



OPERATIONS MANUAL  
FOR THE  
MXP DIMMER PACK  
Version 2.01

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## INTRODUCTION

Congratulations on your selection of Spectrum's MXP dimmer module. The MXP is a versatile and performance-oriented design. Special features include:

- \* 4 channels rated at 1200 watts each
- \* two power feeds for greater capacity
- \* dual in/out control connectors
- \* mounting yoke for easy rig mounting
- \* narrow design to easily fit on rigging
- \* multiplexed control input
- \* .125" thick aluminum case for greater strength and heat dissipation

To get full use of all the MXP features, familiarize yourself with this manual and the dimmer. Keep this manual handy, for quick reference during use.

### Description

The MXP dimmer module was designed to be reliable and easy to operate. A description of the controls, functions and connectors follows (see Fig. 1).

- 1) CONTROL CONNECTORS - conducts control signal in and out of dimmer module. Also conducts 15vdc to controller.
- 2) POWER INPUT CONNECTORS A/B - bring AC power into dimmer module. Connector A supplies channels 1 and 2, connector B supplies channels 3 and 4 and the internal DC power supply. Connector A is the one closer to the output receptacles.
- 3) CHANNEL OUTPUT RECEPTACLES - conducts controlled AC output power to lighting instruments; 2 per channel.
- 4) CHANNEL OUTPUT FUSES - protect output circuitry (internal and external) from overloads and faults.
- 5) CHANNEL ASSIGN SWITCH - this recessed switch determines how the MXP will respond to incoming lighting data. (see assigning control channels, below)

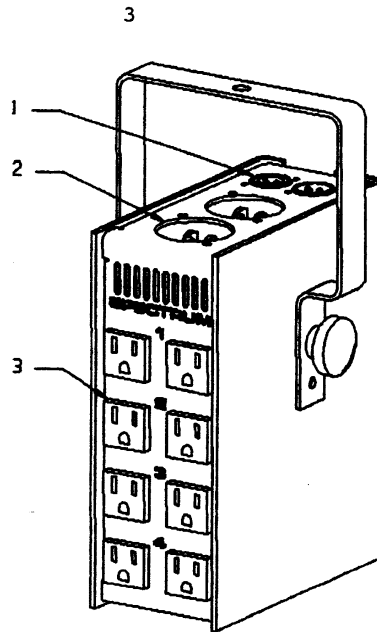


Figure 1

#### GETTING STARTED

##### Assigning Control Channels

The MXP dimmer accepts a multiplexed control input (called SAM, which stands for Spectrum Analog Multiplex). This means that all the controller's channel outputs, typically 8 to 32, are present in the control signal. So, you must set the MXP to respond to any of the control channels in groups of four (see figure 2). For example, if you set the Channel Assign switch to 3, MXC channel 13, 14, 15, & 16 would control MXP channels 1, 2, 3, & 4 respectively.

##### Method 1, Assigning Channels Before Connecting the MXP

- 1) Locate the small hole on the right side of the dimmer (the side with the channel fuse-holders and the U.L. logo). The hole is just left of the black knob for the yoke.
- 2) Look through the vents directly above the access hole, to read

the lettering on the base of the switch. A flashlight can be quite helpful.

- 3) Using a small standard head screwdriver, set the switch as desired. (See figure 2.)

#### Method 2, Assigning Channels After Connecting the MXP

- 1) Connect the MXP as described below, and power up the system.
- 2) Determine which group of four channels you want to control the MXP. On the MXC, put these four channels to full and all others to zero.
- 3) Locate the small hole on the right side of the dimmer (the side with the channel fuse-holders and the U.L. logo). The hole is just left of the black knob for the yoke.
- 4) Using a small standard head screwdriver, turn the switch until the lights come on. Now the pack will respond to those four channels.

Hint: If you are using the MXP's for portable or touring applications, set the channel assignment as needed. Then, label this information on the outside of the dimmer.

