Lou's Guide to Audio and Lighting at the Laurel Theater - revised March 2024

The Laurel Theater is the home of Jubilee Community Arts (JCA), in Knoxville, TN (www.jubileearts.org). This guide is compiled by Lou Gross (lgross.utk.edu)

The objective of this Guide is to provide basic information for volunteers for either JCA or the Knoxville Contra Dancers (KCD) regarding where equipment is located and how to use it to run audio and lights for concerts, dances and other events at the Theater.

Sound Equipment:

Most all the equipment is located in one of 3 places:
(i) The sound board cabinet
(ii) The closet upstairs across from the main entry to the Theater (the dancer's closet)
(iii) The closet downstairs near the rear entrance.

In general, all equipment in (i) and (iii) are owned by JCA, while much of the equipment in (ii) is owned by KCD. There are additional older equipment that is not used regularly located in the mechanical room.

Equipment in the Venue:
1. House Speakers: Pair of Yamaha 5115MT 3-way cabinets, 400 Watts peak, hung from ceiling.
2. Snakes: A single 12 channel XLR to XLR snake is built-in, with stereo powered 1/4" send lines, and 2 non-powered 1/4" monitor sends. A separate built-in snake provides two additional powered 1/4" send lines for monitor sends. Thus the maximum channels on stage we can handle with this is 12, and we can provide a maximum of 3 on-stage mixes, assuming the house is run mono. We typically just run the house in mono and drive it using one side of the powered stereo send in the main snake, and use the other powered side of the main snake to drive a monitor mix.
3. An Audio Technica Pro45 mic built in on balcony for ambient taping.
4. Eight Colorise Quadra LCD lamps hung upstairs and connected to a Chauvet Stage Designer 50 controller/dimmer that is installed in a locked box above the sound board cabinet. Also in this cabinet is a 4-channel controller connected to a cable that is coiled under the stage and can be connected to a four-channel dimmer box (kept in the downstairs closet) to use with additional lights on a light tree or on the floor lamp holders that are behind the piano.
5. Two lamps (one PAR and one Frennel) hung upstairs and connected to the four white dimmer switches on the wall next to the lighting box. These are aimed on the floor to provide additional light in the hall.
6. A Kawai grand piano kept in an alcove on the side of the stage.

Equipment in (i) the sound board cabinet:
1. Mackie Onyx 1640i mixer – 16 channels and Firewire outs. Connected to 12 XLR channel snake with box under the stage with powered send for main speakers and one monitor mix. Also connected to snake with small box under stage with two powered sends (two connectors for each send in the box). Firewire out connected to Dell computer
2. Yamaha GQ1031C 31-band graphic EQ used for Front of House mix typically connected to main out of mixer and to one side of the Crown Amp.

3. Ultra Graph Dual 31 graphic EQ model 3102, typically used for two monitor mixes, or else both sides used for Front of House when running house in stereo. One input is from Aux Send 1 on mixer with upper graphic EQ and output to one side of the Crown amp. The other input is from Aux Send 2 on the mixer using the lower graphic on the EQ and the output is connected to the bridged input of the Yamaha amp.

4. Dual DOD 231 31-band graphic EQ used for additional monitor mixes, as a back-up to the other graphics, to insert on a channel or to use as crossover for the subwoofer.

5. Alesis 3630 compressor with two sides of compression and gates. Not connected but there are several insert cables in the tackle box if needed.

6. Crown 800 CSL stereo amp with 400 Watts per side. One side is connected to the Yamaha EQ which has the main out of the mixer used for mono house. The other side is connected to one side of the DOD EQ which has Aux 1 out from the mixer. Use both sides if the house is run in stereo.

7. Yamaha P1500 stereo amp with 175 Watts per side. Typically run bridged to supply monitor mix from Aux 2 of the mixer, but sends are available to use each side separately.

