Sound Tech Procedure Handbook

The following is not intended to be a comprehensive manual of operation for our mixing board or any of our related equipment, but rather an overview which takes you through a typical Sunday step by step. PDF documents of our mixer and other equipment will be provided separately, as well as links to helpful YouTube videos to provide more detailed diagrams, tips and instructions.

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Chapter 1

Responsibilities

The most basic summary of the sound tech's responsibilities is the setup, tear down and operation of our sound system for services. This includes coordinating with the Pastor, Worship and Video teams, and anyone else involved on stage for services. Our goal is to cooperate with everyone connected with our services in the worship center to find ways that our set up and operation can assist them in their ministries, especially as it relates to sound. We need to make ourselves as familiar as possible with the sound equipment both for smooth operation of it during rehearsals and services, and to be able to address new needs and concerns as they arise. A mark of a "successful" service for the sound team would be that worshipers in the congregation aren't even aware of our job, and nobody leading the service on stage is frustrated by their mics and instruments not allowing them to do their jobs. We also need to be willing to have an open mind to new ideas and change so that we can make a positive contribution to enacting them.

More specifically, on weeks we are scheduled we should arrive in time to help direct members of the setup team in knowing where to find, place and store all the pieces of sound equipment. Once it is set up, we need to test everything and make any adjustments needed during the rehearsal time. That is also when we can familiarize ourselves with that week's order of service (known as the "Run Sheet") to be prepared for and anticipate each transition and any needed adjustments to the sound in both the worship center and the livestream. We should take note of any needs for repairs, replacement or purchases of additional equipment needed and bring them to the attention of the team leader. It is helpful to review the livestream each week when it becomes available to find any concerns or ideas for improvements that may not have been apparent during the service in person.

Finally, we need to make a conscious effort to not be so caught up in all of the above that we don't have time for giving our attention to worship and learning during the service, developing relationships, and encouraging others around us! (Hint: reviewing the livestream also allows us a "second chance" for our personal worship time since it is admittedly too easy to get caught up in the technical things during the service to completely participate in it.)

Chapter 2

Flow of Set up

1. An important first step each week is to print out a copy of the Run Sheet before leaving home to refer to throughout the day. Having a printed copy will allow you to make personal notes to help you with more specific details to be aware of during the service. To find this, open our church website (thecornerschapel.com), click on the three bars, click on Connect and scroll to where it says Serve Team Login . Click this and enter the password: acts16ten. (All lower case and using actual numbers for the "16".) Next you will select "Worship Service Runsheet" which will open a printable copy for you. You can also open the option called "Serve Team Overview" where you will see a picture of who is serving where for the week, which will let you know what members are on the Music Team.)
2. On Sunday morning we arrive in the front lobby of the school at 7:50 AM unless notified of any changes. Here we receive brief instructions for any special details for that day's service or setup and pray to begin our day.
3. The first step of setting up is to unload the cabinets from the trailers and take them to the destinations noted on each one. Since the setup team will handle most of this, the most important one for the sound tech is to take the small cabinet that houses the mixing board to the front of the alley on the right side of the worship center as you face the stage. The cabinet for the Tech team goes in first, facing the stage and about halfway over where the wall goes fully to the ceiling. The sound cabinet then faces the auditorium seats behind the tech cabinet. You will want the buckles for the lid to be facing the wall, and the port for the electric cord facing the stage to have it positioned correctly. There we remove the lid and the front panel and store them behind the work area. In the top of the cabinet, to the right of the mixing board there is an extension cord. Plug the female end into the bottom of the right side of the cabinet and plug it into the power strip that the school provides.
4. At this point turn on the power with the switch at the top right face of the cabinet above the drawers. This switch should always be the first turned on and the last turned off to avoid sending loud noises through the system, or even possibly doing damage to anything. Once this is turned on it is safe for other things in the system to be powered up as well. Other things that you will find to the right of the mixing board include a set of headphones which are plugged into the board and can be moved to the left of it to be out of the way until you need to use them, and a blue cable which sends our sound to the livestream for recording the services. This should be run from the mixer to the tech cabinet for their crew to plug into their equipment. Make sure the two antennas at the back left of the cabinet are pulled up so they are visible above the back of the cabinet. These are for the signal receiver for our wireless microphones.
5. The final things found beside the mixer are a clipboard and pen to hold the order of service / run sheet which can be propped at the back of the cabinet for easy reference, a cord for plugging MP3 players into the board, two charging cords (lightning and USB-C) and our iPad which will be used as an extension of the board throughout the morning. There are instructions taped to the cover of the pad concerning keeping it plugged in to conserve the battery, and powering it off and unplugging it at the end of

the service which should also prevent the battery from being drained during the week. The iPad uses the lightning charging cord.First turn on the iPad, then plug it in. Once it is on it should connect itself to the WiFi signal that is provided by a router connected to the mixer. When you open the pad you can unfold the keyboard which is attached magnetically and allows it to receive its' power from the pad itself. This will mostly be used for naming the channels for the vocalists who will be using them that day and can then be folded back behind the pad when you are done. More on that later.

6. On the screen of the iPad, click on the black icon that says "M32". This opens up an application which will interface with our mixer so that anything you do on it will control the mixer remotely. In other words, if you move a fader on the iPad you will see the same fader move on the mixer, and so on. (**Some troubleshooting:** Most of the time this all works correctly, but like any electronics, it doesn't always! If for some reason the app doesn't want to load all the way you may need to quit it by double clicking the home button on the right side of the screen which shrinks the display of the app, and then drag it straight up off the screen. After waiting a minute, you can try opening it again. If that still fails to work you may need to try first quitting the app and then shutting down the iPad by holding the button on its' top left side until it says "Shut Down" on the screen and dragging the arrow to the right with your finger. After waiting another minute, you can restart it again by holding the same top left button until you see the Apple logo appear on the screen.)
7. Next to the cabinet you will find a wire coming over the wall to the right. This is connected to the school's speaker system and needs to be plugged into the back of our board. When looking at the back you will find a pair of input jacks toward the bottom right that are labeled "AES50". Our own system is already plugged into the "A" side. The school's cable needs to be plugged into the "B" side. There is a slot on the top side of the cable connector which will click into a lock tab on the mixer jack when it is securely connected. The complete speaker instructions are on a separate sheet in a binder labeled "Corners Chapel Sound" that is kept in the bottom right drawer of the cabinet for reference. ***Note:*** Although we are using the school's speakers now, there is a mention of how to set up our own speakers in the section on setting up the stage that follows in case it is ever needed.
8. When the mixer powers up, by default it pulls the fader that controls the main speakers (far right fader on the right side labeled "Main R/L") all the way down to the bottom double zero. This needs to be pushed back up to the zero towards the top which is also referred to as "Unity". That will be the starting point for all of the faders. It also turns down another fader which could be used as a center channel of speakers but we use it for the vocal channel of our livestream. This fader can be found by selecting the bottom button to the left of the right - side faders labeled "Matrix 1-6, Main C". The fader has the red name "Livestream" and also needs to be raised to the negative 10 level. We will cover that adjustment more later.
9. At this point there are two more items remaining to connect to the cabinet. These are both found in the cabinets which the setup team has by now placed on the stage. First find the large square box called a "Stagebox" which has a sheet taped to its' top telling which channels things will be plugged into,and place it to the far right of the stage where it will be hidden by the blue curtain once it is pulled. Remove the front

and back covers. There is a power cord on the back side that needs to be plugged in before you can turn on the power switch that is on the front towards the top right. Then find the Cat 5 snake which is on a spool that has a small extra spool attached to the main one., usually stored in the cabinet with the P16 monitors. This is what carries the signal for everything else that we will be using between the Stagebox and the mixing board. Remove the cover from the end of the cable that is on the larger part of the spool and plug this into the bottom left jack on the front of the Stagebox. Then begin unrolling it across the stage, allowing a clear area for the TV to be rolled out. Take it down the stairs and along the left side of the rows of seats and set it on the ledge next to the mixer. From there unwind the short end of the cable from the small spool and route it behind the cabinet and plug it into the jack labeled "Snake" on the bottom right of the left side of the cabinet. Then place the spool on the floor next to the cabinet.