Channel Assign Switch setting:	The MXP responds to control channels:
0	1-4
1	5-8
2	9-12
3	13-16
4	17-20
5	21-24
6	25-28
7	29-32
8	33-36
9	37-40
A	41-44
B	45-48
C	49-52
D	53-56
E	57-60
F	61-64

figure 2

**Set-up**

In order to connect and use the MXP dimmer, you will also need the following equipment:

- \* MXC controller
- \* Power cords, two per dimmer. (These can be regular extension cords available from a hardware store. The "POWER CONSIDERATIONS" section will tell you what size cord to buy.)
- \* Control cables, one per dimmer. (These are standard male-female microphone cables sometimes called cannon or 3-pin XLR. You can buy these cables from a musical instrument store)
- \* Lighting instruments, as required
- \* PMC pipe mounting clamp (one per dimmer, optional)

- 1) Mount the MXP dimmer near the lights, typically on the light rigging

**IMPORTANT!!** Heat is a major cause of thyristor failure. Never mount an MXP dimmer module directly against or above a hot lighting instrument. Always mount them so their sides are vertical. Do not restrict airflow across sides, or block the vents.

- 2) Plug the lighting instruments into the output receptacles on the dimmer. There are two output receptacles per channel. Be careful not to plug more than 1200 watts into any one channel. (see figure 3)
- 3) Plug the female end of a power cord into one of the power input connectors of the dimmer. Plug the other end into a wall outlet.
- 4) Repeat with the second power input connector and another power cable, but plug this cable into a different wall outlet, preferably on a separate building circuit breaker. Keep in mind that each power cord can draw up to 20 amps when the dimmer is fully loaded (see the "POWER CONSIDERATIONS" section for more information).
- 5) Repeat steps 1)-4) for additional MXP's.
- 6) Plug the female end of a control (microphone) cable into the male connector on the MXP dimmer. Then plug the male end into the connector marked "SAM" on the rear of the MXC controller. If you are using more than one MXP dimmer, the control cable from the second dimmer plugs into the open connector on the first MXP. Plug additional dimmer control cables into the last dimmer in the chain.

Note: If for some reason you only want to use one power inlet, use inlet B (The one closer to the control connectors). Inlet B feeds the internal DC power supply and channels 3 & 4.

That's all there is to it. Refer to the owner's manual for your controller for further information on its operation.

