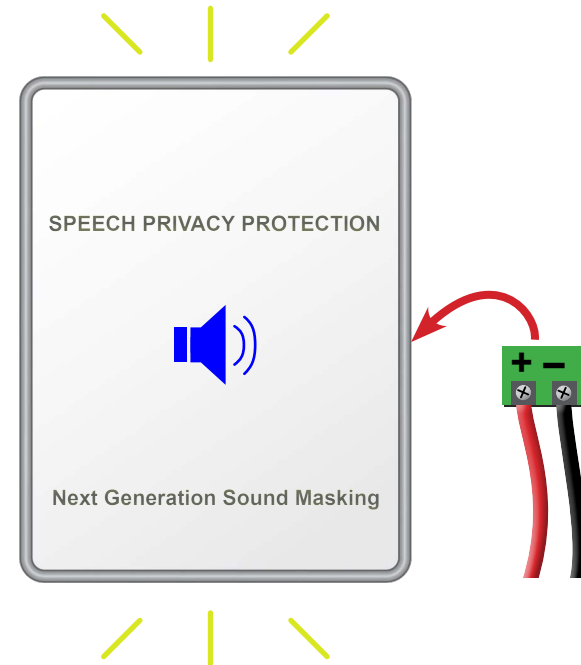
Figure 10. Typical privacy light panel connection

Panel connections *(continued)*

Inputs - Paging and Music

Paging and music sources may be connected to the Qt X audio inputs for distribution throughout select zones. Specific instruction on settings levels in different zones is covered in the Qt X Software and in the Qt X Web UI help files.

The steps that follow give instructions on connecting paging and audio to the Qt X.

For balanced audio inputs:

1. Disconnect power from the Qt X.

2. For balanced audio inputs, connect signal wires to the positive (+) and negative (-) terminals at either of the MIC/Line inputs. Connect the shield to GND at the audio source, as shown in Figure 11-1, below.

For unbalanced audio inputs:

1. Disconnect power from the Qt X.

2. For mono unbalanced line level signals connect the positive (+) and negative (-) terminals. Place a short jumper wire between negative (-) and GND terminals as shown in Figure 11-2, below.

3. For stereo line level signals, utilize a stereo to balanced converter (Radio Design Labs TX-J2 or equivalent). Connect Balanced output of converter as described in note 2 above.

Paging and Music Connections (source)

Follow the instructions provided with the device to make sure that the unit is connected to the controller inputs correctly. See Figure 12.

> **Note:** NPX paging stations are connected to the system network (rather than to the panel directly) and paging audio is sent via AVB or Dante streams. NPX page codes and settings are configurable with the Qt X Software. See more information on page 30.

Qt X Logic I/O configuration:

MicPAT-D: configured as an Input, Push-to-Talk, Active Low, Input Gain Set to +48dB, Phantom Power OFF

MicPAT-2: configured as Inputs, Push-to-Talk, Active Low, Input Gain Set to +48dB, Phantom Power OFF

Figure 11 (1-2). Input connections / wiring
(Qt X 800/805 panels shown)

Wire	MicPAT-D	MicPAT-2
White	Audio +	Audio +
Red	Audio –	Audio –
Black	Contact Gnd	Button 1 Contact
Yellow	Contact	Contact Gnd
Blue		Button 2 Contact
Green		
Orange		
Shield	Audio Gnd	Audio Gnd

MICPAT-2

Figure 12. Typical source connections

Outputs - Sound masking devices

Emitters - Qt X 300/600 models

The Qt X control modules support installation of both Qt Standard and Active emitters. Both emitter types are 'direct field' devices, mounted downward for direct unimpeded transfer of the audio signal to the listening location (Figure 13).

Qt Passive emitter

The passive emitter is a passive audio loudspeaker device suitable for sound masking applications. This emitter receives an amplified signal directly from the Qt X control module via a UTP category cabling infrastructure. Maximum sound pressure levels with this type of emitter are 60dBA at 1 meter with a sound masking frequency response of 200Hz to 6.3kHz.

Qt Active Emitter

The active emitter is a self-powered audio loudspeaker device suitable for sound masking and paging/background music. This emitter contains an internal amplifier which receives the audio signal directly from the Qt X in addition to a direct current voltage which powers the active emitter. Both power supply(s) and power injectors are required for operation in addition to the Qt X. Maximum sound pressure levels with this type of emitter are 65dBA @ 1 meter with a sound masking frequency response of 125Hz to 8kHz. Maximum sound pressure levels for paging and background music are 74dBA @ 1 meter with a frequency response of 105Hz to 16kHz.

Speakers - Qt X 800/805 models *(Figure 14)*

DS1357 is an 8Ω, 6-inch diameter hanging speaker with a 4-point bridle suitable for sound masking and paging/background music environments. The DS1357 connects via standard 18/16 AWG 2-conductor plenum rated cable.

DS1398 is a 4Ω, indirect firing speaker designed for under floor or above ceiling installations. It emits sound in opposing directions and is suitable for sound masking environments. The DS1398 connects via standard 18 AWG / 16 AWG 2-conductor plenum rated cable. An optional tile bridge is available for low clearance plenum installation.

DS1320 is a 4Ω active emitter designed for use as a single output fitted for a standard two conductor audio cable.

In addition to voice coil impedance outputs, the Qt X 805 also has analog line level outputs for external 70V amplifiers. This allows use of the DS1339 in plenum loudspeaker and the DS1390 shallow plenum loudspeaker when powered from a 70V amplifier for distributed sound masking applications. (See Figure 26 for an example)

Qt Passive emitter

Qt Active Emitter

Figure 13. Emitters for use with Qt X 300/600 controllers

DS1339 / DS1390 70V Loudspeakers

DS1357 Loudspeaker

DS1320 emitters

DS1398 Loudspeaker

Figure 14. Speakers for use with Qt X 800/805 controllers

EMITTER INSTALLATION *(Qt X 300/600 models)*

Each cable run has a maximum length of 1000 ft (305m).

The tables that follow give the number of emitters that may be installed in a given cable run, output, etc. per Qt X device. Each output has two identical runs (A and B). The emitters in both output runs are controlled equally and **must** be of the same emitter type.

Qt X 300/300D - Emitter Installation Totals			
Emitter Type	*Per Cable Run*	*Per Output*	*Total (3 Outputs)**
Standard	60	120	360
Active	50	100	300

Qt X 600/600D - Emitter Installation Totals			
Emitter Type	*Per Cable Run*	*Per Output*	*Total (6 Outputs)**
Standard	60	120	720
Active	50	100	600

* Output total assumes the same emitter type in each output. Total emitter counts will vary per device if both standard and active emitters are present in a system.

NOTE: for open ceilings or other installations that do not secure to a tile, other mounting options are available (such as hanging pendants). See Biamp's product offerings for information.

NOTE: Active and passive emitters are installed identically. On the passive emitters, the input and output ports are labeled as such: INPUT, OUTPUT.

On the active emitters, the input is labeled ▷ and the output as ▷. The input can be located by identifying the jack nearest the seismic keyhole on the rear of the emitter.

It is critically important that the emitters are wired / located following the layout and wiring diagram from the Design Team to prevent any signal interference. In addition, please review the general emitter placement and wiring information on pages 18-22.

NOTE: For Active Emitters, a Qt Power Injector (purchased separately) will need to be installed directly adjacent to the first emitter. Each output on the power injector can power up to 25 Active Emitters (up to 50 for each cable run). A Qt Power Supply (also purchased separately) is necessary to power the injectors and can power up to six (6) Qt power injectors (Figures 20-21).

1. Determine emitter installation locations based on the system plan provided by the Design Team. Run cables from the controller to the first emitter location for each run per output (Figure 15). Label the cabling such that the location of the run is easily identifiable at the point of connection to the Qt X. For example: Output 1A - main office, Output 2A - Lobby, etc.
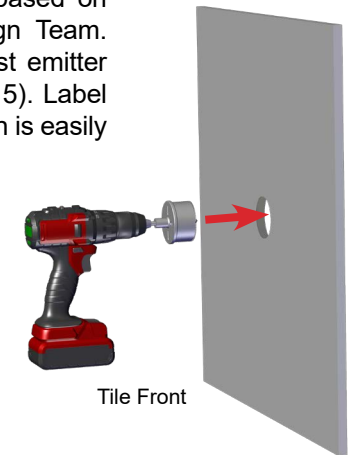

Tile Front

2. Ceiling tile mounting - use an appropriate tool and drill a 2.68" (68 mm) size hole in the center of the appropriate ceiling tiles. Cut from the front of the tile. A hole saw bit is included with Qt X 300/600 models. *Other mounting options are available for open and structural ceilings. They include: Beam Brackets, Pendant Mounts, Drywall Mounts, New Construction Brackets, Plenum Back cans, and Universal Brackets.*

3. Power on the Qt X controller and set the standard sound masking level to 0 dB for the desired output # and associated zone.
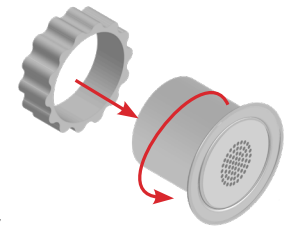
4. Install the first emitter in the ceiling tile by pushing the emitter through the front of the hole in tile and securing it with the locking ring. Connect the cable run from the Qt X output RJ45 connector to the INPUT connector of the first emitter (Figure 16). *The input jack has the rounded tab above it and can help if you can't see it easily.*
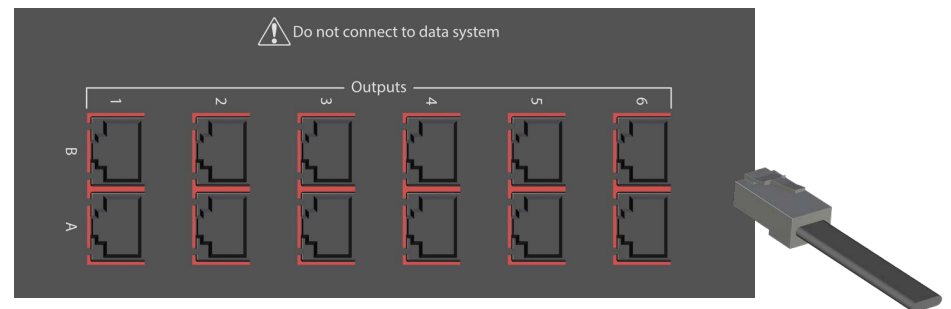
Figure 15. Emitter runs from the Qt X 300/600 controllers (Qt X 600/600D panel shown)

Emitter Installation *(continued)*

5. Listen to the emitter after it is connected. It should produce a 'whooshing' sound. If it does not produce sound refer to the troubleshooting steps at right.

6. Connect a cable to the output of the installed emitter (Figure 16) and run that cable to the next emitter location. Install the next emitter in the run. Connect that output cable to the input port of the newly installed emitter and repeat Step 5, above.

7. Repeat Step 5 and 6 until all emitters are installed. Secure cabling as needed and per any local building codes. A safety cable may be attached to the small keyhole above the input jack.

   NOTE: Do not continue with cabling/emitter installation if the emitter fails to emit sound.

   ⚠ **IMPORTANT: Never** swap (reverse) the In/Out jacks when installing emitters as it could result in an overload condition which forces a controller error condition.

Cable Out to next emitter in the Run

Cable In from Controller or previous Emitter
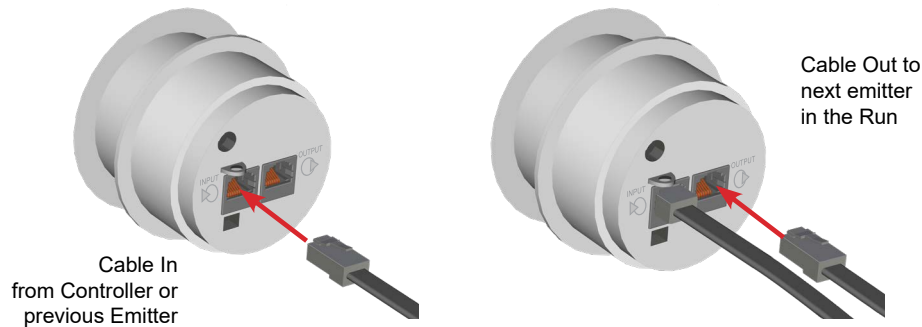
Figure 16. Correctly Wire Emitters

8. Set sound masking volume levels for each zone, using either the front panel controls, the web control interface or Qt X software. Set sound levels according to suggested sound masking levels on page 32. If a small area within a zone exhibits a perceived volume louder than the rest of the zone, due to a difference in acoustics, use the adjustable dip switch on the back of each related emitter to turn the volume down (by 3, 6, or 9 dB on the passive emitters, or 1.5, 3 or 4.5 dB on the active emitters from the value set at the controller). See emitter data sheet for more details.

