THE S624 BIBLE

Section 1: Assembly Procedures

Section 2: Testing

Section 3: Technical Reference Manual

Section 4: Owner's Manual

S624 Assembly Procedures
Version 1.00

INDEX

Installing the Chokes

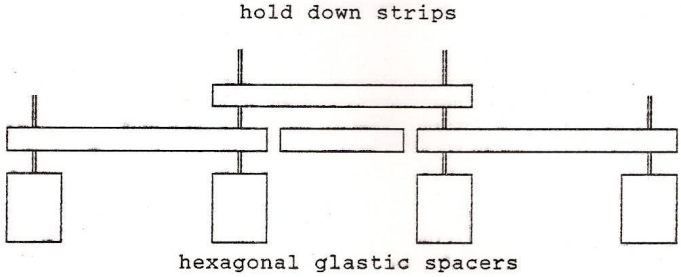
1) Bend the fishpaper to a 90 degree angle. Place it on the floor of the cabinet. The folded side should be closer to the back of the dimmer.

2) Put each of the four glastic hex spacers on the PEM's coming through the bottom. Get them as tight as possible keeping the edges parallel to the sides of the dimmer.

3) Set the chokes and rectangular pieces between the glastic spacers. Use some silicone caulking to glue the rectangular pieces down. Also, put some on the hex spacers and the rectangular pieces to hold the choke more firmly. Make sure that the shorter lead on each of the chokes is facing towards the front of the dimmer.

4) Attach the hold down strip using 1/4" x 3/4" bolts and the fiber washers.

   Temporary modification: You will need to cut two hold down strips to construct this arrangement.



Glue the center two parts to each other with the silicone.

5) Carefully adjust the chokes and tighten the bolts down so that each choke is firmly mounted.

6) Install the insulated sleeving and fork crimps on the shorter lead on all six chokes.

Installing the SSR Heatsink Assembly

1) Make sure that the top edge of the heatsink has been deburred. If not, smooth the edge with the power wire brush.

2) Mount the heatsink to the floor of the bottom frame.

3) Use a stubby flathead screwdriver to attach the choke leads to the SSR's. You may use either terminal 1 or 2 on the SSR, whichever is easier. If the leads are just a little too short, the cut the tape on the chokes slightly. This will give you about 1/2" more.

4) Cut the 12 AWG black which runs between from the SSR's to the top of the cirtcuit breakers. Attach the fork crimps on one end.

5) Again using the stubby screwdriver, connect one wire to each SSR.

Installing the Circuit Breakers

1) Attach the black 12 AWG leads that will go to the terminal block to the bottom or "OFF" side of each circuit breaker.

2) Connect the 12 gauge leads coming from the SSR's to the top or "ON" side of each breaker.

3) Use the breaker bracket and the #8 sheet metal screws to mount the circuit breakers to the front panel.

Installing the Terminal Block

1) Mount the aluminum rail to the floor of the cabinet using 8/32's and kep nuts.

2) Snap the terminal blocks into the rail.

3) Use the silicone to glue the labels into the blocks. Label them like this:

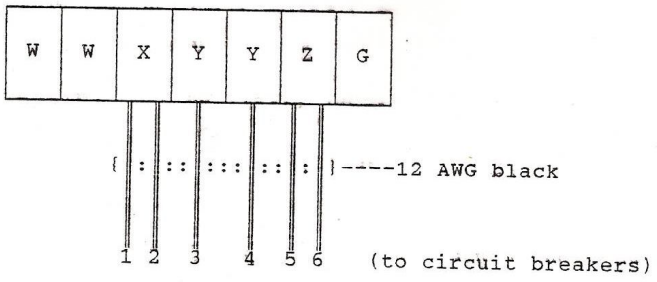


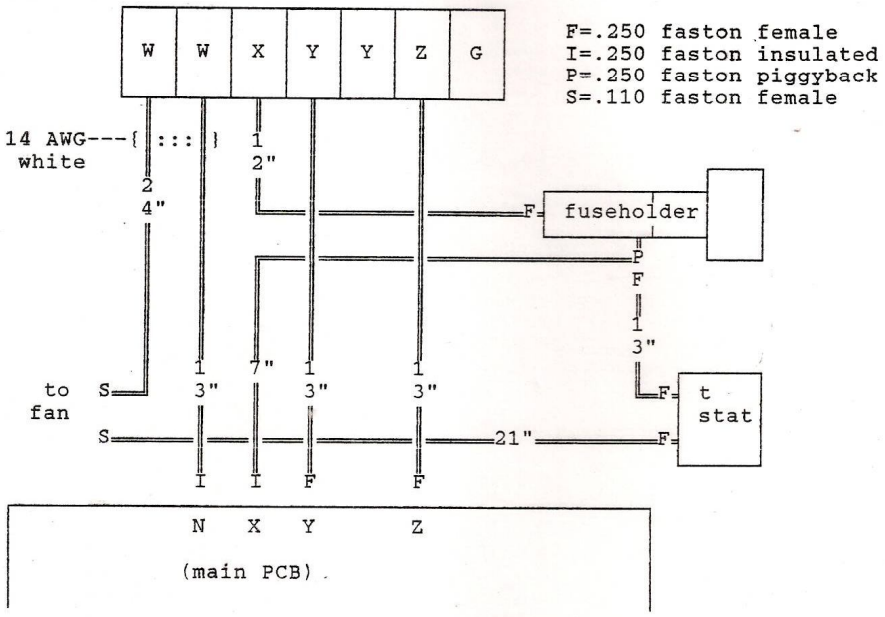
figure 1.

4) Connect the wires from the circuit breakers to the terminal block using the scheme in figure 1.

Wiring the Fuseholder, PCB, and Fan

1) Mount the fuseholder into the front panel

2) Wire using figure 2 as your guide.



all wire is 14 AWG black unless specified otherwise

figure 2

Installing the Output Connectors

Parallel Blade

1) Jumper the grounds together using 14 AWG white with green markings.

2) Using 12 AWG white, connect the neutral terminal on the outlet to the neutral on the terminal block. Do this for each channel.

3) Using 12 AWG black and the fork crimps, make up short (6") pigtails for the hot leads on the outlets.

4) Connect the choke leads to the pigtails with butt splices.

5) Mount the outlets to the panel.

6) Mount the outlet panel.

Installing the Power feed connector

Romex Connector

1) Attach the romex clamp to the panel. (You may need to enlarge the hole before you can do this.)

2) Slap the romex panel on the back of the unit.

