

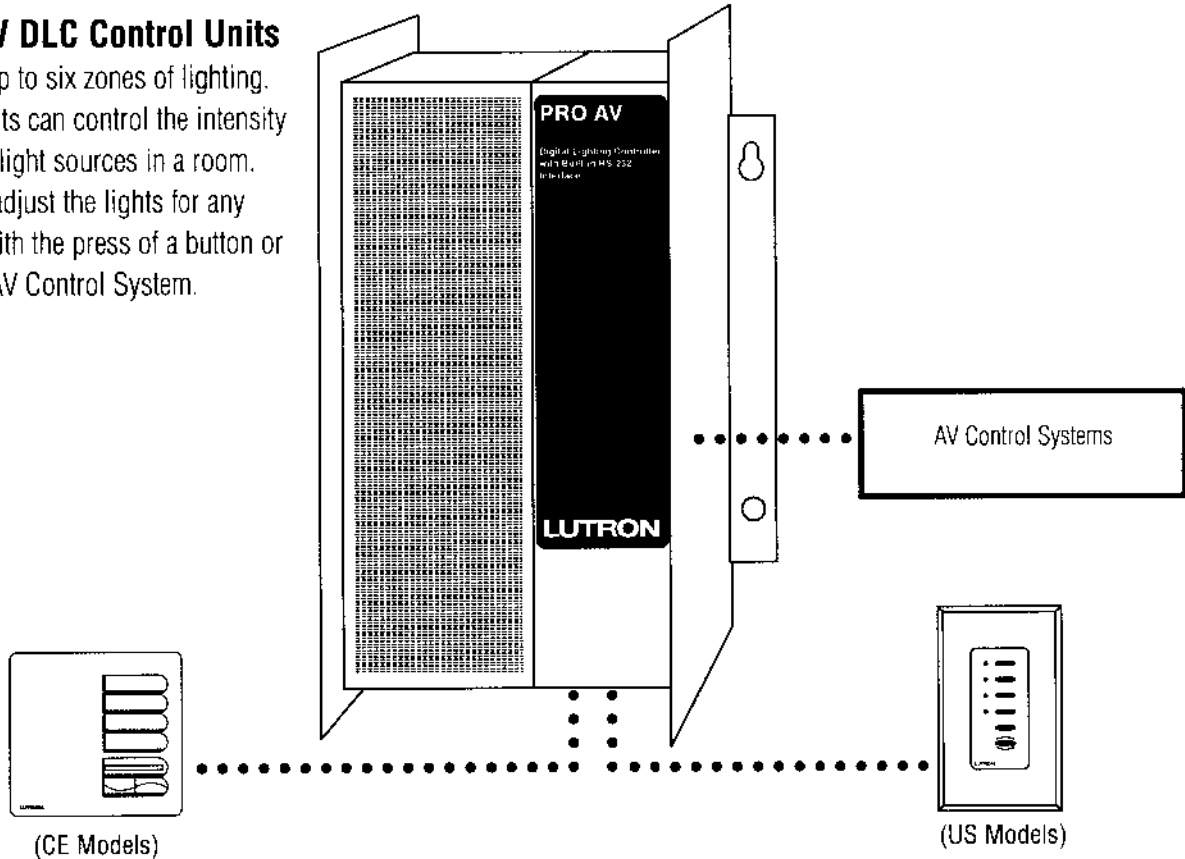
PRO AV Digital Lighting Controller (DLC) Installation Guide

Models PAV6M-120/PAV6S-120 PAV6M-230/PAV6S-230

PLEASE LEAVE FOR OCCUPANT

PRO AV DLC Control Units

operate up to six zones of lighting. These units can control the intensity of all the light sources in a room. You can adjust the lights for any activity with the press of a button or from an AV Control System.



IMPORTANT!

- Pro AV DLC lighting controls must be installed by a qualified electrician in accordance with all applicable regulations. Improper wiring can result in personal injury or damage to Pro AV lighting controls or other equipment.
- Always turn off circuit breaker/MCB or remove main fuse from power line before doing any work.
- To avoid overheating and possible damage to equipment, do not install dimming devices to dim receptacles, motor-operated appliances, or dimmable fluorescent lighting not equipped with Lutron Hi-Lume[®], Eco-10[™], or Tu-Wire[™] Electronic Dimming Ballasts.
- When used with Low Voltage lighting, do not remove factory-installed bypass jumpers on load circuit terminals until load circuits are tested (see start-up procedure on page 6.)
- The Pro AV DLC dimming modules are designed to operate in ambient temperatures between 0 °C-40 °C (32 °F-104 °F).
- To reduce the risk of overheating and possible damage to other equipment, the module must be mounted as shown. Failure to provide adequate space for cooling may result in overheating and void the warranty.
- Module hums slightly during operation and the internal relay clicks when the circuit is turned on and off. Choose an installation location where these sounds are acceptable.
- When used with low-voltage lighting, do not operate Pro AV DLC lighting controls with any lamps removed or burned out; Replace any burned out lamps immediately. Use only low-voltage transformers that incorporate thermal protection or fused primary windings.
- Pro AV DLC lighting controls are designed for commercial indoor use only.
- This control uses Class 2/PELV wiring methods. Check with your local electrical inspector for compliance with national and local codes and wiring practices.

LUTRON

Do you have:	Then read this on page:
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Description

This is an important product addition for systems integrators and A/V dealers. The PRO AV Digital Lighting Controller (DLC) meets the needs of most small to medium size integrated spaces. The DLC is a dimming controller that can be easily incorporated into many projects. There are several features that make this product ideal for single room applications.

The key advantage of the PRO AV DLC is function. It is a self-contained complete lighting control package. It has 6 zones of 800 W dimming capacity* with 16-scene programming capability and an integral RS232 input.

The PRO AV DLC improves coordination of lighting control. It is a simple-to-install system that can operate on its own providing basic lighting control function until the AV system is installed or when the AV system is not needed.

All programming of the PRO AV DLC is done via the RS232 interface and the system integrator's control system. The DLC will operate with Lutron's Liaison Software or from programs generated in AMX, Crestron or other Software.

* Not all zones need to be connected; however, connected zones must have a load of at least 25W (40W for CE models). No zone may be loaded with more than 800 W. Maximum load capacity for Control Unit is 2,000 W (2300 W for CE). Unit must not carry more than 16A of total lighting load (10A for CE models).

Step 1: Installing PRO AV DLC Series Control Units

This section shows how to install the PRO AV DLC.

Mounting and Dimensions

1. Choose an appropriate location.

Select a convenient location, such as an electrical closet AV room or above a ceiling (non-plenum). Make sure location is at least 6' from sensitive AV equipment (and its wiring). Also, make sure to locate module where its slight noise (relays clicking and slight humming) is acceptable. Ensure ambient temperatures are between 32 °F-104 °F (0 °C-40 °C). Module must be mounted away from steam pipes, direct sunlight, or other heat sources.

