Kingdom Hall Audio 3
Installation Manual
V 3.7

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Installing and Connecting Equipment

Connections

The audio interface can be mounted above or below the amplifier. Here is a picture of an installation showing how the mic cables are connected using right angle XLR connectors:

For the signal cables from the PreSonus to the amp, wire:
- Tip, Ring, Shield (TRS) for a balanced signal.

For an unbalanced signal, wire:
- Tip, Shield

Inputs are XLR-1/4” combo jacks

Wiring Stereo (TRS) phone plug output to amp input connector
Setup and Configuration

This part is for installation brothers with technical background and experience in sound systems. Do not make any changes to the configuration of KH Audio 3 unless you are a qualified sound technician!

**Initial Setup**

Do NOT hook up any audio interface and do not run the KH Audio 3 application yet.

- Run the LAME Universal Installer and follow its instructions. This installs the MP3 encoders necessary for MP3 file production.

- Open BlueCatFreqAnalyst.

- Drag the Mono component to the Components folder. Authenticate with System Manager password.

- Double-click the **PreSonus Universal Control.pkg** to start the installer and follow the directions it gives you. When the installation has finished, you will reboot your computer.

**Configuring PreSonus Firestudio Project digital interface**

Connect the PreSonus to the computer with a FireWire 800 to 400 cable and turn it on. Start Universal Control from the Applications folder.

In the small Universal Control window, check the firmware using **Settings - Check Firmware**. Update if necessary. Do not power off while upgrading, this will render the unit in-operational.

Set the rest of the settings in the Universal Control window to match this:
You also need to configure the inputs and outputs of the PreSonus so that you can control them properly from the KH Audio 3 application. Failure to do this can create strange results such as sound coming through the mixer even when all inputs are turned off, or interactions between the telephone output volume and the main amplifier volume.

You should have a window like this on your screen:

Click the "power" button and set input channels 1-8 all the way down to off, like this:

On the right side under the OUTPUT section, click the blue "power" button to turn the MIXER mode off and set it into Daw mode:

Now click on the output section 3 / 4
Do the same for this output pair as you did for 1 / 2, that is:

Enable Mix
Set inputs 1 thru 8 to off
Turn off MIXER mode
Repeat for output 5 / 6 - 7 / 8

Now you can Quit the Universal Control program. Your PreSonus is correctly configured for the System Manager account. Do this for the Sound Operator account as well.
Adjusting PreSonus Input Gains

With the microphones connected to the PreSonus, adjust the input gain knob for each channel so that you do not get clipping when speaking into the mic with the loudest voice that you expect to experience. Often this may be the roving mics. The channel meters on the PreSonus will give you a reasonable idea of when clipping will occur, but there is even some headroom left when it begins to light the red LED. You might not want to turn it down so far that even a child shouting in the mic does not clip as that will remove too much dynamic range. We typically set knobs 4 clicks back from maximum.

Note that if you are using wireless mics, there is often a gain adjustment on the mics or on the receivers that should be considered when making these initial gain adjustments. The goal is to have each channel have the same input sensitivity. If you can have each knob at the same position, that can aid in verifying later that no one has moved the adjustment.

Setup Location of Music Files

- In Finder, go to:
  - Macintosh HD
  - Library
  - Application Support

In the folder labeled KHAudio Tracks:

Create folders:
- Background Tracks
- Background Tracks Piano
- Songs

- In Background Tracks, place the Sing to Jehovah Piano Accompaniment files. Files should be downloaded from JW.org in AAC format. Place files directly in folder.

- In Background Tracks Piano, place the same Sing to Jehovah Piano Accompaniment files. Tracks should be downloaded from JW.org in AAC format.

- In Songs, place the same Sing to Jehovah Piano Accompaniment files. Tracks should be downloaded from JW.org in AAC format.

- Place the Pink Noise file in the KHAudio Tracks folder.
Setting up KH Audio 3

- Copy KH Audio 3 into the Applications folder.
- Start up KH Audio 3

Select Check Automatically

Go to Preferences as described below.

Preferences

To change the configuration of KH Audio 3, select the KH Audio 3 menu and click Preferences or use the keyboard shortcut: Cmd.