8. Dell computer with display, keyboard and mouse. Connected to Firewire out from the mixer to record channels as wav files using Reaper. Saves these files in C: Jubilee Programs

9. Tackle box with a wide array of cords and connectors.

10. Old heavy Pickering headset to monitor sound.

11. A cardboard box with ipod holder and a notebook that has the standard setup for some of the contra bands for Mondays.

12 At the top of the rack is a Power conditioner from Middle Atlantic Products Model PD915A that has a switch that turns on all the power for the rack. Typically the Mackie Board and Yamaha graphic EQ and the DoD and Ultra Graph graphic EQs are the only components that are left on. Turn on the amps after the power conditioner is turned on.

Equipment in (ii) the dancer's closet:

1. Pair of Peavey 112TI monitor wedges, 200 Watts max (owned by KCD).

2. Blue suitcase with 3 long and 3 short black 1/4" powered speaker cables and a couple of 1/4" unbalanced cables (owned by JCA)

3. Silver suitcase with two long and two short clear plastic speaker cables (used by KCD but built from cables purchased by JCA for International Jubilee)

4. Black mic box with two Shure SM57, 2 Shure SM84, 1 EV ND-308, 1 EV ND-408, several other condenser mics, three DI boxes, various mic clips, in three layers in the case (owned by KCD)

5. Orange reel holding several mic cords (owned by KCD)

6. Green tackle box with a Shure wireless handheld SM58 vocal mic with Shure receiver and a headset mic with transmitter. (owned by KCD)

7. Small hot-spot powered monitor speaker (owned by KCD)

8. About 6 tall AKG boom mic stands and two short AKG boom mic stands (Owned by JCA)

Equipment in (iii) the downstairs closet:

1. Pair of EV SM15 wedges, 400 Watts Max.

2. Large black suitcase with mics including 5 Shure SM 58, 5 Shure SM 57, 2 Shure SM beta 58 (on loan from Allen Miller), 1 Audio Technica 3528 condenser mic, 2 Oktava OM-2 condenser mics with 10dB pad, 2 Rapco DB101SL DI boxes with ground lifts, 2 passive DOD 260 without ground lifts, a variety of mic clips, the flexible light for the Mackie mixing board, several 1/4" unbalanced cables.

3. Two orange reels with mic cables

4. Four heavy AKG mic stands
5. A couple of guitar stands
6. The old Mackie 1604 16-channel mixer that used to be used for house. It has XLR10 extension capable of handling 16 channels with either XLR or 1/4" input. This is a modified Mackie, with a single selectable pre-fader and pre-channel EQ or post-fader and EQ monitor send (this is Aux 1), 2 pre-fader and pre-channel EQ AUX sends (Aux 2 and 3), and one additional post-fader and post-channel EQ send (Aux 4).
7. Mackie 1402 10 channel mixer
8. An integrated 8 channel amp/mixer and neutrik connectors for it
9. Three small Peavey monitors/speakers
10. Plastic Box with various cables and connectors.
11. Various old mic stands.
12. A 50-foot snake with 8 sends on a wooden reel used to run around the side of the venue for additional mic sends.
13. A couple of shorter snakes.
14. Small Fender subwoofer.

Additional equipment stored elsewhere:

1. Mackie SR 24x4 VLZ Pro capable of handling 20 mono channels plus two stereo channels with either XLR or 1/4" input. Four Aux sends on this are post-channel EQ and post-low cut filter, pre-fader (two of these are assignable to be post-fader if desired), and two Aux sends are post-channel EQ, post-low cut filter and post-fader. We can thus use this to obtain up to 4 pre-fader monitor sends with two post-fader sends for effects, or we have available two pre-fader monitor sends with four additional post-fader AUX sends. (Stored with Allen Miller)
2. Yamaha 300B 12 channel board with built in stereo amps and in-board graphics (dual 9 band). This is an old back-up and may be used for an on-stage mix or for an additional stereo amp for monitors. (in mechanical room)
3. Two Peavey small 6 channel mixers (a XR 600 and a XR600B) with built-in amp (mono). One of these has both 1/4" and XLR inputs, the other has just 1/4" inputs. (one owned by JCA the other by KCD – stored in mechanical room)
4. An 50 ft. long 8 channel snake with XLR-to-XLR and two mono non-powered sends and two stereo non-powered sends – marked "Slayer" (in mechanical room).
5. TASCAM digital recorder (stored in the office)