Union and Veam Connector

(don't worry about these extremely rare cases)

Installing the Control Panel and the Fan

1) Mount the control panel assembly to the back panel. It goes on the far left--the opposite side of the input panel. (The first run of metalwork will force you to drill some new holes.)

2) Run the wires to the front (where the PCB(s) will be).

3) Mount the fan using 8/32's. (You may need to enlarge the holes on the bottom frame before the screws will fit through.)

Installing the PC Boards

1) Lay the front panel fishpaper mask inside the metalwork.

2) Mount 2 of the 7/16" standoffs to the holes on the left edge of the main PCB. Sandwich fish paper spacers between the metal standoffs and the PCB.

3) Mount the remaing 4 standoffs to the PCB. Don't use the fish paper spacers for these.

4) Drill the mounting holes on the DMX PCB to 3/16".

5) Mount the DMX-512 PCB to the motherboard using the plastic 3/4" spacers.

6) Connect the power wires to the spade terminals on the right side of the motherboard. (see figure 2)

7) Mount the two cards into the metalwork.

8) Install the bezels for the focus check switches.

9) Connect the harness from the SSR heatsink assembly to the bottom connector on the motherboard.

10) Connect the harness from the control panel assembly to the top connector on the motherboard.

11) Connect the harness between the DMX PCB and the motherboard.

12) Connect the harness from the XLR connectors to the header on the top side of the DMX board.

Final Testing the S624
Version 1.00

Before you begin, you must first:

1) Connect the S624 to a proper line feed, either single or three phase. Don't be silly, make sure that the power is off before you connect the dimmer.

2) Make sure that each of the focus check buttons (on the left side) are off. (This is the out position.)

3) Switch each of the channel circuit breakers on.

Preliminary Check

1) Once you have switched on the power, check the front panel LED's for normal operation. LED's L1, L2, L3, and +15 VDC should be on. If the OT LED is on, make sure that the SSR harness is connected correctly. (It is very easy to offset the connector by one pin.)

Trimming

1) If you have the DMX-512 option
   Connect a reliable DMX-512 source to the DMX in jack. (A MXC or Dexter are good choices.)
   If you don't have the DMX-512 option
   Connect a reliable analog source to any of the analog input connectors. (Use a console that has been properly trimmed.)

2) On the controller or test box, slowly bring all the channels for the S264 to full. If you hear sharp buzzing (much louder than the normal dimmer growl) you have a broken choke. You will need to replace it.

Phase X

3) Connect the scope probe to pin 2 on J3. (You can slide the MTA housing out just enough so that you can connect the scope probe to the pin.)

4) Turn the uppermost high trim all the way counter-clockwise.

5) Watching the oscilloscope, slowly turn this pot clockwise. Stop when the square wave finally changes into a flat line (steady DC voltage).

Phase Y

(This only applies to S624's set for three phase power.)

6) Connect the scope probe to pin 4 on J3.

7) Turn the second pot from the top all the way counter-clockwise.

8) Watching the oscilloscope, slowly turn this pot clockwise. Stop when the square wave finally changes into a flat line.

Phase Z

9) Connect the scope probe to pin 6 on J3.

10) Turn the second pot from the bottom all the way counter-clockwise.

11) Watching the oscilloscope, slowly turn this pot clockwise. Stop when the square wave finally changes into a flat line

Low trim

12) On the controller or test box, set all channels to off (0%).

13) Turn the lowest pot fully clockwise.

14) Slowly turn the pot counter-clockwise until the square wave changes into a straight line.

Checking the fan

During your testing, make sure that the fan does come on. It should start up after the dimmer reaches a temperature of 122F or 50C.

Testing the dimmer curves

1) Connect a console to the dimmer.

2) Connect the output of each channel to similar loads (i.e. lights of the same wattage.)

3) Set all of the channels to full.

4) Use the grand master to slowly fade up and down. As you do this, all of the dimmers should fade together. Any bumps or uneven action indicate a problem.

Testing the Analog Inputs

1) Connect the AMP CPC input to one of the ports on the test bench. Verify that the green LED comes on. (It shows that the power supply in the dimmer is able to phantom power a controller.)

2) On the MXC test master, run up the appropriate channels one at a time. Make sure that each channel controls only one dimmer channel. Also, check that the channels map correctly. (Ex: if you connected the dimmer to the control channels 7-12, you want to verify that the MXC channel 7 controls S624 channel 1, MXC #8 --> S624 #2, and so on.)

For dimmers with the DMX-512 option

1) Connect Dexter to the DMX-512 IN. Verify that the DMX-512 LED comes on when there is a valid DMX input.

2) Set the address to 55.

3) Bump channels 86-91 on Dexter. They should control channels 1-6 on the dimmer.

4) Set the address to AA.

5) Bump Dexter channels 171-176. They should control channels 1-6 on the dimmer.

THE S624 TECHNICAL REFERENCE MANUAL
rev 1.00
June 16, 1992

This manual will help you repair a Spectrum S624 dimmer pack. The manual assumes that you have some knowledge of electronics. If you do not, we strongly recommend that you do not attempt to repair the S624 yourself. You can get factory service from Spectrum Design. Please call (215) 395-6934 for more information.

FINDING THE SOURCE OF THE PROBLEM

This manual is split into four different sections. Each one addresses a different type of problem. The brief descriptions below will direct you to the appropriate section.

When you read the debugging sections, start at the beginning and check for each of the different symptoms. By going through each of the problems in order, this manual will direct you to the faulty component(s) or area, with minimal effort on your part.

System Problems

This section will help you trouble shoot a major malfunction that affects the entire dimmer, including:

- The L1, L2, or L3 LED's don't come on
- +15V LED doesn't come on
- The control fuse fails immediately
- All the channels flash wildly
- The control inputs and the focus check buttons don't do anything

Timing Curve Problems

If 2 or more channels don't dim properly, the dimmer probably has a timing curve problem. If all the dimmers on a particular phase behave the same incorrect way, suspect timing curve problems.

Channel Problems

For dimmers with a single misbehaving channel, you should read this section.

DMX-512 Problems

If the dimmer doesn't handle the DMX-512 input correctly, then read this section.

SYSTEM PROBLEMS

Before you start a thorough check, make sure that the connectors on the back of the PC boards (right behind the focus check buttons) are aligned correctly. When connecting them, it's quite easy to accidently shift them over by one pin.

Also, check the high voltage wiring between the main terminal block and the PCB. Make sure that the X, Y, and Z phases go to the proper connectors on the PCB. Additionally, verify that all the wires are properly crimped into the fast-on connectors.