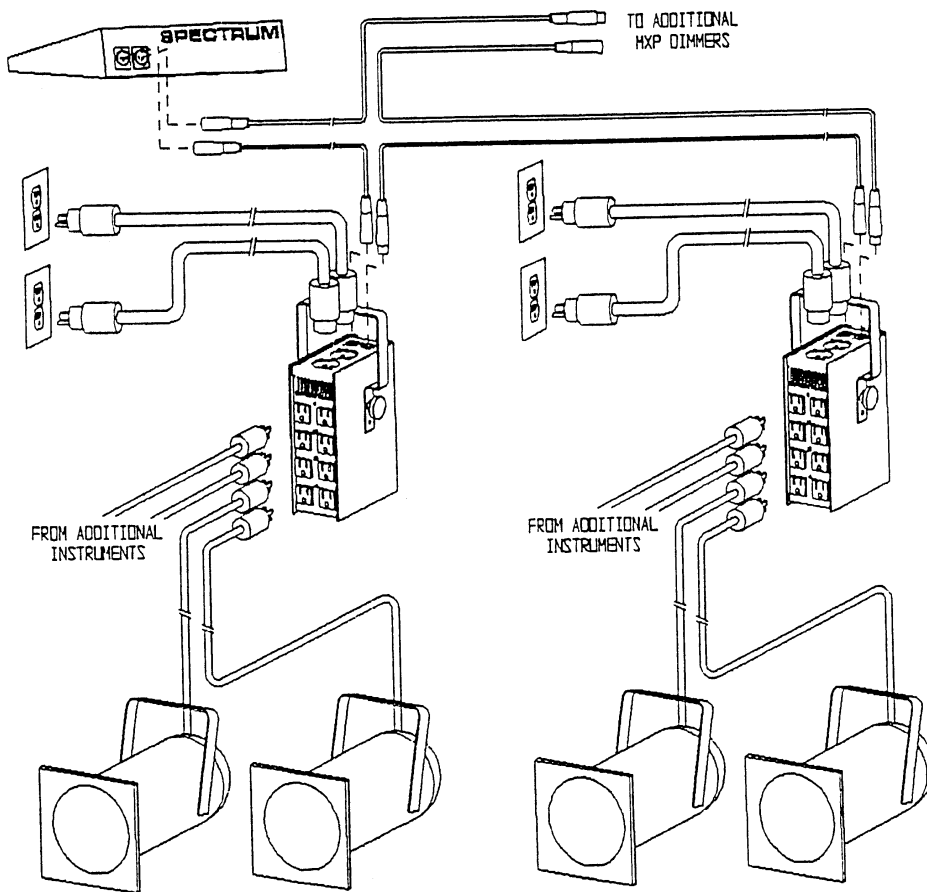


Figure 3

## POWER CONSIDERATIONS

In order to safely use the MXP, you must consider some important factors. Since these factors vary for different applications, this section is divided into three parts. First, if you or an electrician are permanently wiring a system specifically to power the MXP's, read "Permanent Wiring." Second, if you're going to use the MXP at full load (1200 Watts/ Channel) with an existing electrical system, read "Connecting the MXP for a Full Load." Lastly, if you don't plan to use the full capabilities of the MXP, you can use smaller (and less expensive) power cords. This will also simplify the wiring and reduce the number of circuits required; however, you will have to do some necessary calculations. This is in "Connecting the MXP for a Reduced Load."

### Permanent Wiring

Wire a 20 Amp receptacle for each power input (There are two power inputs per MXP). Each receptacle should be on a dedicated 20 Amp circuit. Use size 12 AWG cord between the hard-wired receptacle and the power input on the MXP. The cord connectors should be rated for 20 Amps.

### Connecting the MXP for a Full Load

Use cords that are size 12 AWG (American Wire Gauge) for the power input. Each cord must be plugged into a separate circuit rated at 20 Amps. Meaning, each power feed must have its own 20 Amp circuit breaker in the circuit breaker panel. Each circuit breaker should only control one MXP power feed and nothing else.

If you only have 15 Amp circuit breakers available, you will have to reduce the load on the MXP, so that each power input uses no more than 15 Amps or 1800 Watts. To learn how to compute the power input requirements, read "Connecting the MXP for a Reduced Load." For example, 5 Amps (600 Watts) on channel 1 and 10 Amps (1200 Watts) on channel 2 would be an acceptable way to run the power input A at 15 Amps. Use 14 AWG cord for the power inputs.

### Connecting the MXP for a Reduced Load

To determine proper cord sizes and circuit ratings there are a few steps you need to follow:

- 1) Find out the power requirements for the lights or equipment you'll be controlling with your MXP. This can either be expressed in Watts (usually for lighting) or Amps (for other equipment). Keep in mind that each channel can only handle a maximum of 1200 Watts or 10 Amps. You can have more than one light and/or device on the same channel.

- 2) If the power requirements or "load" is expressed in Watts, convert it to amps by using the formula:

$$\text{Amps} = \text{Watts} / 120$$

Ex: A 300 Watt PAR 56 = 2.5 Amps

If there is more than one light/device on the channel, add the loads together to get the total power that channel requires.

- 3) The MXP has two power input connectors for the four dimmer channels. Channels 1 and 2 are fed by power input connector A and channels 3 and 4 (and the internal DC power supply) are fed by power input connector B. Figure out the power needed by each power input by adding the power requirements from the two channels. Use the loads expressed in Amps.

Power input A = Channel 1 + Channel 2

Power input B = Channel 3 + Channel 4

- 4) Based on the requirements for each power input, select an appropriate cord size. (AWG = American Wire Gauge)

Amps:	Cord Size:	Watts:
0-10	18 AWG	0-1200
10.1-13	16 AWG	1201-1560
13.1-18	14 AWG	1561-2160
18.1-20	12 AWG	2161-2400

- 5) Wall outlets can either supply 15 or 20 Amps, provided that there's nothing else on the same circuit. One way to figure out whether the outlet is of the 15 or 20 Amp variety is at the circuit breaker/fuse box. Each circuit breaker/fuse has the Amperage (current) rating written on it.

Another way to tell how much the wall outlet can supply is by the connector. Look at the two outlets the one on the left can handle 15 Amps the one on the right can handle 20 Amps.

All standard wall outlet can supply 15 Amps, if there's nothing else on the same circuit. So, if your total power requirements are less than 15 Amps, you can safely plug both cords, for the power inputs, into the same wall outlet.

