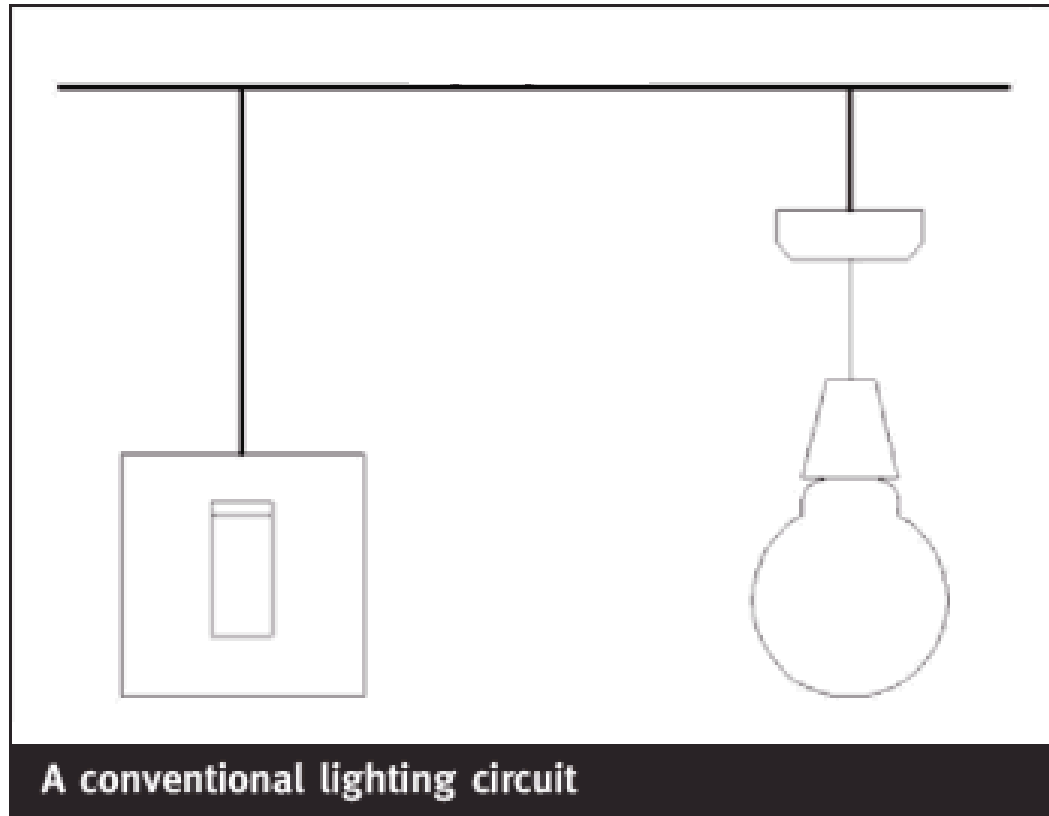


Components of a Control System



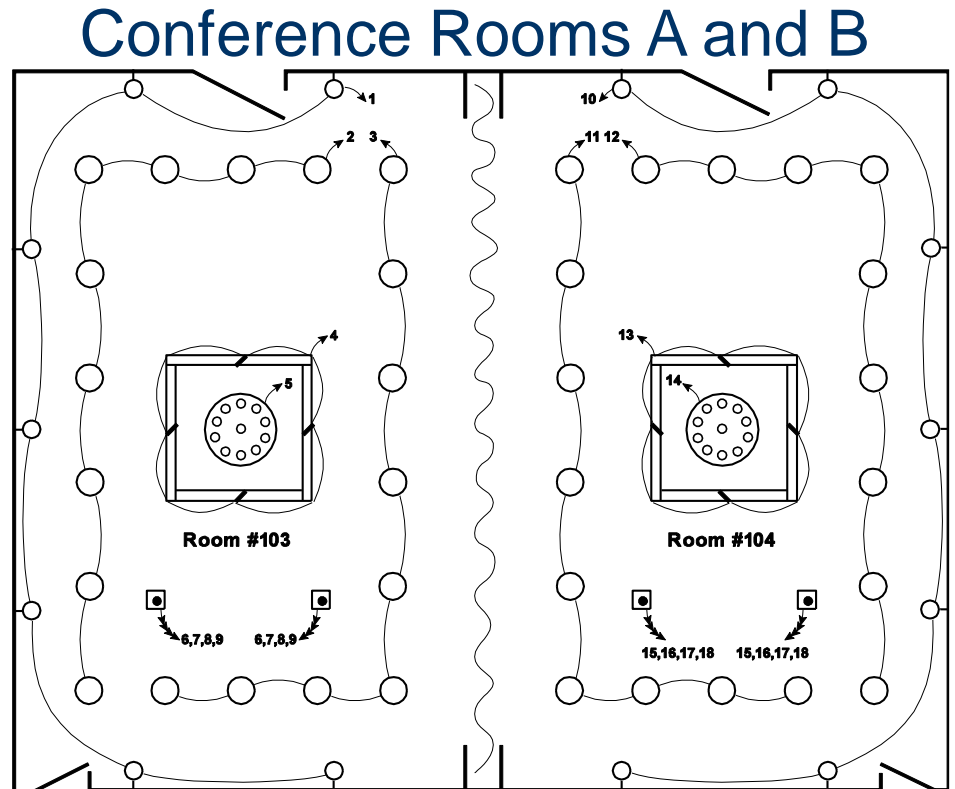
Learning Objectives

At the end of this program, participants will be able to:

- Identify the basic components of a lighting control system
- Describe the basic functions of lighting control and how they apply to designing a space beyond the basic light switch
- Recognize the need for a simple control management program

Definition of terms:

- Dimmer
- Relay
- Zone
- Channel
- Trigger
- Presets/Scenes
- Room Combine



Control Stations



- Buttons or keypad
- Faders/sliders
 - single channel
 - multi-channel
 - functionality
- Touch panels
- Wireless remotes