The L1 LED doesn't go on

Possible problems:

* wiring between the main terminal block and the PCB. (Check the wiring diagram)
* control fuse (the one on the front panel)
* the power resistor (R51)
* the power diode (D27)
* the LED itself--bad solder joints or the LED is burned out.

The L2 or L3 LED's don't come on

Possible problems:

* wiring between the main terminal block and the PCB. (Check the wiring diagram)
* control fuse (the ones on the back of the PCB, right next to the faston's)
* the power resistor (L2: R63, L3: R80)
* the power diode (L2: D28, L3: D31)
* the LED itself--bad solder joints or the LED is burned out.

Control Fuse blows immediately upon power up

Possible problems:

* the MOV (It looks burnt.)
* the transformer (It should have a resistance of about 32 ohms when it's soldered into the PCB.)

+15V DC light doesn't come on

Possible problems:

* the transformer (It should have a resistance of about 32 ohms when it's soldered into the PCB.)
* the 7815 voltage regulator (With a input voltage of 20-30V dc on pin 1, you should see 15V dc at the output, pin 3.)
* the rectifier diodes (D9, D10, D18, D19)
* the big filter cap (C22)
* the LED itself
* solder joints around these components

The OT LED is stuck on

Possible problems:

- wiring of the SSR harness
- wiring of the MTA header
- the thermostat (It should have a resistance of zero ohms when the temperature is less than 90^0C or 194^0F.)

CHANNEL PROBLEMS

The channel LED doesn't respond to the analog control signal

Possible problems:

* the analog control connector on the rear panel
* the wiring for the control connectors
* the housing that connects the control panel to the main PCB. (J1)
* the LM324 for that particular channel (ch 1: U2, ch 2: U1, ch 3: U1, ch 4: U3, ch 5: U7, ch 6: U7.)
* solder joints or jumps around these components

The channel LED doesn't respond to the DMX-512 signal

Possible problems:

* the harness from the DMX PCB to the main PCB
* the DMX board (Jump to "DMX-512 PROBLEMS" on page 8 if all the channels don't respond to the DMX input.)

The choke buzzes loudly when you try to fade up the channel

Possible problems:

* The choke core is cracked. You will need to replace that choke.

The channel LED works, but the dimmer doesn't

Possible problems:

* wiring from the main terminal block to the circuit breakers and on to the heatsink assembly
* the harness and MTA connector for the heatsink assembly
* circuit breaker (with the breaker on, you should see 120V ac at the output of the breaker/input of the SSR)
* open load (Power up the S624 up and switch the breakers on. Connect a load to the output of the bad channel (at least 100 Watts) Test the voltage at the output of the SSR. If you see about 120V ac but the light isn't on, the dimmer isn't actually connected to the load. There could be a bad connection between the output of the SSR and output connector. Or, the neutral for the output connector may be loose or disconnected. Also, before going insane, make sure that the light does work.)
* the SSR (Connect the scope to J3 to check the firing signal. ch1=pin2, ch2=pin3, ch3=pin4, ch4=pin5, ch5=pin6, ch6=pin7.

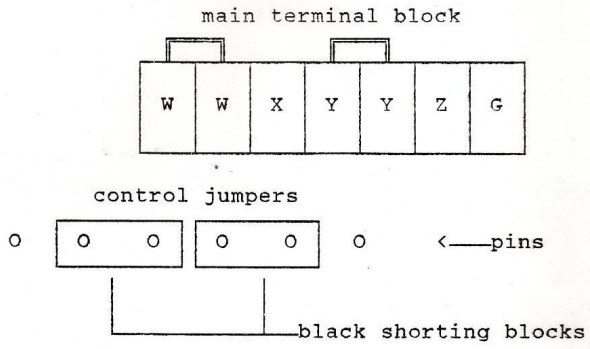
  Ground Probe: a good place to pick up signal common is pin 1 on connector J1. This is the MTA that goes to the analog control input. You can slide the MTA housing out just a little, and clip the ground probe without disconnecting anything.

  Run the control signal for the bad channel up and down. You should see a square wave that changes with the channel level. If you do see this signal, the SSR is probably bad. If not, the problem is on the PCB.
* solder joints or jumps on the PCB

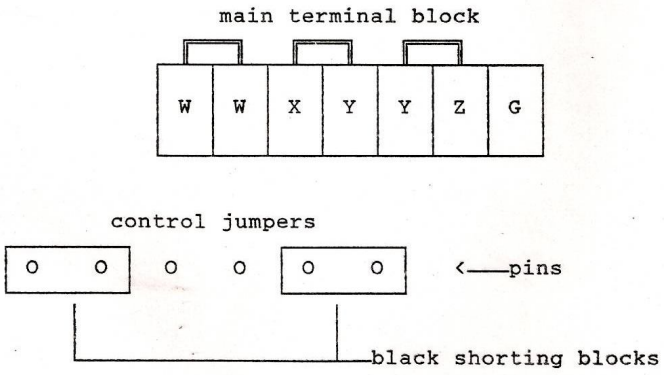
TIMING CURVE PROBLEMS

If you're having problems with channels 3 & 4, make sure that you set the phase arrangement correctly. See the diagrams below.