Stage Setup

1. Now that the connections have all been made for the mixer and its' cabinet you can concentrate on getting the microphones and instruments set up for the day. The Setup Team and possibly some of the musicians may have already started doing most of this, but you will want to make sure that everything needed gets set up and plugged in correctly.
2. As mentioned earlier, since we are currently using the school's speakers, we don't need to set up our own, but we do have them in a cabinet in case they are ever needed. (We have used them for some outdoor services held at the Plaza where our Ministry Center is located, although there we don't bother with the sub woofers for outdoors. We do use powered speakers for stage monitors for that, which are covered in the addendum later in this handbook.) The two main speakers get set up on stands on either side of the stage near it's front and about in line with where the main curtain meets the wall. The sub woofers get set on the stage floor, one next to each of the speaker stands. All of these are powered speakers and will need to be plugged in for electricity. The signal for the sound comes from connecting an XLR cable from the bottom row of the Stagebox to the input jack of each speaker. Although the Stagebox is labeled for left and right, since we are not using stereo sound, it does not matter which goes to which side, but you do need to make sure whether you are connecting a main speaker or a sub - woofer. Because one sub - woofer output isn't working at this time, we first run a cable to the right input of the sub near the drums. Then we run another cable from the right output jack of that one across the stage and plug it into the right input of the other sub. That wire can be tucked out of sight into the gap that runs along the front of the stage floor. Once you turn the power on for each of the speakers there are a couple more items to check. First make sure that the volumes on each of them are at about the ten o'clock position which has been a good volume for our worship center. Then on each of the main speakers you will see a pair of switches on the right side. These need to be turned off, or it can create a delayed echo in the room. Finally, turn each of the main speakers out slightly toward the walls. This helps cut down one possible source of feedback.
3. You next need to find out either from someone on the worship team or by consulting the Serve Team Overview from step 1 on page 3 what instruments are being used that

day, and how many vocalists are included, as well as any special placement that is desired for any of these. Typically, we set up the drums on a carpet at the far left side of the stage as you face it, and the keyboard to the far right of the stage, with the seats for each lined up approximately with the aisles in the auditorium. Bass players usually will be in front of the screen closest to the drums and the guitar will be in front of the right side of the screen. Vocalists will stand forward of the instruments with the Worship Leader for the day standing in the center. Usually the click track and the iPad that controls it will be set up at the keyboard. There is a pair of direct boxes taped together for this with a cable to connect them to the iPad, and a holder for the iPad that mounts on the stand for the keyboard monitor. The musicians will set up their own instruments, but we need to make sure the cables and anything they need for connecting to the system are in place.

4. ***Note:*** For everyone's safety, as you are laying out wires in the following steps, keep things as neat as possible and run wires that will be in the walking paths back stage on either side of the screen grouped together. When they are all laid out, we have two rubber mats with caution stripes around them to be placed over the wires to keep people from tripping on them. After the cords are covered with the safety mats, we also keep rolls of gaffer's tape in the left drawers of the mixing board cabinet that can be used to secure any wires that may still present a hazard. To avoid creating a large tangle of wires it is best to plug the cable you are running into the Stagebox first and only uncoil as much as you need as you walk toward the item you are connecting it to and place the coil of excess wire just behind where that item belongs and out of the walking path for everyone. When winding them up at the end of the day it is also helpful to begin with the end at the item you are putting away so that when you reach the Stagebox you will find a Velcro tie to secure each cord. If everyone does this, it also prevents having two people trying to wind up the same cord by everyone starting at the female end of the cords. All of the XLR cords found in the Sound Accessories cabinet are 50 feet long and can be used for anything that needs them. We also have six 15 foot cords which are kept in the keyboard case. Five of these are needed for the things around the keyboard so using these shorter cables will keep excess to a minimum. The sixth one can be used for the person closest to the keyboard, typically guitar or violin. There is also a Lightning charging cable and block kept in the keyboard case for the track iPad.
5. All of our microphones are found in the middle drawer on the right - hand side of the Mixing Board cabinet. For the drums, we use a total of five mics. Two of them are in the set of clamp on mics in the black zippered box that is stored next to the mixer on the top of the cabinet. They have initials to identify them and one goes on the snare and the other on the floor tom. Two more are in black bags in the drawer labeled as overhead / choir mics. The final one is also in a black bag in the drawer and is labeled kick. This one goes in a short stand found in the drums cabinet and is placed inside the hole on the front of the bass drum. The two labeled overhead go one on either side of the set with one just above and between the two cymbals to the side of the snare drum and the other is closer to the remaining cymbal and the tom attached over the bass drum. These are all connected by attaching XLR cables from the accessory cabinet to the mics at the female ends and to the corresponding jacks on the front of the Stagebox with the male ends. Follow the sheet on top of the Stagebox to know

which number jack to connect them to, using the terms Kick, Snare and Tom and the two Overheads. Overhead One is the mic on the left of the drums as you look at them from the sanctuary, and Overhead Two is on the right.

6. The acoustic guitar, bass guitar, and keyboard will each need a direct box found in the Accessories cabinet, along with an XLR cable connecting it to the Stagebox and a ¼" instrument cable going from the input side of the direct box to the instrument. The one for the keyboard plugs from the direct box into the channel on the keyboard's back labeled output 1. If the bass is using an amplifier you may be able to plug the XLR cable directly into an output on the amp. Our violinist currently only needs an XLR cord to connect to the system. In the same cabinet you will also find a pair of direct boxes taped together with a cord wrapped around them. This is for the Click / Track computer. Place this by the keyboard and using two XLR cables connect them from their labeled sides to their places on the Stagebox. If we have an electric guitar, place a mic on a stand pointed at their amplifier and plug that into the Electric Guitar channel.
7. We have three wireless microphones for our vocalists. First turn each of them on by pressing the power button on the fronts under their screens and check the level of their batteries by the gage on the right - hand side. A less than full bars reading will be fine for rehearsal but we need to check them each again after rehearsal to make sure they are all at full bars and replace the batteries on any that are at three or less. Spare batteries are in the same drawer as the mics and the bottoms of these mics unscrew to access their compartments. These mics can then be set on the stage by their monitors for the vocalists to find them. They are labeled 1, 2 and 3 and we set them left to right as you look at the stage. There is also a 4 hole mic holder that we attach to a stand and place just off stage on the left side where people enter from. They are labeled 1-4 left to right and the vocalists can place their mics in this when they leave the stage both before the sermon and after the closing song so that anyone else needing a mic such as hosts or scripture readers can find them there.
8. We also have three wired microphones with two labeled 1 and 2 for more vocalists and a third is currently labeled "Danny" and used as a communication, or talk back mic at the keyboard which is only heard in the monitors for leading the musicians but is not heard in the main speakers. If we have more than three vocalists, or if any need to use a stand, such as if a vocalist is also playing an instrument, the first two mics can be set up for that purpose. Danny's mic is set up at the keyboard, or for anyone else who may be taking his place as director for that day. All of these inputs are also labeled on the Stagebox.
9. The final microphone is the headset that Pastor Chase, or any guest speaker is using for the day. Since the sending unit for this one does not have a display for the battery other than a green light indicating that the switch is on, we have a battery tester in the microphone drawer. Pull open the battery compartment on the sending unit and place the batteries one at a time in the tester, noting which direction the + side faces and squeeze it onto the battery. The display on the side will tell how many volts are remaining. A double A battery should be at least 1.5 volts at full strength and will sometimes read a little more. As long as a battery is showing at least 1.4 volts it will last throughout a service, but if it is in the 1.3s or less it should be changed. When this mic is ready you can give it to the person who will be using it for the day.

