PRICE: $10.00

ENVIRON 2

DIMMER CABINET INSTALLATION MANUAL

Strand Electro Controls

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Comments and suggestions for corrections and/or updates to this manual are appreciated and will be considered for the next printing if forwarded in writing (red-lined photocopy preferred) to the Architectural Product Manager at the Salt Lake City facility.

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Environ 2 Dimmer Cabinet Installation Manual

This section provides information on manual organization, and details procedures for getting your suggestions to Strand Electro Controls, and receiving help if necessary.

1. INTRODUCTION

This document contains instructions required for contractor installation of Environ 2 dimmer cabinets and ancillary equipment manufactured by Strand Lighting North America or Strand Electro Controls, and designed for use in 120, 277, 100 and 220 VAC applications.

WARNING!!!

Dimming systems must be installed and wired according to approved drawings as submitted from Strand Lighting or Strand Electro Controls Engineering Department. Should the actual installation of the dimmer modules and load wires deviate from these drawings, the installer must return a marked-up set directly to the Engineering Department, as the system may not function correctly until a new Data Cartridge is made.

An Applications Engineer will evaluate the returned drawings to determine how the operation of the system can be modified, and will then produce a final set of "as-built" drawings for record purposes. Failure to comply may void the warranty and prevent correct system operation. The decision of the Strand Engineering shall be final. If necessary, the installer shall correct to Strand satisfaction any deviations from drawings.

1.1 Manual Organization

This manual is divided into 3 major sections as shown below.

INTRODUCTION

Warnings and manual organization (chapter 1)
How to get help (chapter 2)

INSTALLATION

Dimmer Cabinet (chapters 3 and 4)
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MAINTENANCE

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2. TECHNICAL ASSISTANCE

Environ 2 systems require a minimum of maintenance and servicing. All components are modular, allowing performance of service and maintenance operations without special tools or equipment.

2.1 Problems

If equipment fails to operate properly upon installation, or under normal load and temperature conditions, and the basic trouble-shooting procedures in this manual are not effective, please contact Strand Lighting Field Service or Strand Electro Controls Field Service at the office serving your area before returning any equipment. You will be issued an RGA (Return Goods Authorization), which will allow tracking of returned equipment, and speed its return to you.

2.2 Technical Questions

For technical questions regarding setup, operation, or maintenance of this equipment, please contact the Strand Lighting Field Service or Strand Electro Controls Field Service office serving your area (see reverse side of manual title sheet for addresses and phone numbers).

2.3 Parts Purchases

For purchase of spare parts or documentation, Please contact Strand Electro Controls Customer Service in the Salt Lake City office.

2.4 Comments and Suggestions

For comments regarding equipment functions and/or suggested enhancements, or for comments on this manual, please call or write to the Architectural Product Manager at the Salt Lake City office.

INSTALLATION

Environ 2 Dimmer Cabinet Installation Manual

This section provides information on installation of the Dimmer Cabinet, Dimmer Modules, and Electronics Modules, as well as basic setup procedures.

3. *INSTALL CABINET*

3.1 Plan Conduit Layout

The location of conduit runs and their entrance to the dimmer cabinet is important and should be carefully planned prior to cutting any holes or attaching conduit.

DO NOT run power feed or load wires in same conduit or wireway as control wiring.

DO NOT run wiring from more than one Environ 2 system in the same conduit or wireway.

DO NOT run any wiring from other manufacturers' equipment in the same conduit with Environ 2 wiring.

DO NOT run any wiring from unrelated Strand Lighting or Strand Electro Controls equipment in the same conduit with Environ 2 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. Electronic and computer controlled systems (including Environ 2) 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 any unshielded wiring specified, or for conduit. Electronic characteristics of the wiring are affected and may cause problems with the control signals.

3.2 *Mount Cabinet*

A. Large 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.

B. Small Cabinet

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.

3.3 *Cut Conduit Entrance Holes*

A. Remove lift off hinged door and cabinet inner panel.

B. Mask off Power Supply and AC Reference Module to prevent metal chips from falling inside modules during cutting.

C. Cut conduit entrance holes in specified areas.

D. Clean any metal chips from cabinet and remove masking from Power Supply and AC Reference Module.

4. CONNECT CABINET WIRING

4.1 Connect System Ground

System ground connection is made at ground lug in upper right portion of Dimmer Cabinet.

4.2 Connect Main Feed

Main power feed connections are made at main feed terminal block in upper left portion of Dimmer Cabinet. Neutral feed is connected to neutral bus on right-hand side of Dimmer Cabinet. Feed cable should enter from top of cabinet only.

Dimmer cabinets are usually shipped pre-wired for 3 phase power. If the system is to be installed with single phase power, and were not shipped from the factory wired as such, please follow diagrams on page 15 or 16 . Note that in the small Dimmer Cabinet, a splice lug is used for the two #12AWG wires from the A.C. Reference Module (Hollingsworth #P4138 or equal).

Maximum feed wire size is:

Large cabinet: 400MCM
Small cabinet: 2/Ø

4.3 Connect Auxiliary Control Wire Harness

The Auxiliary control wire harness is required only with Quad dimmer modules (#7541). Wiring instructions are provided with the harness kit (Part #3-199024-000, Kit, Accessories, Quad Dimmer).

4.4 Connect Power Failure Sensing Relay Wires

Power failure sensing connections (when required) are made on AC Reference Module. Wiring instructions are shown in the system drawing package.

4.5 *Connect Panic Station Wiring*

Panic Station wires are connected to PANIC terminals on termination board in lower left-hand corner of Dimmer Cabinet. Wiring instructions are included on riser diagram in system drawing package. Panic Station wiring may be paralleled at PANIC terminals.

Systems using a 7810 Control Module require a jumper between terminals 13 and 14 for panic to function properly. Check system drawings and install if required.

When more than one cabinet is installed in a system, the PANIC terminals in all cabinets must be paralleled to properly operate default panic. Automatic and selective panic features are described on page 25 .

esc

4.6 *Connect Control Station Wiring*

Control station wires are connected at the Control Termination Board. 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 termination board. All control wiring should enter at lower left-hand corner of Dimmer 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 control module. Poor connections may cause problems by introducing electronic noise into the system, resulting in poor system operation. Table 1 is provided as a quick reference for control station color codes.

Table 1. Control Station Wiring Summary

6 WIRE MULTIPLEX CONTROL STATIONS
(7000 AND 7200 SERIES)

RED	= POWER
BROWN	= COMMON
VIOLET	= CLOCK
YELLOW	= DATA
GRAY	= COMMON
BLUE	= ANALOG/SWITCH

Brown and Gray are spliced together at the station. These stations require a total of 5 #16 AWG wires. If multiple stations are daisy chained, use #12 AWG wire rather than #16 AWG wire. Maximum allowed wire length is 1500 feet.

4 WIRE MULTIPLEX CONTROL STATIONS
(7300 AND 7400 SERIES)

RED	= POWER
BROWN	= COMMON
VIOLET	= CLOCK
YELLOW	= DATA

If multiple stations are daisy chained, use #12 AWG wire rather than #16 AWG wire. Maximum allowed wire length is 1500 feet.

ANALOG CONTROL STATIONS
(7000 SERIES)

All Analog Control Stations require the following #16 AWG wires.

ORANGE	= SWITCH/POWER
BROWN	= COMMON
RED	= POWER
WHITE/BLACK	= ON/OFF

In addition, one or more of the following wires will be required, depending on the number of controllers on the station. Stations with more than 8 sliders use labeled terminal strip connectors.

WHITE/BROWN	= SLIDER 1
WHITE/RED	= SLIDER 2
WHITE/ORANGE	= SLIDER 3
WHITE/YELLOW	= SLIDER 4
WHITE/GREEN	= SLIDER 5
WHITE/BLUE	= SLIDER 6
WHITE/VIOLET	= SLIDER 7
WHITE/GRAY	= SLIDER 8

