

## Installation

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### Preparation

Before installing your Digital Environ cabinets, you should carefully consider the environment in which the equipment is to be installed, the power feeding the equipment, and the required cable runs.

### Environmental Considerations

To maximize equipment life, and minimize the chance of failures, the following environmental requirements should be met:

- Temperature -- 35°C (104°F).
- Humidity -- 10%-90% relative humidity maximum, no condensation.

### Caution



*Dimmer efficiency is at least 95%. Since the remainder of the energy is dissipated as heat, they should be installed in a room with adequate ventilation to dissipate a heat load equivalent to 5% of the maximum load the dimmer cabinets will handle.*

### Power Requirements

Digital Environ cabinets can be powered by three wire plus neutral, three phase power or two wire plus neutral, single phase power. The maximum power requirements shown below assume cabinets are fully loaded with 50A power modules. Actual power requirements may be less depending on the power modules installed.

#### Three phase power

- 100A per phase maximum for small cabinets.
- 200A per phase maximum for large cabinets.

#### Single phase power

- 150A per phase maximum for small cabinets.
- 300A per phase maximum for large cabinets.

### Warning



*Do not set up this equipment with power applied. Make sure that your incoming power is disconnected before proceeding.*

*Do not provide 220VAC power to 120VAC units, as damage may result.*

## Plan Cabinet Positioning

Digital Environ cabinets can be placed just about anywhere as long as adequate space is provided in front and below the cabinets to allow air circulation for cooling. You should be careful not to obstruct the bottom of the cabinet, since this is where the cooling fans are located.

## Warning



*This equipment is intended for indoor use only.  
Utilizer dans endroit a l'abri.*

*For CSA approval when mounting over a combustible surface, a floor plate of at least 1.44mm galvanized or 1.6mm uncoated steel extended at least 150mm beyond the equipment on all sides must be installed.  
Lorsque L'appareil est installe sur ou au-dessus d'une surface combustible, on doit prévoir une plaque d'acier galvanise d'au moins 1.44mm ou une plaque d'acier sans revetement de 1.6mm se prolongeant sur au moins 150mm tout autour de l'appareil.*

## Plan Conduit Layout

The location of conduit runs and their entrance to the cabinet is important and should be carefully planned before cutting holes or attaching conduit. Figure 3 shows the allowed entry areas for the various types of wiring.

## Caution



*Do not run power feed or load wires in the same conduit or wireway as control wiring.*

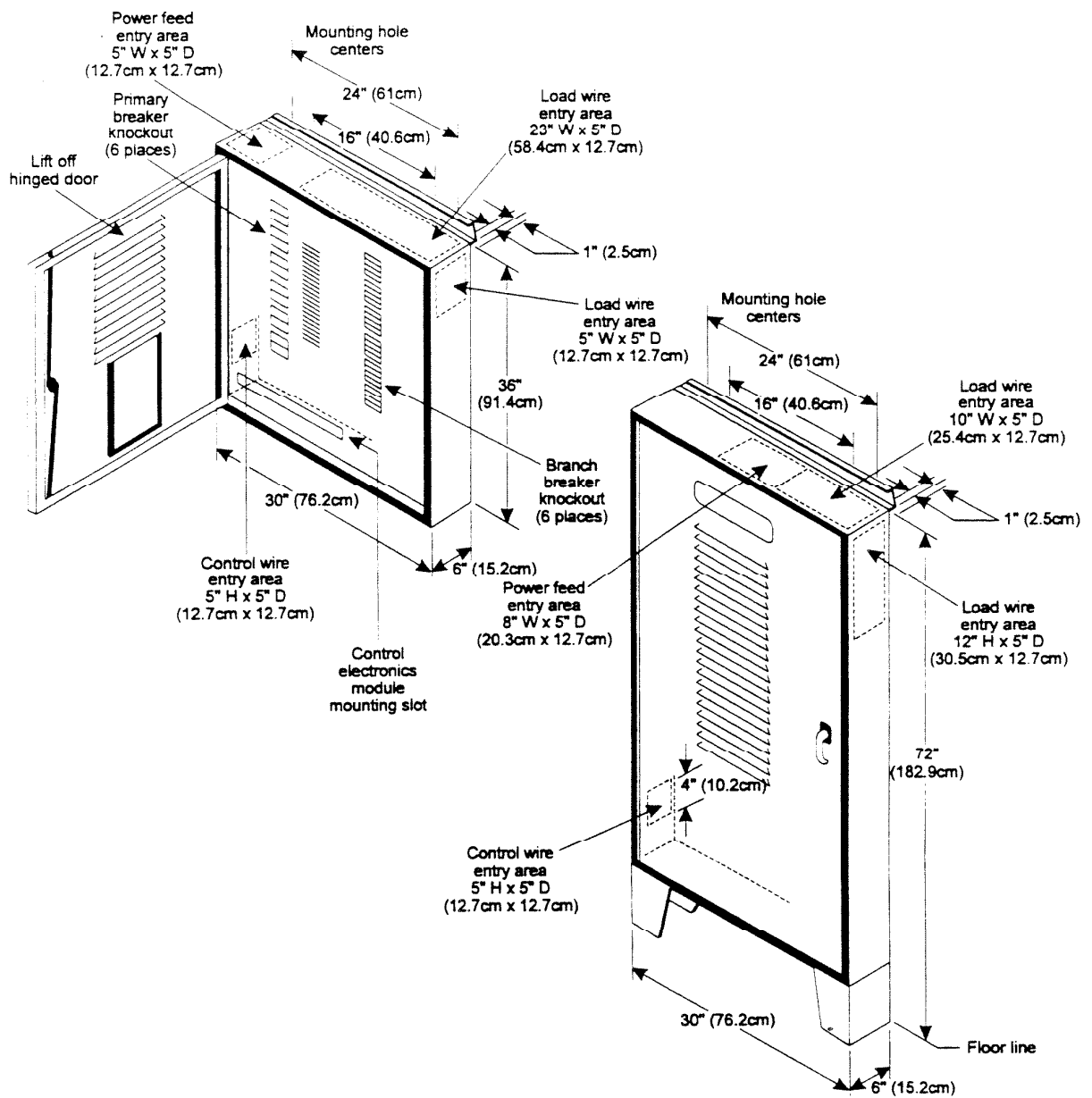
*Do not run wiring from other unrelated equipment (e.g., the building security system) in the same conduit with Digital Environ wiring.*