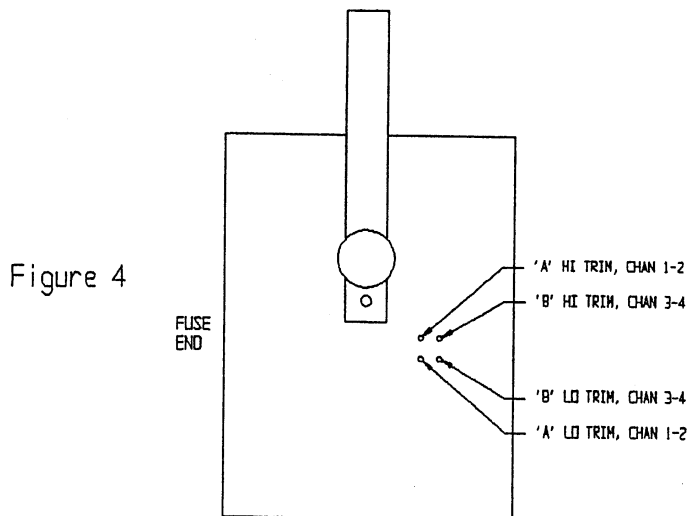
Ex: Power input A = 6 Amps, power input B = 7 Amps. Since  $6 + 7 = 13$ , you can safely plug both power inputs into a standard 15 Amp wall outlet, each cord should be 18 AWG.

With this in mind, connect the power cords appropriately.

## TRIMMING

The MXP dimmer module contains two independent timing signal circuits, making it capable of running off any two building circuits--regardless of phasing. Timing signal A controls channels 1 and 2, and timing signal B control channels 3 and 4. Each timing circuit has a high and a low trimmer, which you can access through four small holes in the side of the dimmer (see Fig. 4). Since there are no trim adjustments on the MXC controller, all trimming is done at the dimmer. The trimming procedure follows:

- 1) Power-up the system.
- 2) On the MXC controller, switch black-out (B/O) off.
- 3) Turn all channels up to full.
- 4) Turn one of the high trimmers all the way counter-clockwise. Then, slowly turn the pot clockwise until the lights just start to dim. From there, turn the pot back again until the lights reach their previous full intensity. Repeat this for the other high trimmer.
- 5) Press black-out, to change all channels to 0%
- 6) Adjust both low trimmers for desired lamp preheat either visually, or by connecting a voltage meter to the channel output (2-3vac).
- 7) Repeat 1)-6) for additional MXP's.



**OUTPUT FUSES**

Each channel of the MXP dimmer has an externally accessible fuse located on the right side of the dimmer module. To remove a fuse, insert a screwdriver into the gray fuse-holder slot and turn counter-clockwise a quarter turn. To replace, push in on the fuse-holder with the screwdriver and turn a quarter turn clockwise. Replace only with a Busman ABC 10, or Littlefuse 312010 fuse.