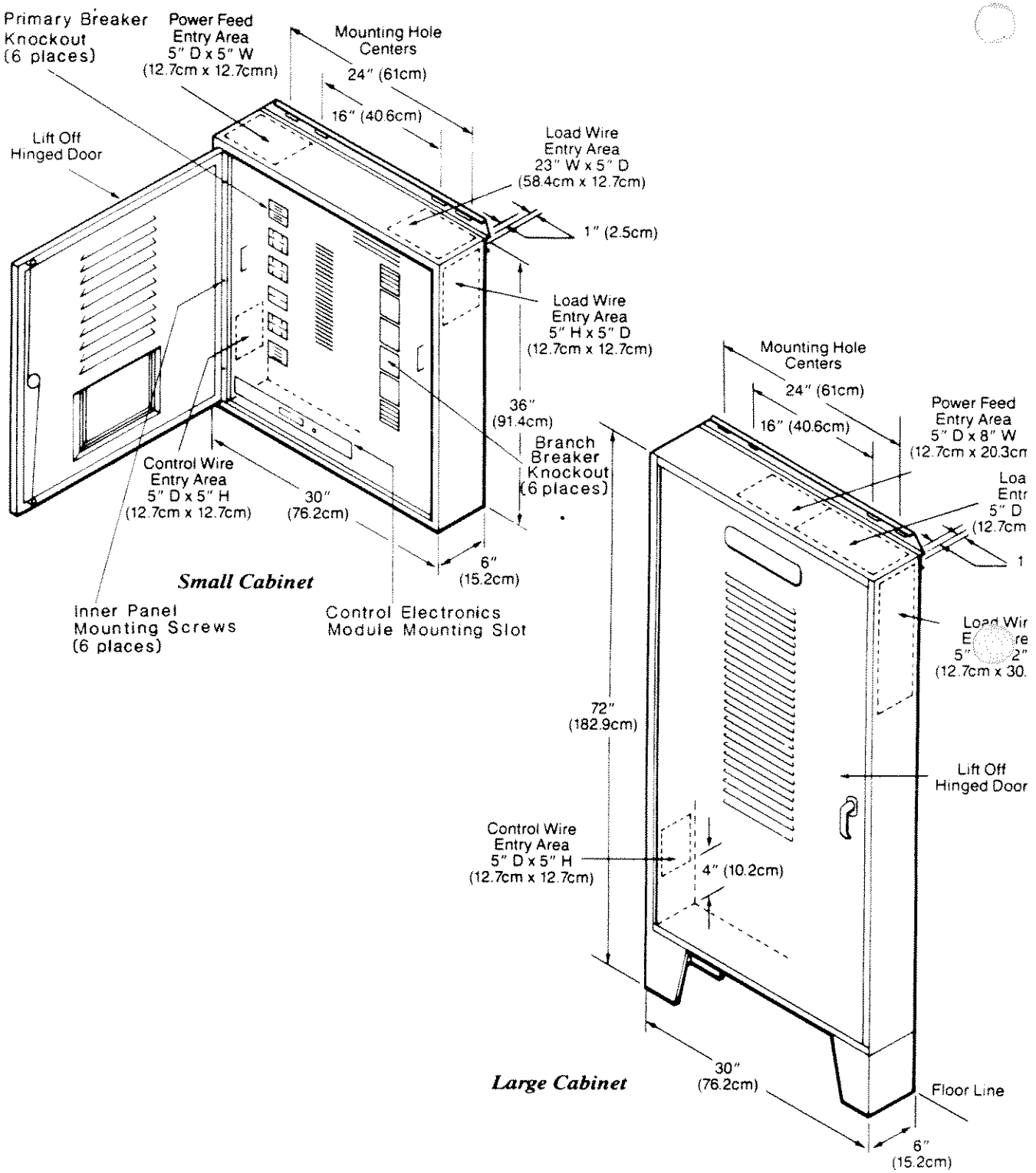
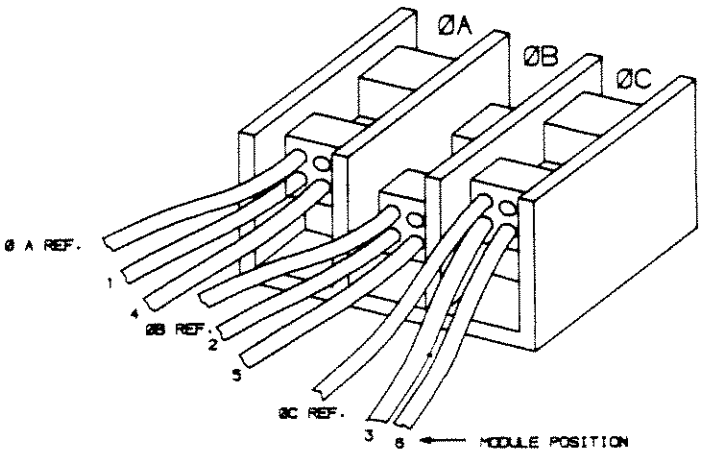


Figure 1. Dimmer Cabinet Outline And Mounting

SMALL CABINET POWER FEED BLOCK

Block - Strand part #1-100017-000 (Marathon #1423570)
Input Range - #2/0 - #12 copper or aluminum

THREE PHASE 4 WIRE STANDARD
(100 Amps Max)



SINGLE PHASE 3 WIRE CONVERSION
(150 Amps Max)

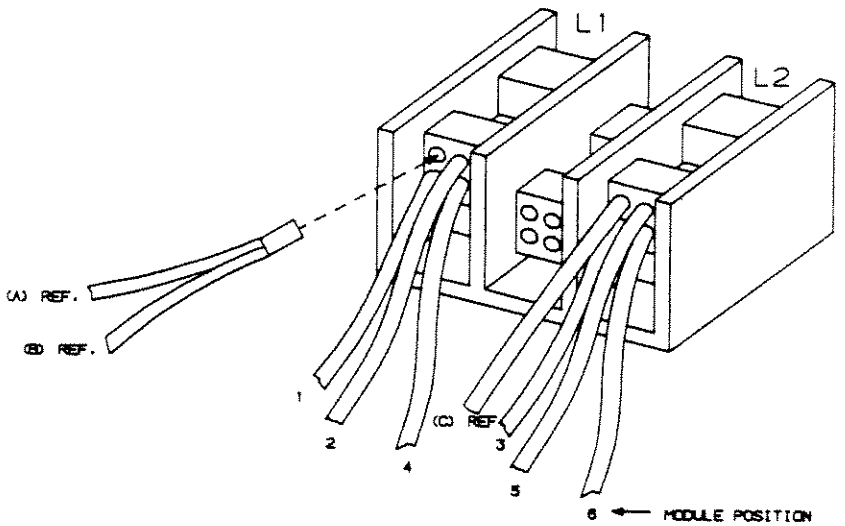
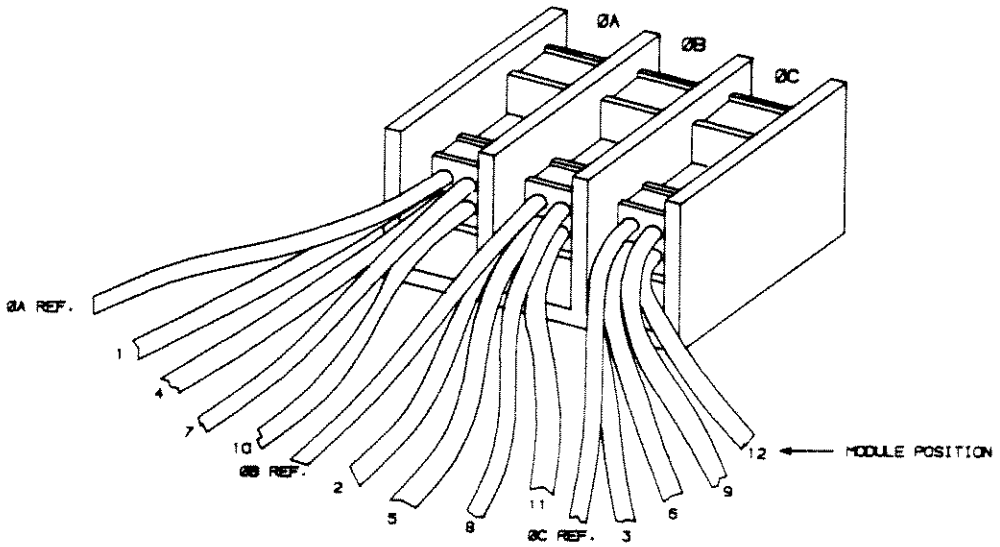


Figure 2. Small Cabinet Power Phase Wiring

LARGE CABINET POWER FEED BLOCK

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

THREE PHASE 4 WIRE STANDARD
(200 Amps Max)



SINGLE PHASE 3 WIRE CONVERSION
(300 Amp Max)

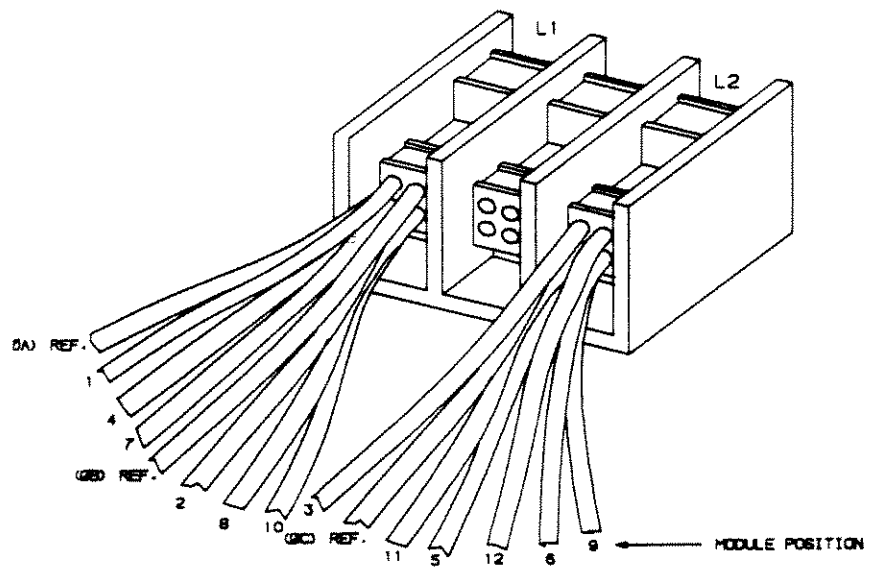


Figure 3. Large Cabinet Power Phase Wiring

5. INSTALL DIMMER MODULES

5.1 Install Branch Breaker Or Terminal Block Kits

Some dimmers 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.

5.2 Mount Dimmer Modules

A. **Remove Dimmer Module** and mounting screws from shipping carton. If a Dimmer Module is equipped for branch breakers, breaker knockout plugs are included.

B. **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.

C. **Place Dimmer Modules** and tighten mounting screws to secure. Modules install easiest if the lowest dimmer as shown on the system drawings is installed first.

D. **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 Dimmer Module location.

E. **Connect Dimmer power feed** wires to copper screw lug on Dimmer Module.

F. **Install control wire plug connectors** on Dimmer Modules.

Wire harness ends are pre-numbered to indicate the appropriate Dimmer Module location.

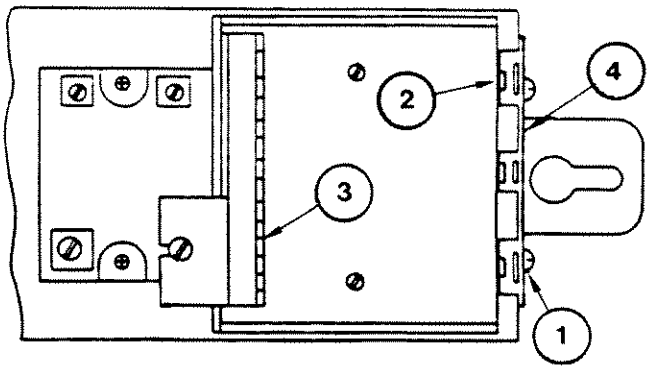
5.3 Install Branch Breakers

Dimmer branch breakers are packaged separately and must be contractor installed on the Dimmer Module.

