

This application guide contains information on:

- Basic lighting control functionality
- Integration with air conditioning
- Integration with security systems
- Integration with audiovisual systems
- Control of equipment such as blinds, ceiling fans, louvres, irrigation systems and floor heating
- Remote control through hand held control units, the Internet or over the telephone

The typical smart home comprises several integrated systems transparently working together to provide convenience and security to the homeowner.

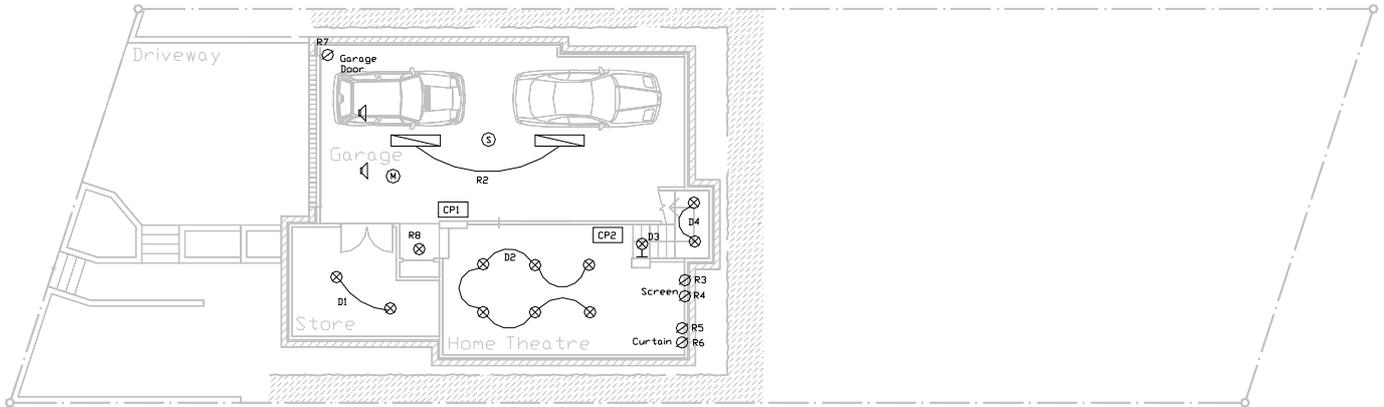
Some of the resulting functionality includes:

- Different lighting scenes and moods like WELCOME, GOODBYE or GOODNIGHT that can be activated from any keypad, wired or wireless touch screen or remote control
- Control of many different lighting sources such as LED, incandescent or fluorescent lamps
- Control of lighting, music and air conditioning on the same lighting control keypad
- The drawing of blinds and extinguishing of lights to occur when the security system is armed
- The activation of lights and music to welcoming levels in desired areas, when the security system is disarmed
- The activation of key internal lights, blinds opened and keypads frozen while the external lights flash on and off to attract attention, if the PANIC button is pressed or the security system is triggered
- Different profile actions to occur when the security system is disarmed by different members of the family
- The home to appear occupied when nobody's present through the activation of lights and other equipment at different times of the day or at random
- Floor heating, irrigation systems and pool plant to be controlled automatically through timers
- Monitoring the home through cameras over the Internet
- Telephone dial-in capability to control the lighting, air conditioning or even access into the home
- Activation of all egress pathways when smoke sensors have been tripped in addition to initiating the PANIC alarm on the security system
- Allowing irrigation systems to operate only when the soil is too dry, regardless of any ongoing timer program
- Turning lights on when presence is detected and turning them off after a nominated time of no presence
- Control of other equipment such as garage doors, ceiling and exhaust fans, heated towel rails or external louvers from the one lighting control keypad
- Cinema style control in the Home Theatre room when the MOVIE button is selected: sequential activation of the projector, dimming the lights over time, drawing open the drapes as the projector screen lowers into position and selecting the appropriate movie title or sound track on the DVD player

