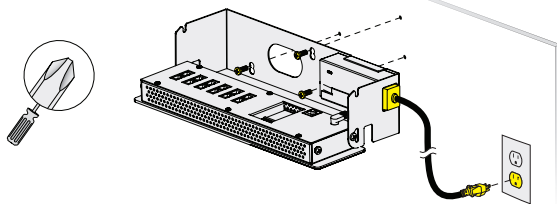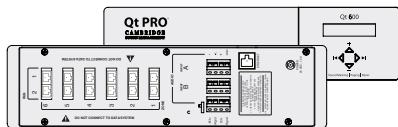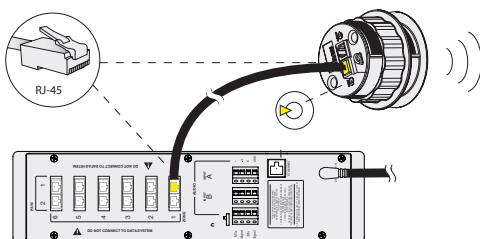# Qt 600™

cambridge
SOUND MANAGEMENT

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SOUND MASKING | PAGING | MUSIC
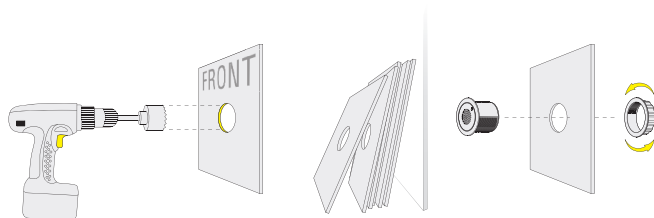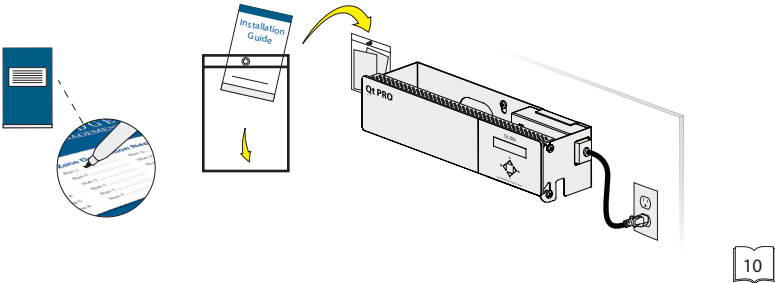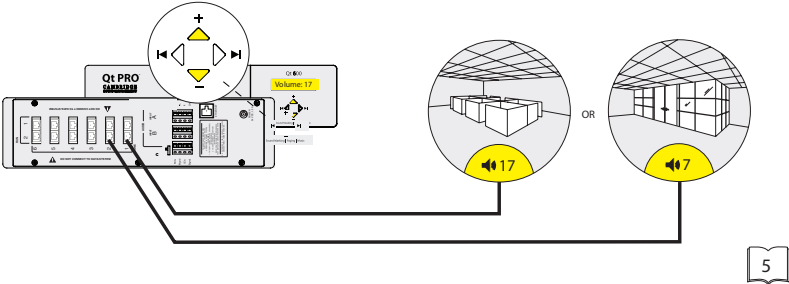
Qt 600™

1

3

2

RJ-45

4

3

FRONT

4

4

ZONE RUN

4

5

Qt PRO
CAMBRIDGE

Qt 600
Volume: 17

17   OR   7

5

6

Installation Guide

Qt PRO

Qt PRO

10

Contents

Qt 600 INTRODUCTION

This manual covers system installation of the hardware, system configuration of the software and system monitoring/maintenance. This section discusses some general guidelines for sound masking levels and coverage. Following this section are the details of hardware set-up followed by using the front panel of network user interface to configure the settings.

The Qt 600 supports six zones of sound masking, each with 1 to 120 emitters covering 100 to 12,000 square feet (9.3 m^2 - 1,115 m^2) per zone. Two audio inputs can be used for paging and/or music. Additional controls for each zone include time-of-day masking, auto ramping, self-monitoring fault detection and notification, and independent equalizers for masking and audio inputs. The system may be operated from its control module front panel OR by a computer directly-connected to the module OR by a computer connected through a local area network. *See system configuration on page 16.*

It is important that the control module's masking volumes be set correctly for each zone to obtain the full effectiveness of the system. If volumes are set too low, speech privacy will be reduced and work place distractions will be much more apparent. If volumes are set too high, the masking sound itself could become a source of distraction. The higher the setting that can be used comfortably, the better the acoustic privacy. For a given open office design, including ceiling height, ceiling material and workstation panel height, we can define the masking volume required to achieve "normal acoustic privacy," i.e., when it is relatively easy to ignore surrounding conversations. For a very large range of open office designs, the target level is in the 45–48 dBA range, measured 3 ft. (0.9 m) above floor level. Similarly, for private offices, based on wall panel design and ceiling construction, we can define masking volumes required to achieve "confidential privacy," i.e., conversations in adjacent offices cannot be understood. Most private offices have a target level in the 38–42 dBA range, averaged spatially within the office.

Setting the masking volumes can be approached in one of two ways:

BEST: If a sound level meter is available, it is recommended that the control module's masking volumes be adjusted up or down to achieve the following readings on the meter:

> Private Office Zones
> > 38-42 dBA, averaged spatially within the office
>
> Open Area Zones
> > 45-48 dBA, measured 3 ft. (0.9 m) above floor level

OTHERWISE: If a sound level meter is not available, the above levels are likely to be achieved in most environments by setting the control module's masking volumes as follows:

> Private Office Zones
> > 05-09, for all ceiling heights
>
> Open Area Zones
> > 13-16, for 08 ft. (2.4 m) ceilings
> > 15-18, for 10 ft. (3 m) ceilings
> > 17-20, for 12 ft. (3.7 m) ceilings

Masking volumes must be set sufficiently high to improve speech privacy and reduce distraction but not so high that the masking sound becomes objectionable. Settings within the above ranges should accommodate both objectives. As a general rule, use the high end of the range. Base final settings on site conditions and customer preferences. If people object to the sound level, set masking volumes toward the bottom of the range or refer to the "Ramping" section of the "Installation and Operations Guide" for information on introducing masking into the space gradually. Remember that the effectiveness of the system relies on sufficient masking sound level and that initial objections are often overcome as people become accustomed to the sound.

Different day and a night volumes may be set. The control module ramps linearly between these two settings beginning at the time specified and over the period of time specified. As the control module ramps between settings, the current volume is displayed under "Current."

NOTE: This document uses the Qt 600 software version 5.0.0 for feature configuration.

Hardware Installation

Installing the Control Module

NOTE: Always plug/unplug power supply at wall outlet.

Wall Mount

Mount the bracket using the three screws and plastic anchors (mollies) provided. Use a ¼ inch drill bit for the anchor hole. *See Figure 1.*

Plastic anchors are #10-12 x 1¼ in. with #10 x 1½ screws.
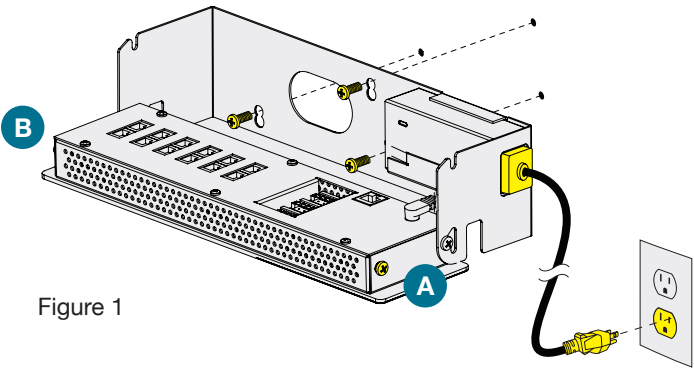
Figure 1

NOTE: The control module hinges forward for wall mounting and cable installation. To hinge forward, loosen screws A and B (see Figure 1) used to secure the module during shipping.
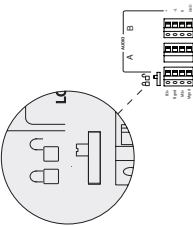
Check to see that the panel lock switch is in the UN-LOCKED position.