10. The final pieces of equipment needed on the stage are the monitors, including a powered spot monitor for the keyboard and personal in ear monitors for each of the musicians, known by their model name “P16”. These are all kept in the Monitors cabinet. The P16s each have a label on them for who will be using them. They all receive the same signal but since they can be adjusted for what each person wants to hear it is helpful to let each instrument or vocalis have their own. These are placed on the floor along the front of the screen except for the drum and keyboard which will have theirs next to their instruments and are mounted on stands. They are connected from the “input” jack on their backs to the second from the bottom row of the Stagebox with Cat 5 cables which are in the monitors cabinet and have labels saying P16 on them. Since they all receive the same signal, it does not matter what order they are plugged in. Each monitor has an extension cable wrapped around it that the musicians will plug their own ear buds into. The additional keyboard spot monitor is mounted on a stand and placed next to the keyboard. It has a power cord to be plugged in which we keep velcroed to its’ frame for storage to avoid losing it. The female end of an XLR cord plugs upside down into the circle on the back of the speaker and the male end connects where it says Monitor 1 on the lower row of the stagebox. Information for setting up the mix for this can be found in the Addendum at the end of this manual, item 12 which covers the option of stage monitors.
11. There is a holder for the iPad used for the click track kept with the spot monitor in the monitors cabinet. This clamps onto the stand for the keyboard spot monitor, low enough not to block the monitor, but above the height of the keyboard.
12. Since by now you know which vocalists will be using which microphones you can label them on the mixer to make it easier to remember who is where for the day. On the iPad, with it in the Home position found at the top left of the screen, click on the box for channels 1-8 and it will duplicate the top row of faders that are on the top row of the left side of the mixer. These are all of the channels we currently have set up for microphones. Start with the first mic being used for that day, which will be wired mic 1 which is on the first fader or channel 1. If nobody is using a wired mic, start with the first wireless mic which is on channel 2. Click on the colored label for that channel on the iPad to select it, and then tab over in the screen that opens to where it says “Naming”. Here you can click in the box to delete the previous name and type in the name of the person who will be using it for that day. The same name will appear above the fader on the mixer. (In this same screen you can select the color you want to use for that channel, although these have already been selected so it should only be necessary if you are setting up a new channel.) You can then use the right arrow at the bottom of the fader on the iPad to click over to the next mic to label and so on. Once you are done labeling, you can click back to the Home tab and fold the keyboard under the iPad since it will not be needed after this step.
13. As a note for the P16s, each of them has labels across the fronts for the musicians to know what they will hear on each channel, so they can set up their mix for what they want to hear. Each microphone has a label to tell them not only which mic they are on, but what channel of the P16 they can find it on. There is also a quick reference chart for these channels taped on our clipboard for the order of service run sheet. For most of them, their available volume is determined by the Gain setting we have for their channel on our mixer and they need to adjust their mixes based on what is

available. There are two exceptions. The Drum channel has all five drum mics combined on one Mix Bus channel on our board, and channel 16 which is labeled Talk Back has Danny's mic, the Pastor's mic, and a mic located on our board all on another mix bus on our board. We can adjust the balance of these mics as needed and this will be discussed later.

14. **P 16 Volume Tip:** Start by pressing "Main" and turn the volume all the way up. Then use the Output Level knob to make fine adjustments to the volume. Setting that at about 2:00 is a good starting point. Finally, the Limiter knob is counter-intuitive. When it is turned down it limits more, but up limits less. Keep it all the way up. It will still protect you from sudden increases in volume or loud noises like feedback, but will allow the most volume to be available. If you watch the light for it, that will only kick in occasionally at this setting.
15. Once everything is set up, we have a brief production meeting on the stage for everyone who will be involved in the service. During this we go over each item in the order of service run sheet. This is a good time to take notes of anything we will need to pay special attention to with the sound including how transitions will happen so we can anticipate the need to mute, unmute, or adjust volume or effects for the microphones and instruments. We can also determine what microphones anyone other than the vocalists and Pastor will be using and how they will be passed off if needed.

Chapter 3

Rehearsal Time

Setting up the Mix

1. To get a more accurate idea of how to adjust the sound initially, it is best to just let the musicians begin their rehearsal so that the settings you make will more closely resemble their actual performance levels. For them to do this, in the row of buttons beside the faders on the right press the one labeled “Group DCA 1-8” which will light up green to show that it has been selected. This will change the labels above the faders to be what we have set up as sub groups, or master controls for multiple inputs. For example, the first fader controls the mic designated for the Pastor or guest speaker, followed by groups for vocal mics, instruments and drums and computer. Having these in groups allows you to control everything in that category in one place. You will also see that the colors of the labels for each sub group matches the colors of the items in the left bank of faders that they are controlling. More details on these DCA / Sub Groups can be found in the Addendum at the end of this handbook. The buttons directly above the faders on each side are labeled mute and if they are lit up red no sound will be heard from that channel in the speakers. To begin the rehearsal, press the buttons to unmute the vocals, instruments and drums. In addition, the computer, livestream and main speakers need to be unmuted and will remain so throughout the day. Each of the faders should be set at zero or unity. Also make sure everything being used on the left side faders have been unmuted and are set at unity.
2. The row labeled “Inputs” on the left side of the board will show you everything that can be controlled individually eight faders at a time. Generally, the drums which are in the third row (channels 17-24) can stay the same every week and if you press the button to select that row you will also notice that these faders themselves may not all be at unity. That is ok and you might not need to change anything there at all. If you press two buttons in the input row at the same time, it will preempt the groups on the right side of the board to show you 16 individual channels at the same time. It is convenient during the initial adjustment time to select both of the top two groups together so you can see all of the vocals and instruments at the same time. The labels on the vocals are lit up in blue and the ones for instruments are in purple. You will also see that channel 8 of the vocals is green, which is for the Group 1 Speaking mics and in this case is the headset used by the Pastor. When you are done with the initial adjustments you can press the Group DCA 1-8 button to return the right - side faders to the subgroups, which is what you will want available during the service. It is also

good to press the Select button above the main speakers fader to avoid accidently making an adjustment to any other channel that might still be selected.

3. While the musicians are rehearsing, begin by choosing a channel that you want to adjust. Depending on the song they are practicing and where they are in it, you may have to wait to hear a certain instrument or vocal. Just take them as you can and keep track of what you have done. If something is standing out as being blaringly loud, or noticeably quiet, you may want to begin with that as you work your way through. It is helpful to keep any channels that are not being used that week muted and have the faders pulled to the bottom so it's easier to see at a glance what you need to work with. To select a channel, press the button labeled "Select" at the top of that fader's row and it will light up in green to show that you have selected it. At that point, any of the adjustments you make in the sections above the faders will affect that channel only, and will be remembered for it when you move on to another. The main item you need to adjust at this time is the Gain knob toward the top left of the board in the Config / Preamp section. This controls the available volume for the channel that you have selected. You will want to set it (with the fader still at unity) to where you can hear that voice or instrument at a comfortable level and blended well with the rest of the musicians. As you turn the dial you will see lights appear in the circle surrounding it, and that they move in half steps as you turn it. Turning it clockwise will show you a light for that volume, one more click will display the next light at the same time, and one more click will show just the higher of the two. (The same thing happens as you turn the knob counter clockwise to decrease the volume.) As you do this, besides listening, notice the lights in the level meter to the right of the knob and try to keep this peaking at about the middle (-9 to -12). The higher you go, the more likely you are to experience the high squealing noise known as feedback, so try not to use any more gain than you have to. If the meter ever reaches the red light at the top, that is also known as clipping which even if it doesn't feedback, may cause a distortion in the sound. Once you have adequate, but not too much volume for this channel, you can press the select button for the next one you want to work on and move on.
4. **Volume note 1.** The amount of gain you use will also determine how much volume the musicians have available for their in - ear monitors (P16s). If someone says they aren't hearing enough of themselves, it almost always means they need to turn other things down in their ears, rather than always trying to turn themselves up. If they still have troubles, or tell you that they hear themselves talking but it gets quieter when they start singing, suggest that they need to turn down the control labeled "Limiter" on their P16 since having that too high will actually cause a signal to cut out as it gets louder. Most problems with the monitor mixes will be solved with the P16 controls and not at the mixer.
5. **Volume note 2.** If you are having difficulty hearing an instrument without turning it's gain up to the higher end of the dial, first ask if the volume control on the instrument is turned up as high as it can go. In the case of an instrument like acoustic guitar or violin they may have a battery in their pickup that needs to be changed. If they don't use a battery, they may need to have what is called Phantom Power supplied, which is a trickle of electricity that the mixing board can send back to the instrument to power it's pickup. This is done by selecting the channel for that instrument and pressing the button labeled "48V" directly beneath the gain knob. That button will light up to

show that it is active for that channel. A third possibility may involve the Direct Box that the instrument is plugged into before the XLR cable that sends it to the Stagebox. First make sure that the ¼" cable for the instrument is completely plugged in. A loose cable may allow some sound to pass but not all. Next, on the box is either a button or a switch labeled "Pad" which may need to be pressed or moved to the position labeled "0", which is it's loudest setting. One other note about direct boxes: If there is a buzz or hum in the system that seems to be coming from an instrument using a direct box, on the side of most boxes is a switch called a Ground Lift. Usually flipping this switch will get rid of the buzz.