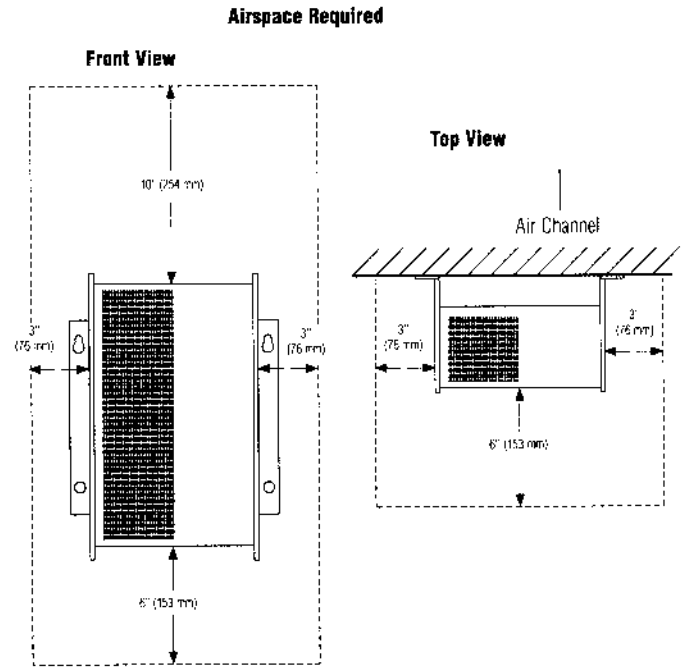
2. Plan placement of modules.

Modules must be mounted vertically. Make sure that nothing blocks the air channel between the back of the module and the wall.

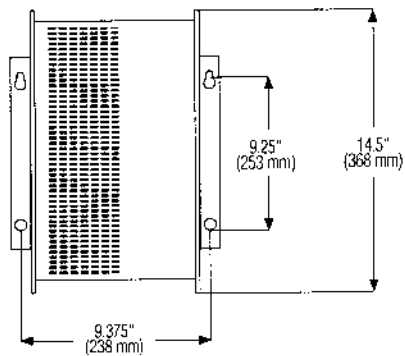
- Leave 6" (152 mm) of space above and below modules and 3" (76 mm) of space on either side of modules.
- Leave 10" (204 mm) between the top of the module and the ceiling, and 6" (152 mm) between the bottom of the module and the floor.
- Leave 6" (152 mm) of clearance in front of each module.

3. Mount modules (see below).

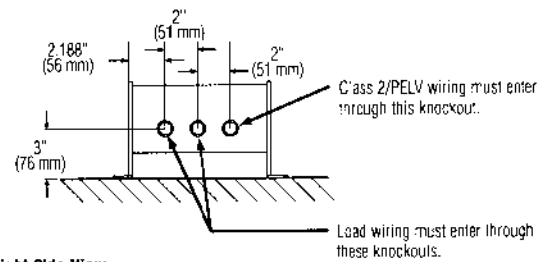
Using the mounting dimensions shown below, mark (while keeping the module vertical), then drill mounting holes. Securely fasten the module to the wall. Top mounting holes are keyed to facilitate mounting.



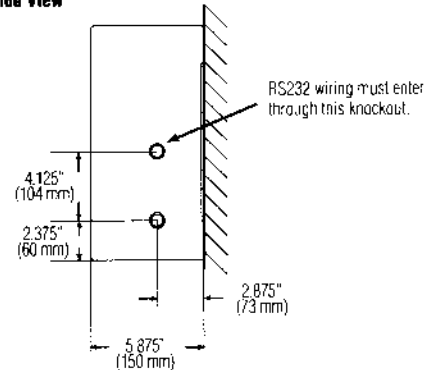
Mounting Dimensions



Bottom View



Right Side View



Step 2: Wiring Instructions

Line Voltage/Mains Wiring. First, turn power off.

WARNING: Turn power OFF to all circuits before installing any part of the Dimming System. Wiring with the power on can result in serious personal injury or damage to equipment.

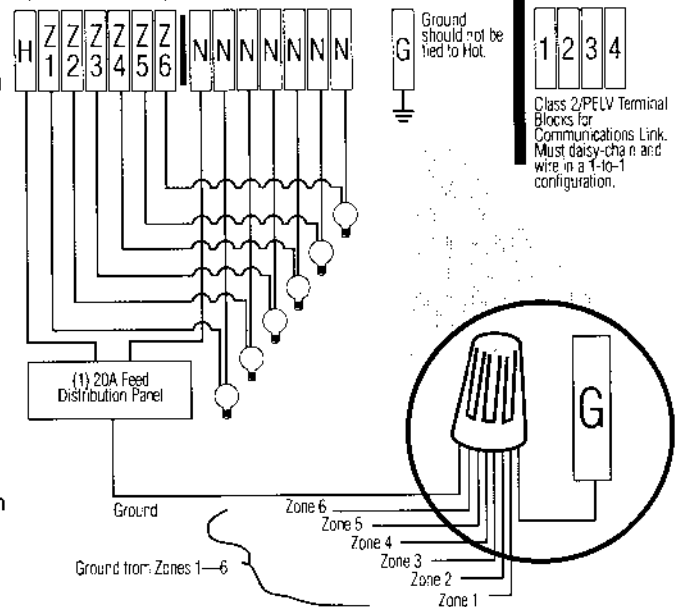
- 1. Pull dedicated feeds.**
Each Pro AV DLC control unit requires a 20A dedicated feed.
- 2. Power and control wires must be run in separate conduit or raceways. Run individual neutrals for input and each load circuit.**
- 3. 15A circuit breakers may be used in place of 20A circuit breakers. Do not exceed 1440W per 15A circuit.**
- 4. Connect HOT load wires to terminals Z1-Z6. Connect all load neutrals to the neutral terminals (N1-N6).**

Load wiring differs depending on the load type and whether the load is dimmed or switched (see below). Loads that require an interface, such as fluorescent, electronic low voltage, switched loads, 277V loads, and loads exceeding 800W/zone - Refer to Appendix C wiring diagrams with interface.

Load Types

The Control Units can control incandescent, halogen (tungsten), magnetic low-voltage, and neon/cold cathode load types. Electronic low-voltage and fluorescent load types can be controlled with an appropriate interface.

- Not all zones need to be connected; however, connected zones must have a load of at least 25W (40 W for CE models).
- No zone may be loaded with more than 800 W. Maximum load capacity for Control Unit is 2,000 W (2300 W for CE).
- Unit must not carry more than 16A of total lighting load (10A for CE models).
- All Electronic Low-Voltage (ELV) lighting used with the Electronic Low-Voltage Interface must be rated for **reverse phase control dimming**. Before installing an ELV light source, verify with the manufacturer that their transformer can be dimmed. When dimming, an Electronic Low-Voltage Interface **MUST** be used with the DLC Series Control Unit.



Class 2 Wiring

Connect Class 2 wiring for Wallstation Controls.

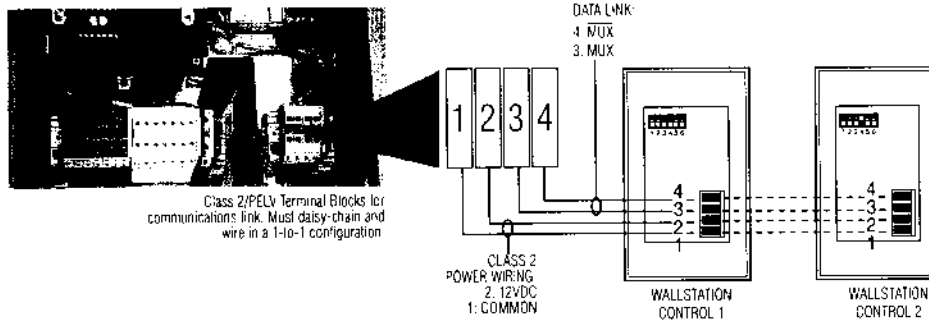
Use recommended cable as specified in **Appendix A: More About Class 2/PELV Wiring**.