Rack Mount

Attach optional rack mount brackets to each end of the control module.

NOTE: When rack mounted, the control module does not hinge forward.

Step 1

Remove the Qt 600 and power supply bracket from wall mount bracket.
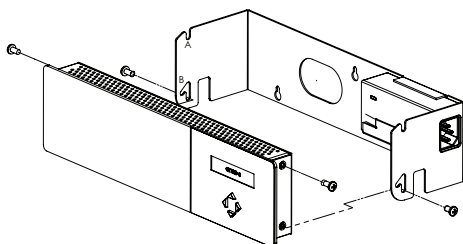
Step 2

Reassemble power supply to right rack mount bracket using 6:32 black screws (included with bracket).
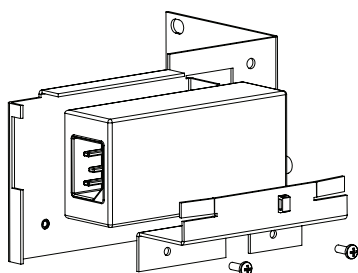
Step 3

Fasten left and right rack mount brackets to Qt 600 using the screws removed in Step 1.
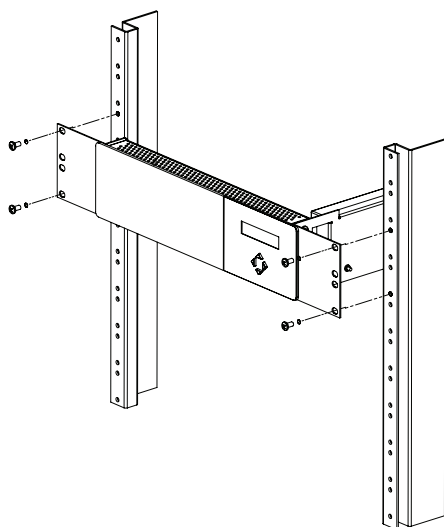
Step 4

Mount Qt 600 to 19" cabinet rail using 10:32 screws as shown (included with bracket).

Installing the Qt Emitters

Important Considerations:

- Each run has a maximum of 60 emitters!
- Each run should have a maximum length of 1000 ft. (305 m).
- Each home run cable attached to the control module should be labeled by zone # and run #. Adding a logical name (e.g. Marketing, Private Offices) is suggested. In addition, fill out "Home Run Zone Destination Record" at the end of this Guide.
- Each zone has two identical outputs, run 1 and run 2. All emitters on run 1 and run 2 are controlled equally for each zone.
- Each job-made cable should be manufactured according to ANSI/ TIA/EIA Standard 568-B. See custom cabling guidelines on page 11.
- Job-made cables should be tested with a LAN tester before installation.

Emitter Installation Order

1. Set the masking output level of all zones to level 20.

2. Refer to the emitter layout and wiring diagram provided by the dealer for cable run connections by zone.

3. Run home run cables from control module to the location of the first emitter for all runs in all zones.

4. Gather all ceiling tiles (per layout drawing) that are to receive emitters. Use the supplied hole saw to cut holes in designated tiles. Cut all tiles from the front. (Different types of emitter housings are available to attach in areas where there are no suspended ceiling tiles.)

5. Push the emitter through the front of the hole in tile and secure it by pushing down and twisting the locking ring at the back of the emitter.

NOTE:

1. The "tombstone" hook on the back of each emitter is next to the INPUT jack. This can help you find the INPUT jack by touch.

2. To adjust for unexpected obstacles such as sprinkler heads, each emitter may be moved up to two feet (one tile) in any direction, if necessary.

6. Connect a run cable from the specified zone OUTPUT jack on the module to the INPUT jack of the first emitter. Listen to each emitter as it is connected. If you cannot hear its "whooshing" sound:

   a. Try a different emitter.

   b. Test all four previous cables for continuity and shorts. Repair any faulty cables.

   c. If there is a short, masking volume will shut off. The short should clear itself in approximately five minutes. If it does not, power cycle (unplug and re-plug) the control module.

Be sure to fix any problems and hear the "whooshing" sound before installing the next emitter. If necessary see Errors in the Operations Guide.

7. Connect the next OUTPUT cable to the emitter OUTPUT jack.

8. Run the cable to next designated tile specified on emitter layout and wiring diagram. Tie cables up to structure or suspend from deck as required by local building code.

9. On the next emitter, connect this cable to the INPUT jack.

10. Repeat Steps 4 through 9 for the remaining emitters on the home run.

11. Set sound masking volume levels for each zone, using either the front panel controls or the software interface. Set sound levels according to Table 1.

NOTE:

The input jack of each emitter bears this symbol and is located near the safety tie off

The output jack of each emitter bears this symbol

Table 1

Zone Type	Ceiling Height	Vol. Level	Intended Result (at listener ear level)
Open Area	8'	13 – 16	45 – 48 dBA
Open Area	10'	15 – 18	45 – 48 dBA
Open Area	12'	16 – 19	45 – 48 dBA
Private Office	ALL	05 – 09 +	38 – 42 dBA

Installing Paging or Music to the Audio Inputs

1. Be sure power is OFF by unplugging power cord from wall outlet.

2. Balanced Audio Input: (most often, but not always characteristic of paging systems.) Connect signal wires to + and - at input A or B. Connect the shield to GND at the audio source.

3. Unbalanced Audio Input: (typical of music systems.)

   a. Mono Signals: Connect signal wire to both L and R at input A or B. Connect the ground wire to GND.

   b. Stereo Signals: Connect signal wires to L and R at input A or B. Connect the ground wire to GND.

4. If a music source is to be connected, using Input B allows emergency music shut-off. See Contact Closures below.

Installing Contact Closures

The Qt 600 provides an instant shut-off capability for masking and/or audio Input B if connected to a contact closure interface. The contact closure utilizes the same style connector as audio Inputs A and B (4-pin).

To leverage this feature for masking, connect a two-conductor cable to the two connectors, labeled M3V and MGND. To leverage this feature for Audio Input B, connect a two-conductor cable to the two connectors, labeled B3V and BGND.

The other end of these conductors (treated as pairs/circuits) can be terminated on closure mechanisms of choice.

1. To shut off masking, form a connection between the two "M" conductors.

2. To resume masking, break the connection (Don't break the connectors as you may want to reuse them).

The contact closure for audio Input B follows the same logic.

Custom Cabling Guidelines

For system compliance, follow these guidelines if custom cables are required:

1. Use solid conductor 24 AWG CAT cable that meets local code requirements.

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

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

4. Snagless boots are not required.

5. 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 end-on view of both types.

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

Figure 2

CORRECT
RJ-45 connector with bent type

INCORRECT
RJ-45 connector with aligned type
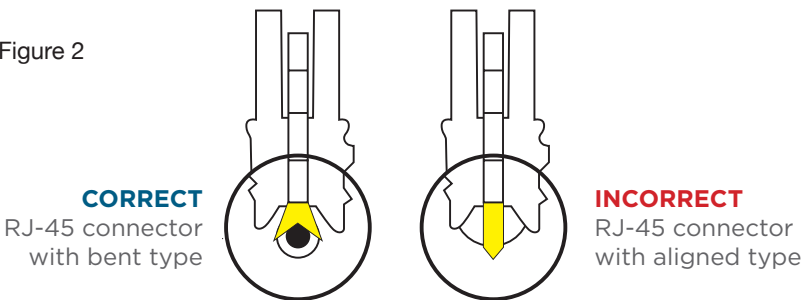
Battery Replacement

A coin-style battery (Cr1220 or Br1220) powers the real time clock during a power loss.

