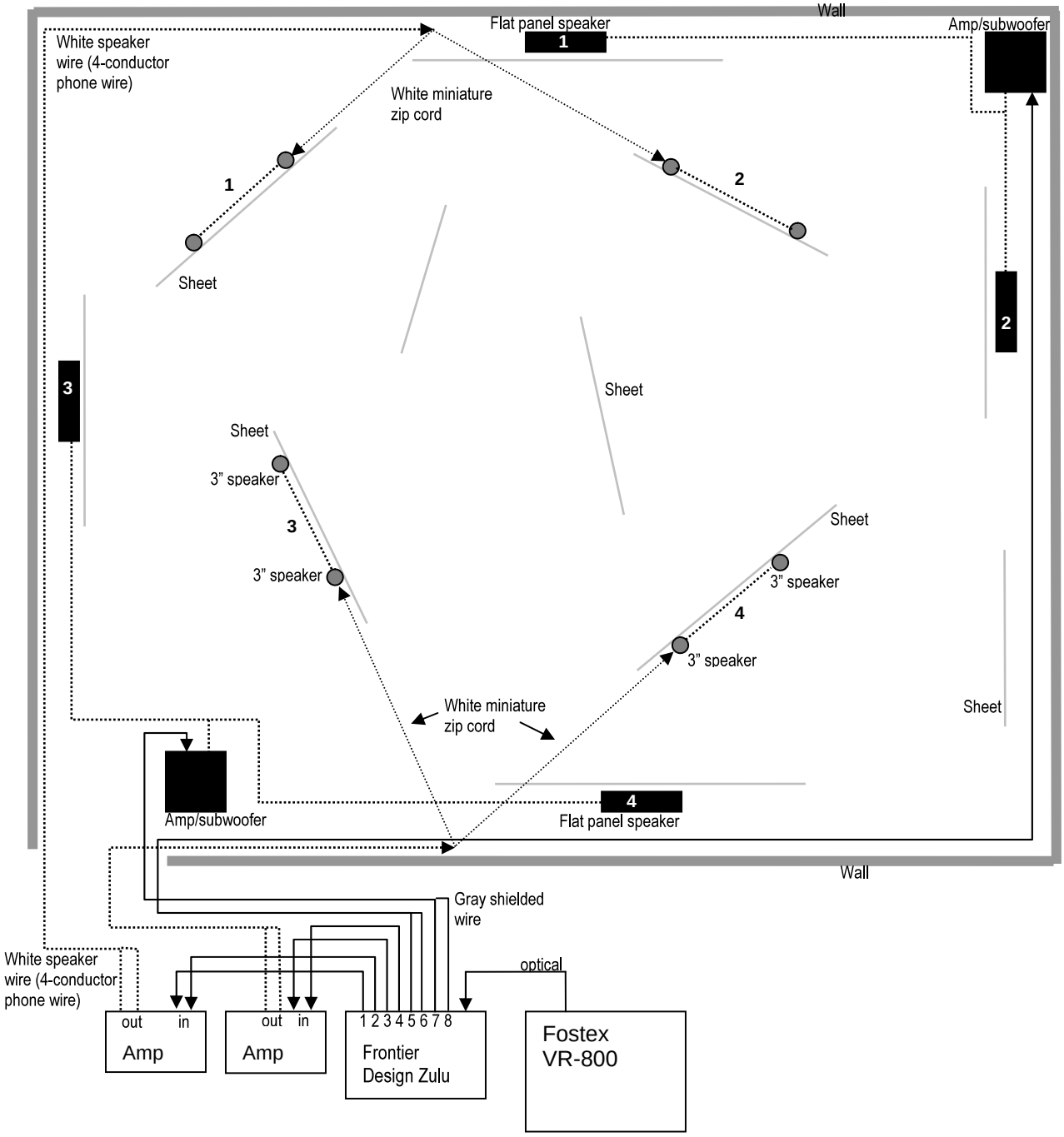
Audio Installation Instructions for “Secrets of the Magdalen Laundries”

Part 1. Installation of the main 8-channel sound environment



Audio wiring diagram for “Secrets of the Magdalen Laundries”

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I. Overview

The audio for “Secrets” is played back from a Fostex “VR-800” 8-channel hard-disk based audio recorder/player. Its optical digital output is fed to a Frontier Design “Zulu” 8-channel digital-to-analog converter with 8 audio outputs. Outputs 1-4 of the Zulu connect to two small stereo amplifiers which feed four pairs of 3” speakers that are attached on clothes lines along with four of the hanging bedsheet images. Outputs 5-8 feed two sets of compact stereo speakers, each with a powered subwoofer and two flat panel satellite speakers that are attached to the walls behind wall-mounted bedsheet images.

