



PRO RACK 824

PROGRAMMABLE

DIMMER PACK

OPERATOR'S MANUAL

FENDER MUSICAL INSTRUMENTS
1130 Columbia Street, Brea, California 92621

INTRODUCTION

Dimmer packs are the workhorse of stage lighting systems; they translate the signals produced by the lighting control consoles into power levels needed to drive the lights to the required intensity. The SUNN PRO RACK 824 is a three rack space dimmer having eight independent 2400 watt channels. The PRO RACK 824 may be programmed to respond to eight (8) of a possible 32 channels using SUNNPLEX or eight (8) of a possible 512 channels using DMX 512, making it suitable for use in larger systems.

Like all SUNN SPOTS components, the PRO RACK 824 includes the digitally controlled SUNNPLEX interface, a multiplexing system that allows the various parts of the lighting system to be interconnected by way of standard three conductor microphone cables. This eliminates the need to use fragile and expensive multi-wire cables as many other lighting systems use. The application of multiplex technology to stage lighting equipment makes system setup and operation easy and convenient. In many cases, the SUNNPLEX control signal can be sent through an audio snake without interference to other signals. The SUNNPLEX Interface system will address up to 32 individual lighting channels. The PRO RACK 824 can also be set to respond to USITT standard DMX 512 or to any 0-10 VDC controller. DMX 512 and 0-10 VDC operation will be explained later in their respective sections.

Professional grade 450 μ s filtering on all AC outputs minimizes potential interference to audio systems. In addition, the AC power, grounds, and control inputs are isolated from each other, reducing noise and providing safe electrical operation.