Central Processor

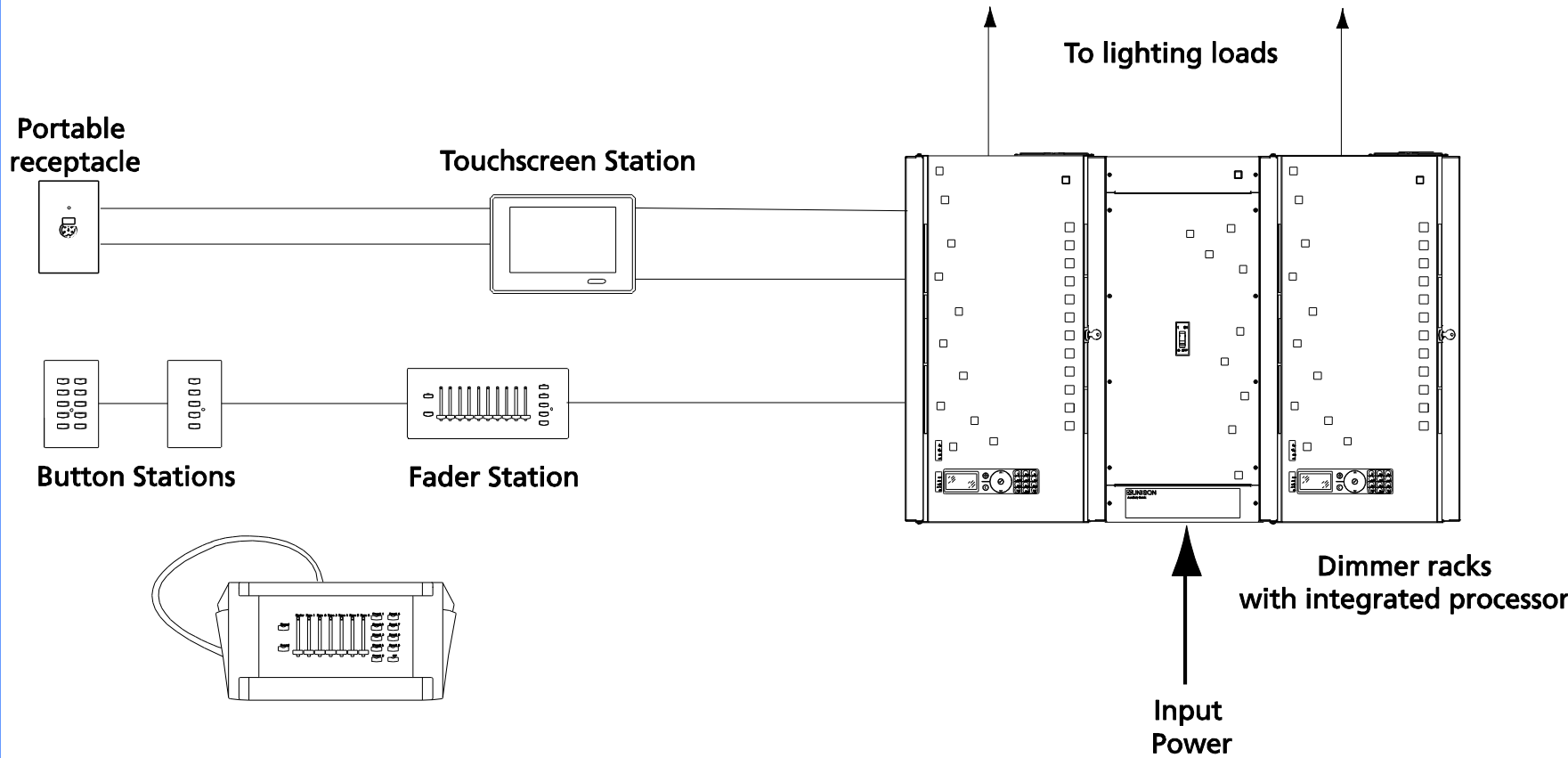
- Ability to create and store scenes, events, timelines...
- Allows complex, conditional programming
- Allows inputs from external sensors and interfaces (contact closures)
- Allows for priorities to be set
- Communication between the processor, control and dimmers or switches may vary

Communication - Control Protocols

- Analog
- DMX
- Open Networks
 - Ethernet
 - LON
 - KNX
 - DALI
- Closed or Proprietary



Typical System Riser



Advanced Control: Partitioning or Room Control

- Take Control and Lock Out
- Priorities
 - LTP (latest takes precedence)
 - HTP (highest takes precedence)
- Open/Close commands
- Room Combine

Advanced Control: Programming Events/Triggers

- Chronological or Real Time
- Astronomical
- Occupancy/Vacancy
- Daylight
- Emergency or alarm interface
- BMS (Building Management System)
- Or any combination thereof...

Advanced Control: Occupancy Sensors

- **Occupancy:** The sensor sends a trigger the control system when the sensor detects the room is occupied. The sensor sends a second trigger to the control system when no occupancy is detected. The control system acts upon both triggers
- **Vacancy:** The sensor sends a trigger the control system when the sensor detects the room is occupied. The sensor sends a second trigger to the control system when no occupancy is detected. The control system only acts upon the “no occupancy” trigger.

Advanced Control: Daylight Harvesting

- Combine a daylight sensor with a control system and take advantage of ambient light through windows to maintain your lighting environment
- When the sun is bright the daylight sensor can lower the level of its connected loads, maintaining your preset luminance level and effectively reducing your energy consumption.

Advanced Control: Building Management Systems

- Commercial buildings have a number of subsystems — lighting, security, power, safety, and HVAC — that are crucial to a well-run building. Many of them operate separately or can be connected through a series of gateways to a single interface.
 - lower installation and lifecycle costs
 - greater expandability and flexibility at a lower cost
 - vastly improved energy efficiency

