dynalite application guide • lecture theatre

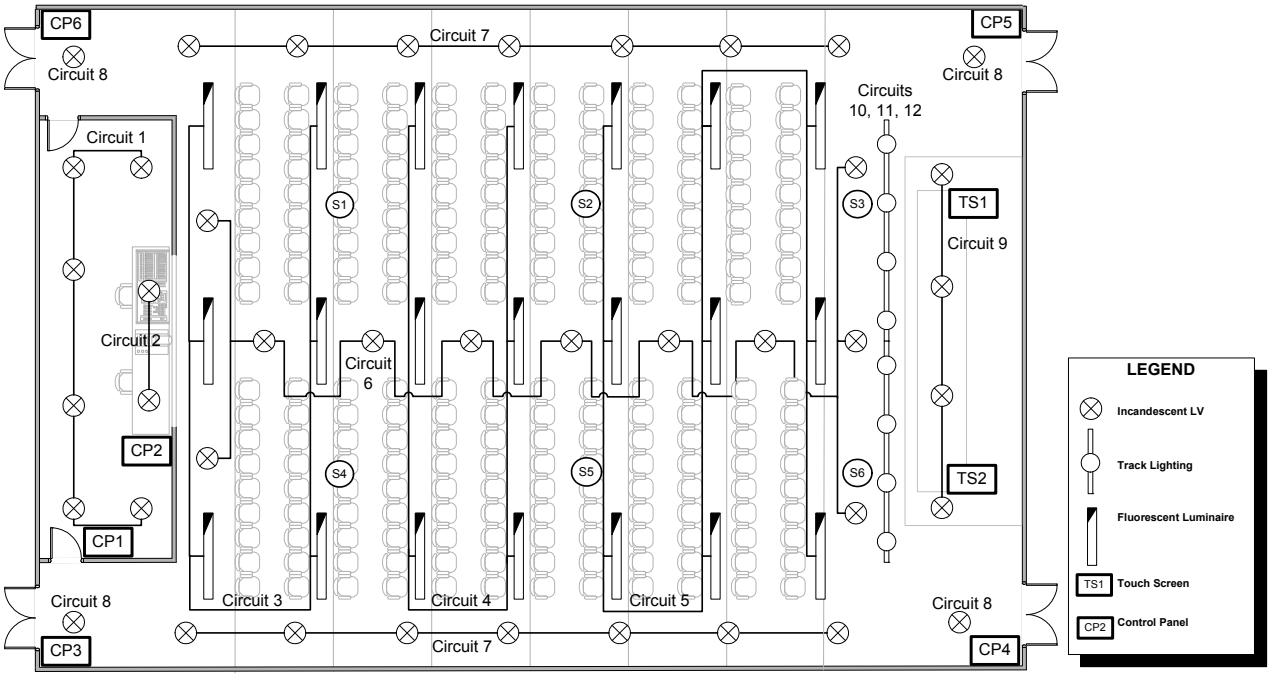
This application guide contains information on:

- Control of workspace and presentation lighting
- Control of a data projector via RS232
- Control of audio equipment via infrared (IR)
- Integration with a building management system (BMS) using the LON protocol
- Occupancy sensing
- Infrared (IR) remote control

In a lecture theatre, a flexible control system is an essential part of the lighting. Lecture theatres need to accommodate a wide range of uses and, as a result, the demands on the lighting control system in this type of application are surprisingly complex. The control system must maintain the most comfortable lighting levels for a wide range of tasks, adapt to a number of room combinations, provide for safe egress in case of an emergency, interface with other systems such as AV and BMS and, of course, maintain the aesthetics of the room and present the best possible appearance at all times.

Users often leave lights on when vacating the space, so it is desirable for the control system to turn off lighting when the room is unoccupied. In a university or similar environment, there is often a BMS responsible for access control and HVAC. To optimise running cost and reduce energy consumption, the lighting control system should notify the BMS if the room is not in use and the air-conditioning not required.