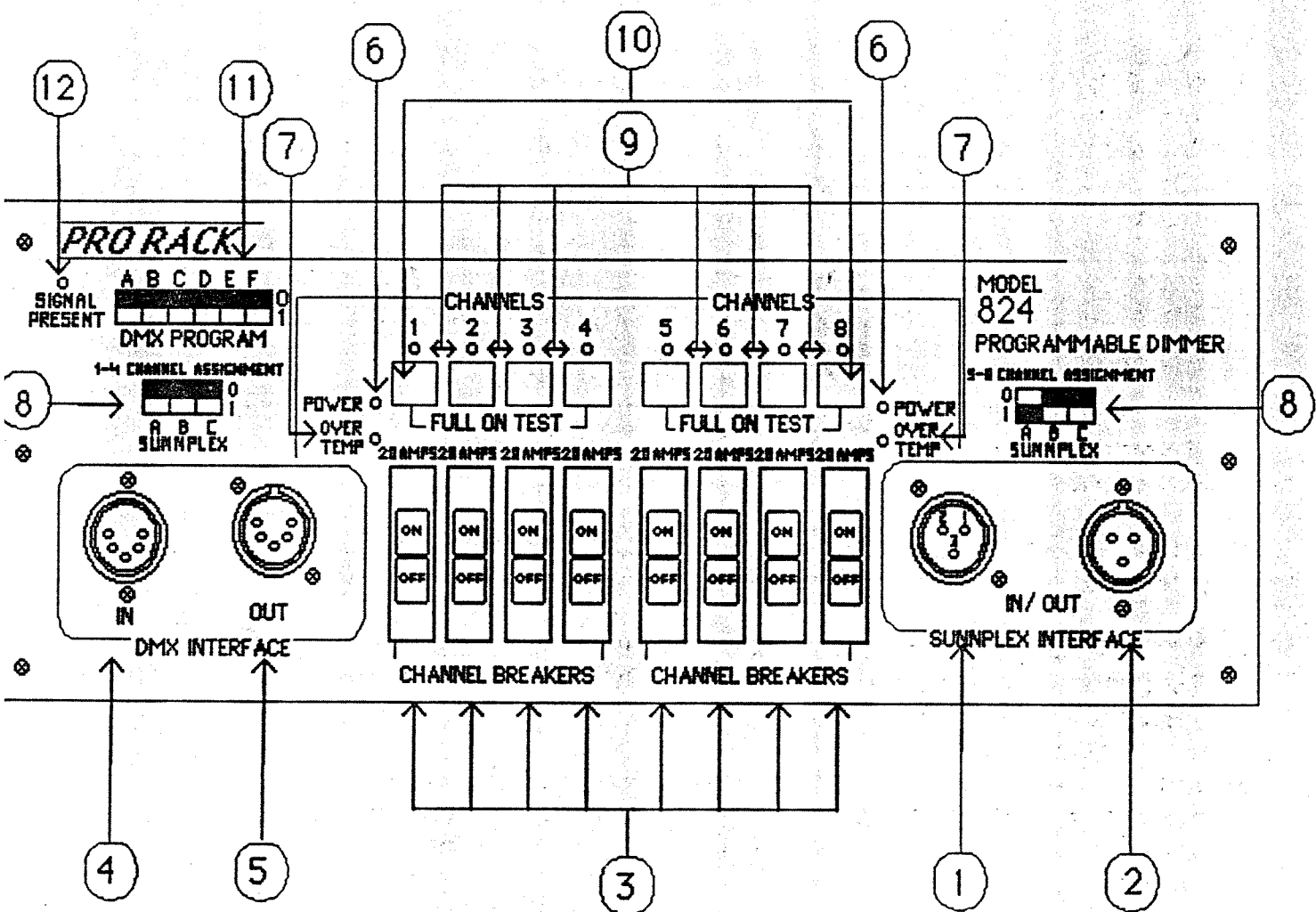
UNPACKING

After unpacking your PRO RACK 824, inspect the unit for any damage that may have occurred during shipment. If such damage has occurred, notify your SUNN dealer immediately, as only he may initiate a claim with the carrier for shipment damage. Be sure to save the packing containers as evidence for the carrier's inspection. Keep all packing material for any further shipping needs.

FRONT PANEL

1. CONTROL SIGNAL IN JACK(SUNNPLEX IN) - A set of male and female 3-pin XLR jacks allow the connection of the SUNNPLEX Interface signal. The female XLR jack connects to a standard, balanced, shielded microphone cable and receives the SUNNPLEX control signal either directly from the control console, or from another dimmer.
2. SYSTEM EXPANSION JACK(SUNNPLEX OUT) - This male 3-pin XLR jack is wired parallel with the female CONTROL SIGNAL INPUT JACK and is used as part of a "daisy-chain" to supply the control signal to another dimmer. If multiple dimmers are being used, once the first dimmer is connected to the control console, the remaining dimmers are "daisy-chained" together using the male and female XLR jacks to get the control signal from one dimmer to the other. These XLR jacks also supply the DC power which "phantom powers" some of the SUNN lighting consoles.
3. INDIVIDUAL CHANNEL CIRCUIT BREAKERS- Each of the eight 2400 watt channels is protected with its own 20 amp magnetic circuit breaker, which must be in the "on" position for that channel to operate. When a channel is overloaded and/or shorted, the circuit breaker for that channel will flip to the "off" position. Check for shorts and/or overloading before turning the circuit back on.
4. DMX CONTROL SIGNAL IN - This male 5 pin XLR jack is used to connect the DMX 512 signal. This jack connects to a DMX cable and receives the DMX 512 signal either directly from the control console or from another dimmer.
5. DMX SYSTEM EXPANSION JACK - This female 5 pin XLR jack is wired parallel with the male DMX control signal "IN" jack and is used in a "Daisy Chain" to supply the control signal to another dimmer.
6. POWER "ON" LEDS - These green LEDs indicate the PRO RACK 824 is receiving power. These LEDs will be active once the dimmer has been connected to the AC source.
7. "OVERTEMP" LEDS - These red LEDs will light when the unit is overheated. The unit will also shut down while overheated. The LEDs will extinguish and the unit will resume operation when a safe operating temperature has been reached.
8. SUNNPLEX CHANNEL ASSIGN SWITCHES - These "DIP" switches allow the PRO RACK 824 to be assigned to respond to selected lighting channels. More information is found in the section SUNNPLEX ADDRESS SELECTION. Also refer to the channel assignment chart later in this manual for proper switch setting. (Switches shown as shipped.)
9. CHANNEL STATUS INDICATORS - These green LEDs "track" the control signal received by each channel. When the unit is overheated, these LEDs will come on full to show which channels are overheated.

- 10. TEST BUTTONS – These Push on/ Push off buttons bring each channel to full on for lamp testing and/ or focusing.
- 11. DMX CHANNEL ASSIGN SWITCHES – These "Dip" switches allow the PRO RACK 824 to be assigned to respond to selected lighting channels. More information is found in the DMX 512 SETUP AND OPERATION section. (Switches shown as shipped.)
- 12. DMX SIGNAL PRESENT LED – This green LED indicates that the PRO RACK 824 is receiving the DMX 512 signal.