MAKE SURE TO CLICK SAVE THROUGHOUT THE SETUP TO AVOID LOSING ANY SETTINGS

The default password is blank. Once in the preference dialog, you can change the password. Our recommendation is to have the password be the same as the System Manager login password. For security reasons we will not disclose that password here. Do not lose this password, otherwise you might have to edit the configuration file in order to get back in.

From the drop down menu you can select from the 13 menus to edit features:
Select PreSonus FireStudio for the Input Device and for the Output Device. Select the number of inputs the system will have. (8 or less) Outputs will remain at 8.

- If you have issues with mics popping, increase the buffer size.

Click Change, then Save.

Save changes and quit KH Audio 3.
Relaunch KH Audio 3.
Open KH Audio 3 Preferences, select Inputs.

Now enter the microphone labels. Channels are laid out left to right.
Click the label to edit it. Then select the type of input:

KH Audio 3 will use this information to determine which microphones to mute during reading, etc. KH Audio 3 only supports one reader microphone.

To enter the color for a microphone, click on the color swatch. This will bring up a color panel where you can set the appropriate color to match to your color label on the microphones.

You can click Save at the top right of the Preferences window any time to save the changed settings. Do this repeatedly during setup.
• Mic Gain controls input volume for all the mic channels.
• Gating Threshold controls the level that is required to activate the microphone. This is used to reduce handling noise, background noise, and reduce feedback.
• Reader Threshold controls the input level that is required to mute and un-mute the roving microphones.

Below are recommended settings:

Mic gain at 0 dB
Reader Threshold at -23 dB
Gating Threshold at -25dB

This setting is required:

Mix Correction at 1.5 dB

Volume Presets

Click + to add or - to remove a volume preset from the preset list. To change the name of a preset double click it. The order in which they appear can be changed by dragging a preset to the desired position in the list.

In order to setup a preset with preferred volume levels:
• Select the desired preset in the configuration panel
• Move the sliders in the main panel to the desired position (master and music volume are not stored)
• Click Set underneath the Volume Presets list
• Click Save to save the configuration changes.

When KH Audio launches, the preset on the top of the list will be automatically selected.
Outputs

Each output of the PreSonus can be controlled independently of each other. Select the Enabled box to activate the output.

Click on the label to edit the name of the channel.

Select the type of output that the channel is to supply. When the Private Meeting box is selected on the user interface, the second amp, FM transmission, and the Telephone transmission are disabled. This allows private meetings to be held with no broadcast of the program outside of the auditorium. Stage monitors output music and roving mics, but not Main or Reader.

Adjust the level of the slider to a level that allows sufficient input to the device receiving the signal. Typically all are set to 0dB.

Playback controls music. Nominal Level controls the level of the music for singing. Background Level controls the music for playback before and after the meeting. Here are recommended settings:

Nominal Level: 0dB
Background Level: -25dB

Time delay is selectable by numerical value below each channel. Each channel is configurable to allow for custom installations. Double click on the number value to enter a time in milliseconds. Example: 20 ft = 58ms. Enter 0.058

The vast majority of KH installations don’t need to compensate for time delay.
Set Initial Output Level

Turn on the Pink Noise generator check box on the Inputs window. Bring up the Music slider on the main window to -0- (master should also be at -0-).

If your power amp has gain adjustments, set it so that you measure about 72 dB 48” off the floor directly below a speaker in the auditorium. If there is no gain adjustment on the power amp you can use the Main Amplifier output slider on the Preferences window. SPL Meter for iOS is a good app for this. Select ‘A’ weighting and slow response.

Room Equalization and Feedback Elimination

A good technique for eliminating feedback frequencies is to set up the microphones on stage the way they will be used. For example; the main mic, plus a reader mic, plus mics for demonstrations. Place those microphones where they would typically be used. Place roving mics in the auditorium.

On the KH Audio preferences panel, click the analyzer button. On the main panel bring all mic channels up to normal operating level (-0- on the sliders). If you are not getting any feedback or ringing yet, raise them all the way up. If needed, you can reduce the master to prevent complete runaway feedback. You want to raise the overall level (using the master) until it starts to feedback. You may need to boost the main power amplifier output level if you can not make it feedback.