6. **Volume note 3.** Some vocalists have a habit of holding back and singing much quieter during rehearsals than they will during the service. While you can mention it to them, this is an unconscious habit that is hard to break and you probably won't be successful at changing them. It is less frustrating to just get to know the vocal characteristics of each of the vocalists and once you know someone who tends to do that you can plan accordingly during the rehearsal by giving them a little less gain so that they won't be overpowering during the service!
7. **Volume note 4.** Sometimes you will find it difficult to know whose voice or which instrument you are hearing while you are making your adjustments. Two singers may have similar voices, or it might be hard to decide if an instrument you are hearing is in the track or coming from the keyboard or guitar themselves. To help with this, put on the headphones and press the "Solo" button just above the name of the channel you are working on. This will allow you to hear just that channel, and once you know what it should sound like you can listen for it without the headphones to make your adjustments. Sometimes listening with the headphone only covering one ear while you listen to the house speakers can help as well. You can also use this Solo feature to select an entire subgroup, say the vocals or the instruments, so you can hear just what all of them blended are sounding like without hearing the whole band, which may help you decide if you need to adjust just an individual fader easier. Any time you have Solo selected on a channel there is also a button that will flash above the fader for the main speakers on the right of the board. Pressing "Clear Solo" will return everything to normal, and at that point the headphones will have the same sound as the house speakers. There is a volume control for the headphones toward the right of the top row of controls at the top of the mixer.
8. **Volume note 5.** Sometimes for different reasons the school will boost the overall volume of their system and it is tempting to reduce all of our gain settings significantly. If you do this the musicians will be complaining that they can't get enough volume in their ears since their signal depends on the amount of gain we are using. If you try just turning down our main fader you will have trouble getting enough volume in the livestream since the mix for that comes from our total output. The better solution is once everyone is playing, with our main volume at unity, listen at the back of the worship center and turn down the main volume fader on the school's mixer to a comfortable level.
9. The goal is that once you have set the gain during the rehearsal you should not have to adjust that any further during the service. From this point out, if possible, all adjustments should be made with the faders. For the most part you should be able to do this with very little movement from the Unity setting, usually within the 5 to -5

marks on the faders. During the rehearsal pay attention to which vocalist will be singing the melody line for each song and give them slightly more volume than the others rather than blending them at the same level. This will help the congregation know which voice to follow as they are singing along. For the same reason, you should have the total vocals slightly louder in the mix than the instruments. If you need to adjust that during a song, it is better to pull down the Sub Group faders for the instruments and drums than to keep turning up the vocals and possibly making the overall volume too loud.

Additional Controls for Quality

Besides simply controlling the volume there are additional ways to enhance the sound and the main controls for these are found in the sections directly above the left bank of faders. Some of the things that help avoid common problems have already been set for the different instruments or mics that need them, but it is good to at least be aware of them even though it is not the intent of this handbook to get very in depth with some of the more technical aspects of these controls. As with setting the gain, these controls will only affect the specific channel which you have selected at the top of its' strip and they will be remembered when you de-select that channel.

The first item above the faders on the left is called the gate which allows you to select at what volume a channel will become active and anything below that threshold will be automatically muted. This helps prevent the microphones from picking up stray sounds from anything else on the stage by only sending the signal that the mic is intended to be picking up. It helps you avoid re-amplifying sounds that are already in the mix on their own channels and allows you to have a more accurate idea of what you are hearing from where. It can also help you avoid one possible source of feedback by eliminating that re-amplifying. To set this level, after selecting the channel you are working on, press the view button below the gate knob and the display will show you a block that gives a graphic illustration of how the gate will work. Press the gate button on the left to make the gate active on that channel and use the knob to move the threshold to the level you want. After making this gate, you will want to check to make sure you haven't set it too high which may cause the channel to be muted when the instrument is playing (or vocalist singing) at a quieter level. This will be easier to hear by soloing that channel in the headphones and can be adjusted by following the same steps used in setting it up and just reduce the threshold with the gate knob. As an indicator of when sounds are being picked up by the gate but not being passed into the system, the meter just below the Select button for each channel has a light at the bottom where it says Gate that will come on.

The next control to the right where it says Dynamics works in a similar fashion to provide what is called a Compressor. This allows you to select a decibel level that you do not want that channel to exceed to avoid what is known as clipping which can both cause the sound from that voice or instrument to become distorted and staticky and in some cases can even do harm to the system. Along with setting this maximum threshold you can set a ratio that you want it to automatically apply. Until you reach this threshold everything will be being amplified at a ratio of 1:1, meaning what level of sound comes in is what goes out. For example, with a 5:1 ratio, when the level you have selected is reached, every five decibels of additional input will only be amplified by one more decibel. In the same manner as the Gate, the meters for each channel also have a light that will come on at the top if the volume reaches the level where the Compressor is activated.

The next, and largest section for working on the quality of what you are hearing is the Equalizer, which as with the other controls is activated by pressing the view button which will show a wide graphic that represents the range of frequencies that all sound is made up of which is expressed in a measurement called a Hertz, or Hz. These are numbers that represent the speed rate of the vibrations that create sound. The notes at the lower end of sound that we can hear are in the low end of the Hz range, or slower vibrations, and as you go up the musical scale the notes in the higher ranges reach into the faster Kilohertz or kHz numbers.

In this section of controls you will see that there are four buttons on the right that break up the range of sound into four basic sections: low, low-mid, high mid, and high. Those areas correspond with looking at the graphic display from left to right. Again, without getting into specifics here, you can make adjustments to each portion that will do anything from raising or lowering how much of what frequencies you may need to enhance, reduce or even cut out entirely to make a more accurate reproduction of the voice or instrument you are working on. For instance, with some instruments you want to hear more of the low end such as on a bass guitar or vocalist, or a full range keyboard. In contrast to that you might want to even eliminate a certain amount of the bass range from higher sounding instruments and vocalists since it isn't necessary for them and you can eliminate sounds that are just rumble or background noise that might be competing with instruments that really need their bass emphasized. By pressing the "Mode" button at the bottom of this section of controls you can toggle between the six items on the left side which let you use the display on the screen to do things like eliminate unneeded frequencies at the high and low ends (called High Cut and Low Cut) and adjust the widths and shapes of shelfs which act on a selected range of frequencies, or sound pitches.

Knowing how to adjust these different things can be learned by experimenting with making changes and listening to the results to see if you have improved something or made it worse. Since these controls are more technical to get into than the intention of this handbook, we are only mentioning them as being available tools at this time. There are many videos available on YouTube for the general practice of adjusting EQ, including several that specifically demonstrate it using our X32 Compact mixer. As you become more practiced with this there are even books and internet programs that can help you take it to a more scientific level where you can learn to associate what you are hearing with the approximate range of its' frequency numbers expressed in Hz and kHz. Don't be scared off by any of this, it all comes with practice and experience and fortunately most of the things, especially instruments, that we deal with on a weekly basis have already been adjusted to levels that we can use without having to work with them right away, until you are more comfortable with the board.

Adding Effects

Now that the levels have been set you can add some effects to the mix. We currently have four effects set up: Instrument reverb, Vocal reverb, Tap Delay, and Guitar Chorus. These can be seen and controlled by pressing the second button from the bottom for the right - side faders labeled "Bus 9-16" which we have added a label over that says "FX". Each of these effects have been assigned to work on channels appropriate to them. More about items found in Bus Groups is included in the Addendum section of this handbook. The Instrument Reverb currently works on the acoustic guitar and violin. The vocal reverb is set up for all of the vocal channels, including the Pastor's headset (labeled "Chase"). The Tap Delay is a rarely used effect that creates a repeated echo and is also assigned to all of the vocal channels. There is a flashing light in the third button of the "Assign" section on the right side of the board. The speed of this echo

can be set by tapping that button at the speed you want, possibly in time with a song where you might use it. About four taps on the button will set it where you want it. The final effect is a chorus setting that we currently use on the acoustic guitar.

It is a matter of personal taste as to when and how much of each of these effects should be used. The vocal reverb is the main one that you will continue adjusting throughout a service. To help with having access to as many controls as possible during the service, since often you need access to both the Sub Group (DCA) layer and the Effects layer at the same time, it is helpful to keep the iPad next to the board with the Effects selected (click Bus 9-16 at the top of the app display) while keeping the Sub Groups selected on the board itself (Group DCA 1-8).

Most of the vocal reverb will be used during singing and it tends to sound best around -10 on the fader, although that is subjective and may depend on the singer and the style of song. If someone starts just speaking or praying during the song you will want to drop it to about -30 or even turn it off completely. At the end of each song, it's best to turn it off since that is a likely time for someone to talk, even if they are going directly into another song.