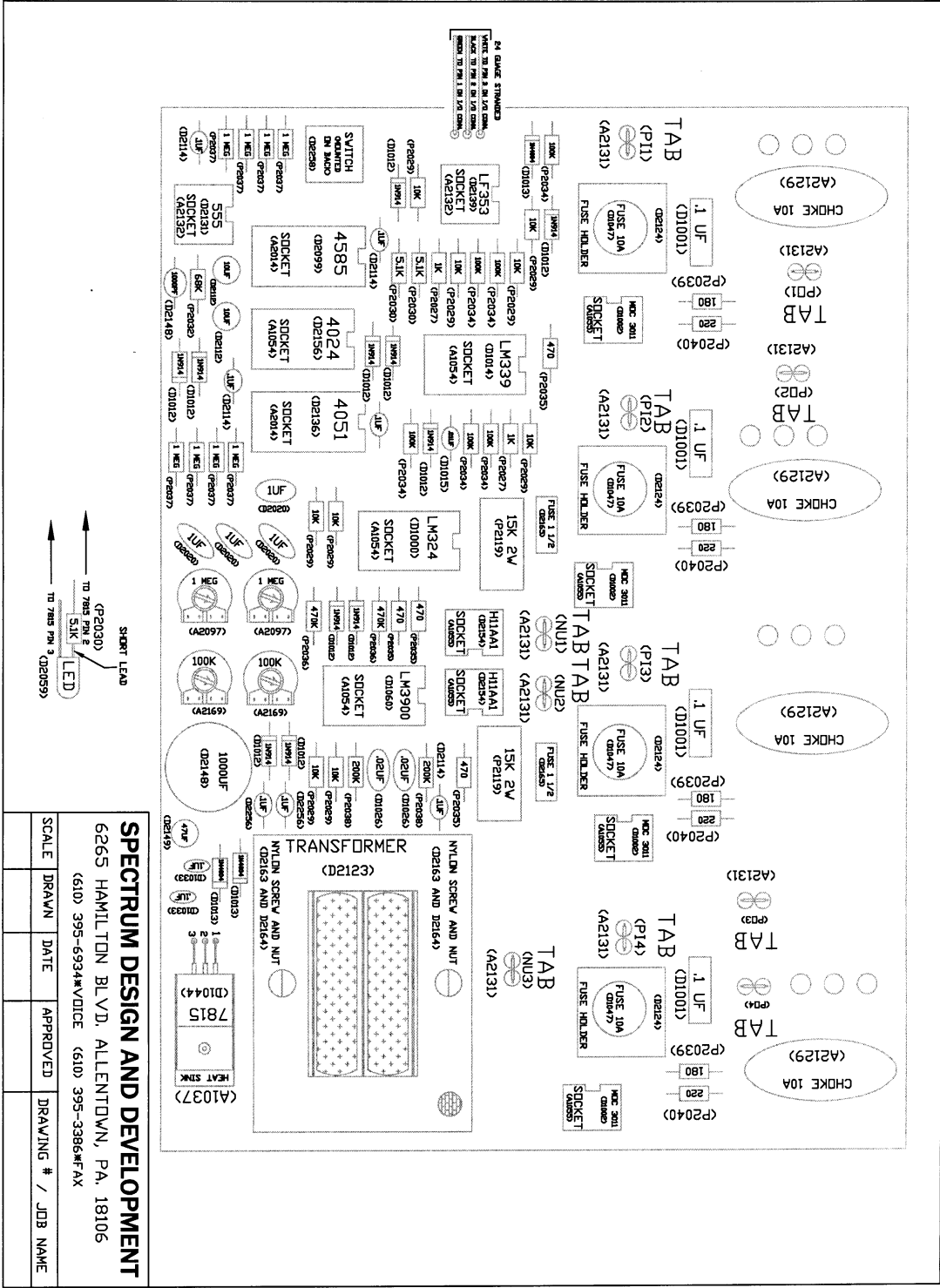
## TROUBLE SHOOTING

CAUTION! THE MXP CONTAINS HIGH VOLTAGE COMPONENTS, WHICH CAN GIVE A HAZARDOUS OR FATAL SHOCK. DO NOT OPEN THE HOUSING UNLESS YOU ARE QUALIFIED TO WORK ON HIGH VOLTAGE EQUIPMENT. SERVICE SHOULD ONLY BE DONE BY EXPERIENCED ELECTRICIANS OR ELECTRONIC TECHNICIANS.

Something appear not to be working correctly? Please consult the troubleshooting table below to see if your problem can be corrected. If you feel something really is wrong with the MXP, refer to the SERVICE section of this manual.

Symptom	Possible Cause
Dimmer doesn't work at all	Control cable not plugged into controller/dimmer Dimmer not plugged into powered AC wall outlet Dimmer control channels assigned incorrectly
One or more channels don't work	Output fuse(s) blown Lamp(s) burned out Power input A not plugged in, or plugged into a dead outlet
Output fuses keep blowing	More than 1200 watts plugged into channel Short circuit in lamp or cord
Building circuit breakers keep tripping	Too much wattage plugged into dimmer Other equipment plugged into same building circuit
Lamps do not dim all the way or don't respond properly	Timing signal out of trim, see the "TRIMMING" section