To replace the battery:

1. Unplug the control module from wall outlet.
2. Hinge the control module forward to access the connection panel.
3. Remove the zone run connections. They should already be labeled, if not, label before removing (for example: Zone 1 Run 2).
4. Remove the six screws that hold the panel.
5. Taking care not to disturb the other connections, lift the panel to expose the coin battery in its housing at the front left of the module.
6. Use a ball-point pen to dislodge the existing battery.
7. Insert a new battery with the positive (+) side facing upward.
8. Replace the connection panel, securing all six screws. Reconnect the zone run cables.

Figure 3
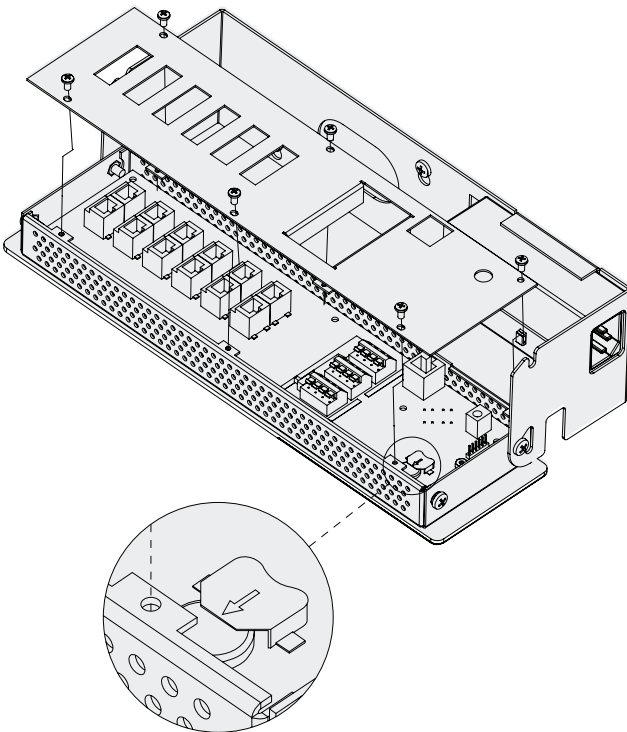
System Configuration

After the Qt 600 is mounted, the power can be turned on and settings modified to test wiring to the connected emitters. After testing, it is time to configure the controller for operations. There are two methods for performing configuration:

1. The front panel display can be used for basic configuration settings to get the system working and tested. In many cases, basic settings are all that a user needs. This interface only supports a subset of the functionality.

2. The MCS (Monitor Control Software) interface allows for configuring all the available functionality. The MCS can be used with any internet browser that can connect to the Qt 600 over a LAN connection. See Connecting the MCS for details.

System Configurable Feature List (Front Panel / MCS)

The following is a complete list of the Qt 600 features and whether they can be configured through the front panel, MCS or both.

Feature	Front Panel	MCS
Set masking level for each zone independently	X	X
Setting audio input levels at each zone	X	X
Setting real-time clock or network clock use		X
Reset system to default settings	X	
Configure network name and IP address		X
Set Time of Day Masking		X
Set Masking Ramp Period (Initial and Daily)		X
Set Masking Equalization		X
Viewing errors	X	X
Configuring error notification		X
System/Software version Information	X	X
Emitter Fault Detection		X
Networking and Security Administration		X
Software Update		X
Contact Closure (hardware only)		
Lock/Unlock the front panel (hardware only)		

Configuring the Control Module for the Network

IP Address DHCP
The IP address is preset for systems that are not on the network. To directly connect to the control module over Ethernet, the user uses any internet browser and places the IP address or control module name in the navigation bar.

If the MCS is not used, DHCP will allocate an IP address when the system is connected to the network. This field can be statically set through the MCS, but it will be dynamically allocated when MCS is not used.

NETBIOS Support
The system supports NETBIOS and advertises its hostname as QtXX, where XX is the last two digits of the MAC address. The hostname may be changed after a connection is made by a browser.

It may be helpful to use hostnames that convey information about the area served, for example: qt_b1f3 (building one floor three). If multiple control modules are installed on a single network, be sure that no two control modules use the same hostname.

Other Recommended Connections
Access to an SMTP server enables the sending of error notification emails.

Access to an SNTP server obtains the SNTP time stamp. The module sends its SNTP request to "pool.ntp.org" (by default). If the SNTP server is enabled, the real-time clock feature is disabled. A time server other than the default time server may be specified in the Administration section under date and time.

Suggestions for Managing Multiple Control Modules
Browser bookmarks are a convenient tool for managing multiple control modules. A bookmark add-on stores bookmarks on a web server and allows access from any computer on the LAN.

Create a "Sound Masking" folder (under Bookmarks) to hold a bookmark for each control module. Use location-based names for each module's bookmark. To access a specific control module, open Bookmarks>SoundMasking, and the specific module bookmark.

Front Panel Control

The front panel is used for configuring basic functionality and initial system test. For advanced system configuration, the MCS is required. Once the MCS is used to configure the system, using the front panel will erase the settings configured by the MCS. Once the MCS is used to configure the system, it should be used exclusively.

System Information

Initial displays of the front panel, shown below, shows the software version and system status.

The VERSION X.X.X field stands for:
major release . minor changes . bug fixes.

The HxBx field is to identify the version of the internal code and used as reference for technical support on rare occasions.

```
VERSION X.X.X
Status: OK   HxBx
```

Status indicates if there are errors *(see error codes, page 33)* or if the system is OK. The HxBx field indicates the version of the internal code images and is only used by CSM when debugging a problem.

For Service Call: The Cambridge Sound Management support center phone number is also on the display as default. This can be changed in the MCS panel.

```
For Service Call
800–219–8199
```

The MAC address is displayed for reference when the system is on the network. The network administrator will need this when configuring a network connection. This is also used when requesting an advanced password for the MCS user interface.

Shown in the next block is the display for the IP Address. This is a default value that can be used in a browser, for direct connection. As noted, DHCP will change it when the system is on a network

```
IP Address DHCP
169.254.1.1
```

Hostname is set at the factory to a default value. This can be changed through the MCS.

```
Host Name
QT XX
```

The next 2 blocks show the username and password when connecting using MCS. The default is admin/secret. These can be changed at the MCS window.

```
Username
admin
```

```
Password
secret
```

A warning message is displayed on the front panel after the MCS is used for configuration (Warning: Time of day Ops). This tells anyone about to use the front panel that the MCS has been used for configuration and using the front panel will reset the settings made by the MCS.

Setting Sound Masking Levels

```
Masking
Z1 Volume: Mute
```

Figure 10: The format of the panel for configuring masking. Z1 stands for zone 1 and it is currently set to mute.

There is a discussion in the Introduction section for recommended volume settings.

Settings within the recommended ranges should optimize speech privacy without excessive distractions. Generally, set masking volumes toward the high end of the range and adjust according to site conditions and user preferences. If possible, measure the results with a sound level meter and check for the achieved sound pressure level. Adjust as necessary or judge by listening in the area.

If installation occurs before the office is occupied, turn the system to

the desired level and leave it at that level. If the system is installed after the office is occupied, turn the system to the correct level when the space is unoccupied and employ auto ramping, only supported through the MCS, to provide for a period of acclimatization.

To set the masking level for a zone, use the arrow keys on the front panel to move to the right until the zone of interest is shown (Z1 is zone 1 which matches the first column of ports on the back). Then use the up and down arrows to change the value.

After setting the value for one zone, arrow to the right or left to set the value for zone of interest. Repeat for all zones.

IMPORTANT:

For full system effectiveness, it is essential to set the volumes correctly for each zone.

If the volume is set too low, speech privacy is reduced and workplace distractions are more apparent.

