

Bethlehem Covenant Church

Sound Systems Recommendation

This document outlines the recommendations for sound system equipment in the sanctuary, community room and fellowship hall. The recommendations in this document are based on the information compiled in the "Sound Systems Assessment and Planning" document that was completed in September, 2011 and from on site testing and analysis of the current equipment in each of the three spaces.

Sanctuary:

Nearly all of the existing equipment in the sanctuary has served a very useful life over the last decades. Due to the age of the equipment and inability of the older components to perform reliably, meet current professional standards of quality and support the current and future uses for the sound system in this space, this recommendation includes replacement of most of the sound system components in the sanctuary.

System Description:

The new equipment recommended for the sanctuary includes installing a main speaker in the center of the sanctuary at the height of the intersection of the main wooden beams. The speaker will be located about four or five feet away from the wood beams, toward the front wall of the sanctuary. New under balcony speakers and an upper balcony speaker will be included. A new mixer, power amplifiers and audio lines will be run. Power amplifiers will be installed in the stairwell room on the north side of the platform. There will be 16 mic jacks in the chancel area, serving the lectern, pulpit, platform area and piano area. Anticipating the increased use of a worship band, the new system includes additional mics and stands as well as floor monitor speakers (4) to provide foldback audio to the vocalists and instrumentalists. The system includes two speakers in the north hallway outside the sanctuary, one in the community room, one in the narthex area at the back of the sanctuary and one in the nursery for hearing the service at those locations. These speakers will include volume controls to adjust the level or turn these speakers off when they are not needed. A digital recorder is included for recording services to SD card in either mp3 or .wav format for archiving and sharing with members and friends of the church. New low profile podium mics are included at the lectern and pulpit. A hanging mic at the front of the sanctuary and at the rear of the sanctuary are included to reinforce choral or instrumental music and /or inclusion in recordings. The existing wireless lapel mics, CD recorder, and Audio Technica mic will be integrated with the recommended system.

On the following pages is a table of recommended equipment and project work for the sanctuary sound system. Click on the URL Reference if desired to go to a description of the equipment item.

Sanctuary Sound System Equipment & project work

| Item | Quan | Model | Notes | URL Reference |
|--|------|-----------------------------|---|---|
| Audio Mixer | 1 | Soundcraft MPMi 20 | | http://www.soundcraft.com/products/product.aspx?pid=157 |
| Power Amplifier Main Speaker | 1 | Crown XLS1500 | 2 Rack space | http://www.crownaudio.com/amp_htm/xls.htm |
| Main Speaker System | 1 | McCauley ID1.108-99 | | http://mccauleysound.com/product_overview.cfm?ID=2088 |
| Under Balcony speakers | 2 | McCauley AC75 | 110 each | http://www.mccauley.com/product_overview.cfm?ID=61 |
| Balcony fill speaker | 1 | McCauley AC6 | | http://www.mccauley.com/product_overview.cfm?ID=842 |
| Balcony speaker & under balcony Power Amp | 1 | Crown XLS1000 | Located in mix area. (Research fan noise) | http://www.fullcompass.com/product/381180.html |
| System Loudspeaker controller/ EQ/ limiter/crossover | 1 | McCauley M408 | | http://www.mccauley.com/product_overview.cfm?ID=2259 |
| Floor Monitor speakers | 4 | Yamaha Club V Series SM12V | 339 ea | http://www.sweetwater.com/store/detail/SM12V/ |
| Speaker cables | 4 | | 25' with speakon connectors | http://www.mcmelectronics.com/product/24-10485 |
| Power amp for monitor speakers | 1 | Crown XLS1500 | 2 Rack space. Locate in Room next to platform | http://www.crownaudio.com/amp_htm/xls.htm |
| Digital Recorder | 1 | Roland R05 Wav/mp3 Recorder | | http://www.fullcompass.com/product/384914.html |
| Mic Boom | 4 | Hercules MB200B | | http://accessories.musiciansfriend.com/product/Hercules-Stands-MB200B-Short-Telescoping-Boom?sku=453070 |
| Mic Cables | 6 | Horizon | 25' Soldered Connectors | http://accessories.musiciansfriend.com/product/Horizon-Pro-LoZ-Microphone-Cable?sku=336520 |
| Mic Stand | 4 | Atlas Black | MS-12CE Black | http://accessories.musiciansfriend.com/product/Atlas-MS12C-Round-Base-Mic-Stand?sku=450649 |
| Microphone-Aisle at rear of sanctuary | 1 | Audio-Technica U853A | Hanging from Balcony | http://pro-audio.musiciansfriend.com/product/AudioTechnica-U853A-Hanging-MicCardioid-?sku=270494 |
| Microphone-Lectern | 1 | Countryman podium Mic | 18" Cardioid pattern Cardioid Standard Black ISOMAX 4RF Podium Mic | M4CP5RF18EB http://www.fullcompass.com/product/341282.html |
| Microphone-Platform | 1 | Audio-Technica U853A | Overhead mic: suspend from overhead center upstage of main speaker to mic choir | http://pro-audio.musiciansfriend.com/product/AudioTechnica-U853A-Hanging-MicCardioid-?sku=270494 |
| Microphone-Pulpit | 1 | Countryman podium Mic | 18" Cardioid pattern Cardioid Standard Black ISOMAX 4RF Podium Mic | M4CP5RF18EB http://www.fullcompass.com/product/341282.html |