typical layout



system outline

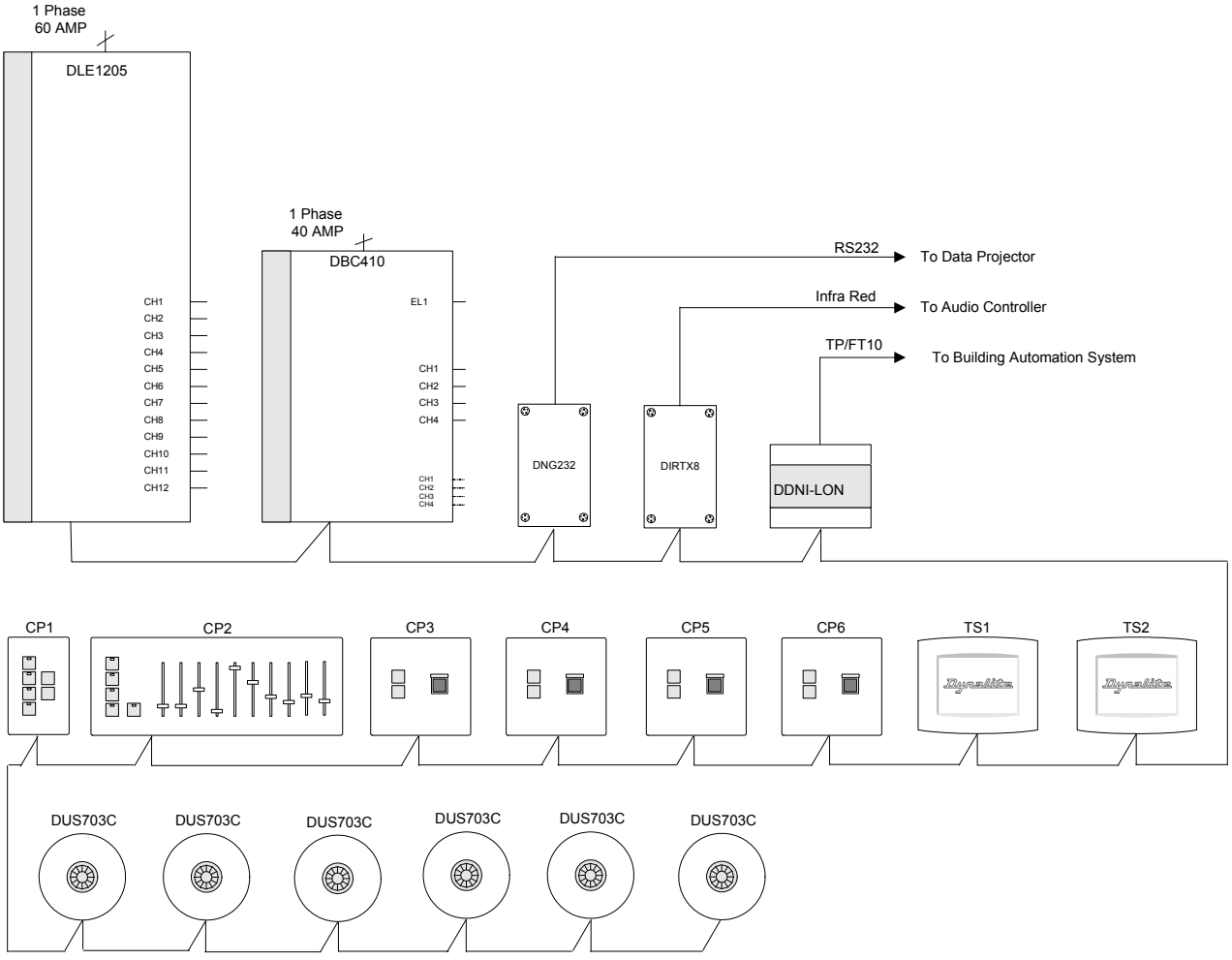
The lecture theatre would typically incorporate a projection room where data, video and other audio-visual equipment would be housed. The lighting within the projection room (circuits 1 & 2) comprises narrow beam downlights, which prevents distracting light spills into the lecture theatre during presentations.

Within the body of the lecture theatre, the primary lighting would be provided by recessed fluorescent luminaires (circuits 3,4 & 5) fitted with electronic dimmable ballasts. There are a number of types of dimmable ballasts including 2-Wire, 1-10V, DSI & DALI. Dynalite controllers support all of these control methods. In this case, DSI ballasts are used, as the individual control capability of DALI ballasts is not needed. Control of the fluorescent luminaires is divided into three circuits to cater for the theatre being occupied by varying group sizes and to allow for delivery of even levels of light to the seating if the ceiling is raked.

There are a number of incandescent low voltage circuits in this design; downlights (circuits 6, 7 & 8) provide safe lighting levels for walkways and doorways. Separate control of the podium area downlights (circuit 9) allows for either AV projections or whiteboard presentations. Track spotlights (circuits 10, 11 & 12) allow for tightly controlled lighting of the presenter at a variety of lectern positions.

Sensors (S1-S6) are placed over podium and seating areas to receive signals from a hand-held infrared remote control and to notify the control system when the space is unoccupied.