   ⚠ **IMPORTANT:** When using Active emitters, it is necessary to select "Active" speaker type in the "Output tab" by connecting to the controller with either the Qt X software or web UI. It is not assignable from the front panel. Passive emitters are the default output type and Active emitters employ a different sound masking spectrum. If the emitter type isn't changed to Active, the installer may not be able to properly adjust the output levels for proper masking performance.

Emitter Spacing Guidelines

• Maintain a square or rectangular pattern with distances/spacing based on ceiling or mounting height.

• Maintain a 2 ft (.6 m) minimum distance from any sound-reflecting surface.

• Maximum distance from a sound reflective surface is the emitter spacing distance divided by two.

• Emitters may be moved up to 2 ft (.6 m) outside of the spacing guidelines to avoid obstacles.

• Refer to the System Plan provided by the Design Team for general zone and emitter placement.

If emitters fail to produce sound, try the following troubleshooting steps:

• Try a different emitter.

• Test the four (4) previous cables in the run for continuity and shorts. Repair or replace faulty cabling.

• If a short is present, circuit protection will engage and all sound masking will shut off. If the short is properly repaired, the protection state should clear itself in 5-6 minutes.

Numbers of Emitters in a Small Enclosed Area

| Enclosed Area Sq Feet (m²)	Number of Emitters	Recommended Layout
up to 180 ft² (16.7 m²)	2	
181 - 260 ft² (16.8 - 24.2 m²)	3	
261 - 340 ft² (24.2 - 31.6 m²)	4	
341 - 420 ft² (31.7 - 39.0 m²)	5	
4210 - 500 ft² (39.1 - 46.4 m²)	6	
More than 500' (46.4 m²)	Use large area / open office guidelines	

Emitter Installation *(continued)*

Layouts may be adjusted by up to 2 ft (.6m) in small rooms with ceiling tiles to avoid placement close to obstacles or walls. We suggest that the distance be decreased rather than increased to maintain adequate coverage. See Figures 17-18.
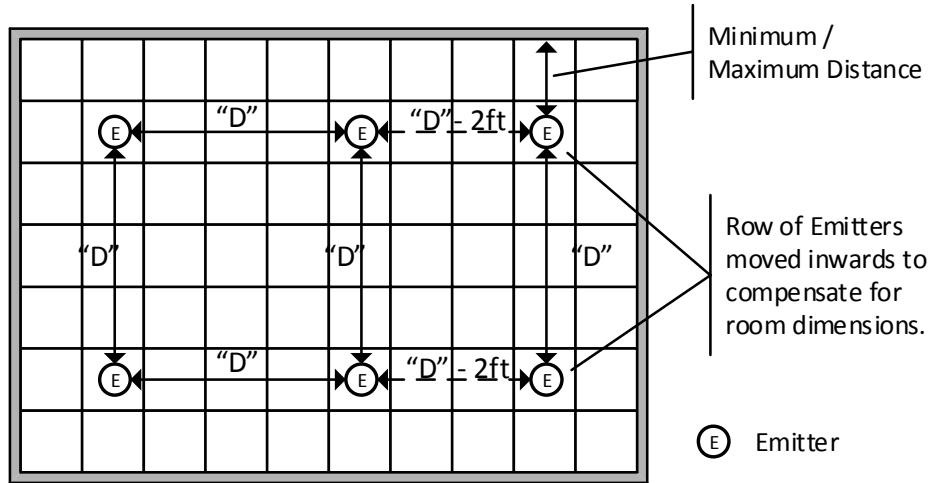
Figure 17. Standard Layout with 2' x 2' ceiling tiles with an adjustment for the room size.
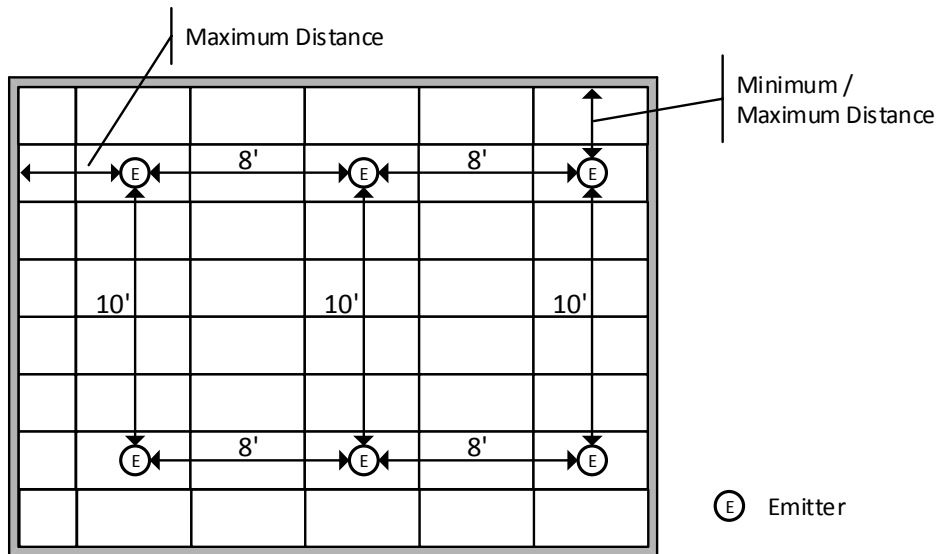
Figure 18. 10' x 8' room layout with 2' x 4' ceiling tiles

Standard and Active Emitter Spacing

Emitter Mounting Height*	Emitter Spacing - 2'x2' ACT, Open or Solid-Surface Ceilings	Emitter Spacing - 2'x4' ACT Ceilings	Min Distance from Wall or Obstacle	Max Distance from Wall or Obstacle
< 8' – 9' (2.4 – 2.7 m)	8' x 8' (2.4 x 2.4 m)	8' x 8' (2.4 x 2.4 m)	2' (.6 m)	4' (1.2 m)
9' – 10' (2.7 – 3.0 m)	10' x 10' (3.0 x 3.0 m)	10' x 8' (3.0 x 2.4m)	2' (.6 m)	5' (1.5 m)
10' – 11' (3.0 – 3.3 m)	10' x 10' (3.0 x 3.0 m)	10' x 8' (3.0 x 2.4m)	2' (.6 m)	5' (1.5 m)
11' – 12' (3.4 – 3.6 m)	12' x 12' (3.6 x 3.6 m)	12' x 12' (3.6 x 3.6 m)	2' (.6 m)	6' (1.8 m)
12' – 14' (3.6 – 4.2 m)	12' x 12' (3.6 x 3.6 m)	12' x 12' (3.6 x 3.6 m)	2' (.6 m)	6' (1.8 m)
over 14' (4.2 m)	Contact Biamp Support	Contact Biamp Support	2' (.6 m)	7' (2.1 m)

*Mounting height may not always be at the ceiling height

Telephone Rooms/Exam Rooms/Mothers Rooms Emitter Spacing

It is permissible to install a single emitter in very small spaces to gain privacy where the duration of occupancy is limited and specific installation conditions can be met. Such spaces include dedicated Telephone Rooms in office environments or Exam Rooms in a clinic environment. A single emitter is acceptable means of coverage if the following statements are true:

- Occupancy is typically less than 1 hour per visit.

- The area of room is less than or equal to the room size below based on ceiling heights.

- A dedicated zone is used for a use similar to a single-emitter room, which allows for adequate adjustment.

Emitter Mounting Height*	Maximum Room Size	Sound Masking Exposure Duration	Use of a Single Emitter
8' – 9' (2.4 – 2.7 m)	< 64 ft^2 (5.9 m^2)	Less than 1 hour	OK
9' – 11' (2.7 – 3.3 m)	< 100 ft^2 (9.3 m^2)	Less than 1 hour	OK
11' – 14' (3.3 – 4.2 m)	<144 ft^2 (13.4 m^2)	Less than 1 hour	OK
over 14' (4.2 m)	Call Biamp Support	Less than 1 hour	OK

In cases where the time duration of exposure, the room size exceeds the recommended ceiling height, or the emitter location is offset due to ceiling conflicts, refer to the chart on the previous page (Emitters in a Small Enclosed Area) for multiple emitter placement.

Emitter Installation *(continued)*

Basics of Qt X 300/600 outputs: maximum signal run, channel definitions, output run architecture and spacing in small rooms per ceiling height. See Figures 19-21.

Passive emitter Outputs
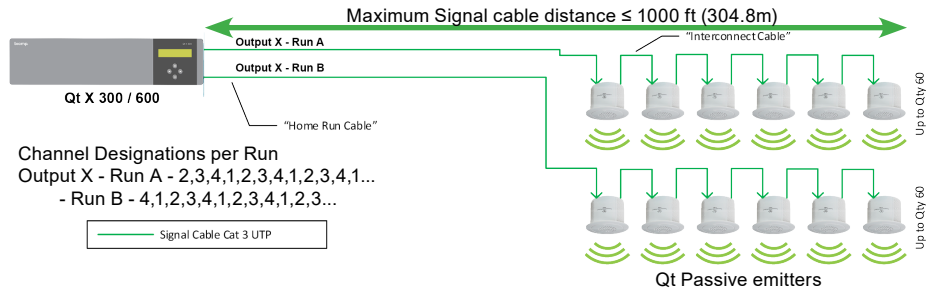
Figure 19. Passive emitter runs and channel designations

Tech Note - Emitter wiring (both Passive and Active)

To prevent interference from adjacent emitters playing the same channel, the emitters are designed to "rotate" the channels so that the next emitter in the sequence is playing a different channel from the current emitter. Each emitter loads the <u>second channel</u> on the cable connected to its input and changes the order of the channels going to the output connector. When emitters are correctly connected the simplified result is shown below for Run A starting with Ch 2. Run B runs from Ch 4 to 3 and then repeats.
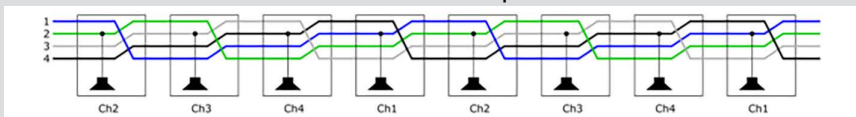
Room Control (QT-RC3 - Accessory option)

⚠ **VERY IMPORTANT:** Use of the Qt-RC3 room control is ONLY recommended for zones broadcasting background music or paging and only when the control needs to be accessible by building occupants. Qt-RC3 room controls should NOT be used for user control of sound masking signals except in some unique healthcare applications. Consult the Cornerstone document <here> for more information. NEVER use Qt-RC3 room controls for private office control of sound masking signals.

The Qt Room Control can be used to adjust the sound masking level for an individual room or a space with up to 8 Emitters. Room Controls can be placed in the cable run and will count as 2 passive emitters in the total number of devices per run. They do not count against the device total if used with Active emitters. Additional information regarding layout and installation is available <here>.