Currently we tend to have hosts come out for announcements after the first song. Since this is usually a pretty upbeat point in the service it often sounds good to keep some reverb on them, but less than with the singers. Again, around -30 or possibly -20 is a good range. The announcements usually end with prayer so we usually will turn the reverb off for that. When the hosts return at the close of the service things are pretty upbeat so we use it again to match the emotion of what is taking place.

Balancing the Livestream

As we mentioned earlier, there are two faders that affect the livestream. DCA 8 next to the Main Speaker fader is the main control for this and is a direct copy of what we are sending to the house speakers. During the service you will want to keep an eye on the meter on the camera computer on the production table next to us and using this fader try to keep it reading in the yellow bands on average, with only occasional peaks in the red. During times of music that will usually be close to unity on the fader but at other times it usually needs to be raised.

The second fader for Livestream is in the same position next to the Main speakers but on the bottom "Matrix / Main C" row. This one is programmed to control just the vocals and will need to be adjusted to a good mix with the overall Livestream feed. To do this, first press the Solo button for the main Livestream fader in the Sub Group row which lets you hear what is being sent to the computer for the livestream broadcast and recording in the headphones. Next go to the vocal fader for it in the bottom row and make adjustments there as needed. There is typically a higher signal on the vocal channel, so during songs we need to bring it down to about a -10 to avoid overpowering the instruments. For this we only want the vocals to be slightly above the instruments, a little less than what we strive for in the Worship Center where people are trying to sing along with them. Once this balance is achieved you can press the Clear Solo button and return to the top Sub Group layer. Most of the adjustments during the service will be made with just the main Livestream fader on this level, although during the sermon you may need to increase the vocal level if the main fader alone will not give a loud enough signal for the livestream. If you do need to increase it for this, remember to bring it back down for any songs following the sermon.

If you find you are having to run the livestream fader near the maximum just to get close to the target on the meters, the person running the tech mixer, or ATEM, next to us can also make

adjustments to the livestream volume. Ask them to turn theirs up while our fader is at unity to give you a better starting point.

Walking the Room

Because of how far to the side of the room the sound and tech area is, and the way the speakers are aimed close to us, it is a good practice at this point to walk around the room during a song and pause at various areas to notice how the sound can be different as you do. For this, you can unplug the iPad and take it with you. With that, you can select and make changes to anything you feel needs to be adjusted as you walk from place to place. After you are satisfied that things are the way you want them you can return to the mixing board and listen to how it sounds from there again to use that as a reference during the service of how it should be. Always plug the iPad back in to preserve the battery and set the display to show the Effects again.

Some Notes About Microphones

1. We have two ways to communicate with others through a microphone that is located in the bottom left corner of the mixer's display screen above the right - side faders. The controls for this are in the top left corner of the mixer where it says "Talkback". Holding the button that says "Talk A" will broadcast over the house speakers for everyone to hear. It will turn the mic off when you let go of the button. The volume for this is controlled by the knob labeled "Talk Level". You don't want this turned up too loud because it's very easy to feed back with the house speakers that are pointed right at us. To talk with the musicians only, press the "Talk B" button and they will hear you on channel 16 of their P16 monitors. This button will stay on after you press it, so you need to remember to press it again when you are done talking with them. ***Tip:*** if you select Solo on bus 5 for Talk Back you can hear Danny in the headphones and use our talk back mic to discuss something with him without having to shout over everyone on the stage.
2. The proper way to hold a microphone is with your hand on the shaft of the mic at least an inch below the windscreen, and keeping the mic about four to six inches below your mouth. Some singers like to hold it with their hand gripping the windscreen, but this needs to be discouraged because it affects the quality of the sound negatively. One possible problem is that it can cause feedback. Another is because of the dynamics of how sound is projected from your mouth, in some cases it can change the EQ (or balance of the pitch of the voice) so much that it doesn't even sound like the same person is singing! Here I will exercise my author's right to editorialize. Unfortunately, our entertainment world is full of bad examples for this, most noticeably by pop artists especially rap and hip hop, but also variations of punk and metal music who like to hold their mics by the screens, and up close to their mouths often pointing either straight out or even from above. Since much of their music is more spoken or even shouted rather than sung with a melody the problem isn't as noticeable. Whether it is unconscious or not, many singers will adopt this habit, not realizing that though it looks cool, it is bad for the quality of their sound and it becomes our job to try to subtly correct them.
3. Another bad habit is when someone either taps or blows on a mic to see if it's on. While this probably won't hurt the mic, it is very unprofessional to make these unnecessary noises and also shows that the speaker doesn't trust the sound person to be prepared and have them unmuted. During our pre-service meetings and rehearsals when explaining to someone who may not normally be a part of the service what mic to use and how to use it

we can assure them that they don't have to worry about anything other than making sure that the mic is turned on before it's time for them to use it if it's wireless. Other than that, we will make sure it will be unmuted and ready for them to talk into, and we will mute it again when they are done. If a person does participate in the service more regularly but still tends to do these things, we can mention it to them subtly after the service that they don't need to do them.

4. When showing someone how to use our wireless mics for the first time they should be told to turn them on at least several seconds before they will need them since there is a slight delay before the signal starts showing up at our mixer. The hand held ones connect fairly quickly, but the Pastor's headset sometimes takes longer so it is worth turning that on even a few minutes before it will be needed. Since we are using the school's speakers now which are located overhead it's not as much of a problem where a person is standing or walking with a mic, but if we return to setting up speakers on the stage everyone will need to know that we will keep their mic muted until they have walked past the speaker and are not at risk of causing feedback.
5. It is a good practice to check the batteries in the wireless mics again after the rehearsal, before the service. The meters on the mics only give a general idea of the strength left in the batteries and once it falls below full bars it tends to go drop quickly. For this reason, it is safest to change the batteries on any that are reading less than full bars after the rehearsal.
6. Occasionally there may be special events during a service that will require having one mic situated to pick up multiple people, such as a children's choir. For this we can take one of the overhead mics that is normally for the drums and use it as a choir mic. For children this should be placed on a stand that is in front of the kids and at about their height. This mic should then be connected to one of our channels that is designated for a wired mic, and you will need to turn on the Phantom Power, or 48 V for that channel on the board, as we discussed for some instruments in Volume Note 2 in the section for Setting up the Mix. This type of mic is stronger in the range of what it can pick up and because of its' design it requires the extra boost of power to work correctly. (The channels that we normally plug them into for the drums already have the 48 V assigned to them.) Even though these mics can pick up from farther away, they are also prone to feedback if you use too much gain or turn up their fader too far, so finding a good placement for it during rehearsal is important. It is also very advisable to ask that someone from the children's ministry direct the kids from the space between the front row of seats and the front of the stage. Then when they are experiencing shyness or stage fright, they can be encouraged to sing out loud and improve their confidence.

Chapter 4

Service Time

The first thing you will want to do to prepare for the actual service is to make sure that the four DCA channels for the Speaking, Vocals, Instruments and Drums are muted and their faders are turned up, and that all the individual channels that you will be using on the left side of the board are unmuted and ready to be used. Because the worship leader for the day will probably be welcoming everyone when the band starts it is a good idea to have the faders for the instruments and drums turned down a bit so they don't drown out the speaker. Somewhere around -10 to -20 is usually good for this, but also listen once they start and make further adjustments as necessary. At this time, make sure the iPad is showing the controls for the Effects.

The next thing to do is to turn on the light that is attached to the right side of the board. This will be vital for keeping track of the order of service on the run sheet since it will be very dark at times during the service. Fortunately, with the digital board a lot of the controls have buttons and labels that are also lit, but at times you may still find yourself pointing the light at the board to find something that is not lit. To turn on this light, select the view button in the top left row of controls where the talkback mic and headphone volume controls are found. Using the right arrow for Page Select beneath the display screen, toggle all the way to the last screen and you will see that "Light" is the only item on that page of the screen. Press the knob beneath that part of the screen and the light will turn on. You can also turn the knob to adjust the brightness, but you will want to keep it at it's brightest. At the end of the service, you will follow these same steps to turn the light back off. After the light is on you can press the Meters button toward the top of the right side of the display screen. Keeping it here during the service will give you a view of the volume meters for all of the channels on the board and lets you keep an eye on them without having to toggle through the layers between vocals and instruments.