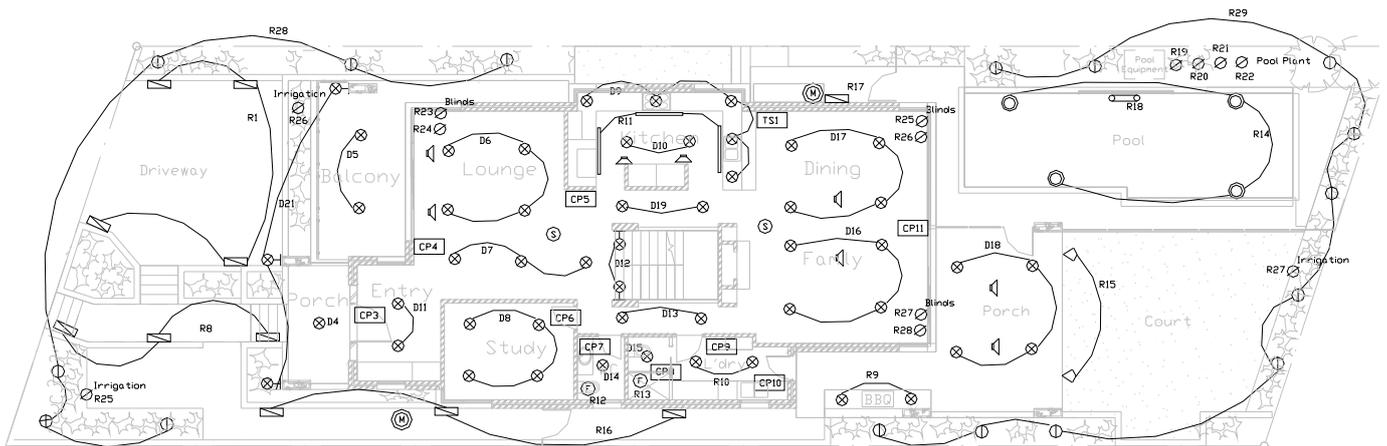
The Dynalite control system interfaces to the above equipment through common interfaces such as RS232, RS485, Infra Red and TCP/IP (Ethernet) through the DNG232, DNG485, DIRTX8 and DNG100BT respectively. Simple equipment such as floor heating, irrigation solenoids and air conditioning is usually controlled through relay or contact closure respectively.

typical layout

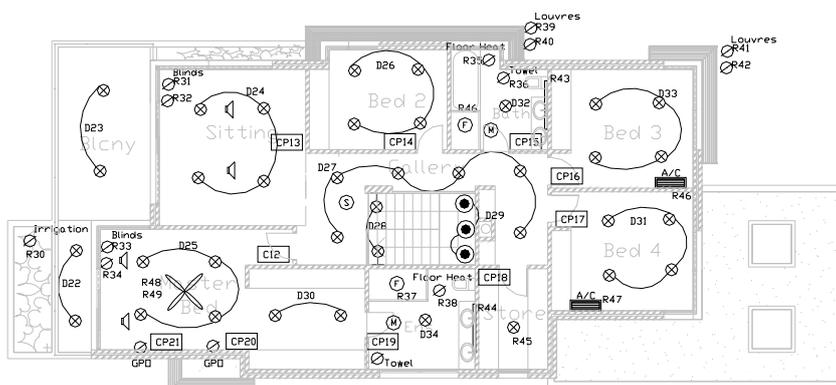
Lower Ground Floor



Ground Floor



First Floor



LEGEND

	50W wall uplight
	TS Linear Fluorescent 18W
	PAR38 100W spotlight
	100W immersed spotlight
	15W PL brick light
	External motion sensor
	10W PL external ballast
	2 x 18W TF linear fluorescent
	RGB LED downlight
	50W LV downlight
	Relay channel - Dim/DFF control
	Air Conditioning
	Audio speaker
	Lighting Control Panel
	Touch Screen
	Exhaust Fan
	Motion sensor
	1 x 18W TS Linear Fluorescent
	Ceiling Fan

system outline

All the main living areas such as the Living, Dining, Bedrooms and Bathrooms have dimmed lighting. Light fitting numbers are kept low (around 5-6 low-voltage down lights per group of lights). Smaller groups allow for more effective and efficient lighting design and control (i.e. D1, D2 etc), in addition to facilitating the use of the DIN series controllers. The Dyalite DIN series controllers occupy a smaller footprint and require less real estate in distribution boards. The home's distribution boards can be found on the ground floor and the first floor, in well-ventilated areas. This is done to minimize cable runs. On-Off lighting control is applied in utility areas such as the Laundry Storeroom and Garage (i.e. R1, R2 etc.). Lighting control panels are placed in each room (i.e. CP1, CP2 and CP12). These panels allow the homeowner control for such functions as "PANIC" and "GOODNIGHT". Other panels such as those by the front door (CP6) allow system wide presets such as "GOODBYE" and "AWAY". The latter preset emulates occupancy when nobody's home - as a preventative security measure. The home also has LED lamps in the stairwell and pool areas for color changing effects and general mood setting.

In addition to fundamental lighting, the Dyalite system also controls other equipment such the ceiling fan in the master bedroom, bathroom run-on exhaust fans, garage doors, blinds and external louvers. The timers within the Dyalite system allow periodic operation of pool cleaners, floor heating and heated towel rails. Sensors in the bathrooms activate lights when someone enters the space then turn everything off after a nominated period of vacancy, including any heat lamps or exhaust fans that were left running. Nominated sensors determine the amount of light present in the home and control the external louvers and blinds to ease the burden on the air conditioning system.