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

Care must be taken when installing branch breakers to prevent damage. The following instructions are also included on the dimmer mounting section.

1. Loosen Clip Screws
2. Place C.B. foot tabs under clip
3. Engage line side of C.B.s with copper bus.
4. Hold clip down and tighten screws.



Failure to follow this procedure may result in broken circuit breakers.

5.4 Connect Load Wires

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

Load wires are connected directly to Dimmer Module terminal block or branch breakers. Branch breaker identification is shown on page 22 . Terminal block identification is shown on page 23 for incandescent dimmers and page 24 for fluorescent dimmers.

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.

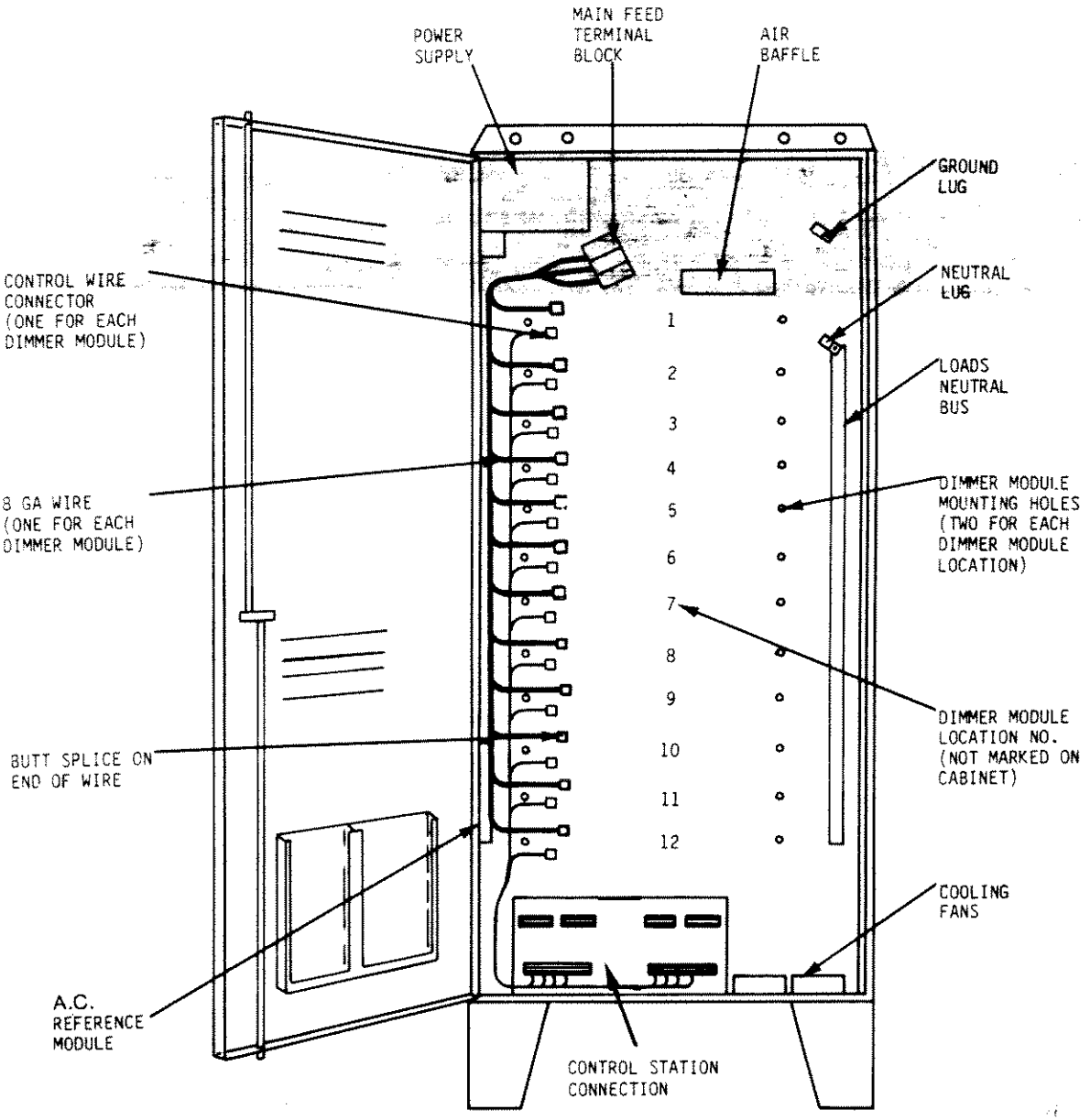
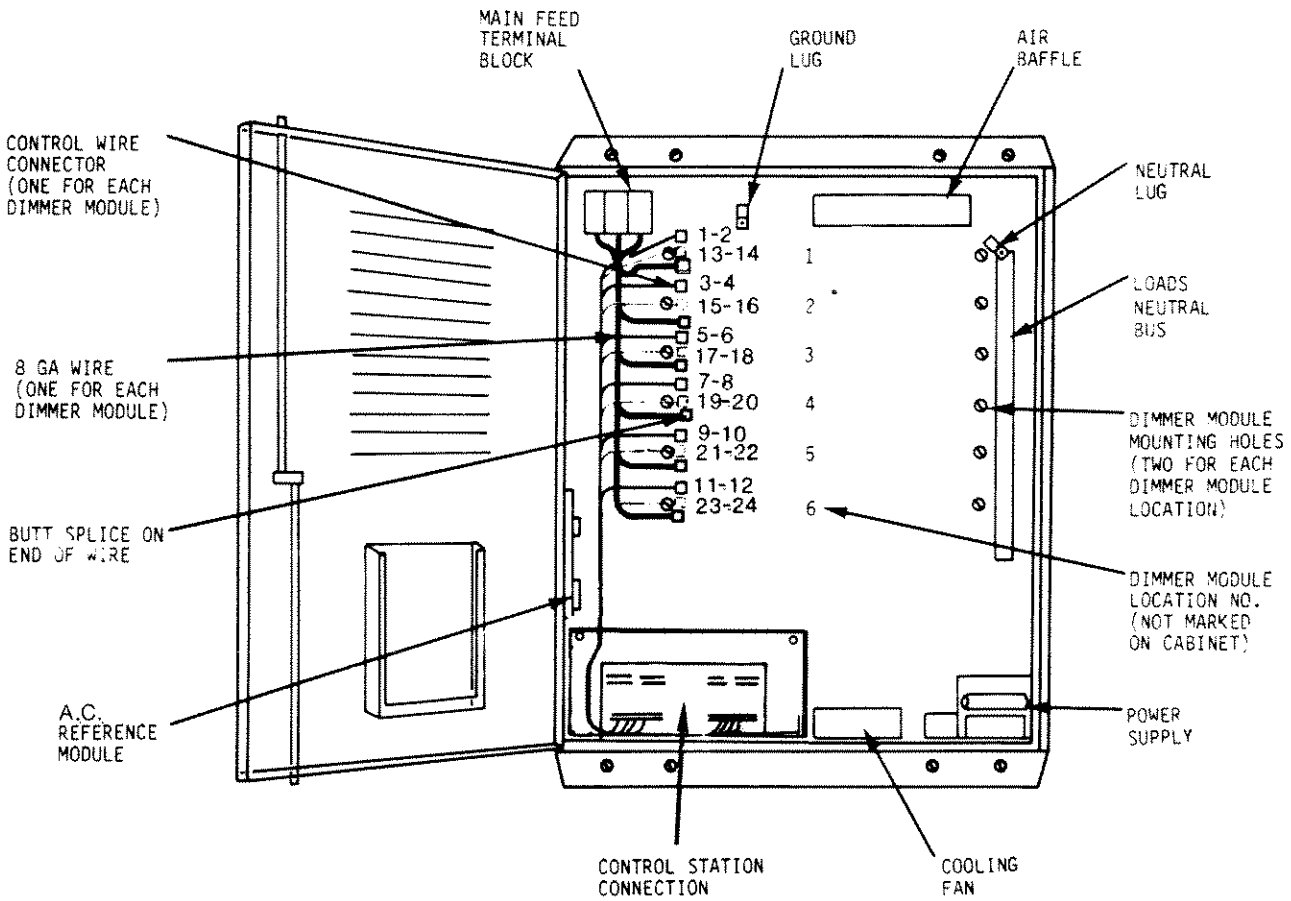


Figure 4. Large Cabinet Interior



NOTE: Drawing shown complete with optional wire harness for Quad Dimmer Module.