*Do not enter control wires from dimmer cabinet locations marked for load or power wires, and vice versa. These locations are chosen to minimize electrical interference between various sections of the system.*

*Do not run wiring in ways other than shown on system riser diagram. Digital Environ systems are designed to be installed in a specific manner.*

*Do not substitute plastic conduit for metal where conduit is called for. Metal conduit acts as a ground and shield.*

*Do not substitute shielded wiring for unshielded wiring or conduit. Changes in transmission line capacitance can cause problems with the control signals.*



**Figure 3. cabinet Dimensions**

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## Installation

Once you have determined that all required conditions for the installation will be met, you can install the cabinets.

**Mount Cabinet** The large cabinet has mounting feet that support its weight. It is anchored at the top with two 3/8 inch bolts through a bracket drilled for 16 and 24 inch stud centers.

The small cabinet is hung on the wall with four 3/8 inch bolts (two at the top, and two at the bottom). Mounting brackets are drilled for 16 and 24 inch stud centers.

**Cut Conduit Entrance Holes** Cut conduit entrance holes as required. Use only the areas specified by stick-on labels.

1. Remove lift off hinged door and cabinet inner panel.
2. Mask off the processor and power supply areas to prevent metal chips from falling inside modules during cutting.
3. Cut conduit entrance holes in specified areas.
4. Clean any metal chips from cabinet and remove masking from the processor and power supply.

**Connect System Grounds** Each cabinet has a ground lug for earth ground termination. Connect a separate ground wire from this terminal to a valid earth ground.

***Do not rely on building conduit for earth ground.  
Do not rely on structural steel for earth ground unless you have verified that it is a valid earth ground.***

If you suspect that system cabinets are wired to different grounds, connect all cabinets with a ground wire (8AWG or larger) and connect one cabinet only to a known valid earth ground.

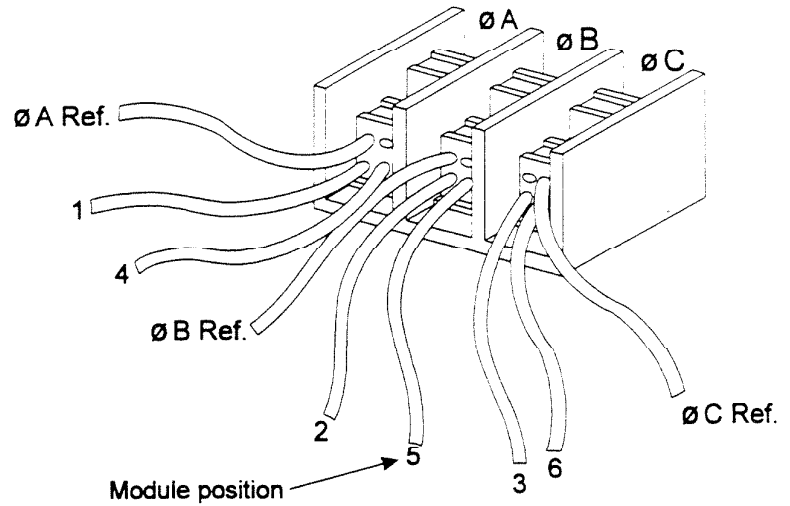
**Connect Power Wiring** Main power feed connections are at main feed terminal block in upper left portion of cabinet. The neutral feed is connected to neutral bus on the right-hand side of cabinet. Feed cable should enter from the top of the cabinet through designated access areas only.

Cabinets are usually shipped pre-wired for three phase power. If the cabinet is to be installed with single phase (3-wire) power, and was not shipped from the factory wired as such, please see Figure 4 and Figure 5.