Advanced Control: Integrated Systems

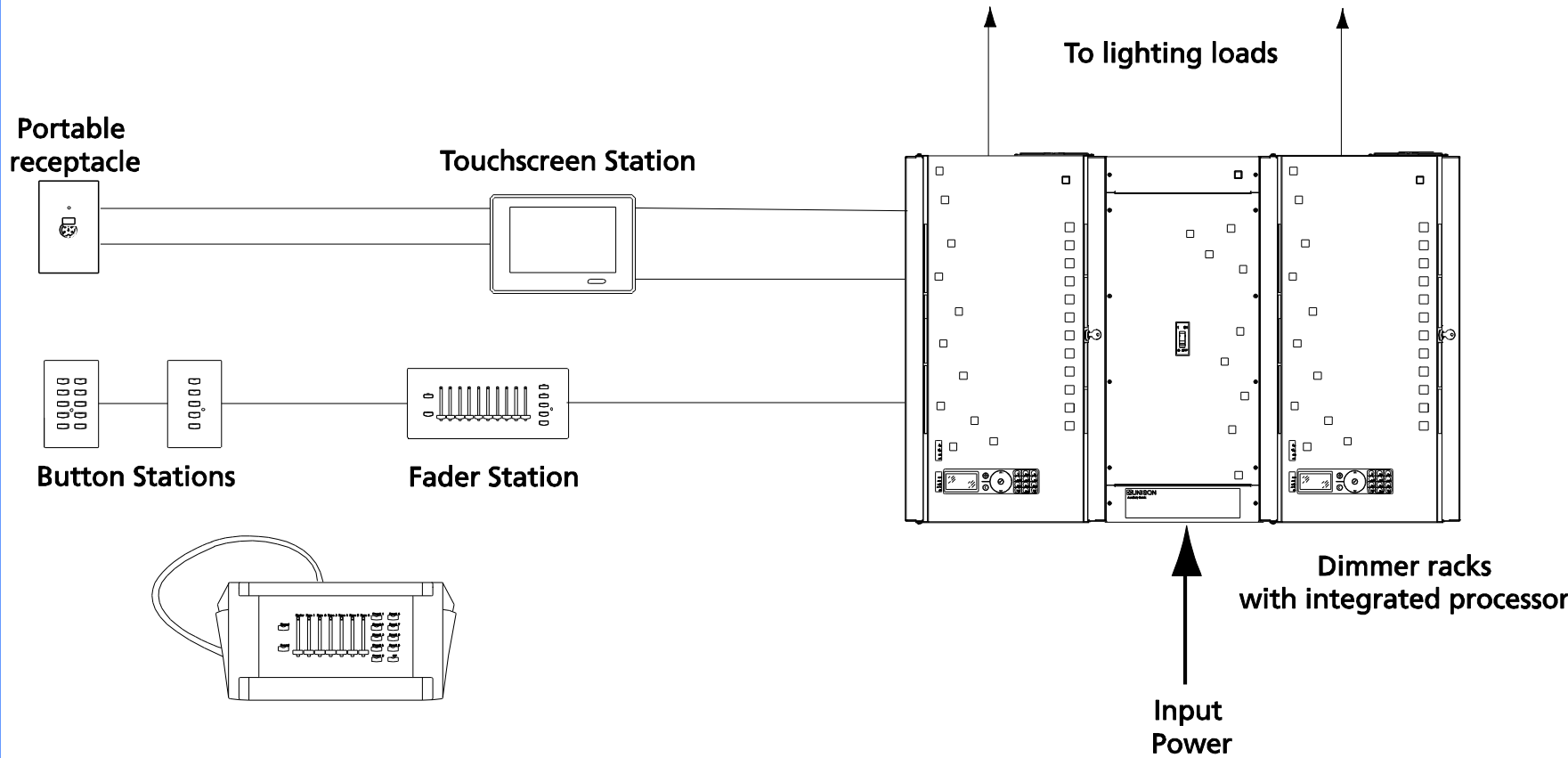
- What about integration to Entertainment or “Arch-ertainment”?
- Permanent or Temporary control
- Day to day operation versus one-day only special event
 - Think Convention Center! 😊
 - So you want a few moving lights...