Figure 5. Small Cabinet Interior

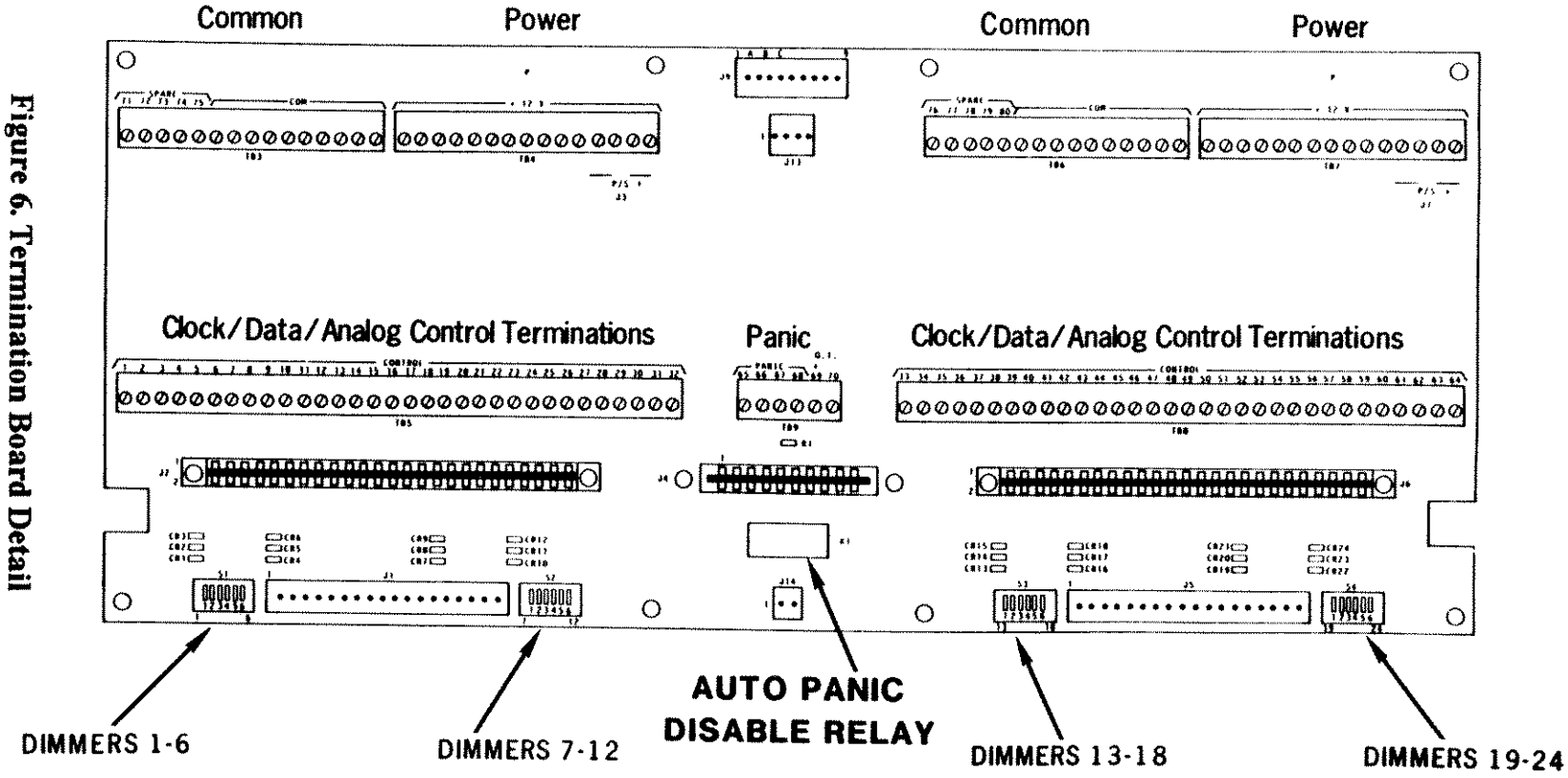
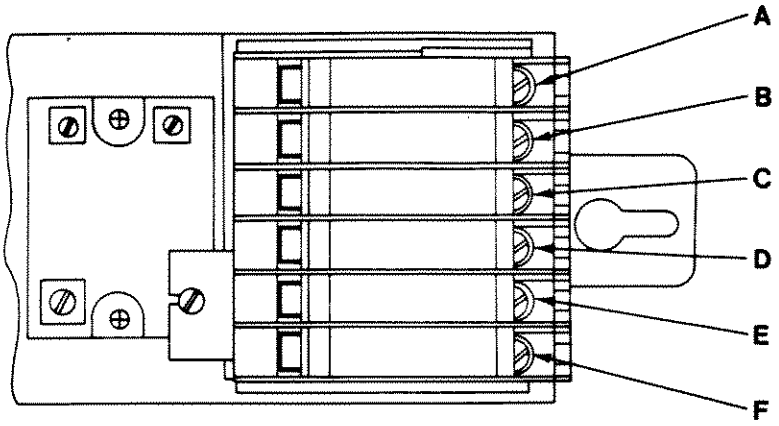
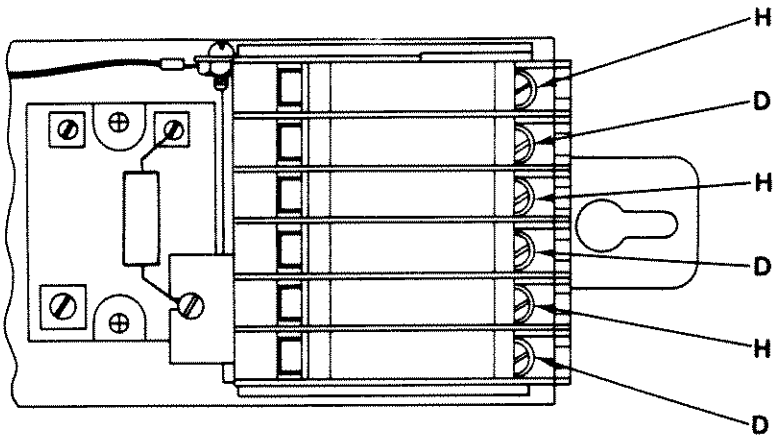


Figure 6. Termination Board Detail

Single Incandescent Dimmer

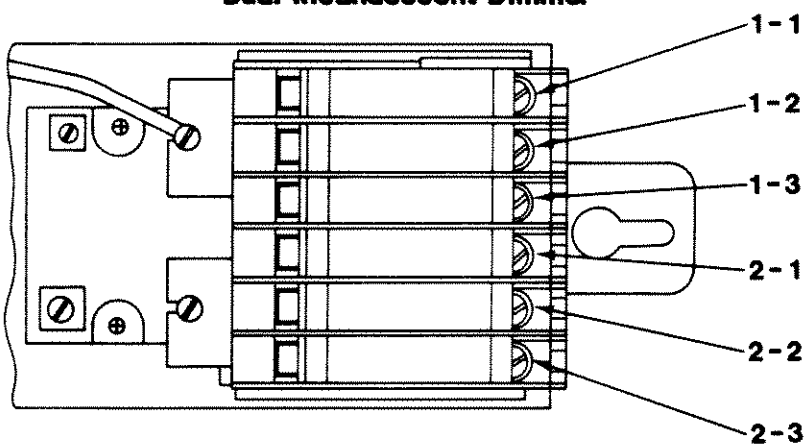


Single Fluo cent Dimmer



NOTE:
D–Dimmer
H–Hot

Dual Incandescent Dimmer

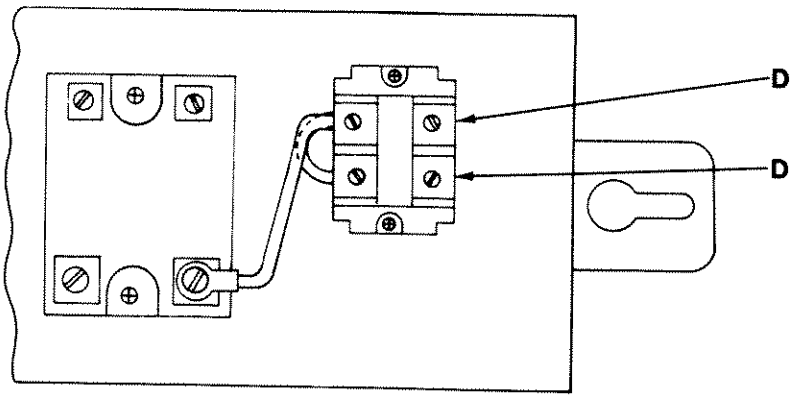


Dimmer #1

Dimmer #2

Figure 7. Branch Breaker Identification

Single Dimmer



Dual Dimmer

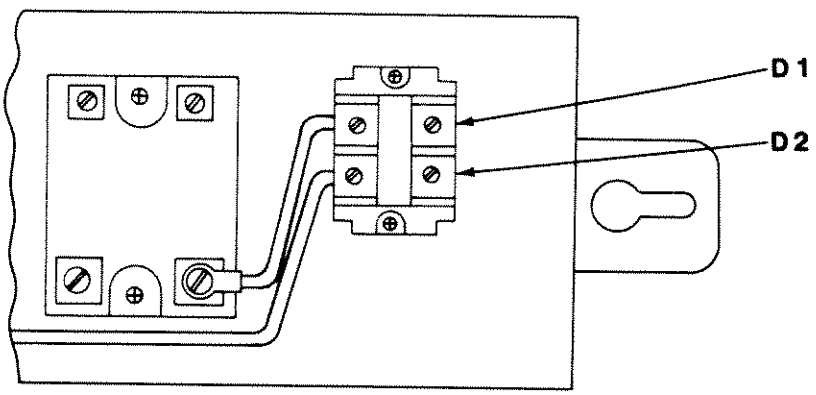
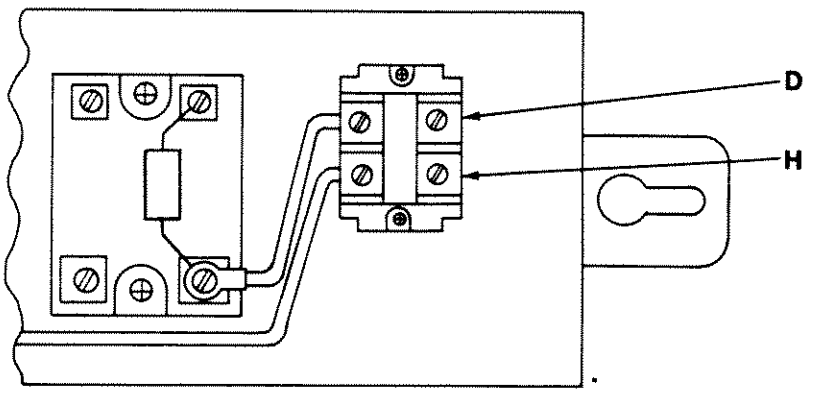


Figure 8. Incandescent Dimmer Terminal Block I.D.