Front View
(Not to scale)

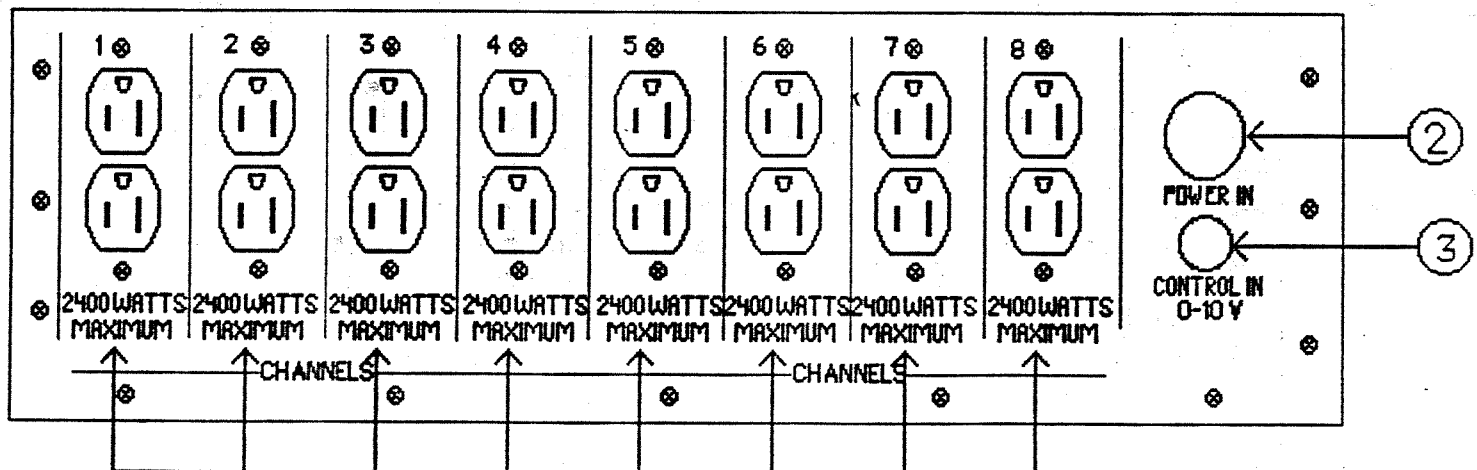
REAR PANEL

1. **AC OUTLETS**— These standard three-prong AC outlets on the rear panel provide the power used by the lamps in the lighting system. The amount of power provided by these outlets at any given time is determined by the lighting control signals received from the lighting control console. On the PRO RACK 824 each pair of outlets corresponds to one channel. (Channel numbers are printed at the top of the panel) The total power available from each pair is 2400 watts total (e.g. one 2400 watt lamp plugged into one outlet and nothing into the other or two 1200 watt lamps, one plugged into each outlet.)

CAUTION: The outlets on the rear panel of the PRO RACK 824 are for lighting fixtures ONLY. DO NOT connect guitar amplifiers, PA equipment, fans, refrigerators, etc. to the outlets. Extension cords may be used between the outlets and the lights. Use adequately rated wire and never plug more than 2400 watts into each channel.

FAILURE TO OBSERVE THE ABOVE PRECAUTION MAY VOID THE WARRANTY AND CAUSE DAMAGE TO THE DIMMER AND/OR CONNECTED EQUIPMENT.