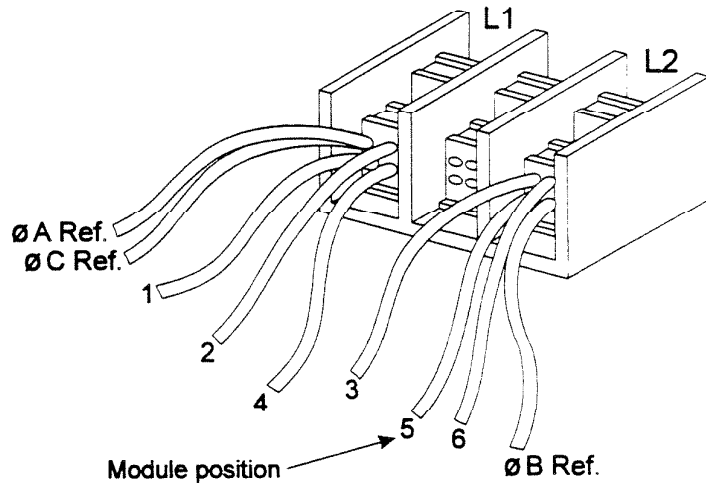
Maximum feed wire size is:

- Large cabinet: 400MCM
- Small cabinet: 2/0

**Three Phase 4-wire Standard**  
 (100 Amps maximum per phase)



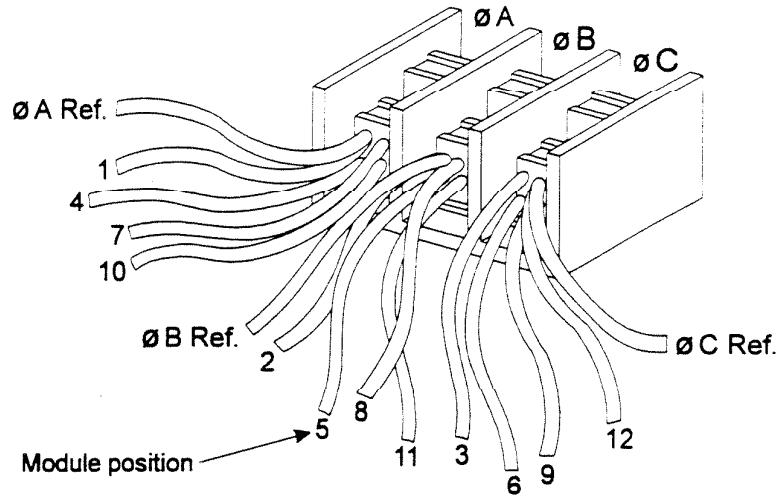
**Single Phase 3-wire Conversion**  
 (150 Amps maximum per phase)



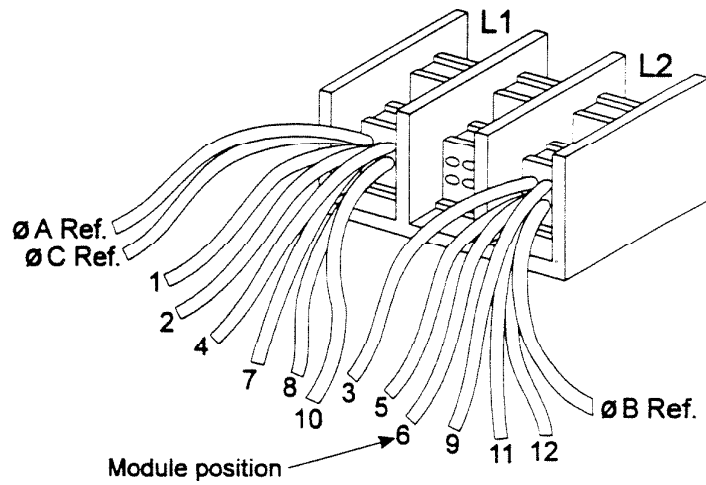
Block is Strand Part #1-100017-000 (Marathon #1423570)  
 Input Range is #2/O - #12 copper or aluminum

**Figure 4. Small Cabinet Power Phase Wiring**

**Three Phase 4-wire Standard**  
(200 Amps maximum per phase)



**Single Phase 3-wire Conversion**  
(300 Amps maximum per phase)



Block is Strand Part #1-100024-000 (Marathon #1433552)  
Input Range is 400 MCM - #6 copper or aluminum

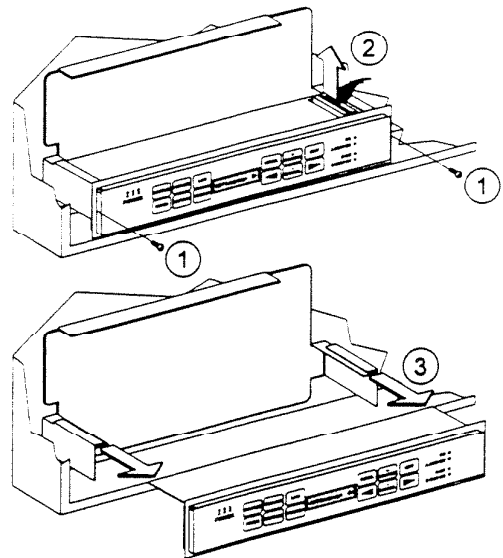
**Figure 5. Large Cabinet Power Phase Wiring**

**Connect Quad Harness** The Auxiliary control wire harness (S.L. #76807) is required only if you have a small Digital Environ cabinet with Quad power modules (S.L. #72004).

