

WEEK 4

2-16-17

# LIGHTING CONTROL

THE HISTORY OF DIMMERS

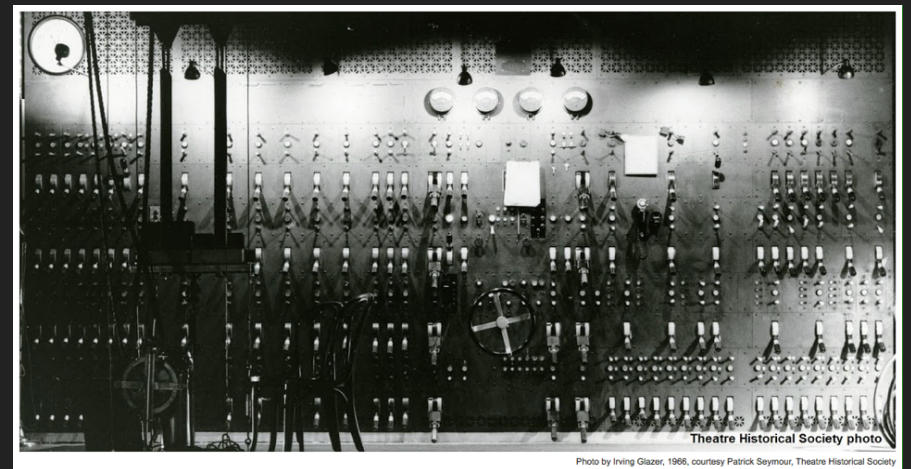
## THE HISTORY OF DIMMERS

- ▶ Dates back to the battle between Direct Current and Alternating Current
  - ▶ Direct Current - electricity that flows in only one direction, for example a battery
  - ▶ Alternating Current - electricity that periodically switches which direction it is flowing, for example the electrical socket in your house
- ▶ A DIMMER is a control device that is used for adjusting the intensity of any lights that are contained in a circuit.
- ▶ Lighting Fixture -> Circuit -> Dimmer -> Light Board

THE HISTORY OF DIMMERS

## RESISTANCE DIMMERS

- ▶ Powered by Direct Current
- ▶ Most common kind of dimmers in Broadway theaters until Broadway gave in to Alternating Current
- ▶ Resistance dimmers were placed in a large rack with control handles connected directly to the dimmer
  - ▶ Commonly called "Piano Boards"
  - ▶ These racks needed multiple people, sometimes one inventive person, to turn the lights on and off to create looks on stage
- ▶ To regulate the power, electrical energy was converted into heat
- ▶ Needed a minimum amount of electricity, known as a load, to dim a lighting fixture fully out so electricians would create "ghost loads" with other fixtures or appliances



Theatre Historical Society photo  
Photo by Irving Glazer, 1966, courtesy Patrick Seymour, Theatre Historical Society

## AUTOTRANSFORMER DIMMERS

- ▶ Powered by Alternating Current
- ▶ Did not require a minimum load to dim fixtures completely out
- ▶ Did not need to transform electrical energy into heat in order to work
- ▶ Were smaller and more compact
  - ▶ Alternating Current pumps more electricity through a smaller amount of cable than Direct Current

## SILICON CONTROLLED RECTIFIER (SCR)

- ▶ First solid-state dimmer
  - ▶ This allowed the dimmers to be stored in separate rooms away from the stage
  - ▶ They could also be controlled by a Light Board that sent out a small electrical signal
- ▶ Individual dimmers are much smaller and module (small independent units that create a larger system)
- ▶ Stored in a dimmer rack that create a fair amount of noise

## DIMMING DISTRIBUTION

- ▶ 5 Key components
  - ▶ Lighting Control Console, or Light Board
    - ▶ Sends a signal out containing information such as intensity levels and color data
  - ▶ Digital Cable or Wireless device
    - ▶ Carries the signal out of the Light Board
  - ▶ Dimmers
    - ▶ Control the electrical energy sent to conventional lighting fixtures
  - ▶ High Voltage Cable
    - ▶ Carries the appropriate amount of electricity
  - ▶ Electrical Cable inputs, or Circuits
    - ▶ Where you plug the lighting fixture in

## CENTRALIZED DIMMING SYSTEMS

- ▶ All of the dimmers/dimmer racks are in one central location
- ▶ Electrical power lines are run from the dimmer room to each lighting hanging position to create Circuits
- ▶ Circuits can be housed in
  - ▶ Plugging strips, known as Raceways, that are attached to each Front of House position and the Electrics
  - ▶ Drop Boxes that are lowered from the ceiling and can be placed anywhere their cable can reach
  - ▶ Wall outlets
  - ▶ Floor Pockets located in various positions on stage, mostly Stage Left, Stage Right, and Up Stage
- ▶ More recently DMX, Wi-Fi, and Ethernet cable and outlets have also been used to help distribute information sent out of the Light Board

## DISTRIBUTIVE DIMMING SYSTEM

- ▶ Dimmers are placed near the lighting fixture they are controlling
- ▶ Completely self contained with internal protective devices, such as circuit breakers
- ▶ Eliminate the need for high powered circuits
- ▶ Some are small enough to fit within an individual fixture
- ▶ They use less power per dimmer than a centralized system but you can only use one fixture per dimmer

## PRESET BOARDS

- ▶ Multiple rows of faders that sent a low energy signal to the dimmers
- ▶ Each row represents a single scene or lighting cue
- ▶ You set one row of faders and while that row is live on stage you set the next row for the next lighting look
- ▶ To switch from one scene to the next you use a master crossfade fader that switches which row gives out the signal to the dimmers
- ▶ Sizes ranged anywhere from two scene board to twenty scene boards
- ▶ Since each scene must be set manually there is a chance for human error



Two Scene Preset Board  
ETC Smart Fade 12 Channels

## MEMORY LIGHTING DESKS

- ▶ Computerized lighting control first developed in the 1970's
- ▶ Eliminated human error in setting up lighting cues
- ▶ So since cues no longer need to be manually set they can be run at a rapid rate and look exactly the same for every performance
- ▶ Shortly after computers were introduced to control, computers were introduced to lighting fixtures themselves
  - ▶ And thus first automated moving lights were created in the 1980's
- ▶ Since then Lighting Control Consoles have become more advanced and sophisticated as technology has advanced

Two Scene Preset Board  
Strand Lighting 48 Channel