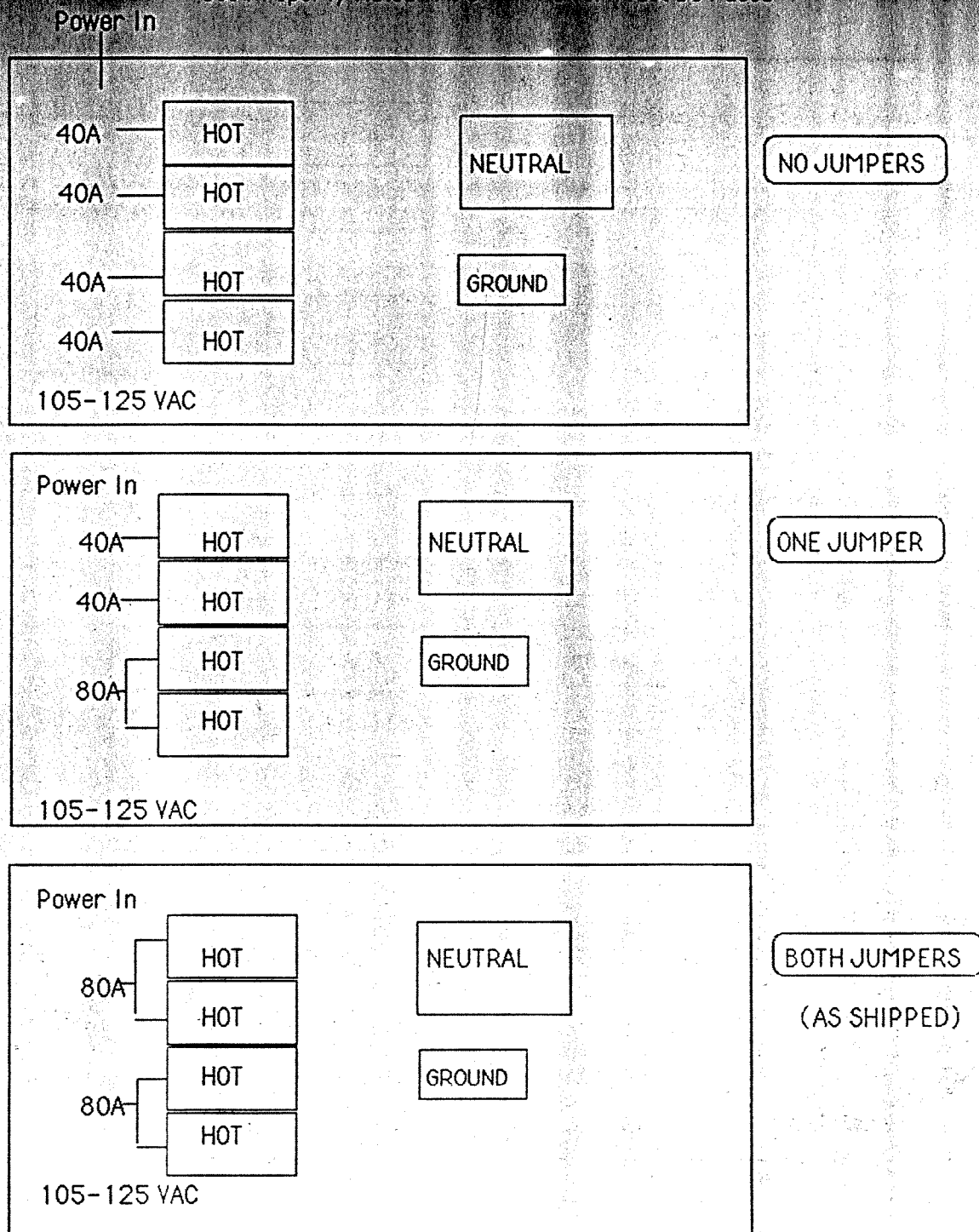
2. **AC POWER INPUT** — This is the main power input for the dimmer pack; it ultimately carries all the AC power consumed by the lights connected to the dimmer pack. See sections on POWER HOOK UP and HINTS AND CAUTIONS.
3. **0-10 VDC INPUT** — This is the input for the 0-10 VDC control cable when the PRO RACK 824 is set-up for 0-10 VDC control inputs. See section on 0-10 VDC HOOK UP AND OPERATION.



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Rear View
(Not to scale)

POWER HOOK-UP

Use Properly Rated Wire - Power Must Be Fused



FRONT OF UNIT

TOP VIEW
(NOT TO SCALE)

