

Qt emitter

Installation & Location Guidelines

While installing emitters is designed to be easy, there are some very important guidelines that need to be followed for a successful installation. This document lists the guidelines and provides information for isolating problems found during the installation/check-out process.

Overview

A single cable run of emitters (one daisy chain from the control module) can have **60 speakers** or **1,000 feet (305 m) of cable**, whichever comes first. The number of runs per zone is dependent on the type of control module.

When the total cable length becomes too lengthy, there will typically be a drop in masking level or volume across the run. There is no limit to the length of cable between two speakers, as long as the overall run stays under 1,000 feet (305 m); however, it is not recommended to use a large number of custom length cables.

Too many emitters on a run will cause an excess of current draw and can have several side effects described later in this document.

The placement of emitters is critical to a positive end user experience. The masking noise must be consistent across an area. Cambridge Sound Management, LLC (CSM) provides services for providing layout and wiring plans. The Knowledge Base Article *System Planning and Layout Guide* provides complete guidelines for a successful system layout. This guide can be found on the CSM website at csmqt.com.

Note: The layout of emitters in an open area is different than that of a closed area. There needs to be at least two speakers in an office so occupants cannot localize the source of the masking noise. It allows the system to better take advantage of the reverberation in the room and create a more uniform masking sound. If possible, avoid placing the emitter directly over someone's head for the same reason.

If the furniture is not available, the desk tends to be in the opposite corner from the door so only place emitters in the corners that are neither occupied by doors nor desks.

Speakers can be moved up to 2 feet (60 cm) in any direction to accommodate existing features in the space. Detailed instructions can be found in the *System Planning and Layout Guide*.

Connecting Emitters

It is very important to pay attention to the input and output ports of the speakers as you install the system. The wire coming from the previous speaker should go into the input port while the wire going to the next speaker should go into the output port. Additionally, if you have been provided a wiring diagram, follow the wiring pattern shown. If you do not have a wiring diagram, follow a serpentine pattern in the open office areas. For private areas, just connect all the speakers in one room before moving on to the next. Detailed instructions can be found in the *System Planning and Layout Guide*.

Zones

If you have an installation or bid plan, follow the zoning shown. In general, it is recommended to zone open office areas separately from enclosed spaces since they have very different acoustics. Sections of an open plan with different ceiling heights should also be zoned separately to allow the speakers to still sound the same at ear level. Detailed instructions can be found in the *System Planning and Layout Guide*.

If the number of zones doesn't provide enough granularities to divide a masking region, use adjustable speakers to add granularity when needed during or after installations. Adjustable emitters have toggle switches that decrease the incoming signal by 3, 6, or 9 dB.

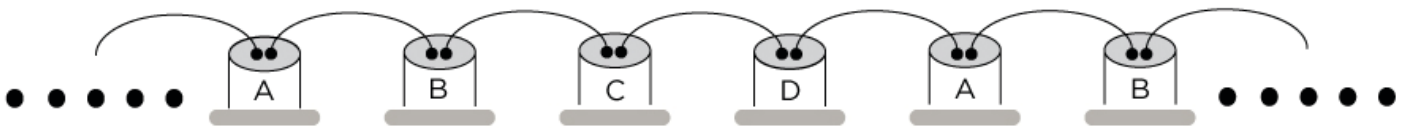
Emitter Channels

A channel is a random noise sequence. If all of the sound masking speakers are emitting the same sound, it is easy to have interference. When the signals are exactly out of phase at certain points along the run, the result will essentially cause noise cancellation. There will also be points along the run where the signals are exactly in phase, creating an increase in level. This prevents the masking sound from sounding uniform as someone moves through the space. We use a 4 channel system to maximize the effect of the masking to not only increase privacy but to also ensure the comfort of the occupants. With 4 channels, it is almost impossible to end up with adjacent speakers on the same channel, therefore eliminating acoustical interference.

System Debug of Non-Functional Emitters

Q: I have one speaker (or every 4th speaker) that is quieter than the rest or completely out.

A: This is due to an impedance issue, usually from a poorly terminated RJ-45 end. You will see a pattern of every 4th speaker as quiet since it will affect the other speakers on that channel further downstream. The system is a 4 channel system with one masking channel on each pair of the CAT cabling. The emitters are smart emitters and can cycle through the channels automatically.



If you have an intermittent connection on one of these pairs, it will cause all speakers on that channel to appear quieter than the rest.

To fix the issue, you need to find the first speaker on the run that is quiet. Check all 4 cables PRIOR to that speaker, either with a simple LAN tester that displays signal continuity or by bypassing the existing cable with a known good cable. If all the cables check out, next check the first bad speaker and all 4 prior to it. The easiest method is to bypass each speaker with a known good speaker. If you replace something and the quiet speakers suddenly become loud, whatever you just bypassed is the problematic piece of equipment. Permanently replace the problematic piece of equipment. Always make sure you are working off the first speaker in line that is exhibiting an issue.

Q: How do I avoid custom cable issues?

A: It is important to follow the Knowledge Base Article *Building Custom Cables*, available on the CSM website at csmqt.com, when making new cables on site. Cables that do not follow these guidelines may pass cable testers but could cause problems when used with our system. All CSM cables are solid core CAT-3 cables with “bent 3-tyne” RJ-45 connectors. If you must use a stranded core CAT cable with our system, you will need different RJ-45 ends. You must use the correct RJ-45 connector with your cable type. All cables must be straight through as well as tested for continuity and shorts.

While all CSM supplied cables are Cat-3 cables, both Cat-5 and Cat-6 cables are supported by

the system. As stated above, the cables just need to be straight through.

Q: How many emitters can I have on a run?