The Dyalite control system also interfaces to the security system so that all the internal lights are activated upon alarm or duress and all external lights flash periodically to attract attention from passers by. Furthermore, all controlled blinds and louvers are opened allowing greater visibility of the inside of the home – from the outside. In addition to this, all internal lighting control panels are frozen – preventing lights from being switched off. Strategically placed PANIC buttons are configured on the lighting control panels. When pressed for a few seconds these allow the Dyalite system to flag a duress alarm to the security system. The Dyalite security interface also allows personalized settings to be applied throughout the home upon security system disarm by different family members. For example, a family member will disarm the security system with their designated PIN code at the front door location. A pathway of dimmed light illuminates the way to the first floor bedrooms (D11 at 80%, D7 at 80%, D12 at 95%, D27 and D28 at 80%). If the sensor in the bathroom detects that ample light is present then only the staircase lights (D12 at 80%) are activated to minimize the use of energy and exploit ambient daylight entering the home. At night, in addition to the above, the backyard lights (D18, R15) are also activated to provide a greater sense of security and discourage any would be intruder. This also allows the darkest corners of the home to be lit and inspected at a glance. The Dyalite system also communicates with the multi-room audio system, channeling their favorite music track to the lounge and first floor sitting rooms only. The ducted air-conditioning system is also instructed to commence operation at a pre-programmed set point. Different set points are chosen for different times of the year.

Upon arming the security system, the Dyalite system immediately activates a "lived-in" profile sequence of events. This activity activates lights and audio in different parts of the home, at nominated (or random) times, making the home appear occupied from the outside.

The smoke sensors throughout the home are also interfaced to Dynalite control system. As these sensors are physically interconnected, a trip on any one sensor necessarily trips all others, which in turn also activates the PANIC scene as described above.

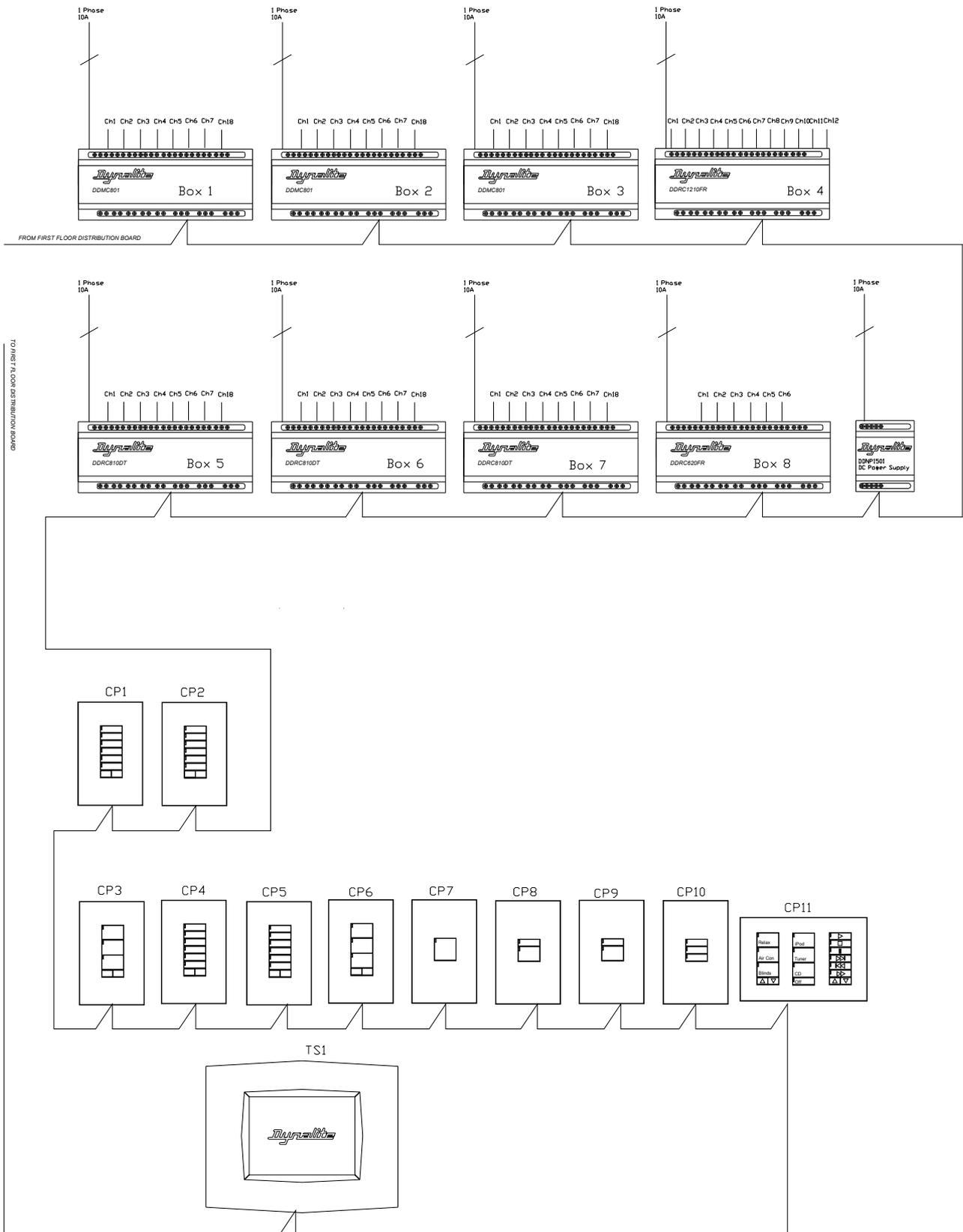
The irrigation solenoids are also controlled by Dynalite relays at different times of the day and different seasons from the built-in 365-day timer. When the third party moisture sensor detects the presence of adequate moisture in the soil, the timer program is overridden and the garden is not watered.