HINTS AND CAUTIONS

1. When mounting the PRO RACK 824 in a rack, make sure all mounting screws are secure prior to transportation and operation.
2. Maintain 1 1/2" to 2" **minimum** side clearance for ventilation. **DO NOT** completely enclose unit.
3. After extended use, check fan for dust accumulation and proper operation. Also check vents for dust accumulation. Clean fan and/or vents if necessary.
4. **IMPORTANT:** Keep the dimmer pack and lighting **power** cords away from audio equipment (amplifiers, speakers, etc.) and sensitive audio cables (microphone cables, guitar cords, audio snakes, etc.). If a buzzing sound occurs in the sound system when the dimmer is activated by the controller, look for lighting **power** cables running near audio lines.
5. Use adequately rated wire and a fused power disconnect for AC power input. When possible, keep the lighting power supply separate from the audio power supply.
6. Make certain the disconnect fuse rating is adequate. The required rating (in amps) of the fuse can be calculated with this formula:

$$I = \frac{P}{E}$$

where
I = the current (in amps)
P = the power (in watts)
E = the voltage (in volts)

and

In a standard 120 VAC electrical system, 100 watts = 5/6 amps. (A safe rule of thumb is to use 100 watts = 1 amp.) In a single phase 4 wire system (hot-hot-neutral-ground), to achieve maximum output, 80 amps or more per hot leg is required.

7. **NEVER** open unit while power is being supplied.

TROUBLESHOOTING

If your lighting system is not operating properly, first verify that the system is correctly interconnected, and that the PRO RACK 824 is connected to a working disconnect panel.

The SUNN PRO RACK 824 dimmer pack has a self-test feature built in. With one or more lights plugged into the dimmer pack and the dimmer pack connected to an AC source, the lights will come on at full intensity when no microphone cord is attached to the SUNNPLEX input. If any light does not come on the light itself may be tested by plugging it directly into any 3 pronged AC outlet. Replace any burned out lamps.

Each channel may also be tested by pressing the test button found above the channel you want to test. The channel and the corresponding green status indicator should come on full. Press the test button again and both should extinguish.

The Autotest feature does not apply when dimmer is set up for 0-10 VDC control input or DMX 512 control input.

WARNING: Busses, SSRs, and parts of the circuit board are 120 VAC potential. **NEVER OPEN THE CASE** when power is supplied.

If a problem only appears when the system is patched together, either the microphone cord or the controller is probably at fault. If the "POWER ON LED" goes out when the microphone cord is plugged in, the cord is shorted and should be repaired or replaced. The quickest way to check a microphone cord is to swap it with one that is known to be good. If this fixes the problem, repair the faulty cord. If swapping cords does not fix the problem, consult the operator's manual of your lighting controller for additional information.

If this is not the problem, it is possible that your dimmer pack is set up to respond to different lighting channels than you desire. See the next section on ADDRESS SELECTION for exact set up details.

One final possibility is that the program plugs are not correctly positioned for the control signal being used. See the PROGRAM PLUG CHANGE section.

SUNNPLEX ADDRESS SELECTION

The SUNN PRO RACK 824 is two four channel dimmer packs in one unit and is preset at the factory to respond to channels 1-8 from your lighting controller. For use in larger systems, the dimmer pack contains "address selection" circuitry which may be programmed so that the dimmer responds to channels 9-16, 17-24, or 25-32. This is accomplished by using DIP switches on the front of the PRO RACK 824. Since the PRO RACK 824 is two 4 channel dimmer packs in one, there is one DIP switch for channels 1-4 and one for channels 5-8; which means the dimmer can be programmed for channels 1-4 and 29-32, 9-12 and 17-20, etc.. By setting both DIP switches the same way you can have two (2) channels respond to the same control signal. The SUNNPLEX ADDRESS SELECTION TABLE on the following page and on the top panel of the unit indicates the proper position of the switches for the desired channel assignment. To assign the dimmer pack to the desired channels, the switches must be placed in the proper position. The more independent lighting channels you have in your set-up, the more flexibility you will have when creating your light "scenes".

NOTE: After you have set the channel assignment of the dimmer pack, we suggest writing the channel numbers on a piece of tape and sticking it to the dimmer for future reference. It is also a good idea to put a small piece of tape over the DIP switch to prevent accidental change of the channel assignments.

The Sunnplex address selection applies only when the PRO RACK 824 is set up for Sunnplex operation. When unit is set up for 0-10V DC control inputs or DMX 512 control inputs these DIP switches have no effect.