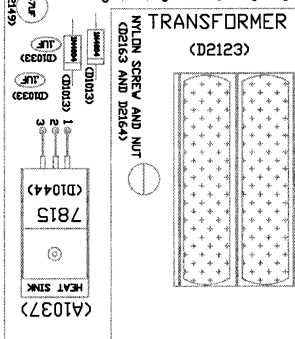


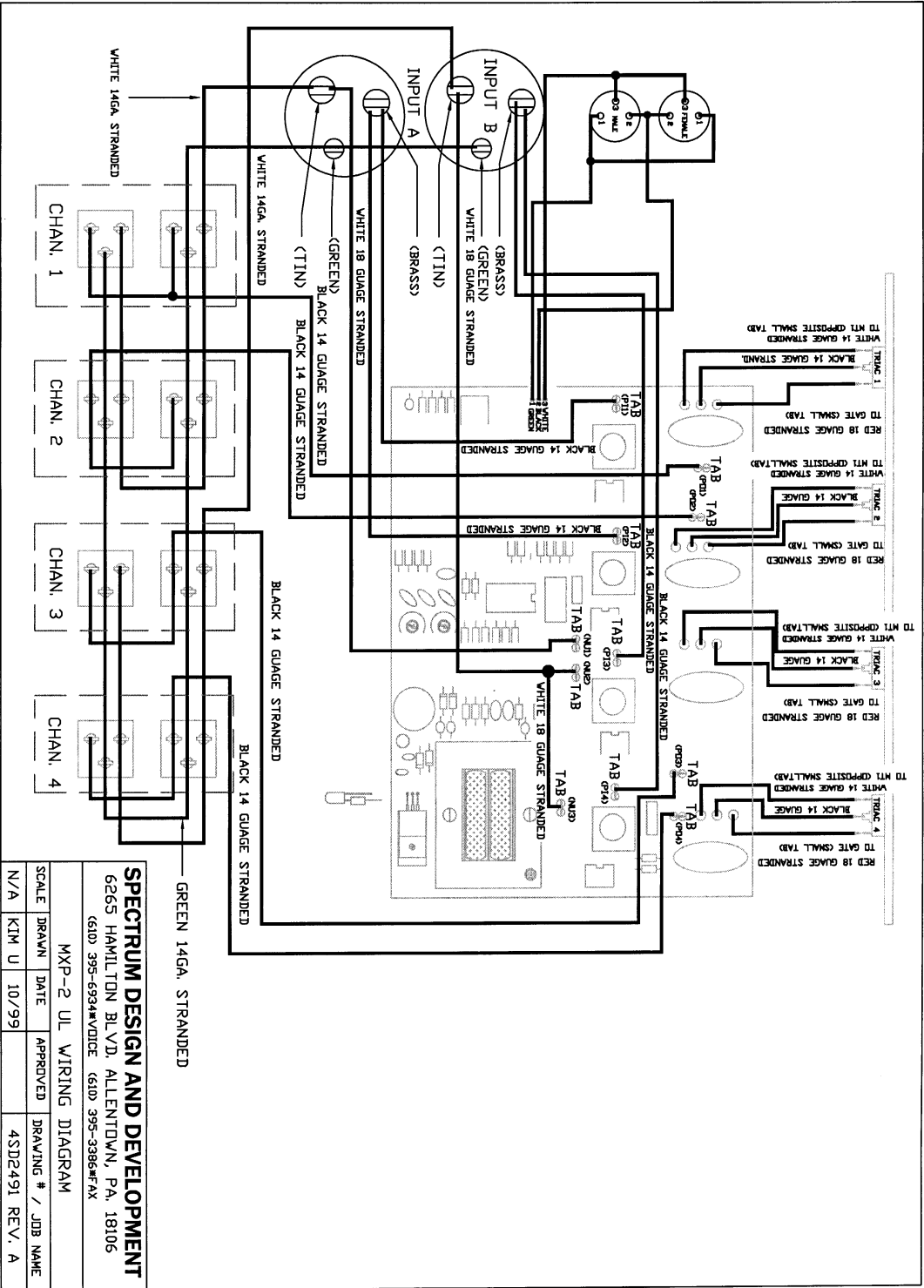
**SPECTRUM DESIGN AND DEVELOPMENT**  
 6265 HAMILTON BLVD, ALLENTOWN, PA, 18106  
 (610) 395-6934\*VOICE (610) 395-3866\*FAX

SCALE	DRAWN	DATE	APPROVED	DRAWING # / JOB NAME
-------	-------	------	----------	----------------------

SHORT LEAD  
 (P2030)  
 TO TAB PIN 5  
 SIK  
 LED  
 TO TAB PIN 3 (D2095)