Wiring Note

- Use the bottom right knockout when pulling Class 2/PELV wires into the DLC (see Page 4).
- 1.** Strip 1 in. (25 mm) of insulation from the Class 2/PELV cable.
 - 2.** Strip 3/8 in. (8 mm) of insulation from each wire.
 - 3. Connect the Class 2/PELV wires to the Class 2/PELV terminal block.** Make sure no bare wire is exposed after making connections. The recommended installation torque is 3.5 in. • lbs. (0.4 N•m) for Class 2/PELV connections.

Small project: A Control Unit with up to two Wallstations Controls

Each Control Unit can power up to two Wallstation Controls. If you need to power more than two Wallstation Controls from one Control Unit, install an external 12VDC power supply as described on page 13.



Maximum of 1000 ft. (300 m) between the PRO AV DLC Control Unit and the second Wallstation. For longer distances, use an external Class 2/PELV rated 12VDC power supply (see Page 4).

IMPORTANT WIRING NOTES!

1. Daisy-chain the terminal 1, terminal 2, terminal 3, and terminal 4 connections to PRO AV DLC Control Units and Wallstation Controls.
 2. Lutron recommends that all connections be made in the wallbox of Wallstation Controls. If a T-TAP connection is used, this remote connection must be in a switchbox or junction box with a maximum wire length of 8 ft. (2.5m) from the T-TAP to the connected unit.
- Note:** Do not allow Class 2/PELV wires to contact line/mains wires.

Step 3: Installing Wallstation Controls

IMPORTANT WIRING NOTES!

Review Appendix A BEFORE wiring!

- Wallstation address must be set prior to installing Wallstations. See DIP Switches below.
- Wallstations use Class 2 wiring methods as applicable in your locale.
 - **Using Class 2 wiring methods:** Wallstations must be connected in accordance with the 1996 National Electrical Code, Article 725-54(a), (1) Exception No. 3 or the Canadian 1994 CE Code Handbook, Rule 16-212, Subrule (4). Check with your local electrical inspector to comply with local codes and wiring practices.
- Wallstations must be mounted in a wallbox. Please refer to instruction sheet included with each Wallstation to determine wallbox requirements.

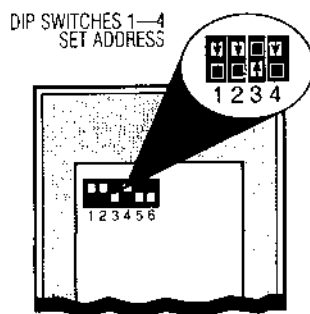
Examples of Wallstations

NTGRX-2B-SL	Entrance/Special Function Control
NTGRX-4S	Scene Selection Control with Raise/Lower
NTGRX-4S-IR	Scene Selection Control/Infrared Receiver
NTGRX-4B	Scene Selection Control
NTGRX-4M	Master Control
NTGRX-4PS	Partition Control
GRX-CIR	Infrared Ceiling Receiver
GRX-4S-DW	Architrave™ Door Jamb Control
GRX-AV	Interface Control
EGRX-4S	European Style 4S Control
EGRX-4S-IR	European Style 4S Control/Infrared Receiver

... and more!

Set DIP switches 1—4 with unique system address

Each Wallstation must have a *unique* system address (1—15) to identify the Wallstation and enable it to communicate with the Control Unit(s). To set its address, set DIP switches 1—4 to one of the configurations shown at right. Document your assignments by noting each Wallstation's address. Do not use address 16.



FOR THIS ADDRESS ...

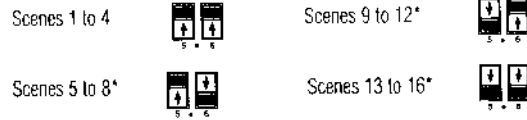
SET SWITCHES LIKE THIS:	RECORD LOCATION AND TYPE OF CONTROL HERE	SET SWITCHES LIKE THIS:	RECORD LOCATION AND TYPE OF CONTROL HERE
1: [Switch 1 up, 2 up, 3 up, 4 up]	_____	9: [Switch 1 down, 2 up, 3 up, 4 up]	_____
2: [Switch 1 up, 2 up, 3 down, 4 up]	_____	10: [Switch 1 down, 2 up, 3 down, 4 up]	_____
3: [Switch 1 up, 2 up, 3 up, 4 down]	_____	11: [Switch 1 up, 2 down, 3 up, 4 up]	_____
4: [Switch 1 up, 2 up, 3 down, 4 down]	_____	12: [Switch 1 down, 2 up, 3 down, 4 down]	_____
5: [Switch 1 up, 2 down, 3 up, 4 up]	_____	13: [Switch 1 down, 2 up, 3 up, 4 up]	_____
6: [Switch 1 up, 2 down, 3 down, 4 up]	_____	14: [Switch 1 down, 2 up, 3 down, 4 down]	_____
7: [Switch 1 up, 2 down, 3 up, 4 down]	_____	15: [Switch 1 down, 2 down, 3 up, 4 up]	_____
8: [Switch 1 up, 2 down, 3 down, 4 down]	_____	16: [Switch 1 down, 2 down, 3 down, 4 up]	Do not use!

Set DIP switches 5, 6 and/or 7 to specify function

For most Wallstations, you must also set DIP switches to specify exactly how the Wallstation is to function. Please refer to the Instructions shipped with each Wallstation for more detailed information.

NTGRX-4S, -4S-DW, -4S-IR, -CIR, -4B Scene Selection Control

Switches 5 and 6 determine which scenes the unit will select:



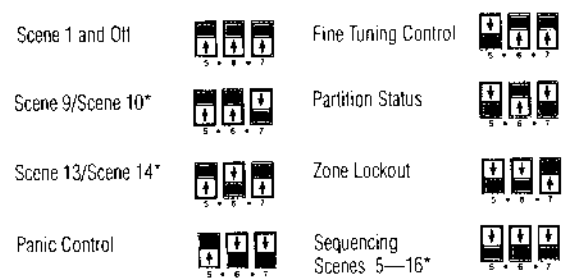
NTGRX-4M Master Control

Switches 5 and 6 determine whether bottom button turns lights on or off:



NTGRX-2B-SL Multi-Control

Switches 5, 6 and 7 determine the function of the unit's two buttons:

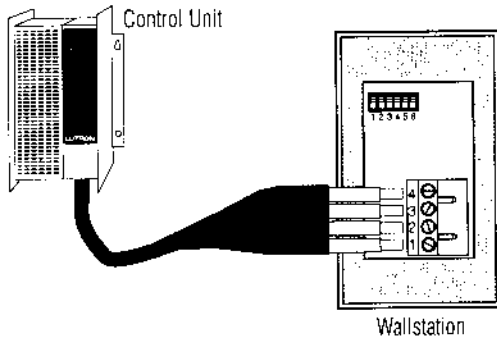


* When using an Wallstation to access scenes 5—16, the scene LEDs will illuminate only on the Wallstation—not on the PRO AV DLC Control Unit.

Turn off power and wire

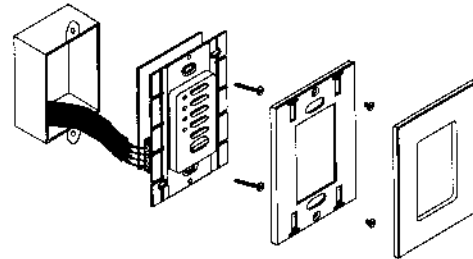
Review Appendix A: More About Class 2 Wiring before proceeding!