If too high, the masking sound can become a distraction. Since, in general, acoustic privacy improves as sound masking volume increases, the general strategy is to set the masking volumes as high as possible without being distracting.

NOTE: Do not disconnect power for 10 minutes after setting values or data may be lost.

Setting Audio Input Levels

```
Input A
Z1 Volume: 6
```
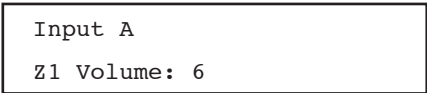
This figure shows the format of the panel for configuring the volume for input A or B. The level of the input is set for each zone, where the example shows Input A is level 6 for zone 1.

The system has two inputs for paging or music. Either input may be connected to any or all zones via software or front panel interface. If no paging and/or music from these inputs are desired in a particular zone, set the audio volume level of that zone to mute.

Note that Input B is the preferred music input due to its ability to be shut down via a contact closure.

The audio input levels are set in a similar way as the masking. Use the arrows on the front panel to move left and right to find the input A and input B field for each zone. The inputs are enabled and level set for each zone for flexibility. Arrow to each zone for each input and set the level using the up and down arrows.

Lock/Unlock the Front Panel
The settings of the Qt 600 can be locked by a physical switch on the back of the control module. Lock the control module panel by moving the "lock" switch to the "Locked" position. This prevents any casual interaction from changing the settings.

Unlock the Front Panel and Control the System
1. Loosen screws and lift the control module slightly and hinge it forward to give access to its connection panel.

2. Move the panel lock switch to the UNLOCKED position. Close the module.

3. Press NEXT or PREVIOUS to scroll between screens for adjusting sound masking, paging or music volumes by zone.

4. Modify a value by 1 dB on any screen by pressing + or -.

5. Press NEXT to accept a screen value.

6. After completing adjustments, lock the system.

NOTE: The system returns to the Version, Status screen after five minutes of inactivity. Z1 indicates Zone 1, Z2 indicates Zone 2, etc. If an error is detected, an error code is displayed on the control

module. See page for Viewing Errors.

Configure Network Name and IP Address
Creating a static IP address or controller name is not available front the front panel. The MCS software can configure both the network name and the IP address (see below). If the system is not connected to the network, the initial values shown on the front panel are used when connecting a PC to the Qt 600 over Ethernet.

If the Qt 600 is connected to the network, a DHCP server will dynamically allocate an IP address. The system MAC address is used by the network system administrator to configure the DHCP server.

NOTE: When connecting a PC directly to the control module, the control module acts as a DHCP server and serves the DHCP enabled PC an IP address.

Real-Time Clock or Network Clock
If the Qt 600 is not connected to the network, it will use a real-time clock within the controller. This requires the battery for power. This is often the way time is supplied to the Qt 600.

If the Qt 600 is on the network, it will look for the network clock to retrieve the time and date. Access to an SNTP server obtains the SNTP time stamp. The module sends its SNTP request to "pool.ntp. org" (by default). If the SNTP server is enabled, the real-time clock feature is disabled. A time server other than the default time server may be specified on the MCS.

NOTE: When the Qt600 is configured in the factory the date and time is set to Jan 1. Basic operations will work without changing this time. For any advanced features that require the time of day, either the network clock or correct setting of the time is required.

Reset System to Default Settings
To clear an error indication (after problem is fixed) or reset the settings to the initial default state, the system should go through a hard reboot.

Steps for the hard reboot:
1. Unplug the power and wait 15 seconds or more.
2. Hold down all 4 arrow keys on the front panel and re-connect the power.

System Control Using Monitor Control Software (MCS)

The MCS (Monitor Control Software) is an interface that configures the Qt 600 over a LAN/network connection. The MCS software is operated from any network browser. Below are the instructions to connect to the control module over Ethernet locally and over the network.

After the discussion on connecting to the control module, the MCS screens will be discussed.

Connecting to the Qt 600 over Ethernet
1. System software is operated from any network browser. Software is pre-installed in the control module. The HELP function provides comprehensive software control operating instructions.
2. Connect a computer or the network to the 10/100 Ethernet jack.
3. Power the control module on by plugging it into a standard wall outlet.
4. Press the right arrow on the control module to advance to the IP address screen. An assigned IP address is displayed on the front panel within two minutes of powering the module.
5. Access the Qt System Monitoring and Control Software
   a. Read the control module Hostname or IP address from the front control panel.
   b. Enter either the hostname or IP address into the browser address bar.
   c. A prompt will appear requiring a username and password.
   d. The default username is "admin". The default password is "secret".
6. After logging in with the defaults, you may change the hostname, username and password.

DHCP Support
The system uses DHCP to obtain an IP address.

The system displays its MAC address on the front panel. This allows the network administrator to use the MAC address to configure the DHCP server to deliver a fixed (static) IP address to the control module.
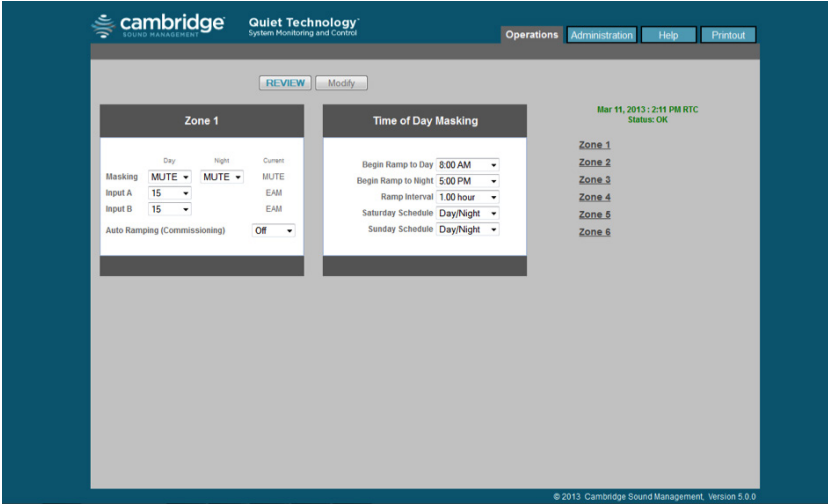
MCS: Operation Screen

Figure 12: Operations Section in review mode.
Note: The software version is displayed at the bottom right of every screen. The 3 digits indicate major release version, minor feature changes and bug fixes. There are times when Cambridge Sound Management will release software to fix unique bugs or small feature changes, and later roll them in to a major release. When a customer reports a problem, the software version number is usually requested.
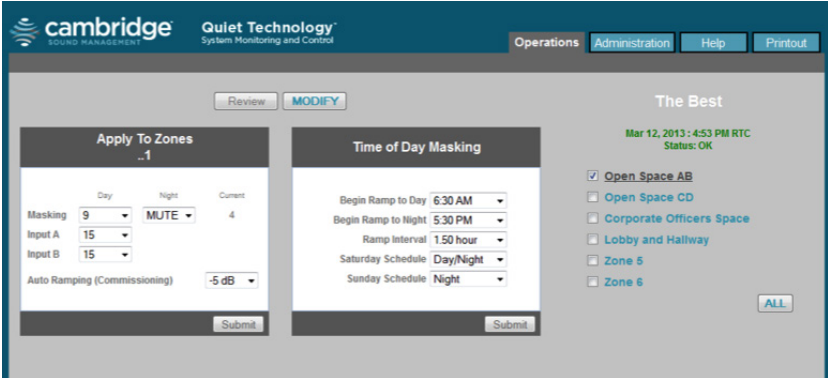

Figure 13: Operations Section in modify mode

The Operations Section contains two blocks. The block on the left allows the configuration of:

- Masking level for day and night.
- Sound level for auxiliary audio inputs A and B.
- Auto ramping.

The block on the right allows for the configuration of:
- Ramping start times.
- Ramping interval.
- Weekend ramping schedule.