The speakers are positioned to form, roughly, two concentric “circles” of sound. The outer circle is formed by the flat panel speakers on the walls. The inner circle is formed by the four sets of 3” speakers attached to the clotheslines within the room. Note that each circle does not need to be perfect, as long as the four speakers in each set are roughly facing each other and roughly equidistant. If at all possible, arrange the clotheslines for the inner speakers as two pairs, with each pair connected together at one end, as shown in the diagram. This will facilitate the wiring of the inner speakers.

The wall-mounted sheets that will cover a speaker need to be mounted at least 3” off of the wall, in order to allow room for the speaker.

IMPORTANT: You will need to keep the above requirement in mind when positioning the sheets in advance of installing the speakers.

II. Playback Equipment Setup

Choose a location for the playback equipment that is as near to the installation as possible, yet out of site. *The playback equipment should NOT be visible to the installation viewer.*

1. Connect the Fostex VR-800 and Frontier Design Zulu

The VR-800 is a self-contained unit. Connect the standard power cord to the back of the unit and to the provided surge protecting power strip. Connect the optical cable to the ADAT Data Out jack. When the unit is turned on using the power push button on the left rear, you should see a red light at the other end of the cable. Connect the other end to the optical input of the Frontier Design Zulu. Plug in the Zulu using the labeled external power adapter and the power strip.

2. Connect the Zulu to the Radio Shack amplifiers

There is a 4-cable bundle with ¼” phone plugs on one end and RCA plugs on the other. Insert the phone plugs into the first four inputs of the Zulu. The plug with the number whose last digit is “1” goes into output “1”, etc. Insert the RCA plugs whose labels have last digits of “1” and “2” into the Left and Right “CD/Tape” inputs of one amplifier. Insert the RCA plugs whose labels have last digits of “3” and “4” into the Left and Right “CD/Tape” inputs of the other amplifier. Set the input selection controls on the front of both amplifiers to “CD/Tape”. Plug the power cords of both amplifiers into the surge protecting power strip.

III. Speaker Installation

The bedsheet images must all be positioned first, before installing any of the speakers, as the speakers are difficult to reposition once installed. This includes the sheets that hang from clotheslines within the room.

1. Wall Speakers.

Place the two black cubic power amp/subwoofers in opposite corners of the room as shown in the diagram. Find the two bundles of gray shielded audio cable, each with two ¼” phone plugs on one end and a single 1/8” stereo phone plug on the other end. Connect one cable to outputs 5 and 6 of the VR-800, run the cable around the edge of the room to one of the amps, and plug the mini-phone cable into the gray line input jack of the amp. Plug the second cable into outputs 7 and 8 of the VR-800 and connect it to the second amp in the same fashion. *Route the cables to the amps in as invisible a way as possible.* Note the small rotary level controls which are in line with the shielded cables, on the amp/speaker end near the mini-phone plug.

Coil any extra cable into a bundle, tie it with a plastic tie, and hide it (e.g., behind the amp). If a cable is not long enough, splice in additional gray shielded cable from the supplied extra spool. Make sure the splice connections are strong, soldering them if possible, and cover them with the supplied electrical tape. Observe polarity (color coding).

Connect a pair of flat panel speakers to each amp by inserting the 1/8” mini-stereo plug on the speaker cables into the yellow speaker output jacks on the amps. For each speaker, locate a position on a wall, behind a wall-mounted sheet and at ear level. Note the numbering on the back of the speakers, and position them according to the diagram, so that the speakers 1 and 2 are connected to the amp which is fed by outputs 5 and 6 of the VR-800, and speakers 3 and 4 are fed by outputs 7 and 8 of the VR-800. Note that numbers 1 and 2 are “left-front” and “right-front”, and 3 and 4 are “left-rear” and “right-rear”, respectively. Once this arrangement is confirmed, peel the covering off of the double-sided foam tape on each speaker and stick it firmly to the wall behind a sheet, at ear level. Use some of the supplied small plastic self-sticking wire guides to secure the speaker wire to the wall behind the sheet, to minimize visibility.

Connect one of the two beige external power supplies to each amp and plug them into a wall outlet or extension cord.

Arrange all cords and cables so as to be as inconspicuous as possible. Coil and tie any extra cabling and tuck it out of sight.

2. Inner Sheet Speakers

There are five 3” speaker “assemblies” in a flat gray semi-transparent plastic box. One of these is a spare. In addition, there is a sixth assembly in a second plastic box which is pre-attached to a piece of clothesline and serves to illustrate how to install and connect the assemblies. Study this example closely. Notice 1) how the speakers are attached to the clothesline, 2) how the wires are connected together, 3) how the miniature zip core speaker wire is wrapped around the clothesline between the speakers and the wall attach point, and 3) how the speakers are covered by the cloth.

You should already have positioned four of the inner-room hanging sheets to form a rough circle or box shape, as shown in the diagram above. Remove the sheets temporarily, and attach a speaker assembly to each clothesline as the example assembly illustrates, extending each assembly to its full 3’ length, and facing the speakers toward the center of the room. Make sure that each speaker is tied to the clothesline so that its top edge is aligned with the top of the clothesline.

There are several lengths of miniature white zip cord. Some are 15’ in length and some are 25’ in length. For each speaker assembly, you will need a length of zip cord at least 50% longer than the distance from the end of the assembly to the wall. Starting at the end of the speaker assembly, tie one end of the zip cord securely to the clothesline, and connect the zip cord to the speaker assembly end-wire. It is important to observe the polarity of the connection. The positive line of the zip cord has a knot tied in it. The positive line of the speaker assembly has a pattern of dashed lines. Twist the positive wires together tightly and cover them with a small piece of white electrical tape. Do the same for the negative wires. On the opposite end of the assembly, cover the exposed ends of the unused connecting wire with tape. Now carefully and tightly wrap the zip cord along the clothesline to the wall, as it is in the example assembly. Keep the zip cord flat and in the grooves of the clothesline to minimize its visibility. At the wall, tie the end of the wire again to the clothesline and coil any extra wire into a small coil and tie or tape it. Repeat this process for each of other three assemblies, as shown in the diagram.

Replace the hanging sheets, draping each sheet over the clothesline so that it just covers the speakers. After replacing the clothes pins, use the double-sided tape at the bottom of each speaker to attach the edge of the sheet so that it further hides the speakers.

There are two long bundles of white 4-conductor phone wire. Each bundle has two RCA plugs on one end and bare wire on the other end. Connect the RCA plugs of one bundle to the speaker outputs of the Radio Shack amp that is connected to outputs 1 and 2 of the Zulu. Route this wire to where the clotheslines and miniature zip cords for two speaker sets are connected to the wall. These should be the speaker sets nearest the wall speakers numbered 1 and 2. Connect the red and green wires to one assembly, and the yellow and black wires

to the other assembly. The red and yellow wires are positive polarity, and must be connected to the knotted side of the zip cords. Twist each connection tightly and cover it with white electrical tape. Arrange the speaker wire to be as inconspicuous as possible, and coil and tape any extra speaker wire where it can be tucked it out of sight. Repeat the previous paragraph using the second Radio Shack amp, second bundle of 4-conductor wire, and second pair of speaker assemblies.

III. Test and Balance

1. Power up

Power up the VR-800 using the push button on the left rear. Turn on the Radio Shack amps and set the levels to the 2 o’clock position. Turn on the black power amp/subwoofers with the push button on top of the amp. Set the initial levels for the wall speakers using the small rotary controls which are inline with the shielded cables, near the amps. Start by setting them to about 30% of their travel (there are some black marks on the controls to serve as aids).

2. Verify speaker configuration

There are four “programs” recorded on the VR-800. Programs 1 and 3 are the installation audio. Programs 2 and 4 are speaker positioning aids. Programs 3 and 4 are backups. When program 2 is played, you will hear beeps which indicate the number of each track, first for the inner speakers, then for the wall speakers. You should first hear one beep in inner speaker 1 (left front), then two beeps in inner speaker 2 (right front), then three beeps in inner speaker 3 (left rear), then four beeps in inner speaker 4 (right rear). Following this, you should hear the same pattern of beeps from the wall speakers, indicating their respective positions.

To play back the beeps, first select program #2 on the VR-800. To do this, press and hold both the HOLD and STORE key simultaneously. “Select PGM” will appear on the display, then change to a flashing “P01 [#0001”. Turn the JOG SHUTTLE dial slowly clockwise until “P02” is displayed (turn counter-clockwise if you go too far). Press the “Execute/Yes” key to select program 2.

Press “Play”. Listen to the beeps and make sure the configuration is as shown in the diagram. If not, first double-check the playback equipment connections as described in section I and shown in the diagram. If the inner speakers are still not correct, re-arrange the RCA speaker wire plugs on the back of the Radio Shack amps until the beeps come from the proper speakers as shown in the diagram. If the wall speakers are incorrect, re-arrange outputs 5-8 of the Zulu until the beeps come from the proper speakers as shown in the diagram.

To repeat the beeps, Press “STOP”, then “REW”. When the display reaches “0:00:00”, press “Play” again.

3. Adjust levels

Select program #1 on the VR-800. To do this, press and hold both the HOLD and STORE key simultaneously. “Select PGM” will appear on the display, then change to a flashing “P02 [#0002”. Turn the JOG SHUTTLE dial slowly counter-clockwise until “P01” is displayed. Press the “Execute/Yes” key to select program 1. Press PLAY.

The installation audio begins quietly, with sparse fragments, and gradually becomes louder and more active over its 14 minute duration. Sounds move quickly among the speakers. The inner speakers will produce mostly speech sounds, and the outer wall speakers mostly processed and more full-range musical sounds.

Gradually make small adjustments to the Radio Shack amp level knobs and the wall speaker in-line rotary controls so that the overall level is balanced and conversational. This may take some time and careful listening. Walk slowly around the room to inform your sense of overall balance. Please refer to the stereo mix version of the work as a balancing reference, using the videotape, CDROM, or web demo (http://www.mcnabb.com/music - click on “”Audio and Video Samples”). There is a point about 2/3 of the way in where you hear ocean waves and laughing. This section should be a bit louder, and the rest should be at a normal speech level, unless there is ambient noise in the space which must be overcome (e.g., at an opening night party).

To repeat the audio, Press “STOP”, then “REW”. When the display reaches “0:00:00”, press “Play” again.

IV. Normal Operation

The VR-800 should be run continuously in looping auto-repeat mode.

To turn on auto-repeat mode, press the AUTO RTN/AUTO PLAY button TWICE. In the small box on the display labeled “AUTO”, you should then see both “PLAY” and “RTN” below “AUTO”. When this is done, pressing “PLAY” will cause the unit to play back the audio in a continuous loop until “STOP” is pressed.

It is recommended that you turn off the VR-800 and amplifiers at the end of each day and back on the next day, resetting the VR-800 to auto-repeat mode each time. However, the equipment can safely be left on continuously during the entire installation, if necessary.

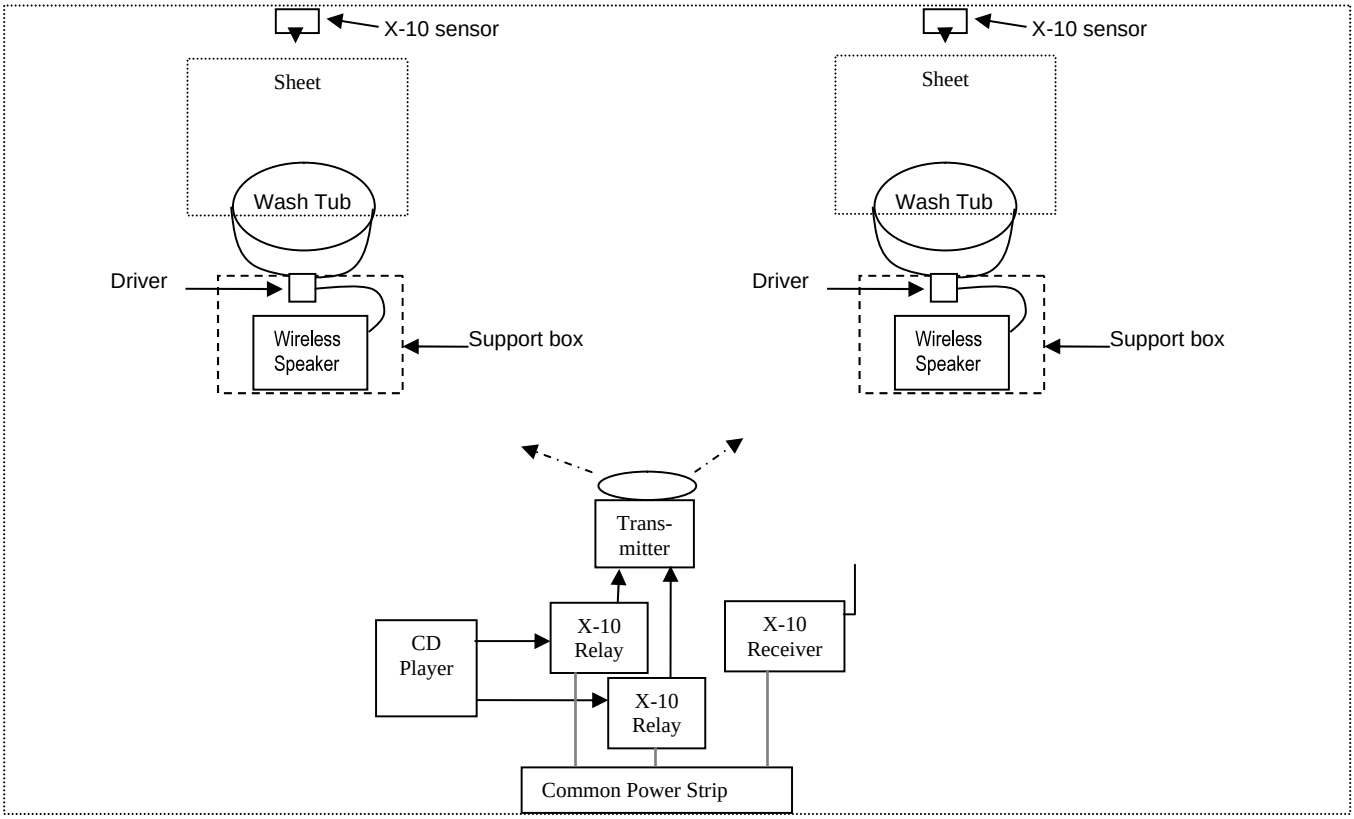
V. Troubleshooting

If no sound comes from a speaker, first double check that all equipment has power and is turned on, and connections have been made as described in sections II and III. Make sure amplifier levels are up as described in section IV. Check for breaks or shorts in the wiring, especially at connection points and plugs.

Make sure the VR-800 is set to Program #1 and is playing back audio. There are 8 vertical level indicators at the lower left of the VR-800 display which should be moving up and down rapidly from time to time. The time display should be advancing at a normal rate.

For further help or questions please call Michael McNabb at 415.819.9170 or 415.661.6376

Part 2. Installation of Optional Wireless Washtub Speakers



I. Overview

Independently of the main sheet and wall speaker setup, two unsynchronized mono sound loops are fed to two of the washtubs, using a pair of battery-powered wireless speakers and a single stereo transmitter fed by a CD player. A pair of wireless X-10 motion sensors transmit to an X-10 receiver, which in turn controls a pair of X-10 relays, to ensure that each washtub speaker is only on while a visitor is near the washtub. This feature both greatly extends the battery life of the speakers and adds an element of interaction to this part of the installation.

The two washtubs to have speakers should be located inside the space and away from a wall, and be as widely separated as possible. If there are more than four sheets in the interior of the installation, place them under sheets which are not wired with speakers from the main system.