1. Mount 1-gang U.S. wallbox*, 2 3/4 in. deep (68 mm) **minimum**.
2. Strip 3/8 in. (9 mm) insulation from both twisted pairs in the wallbox.
3. Connect two #18 AWG (1.0 mm²) twisted pairs for Class 2/PELV wiring (daisy-chain between stations)†.
4. Confirm all connections.



Mounting

Place twisted pairs in wallbox and mount as shown. Restore power.



* Some Wallstations have special mounting considerations. Please refer to the detailed instructions supplied with each Wallstation.
 † If shielded wire is used, the drain wire must also be daisy-chained. **Do not** connect drain wire to earth/ground or Wallstation (unless a "D" terminal is present).

Step 4: Start-up Procedure

Check Load Circuits.

1. Make sure the factory-installed bypass jumper(s) are still in place between the H (Hot), and Z (zone) terminals. Replace module cover. Turn circuit breaker on.
2. Check the input current to the Hot terminal with a "clamp-on" type current probe. The current should be no more than 16A.
3. Turn loads ON for at least 10 minutes. If circuit breaker trips, turn power OFF, then locate and correct miswire or overload.
4. Repeat the above steps until the circuit breaker does not trip.

Check Control Circuit

1. With power OFF, make sure all control wiring is correct. Replace module cover. Turn circuit breaker ON.
2. Push Buttons on Wallstation Control. The lighting should remain on full, but the control indicator lights should go on/off.

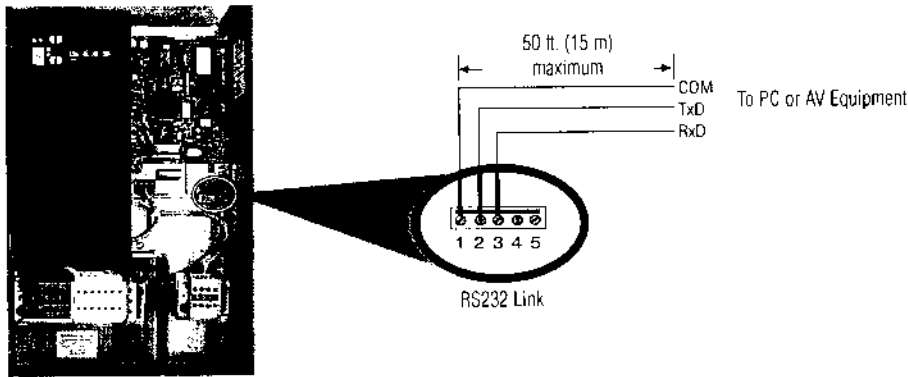
Remove Bypass Jumpers

1. Turn power OFF.
2. Remove the load circuit bypass jumper from the control unit.
3. Turn power ON. Test the control(s) to make sure they adjust the light level. The system should now function properly. If not, refer to the Troubleshooting section.



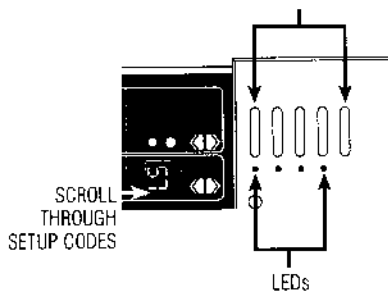
Bypass Jumper

Step 5: RS232 Wiring



STEP 6: Setting Up PRO AV DLC Control Units

TO ENTER (EXIT) SETUP MODE:
PRESS AND HOLD FOR ABOUT 3 SECONDS UNTIL
LEDs CYCLE (STOP CYCLING)



This section shows how to set up a PRO AV DLC Control Unit, including:

- Identifying the load type for each zone of lighting connected to the Control Unit.
- Setting up the scenes to create the desired lighting effects, and make sure the Control Unit is working correctly.

To set up the PRO AV DLC Control Unit, enter the "setup mode" and use the menu of setup codes that appear in the DISPLAY window. Step-by-step instructions for using the setup codes are on the following pages.

How to enter and exit setup mode

To enter setup mode: Press and hold the Scene 1 and OFF button for about three seconds, until the scene LEDs start cycling.

To exit setup mode: Exit setup mode the same way you entered it. Press and hold the Scene 1 and OFF button for about 3 seconds, until scene LEDs stop cycling. The Control Unit is out of setup mode; back in normal operating mode.

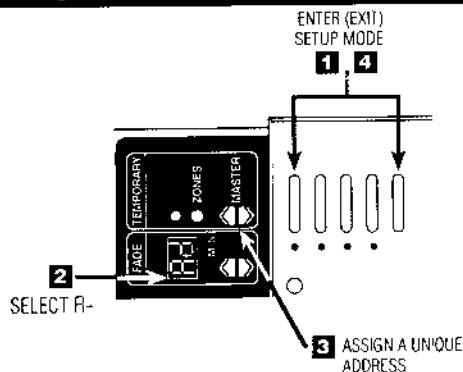
In setup mode, the FADE window displays the setup codes. To scroll through the menu of setup codes, press the FADE ▲ or ▼ buttons.

The following is a list of the setup codes and their descriptions:

Code	Stands for	Description
R-	Address	Identify Control Units when setting up system communications (p. 7)
LS*	Load Select	Identify load type (p. 8)

* When you enter setup mode, this code appears first.

Assign addresses to PRO AV DLC Control Units



Assign each PRO AV DLC Control Unit in your project a unique system address (R# through R#).

To assign an address:

- 1. Enter setup mode.** Press and hold LEFT and RIGHT buttons about 3 seconds, until scene LEDs cycle.
- 2. Select R-** (the address display). Press LOWER ▼ once, R- appears in the DISPLAY window.
- 3. Assign a unique address.** Press UPPER ▲ once, the next "free" (unassigned) address automatically appears in the DISPLAY window. This will be the Control Unit's address. (If you are working on the first Control Unit in the project, R1 will appear.)
- 4. Exit setup mode.** Press and hold LEFT and RIGHT buttons about 3 seconds, until the LEDs stop cycling.
- 5. Repeat** steps 1 through 4 for each PRO AV DLC Control Unit.

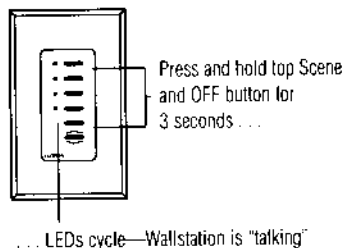
Identifying the load type for each zone

Lutron ships PRO AV DLC Control Units with all zones set for incandescent/halogen (tungsten) lighting. If your project has non-incandescent loads, change all non-incandescent zones to the correct load type, through GRX Liaison or AV Control System.

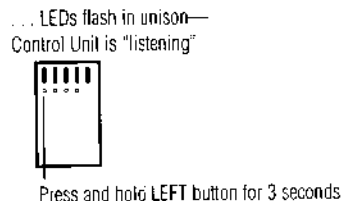
Set up a Wallstation Control to "talk" to a "listening" Control Unit

In order for Wallstation to communicate with a Control Unit, each Wallstation must be individually configured to "talk."

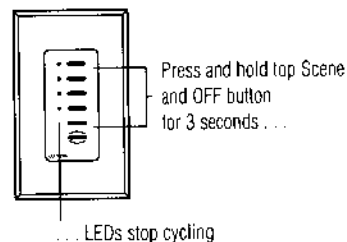
1. Enter setup mode.