Changing Masking Level Using MCS

Follow these steps to update the parameters within the masking level block:

1. Review – selecting the review button will allow the user to select a zone and see the current configuration. Click on the zone on the right side of the operations screen.

2. To modify a zone, start by clicking the modify button.

3. Select the zones to modify by checking the boxes of the zones on the right side of the operations screen.

4. To set the masking level, use the multi-select for night and day settings in the left box.

5. Select Submit to commit the values.

NOTE: Only modify one block at a time and then click submit. If you modify both zone masking and Time of Day, only one window is updated.

Auto Ramping

The Auto Ramping function is typically used once, when the system is first installed. The Auto Ramping function is used to introduce sound masking into an occupied space gradually. The Auto Ramping function sets the operational volumes for a zone a specified number of dBA below its programmed value. The control module will raise the zone's operational level by 1 dBA per weekday until the Auto Ramping value is back to zero and the zone is operating at its specified "Day" and "Night" values. If the system is running "quiet," check that Auto Ramping has been set properly. The Auto Ramping control is also a useful means of temporarily lowering the volume in a zone. This may be necessary if, for instance, there is a problem with some other electrical or mechanical system and maintenance needs absolute quiet to listen for the source. By using the Auto Ramping control, if the administrator forgets to shut off auto-ramping, the control module will gradually ramp back to the operational levels. If the administrator had "Muted" the zone using the "Day" and "Night" levels, masking would remain off indefinitely until someone set off to correct the problem.

Example: Zone 1 is planned to be masking level 9. Auto Ramping is set to -15dB. On day one, the level is active 15dB less that the planned level. Day 2, it is only 14 dB lower. It rises each day until it is functioning at full masking.

Changing Input A and B Level

The control module operates as a paging amplifier. Refer to the control module's specifications for the electrical characteristics of Inputs A and B. Each signal is routed to all zones. The (acoustical) output level for each signal can be specify for each zone. Set a Zone/Input A/B output level to "Mute" if you do not wish to connect the signal to the zone.

NOTE: Input B is the preferred music input due to its ability to be shut down via a contact closure.

The audio input levels are set in a similar way as the masking. Within the Operations window, each zone has a selector for the level of input A or B.

1. Select the modify button.
2. Select the zones to modify on the right by clicking the box.
3. Change the value in the left window.
4. Select Submit.

Time of Day Masking

Qt 600 allows the specification of a day time masking volume and a night time masking volume for each zone. Qt 600 allows you to specify a day start time and a night start time for the zone. Use the pull down menus to specify each start time and the ramping interval - the period of time allotted to accomplish the full, linear (in 0.5 dB increments) transition. Qt 600 also allows you to specify Saturday and Sunday operation. You can chose weekday operation (day/night) or night/night operation where the night volume is in effect for the entire (weekend) day.

Qt 600 obtains the time-of-day from either an Internet-based NTP time server (pool.ntp.org) using the SNTP protocol or from its on-board real time clock. Qt 600 requires the user to define the time zone in which the box is operating and the daylight savings time rules for that time zone. If you are unfamiliar with your time zone, or daylight savings time rules, a quick search on the Internet should help you find this information. Go to "Administration: Time Zone" to specify the control module's time zone and daylight savings time rules.

NOTE: NTP timer servers do not provide time zone or daylight savings time rules and therefore these values MUST be specified by the administrator.

Errors

If the control module is operating properly, software will display "Status: Ok". If the control module encounters an error, software will display "Status: Error". Click on "Error" to obtain additional information. Click on "acknowledge" to clear the error *(see Administration: Notification of Errors, page 27)*. If the error condition persists, the error will be signaled again after clearing the error.

WARNING: If a "System Thermal Fault" occurs, be sure that the control module is not exposed to conditions beyond its ambient air specification of 104°F, 40°C.

WARNING: In order to protect the electronic circuitry from damage, the control module introduces a delay after experiencing an amp short before turning the amp back on. A persistent short will result in the amp being turned off once again. Shorts are most likely to occur during installation of the system due to termination mistakes by the installer. Shorts are unlikely once the control module is operational.

MCS: Administration Section

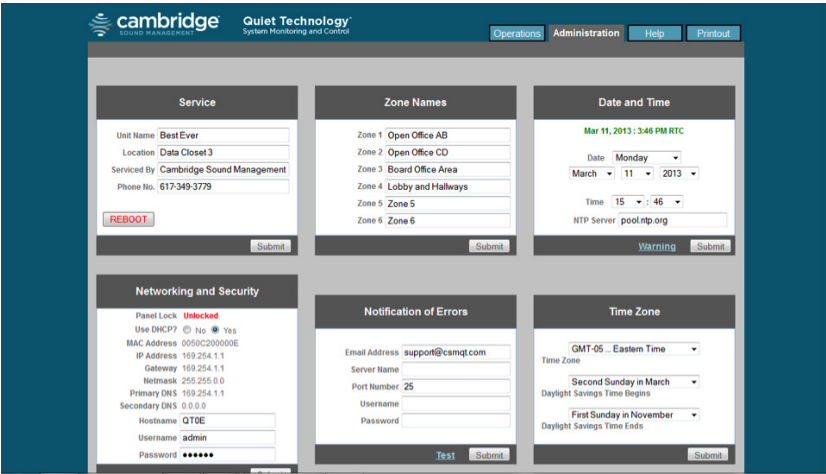The following section will use figure 14 for reference.

Figure 14: Administration Section

IMPORTANT: Only update one block at a time and press Submit! Changes to blocks that are not submitted will be lost if a different block is submitted.

Service

The service window holds the following fields:

Control Module Name: This is just a reference name for the control module and is not used for networking. An example of an informative name is "120 Main Street - First Floor".

Location: This is a good reference to track where the control module is located when faults are detected. Faults can be sent via email and the control module's location can be useful.

Serviced By: This is for getting help when there are errors/problems. The name of the service company can be stored. By default it is Cambridge Sound Management, but it could be changed to the installer.

Phone No.: The number of the company mentioned above.

Zone Names

Use this screen to provide informative names for each served zone. Examples of informative names are: "Reception", "Offices East", "Cubicles East", "Offices West", and "Cubicles West".

Networking and Security

Use this screen to obtain the control module's MAC and IP Addresses, to change its NETBIOS hostname, and to change the username or password for logging in. If you change the control module's hostname, Qt 600 will automatically advertise its new NETBIOS name.

NOTE: If the control panel is locked (the toggle switch on the inside of the control module is set to the "locked" position), the control module cannot be controlled from its front panel. If it is unlocked, the control module's operational parameters can be modified from the control panel.

NOTE: The "Username" and "Password" specified under Administration: Networking and Security to control access to the control module over the network, and the "Username" and "Password" specified under "Administration: Notification of Errors" to log into an SMTP outbound mail server need not be identical.

Notification of Errors

Use this screen to configure access to the mail server that will be used by Qt 600 for sending email messages notifying the system administrator of errors.

The "Email Address" is the address to which error notification emails will be sent by the control module. The "Email Server" and "Port"

are the name (i.e., smtp.mymailservice.com) of the mail server and the port that it listens to for outbound SMTP. If authentication is required, fill in the "Username" and "Password." Otherwise, leave them blank. "Username" and "Password" represent the control module's email account on the specified mail server. If a username and password are specified, the email will arrive From: "Username." Otherwise, the email will arrive From: "Hostname."

To minimize the number of emails sent for intermittent errors (for example, amp thermal fault cycling in a system exposed to excessive heat), the control module will send one email per error, until the error is acknowledged. Once the error is acknowledged, a subsequent error will result in a new email. The administrator acknowledges errors by clicking on the "Acknowledge" link that appears under "Operations" when an error is present *(see MCS Error Display, page 34)*.