Questions about the above equipment should be addressed to Dr. Ethan Fulwood, Executive Director, Jubilee Community Arts, 865-522-5851 or to Lou Gross, Volunteer House Sound Engineer, (lgross@utk.edu)

Sound Setup

Caveat: This is not meant to replace the Manuals - READ THEM

Remember: This system was paid for by member's donations - treat it kindly. The amps can blow out the speakers, including the monitors. Be careful about levels - always turn main and monitor levels off when powering up the amp, or connecting speakers. Turn on power to the mixers and graphics first, then turn on the amps. When turning off the system, do this in reverse - lower all output levels on the mixer, power down the amps, then power down the mixer and graphics by turning off the power conditioner. It is also good practice at the end of the show to turn off phantom on all channels and place all faders down and set the channel EQs flat.

Set the sound as the artist requests. If you're not sure how an instrument is supposed to sound, take it out of the mix, go listen to it acoustically, then solo it in the mix and try to make it sound the same. You should turn phantom power on a channel only if it is needed for the condenser mic on that channel or the artist has a device that requires it.

Below are the basic setups for both dances and concerts, which should cover most situations. The dancers only use equipment that is in the dancers closet though. For my general guide see A BASIC INTRODUCTION TO CONCERT SOUND ENGINEERING, posted at http://lgross.utk.edu/soundeng4.pdf

Setting Channel Levels

Ideally, an objective is to keep everything near unity gain (e.g. channel faders near 0 on each). To do this, mute all channels, assign all channels you will need to L-R, make sure the send to sub 1-2 and 3-4 buttons on each channel are not depressed, keep all faders down, and working with one channel at a time do:

   1. Set EQ for the channel (approximate it if you know the instrument or vocal requirements, otherwise just leave it flat with all EQ knobs straight up)

   2. Turn channel trim sensitivity (e.g. input gain) completely counterclockwise

   3. Solo the channel (push in the Solo button on the channel)

   4. Have artist sing/play in channel as they would in performance

   5. Adjust Trim til channel input peaks at 0dB on LED meter

   6. Raise channel Fader to the center (U) position for unity gain

   7. De-Solo the channel and mute it.

When all channels are done, un-Mute each channel, raise the main fader to get sound in the hall.

Note that the above puts all inputs at approximately the same signal level in the board. In general though, artists don't like going through one input at a time so you typically will have to do some of the above on the fly as you are mixing a group. The objective is just to make sure that one channel is tremendously higher than the others, which you can see as the band plays by looking at the led levels for each channel by hitting solo on that channel.

Setting Amp Levels

The Crown amp has level controls for each side (small screws at the back of the amp). The Yamaha amp has level controls for each side on the front. Ideally these should be set so that when the Master fader for the hall sound is at center detent and the Master levels for the monitor sends (the knobs on the right of the Aux) are near straight up, and the volume in the hall (or monitor) is about right. This will generally mean that the side of the Crown amp being used to drive the monitor will have a lower level that the side being used for the house however we generally don't adjust these screws but leave them at maximum for the Crown. Note that when turning on the

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Yamaha amp, turn the gain levels all the way counterclockwise and then once the amp powers up, raise the gain knob to an appropriate level for the monitor.

Setting the Graphic EQ

There is a standard setting for the Yamaha EQ used for the House in a slight W-pattern, with slight cuts the 4K-6K range and the lower mids in the 120-400 range. The monitor graphic is another story – setting this varies with each show, and will be affected by mic and monitor placement. It is also affected by how exact the artist is about the monitor mix or mixes. You will probably have to make a number of trips back and forth to the stage to get this set correctly. As a basic start though, a slight W-pattern similar to the house graphic is what I use. Just be sure that the sliders for the Ultra Graph EQ for the monitors are mostly at center detent – you can feel the slider click in at the detent.