Three Phase Power

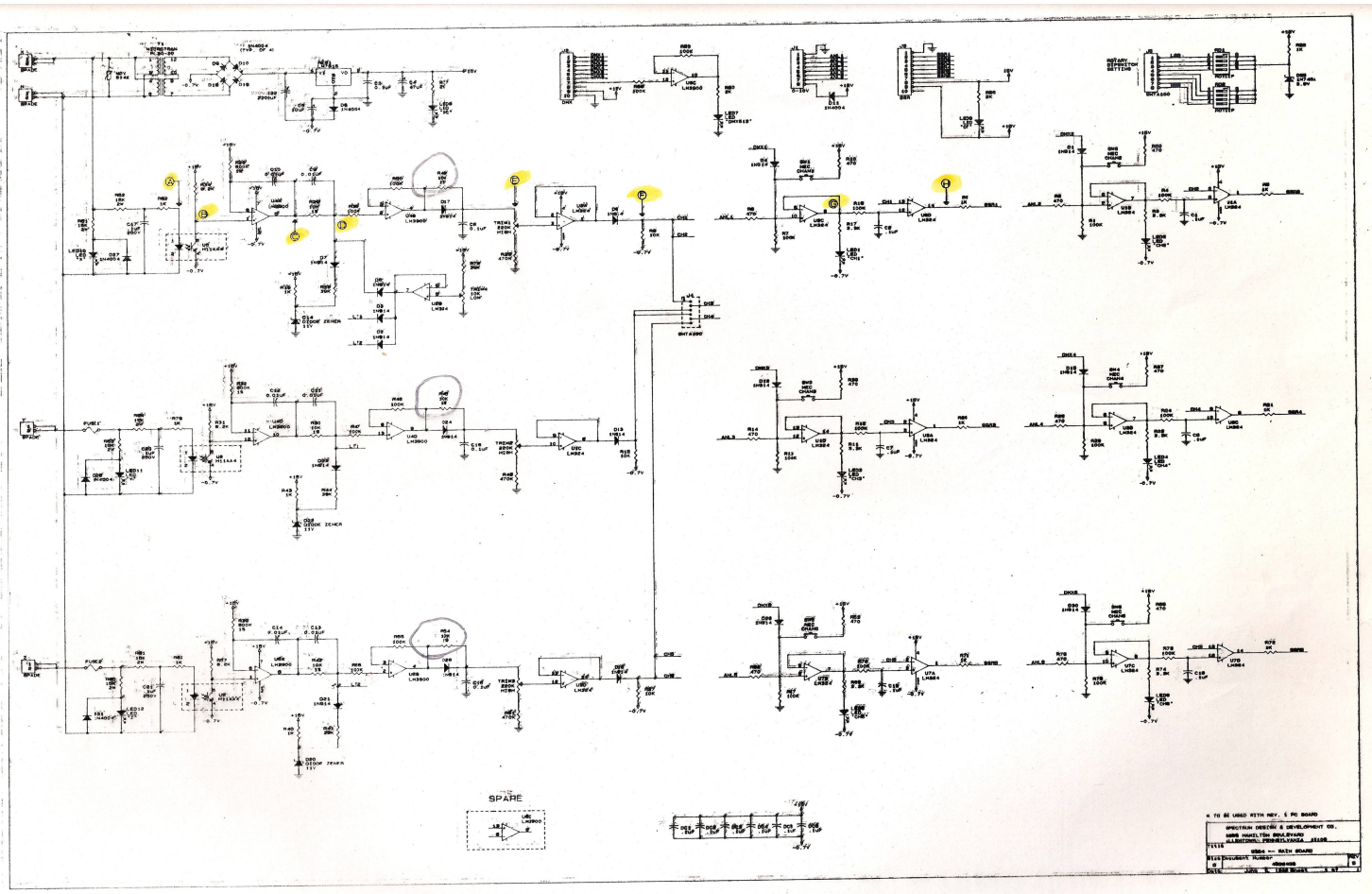


Single Phase Power



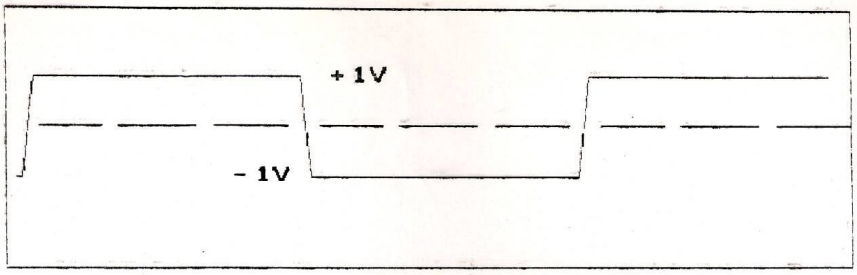
How to locate timing curve problems

To best determine which section of the timing circuit is a problem, you should use an oscilloscope to follow the signal shaping. Take a look at the schematic (page 6). The letter markers show different points in the circuits called "Nodes." By connecting the oscilloscope to these nodes and comparing them with the wave forms below, you can easily find right where the problem is.

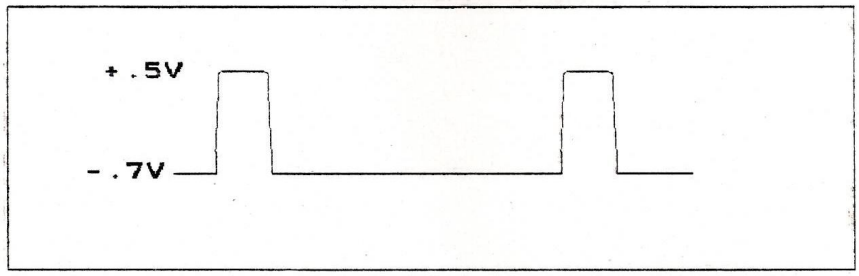


NOTE: To improve performance
CHANGE R49, R45 + R54 TO 1KΩ

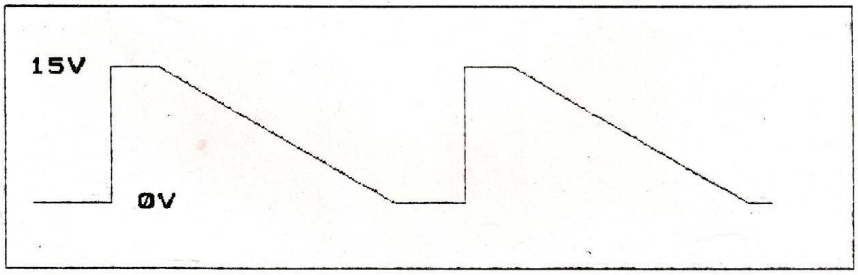
Waveforms



Node A (Pin 1 on the H11AA4's)

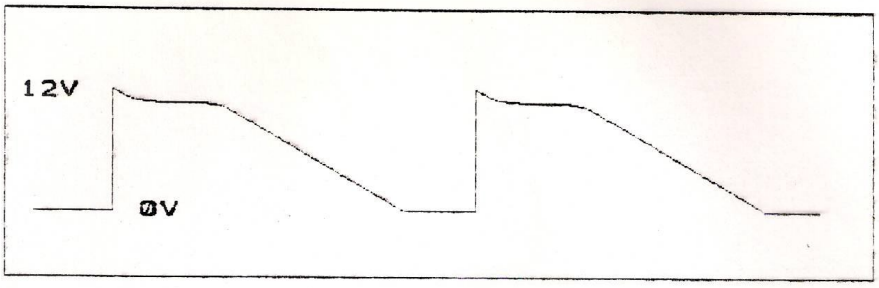


Node B (Pin 1 or 12 on the LM3900's)

