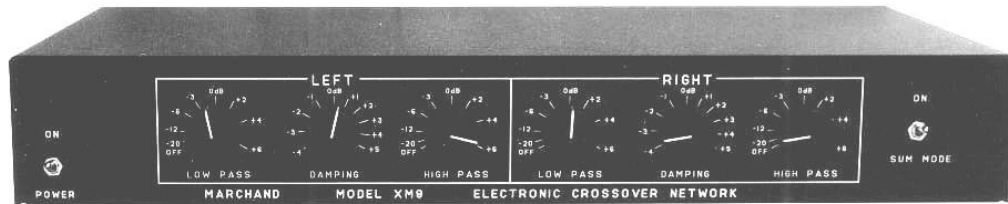


# Marchand Electronics Inc.

## XM9L-KK, XM9L-3KK, XM16L-KK, XM16L-3KK, XM9L-3WAY

### High Performance Electronic Crossover. Assembly of DeLuxe Cabinet



The high performance crossover kits have a cabinet, front panel controls, rear panel connectors and power cord. The kits also include a PS10-K power supply. The 2 way units also have two crossover boards. The 3 way units have 4 crossover boards. The assembly of the four different models is very similar. The differences between the four models will be indicated in the text where appropriate.

#### Assembly of Rear Panel

The rear panel holds the RCA connectors and the power cord and the fuse holder.

Install the 6 ( 8 for 3-way) **RCA connectors** in the holes input, high pass, low pass. The 3-way unit also has two connectors in the holes marked mid. The left channel has the connectors with the BLACK insulators. The right channel gets the RED insulators. Each connector has two insulators, one with a shoulder and the other is flat. Make sure the shoulder is inserted in the hole of the panel. Install the flat insulator on the other side of the panel. Install the solder lug and the nut. Tighten the nut well.

Attach **wires** to the RCA connectors. Prepare 4 (6 for 3-way) pairs of wire by taking a 10" length of red and brown wire and twisting together. Slip a 3/4" length of heat shrink tubing over the end of each wire at one side of the pair. Strip 1/4" of insulation off each wire. Solder the brown wire onto the solder lug of the connector. Solder the red wire into the center pin of the connector. Slip the heat shrink tubing over the solder joints. Shrink the tubing with a heat gun. If no heat gun is available use the heat of a soldering iron.

Repeat this for all RCA connectors.

The two way units come with detachable line cord and a power voltage selector switch. The 3-way units have an attached line cord.

Please use the appropriate instructions below.

#### Attached line cord

Install the **fuse holder** in the panel. The white washer is installed on the outward side. *Gently* tighten the nut. Too much force will crack the housing.

Install the **line cord** using the strain relief. Place the strain relief 9" from the end of the line cord and squeeze tightly with pliers. Insert the cord and strain relief into the hole in the rear panel until it snaps in.

The assembly of the rear panel is now complete. Put it aside until later.

#### Removable line cord

Install the voltage selector switch using the 6/32 hardware. Install the power entry module using the 6/32 hardware. Install the fuse holder. The assembly of the rear panel is now complete. Put it aside until later.

#### Assembly of Shell

First assemble the PS10-K power supply and the XM9 or XM16 crossover boards according to the instructions provided. **Note: (1)** Do NOT install the board mounted RCA connectors that are normally provided with the crossover kits. They are not used in the high performance crossover. **(2)** Replace the LF353 op amps with the better op amps. On the XM9 boards the OPA2134 is inserted in positions IC1, IC2, IC3 and IC4. On the XM16 the OPA2134 is inserted in positions IC1, IC2, IC3, IC4, IC5 and IC6. Please make sure that the IC's are installed correctly.

Place the shell on a flat surface with the bottom down. Notice the pattern of four holes near one side of the bottom of the shell. Place the shell so that this pattern is on the left hand side. The front of the cabinet is now towards you.

Install the **PS10 power supply** with 4 standoffs in the 4 holes on the left of the cabinet, as described above. The two position terminal block of the PS10 faces towards the rear of the cabinet.

The **crossover boards** will now be installed temporarily. Notice the 4 rectangular patterns of 10 holes in bottom of the shell Each pattern hold a crossover board. The

crossover boards are placed with P6 and P7 facing the rear of the cabinet. Use 4 standoffs to install each board. Use the second hole from the rear of the shell for the standoffs. The XM9 then also uses the fourth hole and the XM16 uses the fifth hole from the rear. For the 2-way units mount the two crossovers in the two center positions in the shell.