Single Dimmer



NOTE:
D–Dimmer
H–Hot

Dual Dimmer

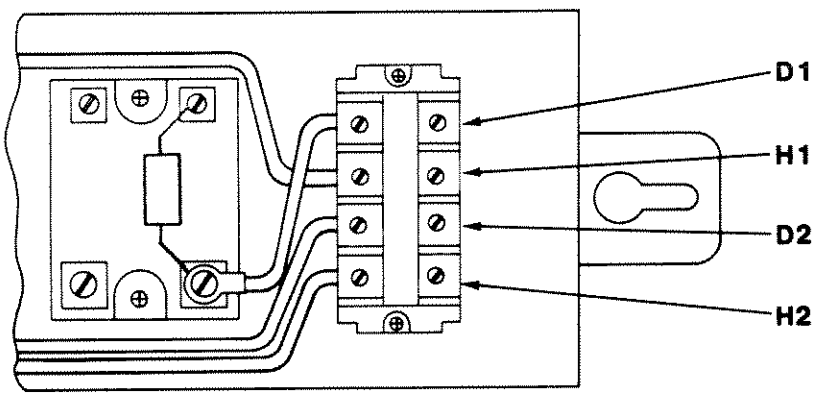


Figure 9. Fluorescent Dimmer Terminal Block I.D.

6. FINISH INSTALLATION

6.1 Select Dimmers For Panic

Panic turns on any single dimmer, combination of dimmers, or all dimmers, bypassing system electronics. It is activated in one of three ways:

A. Pushing "PANIC" on a Remote Panic Station (#7951 or equivalent) turns enabled dimmers ON.

B. When electronics module is installed, switching "NORMAL/PANIC" switch to PANIC turns enabled dimmers ON.

C. When main power is ON and electronics module is removed, enabled dimmers will come ON.

Panic Station wiring is shown on the system riser diagram.

Select panic for a dimmer using DIP switches located on the Termination Board (see page 21). Each Dimmer Cabinet has 24 panic switches (four six position DIP switches). Activating panic turns dimmers with switches in the up position ON (100%), regardless of their Control Station settings. Dimmers with switches in the down position are not affected in A and B above, and go OFF in C. Dimmer cabinets are shipped with all switches in the up position.

Environ 2 systems with a Control Module (7810) in the Dimmer Cabinet must have a jumper wire between terminals #13 and #14 for proper Panic operation.

Panic DIP switches and the "NORMAL/PANIC" switch on the Electronics Module only affect dimmers in their own Dimmer Cabinet unless otherwise indicated on system drawings.

6.2 Remove Circuit Breaker Knockouts

Remove inner panel circuit breaker knockouts as required before installing Dimmer Modules and branch breakers. For Dimmer Modules without secondary branch breakers, remove only the primary circuit breaker knockouts.

6.3 Install Inner Panel

Place inner panel and secure with screws provided.

6.4 Place Branch Breaker Knockout Plugs

Open spaces around branch breakers must be plugged with breaker knockout plugs supplied for proper system ventilation.

6.5 *Install Electronics Module*

The Electronics Module plugs into the lower left-hand slot of the inner panel, after panel installation. Three types are available (see Figures 10, 11, and 12). The module required for each cabinet is shown on the system drawings.

A. **Pre-installation checks**

Before installation, set the phase change switch to match the main power feed (i.e., single phase or three phase - see page 30).

B. **Installation**

Always turn OFF main power to Dimmer Cabinet before removing or installing Electronics Module. Insert Electronics Module using the guides at either end of the access slot, and push firmly to seat in Termination Board connector.

6.6 *Apply System Power*

Systems purchased without Field Service commissioning (turn-on) are now ready for system power. For such systems, proceed to step A 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.

A. Check power to make certain that it is correctly rated per system riser. If not, correct before proceeding.

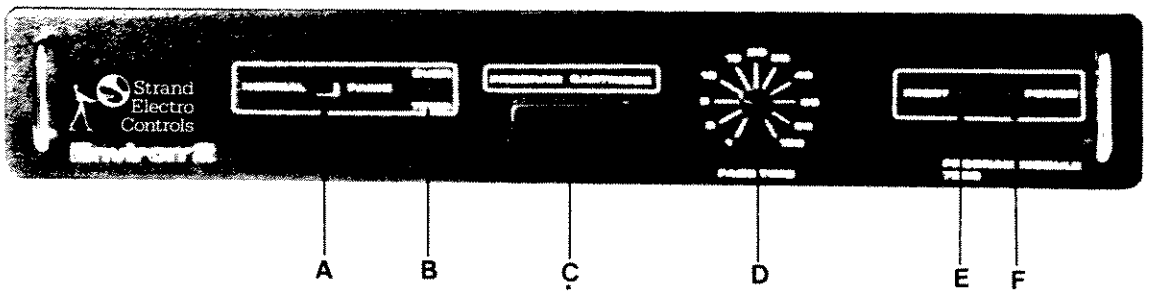
B. Apply power to system.

C. If system does not function properly, follow the Trouble-shooting Guide starting on page 35 . If these steps fail, or for assistance with replacement parts, please call Strand Electro Controls directly.

6.7 *System Environmental Considerations*

All electronic equipment operates more reliably if proper temperature and environmental conditions are maintained. Environ 2 Dimmer Cabinets have an overtemperature sensor which shuts down the system in case of dangerous overheating. Rooms in which this equipment is operated should not exceed 80°F or 90% humidity (non-condensing) for any extended period of time. Dimming equipment dissipates waste heat (maximum 2-4%). A system with 24, 2.4KW dimmers running at full could have a heat loss of 1-2KW or more. Though fans are provided to help vent heat out of the dimmer cabinet, adequate ventilation of the dimmer room is still required.

The Program Module is the main system computer for Programmable Environ 2 systems. It provides dimmer drive signals to dimmers in its own Dimmer Cabinet, and control signals for the entire system. Each Programmable Environ 2 system may consist of up to 192 dimmers controlled by up to 128 channels. System configuration is defined in the Data Cartridge plugged into this module. Upon initial installation of the Data Cartridge, the "RESET" button must be pushed to load Data Cartridge information into the system.



A. {NORMAL/PANIC} Switch - Enables/Disables Panic for its own Dimmer Cabinet. Does not affect other Dimmer Cabinet(s).

B. "OVERTEMP" Indicator - Lights when Dimmer Cabinet internal temperature reaches 65° C. System shuts down at this time, and will not reactivate until temperatures return to acceptable levels.

C. System Data Cartridge slot.

D. {FADE TIME} Control - Sets default fade time.

E. {RESET} Switch (behind front panel hole) - Resets system. Preset information will be cleared. Activate with a small plastic tool.

F. "POWER" Indicator - Lights when +12 volts DC from Power Supply is available.

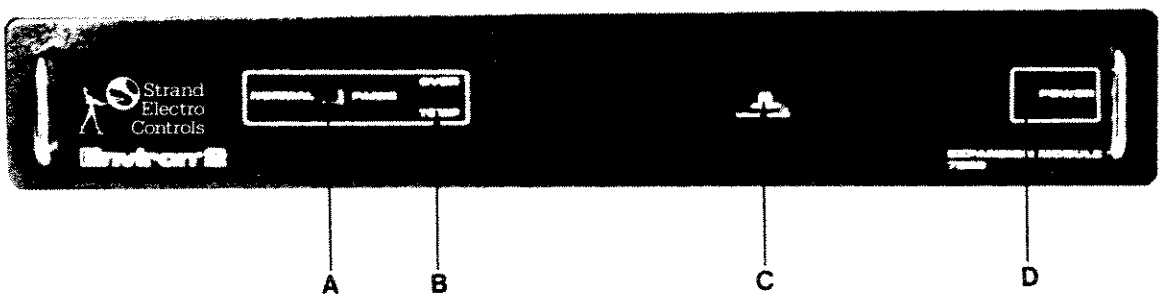
Figure 10. Program Module Front Panel

The Expansion Module is used when more than one Dimmer Cabinet is required. It is a "slave" module, and requires a control signal from a Program Module or other controlling device. One is required per cabinet.

The thumbwheel switch selects the dimmer numbers represented in its own cabinet. Switch positions correspond to dimmers as follows:

DIMMER NUMBER	POSITION
1 thru 24	0
25 thru 48	1
49 thru 72	2
73 thru 96	3
97 thru 120	4
121 thru 144	5
145 thru 168	6
169 thru 192	7

The Program Module controls dimmers 1-24 (position "0"). Expansion Module #1 controls dimmers 25-48 and its switch set to "1". Expansion Module #2 is set to "2" and controls dimmers 49-72, etc.



A. {NORMAL/PANIC} Switch - Enables/Disables Panic for its own Dimmer Cabinet. Does not affect other Dimmer Cabinet(s).

B. "OVERTEMP" Indicator - Lights when Dimmer Cabinet internal temperature reaches 65° C. System shuts down at this time, and will not reactivate until temperatures return to acceptable levels.