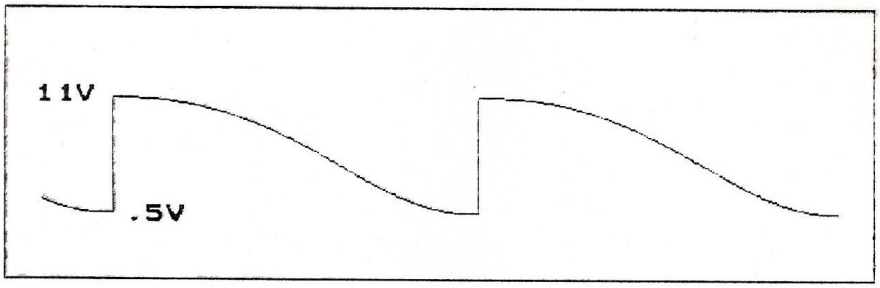


Node C (Pin 5 or 10 on the LM3900's)

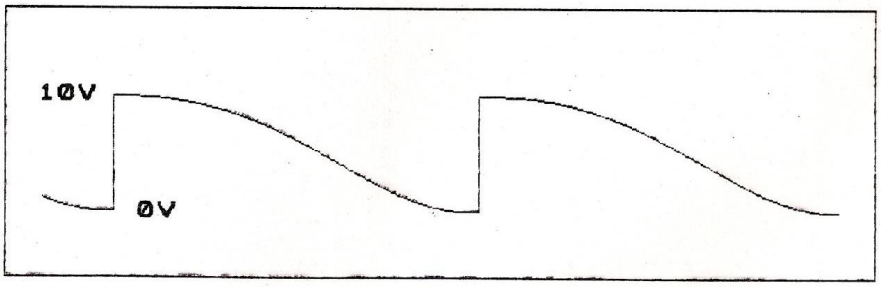
Ground Probe: a good place to pick up signal common is pin 1 on connector J1. This is the MTA that goes to the analog control input. You can slide the MTA housing out just a little, and clip the ground probe without disconnecting anything.



Node D (Between the two LM3900 op amps)



Node E (The high side of the 220K trimmer)



Node F (At J4)

Note: All of the waveforms have a frequency of 120 Hertz

DMX-512 PROBLEMS

The DMX-512 signal is decoded by the second, smaller PCB. Before digging around inside the S624, check to see that the address switches are set appropriately. (See Appendix A on page 10 or the owner's manual)

If the DMX-512 input controls the channel LED's correctly but not the output, then jump to the CHANNEL PROBLEMS section (page 4).

The DMX-512 input doesn't control the channel LED's

Possible problems:

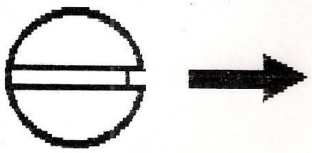
- the wiring for the control connectors
- the wiring for the MTA's (On the MTA housing connected to J1 on the DMX board, make sure that there is a jumper from pin 1 to pin 10.)
- the pin and socket connector that sits right behind the address switches on the main PCB.
- the jumpers on the DMX PCB. (There should be a jumper connecting pin 9 on J1 to the V+ signal on the DMX-board)
- the 4051 (U7)
- the 4066 (U10A)
- the rotary dip switches on the motherboard (RD1 & RD2)
- solder joints or jumps

APPENDIX A: Setting the DMX-512 Address switches

(Taken from the S624 Owner's Manual)

DMX-512 gets it's name from the ability to control 512 dimmers through a Digital MultipleX. Meaning, a single control link contains level information for 512 dimmers. As a result, you must tell the S624 which dimmer levels it should use. By setting the DMX address, you are specifying which DMX dimmer signal will control dimmer #1 on the S624. From there, the next 5 DMX dimmer signals control S624 dimmers #2 through #6, respectively.

The DMX address is a two digit hexadecimal number. This means that each of the digits could be 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, or F. You select the DMX address with the two switches above the DMX-512 LED. The upper address switch is the first digit, the lower is the second. Look closely at the screwdriver slot in the white address switch. The diagram below shows how to tell which way the switch is pointing. Table 1 shows the relation between the DMX address and the dimmer assignment.



Example:

Suppose you want the S624 to act as dimmers 31 through 36 on the DMX-512 link. To do this you would look at table 1 and find that dimmer 31 corresponds to address 1E. Then you would set the upper address switch to 1, and the lower switch to E.

Table 1: Starting Dimmer versus Address Number

Dim#	Addr#	Dim#	Addr#	Dim#	Addr#	Dim#	Addr#	Dim#	Addr#
1	00	53	34	105	68	157	9C	209	D0
2	01	54	35	106	69	158	9D	210	D1
3	02	55	36	107	6A	159	9E	211	D2
4	03	56	37	108	6B	160	9F	212	D3
5	04	57	38	109	6C	161	A0	213	D4
6	05	58	39	110	6D	162	A1	214	D5
7	06	59	3A	111	6E	163	A2	215	D6
8	07	60	3B	112	6F	164	A3	216	D7
9	08	61	3C	113	70	165	A4	217	D8
10	09	62	3D	114	71	166	A5	218	D9
11	0A	63	3E	115	72	167	A6	219	DA
12	0B	64	3F	116	73	168	A7	220	DB
13	0C	65	40	117	74	169	A8	221	DC
14	0D	66	41	118	75	170	A9	222	DD
15	0E	67	42	119	76	171	AA	223	DE
16	0F	68	43	120	77	172	AB	224	DF
17	10	69	44	121	78	173	AC	225	E0
18	11	70	45	122	79	174	AD	226	E1
19	12	71	46	123	7A	175	AE	227	E2
20	13	72	47	124	7B	176	AF	228	E3
21	14	73	48	125	7C	177	B0	229	E4
22	15	74	49	126	7D	178	B1	230	E5
23	16	75	4A	127	7E	179	B2	231	E6
24	17	76	4B	128	7F	180	B3	232	E7
25	18	77	4C	129	80	181	B4	233	E8
26	19	78	4D	130	81	182	B5	234	E9
27	1A	79	4E	131	82	183	B6	235	EA
28	1B	80	4F	132	83	184	B7	236	EB
29	1C	81	50	133	84	185	B8	237	EC
30	1D	82	51	134	85	186	B9	238	ED
31	1E	83	52	135	86	187	BA	239	EE
32	1F	84	53	136	87	188	BB	240	EF
33	20	85	54	137	88	189	BC	241	F0
34	21	86	55	138	89	190	BD	242	F1
35	22	87	56	139	8A	191	BE	243	F2
36	23	88	57	140	8B	192	BF	244	F3
37	24	89	58	141	8C	193	C0	245	F4
38	25	90	59	142	8D	194	C1	246	F5
39	26	91	5A	143	8E	195	C2	247	F6
40	27	92	5B	144	8F	196	C3	248	F7
41	28	93	5C	145	90	197	C4	249	F8
42	29	94	5D	146	91	198	C5	250	F9
43	2A	95	5E	147	92	199	C6	251	FA
44	2B	96	5F	148	93	200	C7	252	FB
45	2C	97	60	149	94	201	C8	253	FC
46	2D	98	61	150	95	202	C9	254	FD
47	2E	99	62	151	96	203	CA	255	FE
48	2F	100	63	152	97	204	CB	256	FF
49	30	101	64	153	98	205	CC		
50	31	102	65	154	99	206	CD		
51	32	103	66	155	9A	207	CE		
52	33	104	67	156	9B	208	CF		