Figure 1 Power entry with voltage selector switch.

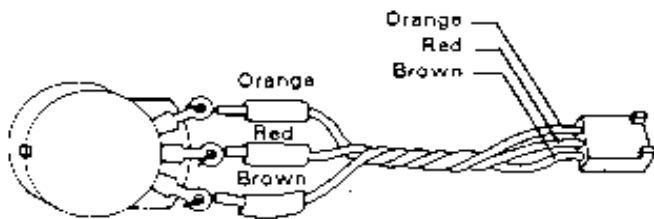


Figure 2: Potentiometer Cable

### Assembly of Front Panel

Install the 6 (4) **10K potentiometers** in the positions labeled level and damping. Tighten the nuts well. One **DPDT switch** mounts in the position marked power and the other **DPDT switch** mounts in the position marked sum. There is a hole left for the indicator LED. Do not install this LED yet at this time.

Install **wires to potentiometers**. Prepare 3 8" lengths of red, orange and brown wire. Strip 1/4" of insulation from each end. Solder one end of each wire to a potentiometer, as shown in Figure 2. Note the color orientation. Use 3/4" of heat shrink tubing over each potentiometer terminal. Shrink with heat gun. Solder a metal terminal to the free end of each wire. Insert the terminals into the 3 -pin female Molex connector. *Be sure to insert the proper colors into the proper connector positions.* (Note: all of the 3-pin female connectors in this kit use the same color orientation).

Twist the wires to form a 3-wire cable.

Repeat above step for all potentiometers.

Install **wires to the sum mode switch** as shown in . Be careful to use the right color wires as shown. Use heat shrink tubing as indicated. Some kits come with a DPST **rocker** switch instead of the **toggle** switch. The rocker switch does not have the two unused terminals that are shown in .

The front panel will be attached to the main chassis using

5 black buttonhead screws or flathead screws.

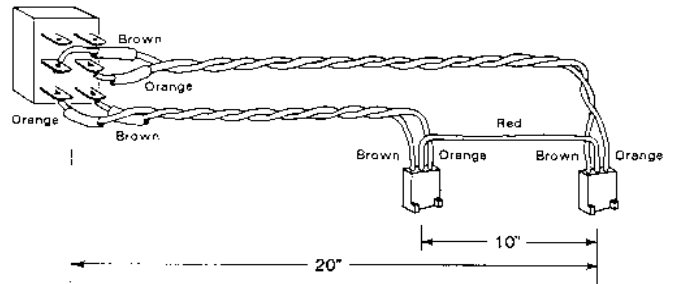


Figure 3: Sum-mode switch cable

### Putting it all together

Prepare 2 (4 for 3-way unit) cables as shown in Figure 4. The two way unit uses one cable **8"** long and another **11"** long. The 3-way unit has two additional cables **6"** long and **15"** long.

Insert all the orange wires from each of the power cables into the terminal block on the PS10 marked +.

Cut a piece of red wire 3" long and strip 1/4" of insulation from each end.

Gather the red wires from the power cables and one end of the 3" red wire and insert them into the terminal block on the PS10 marked GND.

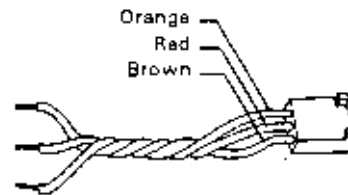


Figure 4: Power cable

Cut a piece of brown wire 3" long and strip 1/4" of insulation from each end.

Gather the brown wires from the power cables and one end of the 3" brown wire and insert them into the terminal block on the PS10 marked --.

Double check: RED is GND, ORANGE is + and BROWN is -.

Identify which end of the LED is the cathode (negative) lead. The LED has a flat on its side next to this lead. Trim both leads to about 1/4".

Cut both leads of the 10K resistor to 1/4" long.

Solder one of leads of the resistor to the cathode of the LED.

Using 1" of heat shrink tubing, connect the free end of the 3" brown wire (from the negative terminal of the power supply) to the free lead of the resistor. slide the tubing over the resistor, against the LED, to cover the connections on both ends of the resistor.

Using 1/2" of heat shrink tubing, solder the red wire from the ground terminal of the power supply to the remaining lead of the LED (anode).

The PS10 power supply of the crossover should be grounded to the cabinet through a power resistor.

Solder one lead of the power resistor to the solder lug.

Solder a 3" length of wire to the other end of the 2.4K

power resistor.

Install the shrink tubing over the resistor and part of the solder lug.