SUNNPLEX ADDRESS SELECT TABLE

PROGRAMMING

	A	B	C	
0	Black	Black	Black	1-4 (A0 B0 C0)
1	White	White	White	
0	White	Black	Black	5-8 (A1 B0 C0)
1	Black	White	White	
0	Black	White	Black	9-12 (A0 B1 C0)
1	White	Black	White	
0	White	White	Black	13-16 (A1 B1 C0)
1	Black	Black	White	
0	Black	Black	White	17-20 (A0 B0 C1)
1	White	White	Black	
0	White	Black	White	21-24 (A1 B0 C1)
1	Black	White	Black	
0	Black	White	White	25-28 (A0 B1 C1)
1	White	Black	Black	
0	White	White	White	29-32 (A1 B1 C1)
1	Black	Black	Black	

SUNNPLEX SYSTEM INTERCONNECTION

BASIC SETUP CONCEPT : The lighting fixtures (lights) plug into the grounded outlets. The dimmer pack connects to an AC source and the control console is connected via the SUNNPLEX interface by using a balanced 3 pin microphone cord.

A dimmer pack may be connected via a standard balanced, shielded microphone cord (and/or an audio snake) to the rest of the lighting system in two ways:

1. Directly from the lighting controller to the dimmer pack.
2. By way of another dimmer pack. The male and female XLR SUNNPLEX connectors are wired in parallel so the signal will go from one to the other.

DMX 512 SETUP AND OPERATION

1. Make sure power is disconnected before removing cover.
2. Carefully change the program plugs on the T400 circuit cards. See the PROGRAM PLUG CHANGE section.

NOTE: To change the program plug for channels 1-4, first remove one rack ear screw (the top screw towards the front of the unit). Then remove four (4) phillips head screws from the DMX 512 interface circuit card. CAREFULLY move the DMX 512 circuit card out of the way and change the program plug as normal, When completed, replace the DMX 512 circuit card and the rack ear mounting screw.

3. Replace top cover and power up unit.
4. Connect the DMX cable from the control console to the DMX IN jack.
5. The DMX SIGNAL PRESENT LED should come on.

DMX 512 ADDRESS SELECTION

The Sunn PRO RACK 824 is preset at the factory to respond to channels 1-8 from the control console. For use in larger systems the dimmer pack contains "address selection" circuitry which may be programmed so that the dimmer responds to channels 9-16, 17-24, 25-32 ... 505-512. The DMX 512 address selection table on the following page and on the top panel of the unit indicates the proper position of the switches for the desired channel assignment. To assign the dimmer pack to the desired channels, the switches must be placed in the proper position.

NOTE: After you have set the channel assignment of the dimmer pack, we suggest writing the channel numbers on a piece of tape and sticking it to the dimmer for future reference. It is also a good idea to put a small piece of tape over the DIP switch to prevent accidental change of the channel assignments.

The DMX 512 address selection applies only when the PRO RACK 824 is set up for DMX 512 operation. When the unit is set for Sunnplex or 0-10 VDC control inputs these "dip" switches have no effect.

DMX 512 ADDRESS SELECT TABLE

PROGRAMMING

Address Range	A	B	C	D	E	F
1-8	0	0	0	0	0	0
9-16	0	0	0	0	0	1
17-24	0	0	0	0	1	0
25-32	0	0	0	0	1	1
33-40	0	0	0	1	0	0
41-48	0	0	0	1	0	1
49-56	0	0	0	1	1	0
57-64	0	0	0	1	1	1
65-72	0	0	1	0	0	0
73-80	0	0	1	0	0	1
81-88	0	0	1	0	1	0
89-96	0	0	1	0	1	1
97-104	0	1	0	0	0	0
105-112	0	1	0	0	0	1
113-120	0	1	0	1	0	0
121-128	0	1	0	1	0	1
129-136	0	1	0	1	1	0
137-144	0	1	0	1	1	1
145-152	0	1	1	0	0	0
153-160	0	1	1	0	0	1
161-168	0	1	1	0	1	0
169-176	0	1	1	0	1	1
177-184	0	1	1	1	0	0
185-192	0	1	1	1	0	1
193-200	0	1	1	1	1	0
201-208	0	1	1	1	1	1
209-216	0	1	1	1	1	1
217-224	0	1	1	1	1	1
225-232	0	1	1	1	1	1
233-240	0	1	1	1	1	1
241-248	0	1	1	1	1	1
249-256	0	1	1	1	1	1
257-264	0	1	1	1	1	1
265-272	0	1	1	1	1	1
273-280	0	1	1	1	1	1
281-288	0	1	1	1	1	1
289-296	0	1	1	1	1	1
297-304	0	1	1	1	1	1
305-312	0	1	1	1	1	1
313-320	0	1	1	1	1	1
321-328	0	1	1	1	1	1
329-336	0	1	1	1	1	1
337-344	0	1	1	1	1	1
345-352	0	1	1	1	1	1
353-360	0	1	1	1	1	1
361-368	0	1	1	1	1	1
369-376	0	1	1	1	1	1
377-384	0	1	1	1	1	1
385-392	0	1	1	1	1	1
393-400	0	1	1	1	1	1
401-408	0	1	1	1	1	1
409-416	0	1	1	1	1	1
417-424	0	1	1	1	1	1
425-432	0	1	1	1	1	1
433-440	0	1	1	1	1	1
441-448	0	1	1	1	1	1
449-456	0	1	1	1	1	1
457-464	0	1	1	1	1	1
465-472	0	1	1	1	1	1
473-480	0	1	1	1	1	1
481-488	0	1	1	1	1	1
489-496	0	1	1	1	1	1
497-504	0	1	1	1	1	1
505-512	0	1	1	1	1	1