THE S624
OWNER'S MANUAL
version 1.02

TABLE OF CONTENTS

INTRODUCTION

Congratulations on your purchase of a Spectrum S624 dimmer. The S624 is a rugged and versatile dimmer designed to provide years of flawless performance. Some of the features include:

* 6 channels @ 2400 Watts each
* Field configurable for either single or three phase
* Extensive front panel indicators displaying channel levels and system status
* All external connections located on the rear of the dimmer
* 0-10 V Analog and DMX-512 control inputs merged in a highest-takes-precedence or pile-on manner
* Solid State Relays using back to back SCR's
* Toroidal chokes with a rise time of 400 microseconds
* Focus check buttons

Note: This manual will reference the model number option codes. An "x" signifies a letter that doesn't matter for the specific situation. Ex: S624-xxD refers to any S624 with DMX-512. See appendix A for the model number assignments.

SYSTEM CONSIDERATIONS

Mounting and Cooling

A thermostat controls the fan on the left side. Whenever the internal temperature exceeds approximately 30°C/85°F, the fan will switch on. Because the dimmer uses forces air cooling, you must allow a sizable path for air to enter and exit the unit.

Over-temperature

If the internal temperature reaches an unsafe level (90°C/195°F), the S624 will temporarily shut itself down. When the unit cools to a safe temperature, it will restart--automatically. Unless the fan fails or something severely restricts the airflow, the S624 will operate at full load indefinitely without reaching the over-temperature level.

INPUT POWER CONNECTIONS

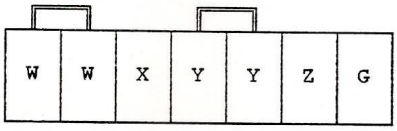
The S624 can operate from single or three phase power. For models S624-Uxx and S624-Vxx just plug the appropriate power connector to the back of the dimmer. For all other models read the following sections. But first, here's the emphatic warning in capital letters:

BEFORE ATTEMPTING TO CONNECT OR SERVICE THE S264, MAKE SURE THAT YOU SHUT OFF THE POWER FOR THE DIMMER. OTHERWISE YOU MAY RECEIVE A HARMFUL OR DEADLY ELECTRICAL SHOCK!

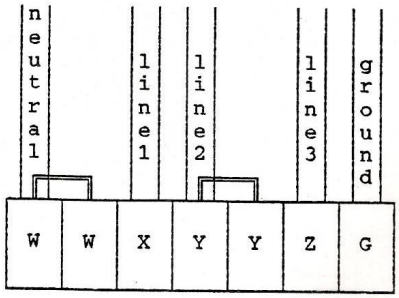
Three Phase Power

This arrangement has 5 wires: 3 hots, 1 neutral, and 1 ground. To configure the dimmer for three phase power do this:

1) Arrange the jumpers on the main terminal block like this:

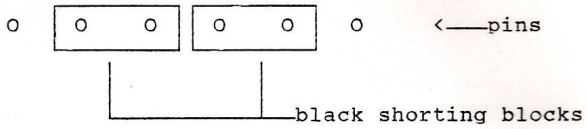


2) **Attach the wires from the input like this: (the standard wire colors for lines 1, 2, & 3 are red, blue, and black. The neutral is white, the ground is green.)**



3) Locate the control phase jumpers. They are on the back of the Printed Circuit Board (PCB) that is mounted to the front panel. You can easily switch these jumpers using needle-nose pliers. For models S624-xxD, the control jumpers are sandwiched between the two PCB's. You can still see and switch them.

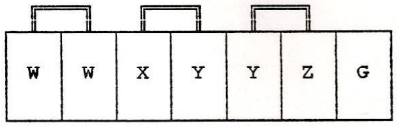
4) Set them like this:



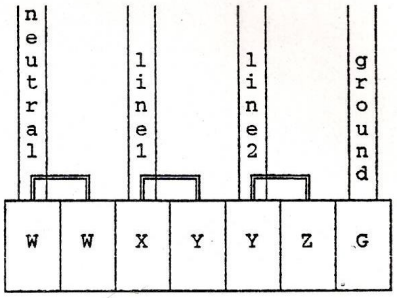
Single Phase Power

This arrangement has 4 wires: 2 hots, 1 neutral, and 1 ground. To configure the dimmer for single phase power do this:

1) Arrange the jumpers on the main terminal block like this:

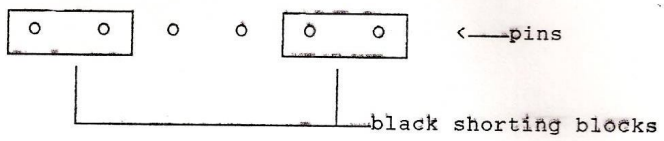


2) Attach the wires from the input like this: (the standard wire colors for lines 1 & 2 are red, blue, and black. The neutral is white, the ground is green.))



3) Locate the control phase jumpers. They are on the back of the Printed Circuit Board (PCB) that is mounted to the front panel. You can easily switch these jumpers using needle-nose pliers. For models S624-xxD, the control jumpers are sandwiched between the two PCB's. You can still see and switch them.

4) Set them like this:



OUTPUT POWER AND CONTROL CONNECTIONS

Determining the Load

A load can either be expressed in Amps or Watts. With a line voltage of 120 Volts, Amps & Watts are related like this:

Amps = Watts / 120

Watts = Amps x 120

The S624 can handle no more than 2400 Watts or 20 Amps per channel. So, when you connect lighting or equipment to the dimmer, be careful not to exceed this limit.