Parametric Filters

Feedback frequencies can be taken out individually by using up to 3 Parametric Filters.
Select up to 3 cascaded parametric filters to eliminate any feedback issues. Set the parametric filters as narrow as they can be to just remove the feedback frequency without taking out a lot of the spectrum. Change the filter width by grabbing the yellow line on the sides of the filter point. Start by taking out only about 3 dB or so. Take out only what is needed. Once you have eliminated the first feedback frequency, then raise the level until you get another feedback point and use the next filter to eliminate that. When you have removed the first 3 feedback points you have nearly reached the optimum level. Go back and adjust the 3 filters to average out the filtering. This will reduce feedback a little bit more.

You can tell that you have a fairly good setting when the feedback seems to pop up on several frequencies at once. This means that you have reached about the maximum headroom for your room acoustics.

**Graphic Equalizer**

Drop lower frequency filters and hi frequency filters to match this setting in the picture:
If further feedback reduction is required, drop the according filter in small increments until the feedback is gone. Be very sparing with these filters, music playback is affected by these settings.

**Setting Microphone Output Levels**

Set the Master and each channel gain back to the normal -0- level. With a normal speaking level into the microphone at the normal distance (about 2 to 3 inches) you should be able to get peaks around 70 dB on a sound meter. This should be a comfortable listening level now. If the level is too low or too high you should adjust the power amplifier gain to get the right level.

If you are using a 2 channel power amp with the second channel going to libraries, office, restrooms, etc. you can adjust that channel for proper level in those areas.
Setting FM and Telephone Outputs

A dynamics processor can now be adjusted to maximize the use of the available signal strength on the FM transmitter and the telephone interface through the following panel.

When setting this processor you want to set it to compress music noticeably, but to have only a small affect on voices. This allows the level to be as high as possible without music over-modulating the FM signal.

To set the level going to your FM transmitter, play a song in the normal mode (not background) so that you have the strongest signal that you will typically use. Now adjust the input to the FM transmitter or the FM Transmitter output slider so that the peak light on the transmitter lights only occasionally. If it lights constantly you are over-modulating and you need to reduce it. Test it with a normal speaking voice signal going over the main mic and make sure it does not light up too frequently. Use a headset radio to listen to the signal to make sure the broadcast is clear and intelligible.

For the Telephone volume you will need to connect to your normal telephone conferencing system and have someone listen to the program. You can adjust the Telephone System output slider to give you the desired level. If the slider is all the way up and its still too soft, then you can increase the output of the Dynamics Processor by clicking the Details arrow on the bottom left of the window, then set the master gain slider at the bottom to give perhaps 5 to 10 dB more gain. Now you can go back to the Telephone slider and adjust for correct level. If you have adjusted the master gain you will need to set the FM transmitter output again because you just increased that too.

Voice Dynamics Processing

Another dynamics processor can be enabled for microphone voice processing if desired. In order to enable it, make sure the box for Voice Processing is enabled. Adjust the Voice Dynamics Processor characteristics as desired as found under the Audio Processing popup. The advantage of this is that the signal of soft spoken persons can be boosted whereas overbearing signals can be tempered automatically.
Connection to Other KH

The system can be configured to send or receive sound over a local network, or using a DNS URL. This allows you to connect multiple halls together to send the same sound to all halls. This feature is configured in the Preferences window. To set it up, open the Preferences and do the following:

Select **Network Sender** for the source hall. You will also now have access to the Net Send Unit in the Audio Processing section. This allows you to set various send parameters. Your DHCP router will need to have the IP reservation and port forwarding setup for the sending computer.

Select **Network Receiver** for the listening halls. If there is a sender on the network you should be able to click **Select Host** in the Audio Processing section for the Net Receive Unit. Select the host which is sending the program. Click **Connect**.

When the connection is enabled for sending or receiving you will see another LED on the main panel indicating the status of the sending or receiving (depending on which end you are looking at).

On the receiving system, the **Other KH** slider adjusts the level of the signal received.

If no network connections are to be made, select **Standalone Operation**

MAKE SURE TO CLICK **SAVE** THROUGHOUT THE SETUP TO AVOID LOSING ANY SETTINGS
Feedback or Suggestions

This computer software can be adapted, so please send any feedback or suggestions for improvement to Br. Tony de Rijk at the following email address: ton@me.com