Theatrical Control

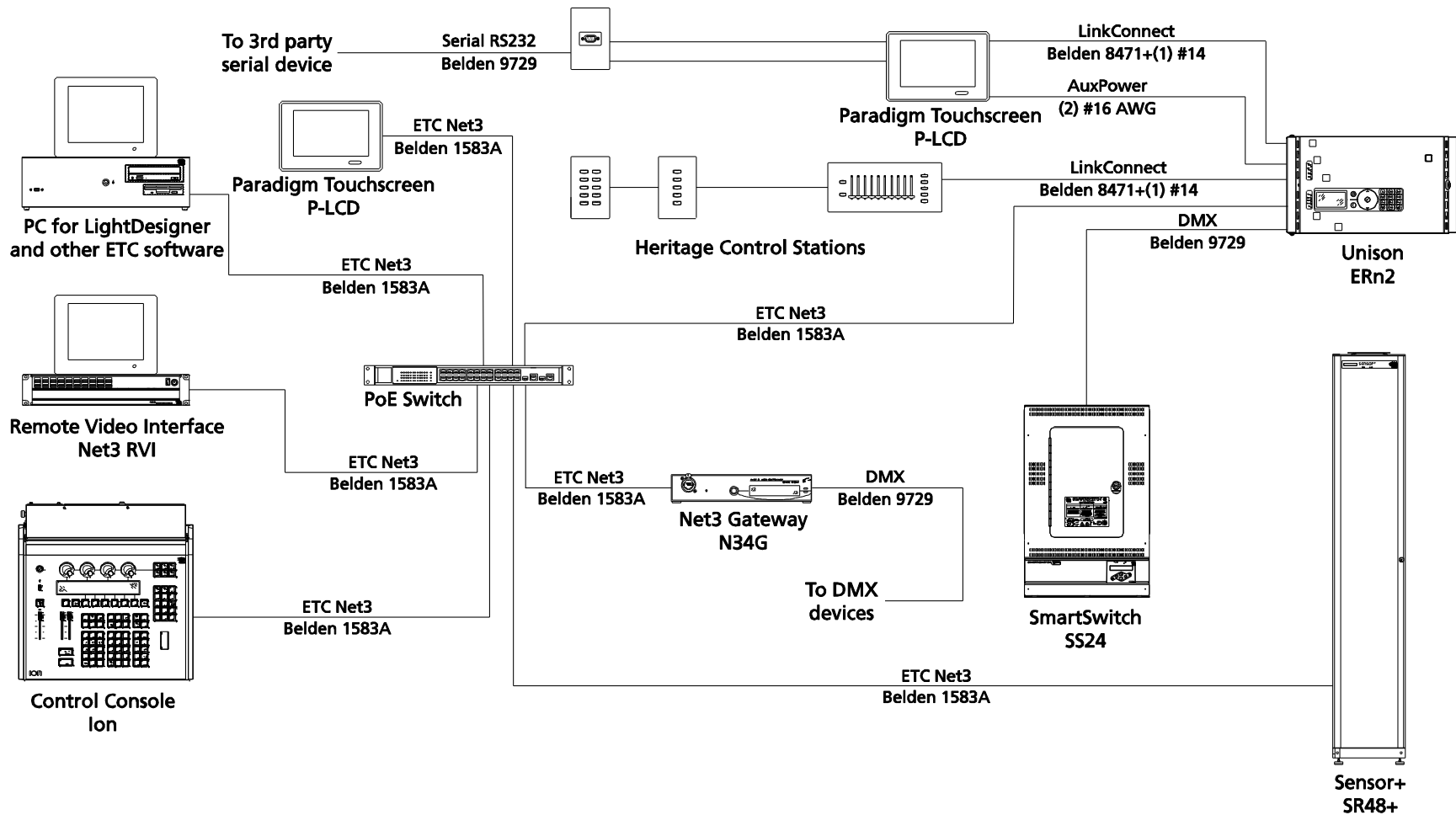
- Manual control - faders
- Computer style - buttons
- Ability to control automated or moving lights efficiently – knobs, wheels, touch screens



Typical System Riser



Advanced System Riser



Components of a Control System

Questions?