Active Emitter Outputs
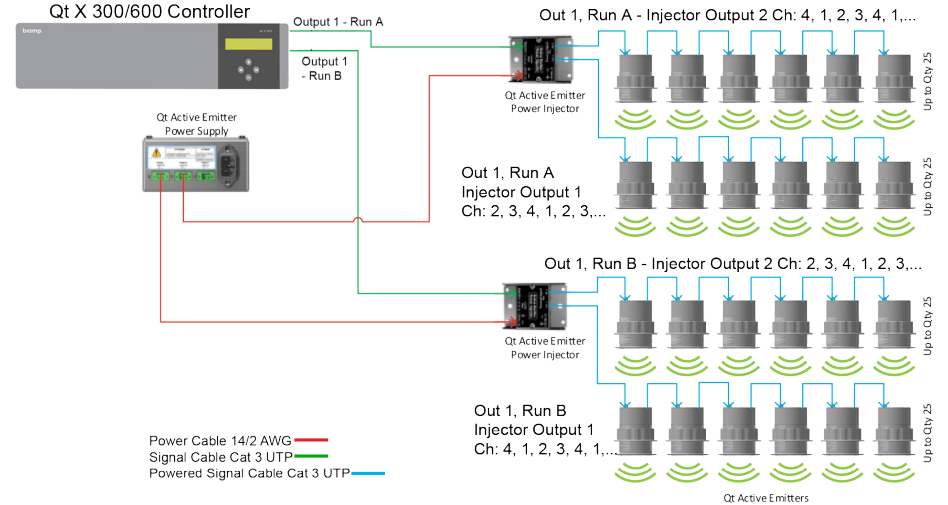
Figure 20. Active emitter runs and channel designations

Active Emitter - Maximum cable lengths
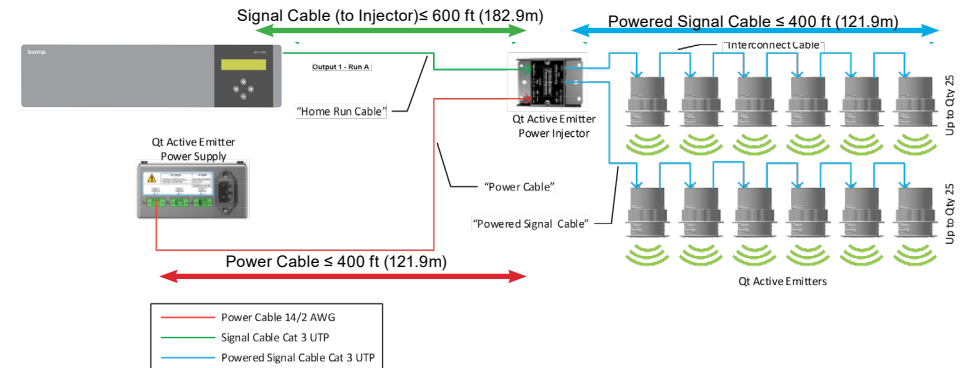
Figure 21. Active emitter maximum cable lengths

Emitter Run Layout - Correct and Incorrect

Layouts below show runs with Passive emitters; the same layout will work for Active Emitter runs with the addition of the power injector prior to the first Qt Active Emitter. The same emitter type must be on both the A & B runs of any output, and are applicable for both the Qt X 300 and 600 models.
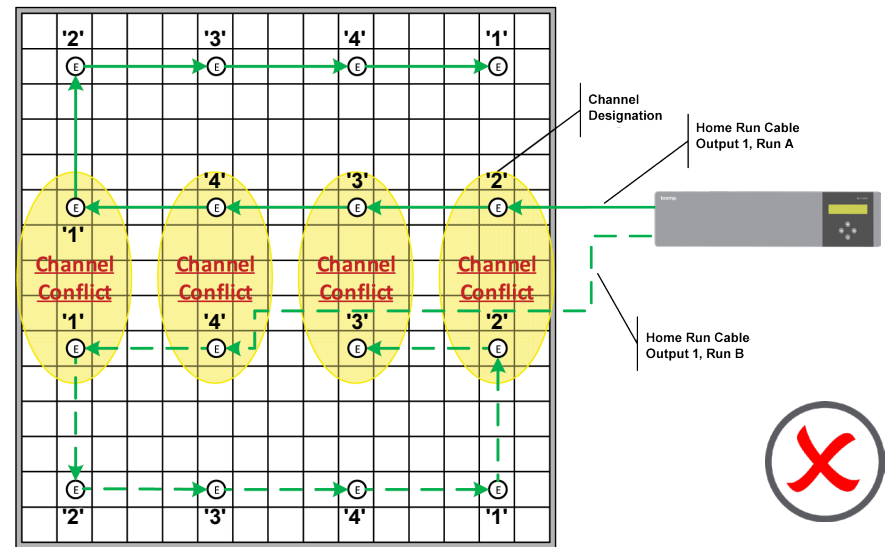
CORRECT
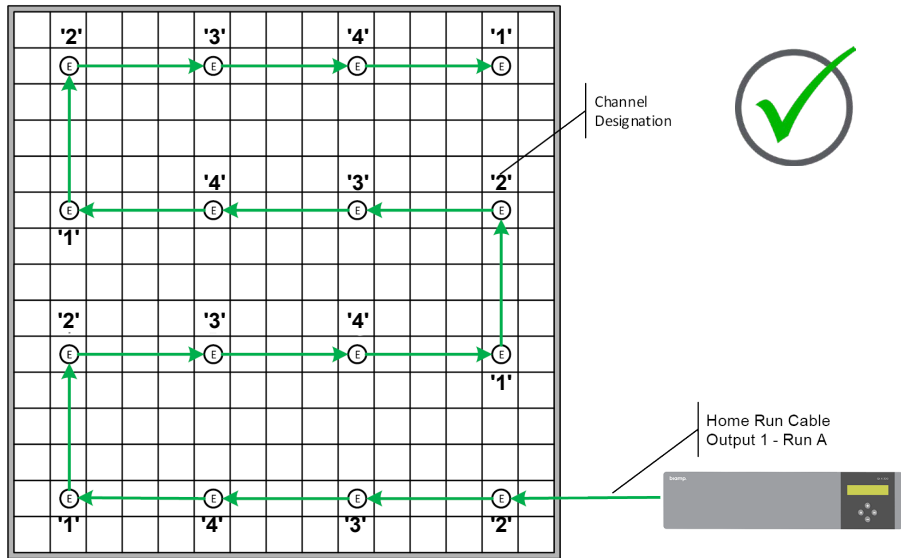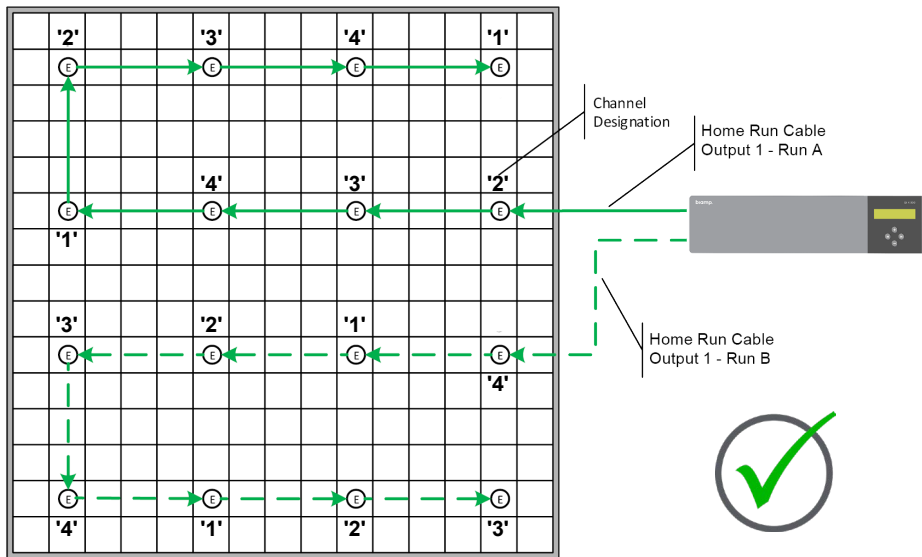
INCORRECT
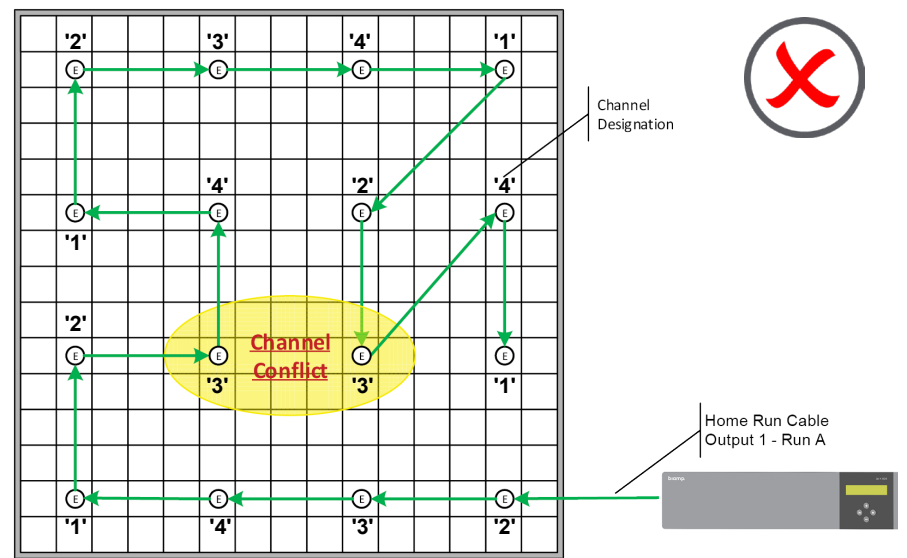
Emitter Installation in Hallways or Corridors

Emitter spacing in hallways and corridors should adhere to the same spacing standards as used for larger open offices, with the distance between emitters being based on emitter mounting/ceiling heights. See Figure 22. Minimum and maximum distances from walls and other obstructions should also be maintained, as outlined for open space sound masking deployment. (See Emitter Spacing table)

It is preferred that each hallway/corridor area be treated as a separate sound masking zone to allow for independent level adjustment in most applications. This is especially important when adjoining areas of lower sound masking levels such as private offices. An exception can occur however when open office spaces are connected to a hallway or corridor as follows:

- When a wider hallway extends from an open office area, it is permissible to continue the open office zone into the hallway with no level adjustment. This may occur when hallway width is greater than the emitter spacing used for the open office.

- In cases where hallway width is less than the emitter spacing used in the open office, the space should be either a separate zone, or have the DIP switch attenuation applied at the corridor emitters. Each corridor emitter can be attenuated downward -3 dB (-1.5 dB for Active emitters) if ceiling heights/materials match and rear emitter DIP switches are used to compensate for the decrease level required.

Mixing Qt Emitter Types

Both the Qt Standard and Qt Active Emitters may be used on the same sound masking project with signals supplied by a single Qt X Controller if they are assigned to different outputs. For example, a Qt X 300 may supply sound masking with Qt Passive emitters to an open office on Output 1, while simultaneously supplying both sound masking and paging to private offices with Qt Active Emitters on Output 2. Additionally, Output 3 can supply sound masking and light music to a reception area with Qt Active Emitters.

⚠ **IMPORTANT:** Do not mix emitter types in the same output.

NOTE: Emitter type selection must be made on an output-by-output basis with the web interface or Qt X software. Passive emitters are the default type for the Qt X 300/600 models.

Corridor - Single zone extension of an open office

Corridor - Separate zone from an open office

Figure 22. Emitter placement / zones in hallways

SPEAKER INSTALLATION *(Qt X 800/805 models)*

The models (DS1357, DS1398) are indirect 8 Ohm loudspeakers. The DS1357 is designed to be suspended by a central wire in open ceilings. The DS1398 can be installed under floor or over ceiling tiles by using the They can be daisy-chained with another speaker (same model) for a maximum of 2 per output. Most designs will just call for a single speaker per output. The DS1320 is an active emitter with a 2-wire connection and can be installed in drop ceilings. The maximum cable distance for each (DS1320) output is 55 ft (16.8 m) when using 16 AWG wire.

DS1357 Installation

1. Run 2-conductor wires from the controller to each speaker location.

2. Install the speaker at the designated height by suspending it with a steel cable (installer supplied) from the center eyebolt. Each speaker should be installed at the same height (from the floor), consistent with the other DS1357 speakers in the space.

3. Connect the conductors from the speaker lead matching the positive and negative conductors to the home run cable and secure with approved connectors. The signal cable must have enough slack to keep it from acting as part of the device suspension.

4. Once the system is powered with the output assigned to a zone and configured, the signal intensity may be further adjusted using the Qt X software or web interface.

DS1398 Installation

1. The speaker may be installed in select raised access floor systems or in shallow ceiling plenums. An optional mounting bridge is available for use in plenums where other sound masking speakers aren't feasible. Please contact the Sound Masking Design team for specific information on use in under-floor systems.

2. Run 2-conductor wires from the controller to each speaker location.

3. Remove the plate to access the speaker lead. Run the incoming cable through the strain relief and connect the conductors matching the positive and negative conductors to the home run cable. Secure connections with approved connectors, tuck them back into the opening. Reattach the cover.