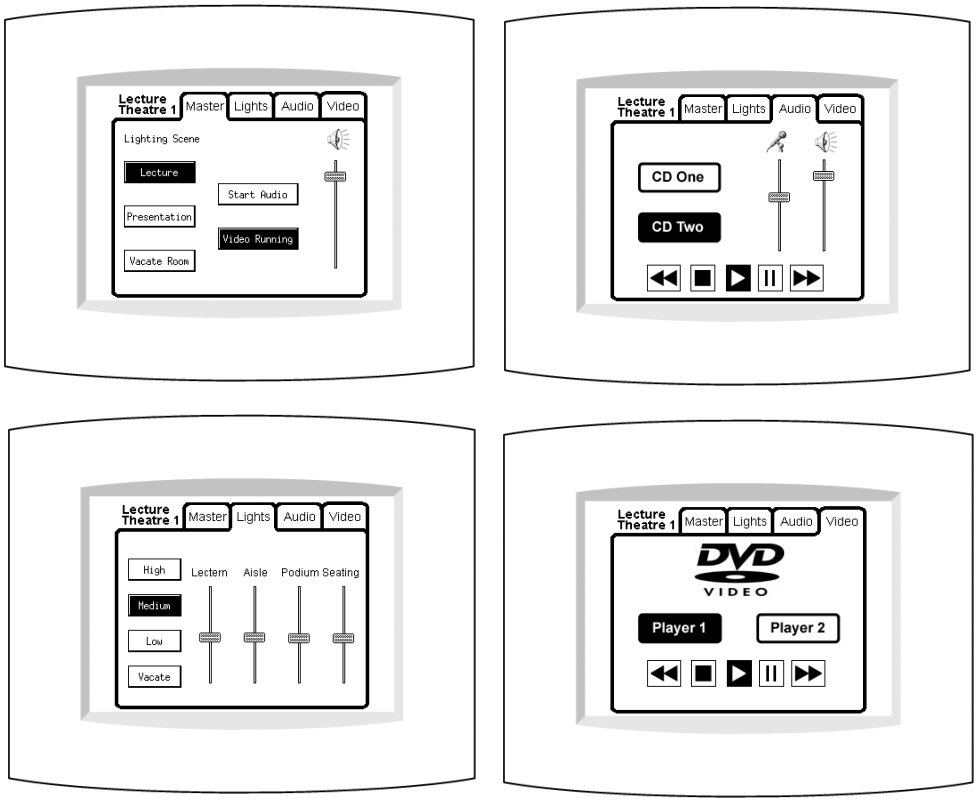
the equipment



the system in operation

Lectern Touch Screens

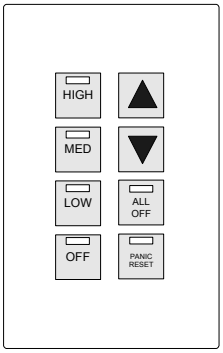
The lectern touch screens allow complete control of the system. The panel allows selection of the preset lighting scenes, which have been programmed using CP2, as well as individual control of each circuit. The system will be configured to 'know' which of the lectern positions is in use and dim up the appropriate channel of track lighting. The touch screen's main menu allows navigation to three sections; Lighting, Audio & Video, as well as preset scenes that provide operation of all three services from a single action, eg a 'play DVD' button would simultaneously; dim the lighting, turn on the projector and select the DVD player as the source, configure the audio routing system to use the DVD player as the source and select the main speakers at the front of the room at a default volume level and play the currently loaded DVD.



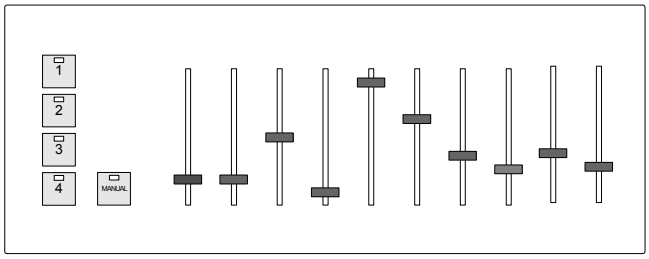
Sample Touch Screen Pages

Control Panels

CP1 is located next to the door in the projection room and controls the lighting within the room. It selects the various preset levels needed for both set-up and operation of the room. 'UP' and 'DOWN' keys allow fine adjustment. An additional button manually selects 'ALL OFF', which switches all lights off in the control room and in the lecture theatre, as well a triggering a transmission to the BMS, which indicates that the room is no longer in use. A panic reset button resets the panic condition on CP3-CP6.



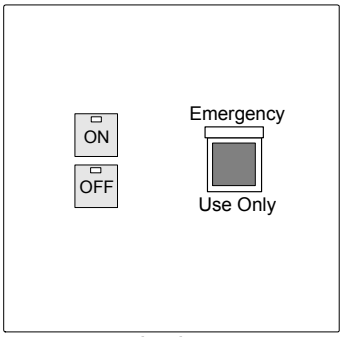
CP1



CP2

CP2 is located in the projection room and controls the lighting in the lecture theatre. It includes manual slider controls and provides one of the various methods by which preset scenes can be programmed in Dynalite systems, having the ability to both program and recall presets. The preset scenes are recalled from TS1 and TS2 touch screens at the two lectern positions in the front of the room. This panel includes a manual slider fader for each lighting circuit. This type of panel provides a very simple method for non-technical users to set up lighting presets. The slider faders also provide for 'live' adjustment of individual circuits. To program a preset, the operator first presses the 'MANUAL' button, adjusts the slider faders until the desired lighting settings are achieved and the presses and holds down the preset button to which the new settings are to be saved. Dynalite call this programming method 'hold-down programming'. Alternative methods for programming presets include PC software, LCD touch screens, push-button programming panels and plug-in portable programmers.