Output Power Connections

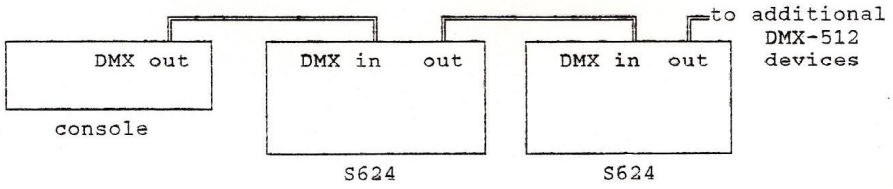
On all but the S624-xTx, simply plug your lighting instruments or devices into the appropriate channel receptacle.

For models S624-xTx, you will need to connect the load wiring to the internal terminal block. The hot and neutral wires attach to the 12-circuit terminal block, which is located behind the chokes. You can connect the ground wires from the load circuits to the main terminal block.

Control Connections

All models have three connectors for the 0-10V control signal. Keep in mind, that the three connectors for the analog input are wired together. So, if you want to control two dimmer packs with the same analog signals, you can use the extra connectors for distribution.

For models S624-xxD, there are two more connectors on the back panel. The DMX-512 IN receives the control signal from the console. The DMX-512 out port is a copy of the input signal. This port will pass the DMX-512 signal on to the next dimmer. The output port works even if the S624 is off. To connect dimmers using DMX-512, follow this diagram.



You can find the pin assignments for the control connectors in Appendix A.

SYSTEM OPERATION

Front Panel Indicators

L1 - This LED indicates that the phase X (Line 1) AC input is live.

L2 - For the 3 phase configuration, this LED indicates that the phase Y (Line 2) AC input is live. For single phase applications, the LED will behave the same as L1 does.

L3 - This LED indicates that the phase Z (Line 3) AC input is live.

+15 VDC - This LED shows that the internal power supply is working. The internal electronics are powered from line 1 (L1). This is Phase X on the main terminal block.

OT - This LED will light when an Over Temperature conditions occurs. When the S624 exceeds the maximum allowable temperature, it will shut itself down and light the OT LED. Once the dimmer reaches a more appropriate temperature, the S624 will resume normal operation.

DMX-512 - (With the DMX-512 option) When the S624 receives a valid DMX-512 signal, it will light this indicator.

Front Panel Controls

Circuit breakers - These 20 Amp circuit breakers protect the dimmer from shorts or overloads on the channel outputs. They also serve as channel disconnects.

Fuseholder - This fuse protects the fan, internal circuitry, and the timing circuit on Line 1. Replace only with a 2A 250V fuse.

Focus Check Buttons - The six latching buttons toggle each channel from normal operation to full on.

LOW - this control is recessed beneath the surface of the front panel. It controls the amount of preheat for all of the dimmers. (Preheat is a low trim adjustment. See Appendix B to learn how to trim the dimmer.)

High trims - There are three pots recessed beneath the front panel for high trimming each phase. They are factory calibrated.

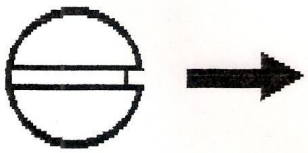
Address high & low - (optional) you can select the dimmer assignment for the DMX-512 control input. For a full explanation see the next section.

Setting the Address switches (with the DMX-512 option)

DMX-512 gets it's name from the ability to control 512 dimmers through a Digital MultipleX. Meaning, a single control link contains level information for 512 dimmers. As a result, you must tell the S624 which dimmer levels it should use.

By setting the DMX address, you are specifying which DMX dimmer signal will control dimmer #1 on the S624. From there, the next 5 DMX dimmer signals control S624 dimmers #2 through #6, respectively.

The DMX address is a two digit hexadecimal number. This means that each of the digits could be 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, or F. You select the DMX address with the two switches above the DMX-512 LED. The upper address switch is the first digit, the lower is the second. Look closely at the screwdriver slot in the white address switch. The diagram below shows how to tell which way the switch is pointing. Table 1 shows the relation between the DMX address and the dimmer assignment.



Example:

Suppose you want the S624 to act as dimmers 31 through 36 on the DMX-512 link. To do this you would look at table 1 and find that dimmer 31 corresponds to address 1E. Then you would set the upper address switch to 1, and the lower switch to E.

Table 1: Starting Dimmer versus Address Number

Dim#	Addr#
1	00
2	01
3	02
4	03
5	04
6	05
7	06
8	07
9	08
10	09
11	0A
12	0B
13	0C
14	0D
15	0E
16	0F
17	10
18	11
19	12
20	13
21	14
22	15
23	16
24	17
25	18
26	19
27	1A
28	1B
29	1C
30	1D
31	1E
32	1F
33	20
34	21
35	22
36	23
37	24
38	25
39	26
40	27
41	28
42	29
43	2A
44	2B
45	2C
46	2D
47	2E
48	2F
49	30
50	31
51	32
52	33

Dim#	Addr#
53	34
54	35
55	36
56	37
57	38
58	39
59	3A
60	3B
61	3C
62	3D
63	3E
64	3F
65	40
66	41
67	42
68	43
69	44
70	45
71	46
72	47
73	48
74	49
75	4A
76	4B
77	4C
78	4D
79	4E
80	4F
81	50
82	51
83	52
84	53
85	54
86	55
87	56
88	57
89	58
90	59
91	5A
92	5B
93	5C
94	5D
95	5E
96	5F
97	60
98	61
99	62
100	63
101	64
102	65
103	66
104	67

Dim#	Addr#
105	68
106	69
107	6A
108	6B
109	6C
110	6D
111	6E
112	6F
113	70
114	71
115	72
116	73
117	74
118	75
119	76
120	77
121	78
122	79
123	7A
124	7B
125	7C
126	7D
127	7E
128	7F
129	80
130	81
131	82
132	83
133	84
134	85
135	86
136	87
137	88
138	89
139	8A
140	8B
141	8C
142	8D
143	8E
144	8F
145	90
146	91
147	92
148	93
149	94
150	95
151	96
152	97
153	98
154	99
155	9A
156	9B

Dim#	Addr#
157	9C
158	9D
159	9E
160	9F
161	A0
162	A1
163	A2
164	A3
165	A4
166	A5
167	A6
168	A7
169	A8
170	A9
171	AA
172	AB
173	AC
174	AD
175	AE
176	AF
177	B0
178	B1
179	B2
180	B3
181	B4
182	B5
183	B6
184	B7
185	B8
186	B9
187	BA
188	BB
189	BC
190	BD
191	BE
192	BF
193	C0
194	C1
195	C2
196	C3
197	C4
198	C5
199	C6
200	C7
201	C8
202	C9
203	CA
204	CB
205	CC
206	CD
207	CE
208	CF