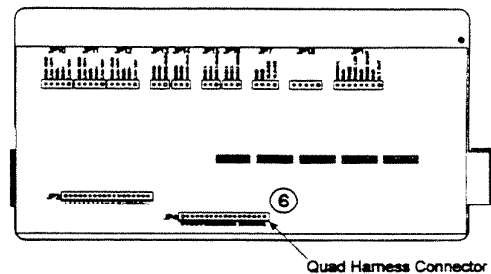


*Always make sure power to the cabinet is OFF before removing or installing a Digital Environ processor module.*

1. Remove two flat head screws on the front of the processor module.
2. Disconnect any analog wiring by unplugging the terminal strip from the processor module.
3. Slide the processor module straight out from the chassis about 3" (75mm), giving you enough space to disconnect the control signal cables, the 3-phase power cable, and the power block cables.
4. Note the positions of all connectors and disconnect them from the processor module.

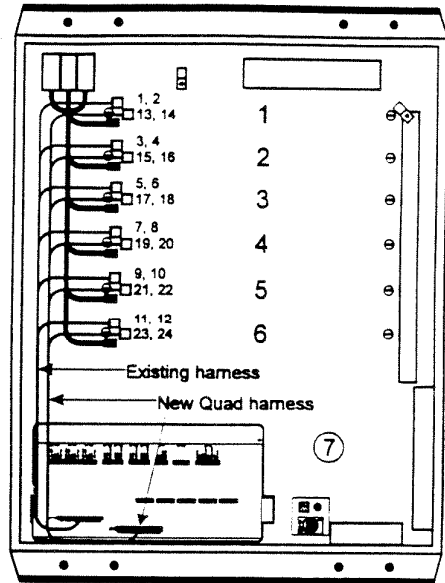


5. Slide the processor module the rest of the way out of the rack and place to one side
6. Plug the single in-line connector on the Quad Module Harness into JP4 on the distribution board.



7. Route the harness along the bottom and left side of the cabinet so that individual power module connectors are adjacent to the connectors in the factory wired harness.
8. Tie-wrap the new harness to the existing factory harness.
9. Replace the processor module. Make sure that you connect all cables to the correct plugs.

*Remember to set the module map for Quad dimmers when you do the rack setup (see Set Module Map on page 82).*



## Connect Panic Wiring

Panic wires are connected to PANIC terminals on JP1 of the distribution board (see Figure 6 for terminal locations). Wiring instructions are included on the riser diagram in your system drawing package. If you do not have a system drawing package, wire the PANIC and NORMAL switches as shown in Figure 7. You can use the PANIC/NORMAL terminals and momentary contact switches to activate panic, and/or use the PANIC MAINT terminal and a maintained dry contact switch or relay.

When more than one cabinet is installed in a system you can connect either type of panic (or both) in parallel across more than one cabinet. All cabinets that are connected in parallel will then be activated by a single switch. This means that you can have a separate panic station for each room, using the momentary terminals, and connect the maintained terminal in parallel across all cabinets to have a system-wide panic (possibly controlled by your fire alarm system).

