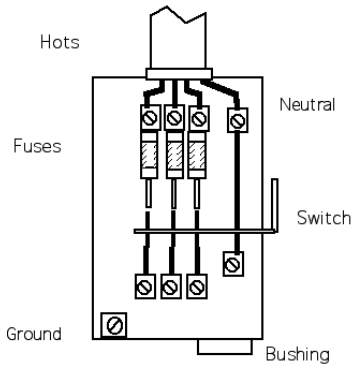
Tying in Power

When in comes to permanent commercial wiring, the Electrical Code requires that only licensed electricians do the work. However, the Code has an exemption for the Entertainment industry. "Qualified Personnel" are allowed to make TEMPORARY hookups to an electrical service. That means that a qualified stagehand can tie a portable dimmer rack to a distribution box, but cannot run permanent wires to that box OR install a PERMANENT dimmer rack. The key phrase is "Qualified personnel". Only stagehands have who been trained to do so are allowed to make hookups. The Code also grants another exemption to theatre not found in other industries. Theatre is allowed to use single conductors and connectors (that is feeder cable with Camlock connectors). But as it is VITAL that the connections be made in the proper order, only trained and qualified personnel are permitted to make those connections.

The distribution box where temporary equipment is tied in to the electrical supply is called a Company Switch, a Distro, or a "Bull switch".



Inside the distro are lugs for connecting the wires. There are three lugs for connecting the "hot" wires, each of which is connected to a fuse or a circuit breaker. They are typically referred to as Leg A, B, and C; or leg X, Y, and Z. They may be black or marked with any color EXCEPT White, light grey, or green. There is also a lug for the Neutral, which does NOT have a fuse or breaker, which MUST be marked white or light grey, and a lug for the Ground wire, which is usually bolted directly to the metal distro box. (According to Code, the box and its conduit are suppose to be grounded, but if they are not, a separate grounding wire, marked with green, must be run to the box.) There will also be an access hole through which the temporary wires are passed. The hole should have a bushing to prevent the box from cutting through the insulation of the wire.

The proper procedure MUST be followed when connecting the cables, or an unsafe situation can occur. DO NOT TAKE SHORTCUTS!

Lay out the feeder tails so they are ready to be connected. NOTE: Code requires the use tails which can be disconnected within 10 feet of the distro box). The tails should NOT be connected to the feeder cables yet.

Turn off the bull switch if it is not already off (the box will not open if the switch is on unless the box is broken). Open the box and MAKE SURE the "hot" terminals are really "dead" using a meter or tester.

Insert the Green tail wire and fasten securely to the ground lug.

Insert the White white and fasten to the Neutral lug.

Insert the Hot tails one at a time and attach them securely to the three "hot" terminals, the ones attached to the fuses or breakers. These wires are usually marked with Black, Red, and Blue. It does not really matter at this point which wire is connected to which hot terminal, but the convention is usually in the order: Black, Red, Blue.

Close the box and make sure the connectors on the tails are clear. Turn on the Bull switch.

Test each wire with a meter by carefully inserting the leads from the meter into the open feeder connectors. You should get:

- Between Neutral and Ground: 0 volts.
- Between each Hot wire and Neutral: 120 v.
- Between each Hot wire and the Ground: 120 v.
- Between each Hot and any other Hot: 208 v.

If you get ANY OTHER READINGS, check your wiring again!

If everything checks OK, turn off the Bull switch and inform the road electrician.

When the feeder cables are connected to the dimmer rack or sound distro, and when the feeders are connected to the tails, **CONNECT THEM IN THE SAME ORDER!**, That is: **first Green, then White, then the three Hots.** Connect them with the power turned off but always treat them as though the power is on anyway. Someday it may be!

Also, **NEVER PLUG THE HOTS IN FIRST!** The equipment may try to close a circuit through two hots and put 208 v. through a circuit meant for 120 v., and destroy the equipment, or worse yet electrocute someone!

Many rigging motors are three-phase motor, using three hots and NO neutral. Occasionally a motor may run backwards. In that case, simply swap any two hots and the motor will run the other way.