Once you have configured your email parameters, you may test your configuration by asking the control module to generate a "test" email. To do this, click Test. An email will be generated and sent. If the email does not get through, you may need to modify your configuration or the configuration of your SMTP outbound relay (server).

Date and Time – Time Zone
The Qt 600 can use a network clock or the RTC (Real-time Clock) in the unit. The field called "NTP Server" is used to identify the name of the network time server when it is being used (default being pool. ntp.org). The date and time for the Real-time Clock are set within this window.

If the Real Time Clock is to be used, it should be set prior to adjusting operating levels. The Real Time Clock is set using the pull-down menus under "Administration: Date and Time". You MUST set the day-of-the-week (e.g. Sun, Mon, Tues, etc), the date, and the time. The RTC will only be used if the control module has been unable to access an external time server (e.g. 0.us.pool.ntp.org) since it was powered on. This may be because the control module is not on a network or because the corporate network's firewall prevents access to the Internet based servers.

The source for the control module's time stamp is listed next to the time stamp as either "SNTP" (external time server - accessed via the "Simple Network Time Protocol" protocol) or "RTC" (Real Time Clock).

WARNING: Manually changing the RTC's time/date via the "Administration: Date and Time" window should not be attempted between the hours of 12:00 AM and 2:00 AM on DST transition days (two per year). Doing so could result in a missed "spring ahead" or "fall behind" event. Set the date and time before midnight on a DST transition day or after 2:00 AM on a DST transition day.

If the date is wrong following a power failure, and the system is relying on the internal real time clock (RTC) and not a network-based time server, it is likely that the RTC's battery is depleted. Replace the battery *(see battery replacement, page 14)*. Reassemble the control module and then plug it back into the wall outlet. Reset the Real Time Clock.

Setting Equalizers and Emitter Fault Detection

A special login password is required to gain access to the ENFD screens. Contact Cambridge Sound Management to obtain the password(s) for your control module(s). You will need to provide the Mac Address of each control module. See "Administration: Networking and Security" for the MAC Address or it can be seen on the front panel.

Below are the screens for emitter fault detection and equalizer settings when logged in with the second level password.

Equalizer Update

After logging in with the second level password, the operations sections will have a block that includes the equalizer settings. The Masking and Audio equalizers are configured by the factory and should not need to be modified in most installations. However, if desired, the equalizers may be used to adjust the system to a different masking, paging, or music spectrum.

You may specify the gain for a tap in its corresponding box. All values are measured in dB and the range is +/- 12 dB, in whole number increments. To specify a negative gain, precede the number by a minus sign (for example, -2). Once you have specified all of the taps of interest, press "Submit." The values will be changed and saved, and the equalizer will redraw to provide a visual representation of your settings.

When an equalizer's settings are modified, the control module calculates and reports the impact the new settings have on speech privacy. The report is shown in the Masking Equalizer control box and is stated in terms of change to the Privacy Index. A change must be at least 1% for it to display. The calculation is performed as specified

in "ASTM International; Designation: E1130-02, Standard Test Method for Objective Measurement of Speech Privacy in Open Offices Using Articulation Index".
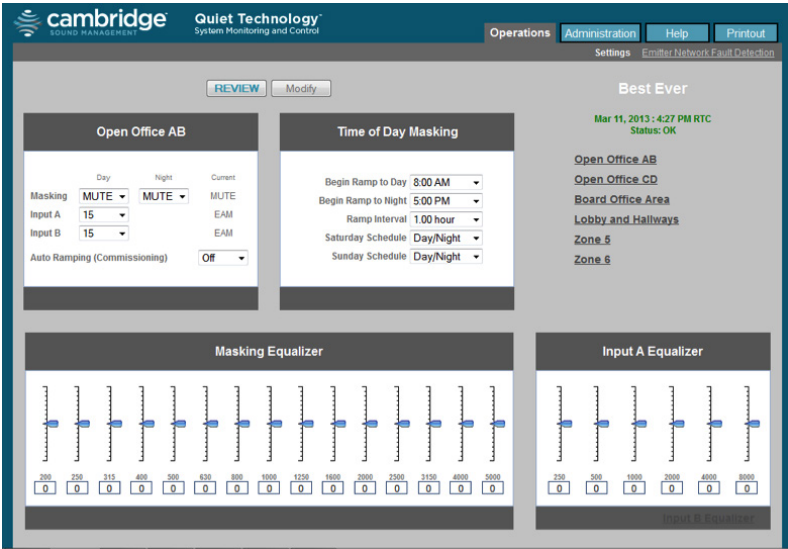

Figure 15: Operations Section with the equalizers block displayed after a higher level password has been entered.

ENFD (Emitter Network Fault Detection)

The ENFD section allows for emitter fault detection to be enabled and tuned. Figure 16 displays the standard view of the ENFD configuration section. To reach the screen shown below, look at the screen above for the equalizer. There is a link to the emitter fault detection just under the Help tab. The lower left corner of the page allows the user to toggle between the standard view and the advanced view.

The base errors reported covers a short in the cable run. This feature is looking for emitters that are no longer functioning. To accomplish this, the control module sends and receives a signal that goes out the emitter run and back. The measurement by the DSP on the return is captured and stored as the Static Target. This can be done any time after the system is fully populated and left to be unchanged. If the emitter configuration is updated, the static value will need to be refreshed. Faults are then detected when the signal strength deviates by more than an allowed delta value (set on full view page, see figure 17). When the measured value is outside of the allowance, a fault is generated.
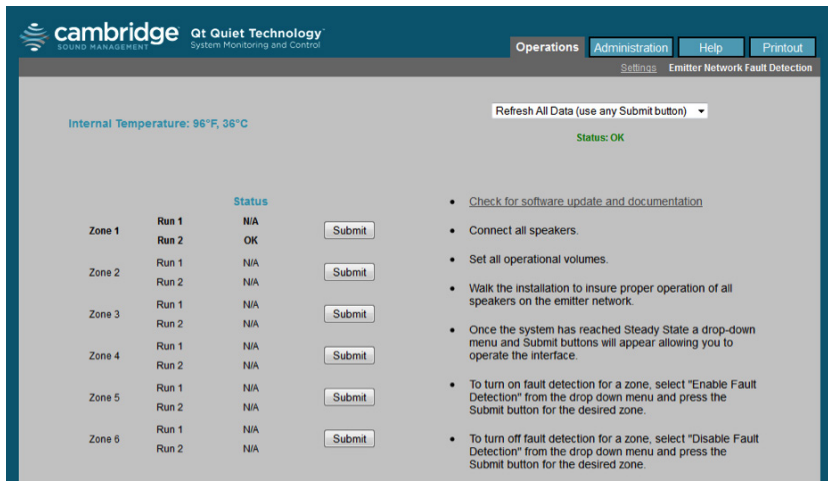
CAMBRIDGE SOUND MANAGEMENT

Figure 16: Standard view of the ENFD configuration section.

If the emitter network is modified on purpose (for example, if emitters are added to an existing run with unused capacity), the zone must be re-mapped by the control module. Be certain that the original emitters remain fully functional before re-mapping the zone. To re-map a zone, following the procedure for enabling ENFD described above.

The control module maintains a count of the number of errors encountered on each jack (visible on the "Full View" Emitter Network Fault Detection screen). The count represents the number of times a zone has transitioned from status "OK" to status "Error." A typical fault will result in the count being incremented (+1). An intermittent fault that periodically clears itself will cause multiple increment events. To reset an error count to zero, select the "Clear ..." operation from the pull down menu, select the desired zone, and press Submit.

Since the emitter impact on the signal is affected by its environment (heavy/light air due to moisture content and cable conductivity due to temperature), there will be some deviation of the measurement over time. Office space temperature changes based on day, night and weekend which changes the energy consumption of the emitter. To handle the allowance of deviation, the system has a Dynamic target which is the measurement at a later point in time. Since allowed environmental impact happens slowly, small incremental changes are expected.

