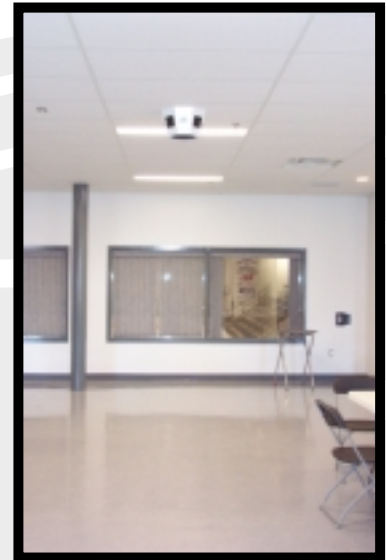


**IN THE
SPOTLIGHT**

KEELER CENTRE COLBORNE, ONTARIO



Octasound®
S O U N D A B O V E A L L



by KDM Electronics

*Manufacturer of
Central & Multi-location Speaker Systems
Voice & Music Sound Systems*

Keeler Centre - Colborne, Ontario

New Sound for a New Southern Ontario Sports Facility

In early 2001, the area of Colborne-Cramahe in Southeastern Ontario built a new public facility incorporating an arena and community hall. In response to a call for audio distribution throughout the new facility, they received an in-depth proposal from TELK Communications Inc. (Sound Contractor) and KDM Electronics Inc. This design met the requirements for all areas and TELK was awarded a contract to provide and install the systems.

The facility consists of a full-size arena with spectator seating on one side. There are dressing rooms below the seating risers. In addition, there is a meeting room area which can be divided into two, there are service corridors for the dressing rooms and a public lobby at the entrance to the building. Finally, there is a Main Office where all of the control equipment was to be housed and an equipment room for the rack.

The main concern for the quality of sound was the arena itself. In the design of new arena facilities, the dasher boards adjacent to the audience seating area are fitted with safety glass panels to protect the spectators from errant pucks. The height of the glass above the dasher boards has grown over the years to the point that it may now extend from five to eight feet above the boards or twelve feet above the ice surface. This presents a considerable impediment to providing clear sound to the spectators who are sitting in the first two or three rows of the audience risers.

Classic arrangements of loudspeaker elements in arenas have been based on one or two loudspeaker clusters that are suspended above center ice and project sound over the ice surface and into the seating area. To overcome the problems with the dasher board glass and to get sound into the seating areas, designers have been putting one or several supplemental speakers close to the seating area to serve those patrons behind the glass.

This was the case with the KDM/TELK design, where they used a KDM SP840A center speaker and two KDM SP520A multi-location speakers.

Most KDM design loudspeakers are constructed to provide 360° coverage by using a down-facing low frequency driver and four high frequency drivers mounted at 90° to each other around the enclosure. The SP840A is comprised of a 15" LF driver and is a tuned port enclosure, with four compression horns and drivers. The efficiency is an astonishing 104 dB, 1 watt/1 meter. The maximum SPL of the system is 128 dB, with a power handling capacity of 300 watts RMS.

The small size (16" height) and low weight (75 pounds) make the SP840A suitable for mounting under a scoreboard. To address the issues of structural stability in a humid environment, KDM have always built the cabinets with marine grade plywood, plastic laminates and waterproof glues and plated hardware.

The SP520A is a design meant to complement the SP840A and has a dispersion pattern of 180° horizontal and 120° vertical. The SP520A is comprised of an 8" low frequency driver (downward facing) and two compression drivers and horns mounted at 90° to each other. The rated sensitivity is 96 dB 1 watt/1 meter, with a maximum power handling of 150 watts RMS for an output of 118 dB SPL. Again the cabinet is manufactured for high humidity.

This system is treated as an entity, powered by a QSC USA400 amplifier. The high efficiency of the KDM "Octasound" product line means that large power amplifiers are not required to deliver sound into the large area. Using these unique loudspeakers, TELK Communications was able to provide complete sound coverage throughout the arena.

The signal to the power amplifier are routed through a Furman dual 15 band graphic equalizer. One channel serves to provide the equalization for the center cluster and the second provides the equalization for the seating area signal. The equalized signals are fed to a QSC USA400 amplifier, one channel for the center speaker and one channel for the support speakers.