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|---|---|---|---|---|
| Microphone-Spare | 2 | Audio Technica ATM61HE/s | Existing | http://pro-audio.musiciansfriend.com/product/Shure-SM58-Mic?sku=270101 |
| Microphones Worship Band | 4 | Shure SM58 | | http://pro-audio.musiciansfriend.com/product/Shure-SM58-Mic?sku=270101 |
| Wireless Mic System | 2 | existing | Shure L4 Diversity Wireless Mics | |
| Rack for equip in balcony | | Raxxess ER-12-18 | | http://www.sweetwater.com/store/detail/ER12/ESS-ER-12-18-/555-11755 |
| Equipment Rack in room near platform | 1 | Raxxess WMK-10 | 10 space. Wall mount 18" deep | http://www.mcmelectronics.com/product/555-3826 |
| Distribution speakers | 4 | 8" Coaxial 2-way Speaker and 10watt transformer | North Hallway (2), narthex, nursery, community room | http://www.mcmelectronics.com/product/MCM-CUSTOM-AUDIO-555-6390-7555-6390 http://www.mcmelectronics.com/product/555-7120&cid=prodCrossSell |
| Volume control for Hallway, Narthex, nursery, community room | 3 | | | http://www.mcmelectronics.com/product/555-0200&green=8E4059DB-E7B4-5DF5-B24E-8AC78A6DA1F1&utm_campaign=MyBuys&utm_medium=Recommendation&utm_source=prod&utm_term=555-0200 |
| Amp for distribution speakers | 1 | TOA 30 watt | 900 series. Use existing amp from Community Room | Mount in wall rack in room near platform |
| New Audio wiring between mix position in balcony and platform | | | 16 input lines (mic) and 6 return lines 2 Cat 5 lines for future video | Not included in the cost estimate at the bottom of the list |
| Speaker wiring to platform area for stage monitor speakers | | | From power amps in room near platform | Not included in the cost estimate at the bottom of the list |
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Cost estimate for the equipment listed above is \$9,483.00 and doesn't include installation or wiring supplies.

Community Room- Upper level

Testing and analysis of the sound system in this room revealed that the system needed improvement to provide better intelligibility for speaking and higher quality for playback of pre-recorded music. The acoustics of the room and the characteristics of the existing ceiling speakers emphasize the audio frequencies in the 350 to 550 Hz range as well as the 750 to 1100 HZ range. The result is a very muddy sound that makes it difficult to understand the words that are being spoken. Adding a 1/3 octave Graphic Equalizer to the existing sound system equipment can improve the sound quality a great deal. An additional step to improve the sound quality in the room is to replace the eight speakers with a higher quality speaker that is capable of reproducing sound more accurately. (Note: One of the existing speakers needs servicing or replacement) While the amplifier works well in the room, it could be replaced with a higher power amplifier for additional improvements in sound quality. The existing amplifier could be used to power narthex, nursery, and hallway speakers carrying sound from the sanctuary. Below is a table of recommended equipment and project work for the Community Room Sound System.