The user is allowed to modify the allowed deviation in the "Deviation Delta Allowed" block, but it is expected that the default value will be used.
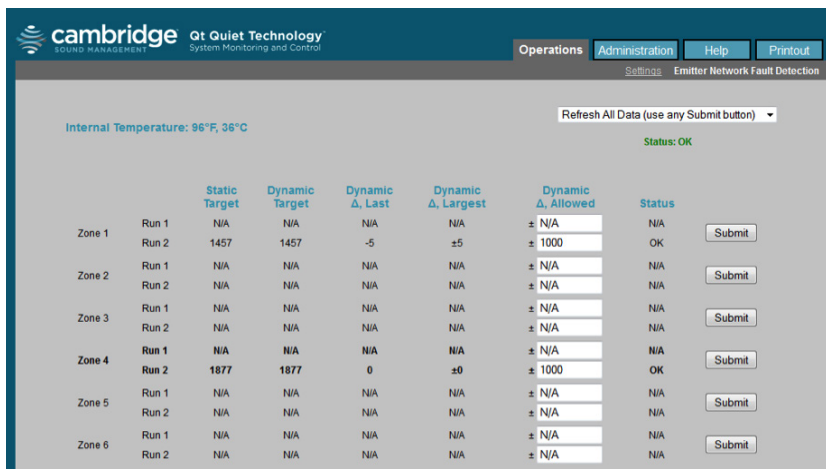
Figure 17: Full view of the ENFD configuration section.

Steps to make adjustments:

1. In the drop down, select the action to be taken: Refresh all data, Enable Fault Detection, Disable Fault Detection, or Set Dynamic Delta Allowed.

2. For "Refresh," "Enable," or "Disable," select Submit on each zone that needs to be changed. It is allowed to enable/disable fault detection differently on each zone.

3. For "Set Dynamic Delta Allowed," enter the new value in the window for a zone and click Submit. Only one zone can be updated at a time.

MCS: Help

The following section will use figure 18 for reference.

Links to Help Topics

From the Help screen on the MCS, there are links to some common questions when using the MCS. The links are shown on the right under Operations and Administration. This information is also contained within this document.

Software Update

This is a link to the Cambridge Sound Management web site for access to the latest software. When the user selects the link from the MCS, it displays the current software on the control module and the version of software available to install.
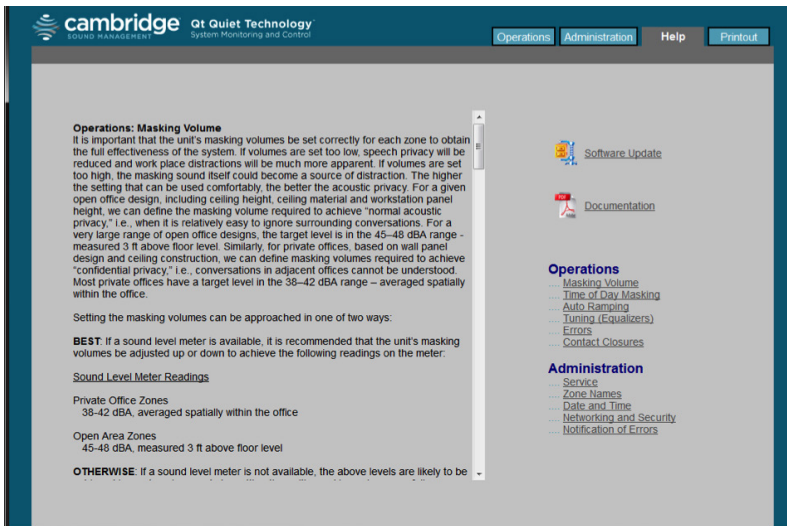
Figure 18: MCS Help Section

If the MCS is not being used, the process for performing the software update is the same. The difference is the update executable and new software will be downloaded from the web site to a PC or laptop which is directly connected to the controller over Ethernet.

The install directions are provided with the new software for convenience and not part of this document.

Documentation Link on Help
There is also a link to download the latest Installation and Operations Guide from the web site for convenience to the user. The help links have all the typical information required, but the guide on the web has the full system usage description.

MCS: Printout

This screen displays the current configuration of the system. This screen should be captured and stored in case of data loss or system failure. Printing is done through the web browser print option.
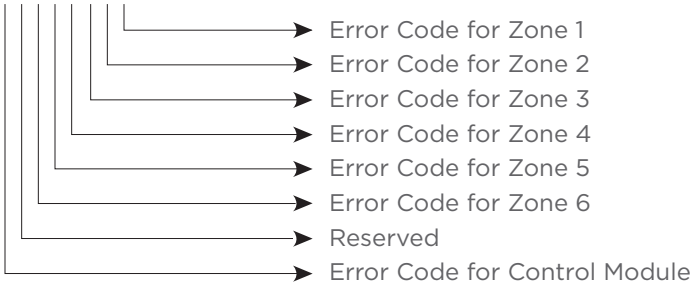
Error Codes and Messages

Front Panel
System errors are shown on the control module front panel display. If an error occurs, the message "Status: Error" will be displayed. To determine the cause of the error, press NEXT. This displays the error screen with system error codes.

Error Codes

If one or more errors exist in the sound masking system, an eight digit error code is displayed on the LCD display (scroll forward to the "Error" screen). The error state is indicated by an eight digit code of the form:

Error: 0_000000

Error Code for Zone 1
Error Code for Zone 2
Error Code for Zone 3
Error Code for Zone 4
Error Code for Zone 5
Error Code for Zone 6
Reserved
Error Code for Control Module

Where a number other than "0" indicates an error.

Examples

Error: 00000100   Short sensed in the wiring in zone 3

Error: 00110000   Short sensed in the wiring in zones 5 and 6

Error: 00000004   One or more emitters are not operating in zone 1

Error: 80000000   Contact the manufacturer

MCS Error Display

When there is an error in the system, the operations window will show a status in red as shown in the window below. Beside the status are the words "Error" and "acknowledge" which are described next.

CAMBRIDGE SOUND MANAGEMENT
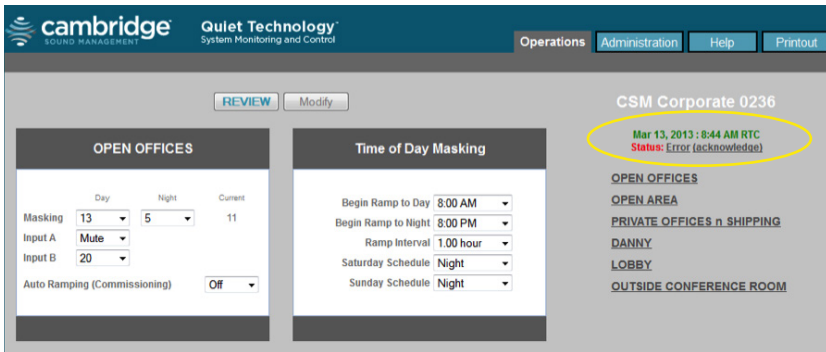
Selecting "Error" for the screen above pops open a window that details the error in the system. The format of the error string is the same as shown on the front panel. The screen below shows there are emitter faults in 3 zones and the administrator should look for non-functional emitters.
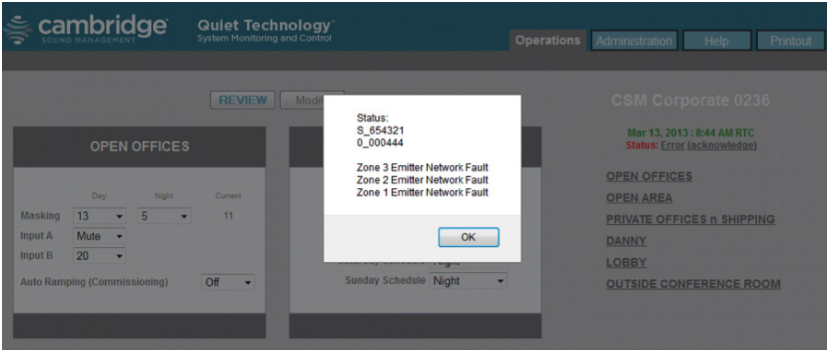
Click OK to close the window.