4. Once the system is powered with the output assigned to a zone and configured, the signal intensity may be further adjusted using the Qt X software or web interface.

DS1320 Installation

1. Run 2-conductor wires from the controller to each speaker location.

2. This emitter can be installed in a ceiling tile the same way as the Qt Active emitter, but must use a 2-wire connection from the controller. The RJ45 jacks and internal amplifier is disabled. The ceiling tile should have a hole cut in the center of the tile.

3. The emitter can be pushed through the front of the tile and secured with the knob. Strip and secure the incoming cable conductors in the euroblock connector. Plug the connector into the jack in the rear of the emitter.

4. Once the system is powered with the output assigned to a zone and configured, the signal intensity may be further adjusted using the software or web interface.

System Architecture

Outputs across the controller or network can be assigned to any zone in the system for a virtual grouping of loudspeakers. Differing types of devices can be connected to the controller as long as they are connected to different outputs (Figure 23). Device type and Zone content should be defined by the system plan delivered by the Applications Design Team.
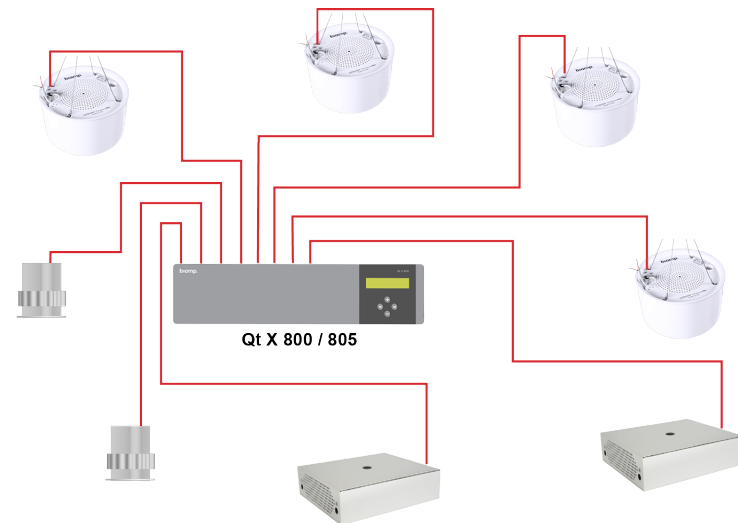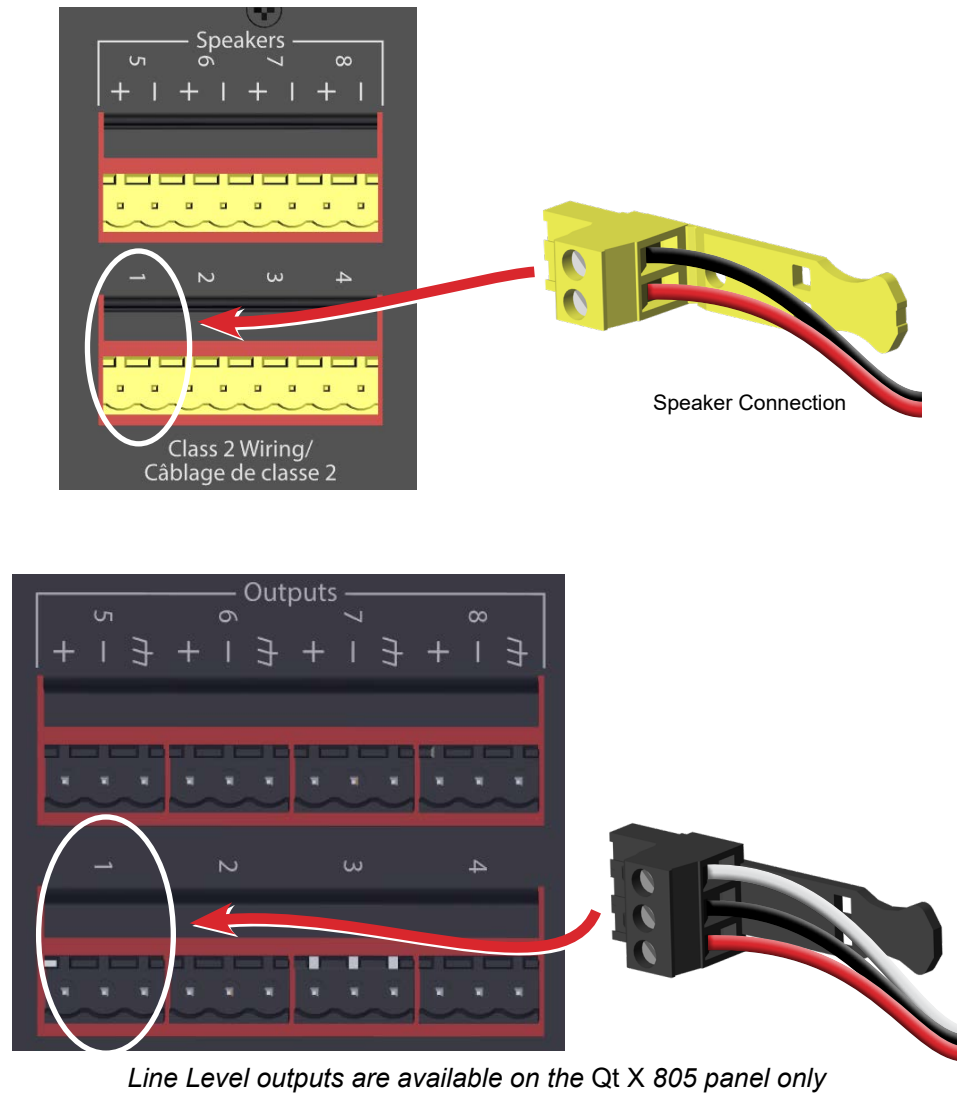

Figure 23. Different speakers may be attached to the controller

Speaker Installation *(Qt X 800/805 continued)*

Please observe the maximum cabling distance from the controller to the speakers described in the illustration (Figure 25).

Line Level outputs are available on the Qt X 805 panel only

Figure 24. Class 2 Speaker (top) and Line level (bottom) output connectors / wiring

⚠️ **IMPORTANT:** Qt X 805 panel - Speaker connections can be made to the same numbered output on both output options, but the settings are mirrored on the same numbered outputs (either Line level or Class 2 speaker). See Figure 24. Due to the inability to separately adjust settings between line level and amplified outputs of the same number, we recommend that only one output type be used of each number in most applications.

Example: Speakers are connected to Speaker outputs 1, 2. 6, 7 and 8, and Line Level outputs are connected to 3, 4, and 5.
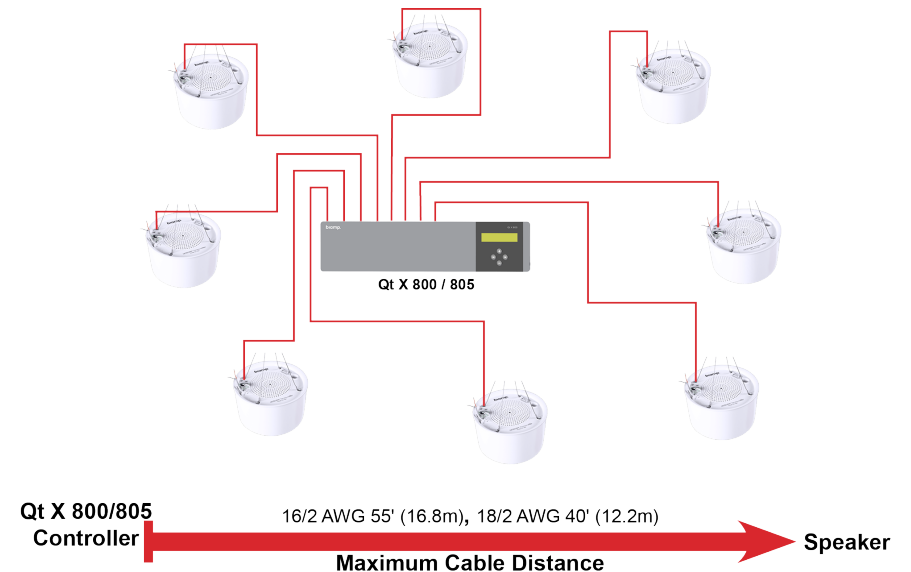
Figure 25. Speaker output connectors - maximum cable length

Speaker Installation *(Qt X 800/805 continued)*

70V/100V Speaker Installation *(Qt X 805/805D models)*

The Qt X 805/805D controllers provide a cost-effective option for controlling large runs of 70V/100V speakers by using the Line Level outputs (see Figures 24 and 26). Each output can control sound masking on a single 70V/100V amplifier channel. Biamp recommends that each channel can run 70V/100V loudspeakers tapped at 1W and the total should not exceed 80% of the rated power for that channel.

Example: Each channel on a 2-channel 70V/100V amplifier is rated for 100W per channel. Up to 80 loudspeakers with their taps set at 1W can be placed on each channel.

This option is best used in large architecturally open areas where the sound masking levels, ceiling architecture, and mounting heights are consistent.
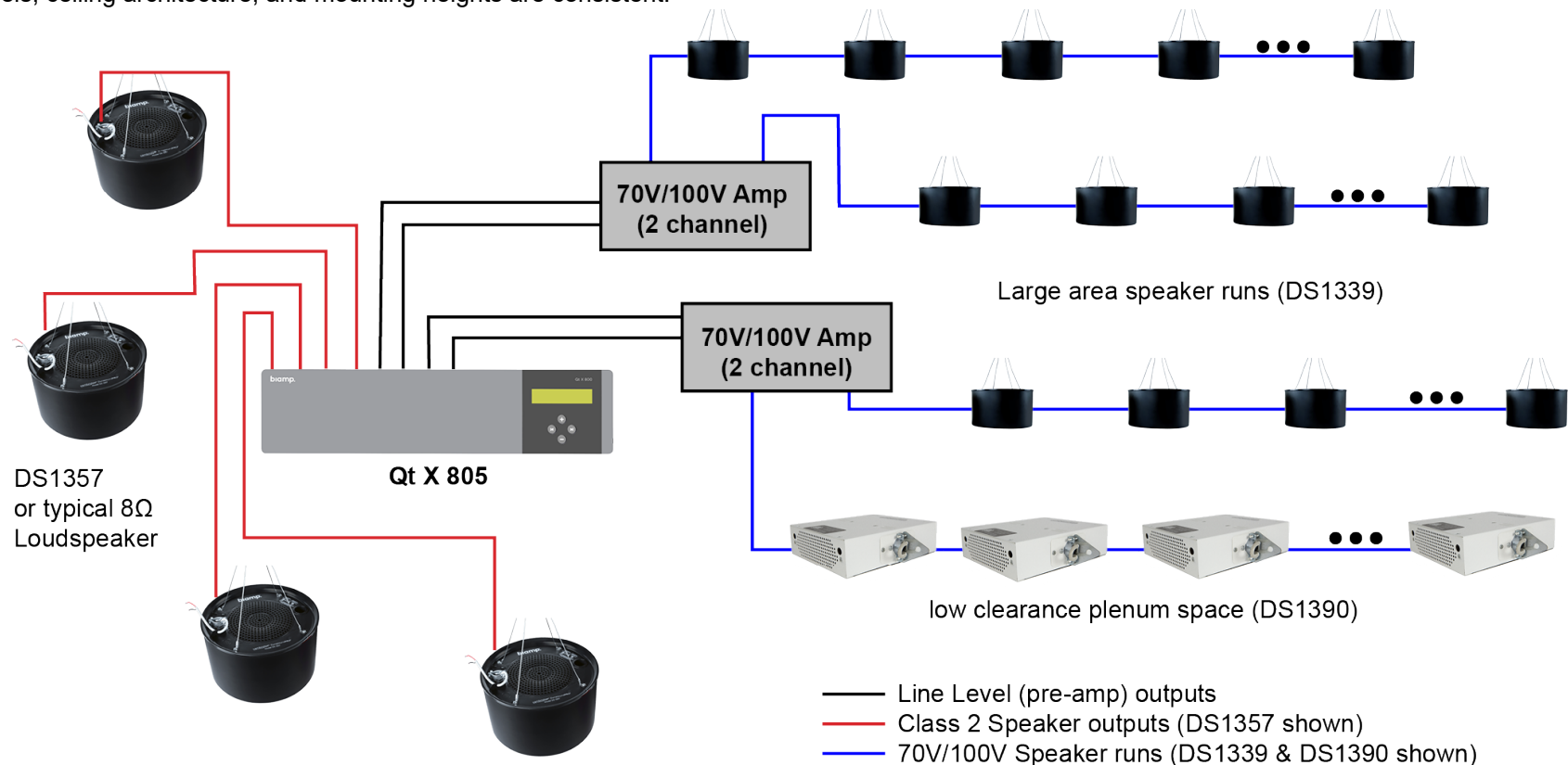
Figure 26. Mixed line level and speaker outputs

INTERACTING WITH A Qt X SYSTEM

There are (4) methods of accessing and configuring the system with differing levels of what can be viewed or affected. The front panel of each unit has very basic functionality - limited to basic information and operating mode of that particular controller. The web user interface gives the installer/user additional access to the networked system and can discover devices, assign outputs to zones, set levels, and manipulate devices in the system. The Qt X software is the most versatile and comprehensive method of controlling a Qt X system. The Qt X software can also help a user design a sound masking system for a location, configure/manage the system settings, control user access levels, and manage system security or protection.