C. Thumbwheel Switch - Used to select starting dimmer number of the cabinet.

D. "POWER" Indicator - Lights when +12 volts from Power Supply is available.

Figure 11. Expansion Module Front Panel

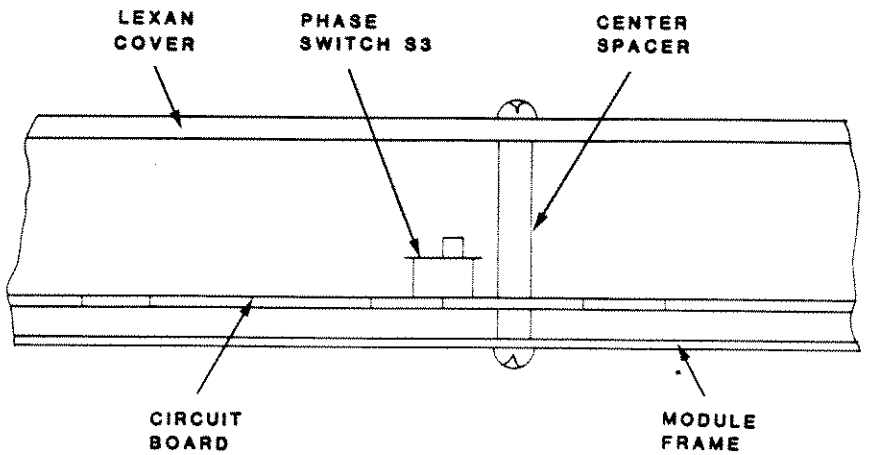
The Control Module is used in all Environ 2 Analog systems, and controls up to 24 dimmers, depending on dimmer capacity.

A. "NORMAL/PANIC" Switch - Enables/Disables Panic for Dimmer Cabinet in which Module is installed. Does not affect other Dimmer Cabinet(s).

B. "OVERTEMP" Indicator - Lights when Dimmer Cabinet internal temperature reaches 65° C. System shuts down at this time, and will not reactivate until temperatures return to acceptable levels.

C. "POWER" Indicator - Lights when 12 volts from Power Supply Module is available at Control Module.

Figure 12. Control Module Front Panel



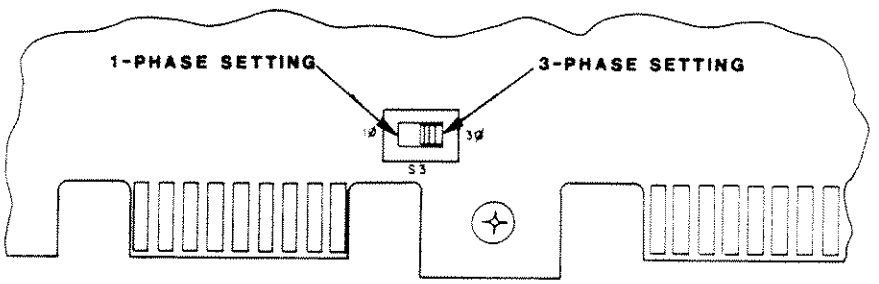


Figure 13. Phase Switch Location And I.D.

MAINTENANCE

Environ 2 Dimmer Cabinet Installation Manual

This section provides information on maintenance and basic trouble-shooting of Environ 2 equipment.

7. *PERIODIC MAINTENANCE*

The only periodic maintenance required for Environ 2 equipment is as follows:

1. Check for dust accumulation that might restrict the flow of cooling air through the heat sinks on the Dimmer Modules. Clean cabinet as necessary.

2. Make certain that the fan (Small Dimmer Cabinet) or fans (Large Dimmer Cabinet) are operational. If not, trouble-shoot as necessary and replace or repair the defective fan or electronics.

3. Make certain that ventilation to the Dimmer Cabinet room has not been blocked. Fully loaded dimmers produce 2-4% of their rated capacity as waste heat while in operation. The OVERTEMP sensor will indicate an overtemperature condition, and shut the system down, leaving all rooms controlled by the overheated Dimmer Cabinet in the dark. A properly ventilated dimmer room is critical to the operation of this equipment. For emergency purposes, activating PANIC will re-activate all lights enabled on PANIC, bypassing the overtemperature sensor and shutoff mechanism. **This procedure should be used only in an extreme emergency, as this is an override of a safety system, and damage to the dimming system may result.**

8. BASIC TROUBLE-SHOOTING

8.1 Problems With Entire Rack Or Major Portion

Total or major part of system does not power up load circuits correctly. Failures of this nature will be by entire phases.

A. POWER INDICATOR DOES NOT LIGHT.

1) POSSIBLE CAUSE
Improper seating of Electronics Module.

SOLUTION
Unplug Module and reseat.

2) POSSIBLE CAUSE
Burned out fuse on AC Reference Module.

SOLUTION
Replace burned out fuse. If fuse burns out again immediately, clip out transient suppresser disk next to affected fuse and replace fuse again. Then call Strand ELectro Controls. Even if this temporarily solves the problem, a new transient suppresser should be installed.

3) POSSIBLE CAUSE
No 12 Volts between "P" (12V) and "COM" on termination board.

SOLUTION
Disconnect red wire from J3 on termination board and check for 12 volts between black and red wire. If no voltage, check output at power supply. If no voltage at power supply, cut leads to transient suppresser (blue cube with LED). In later model Environ 2 systems, this blue cube was eliminated, and may not be present. If still no voltage, replace power supply.

If voltage appears at power supply but not at red wire, check wiring between the two locations.

If 12 volts is present with red wire disconnected from J3, remove Electronics Module and reconnect red wire. If voltage is OK, replace Electronics Module.

If 12 volts is not available with Electronics Module removed, check for miss-wired control station by removing wires, one-by-one from P(12V) terminal block on termination boards.

B. ALL LIGHTS ARE ON FULL ALL THE TIME AND CANNOT BE TURNED OFF.

1) POSSIBLE CAUSE
Auto-Panic is permanently engaged.

SOLUTION
In systems with 2 termination boards, remove Electronics Module and push micro switch located between the two termination boards. If lights go off, then carefully pry switch mounting forward about 1/8 inch. Reinstall Electronics Module.

In systems with single termination board, remove Electronics Module. Then remove small DIP relay in center bottom of termination board. If lights go out, relay is probably defective.

C. SOME LIGHTS (RANDOM) ARE ALWAYS ON AND CANNOT BE CONTROLLED.

1) POSSIBLE CAUSE
Auto-Panic is stuck on as in B, except not all dimmers are assigned to Panic.

SOLUTION
Follow directions as in B above.

D. NO LIGHTS WILL COME ON WHEN CONTROL MODULE IS REMOVED (AUTO-PANIC NOT WORKING).

1) POSSIBLE CAUSE
No DIP switches set to "ON".

SOLUTION
Set desired DIP switches to "ON".

2) POSSIBLE CAUSE
This system does not have properly wired Panic.

SOLUTION
Ensure that Panic control wires are properly daisy-chained between all dimmer cabinets in the system.

3) POSSIBLE CAUSE
Panic not functioning.

SOLUTION
See "F" below.

E. LIGHTS WILL NOT COME UP WHEN CONTROL MODULE PANIC IS USED.

1) POSSIBLE CAUSE
Improperly seated Electronics Module.

SOLUTION
Reseat Electronics Module.

2) POSSIBLE CAUSE
No DIP switches are in the "ON" position.

SOLUTION
Turn on appropriate DIP switches.

F. PANIC STATION WILL NOT BRING ANY DIMMERS ON.

1) POSSIBLE CAUSE
Improper Panic Station wiring.

SOLUTION
Check wiring from Panic Station.

2) POSSIBLE CAUSE
Improper wiring between Panic terminals 65, 66, 67, and 68 (if applicable) and AC Reference Module terminals 1,2,3,and 4 respectively.

SOLUTION
Trace wiring between these points and correct or repair as necessary.

3) POSSIBLE CAUSE
The Panic relay on the AC Reference Module is not functioning correctly.

SOLUTION
Check operation by shorting TB2-3 to TB2-1 for "PANIC" and TB2-3 to TB2-2 for Normal.

G. FANS NOT WORKING.

1) POSSIBLE CAUSE
No dimmers are activated by a control station.

SOLUTION
Bring up at least one dimmer or turn on "PANIC".

2) POSSIBLE CAUSE
The fuse for the fan is blown.

SOLUTION
Check the fuses on the AC Reference Module. If the phase A fuse is blown, the fan will not work.

3) POSSIBLE CAUSE
The fan relay is not functioning.

SOLUTION
Check AC power between the Reference Module TB9-6 and neutral. If there is no AC, replace the AC Reference Module.

4) POSSIBLE CAUSE
Bad AC cable to the fan.

SOLUTION
If AC exists at TB9-6, check the AC cable to the fan. If AC is ok at the end of the cable, replace the fan.

5) POSSIBLE CAUSE
Systems with 7810 Electronics may have a missing jumper between terminals 13 and 14 on the termination board.

SOLUTION
Install a jumper.

H. TAKE CONTROL BETWEEN STATIONS DOES NOT WORK.

1) POSSIBLE CAUSE
No connections at terminals 21-24 and 53-56.

SOLUTION
Connect wiring as indicated.

I. ALL DIMMERS WILL FADE UP, BUT ONLY TO ABOUT 100 VOLTS OUTPUT

1) POSSIBLE CAUSE
Plus (+) Clock and Common reversed in control wiring.

SOLUTION
Check and Correct wiring as necessary.

J. ALL DIMMERS IN A RACK FLOAT TO ABOUT 10% AND WILL NOT GO OUT.

1) POSSIBLE CAUSE
Minus (-) Clock and Common reversed in control wiring.

SOLUTION
Check and Correct wiring as necessary.

K. NO CONTROL OF ANY DIMMERS, BUT PANIC WORKS.

1) POSSIBLE CAUSE
Incorrectly seated Electronics Module.

SOLUTION
Reseat Electronics Module.

2) Analog control wire and one of the other control wires is reversed.

SOLUTION
Check and correct wiring as necessary.

3) POSSIBLE CAUSE
Bad Electronics Module.

SOLUTION
Replace the Electronics Module.

L. NO CONTROL OF ANY DIMMERS FROM ONE CONTROL STATION, BUT CAN CONTROL FROM OTHER STATIONS.

1) POSSIBLE CAUSE
Hang-Up in processor (7820 or 7825 only)

SOLUTION
Reset Program Module in Dimmer Cabinet.

2) POSSIBLE CAUSE
Bad Control Station.

SOLUTION
Swap with known good Station. If problem moves, replace Control Station.