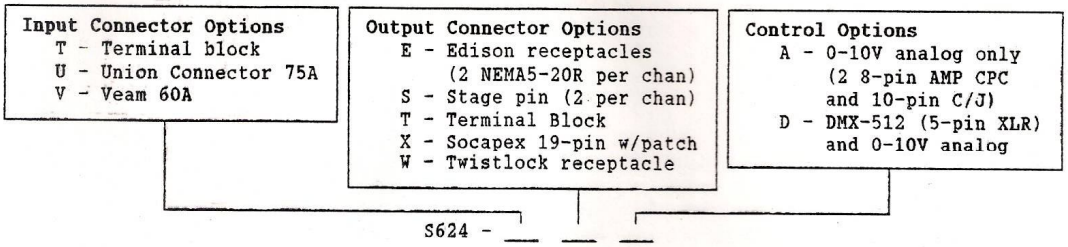
Dim#	Addr#
209	D0
210	D1
211	D2
212	D3
213	D4
214	D5
215	D6
216	D7
217	D8
218	D9
219	DA
220	DB
221	DC
222	DD
223	DE
224	DF
225	E0
226	E1
227	E2
228	E3
229	E4
230	E5
231	E6
232	E7
233	E8
234	E9
235	EA
236	EB
237	EC
238	ED
239	EE
240	EF
241	F0
242	F1
243	F2
244	F3
245	F4
246	F5
247	F6
248	F7
249	F8
250	F9
251	FA
252	FB
253	FC
254	FD
255	FE
256	FF

TROUBLE SHOOTING

If you experience problems with your S624, please consult the trouble shooting guide below. If this does not help, please call the factory for further assistance (7:30 - 5:00 weekdays, Eastern Time @ (215) 395-6934)

Symptom	Possible Cause
OT (Over temp) light is on	* Fan vents blocked causing over temperature condition * Ambient temperature over 40 deg. C or 104 deg. F
+15 VDC and L1 lights don't go on	* Control fuse blown * Input terminal block wired incorrectly * No power to unit
L2 or L3 lights don't go on	* Input power wired incorrectly * No power to unit
A certain channel stays on constantly	* Focus check button latched on
A single channel doesn't work	* Circuit breaker tripped * Lamp has burned out * Light plugged into wrong circuit * DMX address set incorrectly (with the DMX-512 option)
Channels 3 & 4 don't dim correctly	* Jumpers on control board set for wrong phase arrangement--check configuration section on page 7 * Jumpers on main terminal block set for wrong phase arrangement--check configuration section on page 4
Entire dimmer doesn't work	* DMX-512 address set for dimmers that the controller doesn't use * control fuse blown * Input power wires connected incorrectly

APPENDIX A: MODEL NUMBER DESIGNATION



APPENDIX B: SETTING THE HIGH AND LOW TRIMS

Under normal operation, the S624 shouldn't require trimming. However, if you adjusted the LOW trim for preheat or changed the high trims, you will need to recalibrate as follows:

Setup

1) If you have the DMX-512 option
   Connect a reliable DMX-512 source to the DMX in jack. (A console or DMX test box are acceptable)
   If you don't have the DMX-512 option
   Connect a reliable analog source to any of the analog input connectors. (A console or variable power supply are acceptable)

2) On the controller or test box, switch all the channels for the S264 to full.

Phase X

3) Set the your multimeter to read AC rms Voltage, with a range greater than 120 Volts. Connect the meter to the output of channel 1. You will also need to connect a load greater than 100 Watts to channel 1.

4) Turn the uppermost high trim fully clockwise. Make a mental note of the voltage displayed on the meter.

5) Watching the meter, slowly turn this pot counter-clockwise. Stop when the voltage starts to change. Backup slightly until the voltage returns to what it was in step 4)

Phase Y

If your S624 is configured for single phase power, skip to "Phase Z."

6) Connect the multimeter and a 100+ Watt load to channel 3.

7) Turn the second pot from the top fully clockwise. Make a mental note of the voltage displayed on the meter.

8) Watching the meter, slowly turn this pot counter-clockwise. Stop when the voltage starts to change. Backup slightly until the voltage returns to what it was in step 7)

Phase Z

9) Connect the multimeter and a 100+ Watt load to channel 5.

10) Turn the second pot from the bottom fully clockwise. Make a mental note of the voltage displayed on the meter.

11) Watching the meter, slowly turn this pot counter-clockwise. Stop when the

voltage starts to change. Backup slightly until the voltage returns to what it was in step 10)

Low trim

(Leave the multimeter and a 100+ Watt load connected to channel 5.)

12) On the controller or test box, set all channels to off (0%).

13) Turn the lowest pot fully counter-clockwise. The meter will read 0V. (Consider anything less than .1V as zero.)

14) Slowly turn the pot clockwise until the voltage rises above zero. Backup slightly until the voltage returns to zero. (If you want to set a preheat level then set the low trim to that voltage instead.)

APPENDIX C: CONTROL CONNECTOR PIN ASSIGNMENTS

AMP 8-pin CPC Connector

1 - signal common
2 - channel #1
3 - channel #2
4 - channel #3
5 - channel #4
6 - channel #5
7 - channel #6
8 - +15V DC

Cinch/Jones 10-pin

1 - channel #1
2 - channel #2
3 - channel #3
4 - channel #4
5 - channel #5
6 - channel #6
7 - +15V DC
8 - signal common
9 - no connection
10 - no connection

5-pin XLR (with the DMX-512 option)

1 - signal common (shield)
2 - Dimmer drive complement (data 1-)
3 - Dimmer drive true (data 1 +)
4 - no connection
5 - no connection

APPENDIX D: SPECIFICATIONS

PHYSICAL

Size:
5.125"H x 17.0"W x 12.25"D 3 spaces in a standard 19" rack (with optional rack ears)

Weight:
32 lbs.

Material:
16 gauge CR Steel, Textured black finish with white graphics

PERFORMANCE

Rise Time:
400us, measured from 10% to 90% at a 90 degree conduction angle

Efficiency:
97%

ELECTRICAL

Input Power:
Single Phase; 120/240 VAC 60 Amps
Three Phase; 120/208 VAC 40 Amps

Input Connectors Available:
Internal terminal block
75A, 5 pin, Union Connector G47M-RC
60A, 5 pin, Veam CIR030GRH-32A-5P-F80

Power Output:
6 x 2400W (Continuous Duty)

Control Input:
0-10Vdc (standard)
DMX-512 (optional)

Control Power Output:
15Vdc, 350mA

Circuit Protection:
Six 20A circuit breakers (10,000 AIC), Three 2A fuses (internal circuitry)