Mono House Mix - Single Monitor Mix

We use one side of the Crown amp to drive the main speakers, and one side to drive the monitors, with the Yamaha graphic used for the House mix and the upper Ultra Graph EQ used for the monitor mix. Thus the Main out Mono XLR on the Mackie is routed to the Yamaha graphic, the output of that graphic is routed to one side of the Crown amp, and the amp output is sent down the main snake along one of the powered send lines. The stage box then has two outputs for connecting the two main speakers (these are the left-hand 1/4" plugs at the stage box).

The Monitor Send takes the Aux 1 output of the Mackie (set the Aux send to be pre-fader, which makes it post-channel EQ and post Low-cut filter, so what you do in the hall on the channel EQ will affect the monitor sound for that channel) and routes it to the upper Ultra Graph EQ, then to the other side of the Crown amp, then down the main snake to the stage box. The stage box then has two outputs for connecting two monitor wedges (these are the right-hand 1/4" plugs at the stage box). The overall monitor gain level is controlled by the Aux 1 Send Master knob to the right of the row of Aux 1 knobs.

This setup assumes the artist wants a monitor mix separate from the house, that is affected by the channel EQ, but not affected by the channel fader (e.g. the artist wants a pre-fader, post-EQ monitor mix). If the artist wants to hear the house mix in the monitors (e.g. the artist wants a post-fader, post-EQ monitor mix), then press in the Aux 1 button to be post-fader.

If the artist wants a monitor mix that is not affected at all by the channel EQ (e.g. the artist wants a pre-fader, pre-EQ monitor mix), this will require some additional patching. To do this, insert a 1/4" line inserted ONLY TO THE FIRST CLICK into the Insert port at the back of each channel being used. Take the other end of this patch cord into an unused channel and insert it FULLY to the second click into that channel's Insert port. Do this for all channels being used that they want in the monitor mix. For each of the previously unused channels that you have inserted to makes sure the L-R assign button is NOT pushed in. This then allows you to use the channel EQ for these previously unused channels and the Aux 1 send however the artist wants it set to do their monitor mix, and doesn't affect the main house mix.

Mono House Mix - Two Monitor Mixes

Setup is the same as above, except you need to use another AUX send (say Aux 2) for the second monitor mix (this will then be pre-fader, post-EQ). The Aux 2 output is sent to the lower Ultra Graph EQ and then to the Yamaha Then take the Aux 2 Output, patch it into the lower DOD graphic, and the output from the lower DOD graphic goes into the Yamaha amp (on the bridged side - be sure the switch at the back of the Yamaha amp is set to Bridged not Stereo). The output from the Yamaha amp is then sent down the second snake to the small stage box. Use the two 1/4" plugs on the stage box marked "1" to connect the monitor wedges for this monitor mix.

If the artist wants a second monitor mix that is not affected at all by the channel EQ (e.g. the artist wants a pre-fader, pre-EQ monitor mix), follow the above directions for this under the One Monitor Mix directions. Use the Aux 2 knobs on the channels you are now using for the monitor mix to make a second monitor mix with the Aux set as post-fader using the button on the right of the Aux strip. The output from the Yamaha amp is then sent down the second snake to the small stage box. Use the two 1/4" plugs on the stage box marked "1" to connect the monitor wedges for this monitor mix.