| Item | Qn | Model | Notes | URL Reference |
|---------------------------|----|---|--|--|
| 1/3 Octave Graphic EQ | 1 | Rane ME30S | 2 Rack Space S-curve 231 - Graphic Equalizer | http://www.rane.com/me30s.html |
| Speaker Replacement | 8 | 8" Coaxial 2-way Speaker and 10watt transformer | | http://www.mcmelectronics.com/product/MCM-CUSTOM-AUDIO-555-6390-/555-6390 http://www.mcmelectronics.com/product/555-7120&cid=prodCrossSell |
| Wireless lapel mic system | 2 | | existing | |
| CD Player | | | Existing | |
| Conventional mic | 1 | Shure SM-58 | | http://pro-audio.musiciansfriend.com/product/Shure-SM58-Mic?sku=270101 |
| Mic Stand | 1 | Atlas Black | MS-12CE Black | http://accessories.musiciansfriend.com/product/Atlas-MS12C-Round-Base-Mic-Stand?sku=450649 |
| Boom | 1 | Hercules MB200B | | http://accessories.musiciansfriend.com/product/Hercules-Stands-MB200B-Short-Telescoping-Boom?sku=453070 |
| TOA 60 watt amp | 1 | TOA A706 | 700 series A706 60 watt Use existing 30 watt amp for sanctuary distribution speakers. | http://www.fullcompass.com/product/242964.html |
| Equipment Rack | | | Existing | |
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Cost estimate for the equipment listed above is \$1443.20 and doesn't include installation or wiring supplies.

Fellowship Hall- Lower level

Testing and analysis of the sound system in this room revealed that the system performed fairly well for speaking and adequately for background music playback. Recommendations for improvement to meet the higher demands of live music performance include replacing the 12 ceiling speakers with higher quality speakers, adding a 1/3 Octave graphic equalizer for tuning the system to the room and making some improvements to the wire runs to the three mic jacks in the room. Additionally, adding an input module to the amplifier to allow connection of music playback devices such as CD players, iPods, and mp3 players is recommended. Existing or future music performance that requires multiple mics from the chosen performance area in the room can be accomplished with a small auxiliary mixer (not included in the list below) that plugs into an existing mic wall jack. Below is a table of recommended equipment and project work for the Fellowship Hall Sound System.

| Item | Quantity | Model | Notes | URL Reference |
|---|----------|---|---|---|
| 1/3 Octave Graphic EQ | 1 | Rane ME30S | S-curve 231 - Graphic Equalizer | http://www.rane.com/me30s.html |
| Speaker Replacement | 12 | 8" Coaxial 2-way Speaker and 10watt transformer | North Hallway, narthex, nursery, community room | http://www.mcmelectronics.com/product/MCM-CUSTOM-AUDIO-555-6390-555-6390 http://www.mcmelectronics.com/product/555-7120&cid=prodCrossSell |
| Wireless lapel mic system | 2 | | existing | |
| Line Input module for TOA amp | | TOA U01R | For iPod/ Mp3 players/ CD players | http://www.fullcompass.com/product/293621.html |
| Conventional mic | 1 | Audio Technica | existing | |
| Mic Stand | 1 | | existing | |
| Mic stand flex extension | 1 | | existing | |
| Enclose wiring for mic jacks with wire mold raceway | 3 | | | |
| Equipment Rack | | | Existing | |
| Speaker in Hallway near kitchen | 1 | 8" Coaxial 2-way Speaker and 10watt transformer | | http://www.mcmelectronics.com/product/MCM-CUSTOM-AUDIO-555-6390-555-6390 http://www.mcmelectronics.com/product/555-7120&cid=prodCrossSell |
| Volume Control for Hallway speaker | 1 | | | http://www.mcmelectronics.com/product/555-0200&green=8E4059DB-E7B4-5DF5-B24E-8AC78A6DA1F1&utm_campaign=MyBuys&utm_medium=Recommendation&utm_source=prod&utm_term=555-0200 |
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Cost estimate for the equipment listed above is \$834.27 and doesn't include installation or wiring supplies.