3) POSSIBLE CAUSE
Bad Electronics Module.

SOLUTION
If Control Stations are all ok, replace electronics module.

8.2 Problems With All Dimmers On One Power Phase

A. DIMMERS 5 AND 11 ACT LIKE NON-DIMS

POSSIBLE CAUSE
Phase switch on Electronics Module is incorrectly set.

SOLUTION
Set Phase switch correctly.

B. DIMMERS ON ONE PHASE OF A DIMMER CABINET ACT LIKE NON-DIMS. LOOK FOR THE FOLLOWING PATTERNS:

	Dimmer Module #	
	Three phase System	Single phase System
Phase A Fuse	1, 4, 7, 10	1, 2, 4, 7, 8, 10
Phase B Fuse	2, 5, 8, 11	
Phase C Fuse	3, 6, 9, 12	3, 5, 6, 9, 11, 12

1) POSSIBLE CAUSE
Bad phase fuse on AC Reference Module.

SOLUTION
Replace phase fuse.

C. DIMMERS ON ONE PHASE OF THE ELECTRONICS MODULE ACT AS NON-DIMS. LOOK FOR THE FOLLOWING PATTERNS:

	Dimmer Module #	
	Three phase System	Single phase System
Phase A Ramp	1, 4, 7, 10	1, 4, 7, 10
Phase B Ramp	2, 5, 8, 11	2, 8
Phase C Ramp	3, 6, 9, 12	3, 5, 6, 9, 11, 12

1) POSSIBLE CAUSE
Defective Reference Ramp in Electronics Module.

SOLUTION
Replace Electronics Module.

D. ONE OR MORE DIMMERS WILL NOT COME UP TO FULL.

1) POSSIBLE CAUSE
Incorrect phase reference voltage.

SOLUTION
Check for proper reference voltage from the AC Reference Module. Adjust as necessary.

8.3 Single Dimmer Problems

A. DIMMER FLICKERS AS SYSTEM IS BROUGHT UP.

1) POSSIBLE CAUSE
Defective dimmer module.

SOLUTION
Swap dimmer with known good unit. If problem moves, dimmer is defective. Replace SSR (and driver card, if applicable).

2) POSSIBLE CAUSE
Defective Electronics Module.

SOLUTION
Replace Electronics Module.

B. DIMMER IS ALWAYS OFF.

1) POSSIBLE CAUSE
Defective dimmer module.

SOLUTION
Swap dimmer with known good unit. If problem moves, dimmer is defective. Replace SSR (and driver card, if applicable).

2) POSSIBLE CAUSE
Defective Electronics Module.

SOLUTION
Replace Electronics Module.

3) POSSIBLE CAUSE
Control wiring open between Electronics Module and dimmer.

SOLUTION
Find and repair break in wiring.

C. DIMMER IS ALWAYS ON.

1) POSSIBLE CAUSE
Panic is ON and dimmer is enabled.

SOLUTION
Turn Panic OFF, or turn enable switch OFF.

2) POSSIBLE CAUSE
Defective dimmer module.

SOLUTION
Swap dimmer with a known good unit. If problem moves, dimmer is defective. Replace SSR (and driver card, if applicable).

3) POSSIBLE CAUSE
Defective Electronics Module.

SOLUTION
Replace Electronics Module.

C. DIMMER CAN BE CONTROLLED BETWEEN 50% AND 100%, BUT WILL NOT GO BELOW 50%.

1) POSSIBLE CAUSE
Defective SSR in Dimmer Module.

SOLUTION
Swap dimmer with a known good unit. If the problem moves, the dimmer is defective. Replace the SSR (and driver card, if applicable).

D. ONE OR MORE DIMMERS COME ON AFTER SYSTEM HAS BEEN SHUT OFF FOR A WHILE.

1) POSSIBLE CAUSE
Bad output stage in Electronics Module.

SOLUTION
Replace Electronics Module.

8.4 Problems With Fluorescent Circuits

Prior to trouble-shooting for specific troubles which may be encountered with fluorescent circuits, all other dimmer problem categories should be investigated.

A. ALL OF THE FLUORESCENT LAMPS FLICKER

These are system problems, and are not related to the individual failure, miswire, etc. of a fixture.

1) POSSIBLE CAUSE
Line Voltage is too low.

SOLUTION
Check line voltage with a voltmeter. If voltage is more than 8% below the rated voltage of the fixtures, the power company should be advised that they have a distribution problem, and must supply the appropriate voltage. If the power company will not do this, a booster transformer could be required on the in-coming feed to the fluorescent dimmers.

2) POSSIBLE CAUSE
Lamps are reaching their end-of-life.

SOLUTION
Check lamp specifications to make certain that rated life is about ended. If it is necessary to relamp, relamp the entire system, and not just a part. New lamps will be brighter than the old lamps. Once the system is relamped, new lamps must be burned in for 100 hours or more at full intensity.

3) POSSIBLE CAUSE
Lamps are too new (i.e., brand new)

SOLUTION
Burn in new lamps at full intensity for 100 hours.

4) POSSIBLE CAUSE
Use of unapproved ballasts.

SOLUTION
Check ballast model number to make sure that ballasts used are on the Strand approved list. If not, replace ballasts.

5) POSSIBLE CAUSE
Use of energy conservation lamps in the fixtures (i.e. watt-mizer, etc.).

SOLUTION
These lamps are not recommended for use in dimming ballasts, and must be replaced. Problems with this type of lamp become more obvious as environmental temperature decreases.

B. SOME (RANDOM) OF THE FLUORESCENT LAMPS FLICKER (BUT NOT ALL OF THE FIXTURES ON A CIRCUIT OR A DIMMER)

These are probably individual fixture problems, and are not related to the control system or incoming power.

1) POSSIBLE CAUSE
Bad contact(s) in lamp holder(s).

SOLUTION
Check lamp holder contact springs.

Make sure that lamp holder spacing is correct for type of lamp being used.

2) POSSIBLE CAUSE
Improperly grounded fixture(s).

SOLUTION
Check continuity between an uninsulated portion of the fixture and a known earth ground. Properly ground the fixture if continuity is not found.

3) POSSIBLE CAUSE
Fixture is improperly wired internally.

SOLUTION
Check internal wiring of fixture against manufacturers information to make certain that ballast is wired to lamp holders correctly.

C. ENTIRE CIRCUIT OF FIXTURES FLICKERS (BUT NOT THE ENTIRE DIMMER)

These are problems related to individual circuit wiring or failures.

1) POSSIBLE CAUSE
The circuit is miswired.

SOLUTION
Check wiring against riser diagram, and rewire as necessary. The most common miswire is reversal of the ballast control line and ballast supply line from the dimmer.

D. ENTIRE DIMMER OF FIXTURES FLICKERS.

1) POSSIBLE CAUSE
Dimmer failure.

SOLUTION
Replace dimmer with known good unit.

2) POSSIBLE CAUSE
Use of mixed length fluorescent fixtures on the same dimmer.

SOLUTION
Fixtures should be wired so that each dimmer only uses one size fluorescent fixture, and not a mixture of sizes.

3) POSSIBLE CAUSE
Use of mixed manufacturers fixtures on a single dimmer.

SOLUTION
Make certain that each run only contains ballasts from a single, approved, manufacturer. Different approved fixtures may be used in the system, but not on the same dimmer.

4) POSSIBLE CAUSE
Bad ballast in one fixture, affecting whole dimmer.

SOLUTION
Find and replace bad ballast.

5) POSSIBLE CAUSE
Too few lamps on dimmer for rated power.

SOLUTION
Make certain that there are at least 8, 40W fixtures on the dimmer. If not, consolidate circuits on to one dimmer, shift some loads from another dimmer, or add "dummy" loads. If dummy loads are needed, incandescent lamps are most effective. Fluorescent dimmers and fixtures are most stable if the total wattage load on a dimmer matches the rated capacity of the dimmer module.

E. ALL LAMPS HAVE SWIRLING OR STRIATIONS

1) POSSIBLE CAUSE
Lamps are too new (i.e., brand new)

SOLUTION
Burn in new lamps at full intensity for 100 hours.

2) POSSIBLE CAUSE
Use of unapproved ballasts.

SOLUTION
Check ballast model number to make sure that ballasts used are on the Strand approved list. If not, they must be replaced.

F. LAMPS FLICKER OR SWIRL ONLY AT VERY LOW LEVELS.

1) POSSIBLE CAUSE
Minimum adjustment is set too low. Fixtures are not getting adequate voltage for proper firing.

SOLUTION
Adjust minimum potentiometer in Dimmer Cabinet to eliminate low end flicker.

G. UNEVEN LIGHTING

1) POSSIBLE CAUSE
Use of unapproved ballasts.

SOLUTION
Check ballast model number to make sure that ballasts used are on the Strand approved list. If not, they must be replaced.

2) POSSIBLE CAUSE
Use of mixed length fixtures on the same dimmer.

SOLUTION
Fixtures should be wired so that each dimmer only uses one size fluorescent fixture, and not a mixture of sizes.

3) POSSIBLE CAUSE
Lamps are of different ages.

SOLUTION
Relamp entire system, and not just a part. New lamps will be brighter than old lamps. Once system is relamped, new lamps must be burned in for 100 hours or more at full intensity.

H. ENTIRE CIRCUIT OF FIXTURES BUZZES.

1) POSSIBLE CAUSE
The circuit is miswired.

SOLUTION
Check wiring against riser diagram, and rewire as necessary. The most common miswire is reversal of the ballast control line and ballast supply line from the dimmer.

I. SINGLE BALLAST BUZZES

1) POSSIBLE CAUSE
Defective Ballast.

SOLUTION
Replace defective ballast.

2) POSSIBLE CAUSE
Use of unapproved ballast.

SOLUTION
Check ballast model number to make sure that ballasts used are on the Strand approved list. If not, replace ballasts.