Mono House Mix - Three Monitor Mixes

This is the same as the two monitor case, except that now we use must use another AUX send (say Aux 3) for the third monitor mix (this will then be pre-fader, post-EQ) if the Aux button is set pre-fader. Then take the Aux 3 Output, patch it into one side of the DoD graphic and send the output from that graphic into the second side of the Yamaha amp (be sure the switch at the back of the Yamaha amp is set to Stereo, not Bridged). Be sure there are two dual banana jacks plugged into the two sides of the Yamaha amp, the outputs from which go to the second snake to the small stage box. Use the two 1/4" plugs on the stage box marked "1" to connect the second monitor mix wedges (from Aux 2 send) and use the two 1/4" plugs on the stage box marked "2" to connect the third monitor mix wedges (from Aux 3 send).

Mono House Mix – Adding small on-stage monitor for caller for a dance

Particularly for callers during a dance if they want to hear themselves, you don't want the caller mic in the monitor mix for the band. Rather than just using a large second monitor for the caller, you can use the small powered hot-spot monitor kept in the dancer's closet. One way to do this is to use an Aux Send (say Aux 3) with a 1/4" connector that allows you to send the signal to the stage by connecting to it an XLR (typically using line 12 in the snake). Then from the stage use an XLR to take the line 12 and connect it to the input of the hot-spot monitor and place it on a stool near the caller. You can then put whatever you want in this monitor using Aux 3. This does not run through any graphic EQ.

Stereo House Mix - One Monitor Mix

Here we use both sides of the Crown amp for the house, and then use the Yamaha amp to drive the monitors. Use Main Left and Right 1/4" outputs from the Mackie into each side of the Ultra Graph EQ, then patch the Ultra Graph outputs to the two sides of the Crown amp, and down the two powered send lines in the snake. At the stage box, use one of the left 1/4"

plugs for one house speaker and use one of the right 1/4" plugs for the other house speaker. Use the Aux 1 send for the monitor by taking the Aux 1 output to the Yamaha graphic input, take the output of the Yamaha graphic into the Yamaha amp (on the bridged side - be sure the switch at the back of the Yamaha amp is set to Bridged not Stereo). The output from the Yamaha amp is then sent down the second snake to the small stage box. Use the two 1/4" plugs on the stage box marked "1" to connect the monitor wedges for this monitor mix.

Adding the Fender Subwoofer to the House Mix

To enhance the bass in the hall, place the Fender subwoofer near the sound board, typically under the table used to hold recording equipment. Use an Aux send (typically Aux 4) to send the signal from any channel (such as one with a stand-up bass) to the subwoofer. To do this, take the output from Aux 4 using a cable to the input on the upper DOD Eq. Knock out everything above about 250 on the DOD by moving all the graphic sliders to the bottom and have a gradual decrease in the sliders from about 150 to 250, with all the sliders below 150 at enter detent. This uses the graphic EQ as a simple cross-over controller. Then take the output from the DOD to the input of the Fender subwoofer. You then control how much goes to the sub by changing the Aux 4 knob on the channel for the bass.

Taping for Live at Laurel and Mountain Jubilee using the TASCAM

There are several options for how to do this, but I will describe only the standard way used. In this case, the Dell computer is used to save the outputs from each channel using Reaper and the 1-2 sub outs are used for the left and right inputs to the TASCAM digital recorder. I use the 3-4 sub outs in a similar way to run into a laptop that allows me to burn CDs to give to the artist. First be sure the ambient mic (cord above the sound board) is plugged into an unused channel (typically channel 14) and phantom power is turned on for that channel.