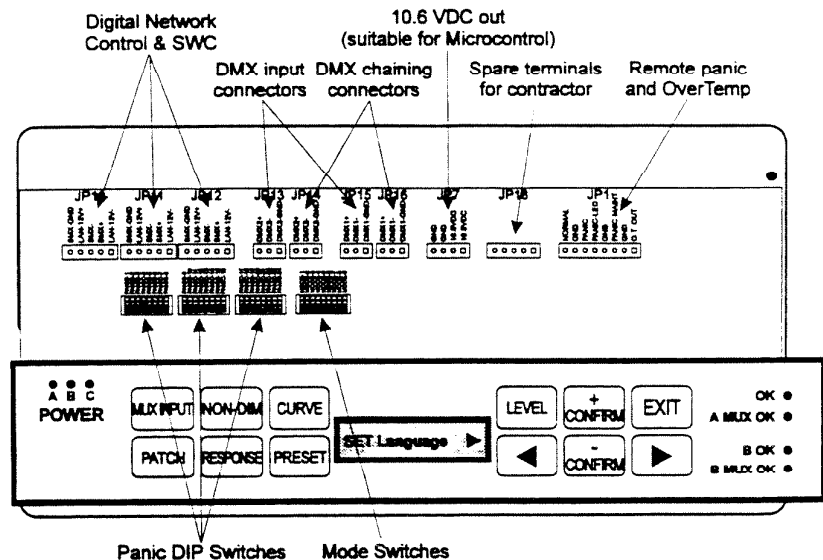


Figure 6. Control Terminal Locations

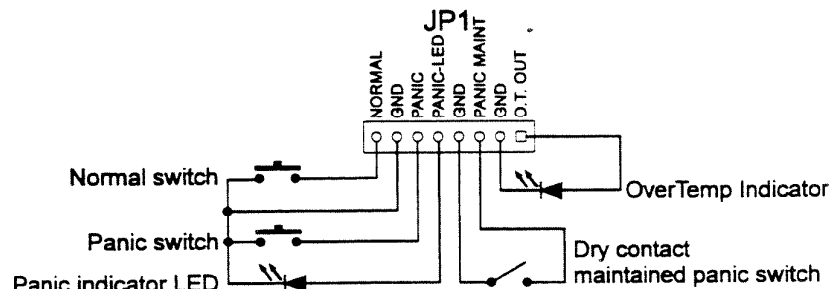


Figure 7. Panic & OverTemp Wiring

### Connect OverTemp Wiring

OverTemp wires are connected between the O.T OUT and GND terminals on JP1 of the distribution board board (see Figure 6 for terminal locations). Wiring instructions are included on the riser diagram in your system drawing package. If you do not have a system drawing package, wire the OverTemp indicator as shown in Figure 7.

To provide a system-wide OverTemp indicator you must connect the OverTemp terminals in all appropriate cabinets together.

### Connect Digital Network Control Wiring

Digital Network Control wiring from stations such as Outlook is connected to JP10 through JP12 on the distribution board board (see Figure 6 for terminal locations). Wiring instructions and appropriate wire gauge sizes are provided on the system riser diagram. DO NOT land two sets of wires on any control terminal unless shown in the riser diagram. Most control station runs are daisy-chained, and must not be paralleled at the distribution board. All control wiring should enter at the lower left-hand corner of cabinet.

Wherever possible, control station runs should be single pulls directly from the first control station in a daisy chained run. If connections must be made in a junction box due to length of run or other considerations, these connections must be soldered prior to installation of the wire nut. These are not power connections. They are electronic interconnections which feed data directly to a microprocessor in the processor module. Poor connections may cause problems by introducing electronic noise into the system, resulting in poor system operation. Table 1 shows the control station wire color codes.

**Table 1. Outlook Control Station Wiring Summary**

Cable: Belden 9773 or equal.				
Max Length: 1000 feet (300m - daisy chained runs only).				
Connector: Terminal block in dimmer rack. Unpluggable terminal block on stations.				
Term. #	Station Terminal Label	Signal Name	Comments	Pairs
4	V +	POWER +	control station power +	pair 1
1	V -	POWER -	control station power -	
2	LAN +	LAN DATA+	network signal true	pair 2
3	LAN -	LAN DATA-	network signal complement	PAIR 3
5				
6	SCRN	SCREEN		Screen wire
The terminals for connecting the network signal lines may be labelled DATA+ and DATA-, LAN+ and LAN-, or SMX+ and SMX-, depending on the control system to which you are connecting the station. Consult your system diagrams or risers.				

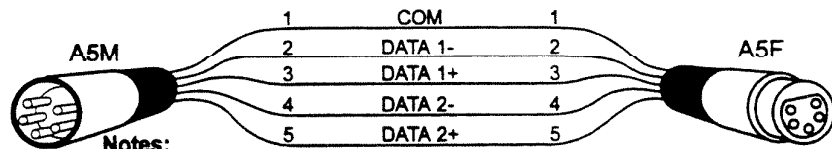
## DMX512 Dimmer Control Wiring

The two types of connections provided in Strand Lighting equipment for DMX512 dimmer control signals are the XLR style connector and terminal blocks. Unless otherwise specified, cabinets use terminal block connections and control consoles use XLR style connectors (see Table 2). DMX512 connections in Digital Environ cabinets are made on JP15 and JP16 (Mux A connections) or JP13 and JP14 (Mux B connections). Please see Figure 6 for terminal locations on the distribution board.

**Table 2. DMX512 Control Inputs**

Cable:	Belden 9841, 9842, or equal.				
Max Length:	Standard RS485 electrical characteristics apply, including line driver and receiver characteristics, line loading, and multi-drop configurations.				
Connector:	Terminal block in fixed cabinets and racks. "XLR" style connector on moveable racks and packs, and on control consoles.				
XLR Pin #	Terminal Label	DMX Signal	Comments	Pairs	Wire Color
1	DMX1-GND	COMMON	Dimmer Common (shield)		shield
2	DMX1-	DATA 1-	Dimmer Link Complement	pair 1	black
3	DMX1+	DATA 1+	Dimmer Link True		red
4	Not used	DATA 2-	Optional #2 Data Link Complement	pair 2	black
5	Not used	DATA 2+	Optional #2 Data Link True		white

*DATA 1- and DATA 1+ are one twisted pair. Common is tied to the cable shield. There are multiple DMX terminals, labeled DMX1-, DMX2-, DMX3-, etc. The above table shows only the DMX1 terminal set.*



**Notes:**

1. Use a cable approved for RS485
2. For electrical characteristics, including driver and receiver selection, line loading, and multi-drop configurations, see RS485 specification.