A third party wireless touch screen allows each family member complete control over the Dynalite system as does the Dynalite wall touch screen. These units typically offer Ethernet connectivity, allowing their pages to be displayed not only in the home through a wireless router yet also over the World Wide Web. Different control actions can be sent from these units such as control of light levels in different rooms, audio source selection, timer programs for floor heating and irrigation systems. In addition to this, web cameras can also be incorporated to allow viewing of different areas around the home. Many of these audio control commands can be replicated on the same Dynalite lighting control keypads in each room in addition to air conditioning settings.

The home is also equipped with SMS dial-in control that enables family members to dial-in codes from a mobile telephone. This will activate different parts of the control system. For example, when "ACON" is SMS'ed to the Dynalite control system, the air conditioning is activated, in addition to all blinds being drawn closed. After this activity has been completed a reply SMS is received to confirm the action. Other events such as ALARM or PANIC will make the Dynalite system transmit the message "SECURITY EVENT" to the homeowner's mobile phone, provided it's within range. Upon receiving this message, the homeowner can access the home's website and inspect all activity throughout the home via the connected web cameras. Furthermore, the system can then be instructed to commence recording any intrusion activity on the connected DVR, via this web page.

The home theatre room has audiovisual devices such as a DVD player, projector and audio amplifier/receiver. The Dynalite system can co-ordinate the operation of these devices through the press of one MOVIE button on the lighting control keypad in that room. This will commence dimming the lights (D2 to 5% over 30 seconds) to a low level. The projector screen is then controlled to lower into position, behind the closed curtains (R3, R4). When the screen is in position, the curtains are controlled to open (R5, R6). All along, the projector has been activated and warming up. As the curtains are drawn, the opening credits and title of the selected movie appear on the lowered screen as the Dynalite system has instructed the DVD player to start playing its disc in addition to instructing the receiver to channel the DVD source out into the speakers in that room. When the movie concludes, the homeowner presses the END button either on the lighting control keypad or the wireless touch screen to initiate a reverse sequence of the above events. The third party universal remote control can also be used to achieve this and other functions as it too can execute similar functionality. All the Dynalite lighting control keypads and sensors are equipped with infrared receivers so that any sequence of codes transmitted from the universal remote are received and acted upon in the same way as a button press.

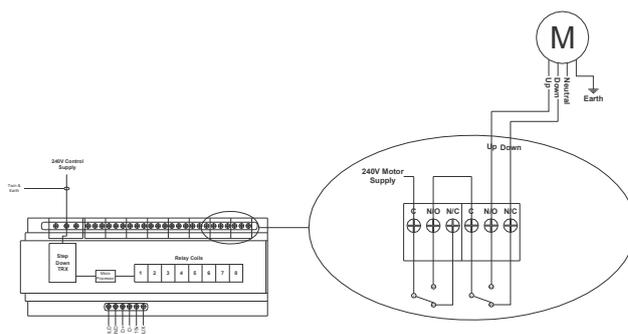
the equipment (ground floor distribution board only)



the system in operation

The lighting control panels around the home provide control for the lighting groups and other relayed equipment in each immediate area. The touch screens are capable of controlling every area around the home.

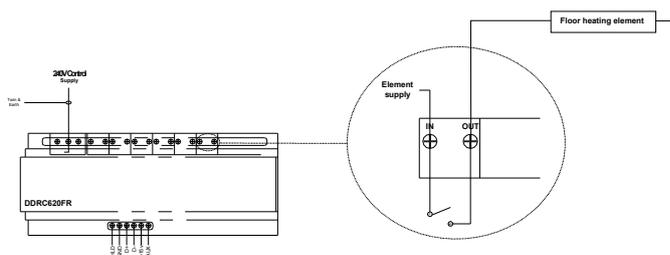
The DDNP1501 (Box#3) is utilised to supplement the network power supply, as the number of lighting control panel power requirement exceeds that supplied to the network by the two load controllers (Box#1 through to Box#8), due to the presence of the Dynalite touch screen.