2. Make the Control Unit "listen."



3. Take the Wallstation out of setup mode.



The communication link is now established. The Control Unit will "listen" when the user presses a button on the Wallstation. You can proceed to the next Wallstation and set up its communications.

For more specific, step-by-step instructions about setting up communications for each type of PRO AV DLC Wallstation, please refer to the instructions included with each Wallstation.

Step 7: Setting up RS232 Communication

Description

The PAV is equipped with an integral RS232 and capable of programming through Lutron's Liaison programming software.

This unit allows for up to eight PRO AV units to be interfaced with your personal computer or auxiliary audio/video equipment via RS232. The interface can be used to execute Control Commands and allow for Status Monitoring. Complete programming is allowed through other RS232 devices. This programming software includes an internal astronomical timeclock. The GRX-Liaison software can also be used to schedule events, make Sequences, and program additional PAV6S.

DIP Switches on Interface Board

NOTE: DIP Switch 6 and 7 should be set "ON" if operating with external Control Systems such as Crestron or PANJA (AMX)

The setting of the DIP switches affect the interface control between PRO AV DLC Control Units and your PC or auxiliary A/V equipment. DIP switch options are described below:

DIP Switch 1: Zone Lock Retain

DIP Switch 2: Scene Lock Retain

DIP Switch 3: Sequence Retain – In the event of a power outage, the RS232 Interface will retain which PAV6 control units were in ZONE LOCK, SCENE LOCK and SEQUENCE, respectively. Upon returning power, Control Units that had been in Zone Lock, Scene Lock, or Sequencing will stay locked or sequencing if the DIP switches are in the ON position. When these DIP switches are in the OFF position, this information will **not** be restored upon power up. These DIP switches do not affect Zone Lock, Scene Lock, or Sequencing set by a GRX-AV in 4Q mode.

DIP Switch 4: Sequence Type – Set the scene range that PAV-6M control units will sequence, using the Sequence command. In the OFF position, the PAV-6 control units will sequence scenes 1 through 4. In the ON position, they will sequence scenes 5 through 16.

DIP Switch 6: Raw Feedback – In the ON position, the programming interface will report when a button has been pushed or released on a PAV-6 control unit or low voltage Wallstation. This response varies depending on the type of unit, as listed below:

PRO AV Digital Lighting Controller (PAV-6M-120 and PAV-6S-120, PAV-6M-230 and PAV-6S-230)

Scene Selection Control (NTGRX-4S/4S-IR and EGRX-4S/4S-IR)

Architrave Door Jamb Control (GRX-4S-DW)

Infrared Ceiling Receiver (GRX-CIR)

A/V Interface Control (GRX-AV)

Infrared Wireless Remote Controls (GRX-IT & GRX-8IT) The first parameter indicated the address of the Wallstation Control or Control Unit upon which the button was pushed or released. A capital letter indicates a button was pushed, and a lowercase letter indicates a button was released. The following is a list of how addresses are indicated.

<u>Unit</u>	<u>Addressed as:</u>	<u>Indicated by:</u>
Control Unit	A1	A or a
	A2	B or b
	A3	C or c
	A4	D or d
	A5	E or e
	A6	F or f
	A7	G or g
	A8	H or h

<u>Unit</u>	<u>Addressed as:</u>	<u>Indicated by:</u>
Wallstation	1	I or i
	2	J or j
	3	K or k
	4	L or l
	5	M or m
	6	N or n
	7	O or o
	8	P or p
	9	Q or q
	10	R or r
	11	S or s
	12	T or t
	13	U or u
	14	V or v
	15	W or w
	16	X or x

The second parameter indicates the scene which was selected. If off button is pushed, it is indicated by a zero. A Master Raise is indicated by an 18, and a Master Lower is indicated by a 19.

Example of response: D3<CR><LF>

The scene 3 button was pushed on the PAV control unit addressed A4.

Two-Button Control (NTGRX-2B-SL) The first parameter indicates the address as above. The second parameter is a 1 to indicate that the Raise or top button has been pushed as is a 0 to indicate that a Lower or bottom button has been pushed.

A/V Interface Control configured as a Special Function Control (Interface configured as 4Q) Unlike the other controls, first parameter will be a capital letter if any of the control's four functions, Sequence, Zone Lock, Scene Lock or Fad Override are active. A lower case letter indicates that no functions are active. The second parameter will be a character that contains encoded information about which functions are active. For details on the format of this response, contact Lutron.

Master Control (NTGRX-4M)

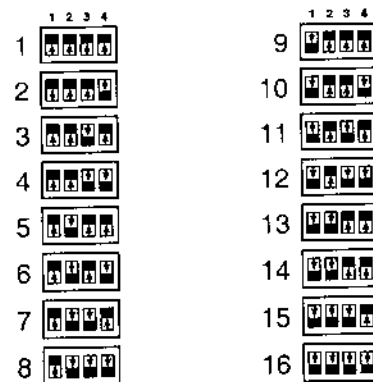
Partition Control (NTGRX-4PS) This status of these Wallstations cannot be the Programming Interface. When buttons are pushed on the Master Control and Partition Control, 1s and 0s may be returned by the RS232 interface.

DIP Switch 7: Scene Status – In the ON position, the Programming interface will return the current scene of all eight selected. The response will be a 'ss', followed by a string of eight ASCII characters, one for each PAV control unit. Each character represents the scene of each PAV control unit indicated by an 'A', scene 11 will be indicated by a 'B', and so on up to scene 16. A '0' will be returned if the PAV control unit is turned off, and 'M' will be returned if the PAV control unit is missing or not responding. An 'R' will be returned if a Master Raise is being sent, and a 'L' will be returned if a control unit is sending a Master Lower. Regardless if this switch is in the ON or OFF position, the current scene can be obtained by using the REQUEST SCENE STATUS command. See the GRX-RS232 Protocol and Command Set included with the PAV-6M unit for details.

Example of response: ssM180R2D2<CR><LF>

- Control Unit A1 is missing
- Control Unit A2 is in scene 1
- Control Unit A3 is in scene 8
- Control Unit A4 is off
- Control Unit A5 is sending a Master Raise
- Control Unit A6 is in scene 2
- Control Unit A7 is in scene 13
- Control Unit A8 is in scene 2

DIP Switch 8: Timeclock ON/OFF– In the ON position, the internal timeclock of the PAV can control the operation of the control unit. Timeclock schedules and the Super Sequence are configured and programmed using Lutron's Liaison software.



Appendix A: More about Class 2/PELV Wiring

This appendix explains the Class 2/PELV wiring used to carry communications between PRO AV DLC Control Units and Wallstation Controls.

Lutron requires that you connect (daisy-chain) all PRO AV DLC Control Units, Wallstations, and Accessories with two twisted pair for operation. If shielded wire is used, the drain wires must be connected to each other or to Terminal D, if present. Drain wires should not be connected to Earth/Ground.

- One pair is for the low-voltage power wiring that enables each PRO AV DLC Control Unit to supply power to up to two Wallstations. Connect this twisted pair to terminals 1 (COMMON) and 2 (12VDC). Terminate the 12VDC power to ensure that each Control Unit powers **no more than two Wallstation Controls**.
- The second pair is for a data link (up to 2000 ft. or 450 m long) that enables Wallstation Controls to communicate with PRO AV DLC Control Units. Connect this twisted pair to terminals 3 (MUX) and 4 (MUX) of every Control Unit and Wallstation.