DMX 512 SYSTEM INTERCONNECTION

BASIC SETUP CONCEPT : The lighting fixtures (lights) plug into the grounded outlets. The dimmer pack connects to an AC source and the control console is connected via the DMX 512 interface by using a 5 pin DMX cable.

A dimmer pack may be connected via the DMX cable to the rest of the lighting system in two ways:

1. Directly from the lighting controller to the dimmer pack.
2. By way of another dimmer pack. The male and female XLR DMX 512 connectors are wired in parallel so the signal will go from one to the other.

0-10 VDC SETUP AND OPERATION

1. Make sure the power is disconnected before removing the top cover.
2. Connect the multi-wire control cable to the terminal block inside of the unit. (See diagram below).
3. Carefully change the program plugs on the T400 circuit cards. See the PROGRAM PLUG CHANGE section.

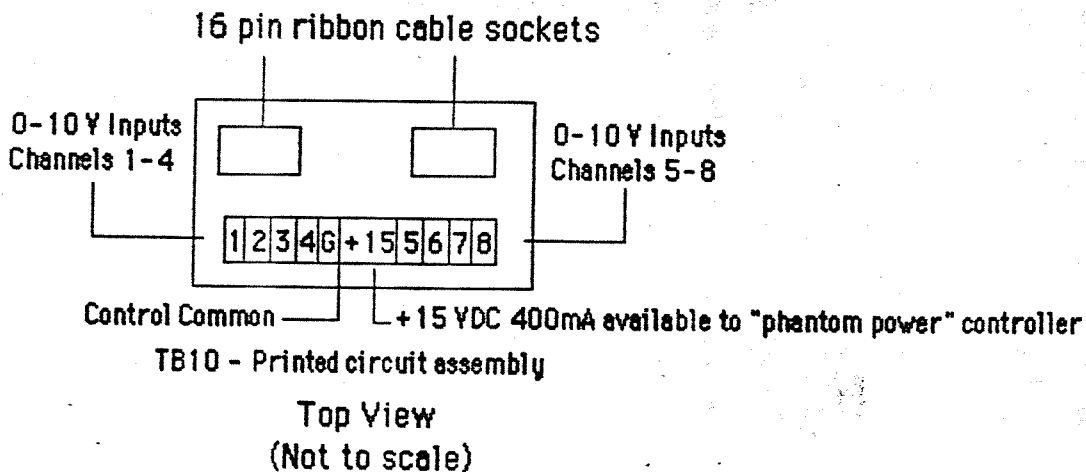
NOTE: To change the program plug for channels 1-4, first remove one rack ear screw (the top screw towards the front of the unit). Then remove four (4) phillips head screws from the DMX 512 interface circuit card. CAREFULLY move the DMX 512 circuit card out of the way and change the program plug as normal. When completed, replace the DMX 512 circuit card and the rack ear mounting screw.