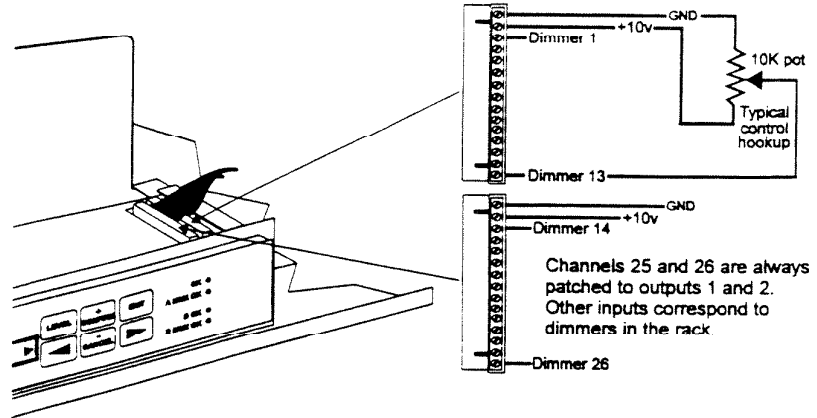
**Figure 8. DMX512 Dimmer Control Extension Cable**

## DMX512 Terminations

DMX512 connections are digital data connections (EIA Standard RS-485) and must be properly terminated. In multiple cabinet systems, make sure that the cabinet farthest away from the console (and only this cabinet) is terminated. The termination jumpers are located at the top edge of the Distribution board.

- The termination jumper for Mux A is jumper LK3.
- The termination jumper for Mux B is jumper LK2.

**Analog Control** The Digital Environ processor module has an analog input for each control channel. This control signal is piled on to the dimmer levels from the selected incoming protocol. These signals are input through two pluggable terminal blocks on the top of the processor module.



**Figure 9. Typical Analog Hookup**

For Microcontrol connections, see your riser diagram or system drawing package.

**Mode Switch Settings** The 8-position Mode DIP switch allow various control parameters to be changed as required.

**Table 3. Mode Switch Settings**

Position/ Condition	Effect
<b>Position 1-4 ON</b>	<b>reserved--these switches must be ON.</b>
<b>Position 5 ON</b>	<b>cabinet is small (can hold up to 6 power modules)</b>
<b>Position 5 OFF</b>	<b>cabinet is large (can hold up to 12 power modules)</b>
<b>Position 6 ON</b>	<b>single phase operation (two wire plus neutral)</b>
<b>Position 6 OFF</b>	<b>three phase operation (three wire plus neutral)</b>
<b>Position 7-9 OFF</b>	<b>reserved--these switches must be OFF.</b>

Factory default settings are shown in bold.

## Install Branch Breakers or Terminal Block Kits

Some power modules are stocked only in terminal block or branch breaker configuration. Conversion kits and instructions are supplied separately. Conversions should be made prior to module installation.

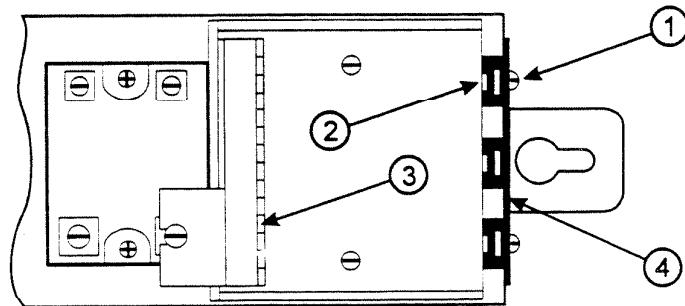
## Mount Power Modules

1. Remove power module and mounting screws from shipping carton. If a power module is equipped for branch breakers, breaker knockout plugs are included.
2. Install mounting screws in holes located at all module locations in cabinet. Refer to circuit schedule for correct module locations. Place all mounting screws prior to module installation.
3. Place power modules and tighten mounting screws to secure. Modules install easiest if the lowest power module as shown on the system drawings is installed first.
4. Remove module power feed insulator and re-strip power feed wires for module locations which are to be connected. Insulators are shipped on wire ends for safety. Wire harness ends are pre-numbered to indicate the correct power module location.
5. Connect power module power feed wires to copper screw lugs on the power module.
6. Install control wire plug connectors to the power modules. Wire harness ends are pre-numbered to show the appropriate power module location.

## Install Branch Breakers

Power module branch breakers are packaged separately and must be contractor installed on the power module.

Branch breakers are stab-in General Electric THQP series. Incandescent power modules accommodate up to 6 single-pole breakers (3 breakers per dimmer on dual power modules). Fluorescent power modules with only one dimmer accommodate up to 3 two-pole breakers. Dual fluorescent power modules are available only with terminal strip outputs.



1. Loosen clip screws.
2. Place circuit breaker foot tabs under clip.
3. Engage line side of circuit breaker with copper bus.
4. Hold clip down and tighten screws.

## Connect Load Wires

Load neutral wires are connected to the neutral bus on right side of cabinet.

Load wires are connected directly to the power module terminal block or branch breakers. Branch breaker identification is shown in Figure 10 on page 26. Terminal block identification is shown in Figure 11 on page 27.

All load wiring should enter at the top right-hand corner of the cabinet. Under no circumstances should load and control wiring be placed in the same conduit or raceway.