We use two Aux sends (typically Aux 5 and 6) for the left and right sides of the tape mix. Make sure these are set pre-fader. This gives control over the levels of separate channels in the tape mix. This will still be post-EQ and post Low cut for each channel, so it will still be affected by the EQ set for the house mix. Center each channel's Aux 5 and 6 knobs (e.g. straight up), take Aux 5 and 6 outputs from the back of the Mackie to the input of channels 15 and 16 using 1/4" cables that are fully inserted, and assign channels 15-16 to subs 1-2 and 3-4 (not L-R). Pan channel 15 all the way left and pan channel 16 all the way right using the pan knob on the channels. For whatever channel you have the ambient mic in, assign it to only subs 1-2 and 3-4. Ride the fader for the ambient mic to add it to the tape mix. Take the tape mix out via the 1-2 Sub Outs at the back of the Mackie, which gives the mix you are doing on Aux 5 and Aux 6 post the channel EQ, and plug these into the TASCAM. You can then increase or decrease the level of any channel in the tape mix by adjusting the Aux 5 and 6 knobs for each channel and pan these channels by increasing or decreasing the channel's Aux 5 and 6 knobs to do a stereo mix. In general you don't want a hard pan on these so most of the knobs will only have slight differences between Aux 5 and 6 knobs. The overall level of the left and right inputs to the tape mix are controlled by the faders for Sub 1 and 2. For another tape mix (as done to record to another device such as a computer) use the same as this only use the Sub 3-4 outputs.

Processors and other junk

Connecting a processor to a single channel is easy, if you use a Hybrid 1/4"
plug set to set up an effects loop by plugging it all the way into (2nd
click) the channel insert for the channel you want the effect in. For
example, to use a graphic on a single channel, plug the Hybrid into the
channel insert, connect the output side of the plug into the graphic input
and the input side of the plug into the graphic output. This inserts the
graphic into that channel. You can do exactly the same thing to insert the
Alesis compressor into a channel. For other more exotic effects, like reverb,
which you want in several channels, you could use the sub outs if you are not
using them for recording. Assign the channels to 1-2 (as well as L-R), insert
the effects unit into the Sub 1 out) and use the Sub 1 fader to control the
signal from the effects processor added to the main mix (be sure to assign
the Sub 1 mix to L-R by pressing the Assign L-R button for Sub 1. If it gets
more exotic than this, the group is probably carrying their own sound person,
so why should you worry?

Lighting System

The main lighting system has 8 LED lamps hung in the balcony and these are
set so that the center 2 lower lamps on each side are controlled by the
faders 1-4 on the Chauvet dimmer board (RGBW order), the out 2 lower lamps
are controlled by dimmers 5-8, and the upper two lamps are controlled by
dimmers 9-12. You can use the upper faders (Scene A) to set any combination
and have both Master faders up all the way.

There are a set of pre-set scenes that are accessed using the lower set of
faders (Scene B). To use these, put the two Master faders down at the bottom
and make sure this is Page A. Each of the faders 13-24 control a single scene
that is listed on the page taped on the light board. To see a scene, set the
Fade slider at about 5 sec and then raise the fader for whatever scene you
want. To switch scenes, move the fader all the way down and then bring up a
new scene fader.

To record a new scene:
1. Move Left Master to top and Right Master to bottom
2. Enter record mode by holding Record button and pressing in sequence the
flash buttons below #1, 5, 6 then 8
3. Set a scene using the upper faders 1-12
4. Hit record once
5. Hold record button and hit the flash button below the slider 13-24 that
you want to hold the scene
6. Exit record mode by holding record button and hitting the exit record
button.
7. To see the scene you set, move both Masters down and raise the slider that
you set the scene on.

There is a Fresnel and a PAR on the upper bars in the balcony that are aimed
towards the floor. These are controlled by two of the 4 dimmer switches
outside on the left of the lighting box. Hit the button on top of the dimmer
to turn it on (the light turns green) and raise the slider. Turn it off by
moving the slider all the way down and hit the button so it turns red. Make
sure these are red before locking up.

The dimmer controller that is located above the Chauvet is connected to a
control cable that has an end coiled under the stage. To use these, bring up

the 4-channel dimmer that is in the downstairs closet and connect the control cable to it. Plug the dimmer into an outlet and connect power plugs for any lights you wish to use to the dimmer. This is used with either a light tree (two of these are in the mechanical room) or the small light holders kept on stage behind the piano. There are a couple of PARs and a Fresnel in the mechanical room that have brackets that can be used with these and attached to the tree.

Best of luck - if you have questions contact me.

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