The two meeting room areas are served by small "Octasound" speakers designed to hug the ceiling and provide 360° coverage throughout the room. For its size, the SP800A delivers 99 dB SPL 1 watt/1 meter, with a maximum output of 117 dB SPL. Constructed with one high efficiency 8" low frequency driver and four direct radiating piezo horns, it has a power handling capability of 75 watts RMS. Its small size (8" high) and light weight (14 lbs) make this speaker a nice little problem solver.

Finally, the public areas are served by conventional ceiling speakers and KDM SP80A speakers configured as a 70.7 volt system. This includes the general public areas (SP80A's in the lobby and hallway), the arena hallways and the office area. These speakers are powered by TOA P-60MK2 amplifiers.

In summary, there are five areas in the Colborne Arena and Community Hall: Arena, two Meeting Rooms, General Area, Hallways and the Main Office.

KDM manufactures a unique line of electronic products to complement their loudspeakers. The heart of these systems is a control block designed around these electronics modules. The architecture of this particular system involves remote modules located in the time-keepers box in the arena. The module (MX120A) is fitted with an XLR microphone connector and a pair of RCA connectors. Each input has a front panel level control. Internally, the module amplifies the mic level input to line level and mixes it with the line level source.

Those experienced in arena installations will quickly recognize that this is perfect for any type of "room" fit-up where the possible sources are mic level and line level. This same module is used in the meeting rooms as the input to the system. Finally, there is one in the Main Office system for use with the microphone there.

In the meeting rooms, a sub-system is created from the two input modules. These modules feed a selector system that allows the two rooms to operate independently, or to be combined into one big room. The USA400 amplifier is fed the outputs of this system and powers the ceiling SP80A speakers. It should be noted, however, that the line level signals from these areas are fed to the equipment rack in the main office area and ultimately "routed" to the destination amplifier.

The Main Office control system utilizes the MP200A control module manufactured by KDM. Five of these modules are grouped together to create a zone select system. The concept is that there are normal sources to various areas and there are sources that are distributed as required. For example, the arena source (the MX120A in the time-keeper's box) is normally routed to the input of the amplifier driving the arena speakers. For a special event, this output could also be selected to go to the meeting rooms amplifiers, or the hallways, and so on.

There are actually three MX120A modules that feed the amplifiers for the arena speakers. Besides the one in the time-keeper's box, there is one in the figure skater's music room and one in the main office. The outputs of these modules are combined via an IA330A interconnect module. Common equipment to all parts of the system is the office microphone, the tuner and a CD player. These occupy the first three of the five positions on the MP200A groups.

The flexibility built into the design of the electronics by KDM and TELK ensures that the building management have the ability to direct signal sources to any or all the parts of the building. A juvenile hockey tournament attended by many parents always results in overflow crowds, particularly if the aunts and uncles are in attendance as well. By routing the sound from the time-keepers box in the arena to other areas of the building, spectators can watch from overlooking areas and still hear the arena announcements and music originations.

The same would hold true in the event of a trade show. Announcements made from the meeting rooms can be directed to the arena as well as to the public areas. Finally, in the event of an evacuation of the building, announcements from the office can be directed to all areas of the building and override the audio being sent concurrently from those areas. There is a priority override scheme in the KDM module system that permits the designated microphone to override all other signals sources.

The comments from the arena management about the installed systems have been favourable indeed. They appreciate the simplicity, the flexibility and the reliability of the equipment. They also commented on the high quality of the products and the installation. For more information about this installation, contact TELK Communications at 416-284-0561 or KDM Electronics at 416-439-7158. Toll Free: 1-800-567-6282.

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Operational Description

The system will be capable of originating and receiving programs as follows:

ZONE 1 - ARENA

A totally independent system that will be capable of **originating and/or receiving** voice and music programs at the desired/required audio level from three (3) locations:

- (a) One remote mixer - located in the Timekeeper's Box.
- (b) One remote mixer - located in the Audio Room.
- (c) The Main Office System module designated "Arena". (Mic, C.D., Tape, Radio).

ZONE 2 - HALLS "A" & "B"

Two totally independent systems that will be capable of **originating and/or receiving** voice and music programs at the desired/required audio level from five (5) locations:

- (1) Two remote mixers - located in the Hall "A".
- (2) Two remote mixers - located in the Hall "B".
- (3) The Main Office System module designated "Halls A & B". (Mic, C.D., Tape, Radio, Arena).

ZONE 3 - GENERAL AREAS (LOBBY, HALLWAY & WASHROOMS)

A totally independent system that will be capable of **receiving** voice and music programs at the desired/required audio level from two (2) locations:

- (1) The Arena Remote Mixers (via the Main Office Module).
- (2) The Main Office System module designated "General Areas". (Mic, C.D., Tape, Radio, Arena).

ZONE 4 - ARENA HALLWAY & DRESSING ROOMS

A totally independent system that will be capable of **receiving** voice and music programs at the desired/required audio level from two (2) locations:

- (a) The Arena Remote Mixers (via the Main Office Module)
- (b) The Main Office System module designated "Arena Hallway" (Mic, C.D., Tape, Radio, Arena).

ZONE 5 - MAIN OFFICE MONITOR

A totally independent system that will be capable of **monitoring** the Tape, Compact Disc Player, Radio, and Arena originations at the desired/required audio level from the Main Office Monitor Speaker. Selection to be via the Main Office System Module designated "Monitor" (C.D., Tape, Radio, Arena).

MAIN OFFICE SYSTEM

Will be capable of originating voice and music programs at the desired/required audio level and **priority/emergency** paging to all zones as shown on the following chart.

SELECTOR POSITION	ZONE 1 ARENA	ZONE 2 HALLS A&B	ZONE 3 GENERAL AREAS	ZONE 4 ARENA HALLWAY	ZONE 5 OFFICE MONITOR
1	MIC	MIC	MIC	MIC	OFF
2	CD	CD	CD	CD	CD
3	TAPE	TAPE	TAPE	TAPE	TAPE
4	RADIO	RADIO	RADIO	RADIO	RADIO
5	OFF	ARENA	ARENA	ARENA	ARENA

VOICE AND MUSIC ACCESSORIES

A variety of accessories -- microphones and music sources (Tape Player/Recorder, Compact Disc Player, FM/AM Tuner, etc.) will be provided to make the system totally functional.

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Equipment List

ZONE 1 - Arena

- 1 * **KDM SP840A** - 360° x 180° Full Range "OCTASOUND" Central Speaker System.
- 2 * **KDM SP520A** - 180 x 120 Full Range "OCTASOUND" Multi-Location Speakers.
- 1 *** **SOUND CONTRACTOR** - 125W 2 Channel Power Amplifier (Channel 1 - SP840A Channel 2 SP520A's)
- 2 * **KDM MX120A** - Dual Channel Phantom Powered Remote Audio Mixer.
- 2 ** **KDM MX120A OPT 01** - Locking Protective Case - Surface Mount.
- 2 * **KDM IA330A** - Interconnect Module - 3 inputs to 1 Output.
- 1 *** **SOUND CONTRACTOR** - Stereo Graphic Equalizer 15 Band
- 1 * **KDM PS2415B** Dual Output Power Supply

ZONE 2 - Hall A&B

- 2 * **KDM SP800A** - 360° x 180° Full Range "OCTASOUND" Central Ceiling Speakers.
- 2 *** **SOUND CONTRACTOR** - 30W Power Amplifier
- 2 * **KDM MX120A** - Dual Channel Phantom Powered Remote Audio Mixer.
- 2 * **KDM IA330A** - Interconnect Module - 3 inputs to 1 Output.
- 2 * **KDM EQ450A** - 5 Band Tonal Balance Equalizer.

ZONE 3 - General Areas (Lobby, Tickets, Hallway)

- 3 * **KDM SP80A** - 360° x 180° Full Range "OCTASOUND" Central Ceiling Speakers.
- 3 ** **KDM TX16A** - 16W Multi-Tap Transformer.
- 2 *** **SOUND CONTRACTOR** - 8" 10oz. Loud Speakers c/w 70V Transformers
- 2 *** **SOUND CONTRACTOR** - Square Metal Back Boxes (for 8" Speakers)
- 2 *** **SOUND CONTRACTOR** - Flush Square Metal Baffles
- 1 *** **SOUND CONTRACTOR** - 60W Power Amplifier.

ZONE 4 - Arena Hallway

- 11 *** **SOUND CONTRACTOR** - 8" 10oz. Loud Speakers c/w 70V Transformers
- 11 *** **SOUND CONTRACTOR** - Square Metal Back Boxes (for 8" Speakers)
- 11 *** **SOUND CONTRACTOR** - Flush Square Metal Baffles
- 1 *** **SOUND CONTRACTOR** - 30W Power Amplifier.

ZONE 5 - Main Office Monitor

- 5 *** **SOUND CONTRACTOR** - 8" 10oz. Loud Speakers 8 Ohm
- 5 *** **SOUND CONTRACTOR** - Square Metal Back Boxes (for 8" Speakers)
- 1 *** **SOUND CONTRACTOR** - Flush Square Metal Baffles

Main Office System Components

- 5 * **KDM MP200A** - Master Aux. Pre-amp (Arena, Hall A&B, General Areas, Arena Hallway, Office Monitor)
- 5 * **KDM MP200A OPT 01** - Mic Aux. Pre-amp Plug-in Module
- 1 * **KDM MP200A OPT 02** - 2 Watt Monitor Amplifier
- 4 * **KDM MP200A OPT 03** - Priority Page
- 2 * **KDM MP200A OPT 04** - External Auxiliary A & B Input Plate (Tape, CD, Radio)
- 1 *** **SOUND CONTRACTOR** - Microphone "Push to Talk"
- 1 *** **SOUND CONTRACTOR** - Desk Top Microphone Stand
- 1 ** **KDM RM700A** - E.I.A. 19" Rack Mount (19"L x 7"H x 10"D) (4RU / 7" Rack Space)
To accommodate: 5-MP200A's, Arena IA330A, and System PS2415B
- 1 ** **KDM RM175A** - E.I.A. 19" Rack Mount (19"L x 1¾"H x 10"D) (1RU / 1¾" Rack Space)
To accommodate: Hall A&B 2 - IA330A's and 2 - EQ450A's
- 1 *** **SOUND CONTRACTOR** - E.I.A. 19" Rack Panel with Hall "A" & "B" Common/Separate Switch
- 1 *** **SOUND CONTRACTOR** - E.I.A. 19" Rack Housing With Suitable Space to Accommodate all Rack Mounted Components

Voice & Music Accessories

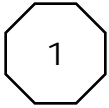
- 1 *** **SOUND CONTRACTOR** - Microphone "Push To Talk", 13" Gooseneck (For MX120A's in the Timekeepers Box & Audio Room).
- 1 *** **SOUND CONTRACTOR** - Microphone with "On/Off" Switch, 25 Foot Cable, XLR Type Male Connector.
- 1 *** **SOUND CONTRACTOR** - Heavy Duty Microphone Floor Stand c/w 13" Gooseneck.
- 1 *** **SOUND CONTRACTOR** - Heavy Duty 50 Foot Microphone Cable c/w XLR Type Connectors.
- 1 *** **SOUND CONTRACTOR** - Portable Compact Disc Player, Auto Skip Memory, with Headphone and AC Adapter.
- 1 *** **SOUND CONTRACTOR** - Rack Mount Dual Auto Reverse Cassette Deck, Auto Tape Select, Repeat Playback Function.
- 1 *** **SOUND CONTRACTOR** - Rack Mount FM/AM Rack Mount Tuner with Digital Tuning & Station Storage.
- 1 *** **SOUND CONTRACTOR** - Rack Mount C.D. Player, Multi-Disc, Front Loading, Repeat and Shuffle Play.

Equipment List Notes

- 1. * ARE DESIGNED & MANUFACTURED BY KDM ELECTRONICS INC.
- 2. ** ARE MANUFACTURED TO KDM ELECTRONICS INC. SOUND SYSTEM SPECIFICATIONS.
- 3. *** ARE SELECTED TO MEET KDM ELECTRONICS INC. SOUND SYSTEM SPECIFICATIONS.

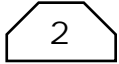
Keeler Centre - Colborne, Ontario

Riser Symbol Legend



SP840A CENTRAL SPEAKER.

ZONE "1" (Arena) - One Central Speaker located as per the architectural drawings. Speaker is 8 ohms. Wire speaker directly to the zone "1" power amplifier installed in the 19" Rack located in the Main Office. Directly above the speaker location, mount a standard octagon or an 1110 electrical box. Electrical box to be supplied and installed by the Electrical Contractor.



SP520A MULTI-LOCATION SPEAKERS.

ZONE "1" (Arena) - Two Multi-location Speakers located as per the architectural drawings. Each speaker is 8 ohms. Wire the two speakers in parallel (4 Ohms) and connect directly to the Zone "1" power amplifier installed in the 19" Rack located in the Main Office. Directly above each speaker location, mount a standard octagon or an 1110 electrical box. Electrical box to be supplied and installed by the Electrical Contractor.



SP80A AND SP800A CEILING MOUNT SPEAKERS.

ZONE "2" (Halls "A" & "B") - Two SP800A Central Ceiling Speakers located as per the architectural drawings. Each Speaker is 8 Ohms. Wire each speaker directly to the Zone "2" power amplifiers installed in the 19" Rack located in the Main Office. Directly above each speaker location, surface mount a standard electrical box. Electrical box to be supplied and installed by the Electrical Contractor.

ZONE "3" (General Areas - Lobby, Hallway) Three SP80A Central Ceiling Speakers with 70 volt multi-tap transformers, located as per the architectural drawings. All speakers wired in parallel and connected to Zone "3" power amplifier installed in the 19" Rack located in the Main Office. Directly above each speaker location, surface mount a standard electrical box. Electrical box to be supplied and installed by the Electrical Contractor.



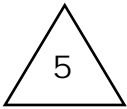
ZONE "3" (General Areas - Washrooms) - Two Wall or Ceiling Mount Speakers with 70 volt multi-tap transformers located as per the architectural drawings. All speakers wired in parallel and connected directly to the Zone "4" power amplifier installed in the 19" Rack located in the Main Office. At each speaker location, surface mount a standard electrical box. Electrical box to be supplied and installed by the Electrical Contractor.

ZONE "4" (Arena Hallway & Dressing Rooms) - Eleven Wall or Ceiling Mount Speakers with 70 volt multi-tap transformers, located as per the architectural drawings. All speakers wired in parallel and connected directly to the Zone "4" power amplifier installed in the 19" Rack located in the Main Office. At each speaker location, surface mount a standard electrical box. Electrical box to be supplied and installed by the Electrical Contractor.

ZONE "5" (Main Office Monitor Speaker) - One Wall or "T-Bar" Ceiling Mount 8 Ohm Speaker. Speaker wired to Zone "5" Monitor power amplifier installed in the 19" Rack located in the Main Office. Directly above the speaker location, surface mount a standard electrical box.

** Electrical box to be supplied and installed by the Electrical Contractor.

MX120A REMOTE MIXERS & LOCKABLE CASES



ZONE "1" (Arena) - Two mixers and surface mount cases. One located in the Timekeeper's Box and the other located in the Audio Room.

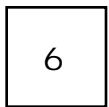
ZONE "2" (Halls "A" & "B") - Four mixers and flush mount cases. Located as per the architectural drawings. All Mixers to be wired directly to the individual zone Interconnect Modules installed in the Main Office 19" Equipment Rack.

Mount the surface mount cases for the Arenas on the counter tops in each location overlooking the Arena ice surface.

Mount the flush mount cases for the Halls at approximately 36" from the floor surface.

Case dimensions (± 0.030): Height - 6.25" X Width - 4" X Depth - 3.75". Flush Mount Shroud dimensions (± 0.030): Height - 8.125" X Width - 6".

Surface Mount and Flush Mount cases to be supplied by the Sound System Contractor and Installed by the Electrical Contractor.




19" EQUIPMENT RACKS.


AUDIO ROOM AND MAIN OFFICE - Racks to be of adequate size to accommodate the required power amplifiers, Interconnect module rack mounts, Voice and Music modules, plus space to accommodate future equipment requirements. Behind each 19" rack location, install a standard electrical flush mount "T" cabinet. 19" rack cabinets to be supplied by the Sound System Contractor. Electrical "T" Cabinet to be supplied and installed by the Electrical Contractor.

NOTES

1. All lines on the riser diagram represent individual conduits at a minimum diameter of $\frac{3}{4}$ " unless shown otherwise.

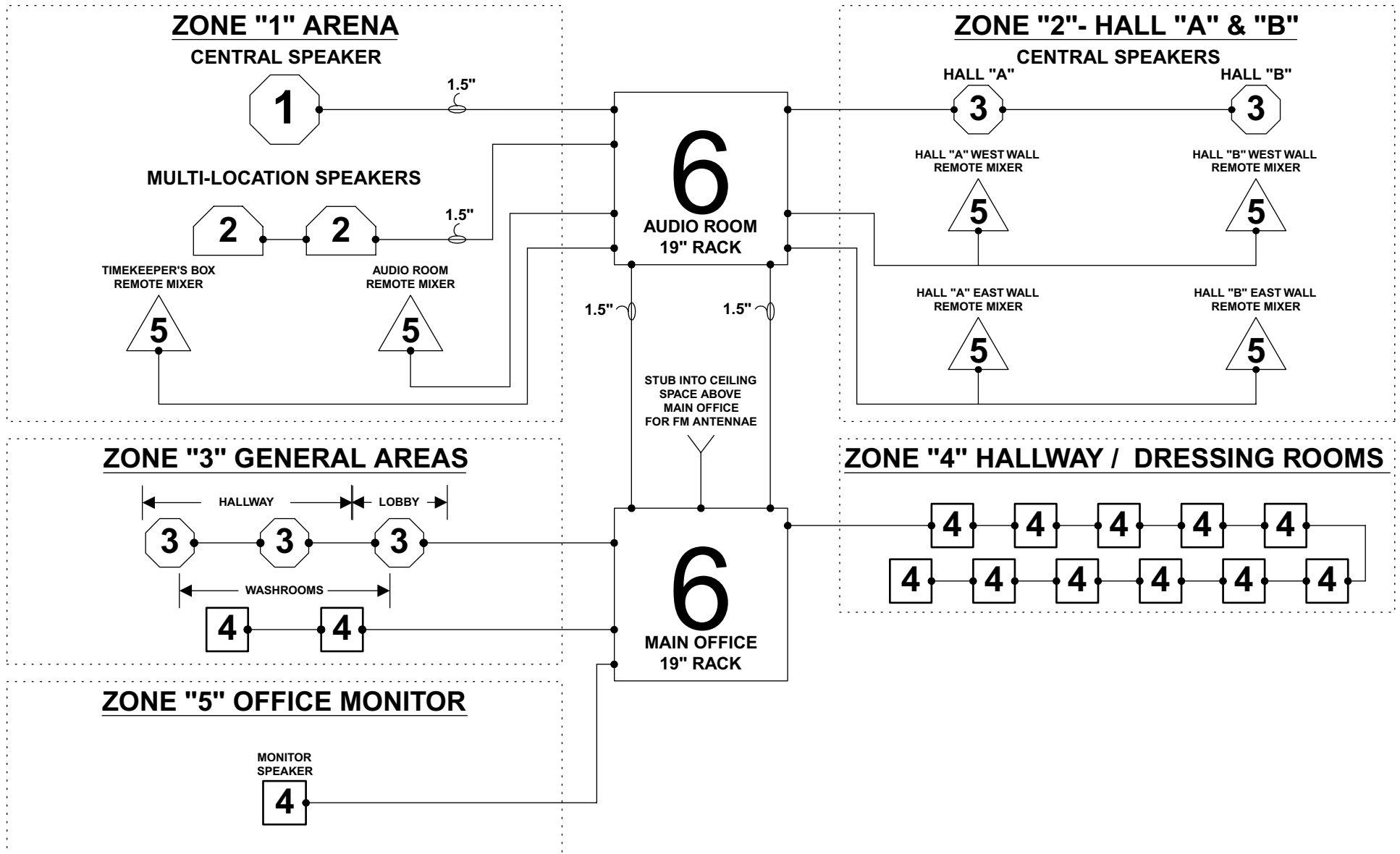
2. All conduit to contain pull wires (Polytye or equivalent).

3. AC outlets should be installed in close proximity to all  locations

4. AC outlet on a separate 15 amp breaker must be installed next to the two  locations

KEELER CENTRE - COLBORNE, ONTARIO

Sound System Riser



NOTE: ALL CONDUITS 3/4" UNLESS SHOWN OTHERWISE
ALL CONDUITS TO CONTAIN PULL STRINGS

KEELER CENTRE - COLBORNE, ONTARIO

Sound System Layout - 2nd Floor