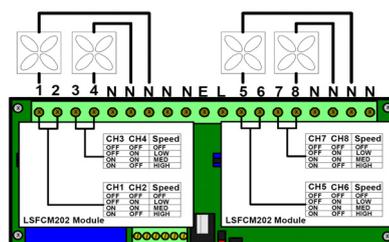
All blinds and curtains are connected to the DDRC810DT in the following manner.

Lighting control panels can be programmed to drive the blinds either up or down by manipulating the outputs of the associated controller in the desired manner.

Floor heating is controlled by connecting the power directly to the output of the DDRC620FR due to the high currents associated with these appliances. The Dynalite system can then activate the floor heating elements at programmed times. When the floor-heating element is active the temperature is then controlled by its own specific thermostat. This equipment is connected in the following way.

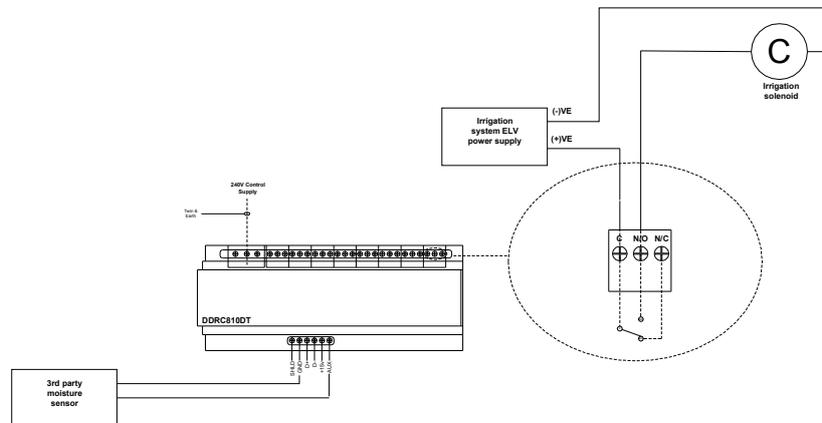


Ceiling fans are controlled by Dynalite through the DDMC801 controller, fitted with the LSFCM202 and connected in the following way.



Four levels of control are possible through the LSFCM202. Four lighting control panel buttons are dedicated to the four settings HIGH, MEDIUM, LOW and OFF respectively.

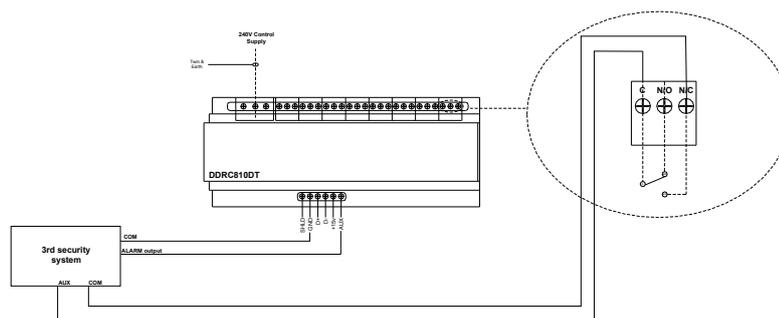
The irrigation solenoids are connected to the DDRC810DT in addition to feedback from the third party moisture sensor through the AUX input of this same device. The third party moisture sensor used in this installation outputs a contact closure upon detecting pre-defined moisture levels.



Although the irrigation system will operate during programmed times, the moisture sensor input can override this until such time that moisture levels drop.

The security system has been interfaced to Dynalite through simple dry contact closure upon different security events. Upon the ALARM situation, the security system provides the Dynalite system with a contact closure via one of the AUX inputs as described above. This action then triggers a sequence events starting with activation of all the lights in the home. Immediately afterwards, all blinds are drawn while the lighting control keypads are frozen.

This same activity can be also be triggered from a lighting control panel that incorporates a programmed PANIC button. This button must be pressed for at least 3 seconds to avoid inadvertent or accidental presses. When activated it signals a duress alarm to the security system by breaking the normally closed dry contact

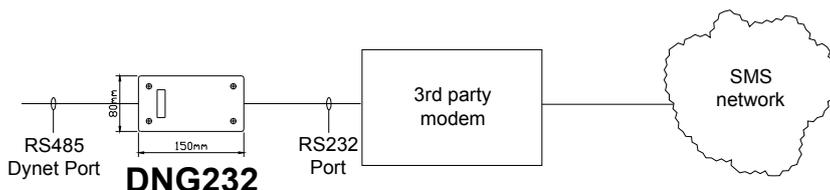


input, as shown below.