Each twisted pair in the Class 2 wiring link should consist of two #18 AWG (1.0 mm²) stranded conductors.

- **Lutron offers a one-cable (non-plenum), low-voltage solution. Please ask for P/N GRX-CBL-346S.**

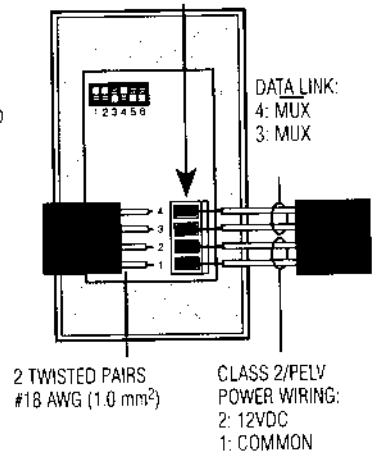
Recommended unshielded cables:

- For non-plenum installations, use (2) Belden 9470, (1) Belden 9156, or (2) Liberty 181P/2C-EX-GRN, or equivalent.
- For plenum installations, use (2) Belden 82740, or equivalent.

Wallstation circuits are classified as Class 2 circuits (U.S.A) (IEC). Unless otherwise specified, the voltages do not exceed 24VAC or 15VDC. As Class 2 circuits, they comply with the requirements of NFPA 70, National Electrical Code (NEC). When installing and wiring to these Wallstations, follow all applicable national and/or local wiring regulations. External circuits connected to input, output, RS232, DMX512, and other communication terminals of Wallstations, must be supplied from a Listed Class 2 source.

The PRO AV DLC Control Unit Class 2 circuit is 12VDC.

EACH TERMINAL CAN ACCEPT UP TO 2 #18 AWG (1.0 mm²) WIRES



Appendix B: Installing an External Power Supply

Use an external power supply if you need to power more than two Wallstations or Accessories from a single Control Unit or if your wire lengths exceed maximums. Power supplies do not boost data line signals. The distance limitation for the data line is 2000 ft. (450 m).

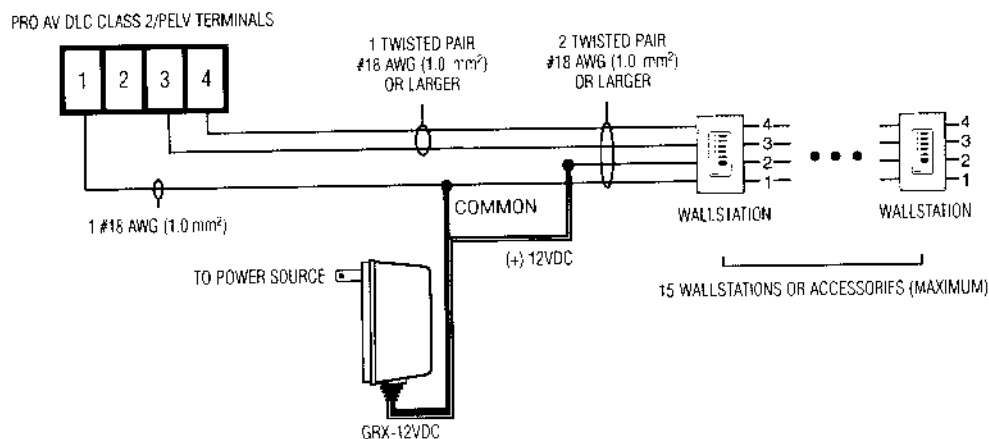
Install an external Class 2/PELV rated 12VDC power supply as shown below. This power must be Class 2/PELV rated and be a regulated supply rated for at least 50 mA per Wallstation on the link. It can supply power to up to 15 Wallstations, enabling you to use up to 15 Wallstations with one Control Unit. Make sure you review the manufacturer's instructions before installing.

Lutron 12VDC transformer for 120V applications (P/N GRX-12VDC).

IMPORTANT WIRING NOTES!

1. Connect the +12VDC wire from the power supply to the terminal 2 connection on all Wallstations. Do not connect this wire to any PRO AV Control Units on the link. Be sure that the terminal 1 connection is made to all Wallstations and Control Units.
2. Lutron recommends these maximum distances from the external 12VDC power supply to the last Wallstation:
 - #18 AWG (1.0 mm²) wire: 300 ft. (90 m).
 - #12 AWG (2.5 mm²) wire: 1000 ft. (300 m).

Note that the allowable maximum distance depends on the number of Wallstations in the system. Please see Application Note W14 or consult the Lutron Technical Assistance Hotline for more detailed information.



Appendix C: Power Boosters and Load Interfaces

This "load-side" equipment installs on the zone wiring between the Control Unit and the lighting load.

The **NGRX-PB** increases a Control Unit's zone load capacity for Incandescent/Halogen (Tungsten), Magnetic Low Voltage, and Neon/cold Cathode load types.

The **ELVI-1000** enables a zone of the Control Unit to control electronic low-voltage loads.

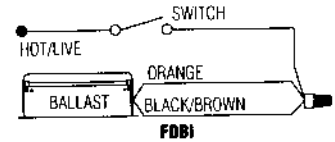
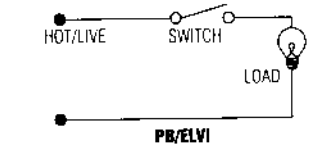
The **FDBI-16A-120** enables a zone on the Control Unit to operate fluorescent loads outfitted with Lutron's Hi-Lume or Eco-10 phase-controlled dimming ballasts.

Unit	120V	220-240V (AU)	230V (CE)*
PB	1920W/VA	2400W/VA	1840W/VA
FDBI	1920W/VA	2400W/VA	2400W/VA
ELVI	1000W/VA	1200W/VA	1200W/VA

* 1840W/VA surface mount, 1200W/VA flush mount.

CAUTION! Test load for short circuits.

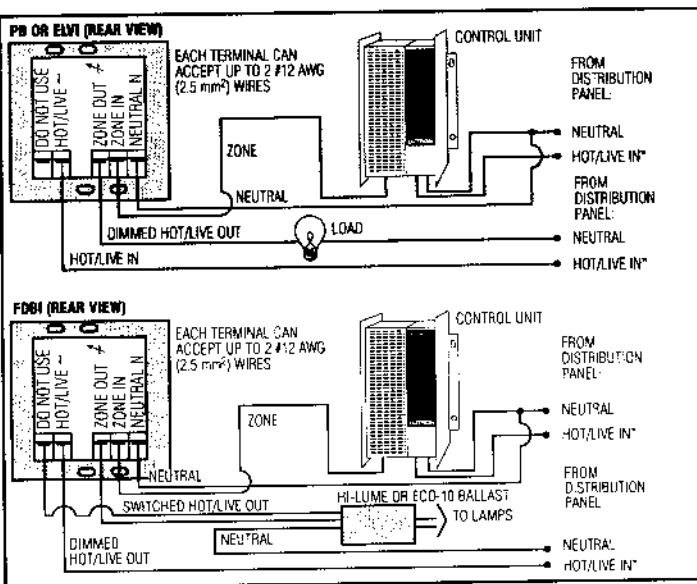
- Turn power off.
- PB/ELVI: Connect standard switch between hot/live lead and the load wire to test circuit.
- FDBI: Connect standard switch between hot/live lead and both the dimmed hot/live and switched hot/live leads of the ballast.
- Turn power on and check for short or open circuits.