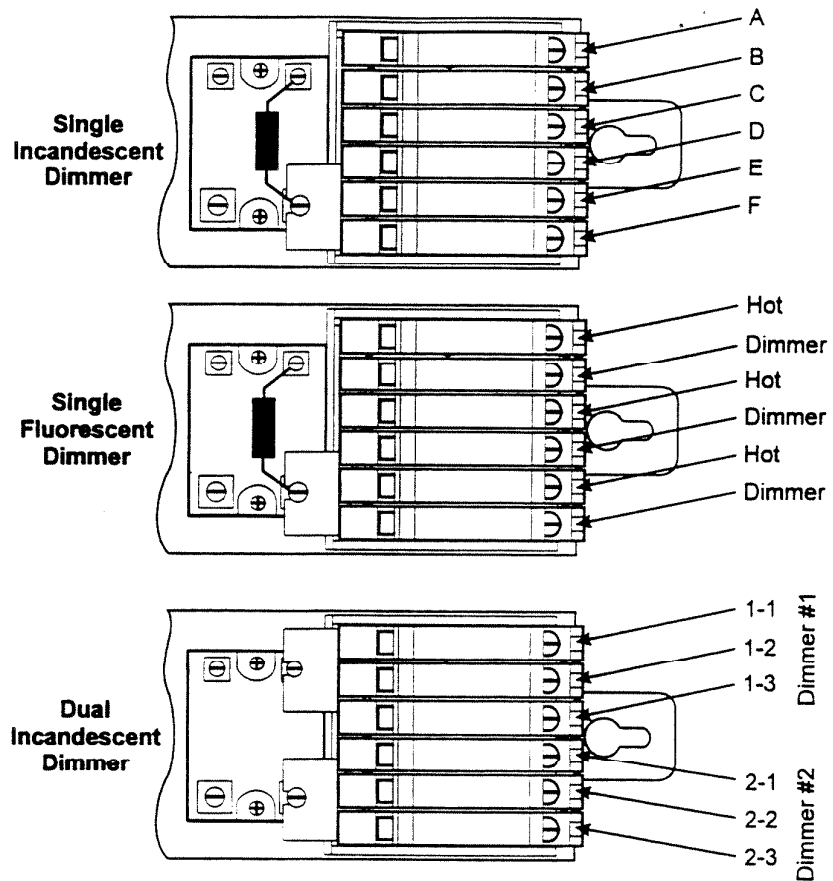
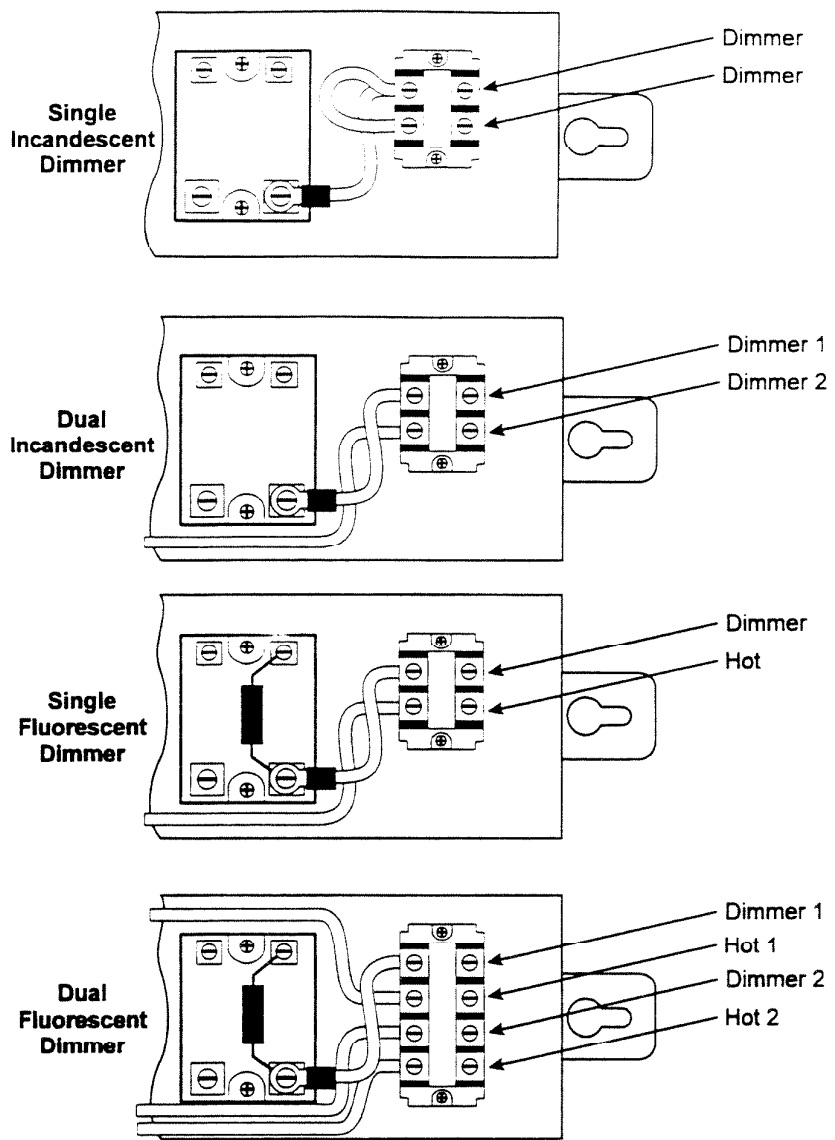


Figure 10. Branch Breaker Identification



**Figure 11. Terminal Block Identification**

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## Hardware Setup

Once you have finished you must set up the system as required for proper phasing, Panic operation, etc.