J. DIMMER OVERHEATS (TOO HOT TO TOUCH)

1) POSSIBLE CAUSE
A circuit on the dimmer is miswired.

SOLUTION
Check wiring against riser diagram, and rewire as necessary. The most common miswire is reversal of the ballast control line and ballast supply line from the dimmer.

2) POSSIBLE CAUSE
Use of unapproved ballasts.

SOLUTION
Check ballast model number to make sure that ballasts used are on the Strand approved list. If not, replace ballasts.

3) POSSIBLE CAUSE
A ballast is defective.

SOLUTION
Check current in each ballast supply wire and ballast control wire with an amprobe. If one ballast draws more current than others, it should be replaced.

4) POSSIBLE CAUSE
Dimmer is overloaded (too many fixtures).

SOLUTION
Offload some fixtures to another dimmer, replace dimmer with a larger capacity unit, or add another dimmer to system.

K. LAMP BLACKENING

1) POSSIBLE CAUSE
Bad contact(s) in lamp holder(s).

SOLUTION
Check lamp holder contact springs.

Make sure lamp holder spacing is correct for the type lamp being used.

2) POSSIBLE CAUSE
Fixture is improperly wired internally.

SOLUTION
Check internal wiring of fixture against manufacturers information to make certain that ballast is wired to lamp holders correctly.

3) POSSIBLE CAUSE
Use of unapproved ballasts.

SOLUTION
Check ballast model number to make sure that ballasts used are on the Strand approved list. If not, they must be replaced.

8.5 Control Channel Assignment Problems

Accurate documentation of **Dimmer To Channel Assignment** is essential to insure correct system operation.For Environ Programmable Controls, this information is recorded in the factory supplied **Program Data Cartridge.**

Make sure that the control channel data as shown in your system drawings matches how you think the system should work. If it does not, a new Data Cartridge may be required. Please contact Strand Electro Controls Applications Engineering.

Figure 14 and 15 show a sample system riser and the corresponding dimmer to channel assignment schedule used to program the Data Cartridge.

DEFINITIONS

> **DIMMER** - One or more circuits wired together to a single dimmer. A dimmer is controlled by only one channel, but several dimmers may be grouped together on one channel.

> **Dimmer To Channel Assignment** - The grouping of dimmers to individual slider or push-button CHANNELS by ROOM and STATION, recorded in the Data Cartridge.

> **PRESET** - A lighting "look." There are two types of Presets:
> - "Manual" is slider adjustment and is activated by the ON/OFF Button.
> - "Programmable" is activated by pushing Preset Buttons or by the Time Clock.

INFORMATION REQUIRED

> **ROOM** - Is a single **area** of control. Up to 16 ROOMS are available.
> - All stations in a ROOM operate the same CHANNELS and PRESETS.
> - A MASTER STATION can control multiple ROOMs.

> **STATION** - Is any Environ 2 **Control Station.**
> - Shows the quantity & model number of each station by ROOM.
> - All stations in a Room share the same channels.

> **CHANNEL** - **One dimmer or a group of dimmers** (or non-dims) which are controlled together.
> - 99 CHANNELS are available per ROOM (up to 128 per system).
> - CHANNEL levels for PRESETS may be set & activated by "Manual" sliders or "Programmable" pushbutton stations.

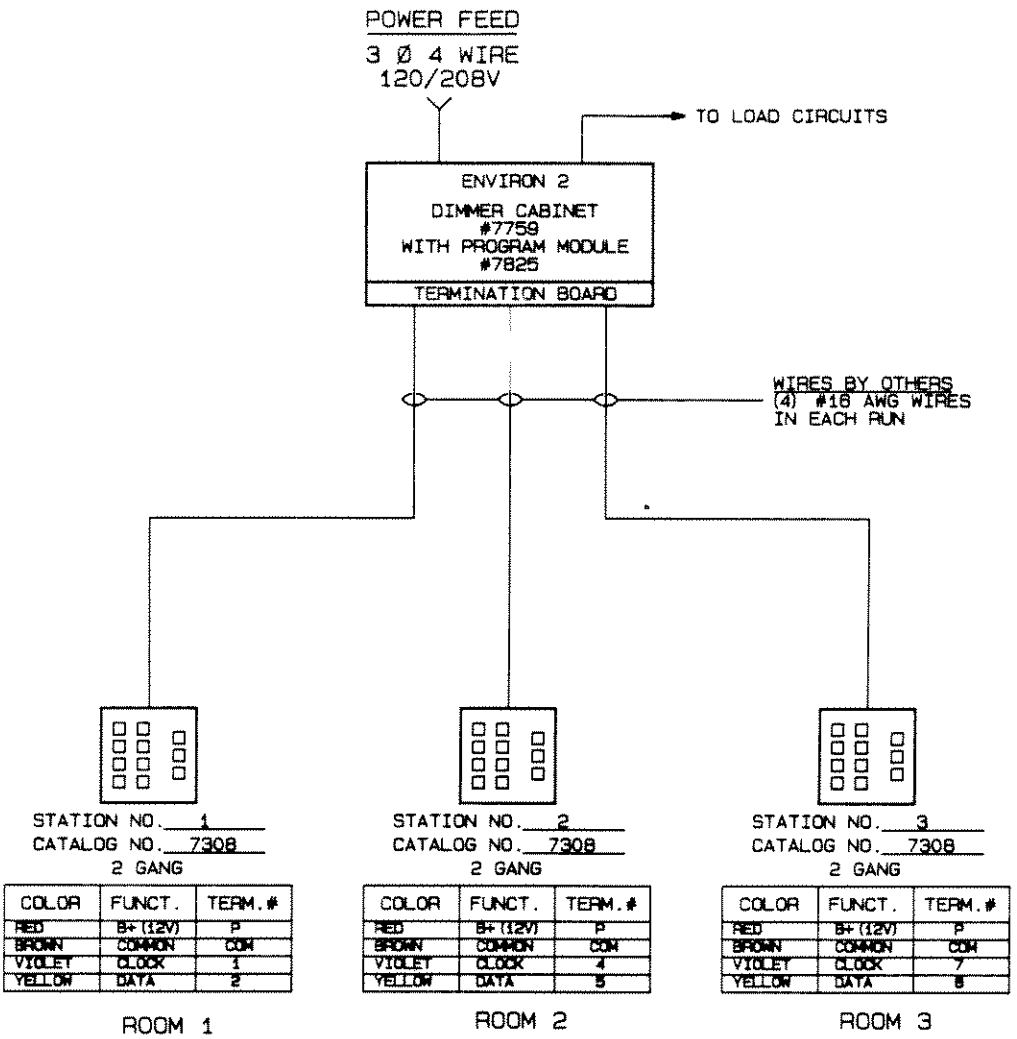


Figure 14. Sample Riser Diagram

DIMMER CABINET CIRCUIT SCHEDULE — Panel DP1A, RM 108

DIMMERS			CONTROL			LOAD CIRCUITS			
MODULE NO. / PHASE	DIMMER CAT. & NO. CAPACITY	FROM BKR POS. NO.	ROOM	STATION NO.	CHANNEL NO.	LOAD SIZE & TYPE	QTY OF & BKR'S	LOAD CKT NO.	LOAD CIRCUIT DESCRIPTION
1 / A	7513 2-20A	1	BALL RM. A 1	1	1	INC. 1850W	(2) 7921 20A1P	A 101 B 102 C	CHAND. CHAND.
		2			2	INC. 1375W	(1) 7921 20A1P	D 103 E F	SCONCE
2 / B	7516 1-50A	3/4			3	INC. 5500W	(4) 7921 20A1P	A 104 B 105 C 106 D 107 E F	DOWN LIGHTS DOWN LIGHTS DOWN LIGHTS DOWN LIGHTS
3 / C	7532 2-20A	5			4	FL. 30-40W	T.S.	A 108 B C	COVE DIM CCT COVE HEATER CCT
		6	BALL RM. B 2	2	4	FL. 30-40W	T.S.	D 116 E F	COVE DIM CCT COVE HEATER CCT
4 / A	7513 2-20A	7			1	INC. 1850W	(2) 7921 20A1P	A 109 B 110 C	CHAND. CHAND.
		8			2	INC. 1375W	(1) 7921 20A1P	D 111 E F	SCONCE
5 / B	7516 1-50A	9/10			3	INC. 5500W	(4) 7921 20A1P	A 112 B 113 C 114 D 115 E F	DOWN LIGHTS DOWN LIGHTS DOWN LIGHTS DOWN LIGHTS
6 / C	7516 1-50A	11/12	BALL RM. C 3	3	1	INC. 6000W	(4) 7921 20A1P	A 117 B 118 C 119 D 120 E F	DOWN LIGHTS DOWN LIGHTS DOWN LIGHTS DOWN LIGHTS
7 / A	7516 1-50A	13/14				INC. 6000W	(4) 7921 20A1P	A 121 B 122 C 123 D 124 E F	DOWN LIGHTS DOWN LIGHTS DOWN LIGHTS DOWN LIGHTS
8 / B	7512 2-20A	15			2	INC. 925W	T.S.	A 125 B C	CHAND.
		16			3	INC. 925W	T.S.	D 126 E F	CHAND.
9 / C	7512 2-20A	17			4	INC. 1375W	T.S.	A 127 B C	SCONCE
		18			5	INC. 1375W	T.S.	D 128 E F	SCONCE
10 / A	7503 2-20A	19			6	L.V. 1750W	(2) 7921 20A1P	A 129 B 130 C	TRACK 1 TRACK 2
		20			7	L.V. 1750W	(2) 7921 20A1P	D 131 E 132 F	TRACK 1 TRACK 2
11 / B	BLANK SPACE							A B C D E F	
12 / C	BLANK SPACE							A B C D E F	

Figure 15. Sample Dimmer To Channel Assignment Sheet

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NOTES: