

Master Electrician Handbook

This is a guide to help Master Electricians with tasks and responsibilities of their job. If there are questions at any time please see the Lighting Designer, Assistant Lighting Designer, Technical Director or any of the Electrical Staff of the Strayer-Wood Theatre.

Electric Position Definitions

Lighting Designer (LD)- The lighting designer is responsible for the design, installation, and operation of the lighting and special electrical effects used in the production.

Assistant Lighting Designer (ALD)- Assists the designer in ideas and concepts of the design. Responsible and duties assigned by the designer.

Master Electrician (ME)- The Master Electrician, under the supervision of the lighting designer, implements the lighting design. He or she is directly responsible for the acquisition, installation, and maintenance of all the lighting equipment and the supervision of crews who will hang, focus, and run the lighting equipment.

Assistant Master Electrician (AME)- Assists master electrician with circuiting, work calls, dimmer checks, light hang, and strike. Responsible for duties the master electrician assigns. The ME is to show the AME what their responsibilities are, so that the AME will be able to become a ME.

Electrics Crew- Composed of students, this crew is a learning experience. People on this crew are to be taught elements of Electrics. The people on this crew are directly responsible to the AME and ME.

Steps for the Master Electrician to Follow:

1. Meet with Assistant Master Electrician; make a schedule for meeting times. (Game Plan)
2. Get a list of crewmembers. From this list contact crew and find out what their conflicts are for the period of light hang.
3. Meet with the Lighting Designer, go over light plot with Designer to make sure questions are answered and ME understands the plot.
4. Plan circuiting; indicate on plot and in paperwork.
5. Start Pre-hang.
6. Hang.
7. Cable/ Troubleshoot
8. Focus.
9. Run shows
10. Strike

Master Electrician Lighting Equipment Responsibilities

- *Be responsible for all of the lighting equipment to be used in the show.
- * Organize light hangs and focus times with the Designer and TD.
- *Know the correct terms and names to be used when working with crew and Designers.
- *Know how to change lamps, barrels, and lenses in each instrument; teach crew to fix broken instruments.
- *Keep track of what instruments are being used in the design, and what instruments are still available to designers.
- *Fix any non-working instruments and cable. If there are instruments or cable the ME is not able to repair, notify the TD.
- *Broken instruments should be placed by the ME table, with a tag indicating what is wrong with the instrument.
- *Double-check all work done by the crew.
- *Make sure instruments hung for the plot are hung right side up, shutters have been pulled, safety cables are being used, c-clamps are tightened one turn past tight, and instruments are rough focused.
- *At the end of each light hang all instruments or cable in need of repair are to be fixed and hung back into instrument storage.
- *Keep the Designers and TD informed of any problems pertaining to the electrics department.
- *Make sure cables are dressed
- *Make sure catwalks, light booth, and ME table are clean after each call.
- *After each work call make sure work lights are turned off. When turning off the lights, always leave some light on. The LD, TD or ALD will inform you which lights should remain on.

Master Electrician Electrics Crew Responsibilities

- *The ME is responsible for the people on the assigned electrics crew.
- *The ME is to teach his or her electrics crew how to hang lighting instruments, cable instruments, and focus instruments.
- *The electrics crew is required to be at light hang.
- * Electrics crew is to be taught how to understand and read the light plot, properly handle instruments (safety cables, shutters, lamps, etc.), correct storage of instruments, cabling, correct hanging of instruments, maintenance of non-working instruments and cable, incorporation of gels and gobos.

Light board

- *The Master Electrician is responsible for patching the light board.
- * The ME is responsible for training the Light Board Operator.
- *It is important for the ME to have an understanding of how the board works; get a manual from the TD, LD or ALD. Be able to answer questions.

Pre-planning Circuit Layout

Before Light Hang it is very helpful to assign circuits to instrument on the light plot. The following is a chart describing what to do.

Channel- The number by which a unit or number of units are controlled.

Circuit- The conductive path through which electricity flows. Permanent plugs into which instruments are plugged into.

Dimmer- The electrical device that controls the intensity of the lighting instrument

The channel, circuit and dimmer work in the following way:

The instrument plugs into the circuit (that hangs in the space). The circuit then runs through the building to the dimmer rack (located in the deluge room). The dimmer is then patched into a channel (this is done in the light board). The channel is used to control the instrument.

Example:

I have a Source 4 Par (its channel number is 3). I'm going to plug this instrument into circuit number 23. This means that the dimmer I am using is dimmer 23. I want this light to turn on... I will go to the light board. Since I have already patched the board (The computer realizes that dimmer 23 is patched into channel 3) all I have to do is bring up channel 3.... Light works.

How to Circuit:

1. Figure out if any instruments are on the same channel.
Instruments that are on the same channel can be plugged into the same circuit. (As long as the total wattage of instruments does not exceed 2400w.)
2. Determine whether there are enough circuits for instruments on the plot.
If there are not enough additional dimmer packs can be added. See TD.
3. Figure that for each individual channel number there needs to be an individual circuit number.
4. Write down which circuit number corresponds with the channel number.

Helpful hints:

It is handy to keep one circuit open per catwalk. This will make things easier if the designer chooses to add an instrument. If a designer adds an instrument to the 2nd cat, keeping an open circuit on that cat will make circuiting easier after hang.

Multicables are very handy for adding circuits where there aren't any. Example: empty battens, where circuits have already been used.) Run the multicable from available circuits (the mid-rail) to where you need more circuits (the 2nd cat.)

Drop boxes are also helpful in adding circuits to an area. The drop boxes are located in the grid, which can be dropped onto a batten or even to the floor to add additional circuits to and area.

Pre-hang

Pre-hang is the week prior to light hang. The first thing the ME must do is get the ME keys from the TD. This is the time where the ME and AME meet and discuss what needs to happen to make light hang go smoothly. During this first meeting the ME should go over the circuiting of the plot with the AME. Then the ME and AME should put the circuit numbers onto the plot. From this the plot can now be easily updated and corrected.

Hang cards need to be made. Hang cards are individual sections of the plot, normally broken up into sections by catwalks and electrics. These hang cards should be mounted on cardboard. The crew will be able to use these hang cards to hang instruments easier. Each card should include an area and an instrument key.

Instrument Schedule- An instrument schedule is a list that states, by position, how many and what types of instruments are being used. It also shows circuit, channel, color and number information.

Cut List-A cut list states how many cuts are needed of a certain gel, and what sizes they need to be.

Channel Hook-up- A channel hook-up shows clearly what channels each instruments plugged into. This list is important for figuring out all vital information that will be needed by the ME and AME.

Spare Lamp Count- The lamp list shows all of the lamps needed for the production.

From these lists the ME needs to figure out if there are enough lamps and gel in storage. If not, an order needs to be put into the TD. This needs to be done ASAP.

After this is done the ME and AME should start incorporating members of the crew. Start pre-hang calls. Pre-hang calls should be cleared with the TD. These calls should be used to teach the crew correct ways of hanging instruments, make sure cable and instruments are working, fix instruments in need of repair, cut gel, find gobos if needed, make sure all instruments have the correct lamps and barrels.

It is wise to have gel cut during pre-hang this helps with making sure there is enough gel to color the entire hang.

Light Hang

During Light hang the ME is to SUPERVISE and INSTRUCT the electric crew. This means that the ME is at the hang to help, not hang. (It has been a tradition that someone brings donuts, normally the LD or ME.) A break is normally given between the beginning of hang and lunch, and one between lunch and the end of the day. Use your best judgement.

Start hang

Crew is broken into groups; each group is given a hang card and heads to the cats or to stage. Instruments are hung.

Correct way to hang instruments:

1. To know whether an instrument is hung right side up, look to see if a gel frame will fall out of the instrument.
2. C- clamp is tightened one turn past tight (they do not need to be super tight)
3. Engage safety cable.
4. Pull shutters
5. Rough focus instrument. (Direction will be indicated on the plot)

After all the instruments are hung cabling can begin. It helps to have one person reading the hang card; this person should keep track of which instruments have been cabled/circuited.

Normally circuiting is started around lunch and continues until done. The best plan is to have all the cabling done on the first day of hang. That way focus can begin the next day. However each hang is different and the ME should plan the day according to size and skill of crew.