Wiring instructions

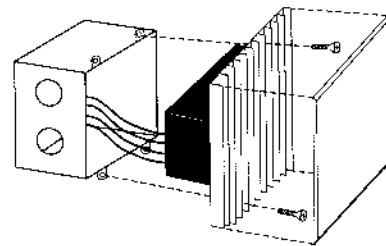
1. Turn off power to the Control Unit and the feed to the PB, ELVI, or FDBI!
2. Mount 2-gang wallbox: 3 1/2 in. (87.5 mm) deep recommended, 2 3/4 in. (68.75 mm) deep minimum. When mounting several units in a vertical layout (one underneath the other), allow at least 4 1/2 in. (11 cm) between units.
3. Strip 1/2 in. (12 mm) insulation from #12 (2.5 mm²) 75 °C copper (CU) AWG wires and connect as shown. Please see the Instruction Sheet supplied with the unit for more detailed wiring diagrams.

Wiring detail



* Can be on the same or different phases.

Mounting



IMPORTANT WIRING NOTES!

Connect ZONE OUT only to Lutron Hi-Lume or Eco-10 Electronic Dimming Ballasts. Do not use this connection with any other fluorescent ballast or transformer.

Appendix D: GRX-TVI 0-10 Volt Ballast/Switching Interface

Specifications

The GRX-TVI provides 0-10V control and ballast switching capabilities in one enclosure. The interface gives PRO AV DLC Control Units the ability to control 0-10V ballasts powered by 120V to 277V and provides a switching relay that can handle the in-rush current of ballasts. The interface gives PRO AV DLC Series Control Units the ability to both dim and switch electronic ballasts, such as Lutron's Eco-10 (TVE models), and Persona fluorescent fixtures.

FEATURES

- Provides a Class 2/PELV isolated 0-10V output signal. Complies with UL Standard 508.
- Accepts a zone output signal from PRO AV DLC (100-127V, 220-240V, 50/60Hz).

CONTROL INPUT POWER RATING

100-127/220-240V, 50/60Hz

0-10V OUTPUT RATING

10µA-300mA (maximum 150 ballasts)

OUTPUT SWITCHING CAPACITIES

	100-277V	230V
Fluorescent (with Lutron TVE ballasts).....	16A	10A
Fluorescent (with ballasts by others).....	5A	5AX
Incandescent.....	16A	10A
Low Voltage.....	16A	10A
Metal Halide.....	16A	10A
Neon/Cold Cathode.....	16A	10A
Motor @ 100-127V.....	1/4Hp	—
Motor @ 220-277V.....	1/2Hp	—

TERMINALS

MOUNTING

ENVIRONMENTAL

WEIGHT

Two #12-20AWG conductors per terminal.

NEMA Type 1 enclosure, indoor use only.

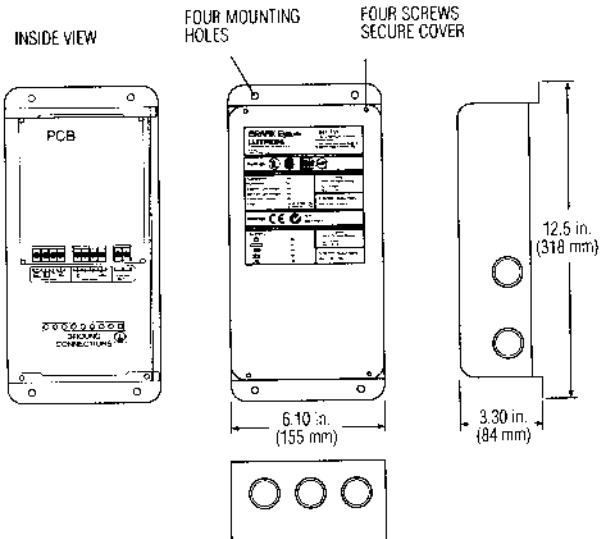
32—104 °F (0—40 °C).

4.25 lb. (2kg)

Installation

Mount on a wall using four screws. Use the unit to mark the position of the holes.

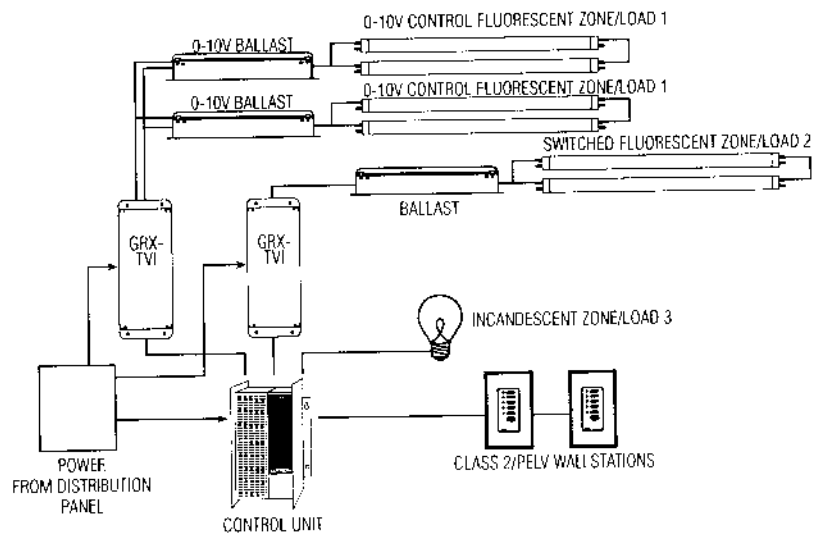
Terminal blocks in the Unit accept up to two #12 AWG (2.5 mm²) wires. This allows the interface to be wired in multiple ways. The power feed can be from a different phase than the PRO AV DLC power.



Wiring overview

A GRX Interface is required for each fluorescent dimming zone. (A 3-zone Control Unit with two fluorescent zones and one incandescent zone is shown as an example.)

Please note that the power feed to the Control Unit and H₂/L₂ of the GRX-TVI must be the same phase!



Appendix E: HP Dimming Modules (120V control feed only)

Not for use with generator-supplied power!

HP 2•4•6 Modules increase the load capacity of a Control Unit zone from 800W/VA to:

- 1920W/VA with the HP•2
- 3840W/VA with the HP•4
- 5760W/VA with the HP•6
- Up to 28,800W/VA by daisy-chaining five HP•6 Modules.

HP 2•4•6 Modules can also accept 277V input load power feeds to integrate 277V fluorescent dimming loads controlled by Hi-lume or Eco-10 Electronic Dimming Ballasts with 120V PRO AV Series Control Units.

Specifications

DESCRIPTION	MODEL NUMBER	No. OF OUTPUTS TO LOAD CIRCUITS	CAPACITY@ 120VAC, 20A
	HP•2	1	1920W/VA
	HP•4	2	3840W/VA
	HP•6	3	5760W/VA

POWER
Operating power: 0.20A per HP-Module. 120VAC supplied to control circuit. Input power for load circuit(s): 120 or 277, 60Hz VAC. 32—104 °F (0—40 °C).

ENVIRONMENTAL CAPACITIES PER LOAD CIRCUIT OUTPUT	LOAD TYPE	DIMMED 120VAC/277VAC	SWITCHED 120 VAC/277VAC
	Incandescent	16A	10A
	Magnetic/electronic low voltage; neon/cold cathode*	16A	10A
	Hi-lume or ECO-10 Fluorescent	16A	16A
	Fluorescent (non-dim)	---	16A
	Metal Halide	N/A	10A

Dimmed and switched hot available for each output. 50W/VA minimum load per output.