Click the acknowledge link and the status goes back to OK. If the error persists, the status will show the error. This can be used to test problem resolutions.

Post Installation Handoff
Perform a final walkthrough to satisfy all aspects of the system performance:

1. Fill out the settings record.

2. Store guide with completed settings record in the clear plastic job ticket holder next to the control module. If there is a hard module failure, the recorded values can be used to reconfigure the system. System settings are retained after a power outage.

3. Lock the control module panel by moving the "lock" switch to the Locked position.

4. Lift the control module front panel and hinge it backward into its closed position. Tighten all retaining screws.

5. If operating by software control, show the administrator how to connect to the control module using both the Hostname and IP Address methods. Share this guide with the administrator.

WARRANTY:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Modifications not expressly approved by the manufacturer could void the user's authority to operated the equipment under FCC rules.

Warranty Coverage — Qt Emitters™

Cambridge Sound Management, LLC (the "warrantor") will, for a period of five (5) years, starting with the date of purchase, warrant that the Qt Emitters™ (the "speakers") will be free of defects in materials and workmanship that interfere with proper operation as a sound masking, paging and music speaker system. During that period, the warrantor will, at its option, either (a) repair the speaker, or (b) replace the speaker. The decision to repair or replace will be made by the warrantor.

Warranty Coverage — Qt control unit

The warrantor will, for a period of one (1) year, starting with the date of purchase, warrant that the Qt control unit (the "system") will be free of defects in materials and workmanship that interfere with its proper operation as a sound masking, paging and music distribution control system. During that period, the warrantor will, at its option, either (a) repair the system, with new or refurbished parts, or (b) replace the system with a new or refurbished system of equal functionality at no charge. The decision to repair or replace will be made by the warrantor.

All software installed in the Qt system is warranted to substantially conform to its published specifications. In no event does the warrantor warrant that the software is error free or that the customer will be able to operate the software without problems or interruptions. The warrantor will, from time to time, make available software bug fixes. It is the responsibility of the purchaser to download and install these software modifications. Except for the forgoing, all software and software upgrades are provided AS IS.

The following terms apply to all

These warranty terms are extended only to the original purchaser of a new product. A purchase order or other proof of the original purchase date and purchaser is required for warranty service.

Obtaining warranty repairs: Please access and review online help resources for the product before requesting warranty service. If the product is still not functioning properly after making use of these resources, please contact Cambridge Sound Management for a return authorization number. All returns are to be prepaid. The warrantor will pay return surface freight within the continental United States on warranty repairs. All customs and freight charges in excess of surface freight within the United States will be born by the purchaser.

Warranty Limits and Exclusions

This warranty ONLY COVERS failures due to defects in materials or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage. THIS WARRANTY DOES NOT COVER USE OF THE SYSTEM WITH ANY OTHER SPEAKER OR EMITTER MANUFACTURED BY ANY ENTITY, ORGANIZATION OR COMPANY OTHER THAN CAMBRIDGE SOUND MANAGEMENT, LLC OR USE OF THE SYSTEM FOR ANY PURPOSE OTHER THAN SOUND MASKING AND/OR PAGING AND/OR MUSIC DISTRIBUTION. THIS WARRANTY DOES NOT COVER THE USE OF ANYTHING OTHER THAN CAT-3 OR EQUIVALENT, 24 GAGE CABLING. The warranty ALSO DOES NOT COVER damages that occurred in shipment, failures that are caused by products not supplied by the warrantor (e.g., replacement power supplies) or failures that result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration of any sort, installation, use as a system driver during speaker installation, set-up adjustments, misadjustment of controls, improper maintenance, power line surge, lightning damage, power surges, modification, rental use, service by anyone other than the warrantor or damage that is attributable to acts of God.

THERE ARE NO EXPRESS OR IMPLIED WARRANTIES EXCEPT AS LISTED UNDER "WARRANTY COVERAGE." THE WARRANTOR IS NOT LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT OR ARISING OUT OF ANY BREACH OF THIS WARRANTY. As an example, this specifically excludes damages for lost time, lost use of the system, cost of removal or re-installation of the system or travel to and from the purchaser's location. ALL EXPRESS AND IMPLIED WARRANTIES ARE LIMITED TO THE PERIOD OF THE WARRANTY.
This warranty provides specific legal rights, and there may be others that vary from state to state or in the country of compliant use. Therefore, certain additional exclusions may apply.

Settings Record (Installer/Administrator)

If using software control, select the "Print Settings" link under the Administration page to print a complete list of system information. Place the printout in the job ticket holder near the control module. If using front panel control, fill in the details below.

This information is critical to ease recovery from a hardware fault.

Volumes:

Zone:	1	2	3	4	5	6
Masking:						
Input A:						
Input B:						

Networking and Security:

Mac Address:

Hostname:

Username: admin (default, can be changed)

Password: secret (default, can be changed)

Installation / Service:

Company name:

Install date:

Phone:

Zone Level Controls:

Zone:	1	2	3	4	5	6
Day Volume:						
Night Volume:						
Input A:						
Input B:						
Day Start Time, AM:						
Night Start Time, PM:						
Ramp Interval:						
Saturday Schedule:						
Sunday Schedule:						

Qt 600 Software Version 5.0 Changes from Version 3.4

1. Allows manual specification of the DNS address of the Network Time Server instead of only supporting pool.ntp.org
2. Allows manual setting of the IP parameters of the control module
   a. IP Address, Subnet Mask, Default Gateway, DNS Server, 2nd DNS Server
   b. Manually assigning IP Address disables DHCP
3. Displays all active IP parameters in software GUI to aide in network issue resolution
4. Displays selected network address allocation paradigm (DHCP or Fixed) on the LCD and in the software GUI
5. Supports 20 dB dynamic range for auto ramping
6. Modifies Time of Day masking ramping features
   a. Reduces maximum ramping window from 4 hours to 1 hour
   b. Allows ramp time to be selectable in 15 minute increments (versus 30 minute increments)
   c. Limits start time choices to those consistent with work day practices
7. Allows operator to assign parameters to multiple zones via a single submit operation
8. Displays Service Information on the LCD and in the software GUI
   a. The LCD displays "For Service Call XXXXX"
   b. XXXXX ships from factory as CSM with CSM's phone number; can be changed via software GUI.
9. Adds Control Module Name field to Service features in software GUI
   a. Displays Control module Name on Administrations Page (e.g. First Floor)
10. Parameter changes made via software GUI are saved immediately (versus after 10 minutes)
11. Improved Error reporting format on the LCD and in the software GUI (minor improvement)
12. Issues pop-up warning on pressing Reboot button
13. Adds ability to determine whether a normal cord or a bridge mode adapter cord is plugged into an RJ45 (zone) and adjusts DSP to match the wiring mode
    a. Per zone
14. Implements new product identity (color, logo)
15. Fixes the following bugs:
    a. Non-functional RTC-based Auto Ramping progression. Auto ramping is only used on initial install.
    b. Boot loader had a race condition during power glitch that could cause lock-up
    c. Provides software protection against meta-stability in main DSP clock circuit, not visible to user but may cause slight deviation in masking levels.

Homerun Zone Destination Record

Zone 1	Run 1	_____	Run 2	_____
Zone 2	Run 1	_____	Run 2	_____
Zone 3	Run 1	_____	Run 2	_____
Zone 4	Run 1	_____	Run 2	_____
Zone 5	Run 1	_____	Run 2	_____
Zone 6	Run 1	_____	Run 2	_____