After everything is cabled have the crew drop gel into the assigned instruments. This will help jump start focus.

Focus

During focus the ME will probably stumble across many problems. Lights will not work; this is where the ME will need to troubleshoot problems. Focus will take anywhere from a day to 3 days; it is wise to split the crew if there is a large crew. Approximately 5 crewmembers are good for focus, this way crewmembers stay busy, and on track.

Focus will end when the designers say so.

Rehearsals

It is the ME's responsibility that there are run lights for rehearsals. Run lights include quick-change areas, props tables, props cabinets, cross over area, and on the tech table.

Organize additional crews for after rehearsals; expect things to change and instruments to break. Having crews already scheduled will save time and stress on the ME. These calls can be split up between the ME and the AME to allow some off time for each.

As soon as tech rehearsals start there will need to be dimmer checks.

Dimmer checks:

Dimmer checks consist of running through each channel individually. Start at one, and continue, making sure each channel comes up and that each channel is focused correctly. Dimmer checks take anywhere from 10 minutes to a half an hour. If problems arise or instruments need to be refocused, this needs to be done before the rehearsal can start.

The stage manager schedules dimmer checks. He or she will assign a time for dimmer checks to start.

It is wise to have at least one crewmember at each dimmer check. This will help in troubleshooting. Either the ME or the AME can run dimmer checks.

After each dimmer check, approx. 5 minutes before house opens there must be a black out check.

Black out check:

A black out check is to determine that all lights that are supposed to be turned off have been. This also provides a time where it is possible to find any light spills.

To perform a black out check, all house lights need to be turned off, and go into black out. Check doors and hallway lights; if there is a light on make sure it is turned out before house opens. Once the black out check has been performed house can open.

If any problems arise during black out check or dimmer check it is the responsibility of the ME or the AME to inform the stage manager so a hold on house open can be discussed.

Strike

After the final performance, the TD will inform the ME of strike time. The electric crew must attend strike as well. Actors will also be assigned to electric for strike.

During strike the ME and AME are to supervise and instruct crews in proper methods of handling equipment at strike.

- *Cable and instruments are to be returned to their correct storage areas.
- *Barrels are to be switched back.
- *Gel and gobos are to be removed and taken back to the Light Booth.
- *Gel is to be sorted and put back in their proper slots; burnt gel is to be thrown away.
- *Any broken instruments are to be repaired and put back into storage.
- *Any damaged equipment is to be reported to the TD.

After electric strike is complete, find the TD; see if anything else needs to be done. (Do not dismiss crew)

If everything has been taken care of...wait... there is food provided for crews.

Calls Used in Electric

Heads- Anytime ANYTHING (gel, cable, instruments, rope, screw, etc.) is dropped from catwalks, ladders, genie, grid, torm, etc this is the call to be used to warn people below something is falling.

Working- When focusing, the person focusing will announce “working”, this communicates to the designer or ME that the task they have asked about is being done.

Complete- When the asked task is completed. This allows the person to move on to the next project.

Hold Please- When working, if something is asked and cannot be completed immediately, this is the proper response. Saying this tells the person asking, that you are in the middle of something, and will be right there to help. This call is also used to stop the action taking place.

Coming in- When you are dropping rope, drop boxes, or multicable in, this allows people on deck to know what is going on.

Glossary

Ante- Proscenium (AP PIPE)- Hanging position; this position is located directly downstage of the proscenium, in the air. There can be many AP pipes used in one spaces.

Barn door- An accessory for a fresnel whose movable flippers are moved into the beam to control it.

Board operator- Person who runs the lighting console during rehearsals and performances.

Boom- A vertical pipe with a heavy base. Used as a hanging position for lighting instruments.

Box boom- Area located on the house left and right walls in the Strayer-Wood house. Additional area to hang lights.

Bump- An instantaneous cue. Used in programming light board.

Cable- an electrical extension cord used to connect instruments to dimmers.

Center line- Line that runs perpendicular to the plaster line. Starting at the midpoint of the proscenium.

Channel- The number by which a unit or number of units are controlled.

Circuit- A conductive path through which electricity flows. Permanent plugs into which instruments are plugged into.

Circuit breaker- Device to protect a circuit from an overload.