Two types of air conditioning systems can be found in this home, ducted and split. Both systems typically interface to the Dynalite control system through dry contact closure. The home has ducted air conditioning throughout with separate split units in the living and master bedroom areas, although this is not depicted in the diagrams above for simplicity. Both systems usually require add-on modules available from the vendor. Connection occurs via the DDRC810DT. One of these units can be found in both distribution board and is used specifically for ELV switching only. Light control panels in the master bedroom (CP20,21), bedrooms

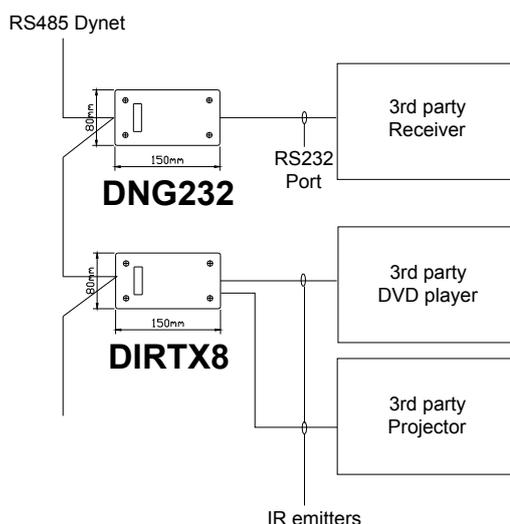
(CP16,17,14), living room (CP11) and sitting room (CP13) incorporate an AC button which turns the air conditioning on and off at different set-points for different times of the day and year.

Control through SMS is achieved through the DNG232 and connected modem. When the homeowner messages the command through the SMS network to the home, the message is translated by the DNG232 to the appropriate actions on the Dynalite network. The diagram below depicts the manner in which this functionality is realized.



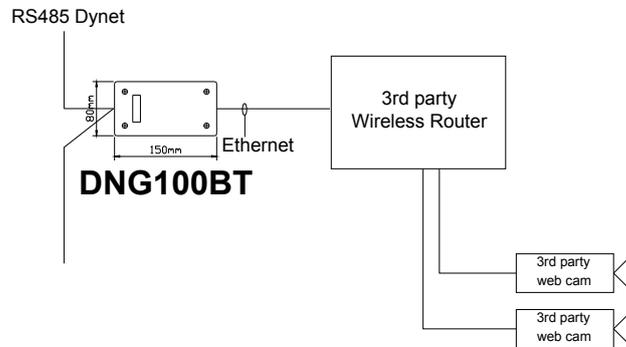
The DNG232 uses RS232 to communicate with the modem in order to access the outside world. After the desired activity is acknowledged by the Dynalite control system, the acknowledgement message is transmitted back to the homeowner as confirmation. Some of these activities include ensuring all the lights are OFF through the “ALLOFF” message and activation of the home’s air conditioning system by the command “ACON”. More messages can be programmed to achieve more functionality as desired by the homeowner.

Home theatre equipment is connected and controlled by the dynalite system both through the DIRTX8 with infrared commands and through the DNG232 with serial RS232 commands in the manner shown below.



Each of these devices is programmed to transmit the necessary codes in the appropriate sequence. For example, the DNG232 will first transmit the STANDBY code to the home theatre receiver. Subsequently the commands to select the desired source (DVD) and zone are sent one after the other. In addition to this, the volume is gradually increased to attain the true cinema experience. Simultaneously, the Dynalite control system has been dimming the lights (D2) over 30 seconds and lowering the projector screen.

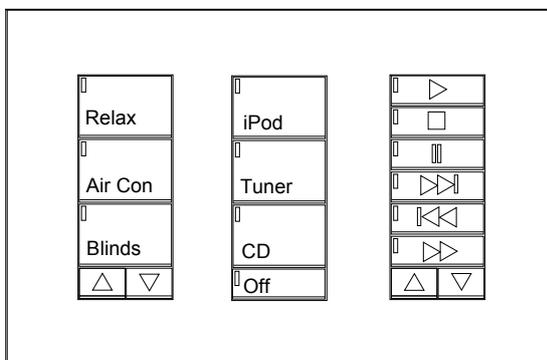
The wireless touch screen can control all the equipment connected to the Dynalite system. It does this by displaying HTML pages of controls that reside on the DNG100BT web page server. These pages are transmitted wirelessly throughout the home via the connected 3rd party wireless router. In addition to this, several web cameras are also accessible from these pages and allow inspection of different areas around the



home both from within the home or on any web browser over the internet, through the homeowner's connection. The DNG100BT translates Ethernet into DyNet and accordingly provides Internet connectivity to the Dynalite control system. The DNG100BT and wireless router connections are depicted in the diagram below.

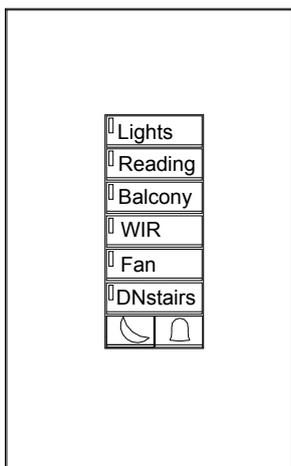
The Dynalite lighting control panels throughout the home are programmed to do more than activate lights On and Off. Panels in main living areas such as the living/family room have the ability to control lights, audio, blinds and air conditioning. This panel (CP11) is shown below.

The first button on the first column activates the Relax mood setting in this area. This setting entails dimming the main lights to a lower level (D17,16 to 85% over 5 sec). If a different lighting level is desired then the up and down arrow buttons can be pressed to either raise or lower the current light setting respectively. In addition to this a preselected music track is channelled into the living room while the blinds are drawn down. The Air Con button can start or stop the air conditioning in that area. According to the time of year, different temperature presets are chosen automatically. The Blinds button, when pressed, changes the function of the up and down arrow buttons to inch up or down the blinds. The second button column allows the homeowner to select a music source for listening in the living room through the multi-room audio system. The Off button extinguishes all volume and de-activates source equipment. The third button column provides the transport



controls for the audio selection. The buttons are (in order): Play, Stop, Pause, Skip FWD, Skip REV, Fast FWD. The up and down arrow buttons on the column control the volume in the living room. The engraving on each button is backlit allowing the homeowner to make the correct selection every time. Furthermore, the LED indicators on each button can be programmed to flash at different frequencies during different activities such as

Play, Blinds up and Blinds down.



The bed side panels (CP20,21) allow control of lighting in the room and surrounding areas. The Fan button toggles the ceiling fan between HIGH to MEDIUM to LOW to OFF when pressed in succession. The LED indicator for this button flashes intermittently, indicating that the cycle of fan control is currently underway. The DNstairs button illuminates a dim path from the master bedroom to the downstairs kitchen (D25 to 20%, D27,D28 and D12 to 40%, D10 to 50%) when pressed after 11pm. At other times, this button only activates the lights in the adjacent hallway (D27 to 80%).

The Goodnight button (with the engraved moon icon) shuts the home down if pressed for longer than 3 seconds. This press delay is done to avoid accidental activation as for the adjacent Panic button (with the engraved bell icon). The

Goodnight setting turns Off everything in and around the home, connected to the Dyalite system. In addition, blinds are drawn closed and the air conditioning system is turned off. The Dyalite control system then indicates to the security system that the home's perimeter (front door and window reed switches and glass break sensors) is to be sealed, securing the home while everyone sleeps.

Load Controllers

The following load schedule outlines the devices found in the ground floor distribution board.

The DDMC801 mixed controller is used for dimming resistive type lamps within the apartment. One controller (Box 3) has been fitted with a four-channel relay module (LSRM401 4 x 1A) and a four-channel leading edge dimming module (LSDM401 4 x 1A). The other controllers have been fitted with 2 x LSDM401 modules. The DDRC810DT is used to switch Extra Low Voltage (ELV) loads such as the irrigation solenoids that are usually powered by a 24VDC power supply. ELV loads must never be switched on this same device when switching 240VAC loads also.

Load Schedule for distribution board on Ground Floor

Load Controller	Cct Capacity	Drawing Designator	Fixture	Qty	Load
DDMC801 Box 1 C1	240W	D1	LV Downlight 50W	2	100W
DDMC801 Box 1 C2	240W	D2	LV Downlight 50W	6	300W*
DDMC801 Box 1 C3	240W	D3	Incandescent 50W uplight	1	50W
DDMC801 Box 1 C4	240W	D4	LV Downlight 50W	2	100W
DDMC801 Box 1 C5	240W	D5	LV Downlight 50W	2	100W
DDMC801 Box 1 C6	240W	D6	LV Downlight 50W	4	200W
DDMC801 Box 1 C7	240W	D7	LV Downlight 50W	3	150W
DDMC801 Box 1 C8	240W	D8	LV Downlight 50W	4	200W
DDMC801 Box 2 C1	240W	D9	LV Downlight 50W	6	300W
DDMC801 Box 2 C2	240W	D10	LV Downlight 50W	2	100W
DDMC801 Box 2 C3	240W	D11	LV Downlight 50W	2	100W
DDMC801 Box 2 C4	240W	D12	Incandescent 50W uplight	2	100W
DDMC801 Box 2 C5	240W	D13	LV Downlight 50W	2	100W
DDMC801 Box 2 C6	240W	D14	LV Downlight 50W	1	50W
DDMC801 Box 2 C7	240W	D15	LV Downlight 50W	1	50W
DDMC801 Box 2 C8	240W	D16	LV Downlight 50W	4	200W
DDMC801 Box 3 C1	240W	D17	LV Downlight 50W	4	200W
DDMC801 Box 3 C2	240W	D18	LV Downlight 50W	4	200W
DDMC801 Box 3 C3	240W	D19	LV Downlight 50W	2	100W
DDMC801 Box 3 C4	240W	D21	Incandescent 50W uplight	3	150W

DDMC801 Box 3 C5	240W	R12	Exhaust fan	1	240W
DDMC801 Box 3 C6	240W	R13	Exhaust fan	1	240W
DDMC801 Box 3 C7	240W	R17	CFL Bick light 15W	1	15W
DDMC801 Box 3 C8	240W	R10	LV Downlight 50W	2	100W
DDRC1210FR Box 4 C1	2400W	R8	LV Downlight 50W	1	50W
DDRC1210FR Box 4 C2	2400W	R1	CFL Brick light 15W	4	60W
DDRC1210FR Box 4 C3	2400W	R9	LV Downlight 50W	2	100W
DDRC1210FR Box 4 C4	2400W	R11	T5 Linear Fluorescent 18W	3	54W
DDRC1210FR Box 4 C5	2400W	R14	Incandescent 100W	4	400W
DDRC1210FR Box 4 C6	2400W	R15	Incandescent 100W	2	200W
DDRC1210FR Box 4 C7	2400W	R16	CFL Brick light 15W	3	45W
DDRC1210FR Box 4 C8	2400W	R28	CFL Bollard 10W	6	60W
DDRC1210FR Box 4 C9	2400W	R29	DFL Bollard 10W	10	100W
DDRC1210FR Box 4 C10	2400W	R18	TF Linear fluorescent	1	18W
DDRC1210FR Box 4 C11	2400W				
DDRC1210FR Box 4 C12	2400W				
DDRC810DT Box 5 C1	240W	R3	Projector screen motor	1	500W
DDRC810DT Box 5 C2	240W	R4	Projector screen motor	1	500W
DDRC810DT Box 5 C3	240W	R5	Curtain motor	1	500W
DDRC810DT Box 5 C4	240W	R6	Curtain motor	1	500W
DDRC810DT Box 5 C5	240W	R23	Blind motor	1	500W
DDRC810DT Box 5 C6	240W	R24	Blind motor	1	500W
DDRC810DT Box 5 C7	240W	R25	Blind motor	1	500W
DDRC810DT Box 5 C8	240W	R26	Blind motor	1	500W
DDRC810DT Box 6 C1	2400W	R27	Blind motor	1	500W
DDRC810DT Box 6 C2	2400W	R28	Blind motor	1	500W
DDRC810DT Box 6 C3	2400W			1	500W
DDRC810DT Box 6 C4	2400W			1	500W
DDRC810DT Box 6 C5	2400W			1	500W
DDRC810DT Box 6 C6	2400W			1	500W
DDRC810DT Box 6 C7	2400W			1	500W
DDRC810DT Box 6 C8	2400W			1	500W
DDRC810DT Box 7 C1	ELV	R7	Pulsed dry contact**	1	ELV
DDRC810DT Box 7 C2	ELV	R25	ELV Irrigation solenoid	1	ELV
DDRC810DT Box 7 C3	ELV	R26	ELV Irrigation solenoid	1	ELV
DDRC810DT Box 7 C4	ELV	R27	ELV Irrigation solenoid	1	ELV
DDRC810DT Box 7 C5	ELV			1	ELV
DDRC810DT Box 7 C6	ELV			1	ELV
DDRC810DT Box 7 C7	ELV			1	ELV
DDRC810DT Box 7 C8	ELV			1	ELV
DDRC620FR Box 8 C1	4800W	R19	Pool cleaner	1	4800W
DDRC620FR Box 8 C2	4800W	R20	Pool water jet pump	1	4800W
DDRC620FR Box 8 C3	4800W	R21	Pool waterfall pump	1	4800W
DDRC620FR Box 8 C4	4800W	R22	Other pool plant	1	4800W
DDRC620FR Box 8 C5	4800W				
DDRC620FR Box 8 C6	4800W				

*The maximum load current for any DDMC801 output is 2A. Each plug-in module such as the LSDM401 should never have more than 5A load connected to it. When 2 x LSDM401 modules are used with a DDMC801 controller base/motherboard the total load current should not exceed 10A and it is strongly recommended that each such controller be protected with its own dedicated circuit breaker.

**Applies to certain garage door models that require a pulsed dry contact to operate up, stop and down in that order.