Controller Front Panel

The individual control panel menu give you access or control of this:

- FW version number
- Fault status message
- Hostname
- MAC address (Control)
- IP Address (Control)
- Netmask (Control)
- MAC Address (Media)
- IP Address (Media)
- Netmask (Media)
- Zone Audio level

Qt X Web Interface *(online help file <link>)*

The web interface allows you access or control to:

- Discover devices and assign them to a system
- Configure a sound masking system
- Create zones and assign outputs to them
- Define the Logic I/O for each controller
- Add and/or configure Audio sources
- Manage and configure Inputs, Zones, and Outputs
- Manage schedule and "Soft Start" planning
- View status and send changes to Zones, Devices, Faults, Outputs, Date/Time and System Info
- View or make changes to system, device and network settings
- Update firmware
- Set user security and access levels

Qt X Software *(online help file <link>)*

The Qt X software provides the following design and control elements:

- Design a sound masking system
    Import a floor plan
    Add / Configure Zones
    Add / Configure Qt X Controllers
    Add Emitters or Speakers
    Connect them to Outputs
    Save the system configuration
    Output fault monitoring for passive emitters (Qt X 300/600 controllers)
- Discover devices (Qt X & NPX)
- Configure a system
    Assign outputs to zones
    Rename Devices
    Assign NPX devices (physical device & controller proxy)
    Assign Audio Sources
- Configure and send system settings
- Define / Change system properties
- Filter and group systems and devices
- Adjust Output and system Zone levels, including changing individual and batched sound masking or streamed audio settings to a live system
- If there are NPX stations in the system, configure the page codes, assign them to the appropriate zones and schedule precorded pages
- Manage schedules (system, pages) and "Soft Start" planning
- Update Firmware
- Define system security, passwords and user access settings - Qt X devices are shipped in an 'unprotected' state to allow installers to configure and use the device without requiring explicit authentication or authorization
- View and manage security certificates

Qt X API / Plug-in *(online help file <link>)*

The restful API will allow external device control of the Qt X system by interfacing to it through documented commands.

Interacting with a Qt X system *(continued)*

Controller Front Panel Menu / Functionality

When the panel is powered up and connected, you can navigate through the basics of the system using the 4 push buttons under the front panel display. What you will be able to view is based on whether the controller is unconfigured (not part of a system) or configured (part of a defined network system). You can view the IP address and name of the device, the network mask of the device, and the current operating mode of the device - configured, unconfigured or updating firmware.

All Qt X controllers are pre-loaded with a default configuration where every output is assigned a specific output 1-> zone 1, output 2 -> zone 2, etc. To connect this controller to a larger Qt X system, the existing configuration needs to be removed/erased. This can be accomplished within the web interface or in the Qt X software.

On certain screens, the user can modify the values shown:

1. Press the down button to enter edit mode; cursor appears.

2. Up/down buttons rotate through 0-9.

3. Right/left buttons move cursor forward/backward.

4. Moving past the last character exits edit mode.

Qt X 600

HOSTNAME:
Qt X-600-23456789

Unit's Model & Serial Number

Typical front panel display *(simulated)*

View the following information:

- Hostname
- MAC address (control)
- DHCP (control)
- IP Address (control)
- Netmask (control)
- MAC Address (media

- DHCP (media)
- IP Address (media)
- Netmask (media)
- FW version number
- Status message
- Audio output level - up/down buttons will increase or decrease the volume level

NOTE: The audio levels can be modified from the front panel after system configuration, but will not be reflected in the software or web UI unless it is refreshed. This is accomplished by (closing and) opening the window in the software or "refreshing" in the web UI).

Interacting with a Qt X system *(continued)*

Qt X Web Interface

The Qt X Web Interface (or web UI) is a browser-based user interface and contains almost as much functionality as the Qt X Software. This web interface allows users to configure sound-masking control devices in a sound-masking system, assign devices to sound-masking zones, configure audio controls and additional functions that comprise a biamp sound-masking system. It can be accessed by inputting either the IP address or device name of the controller, or by clicking the device name in the software when connected to the system.

NOTE: You must be on-site and directly connected to the device, or on the same VLAN or subnet that the system is on.

IMPORTANT: Different setting options will be available depending on if devices are a part of a configured system or not. Please refer to the software help <here> or the Web UI help <here> for additional information on configuring a system or specific settings.

Interacting with a Qt X system *(continued)*

Qt X Software

The Qt X Software allows sound masking system designers to create and customize layouts that define how Qt X sound masking controllers, emitters, speakers, NPX paging stations, and supported audio devices integrate within a floor plan and building infrastructure. Once the equipment is installed and available on the network, it is easy to configure and control the system by utilizing the same Qt X software. The design file can be opened and all of the networked devices can be discovered and paired with the representations in the system design. Outputs and input devices can be identified and assigned to Zones, logic and contact behaviors can be defined, page codes can be assigned to zones, and security can be enabled to protect the system from unauthorized changes.

There is a robust help file describing the elements of system design and configuration. The help file can be accessed <here>.

NPX Paging Stations

There are four NPX models: 4- and 10-button models with either a gooseneck or handheld microphone. Network device discovery and system configuration in the Qt X Software is supported in v2.2 (and later) firmware / software release. Qt X software can update the NPX stations' firmware intelligently via a separate firmware file.

Paging audio is sent to the system via AVB or Dante streams as determined in Qt X system settings. Paging Audio (levels, compression, filters) is configured in the NPX paging section of the Qt X software setup. Page codes and their settings are also managed, scheduled, and assigned to system zones in the software. Refer to the Qt X software help for additional information.

NPX H1040

NPX G1040

NPX H1100

NPX G1100

Set levels

Page Code settings

Page Code management

COMMISSION THE SYSTEM *(next steps)*

Once all of the components and their peripherals have been installed and are operational, they need to be configured into a networked sound masking system. Additional information to explain each of the configuration steps is available in both the Qt X Software help and the Qt X Web Interface help files.

Suggested order of operations for installation & commissioning a typical sound masking system.

❏ Discover controllers and NPX devices connected to the network

❏ Configure the system using the Qt X Software or web interface

   ❏ Configure controller's IP Address, Network Operation Mode (single / dual network cable)

   ❏ Add all controllers by serial number to proper location *(Qt X software)*

   ❏ Add NPX paging stations to the system with physical device and controller proxy assignment *(Qt X software)*

   ❏ Update firmware for all controllers / devices *(NPX devices must be updated via Qt X software)*

   ❏ Create zones as required

   ❏ Assign controller outputs to zones

   ❏ Assign appropriate loudspeaker type(s) to each controller's output

   ❏ Create music paging Audio Sources and assign to Zones (ensure emitter / loudspeaker type in use supports audio sources)

   ❏ Define behaviors of input and outputs

   ❏ Set zone sound masking levels (42dBA SPL to 48dBA SPL) using a calibrated sound pressure meter. Measure at 4ft. (1.2m)

   ❏ Adjust masking spectrum equalizer for each output as necessary to meet project requirements

   ❏ Create / configure page codes associated with NPX paging stations and assign them to zones

❏ Set system security / user levels and document passwords

   Important: Record the admin user name and password and keep with the system documentation. If the Admin level ID and password is lost there isn't a means to recover it.

❏ Go through each zone testing / adjusting levels, checking behavior

   ❏ Set Audio Source levels

   ❏ Capture final sound masking spectrum and sound pressure level measurements for reporting if required

   ❏ Set background music and paging levels, and confirm paging behavior for each zone (if applicable)

❏ Set soft start, sound masking schedules, schedule pages, etc., as necessary

❏ Document the schedules on a copy of the System Information Worksheet (on page 39 of this guide) and leave it with the system administrator

❏ Save / backup system configuration using Qt X software

Setting Sound Masking Levels

Target sound masking levels may vary from area to area throughout a facility based on use. Multiple controller outputs as well as multiple controllers may serve virtual zones of sound masking making user control and adjustment of simplistic. Outputs may be adjusted independently to compensate for emitter/loudspeaker mounting heights and architectural conditions present. Each virtual zone of Qt X sound masking may serve specific architectural spaces and include background music and/or paging signals (when used with supported emitter/loudspeakers) by using external audio sources. Best practice in setting sound masking levels is to use a sound level meter. Typical sound level targets to create effective / comfortable sound masking for common office environments are as follows:

Zone Type	Measured dBA SPL
Private Office Zones	38-43 dBA
Open Area Zones	44-48 dBA
Corridors	42-45 dBA
A-weighted sound masking levels in dB SPL as measured 4ft (1.2m) above finished floor using a calibrated sound pressure level meter. (Class 1 SPL Meter / Microphone recommended)	

If no sound level meter is available, the levels above may be achieved in most environments by setting the Qt X sound masking volumes as follows:

Zone Type	Qt X Zone Setting	Ceiling Height
Private Office Zones	-5 dB to -1 dB	All ceiling heights
Open Area Zones	+1 dB to +4 dB	8 ft (2.4m)
	+3 dB to +6 dB	10 ft (3 m)
	+5 dB to +8 dB	12 ft (3.7 m)
Corridors	0 dB to +2 dB	All

Note: Levels based on individual output levels set to 0 dB

In cases where sound masking levels exceed these recommendations, especially in extremely quiet environments, occupant acceptance will diminish greatly leading to occupant complaints. This can result in dissatisfaction with the sound masked environment and a request by staff for eventual lowering of sound masking levels, ultimately reducing the effectiveness of the system. For this reason, each zone of a Qt X sound masking system should be calibrated and adjusted precisely upon installation completion using calibrated measurement equipment by the qualified installer.

Once sound masking levels are optimized for a space, it is always recommended to that they remain consistent indefinitely as very small changes in level can be noticed by building occupants as they occur. It is permissible however to adjust sound masking in small increments over long time spans at specific times of day using scheduling functionality. Reducing a sound masking levels at night (under conditions of little to no building occupancy) can be beneficial for security staff to hear/detect intrusion. Qt X provides daily scheduling functionality which allows attenuation of the sound masking levels between specific time frames to meet reduced masking level needs. These schedules include a "ramp duration time" in which the change in level is to occur, extending the gradual level adjustment across multiple hours slowly. This slow change in sound masking level helps to avoid detection of level changes by remaining building occupants. The table below indicates the recommended ramp duration time based on desired sound masking attenuation;

15 Minute Ramp Duration	<1 dB attenuation
30 Minute Ramp Duration	1 dB to 1.5 dB attenuation
60 Minute Ramp Duration	2 dB to 2.5 dB attenuation
90 Minute Ramp Duration	3 dB to 4 dB attenuation
120 Minute Ramp Duration	>4 dB attenuation

Effectiveness of a sound masking system is dependent on adequate volume level. Occupants will typically become accustomed to the sound masking noise.

If a sound masking system is introduced to a location that was previously occupied, it is necessary to introduce the sound masking to the occupants gradually. To do this the installer must use the "Soft Start" feature (configurable in both the Qt X software and web interface). This provides an adjustment time period to slowly introduce the sound masked environment over a period of days/weeks. If the location is new, or was not previously occupied a Soft Start is not necessary.