Circuiting- The process of connecting a lighting instrument to its specific stage circuit.

Cut list- List that states how much gel needs to be cut to specific sizes to fit instruments used in the design.

Cyc- Cyclorama. A large drop that light is shone onto.

Cyc lights- Rectangular shaped instruments, 3 circuits. Used to create a soft edge beam. Normally different colored gel is used in each lamp to create washes.

Diffuse- To soften the appearance of light by using a translucent filter (gel)

Dimmer- The electrical device that controls the intensity of the lighting instrument

connected to it.

Double hang- To place two instruments adjacent to each other to light the same area that normally would be lit by one instrument. Normally done to allow a color shift during a scene or to provide an additive color mix.

Drop box- A small connecting strip, containing four to eight circuits, which can be clamped to a pipe or boom, this allows extra circuits to an area.

Edison plug- Everyday three pin plug, two thin vertical and one wide rounder pin.

Electric- Any pipe that is used to hold lighting instruments.

Ellipsoidal Reflector Spotlight (ERS)- Lighting instrument characterized by hard-edged light with little diffusion designed for relatively long throws. It is manufactured with fixed and variable focal length lenses the light beam is shaped with internally mounted shutters.

Filament- The light-producing element of a lamp usually made out of tungsten wire.

Flagging an instrument- While focusing, when asked to the electrician focusing the instrument will wave his or her hand in front of the beam. This is to tell where the beam is.

Focus- The location onstage in which the light is directed.

Followspot- Instrument with a high-intensity, narrow beam of light mounted on a stand that allows it to tilt and swivel so that the beam can “follow” the actor.

Front of House (FOH)- Describing lights that are hung on the audience side of the proscenium.

Gel- Sheet of thin plastic used to change the color of the beam of light.

Gel frame- Thin pieces of metal used to hold gel. Distinct size for different instruments.

Gobo- Thin metal template inserted into an ERS to project a shadow pattern of light.

Ground row- Generally low, horizontal flats used to mask lighting instruments used to light the cyc, scrim or other drops.

Hot spot- The intense center circle of light in a beam, used to focus instruments.

Instrument schedule- A form used to keep track of all the technical data about each instrument used in a production.

Iris- A device with many movable metal pieces, used in ERS to control the size of the circular pattern of light.

Lamp- The stage term for “The Light Bulb” used in lighting instruments.

Light board- Console from which the lighting cues and instruments is controlled.

Lighting area- Area on stage designated by the designer; usually 8’-12’. This area is used to decide instrument usage, and focus of instruments.

Light plot- A scale drawing that shows placement of instruments.

Master Electrician Table- Located on the HL side of the 5th catwalk. This is where ME/AME can fix broken instruments/cable. Also where broken instruments are to be placed in need of repair.

Multicable- Movable cable that carries 6 circuits instead of one, to allow the addition of circuits to an area (or batten without circuits.)

Patch- Assigning dimmers to channels in the light board.

Plano-convex lens- A lens with one flat side and one outward curving side.

Repatch- To remove one circuit from a dimmer and replace it with another. Done in the light board.

Run Light- A music stand light or other small light that is covered with a blue gel; this is used during the run of a performance for board ops and others to see what they are doing, also used on the tech table.

Shutter- Used to control the beam of light from an ERS into shapes or areas. Found in the casing of an instrument.

Spider box- Square box with female receptacles, used to connect two or more instruments on the same circuit.

Striplights- Long thin instruments with 3-4 circuits to control the individual lamps, each lamp is usually a different color, used to create washes on eyes.

Top hat- Accessory for a fresnel or ERS, used to mask the beams throw.

Torm- Area above SL/SR entrances. This is a light hang area.

Trim height- Height at which the instruments are hung (normally on an electric or baton) to be in the correct focus.

Two-fer- An Electrical Y that has female receptacles at the top of the Y and a male plug at the bottom, used to connect two instruments to the same circuit.

Work light- A lighting fixture, used to light the area, not used in performance.

The previous information available from:

J. Michael Gillette. *Theatrical Design and Production*, 4th edition. Mountain View, CA: Mayfield Publishing Company. 1999. Chapter 12: Lighting Design