CP3-CP6 are installed adjacent to lecture theatre doors. They have two buttons, one to select the 'ON' preset and the other to select the 'OFF' preset. From these control panels, the ON scene would have a relatively fast fade time, say three seconds. However, the fade time for the OFF scene would be in the region of 15-20 seconds, ensuring that the person operating the control panel has adequate time to leave the room before the lighting fades out. All four of these control panels would work in parallel and all would include panic switches. To reset the panic condition, a 'RESET PANIC' switch is provided on CP1.



CP3-CP6

Sensors

Dynalite DUS703 360° universal sensors incorporate motion detect, infrared receiver and PE cell capability (in this application the PE function would not be used). The motion detect function is used to turn lighting off after a predetermined period of no activity, ensuring that lights are not left on unnecessarily, and to notify the BMS that the room is no longer occupied. The IR receive function is used to recall preset scenes by a roving presenter with the hand-held remote.

Gateways to Other Systems

data projector

Control of the data projector is implemented using a DNG232 Network Gateway configured to ASCII mode. This allows bi-directional communication with the projector using text, via an RS232 port. Other methods of interfacing include using a DIRTX8 infrared transmitter for projectors that are IR enabled.

audio controller

Integration to audio equipment is implemented using a DIRTX8 Infrared Transmitter. This is a convenient and cost effective method of integration as most commercial and domestic AV products are supplied with an IR port. The DIRTX8 has eight outputs, more than meeting the requirements of a typical application. It is capable of replaying 'macros' of IR commands with appropriate delays and conditional logic in between each step of the macro. In addition to the supplied library of IR commands, the DIRTX8 has an inbuilt learner to record IR commands.

Other methods of interfacing with audio controllers include using a DNG232 Network Gateway for equipment that has an RS232 port. Some AV controllers have an RS485 port, which allows direct connection to the Dynalite RS485 network. Most leading AV control systems include libraries that enable control of Dynalite systems.

building management system

Integration with the BMS is achieved with the DDNI-LON Network Interface. This device translates Dynalite's DyNet protocol to LON® protocol, using the standard lighting SNVTs (standard network variable type). Whenever the door entry panels are used to switch the lights on, or the motion sensors detect motion or any absence of motion, the DDNI-LON notifies the BMS, which in turn sets the air conditioning to the appropriate state. There are several other common methods of interfacing with a BMS, ranging from simple interfaces such as dry contact closures, to high-level interfaces, such as DDE or DCOM over TCP/IP.

Load Controllers

The controllers are a DBC410 (4 x 10A ballast controller) and DLE1205 (12 x 5A leading edge dimmer). For this installation, controllers with individual circuit breakers on each circuit have been selected. This is to allow for simplified connection and testing of emergency lighting systems (see separate Technical Guide: Emergency Lighting).

Load Schedule

Load Controller	Cct Capacity	Drawing Designator	Fixture	Qty	Load
DLE1205 Box 1 C1	1200W	Circuit 1	LV Downlight 50W	6	300W
DLE1205 Box 1 C2	1200W	Circuit 2	LV Downlight 50W	2	100W
DLE1205 Box 1 C3	1200W	Circuit 6	LV Downlight 50W	11	550W
DLE1205 Box 1 C4	1200W	Circuit 7	LV Downlight 50W	14	700W
DLE1205 Box 1 C5	1200W	Circuit 8	LV Downlight 50W	4	200W
DLE1205 Box 1 C6	1200W	Circuit 9	LV Downlight 50W	4	200W
DLE1205 Box 1 C7	1200W	Circuit 10	Track		
DLE1205 Box 1 C8	1200W	Circuit 11	Track		
DLE1205 Box 1 C9	1200W	Circuit 12	Track		
DLE1205 Box 1 C10	1200W	Spare			
DLE1205 Box 1 C11	1200W	Spare			
DLE1205 Box 1 C12	1200W	Spare			
DBC410 Box 2 C1	2400W	Circuit 3	Fluorescent 2 x 36W	6	432W
DBC410 Box 2 C2	2400W	Circuit 4	Fluorescent 2 x 36W	6	432W
DBC410 Box 2 C2	2400W	Circuit 5	Fluorescent 2 x 36W	9	648W
DBC410 Box 2 C4	2400W	Spare			