A: Each cable run can have up to 60 emitters or 1,000 feet (305 m) of cable, whichever comes first. Having too many emitters on a run can cause an error code 1, short, because it draws more than the allocated power.

The problem can also cause the emitters at the end of the run to be quieter than the emitters at the start of the run.

Q: The sound masking is going off and on periodically. What is the cause?

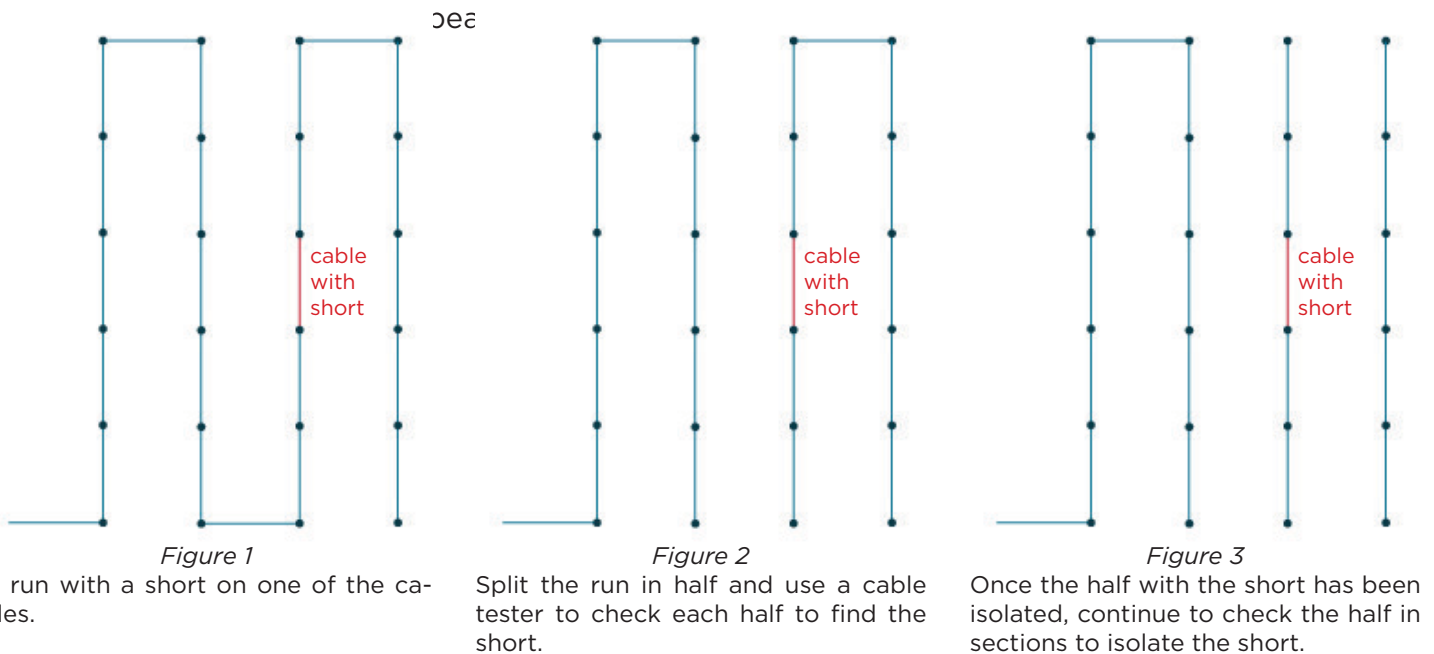
A: This is typical of an overdraw of power on the run that the controller is restricting the power draw. It is often caused by too many emitters.

It can also be caused by poor cabling. Connecting cables to the wrong port, swapping input and output cables, can cause a loss of channels and confuse the controller.

Q: I have a short/short error code displayed on the controller. How do I find it?

A: Shorts can be tricky to isolate on a run. This error is displayed when a run is drawing more power than expected.

The best method for isolating a short is to use a simple LAN RJ-45 cable tester. First, check that



A run with a short on one of the cables.

Split the run in half and use a cable tester to check each half to find the short.

Once the half with the short has been isolated, continue to check the half in sections to isolate the short.

It is recommended that you use a simple LAN tester to find the short efficiently by “sandwiching” sections of the run between the two parts of the tester, as seen in Figure 2. It is okay to use the tester with the speakers still in the line. Connect the main unit of the LAN tester to the front end of the home run cable (essentially taking the place of the control module). Find the midpoint of the run. Disconnect the second half of the run and connect the remote unit of the cable tester to the end of the first half.

Watch for the short on the remote lights. If the cable tester shows the short, you know it is in the first half of the run. If it does not, you know it is in the second half. Cut the section with the short in half again and repeat the cable test, “sandwiching” another small section of the run

between the cable tester, as seen in Figure 3. Continue the process until you isolate the cable of speaker with the short.

If the control module is part of the Qt family (consisting of the Qt 100, Qt 300, and Qt 600), you can also use the control module to test for the short in a similar manner. Disconnect the run and clear the error. Reconnect only the first few speakers. If the error returns, the short is in this section. If not, connect another few speakers. Continue to add speakers back to the run until the error code returns. The short will be in the last portion you added. Check the cables in that section and then the speakers until the short is found. Implementing either a cable tester or a known good speaker and cable, use them in each location to determine the problematic equipment. See the first question for more details on isolating problematic equipment in this way.

Q: What is the pin out of the cables? Which pairs carry power?

A: All patch cables provided by CSM use a T568B pin out. As long as all cables are straight through, the pin out is not critical. It is far more important that the RJ-45 type matches the cable type (3-tyne for solid care, 2-tyne for stranded core). All four pairs carry powered audio on our system, on pair for each channel.

Questions?

Contact a Cambridge Sound Management representative at techsupport@csmq.com or call us at (800) 219-8199.