Typically, we begin each service with music played from the computer, so you will want to make sure the DCA labeled computer is unmuted and the fader is up. Be sensitive at this point that the volume is not too loud for the people coming in. Towards the end of that music a countdown will begin on the screen and the musicians will begin to assemble on the stage when there is about two minutes left before the service starts. When the countdown ends the lights will usually be turned off and a Service Bumper video will play, with the sound again coming from the computer. For this we usually will bring the volume up on the computer channel.

As the video ends you will see that the musicians are ready to begin. At this point unmute the three DCA channels for Vocals, Instruments and Drums. When they begin, as the Worship Leader invites the congregation to sing, bring the volume of the Instruments and Drums back to their normal levels (Unity) and turn up the Vocal Reverb effect on the iPad to the level you want. Listen carefully to make sure everything is balanced the way you want it. From the rehearsal you should know who the lead singer for each song is, so you want to make sure their voice is heard above the others for the congregation to hear the melody to follow. This may mean turning their individual fader up slightly. You also want the level of all of the vocals is slightly above the instruments for that same reason. If the band seems too loud for this, it is better to turn them down a little rather than turning up the vocals, just to keep your volume under control.

Once the first song is under way and balanced well, check the meters for the Livestream on the computer screen of the tech team next to us, located toward the bottom right, below the camera view displays. We try to keep this reading in the yellow range, with only occasional peaks in the red, to give good volume in the livestream without the distortion caused by clipping. Make any adjustments with the DCA fader for Livestream to keep it in that range. Make any changes as gradual as possible since it can be very noticeable if the volume suddenly goes up or down for people watching. If you have time, it is good to solo the Livestream channel and listen in the headphones to make sure the balance of vocals to instruments is good and adjust that if necessary. You will want to monitor this Livestream level periodically throughout the service, especially as things go back and forth between speaking and music. Even within the same song you will want to keep an eye on it as the music being performed gets louder or softer.

Sometimes during a song, the lead singer may begin speaking to the congregation between verses of the song, so be ready to increase the volume on their channel temporarily if necessary, or in some cases you may even want to bring down the DCA channels for the instruments and drums if it is for something more than just a quick sentence or two. If they begin praying over the music you may even decide to lower the level of reverb temporarily as well. Once the singing resumes you can turn everything back to its' normal levels. Even within a song there may be a change in who is singing the lead melody, so you will want to remember from rehearsal who you might need to bring up in their individual volume at any time. During every part of the service, always be looking ahead in the order of service to know what is coming next and be ready for whatever you will need to do for that in terms of muting, unmuting and adjusting volume and reverb. Since videos can vary significantly in the volumes they have been recorded at, it is a good practice to pull the computer fader down to about -20 after each video so the next one doesn't come on too loud. It is less noticeable to the congregation if you need to raise the volume quickly at the beginning of a video than if it comes on too loud and blasts them out of their seats!

Usually after the first or second song we will have a time of announcements where one or two hosts will come out from backstage to welcome everyone and share a few updates with them. You will want to consult your notes on the order of service to be anticipating who will be

on which microphone, which they usually will borrow from the vocalists closest to the side of the screen that they have entered the stage from. This is generally an upbeat part of the service and the instruments will continue playing during it. To help with the volume of those speaking, lower the faders on the instruments and drums to about -30 or wherever it sounds natural for the hosts to be speaking above the music. To enhance the emotion of this time we also keep the reverb on their voices, although it might sound more natural if you reduce the level of it a little. Toward the end of the announcements there is typically a time of prayer, and you will want to turn down the vocal reverb all the way for this and possibly lower the volume of the instruments too. Be sure to check the level of the livestream for these quieter times as well since you will probably need to raise that until the next part of the service begins.

Often the announcements will be followed by a Chapel News video. For this you will want to mute the Vocal channel as soon as the hosts are done speaking, and fade out the musicians as the video begins. As soon as the sound from the video starts you can mute the instruments and drums and make any adjustments to the volume of the video that are needed. During the video you can return the faders of the muted channels to the level that you will need them at next. The main Vocal channel should be at unity, as well as any of the individual vocal channels that you may have needed to adjust during the announcements. The faders for the Instruments and Drums should be at about -20 so that the person leading the next song can be heard above them as they are inviting the congregation to join in singing again and anything else they may have to say. Pay close attention to when the video is ending, as you remember it from the rehearsal, and unmute the musicians and vocalists as soon as the video is done. Once you bring the band back up to their normal level be sure to check the Livestream volume again.

Again, during the song be checking the order of service to anticipate whatever is next, always thinking at least one step ahead of what is currently going on. Once the time of worship through singing is done and the congregation has been told they can be seated, there is typically what we refer to as a Sermon Bumper video. This will be handled in the same way as with the Chapel News video, but you will be preparing for something other than music to be coming next, and setting up your channels accordingly. If someone will be reading scripture next, they will probably be using one of the vocalist's mics and will need the main Vocal channel turned on as they come out at the end of the video. If instead the Pastor will be the next person following the video you will need to be ready to turn on the main Speaking channel. During this video you can also make an adjustment to the Livestream by selecting the Matrix button at the bottom of the row for selecting what the right - hand faders are controlling and turn up the fader that controls just the vocal channel of the Livestream at the right end to its' unity position. This will make more volume available for when there is only one person speaking and nothing else. Then return the controls to the DCA level to be ready for the end of the video.

Once the sermon has begun and the volume is good for the Pastor speaking, check the Livestream level again to make sure it is staying in the yellows and occasionally peaking into the reds. Unless there will be another video before the end of the service, turn the fader for the Computer all the way down. Set the faders for the Instruments and Drums to about -30 and make sure all the Vocal levels are back at unity. Continue keeping an eye on the Livestream levels throughout the sermon.

Toward the end of the sermon the Pastor will have usually made arrangements with at least the keyboard, if not the full band, to come up and start playing softly beneath him as he is drawing to a close. Be ready to unmute the Instruments channel when you see that the keyboard is ready to play, and to adjust the volume as necessary. Following that the Pastor will usually call

the rest of the musicians back up for a final song. Be ready to mute the Speaking channel when the Pastor is done and unmute the rest of the musicians. If one of the vocalists is using a wired mic on a stand, typically if they are also playing an instrument, their stand will have been moved back closer to the screen during the sermon. Be sure to keep this mic muted util it has been set back in position so that you will not be amplifying the sound of moving it around. As soon as they begin and you have balanced their volumes and reverb, check the Livestream again since you will need to lower the Vocal portion of it back to about -20 again and adjust the main level of it to the meters.

At the end of the final song, the instruments and drums will typically continue playing clear through to the end of the service. You will want to lower the Instrument and Drum faders and continue adjusting them as needed for each of the things that follow. The Pastor will usually come back up to conclude his message with any final thoughts such as the Key Takeaway and Action Steps. When he is ready for this, unmute his channel and mute the Vocalists. Pay close attention through this since he may ask to have everyone sing the final chorus of the previous song again so you may need to mute the Pastor and unmute the Vocalists and bring the volume of the band back up again. Watch carefully throughout this time and be ready for the Pastor to want to speak again, so there can tend to be a lot of muting and unmuting at this point of the service!

At this point the Pastor may lead things through the rest of the service, or he may introduce the hosts to come back out and take over, so follow the order of service to know what microphones will be used and bring the musicians back down to the proper level for speaking. One of the final elements of the service is taking communion, and this is usually followed by any final announcements. We currently have been concluding every service by offering a benediction or blessing. This is also another high energy part of the service, so as this is being done, we will raise the volume of the music and add some reverb to the voice of the person leading the benediction. Once they say that the service is concluded (often telling the congregation that they are ”sent”) you will immediately mute the vocal channel (or Pastor if he has concluded things) and bring the musicians to their full volume if they aren’t already. Then watch the meter on the Computer channel. Once you see that there is a signal there it means that the tech team has begun playing music. Cross fade the Computer with the Instruments and Drums (turning up the computer fader at the same time as you pull down the others) and mute both of those when they are completely off. Set the volume of the computer music to a comfortable level for the congregation to have conversations as they are leaving and wait a few minutes before starting to tear things down for the day. During this time, you can turn off the light on the mixer, and close the program on the iPad by double clicking the home button on the right which minimizes the size of the app, and drag it past the top of the screen. Then you can shut down the iPad and unplug it to keep its’ battery charged for the next time it will be used. To do this, hold the button on the top left side of the pad until “Slide to Shut Down” appears on the screen. Touch this with your finger and drag it to the right. Once it is shut down you can fold the keyboard section over the screen to close it and unplug it.