24 GAUGE STRANDED  
 WIRE TO PIN 1 ON BOARD  
 WIRE TO PIN 1 ON TAB

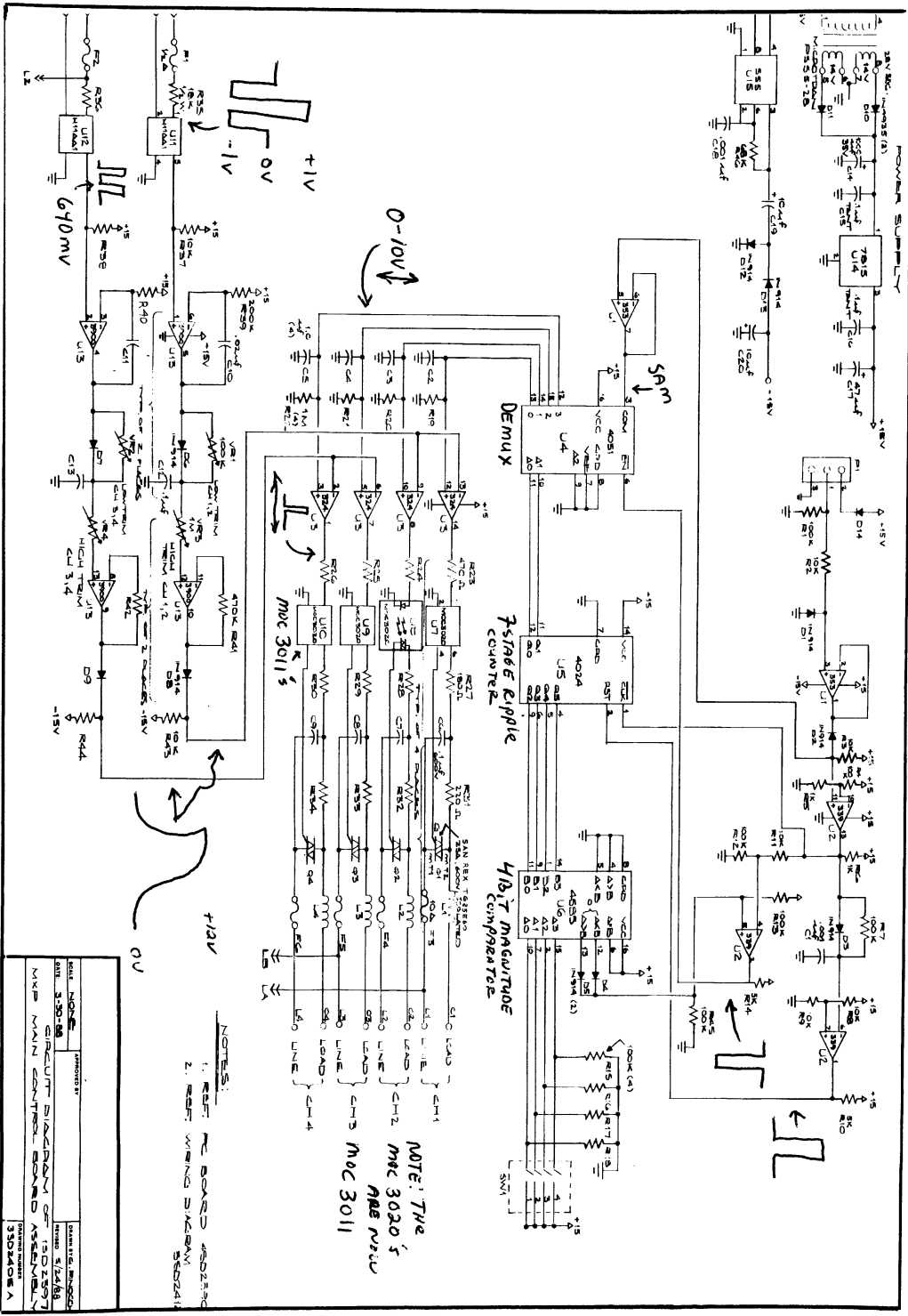




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MXP-2 UL WIRING DIAGRAM

SCALE	DRAWN	DATE	APPROVED	DRAWING # / JOB NAME
N/A	KIM U	10/99		4SD2491 REV. A



ITEM NO.	DESCRIPTION	QTY	DATE
1	RESISTOR	100	1/24/68
2	CAPACITOR	50	1/24/68
3	INDUCTOR	2	1/24/68
4	IC	1	1/24/68
5	IC	1	1/24/68
6	IC	1	1/24/68
7	IC	1	1/24/68
8	IC	1	1/24/68
9	IC	1	1/24/68
10	IC	1	1/24/68
11	IC	1	1/24/68
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99	IC	1	1/24/68
100	IC	1	1/24/68

NOTES:  
 1. REF. TO BOARD ASSY  
 2. REF. WINDING DIAGRAM

NOTE: THE  
 MK 3030 S  
 ARE NEW  
 MK 3011 S