Soft Start recommended settings -

Open Office	Set the attenuation to -5 dB over the course of 2 weeks
Private Office	Set the attenuation to -3 dB over the course of 1 week

See the Qt X software help <here> for more details on setting sound masking levels.

ACCESSORIES

Qt X Controller Accessories

Rack Mount Kit (Qt X RMT-KT) – allows a Qt X 300, 600 or 800 to be mounted to a rack. See instruction to change from a wall mount (Qt X 300/600) or install in a rack (Qt X 800).

Wall Mount Kit (Qt X WMT-KT) – allows a Qt X 800 or 805 to be mounted to a wall and includes the wall bracket. See instruction to change from a rack mount (Qt X 805) and install on a wall.

Plenum Mount Kit (Qt X PLMT-KT) – allows a Qt X 300/600 or 805 to be mounted in a plenum space and includes the mounting brackets. See Plenum Bracket instruction to change from other mounting options.

48V Power Supply Kit (Qt X PWR-KT-48V) – includes a 48V power supply, power cord, bracket and hardware for use with a Qt X 800/805 models.

PoE+ Class 4 Power Injector (POE29U-1AT(PL)D-R [91x.0004]) – plenum rated - provides power to the Qt X 800/800D.

NMS-NG10GPX-AVB Switch – equipped with 8 PoE+ ports, it can power up to 8 Qt X 800 controllers. Provides an out-of-the-box solution with AVB licenses preloaded and configurations ready for Qt X applications.

NMS-NG26GPX-AVB Switch – equipped with 24 PoE+ ports, with 480W of total power. It can power Qt X 800 controllers and NPX paging stations. Provides an out-of-the-box solution with an AVB license and configurations preloaded for Qt X networked systems.

Qt Active Emitter Accessories

Power Supply (PS-AE-3) – has 3 outputs and can provide power for 1-3 PI-AE power injectors

Power Injector (PI-AE) – has 2 channel outputs - each channel will power up to 25 Qt Active Emitters in a single run

Emitter Mounting options

Universal Bracket (AE-UB-W, AE-UB-B) – Mount the Qt Active or Passive emitter to a wall or ceiling

Beam Bracket (AE-BB-W, AE-BB-B) – Mount the Qt Active or Passive emitter to exposed I-beams or trusses

Pendant Mount (PM-W, PM-B) – Suspend Qt Active or Passive emitters at an optimum height in open or raised ceiling spaces.

Drywall Mount (DM) – Mounting bracket for Qt Active or Passive emitters in drywall ceilings

Drywall Rough-in Bracket (DRB-1) – Install before drywall ceiling is hung. (DRB-1 Kit includes the Drywall Mount)

Ceiling Conduit Mount (4-pack) (CCM-1) – For mounting the emitter into acoustic ceiling tile or drywall in regions with special fire and/or conduit requirements. Ceiling tile and drywall mounting rails included. Compatible with both Qt Active and Passive emitters.

Conversion from Wall Mount to Rack Mount

1. Remove the wall mount bracket from the controller and reserve the M4 screws to attach the rack mount brackets later (Figure 27).

2. Disconnect the power supply supporting bracket from the wall mount bracket (Figure 28).

Power Supply
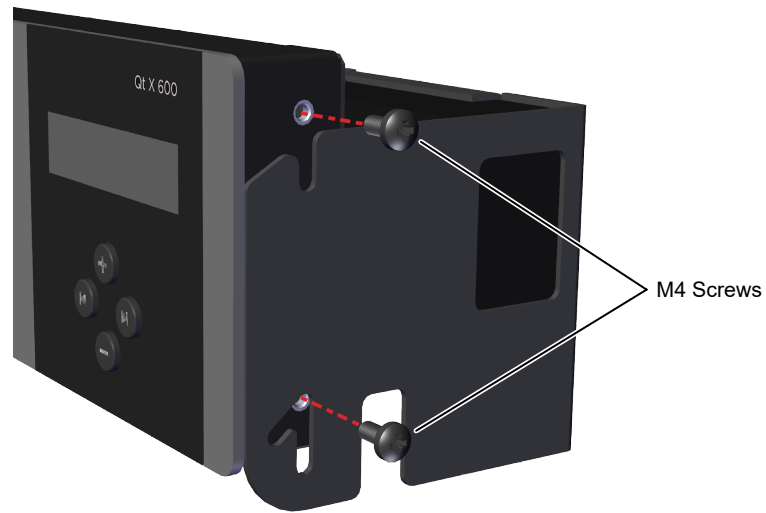
M4 Screws

Figure 27. Remove screws and panel from wall mount bracket
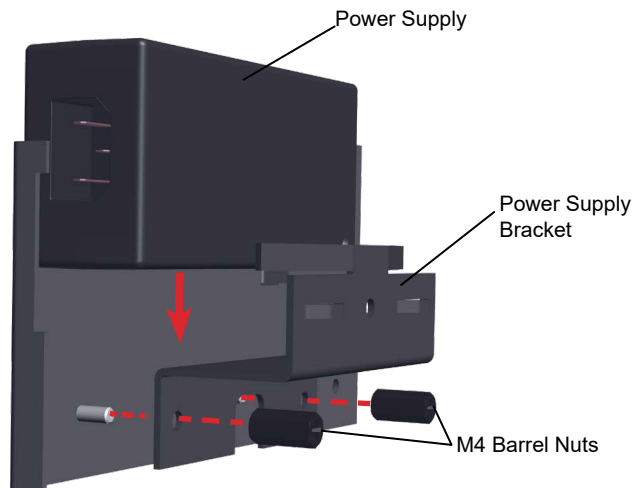
Power Supply Bracket
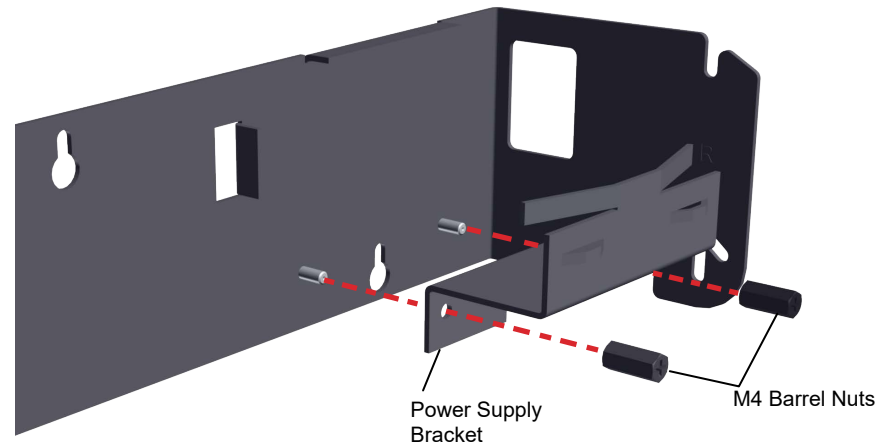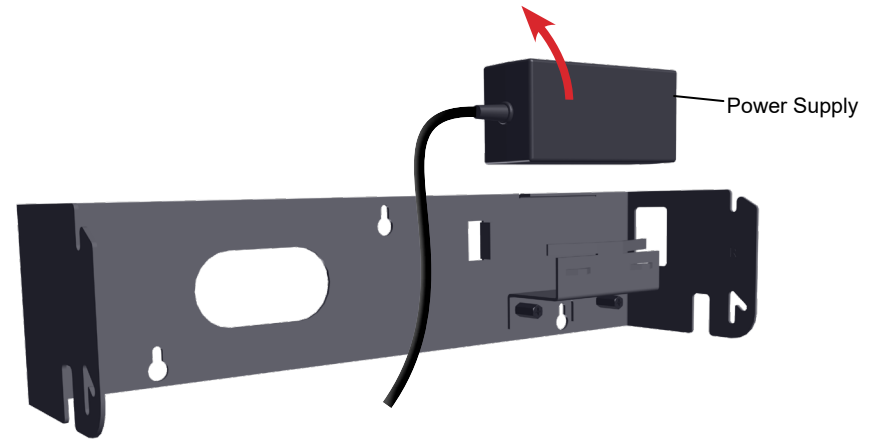
M4 Barrel Nuts

**Figure 28.** Remove power supply and bracket

NOTE: *Older models may have standard M4 hex nuts instead of M4 barrel nuts.*

Conversion from Wall Mount to Rack Mount *(continued)*

3. Attach the power supply bracket to the longer (R) rack ear with 2 M4 barrel nuts and insert the power supply with power cord outlet located to the back (Figure 29).

4. Attach the rack ears to the Qt X device with the M4 screws removed in the first step. Mount the longer one with the power supply to the right side on the controller. The brackets and controller are marked with R/L. Match the bracket to the appropriate side of the controller (Figure 30).

5. Secure the Qt X device to the rack via the rack ears as shown in Figure 31. Hardware to attach the unit to the rack is not included. Plug power cord into the rear of the power supply.

NOTE: It may be easier to make all of the connections to the back panel prior to securing the controller to the rack. The controller will not rotate forward to allow access to the back panel when secured to the rack ears.

TIP: Use cable ties to constrain extra cable lengths for a neat appearance and to reduce tangles.

Figure 29. Reinstall bracket and power supply on long rack ear
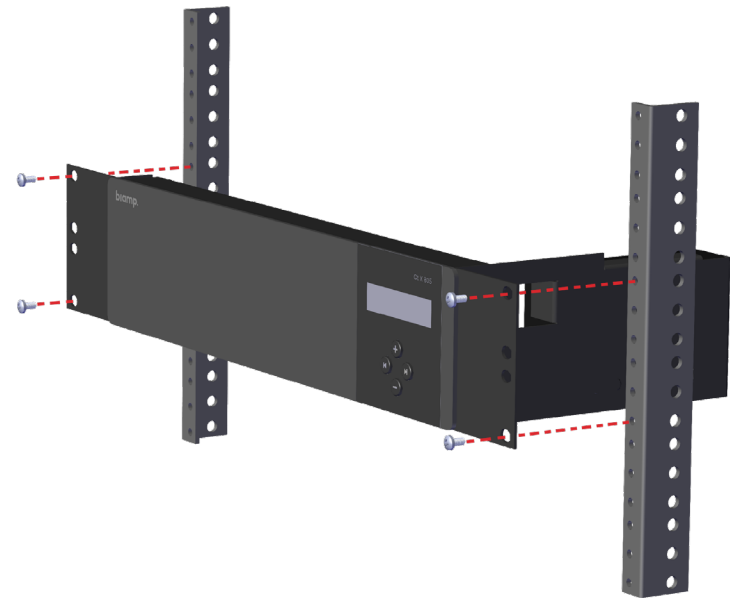**NOTE:** *Older models may have standard M4 hex nuts instead of M4 barrel nuts.*
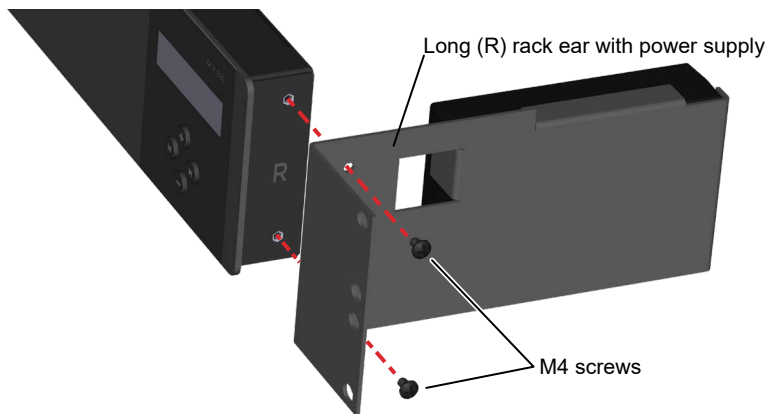
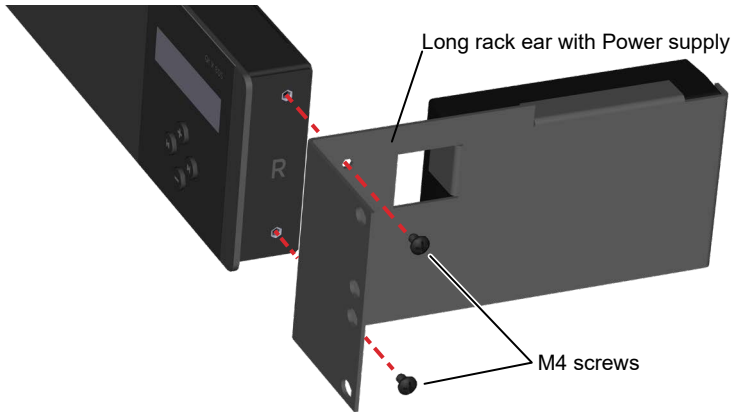
Figure 30. Attach rack ears to the controller

Figure 31. Attach controller assembly to the rack (hardware not provided)
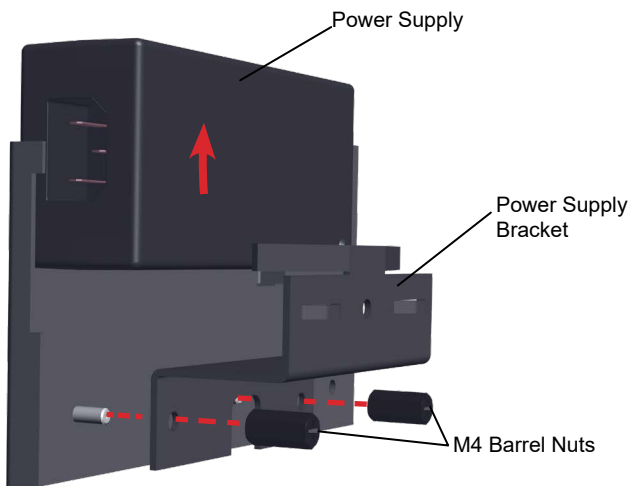
Conversion from Rack Mount to Wall Mount

For Qt X 805 controllers start at step 1. If you are converting a Qt X 800 controller to a wall mounted unit with a 48V power supply, you will need to have both the wall mount kit and the power supply kit. Start with Step 3.