Chapter 5

Tearing Down

While there isn't a specific item by item way things need to be torn down and packed in their cases, there is a sequence of categories of things that should be followed. Most weeks, unless there is a special event requiring us to be in a hurry, we try to wait about 10 minutes before starting to allow folks to visit after the service and not feel like they're getting rushed out of the Worship Center. Even once we do start tearing down, we continue to play the post service music until the second stage of the sequence.

1. The first group of things to take apart and store are the instruments, microphones, and all of their cables. At this point all of the XLR instrument cables and CAT 5 ones for the P16s can be disconnected from the Stagebox, but not any speaker cables that might be connected to it, or the snake, and the power needs to remain on while the music is still playing. These cables should be coiled neatly and bound with the attached Velcro ties. With multiple people helping, it is best to always start winding a cable from the end that was attached to an instrument, mic or P16 and work your way to the Stagebox. This will avoid having two people begin from opposite ends of the same cable. It also keeps the Velcro tie from being in your way until you are ready for it since we have attached these to the ends that plug into the Stagebox. All of the mic, instrument and music stands, P16 units, direct boxes and quarter inch instrument cables are also put away at this time. Since the extensions for ear phone cords for the P16s are kept wrapped around their units, it is best to unplug them first to prevent the wires from being stretched and damaged. Since the Set Up / Tear Down team will be working on these things, a good first step for the Sound Tech is to gather up all of the microphones, making sure any wireless ones have

been turned off. Put each of these in their cases and store them in the middle drawer of the mixer cabinet on the right side.

2. Once all of these items have been stored, it is time to let the Tech Team shut off the music from the computer and turn off the projector. Then our speakers can be turned off and packed up if we used them, or the person on duty from the school for the day can shut down their system. The Stagebox can now be turned off and any remaining cables from it can be disconnected and the box covered and stored. The end of the snake has a cap attached to it to slip over its' jack to protect it. The snake cable should be left on the floor where it has been disconnected since it is easier to wind the spool for this with the cables still stretched out. While the Set Up team is packing away these things, we can disconnect the rest of the cables from the mixing cabinet except for the school's speaker cable and our power cord since the mixer still needs to remain on at this point. After unplugging the snake, place the protective cap on the jack end and wrap the lead end of the cable around the smaller section on the spool and secure the end with the attached tether. The spool for the snake can be set on the ledge of the wall so the cable can be wound up and placed in the cabinet. The red Livestream cable remains plugged into the back of the mixer and is just coiled and set to the right of the mixer with the iPad. The headphones are also left plugged in, but put in that same place on the right. If the TV was used, the remote for it needs to go back in the top left drawer, as does the hard drive when the Tech team is done uploading it, and any roll of gaffer's tape that had been used for the day. (Note: now that the tech team has it's own cabinet they have been taking care of the remote and hard drive.)
3. By this point, the school speakers should have been shut down and control for them returned to the school's mixer. We need to check with the person on duty to be sure that they are ready for us to shut the last of our system down to avoid sending any noise through their system. With that confirmed, the power switch on the front top of the mixer cabinet is always the last item to be turned off. The school's speaker cable can now be disconnected from our mixer and left draped over the wall to the right of us. The power extension cord can be unplugged from the side of the cabinet and the power strip, and be coiled and stored on top of the other items to the right of the mixer.
4. Once everything is put away place the front cover on the mixer cabinet and secure the two latches on either side of it. Then lift the top lid and fit the hinge halves on the back into the halves on the top rear of the cabinet and swing it shut. Secure this with the two latches on the front. The cabinet is now ready to be rolled out into the hallway along with all of the other cabinets which will be loaded on the trailers by the Set Up team.

Chapter 6

Just when you thought we were done…Or…

The Portable Sound System

We do have a portable sound system that we can use for things like meetings in other rooms of the building, services held either outdoors or at other facilities, and our annual baptism service at Euclid Beach Park by Lake Erie. This is kept in our rented storage unit where you will find both a large and a small tote on wheels plus a folding stand to set it up on. Everything you should need for this system is kept in these totes and there is a list attached to each of them telling what belongs in each one. Musicians will only need to bring their own instruments and music stands, although we even have fold out extensions for the music stands and clear plastic clips to hold their music in place at potentially windy outdoor services. Music stands are available at the Ministry Center.

The system is small and self contained, in that the speakers clamp on to either side of the unit for storage. This is stored in the large tote, along with stands for the speakers and microphones, a power extension cord and ¼' cables for the speakers, along with the music stand accessories, including one folding music stand. There is a copy of the manual for the unit in the bottom of this tote.

The smaller tote has foiur microphones, two direct boxes and the necessary XLR and ¼' instrument cables, as well as two charging blocks with both lightning and USB-C to C phone charging cords. It also has two more extension cords and a power splitter. The power cord for the unit is in a compartment on its' back that you will see after removing the speakers. This plugs into the back of the unit, as do the cables for the speakers. There is also an extra mic with a short cable stored in the back.

The Folding table has four legs clipped to the back which screw into the bottom. Once the unit is set on this, it helps keep things from getting cluttered if you feed the mic and instrument cables through the handle on the top before you connect them.

There are four main channels available which each have their own dials to control their individual volumes, adjusting treble and bass, and adjusting any reverb you want to add. There is a button directly below the input jack for each one which you can press in for microphones or leave out in the line position for instruments. On the right side next to where you see a display for the volume output is a button to press if you need to supply phantom power for any of the mics or instruments. The master volume for the system is on the bottom knob to the left of the phantom power switch. Directly below that is a five band graphic equalizer which is for adjusting the tone of the whole system, in addition to the individual controls mentioned for the channels above.

Besides the four regular channels, there is a fifth one on the right which can be used for different things. You can plug a ¼" instrument cable into it for a keyboard if needed. This channel only goes directly to it's corresponding speaker, so you will need to plug the keyboard into both ¼ " jacks. A Y-cable may be used for this purpose.It also does not supply phantom power, so the instrument itself must be powered, like a keyboard. It will not power an electric guitar, although it may work with an acoustic guitar that has a battery powered pickup. This input only has a volume control and it is also shared with other items you may want to use. A computer can be plugged into it using an adaptor cable that plugs into the headphone jack of the computer

and has two RCA jacks at the other end to plug into the unit. (***Note:*** **We do not have a cable with the system for this so one would need to be purchased and tested prior to wanting to do this for a service.)**

A third item that is also controlled through this channel is that they system can receive a Bluetooth signal by which you can link a cell phone to it for playing streaming music such as before and after service. That is also why we keep a phone charger with the system so you can keep that plugged in. To connect to Bluetooth, press the MP3 / Line button for this channel in to select MP3. With the volume knob turned down to avoid unwanted noise until you are ready to use it, press the Mode button under the display at the top of the unit repeatedly until you find and select the Bluetooth mode, shown by the word Blue in the display. At that point the system is "discoverable" and you can search for the word **"Knoxgear"** in your phone's system settings to connect to it. At that point you will be in the system and can control the volume with the dial for channel 5. You will also want the volume of the phone you are using to be turned up for a better range.

If you are using channel 5 for both Bluetooth and an instrument, you can switch between them without losing the Bluetooth connection. First turn the volume for that channel down, then press the MP3 / Line button again for it to be in the out, Line position. Then turning up the volume will give you the instrument that is connected.

The last thing we haven't covered is the reverb effect. This is controlled first by the two dials at the bottom labeled Echo and Depth. This is something you will want to experiment with during a rehearsal time to find what sounds best. Whatever you set it to will be available for the four main channels. Turning up the dial in each of their channels that is labeled Effect will add that reverb to their output, and you can control how much of it you want for each channel.

Since there are no mute buttons for this unit you will need to turn the dials for volume and effects on and off and make adjustments to them all individually. Since there are only five channels available this is not as difficult as it would be to do on our regular mixing board. One helpful hint to streamline and speed up making these adjustments is to write notes on your order of service and make a small chart of what volumes and reverb levels work well for each channel during the rehearsal time. Then you can know where to quickly turn their knobs to when it is time to turn them on at each change between music and speaking during the service as a starting point, using that in a similar way to dialing in faders to 0 or unity on the regular mixing board.