4. Replace top cover and power up unit.
5. Connect the other end of the control cable to any 0-10 VDC controller.

6. INPUT TO OUTPUT CONVERSION:
- Zero (0) VDC input = 0% output
 - One (1) VDC input = 10% output
 - Two (2) VDC input = 20% output
 - Three (3) VDC input = 30% output

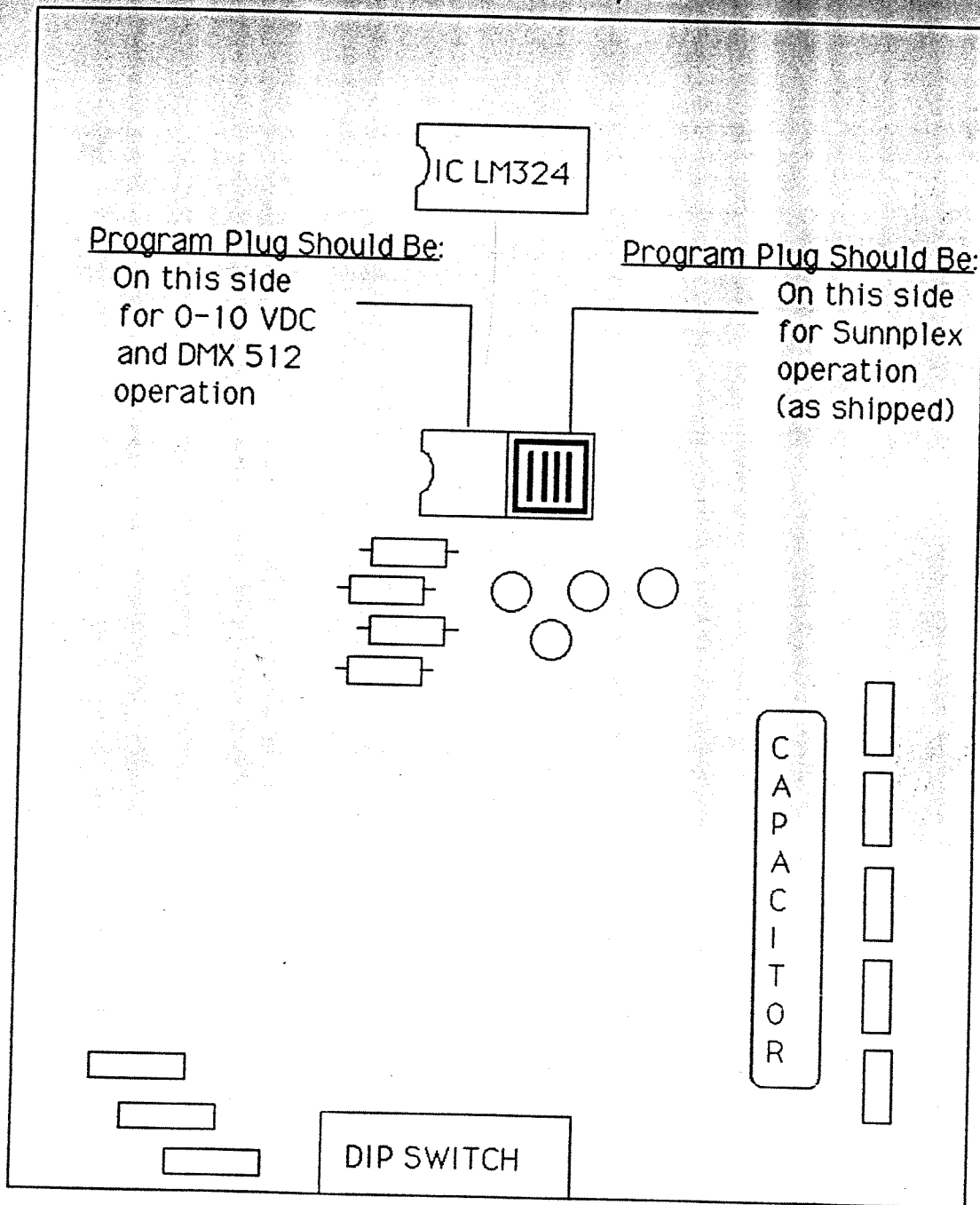
Ten (10) VDC input = 100% output

NOTE: Autotest feature and address selection are inoperative when the PRO RACK 824 is setup for 0-10 VDC operation.



PROGRAM PLUG CHANGE

T400 PCA
(partial componet layout)



Each of the two T400 PCB's has a program plug which must be changed for 0-10 V and DMX 512 operation. The PRO RACK 824 comes preset for SUNNPLEX operation. To change the Program Plug, CAREFULLY remove the 8 pin jumper plug and CAREFULLY reinsert it as shown above. (Make sure that pins are not bent and jumper plug is fully seated.)

TOP VIEW (Not to scale)