II. Installation of wireless speakers

Each speaker has been modified by replacing its speaker element with an external driver. This driver is to be firmly attached to the bottom of a washtub by the included sheet metal screws (two of the washtubs are already drilled with corresponding screw holes). 6 high-quality “C” batteries should be installed in each speaker, the speaker placed inside one of the two white square wooden support boxes (supplied with the tubs), and the washtub carefully placed on top of the assembly. One speaker should be set to “Left” and the other to “Right”.

III. Playback and transmitter setup

The X-10 relays and receiver must be plugged into the same power strip, as they communicate over the power lines. The CD player and transmitter power supplies can be plugged into the same strip or elsewhere.

Connect the CD player, relays, and transmitter using the supplied and labeled cable. Press the “On” buttons on the relays. Insert the CD, press “Play” and “Repeat”. Adjust the CD player and transmitter volumes to maximum. Pull out the receiver’s antenna all the way.

IV. Frequency adjustment

The frequency settings on the transmitter and speakers must match. Set the transmitter’s frequency to something near the middle of the range. With the playback system operating, go to each speaker, turn it on, turn up its volume, and carefully adjust its frequency setting so the CD sound is received and played back at its loudest level, without static. Adjust the volume then so that the sound is ***very low***. *These sounds are intended to be heard only through gaps in the main 8-channel loop, while standing quite close to the washtub*. Each speaker should have a different sound (the left and right channels are independent loops).

If it is difficult to get a clear sound, try setting the transmitter to a different frequency, and readjusting the speakers to match. The system is a little susceptible to interference from 900 MHz cordless phones or other wireless equipment. However, it is usually possible to get a clear transmission by picking a different frequency. Once adjusted, cover the frequency knob with electrical tape to prevent inadvertently moving it.

VI. Motion sensor setup and adjustment

There are two small X-10 wireless infrared motion sensors. Their “house” and “unit” codes must be matched to the two X-10 relays. The X-10 receiver has its own internal relay that responds to its house setting and unit code 1. Since it makes a loud noise, we avoid triggering that by setting the sensors and relays to unit codes 2 and 3.

Set both relays and the receiver to house code A. Set one relay to unit code 2 and the other to unit code 3.

The sensors contain batteries and have been preset to house code A and unit codes 2 and 3. Check this by opening the battery cover and pressing the on and off buttons for each sensor in turn. You should hear the respective relay click on and off. If not, follow the procedure for setting the house and unit code for the sensor:

> **To change the Unit Code that the Motion Sensor transmits:**
> Press and hold the **Unit/Off** button (under the battery compartment lid) the red light flashes first and then blinks the current setting. Release and immediately press the button the desired number of times for the Unit Code you want to set. **Hold the button for 3 seconds on the last press.** The red light blinks back the number of times for the code you set. Release the button.
>
> **To change the House Code that the Motion Sensor transmits:**
> Press and hold the **House/On** button (under the battery compartment lid) the red light flashes first and then blinks the current setting (once for A, twice for B, etc.). Release and immediately press the button the desired number of times for the House Code you want to set (once for A, twice for B, etc.). **Hold the button for 3 seconds on the last press.** The red light blinks back the number of times for the code you set. Release the button.

Once the sensors are matched to the transmitter and relays, they will turn on their respective relay when they detect a person’s motion, and turn off their relay one minute after sensing no motion. If this does not occur, please read the full sensor documentation, which is included.

Once the sensors have been verified to operate correctly, attach them with double-sided foam tape to the ceiling or a structure directly above the two washtubs with speakers. Orient them so that the wide part of the sensor is perpendicular to the sheet.

The sensors should only trigger when someone comes within about 3 feet of the sheet. In the case of a high ceiling, you may need to mask the sensor a bit in certain directions, using electrical tape or some other method.

VII. Battery life

The sensors contain two “AAA” batteries each and should last for the duration of the installation. If the sensors operate correctly, the speakers’ “C” batteries will probably last for about a week and then need to be replaced, depending on the level of activity in the space. Check the washtub speakers every day to ensure that they are still operating and replace the batteries when necessary.

For further help or questions please call Michael McNabb at 415.819.9170 or 415.661.6376