1. Remove the rack mount brackets from the controller and reserve the M4 screws to attach the wall bracket later (Figure 32).

2. Disconnect the power supply supporting bracket from the longer (R) rack mount bracket. Reserve the barrel nuts for reattachment to the wall bracket (Figure 33).

3. Attach the power supply bracket to the wall mount bracket with barrel nuts on the threaded studs loosely as shown. Insert the power supply with power cord outlet located against the side hole provided for power cord access) and tighten the hardware (Figure 34).

Figure 32. Remove rack brackets from the controller

Figure 33. Remove bracket and power supply from long rack ear
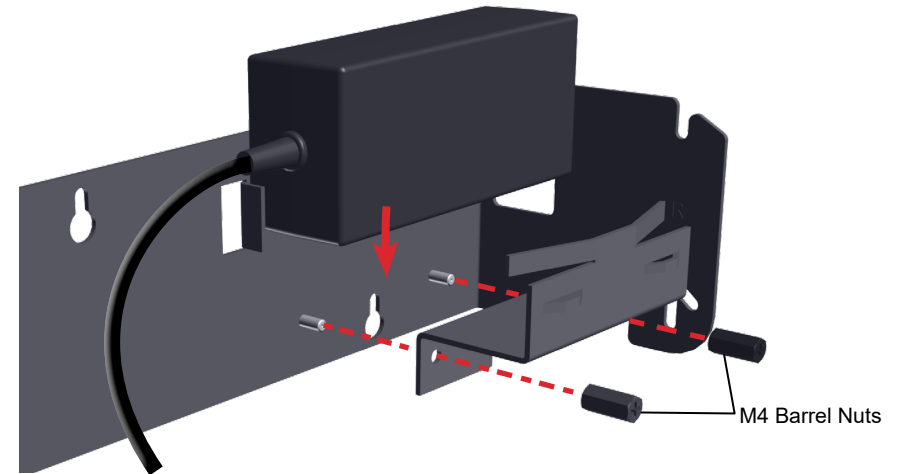
Figure 34. Attach bracket and power supply
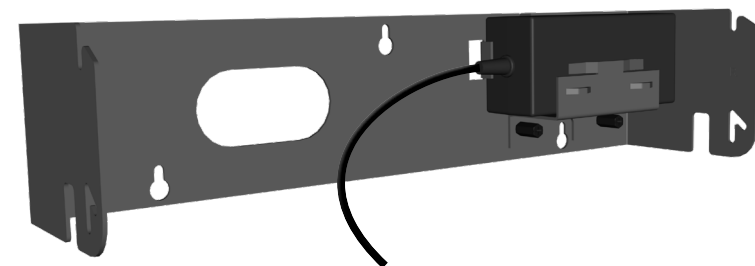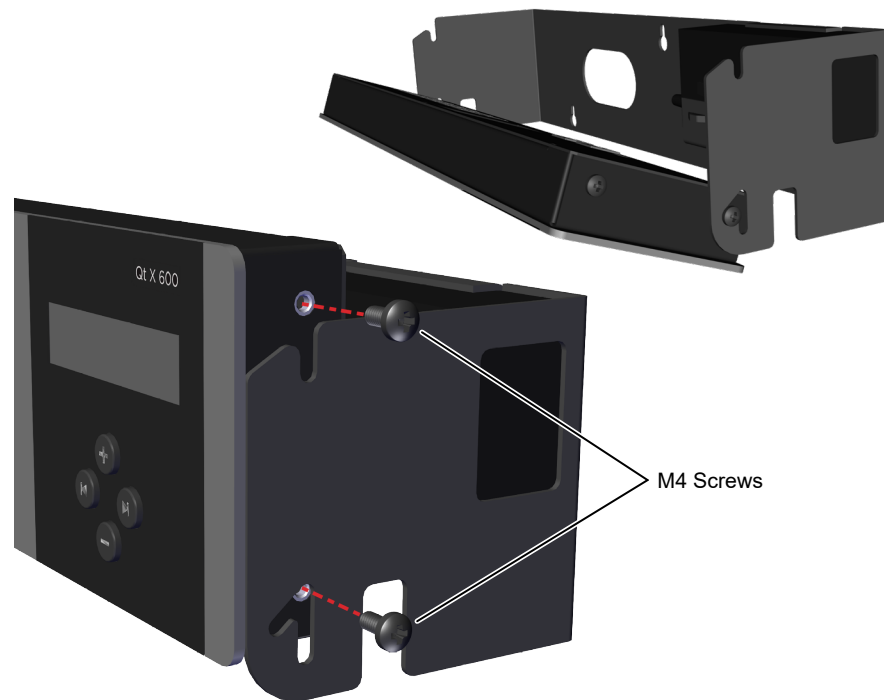

Assembled bracket with power supply.

NOTE: *Older models may have standard M4 hex nuts instead of M4 barrel nuts.*

Conversion from Rack Mount to Wall Mount *(continued)*

4. Place the mount on the wall and mark the hole locations. If installing into drywall/sheet rock, drill the mounting holes with a 1/4" drill bit, and insert plastic mounting anchors into the drywall/sheet rock.

   Important: If using the wall mount bracket as a template to drill into the wall, do not connect it to the control unit until after the wall has been drilled. This prevents dust and debris from getting into the Qt X connectors and ports.

5. Attach the controller to the wall bracket by aligning the lower holes on either side with the angled slot. Install the lower screws, but do not tighten, allowing the bracket to move. Loosely install the upper screws without capturing the upper slots in the bracket (Figure 35). The control module rotates forward for wall mounting and cable installation.

6. Install the screws into the plastic anchors leaving enough room for the bracket to be hung on the screw heads. Place the bracket so the screw heads fit into the keyholes and then move the bracket down to capture the screws. Tighten the screws to secure the bracket to the wall (Figure 365).
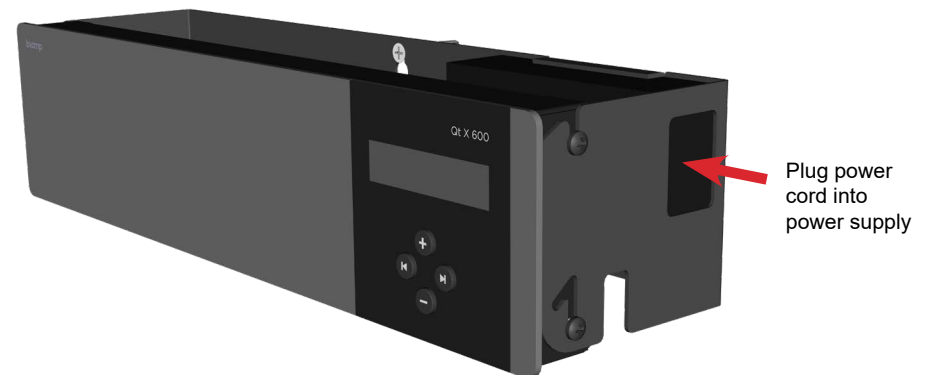
   Note: Keep the controller rotated down to make it easier to tighten the mounting screws.

7. Connect all wiring/cabling as described in Wiring & Connections. Rotate the Qt X up and move down into the operating position to lock into place. Tighten the side screws to secure it to the bracket (Figure 37).

   Tip: Use cable ties to constrain extra cable lengths for a neat appearance and to reduce tangles.

M4 Screws

Figure 35. Mount unit to wall bracket and rotate down
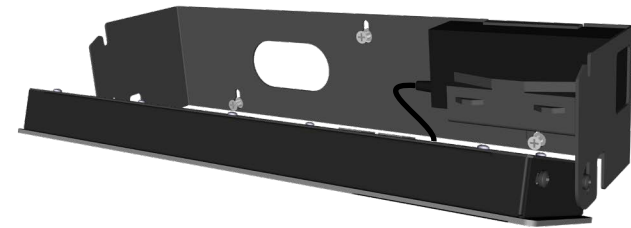
Figure 36. Mount unit / wall bracket

Plug power cord into power supply

Figure 37. Controller in operating position
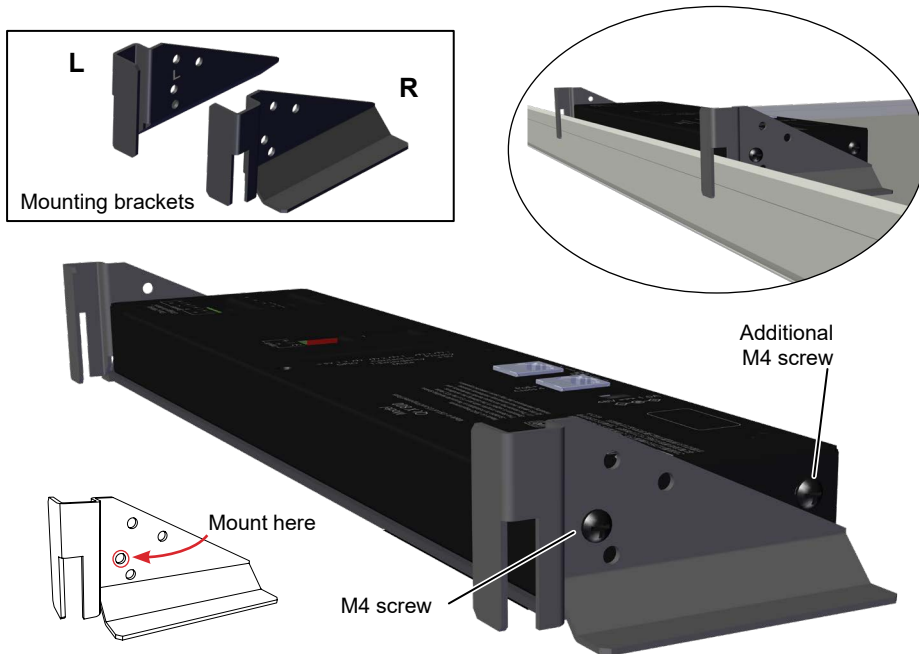

Plenum Bracket Installation

A pair of mounting brackets and M4 screws are included with the plenum bracket kit. They can be positioned as shown below in any of 3 configurations to fit over a ceiling rail (shown in the smaller inset images). Chose the orientation that best fits your application (Figures 38-40). Orient brackets as shown – right (R) and left (L).

Remove the controller from any other bracket reserving the M4 screws for plenum bracket attachment. Secure each bracket with a screw threaded in the appropriate hole as noted on the smaller bracket drawing for each configuration. Both brackets must be installed in the same configuration to adequately secure the panel. Tighten the screws so that the controller doesn't move in the brackets.
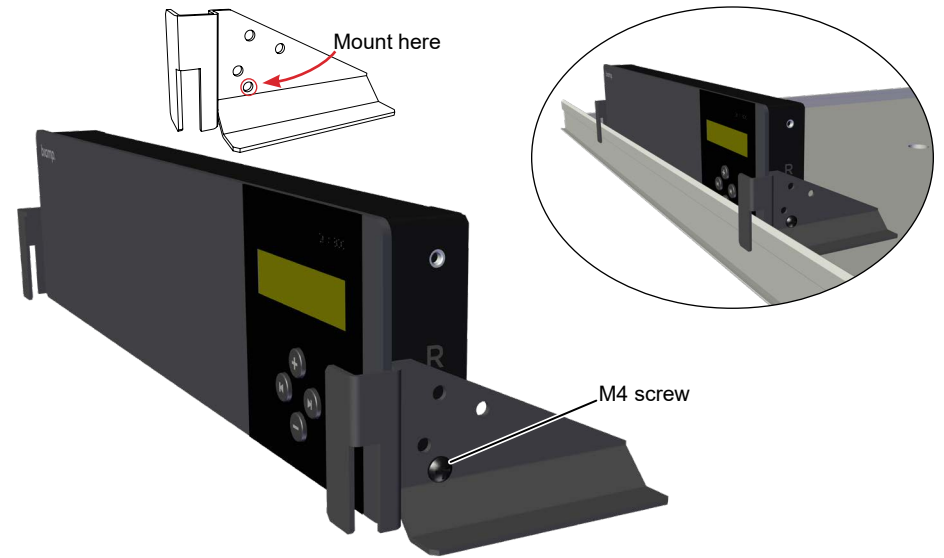
A safety cable may be threaded through any of the open holes to prevent movement and/or further secure the unit in the ceiling.

Important Notes:
1. If the panel is installed in the face down position (below), an additional M4 screw must be installed in the lower holes on each side to prevent panel movement.
2. All wiring must be plenum rated if it is installed in a plenum space.
3. The installer is responsible for sourcing and installing the proper safety cable to meet all applicable local building codes and standards.

Figure 39. Base of controller is flush with the bottom of the brackets

Figure 38. Controller is face down against the ceiling tile with an additional M4 screw on each side to prevent panel movement
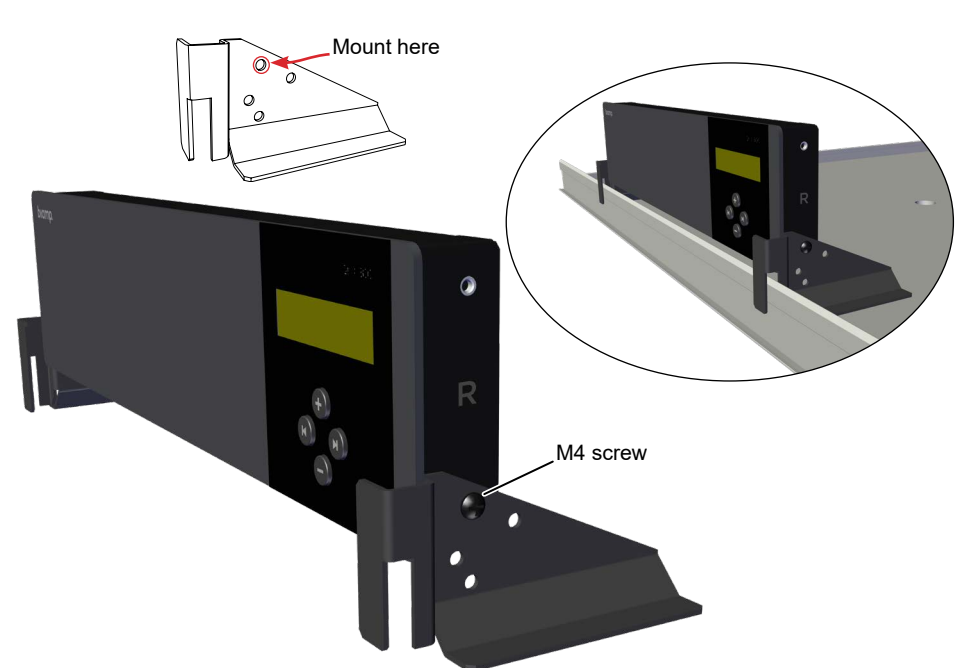
Figure 40. Controller is raised above the rail

Accessories *(continued)*

Room Control (QT-RC3)

⚠️ **VERY IMPORTANT:** Use of the Qt-RC3 room control is ONLY recommended for zones broadcasting background music or paging and only when the control needs to be accessible by building occupants. Qt-RC3 room controls should NOT be used for user control of sound masking signals except in some unique healthcare applications. Consult the Cornerstone document <link> for more information. NEVER use Qt-RC3 room controls for private office control of sound masking signals.

IMPORTANT: The status of the output volume to the area controlled by the Qt-RC3 is not reported back to the system controller, so visual/manual verification of the Qt-RC3 knob position is necessary to determine the output level in each individual room.
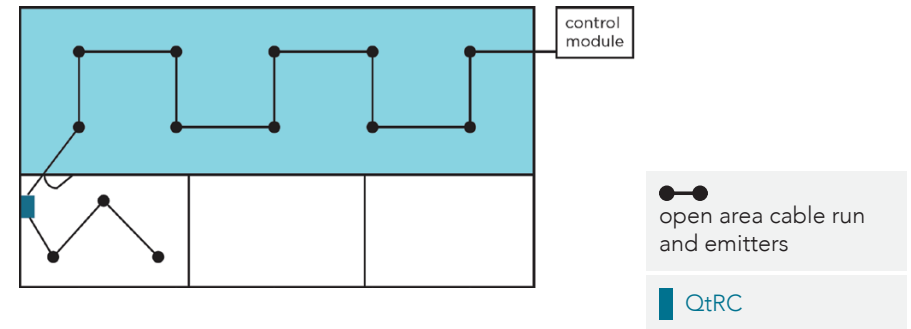
The Qt-RC3 room control may be used with Qt X 300/600 models in certain circumstances for localized control of sound masking, background music, and paging signals (all signals routed to the zone are affected). The Qt-RC3 connects in-line with emitters through an input port and passes the signal through an output port. The room port on the Qt-RC3 controls the sound level of up to eight emitters. Inserting the room control in-line with the cable run counts as two emitters on the run thus decreasing the total run count by two emitter devices.

Two layouts are presented at right *(Figure 41)*:

1. One output from the controller with a Qt-RC3 at the end, controlling a closed room. Since the desired volume level for closed offices is less than for open ones, the Qt-RC3 should be used to turn the volume down to a more comfortable level for that space.

2. Two outputs from the Controller: This is the optimal layout when using Qt-RC3s. The cable run from the first output covers the open area while the second output cable covers the three closed rooms. The second output's cable goes to the first QT-RC3 and uses its built-in splitter to connect to the next QT-RC3, and then to the next. Each RC3 then connects to emitters in the room from the "Room" output jack to create a mini control area. After installation, each room should have the same maximum volume while the emitters in each room can be turned down by each room's Qt-RC3.

The full Installation and Operation Guide for the Qt-RC3 can be found in the Cambridge Manuals section in Downloads or by searching for "QtRC".

1. Qt-RC3 in a Single Room *(at the end of a single output)*

control module

open area cable run and emitters

QtRC

2. Qt-RC3 in Closed Rooms *(1 output - open area; 1 output - closed rooms)*

control module

open area cable zone and emitters

closed area QtRC control spaces
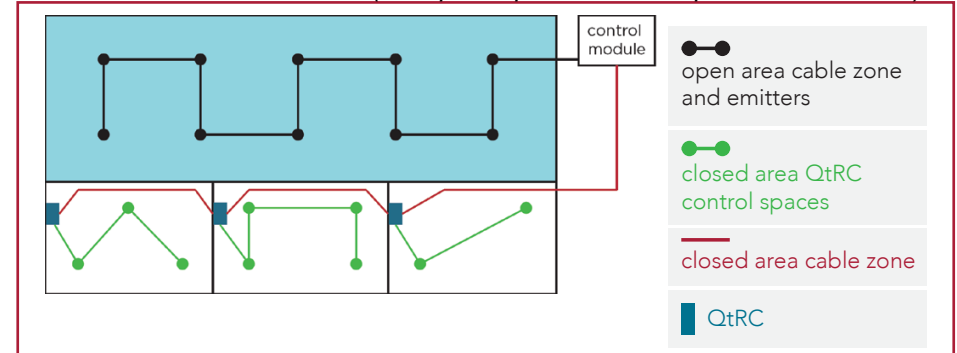
closed area cable zone

QtRC

Figure 41. Possible layouts for Qt-RC3 controlled rooms

Qt X SYSTEM INFORMATION WORKSHEET

Homerun Output Destination Record

Output #	Run A (Qt X 300/600) Class 2 (Qt X 800/805)	Emitter / Loudspeaker Type	Run B (Qt X 300/600) Line Level (Qt X 805)	Emitter / Loudspeaker Type
1				
2				
3				
4				
5				
6				
7				
8				

Qt X Controller Information

Controller Type / Serial Number: Qt X _____ / #_____

Hostname: _____

Mac Address (control / media): _____ / _____

IP Address (control / media): _____ / _____

Netmask (control / media): _____ / _____

Location: _____

Admin Name / Password: _____ / _____

Installation / Service

Company: _____

Installation Date: _____

Phone / Email: _____ / _____

Notes: _____

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Volumes / Outputs	1	2	3	4	5	6	7	8
Assigned to Zone								
Masking Level								
Paging Level								
BGM* Level								
Zone Level Controls								
Masking Level								
Paging Level								
BGM* Level								
Notes								

*BGM = Background Music

Safety Information - Multi-language

The controllers are UL 2043 approved for installation into a plenum space.
DANGER: The AC/DC power supply provided with this product has not been evaluated to UL 2043 and must not be installed in a plenum space.

Les contrôleurs sont approuvés UL 2043 pour une installation dans un espace plénum.
DANGER: Le bloc d'alimentation CA / CC fourni avec ce produit n'a pas été évalué selon UL 2043 et ne doit pas être installé dans un espace plénum.

Los controladores están aprobados por UL 2043 para su instalación en un espacio plenum.
PELIGRO: La fuente de alimentación CA / CC proporcionada con este producto no se ha evaluado según UL 2043 y no debe instalarse en un espacio pleno.

Os controladores são aprovados pela UL 2043 para instalação em um espaço pleno.
PERIGO: A fonte de alimentação CA / CC fornecida com este produto não foi avaliada para UL 2043 e não deve ser instalada em um espaço pleno.

Die Steuerungen sind nach UL 2043 für den Einbau in einen Plenumraum zugelassen.
GEFAHR: Das mit diesem Produkt gelieferte AC / DC-Netzteil wurde nicht gemäß UL 2043 bewertet und darf nicht in einem Plenumraum installiert werden.

控制器已通过UL 2043认证，可安装在通风空间中。
危险：本产品随附的AC / DC电源尚未经过UL 2043评估，因此不得安装在通风空间内。

控制器已通過UL 2043認證，可安装在通風空間中。
危險：本產品隨附的AC / DC電源尚未經過UL 2043評估，因此不得安装在通風空間內。

컨트롤러는 플레 넘 공간에 설치하도록 UL 2043 승인을 받았습니다.
위험 :이 제품과 함께 제공된 AC / DC 전원 공급 장치는 UL 2043에 따라 평가되지 않았으므로 플레 넘 공간에 설치해서는 안됩니다.

وحدات التحكم معتمدة من UL 2043 للتركيب في مساحة مكتملة.
خطر: لم يتم تقييم مصدر طاقة التيار المتردد / التيار المستمر المتوفر مع هذا المنتج إلى UL 2043 ويجب عدم تثبيته في مكان المفتوح.

Контроллеры имеют сертификат UL 2043 для установки в статическом пространстве.
ОПАСНО: Источник питания переменного / постоянного тока, поставляемый с этим продуктом, не прошел оценку UL 2043 и не должен устанавливаться в камере статического давления.

הבקרים מאושרים UL 2043 להתקנה בחלל מליאה.
סכנה: ספק כוח AC / DC מסופק עם מוצר זה לא הוערה ל- UL 2043 ואין להתקינו ואותו במליאה.

Notes

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CONTACT US

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