**Check All Wiring** Before applying power to the system you should double-check all of your wiring.

1. Check that all terminals and mechanical fixings are secured.
2. Check for stray wire strands and make sure wires are correctly restrained and not in contact with metal edges or obstructing the power module ventilation paths.
3. Check earth connections.
4. Double-check Neutral connections and positively verify phase orientation at the input busbars. Ensure that Neutral has not been confused with a phase - connecting the unit "across the phases" will do severe damage.
5. Make sure all power module control cables are connected.
6. Make a full safety inspection of all load wiring.

**Select Dimmers for Panic** Panic turns on any single dimmer, combination of dimmers, or all dimmers, bypassing system electronics.

Select panic for a dimmer using DIP switches located on the distribution board (see Figure 6). Each cabinet has 24 panic switches (three eight-pole DIP switches). Dimmers with switches in the up (ON) position are switched ON when you activate panic, regardless of their control station settings. Dimmers with panic select switches in the down (OFF) position are not affected when panic is activated. Cabinets are shipped with all switches in the up (ON) position.

**To activate panic:**

1. Activate a maintained switch or relay connected to the PANIC MAINT terminal to turn selected dimmers in all connected cabinets ON.
2. If the processor module is installed, press PANIC on the cabinet to turn selected dimmers in the cabinet ON.
3. Remove the processor module to turn selected dimmers in the cabinet ON.

**To deactivate panic:**

1. Deactivate a maintained switch or relay connected to the PANIC MAINT terminal to turn selected dimmers in all connected cabinets OFF.
2. If the processor module is installed, press NORMAL on the cabinet to turn selected dimmers in the cabinet OFF.
3. Re-install the processor module to turn selected dimmers in the cabinet OFF.

*Make sure that the reason for removing the processor module has been repaired, and turn power to the rack OFF while installing the module.*

**Set Correct Phasing** Correct phasing for the processor module is set on the distribution board. Mode switch 6 (switch 6 of DIP switch S1 on the distribution board) must be ON for single phase systems and OFF for three phase systems. This switch is on the distribution board.

**Close the Cabinet** Once all internal settings are completed, and all wiring checked, you can close the cabinet.

1. Clean out any installation debris from the cabinet.
2. Remove inner panel circuit breaker knockouts as required before installing power modules and branch breakers. For power modules without secondary branch breakers, remove only the primary circuit breaker knockouts.
3. Plug any open spaces around branch breakers with the breaker knockout plugs provided.
4. Place inner panel and secure with screws provided.
5. Install the cabinet door.

**Apply System Power** Systems purchased without Field Service commissioning (turn-on) are now ready for system power. For such systems, follow the steps below. If commissioning is required, a notice appears on the riser diagram that the system should not be energized without a factory technician present. Call and request scheduling for commissioning as early as possible. Due to heavy scheduling requirements, the normal time required for proper scheduling is at least two weeks. Please mail back the enclosed commissioning request sheet. Early receipt will help insure that your turn-on requirements are met.

1. Check power to make certain that it is correctly rated per system riser. If not, correct before proceeding.
2. Apply power to system.
3. If system does not function properly, follow the Trouble-shooting Guide starting on page 31. If these steps fail, or for assistance with replacement parts, please call Strand Lighting directly.

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## System Tests

Once you have applied power, there are a number of indicators that you should check before proceeding with cabinet setup.

**Startup** When the cabinet is switched ON, a number of self-tests are run and the system displays the following message for a few seconds:

DE90 V.C1 LS

This display shows the software version (C1 in this example) and the cabinet type (large single phase cabinet in this case). Cabinet type codes are:

- LT = large three phase cabinet
- LS = large single phase cabinet
- ST = small three phase cabinet
- SS = small single phase cabinet

The default display appears as soon as this software check is complete.

Rack No.:01

*If either of these displays fail to appear, switch the power OFF immediately and check the installation again. If all wiring seems correct, call Strand Lighting.*

- After Startup**
1. Make sure that the L1, L2, and L3 LED's are lit and are the same intensity if you have a three phase supply, or that the L1 and L3 LED's are lit and are the same intensity if you have a single phase 3-wire supply.
  2. Make sure that the OK LED is lit and is not flashing.

### IMPORTANT



*If any of the LEDs do not illuminate, switch the power OFF immediately and check the installation again.*

3. Refer to the *Setup* chapter and set up the variable parameters on the cabinet as required.
4. Switch on all load circuit breakers.
5. Connect a suitable luminaire to each outlet and check every dimmer using the LEVEL control facility, a suitable control console, or System Wide Control. Investigate and correct any malfunctions you find.