The final piece of equipment that goes with our portable sound system is a rechargeable power station, which is essentially a battery unit to supply power to the system and instruments when we are using it somewhere that does not have electricity available for us to plug into. Since it must be stored within a temperature range of between 32 and 113 degrees F we do not keep this with the rest of the system in our storage unit. For the time being it is being stored at the home of the Team Lead for Sound which also is more convenient for the periodic recharging it requires to maintain it. This is done every three months so that it stays charged to at least 80% of it's capacity. There are four 110V outlets on the face of this unit that we can plug the sound system, phone charger and a keyboard into, depending on what we are using for the service or event. There is a button to the left of these outlets that you press to turn the power on and a display will come on temporarily to show the current level of charge remaining in the battery. Unfortunately, this display does not remain on, but so far we have had plenty of battery life to go through an entire service and still stream music during a picnic after it with no problem. It is a good idea to limit rehearsal time prior to the service to help extend the usage time for later just in case. There is a Low Battery Alert in the lower left corner of the screen on the face of the battery,

but we have not drained it to the point where that would come on yet as of this writing. The manual does advise keeping it out of direct sunlight, so placing it beneath the table that the sound system is set up on is recommended. At the end of the day, just press the power button next to the outlets to turn the battery off and make sure to recharge it before storing it again.

Chapter 7

Addendum

The following are random notes that have been made for the operation of our system that are not covered in the main body of the handbook which was intended more for common usage and not for more technical operations. These are random and have been added in no particular order as information is available.

1. **Router password** for X32 mixer: KillerAudio1
   This is only for connecting additional devices such as the iPad to control the mixer through an app and is not connected to any internet, but is only linked to the mixer.

2. To assign where a channel should find it's input from the stagebox, select the channel while in Home and right arrow to Config. The left column is the source. Stagebox channels start with the letter A, as in A15, A16… Check that you are selecting an open channel and be sure to re-label the stagebox itself.

Making **routing assignments** for channel inputs: (note, this was a previous instruction so not quite sure if it's accurate.)
Select Routing and right arrow to Patch Points:User

Input	User Input	Patch	In Signal
1-8	Channel we	AES-50	Choose Channel on
9-16	Want to	(Snake)	Stagebox
Etc.	Assign		
	(Use Knob)		(Use Knob)

3. Portable Church set up **livestream** as a mirror of the mains and routed it out of the Aux and XLR outs (7&8) going to two XLRs on the side of the cabinet. We never used this, but the output cables and jacks on the cabinet are still there. See next note for update.

4. 12-29-23 Carlton from Nordonia High was able to set up Matrix 1&2 to mirror the LR Mains and sent them to the Aux 5&6 quarter inch outs to supply the **livestream.** The DCA8 fader labeled Livestream will adjust the total volume as needed. The MC channel found in the Matrix level will adjust just the volume of the vocals in the stream. During singing the volume of the vocals is typically too loud in the livestream and will need to be balanced. Solo the Livestream fader in the DCA (top right) row to listen in the headphones and adjust with the fader in the Matrix row. Approximately -10 is usually good. This can be brought back up for more livestream volume as needed for speaking such as announcements and the sermon.

NOTE: As an automatic part of the system start up the MC channel on the Matrix level (which would be the main center channel) defaults to the fader being pulled all the

way down, the same as the main LR fader. This means you always need to bring it back up to O or Unity for the livestream to have vocals.

5. **New iPad** for sound was set up on 2-22-24 using the church account. Instructions are taped to its' cover about powering it off after services and keeping it plugged into the charge cord that is set up in the sound cabinet to preserve the battery.

6. Began using the **school's speaker system** instead of our own on 2/25/2024. See separate file labeled "House Speakers" for setup and use details.

7. **P16 assignments.** To view or edit press Routing on the display and right arrow to P16. In the left column use the knob to select the channel you want. In the 2nd column select "Direct Out" as the category, and in the third column scroll down and select the Output signal you want to use. The display in the Current setting on the left should change to that selection. Make note in the P16 Assigns file and on each unit of any changes you make.

8. **Saving Scenes** on the X32 Compact. The mixer can be set up to remember different settings from our regular Sunday morning worship ones if we ever need to. We do have a scene saved for this reason so that if someone ever makes unwanted changes, we can restore all the settings we are currently using for things like channel and P16 monitor assignments. To access these scenes, press the view button in the top right section labeled Scenes just below the main display. On the display you will be able to find and select the scene you want and tell it to restore or load it. If we ever make major changes to what we normally use and want to update the scene we are currently using select Save in the display. If we are creating a whole new layout for the board that is to be saved separate from what we are currently using, select an empty scene slot and assign it a name and select Save. Whenever saving or loading a scene the display will always ask you to confirm the action you are doing as a safety measure to prevent doing anything accidentally. As an additional safety, in the top left corner of the Scenes section below the display there is an Undo button that will allow you to correct a mistake if you catch it in time.

9. **DCA / Sub Group Assignments** can be made and reviewed by pressing and holding the Select button above the group you are working on. While holding that select button, the select buttons for any channels included in it will also light up. To add or remove a channel from the group just press the Select button for that channel while still holding the one for the DCA. It is important to know that you cannot include the same channel in more than one group this way, they will just cancel each other out and won't work on either group. For instance, a vocal channel can't be on both the speaking and the vocal DCAs at the same time.

10. **Bus Group Assignments** are made by first pressing the Select button above the Bus channel you are working on in the right - side section of faders. Next press the **Sends On Faders** button at the top of the column to the left of these faders, just below where it says Buses / Groups. This button will begin to flash showing that it is active, and the

faders of any channels that are being included or controlled by that bus will move to the positions they have been set at while any not included in that bus will drop down to the bottom (OO or Off position). To add another channel just bring up its' fader, or to remove one bring that one down. For example, if reviewing the bus channel that controls the Instrument Reverb, select the channel on the right side for that bus and press Sends on Fader. In the Instruments row of channels on the left side (9-16) you will see that currently only the Guitar and Violin faders are up to be included in this effect. You will also see that the Violin is not set as high as the Guitar. That way when adding Instrument Reverb during a song it will not be as noticeable on the violin since it can be overpowering to use too much for that, and it allows the guitar to receive a higher amount of reverb at the same time. Currently all of the vocal channels, including the Pastor's speaking channel are included in the bus group for Vocal Reverb to make that effect available to them.

Another way we are currently using busses is to combine multiple items into a single channel on the P16 monitors. All of the drum mic channels are on one bus, with their faders set to the levels the musicians have requested them to be at for that grouping. Also, the talk back mics for the sound board and the worship leader plus the Pastor's mic are all on a single channel through a different bus. These busses are assigned to the P16s in the same way as regular channels as described in note 7 above.

11. **Recording to USB.** At the top right of the control sections is a USB slot. Pressing the View button in that section brings up an image of a cassette recorder on the display. If you insert a USB stick in the port you can record directly onto it from the output of the L/R Mains channel (the same audio as is being sent to your house speakers.). To use the controls, press the knobs under the recorder display for play, pause, record, etc. and the display will show the "tape" responding to the controls. If you press the record button a second time during recording it will pause and then continue recording the same track when you press it again. If you press stop while recording, the next time you press record it will begin a new track.

    To the right of the cassette there is a column displaying the tracks that are being saved on the stick. Turn the knob below this to scroll through the list and press it to select a track. When you press play the volume is controlled by the Aux 7/8 faders which are stereo linked together (move one and they both move.). These are found on the left bank of faders in the row labeled Aux In/USB. The total file size is limited to 2 GB which is about three hours of stereo recording. After recording the stick can also be plugged into a computer for playback, or to delete tracks.

12. **Stage monitor option:** For some events, such as outdoor services when we use our Sunday morning system we use stage monitors rather than the P16s. We have two powered Mackie speakers kept in our storage unit which require electricity. They get set up on either side of the stage and are connected to the stage box with XLR cords. The left (as you view the stage) plugs into the second bus output from the left and the right one goes in the third, labeled as 2 and 3 on the lower "output" row beneath the inputs which are labeled Monitor 1 and 2. The mix for these is controlled by busses 2 and 3 found in the first group below the main DCA row on the board. To assign and adjust channels being used in these monitors, select the bus you want to edit and press Sends

On Faders. Then move up any faders you want to the level you want them. Any settings on Monitor 1 will be heard on the left stage monitor and any on Monitor 2 will be on the right, so you can adjust them different and customize them for the people asking to hear something will get it in the speaker closest to them. **Note: Monitor 1 is now also being used every week as an additional monitor for the keyboard.**