MAXIMUM HEAT DISSIPATION 200BTU per hour per load circuit output.

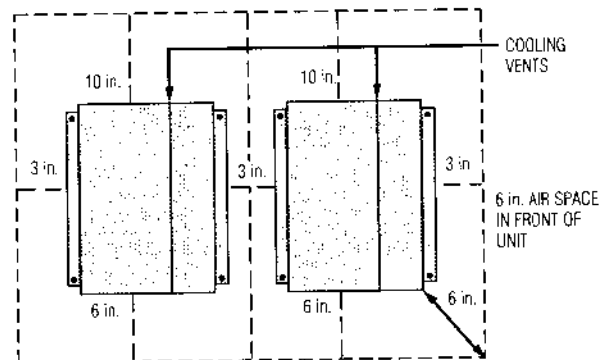
* For neon/cold cathode light sources, consult Lutron Application Note #25.

Choose a mounting location

- Must be within 1000 ft. (300 m) of the Control Unit.
- Must allow for adequate cooling. (Make sure ambient temperature is 32°—104 °F (0°—40 °C). Allow for adequate air space.)
- Must be **at least** 6 ft. (1.8 m) away from sensitive electronic equipment.
- Must be placed where the HP 2•4•6's slight operating noise is acceptable.

IMPORTANT!

Leave the HP 2•4•6's factory-installed bypass jumpers in place until you have installed and tested the Module.

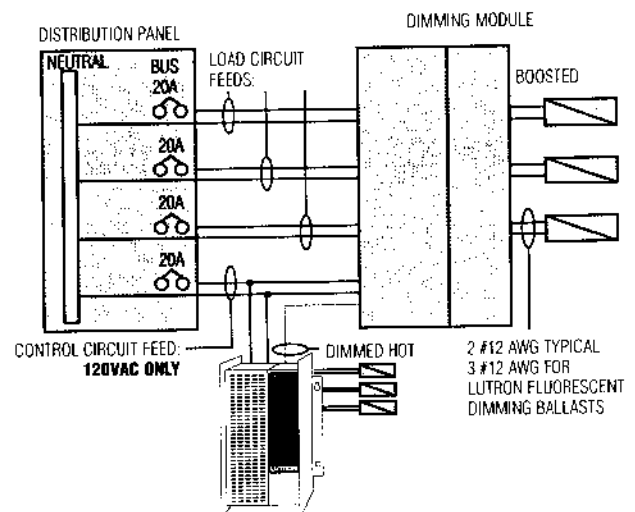


Mounting

1. Hold unit vertically.
2. Mark and drill holes.
3. Using the keyed upper holes for easy positioning, secure the unit to the wall.

Please see the Instruction Sheet provided with the unit for more detailed programming instructions.

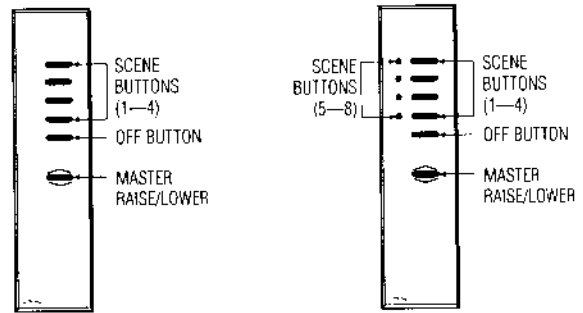
Wiring Overview



Appendix F: Infrared Transmitters/Receivers

Transmitters/Receivers

PRO AV DLC Control Units can be used with the ceiling IR Receiver (GRX-CIR) or a Wallstation IR Control (NTGRX-4SIR-WH). This allows control of the Control Unit with the optional Handheld Infrared Wireless Remote Control Transmitters. The Infrared Transmitters control 4 (or 8) scenes plus master raise/lower and Off. With this you can recall scenes or fine-tune light levels.



Infrared Interference

The IR frequency for all PRO AV DLC Control Units is 40,000 KHz. Any other device continuously operating in the frequency range from 30 KHz to 50 KHz may cause either no response or unwanted scene changes on the Control Unit. Fluorescent ballasts are a known cause of IR interference. Lutron dimming ballasts have been thoroughly tested to ensure that there is no IR interference with any PRO AV DLC product. However, other manufacturer's ballasts may cause interference. It is the responsibility of the contractor to determine the operating frequency of the ballasts used on the project. Lutron takes no responsibility for ballast interference to the PRO AV DLC system.

Appendix G: Troubleshooting

Problem	Cause	Remedy
Lights do not come on	Load input feed power not present	Verify that the input breaker is on wiring is connected properly
Lights cannot be dimmed	Bypass jumpers are not removed	Remove bypass jumpers on Load
Hi-lume FDB or Eco-10 lamps flicker at low-end	Lamps not operated at full intensity before dimming	Operate lamps at full intensity for 100 hours Prior to dimming
Neon lamps flicker at low-end.	Low-end trim is set too low	Refer to GRX-Liaison and adjust low-end trim
Switched load does not turn off	Bypass jumper not removed	Remove bypass jumpers on load circuit terminal blocks
Lights do not dim low enough	Low-end trim needs adjustment	Refer to GRX-Liaison and adjust low-end trim. If lights controlled via HP-2,4,6 set trims in HP Unit (refer to unit instruction sheets)
Lights do not brighten to full or remain at low-end	High-end trim is set too low	Refer to GRX-Liaison and adjust high-end trim
Circuit breaker trips on power up	Additional dimming module Slaves wired incorrectly-unit is overloaded	Compare additional module wiring to diagrams. Check input current. Check each zone output current, add power boosters where necessary.

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- **In the U.K.:** 0800-282-107
- **In Europe:** 44-171-702-0657
- **All others:** 1-610-282-3800
- **Website address:** www.lutron.com
- **E-mail:** product@lutron.com

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Lutron warrants each new unit to be free from defects in materials and workmanship and to perform under normal use and service. This warranty shall run only for a period of one year from the date of purchase and Lutron's obligations under this warranty are limited to remedying any defect or replacing any defective part and shall be effective only if the defective unit is shipped to Lutron postage prepaid within 12 months after purchase. Damage due to abuse, misuse, inadequate wiring or installation is not covered by this warranty. In no event shall Lutron or any other seller be liable for any other loss or damage, including consequential or special damages that may arise through the use by a purchaser or others of this device and the purchaser assumes and will hold harmless Lutron in respect of all such loss. Although every attempt is made to ensure that catalogue information is accurate and up-to-date, please check with Lutron before specifying or purchasing this equipment to confirm availability, exact specifications and suitability for your application. This product may be covered by one or more of the following U.S. patents: 4,797,599; 4,803,380; 4,825,075; 4,893,062; 5,030,893; 5,191,265; 5,430,356; 5,463,286; 5,530,322; 5,808,417; DES 308,647; DES 310,349; DES 311,170; DES 311,371; DES 311,382; DES 311,485; DES 311,678; DES 313,738; DES 335,867; DES 344,264; DES 370,663; DES 378,814 and corresponding foreign patents. J.S. and foreign patents pending.
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Safety standards listed above apply to one or more products in the PRO AV DLC product line. Consult factory for specific information

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