Attach the solder lug to the cabinet using a 6-32 screw and nut. Use one of the available holes near the PS10.

Insert the free end of the wire in the center terminal of the three position terminal block of the PS10 output. This is the neutral DC output.

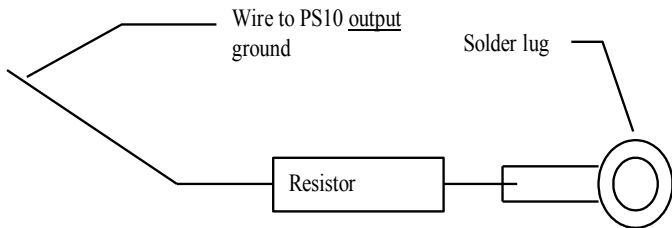


Figure 5

Install the LED into the front panel. First insert the black grommet through the hole in the front panel from the outside. Then insert the LED into the grommet from the inside. The grommet snaps around the base of the LED and holds it in place.

Check that all the pieces of heat shrink tubing are properly positioned over the connections they are supposed to protect and shrink with a heat gun.

Now the **AC power wiring** will be hooked up to the power supply.

### Attached line cord

Separate the power cord wires back to about 1/4" from the strain relief and cut one of the wires about 2" from the strain relief. Slip 1/2" of heat shrink tubing over the short wire and solder it to the center connector of the fuse holder. Cut 1/2" of heat shrink tubing and slip it over the remaining power cord wire. Solder the wire to the center connector of the power switch.

Cut an 8" piece of red high voltage (thick insulation) hookup wire, strip 1/4" at each end and solder to the *bottom* terminal of the power switch. Use 1/2" of heat shrink tubing over this connection as well.

Secure the free end of the wire in the leftmost terminal of the 4-position terminal block (AC input) on the PS10 power supply board.

Cut a 2" piece of brown high voltage hookup wire and secure the free end of the wire in the rightmost terminal of the 4-position terminal block (AC input) on the PS10 power supply board.

Use jumpers on the 4-position terminal block of the PS10 power supply to select line voltage, as shown in Figure 6.

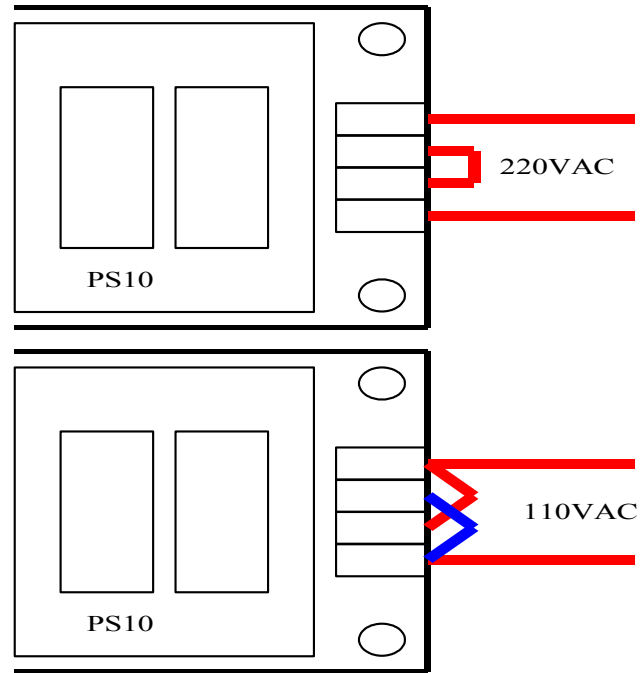


Figure 6

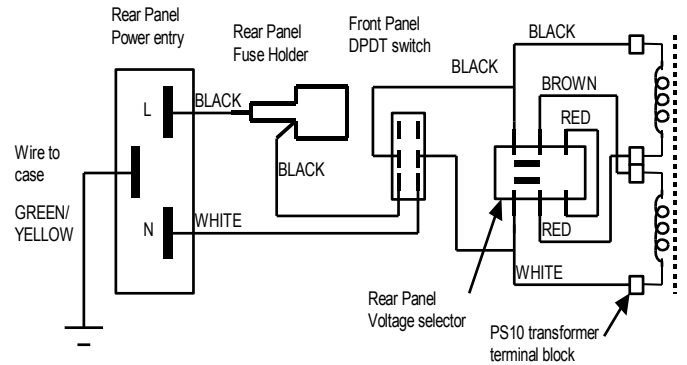


Figure 7. Power entry with voltage selector switch on rear panel and toggle switch on front panel.

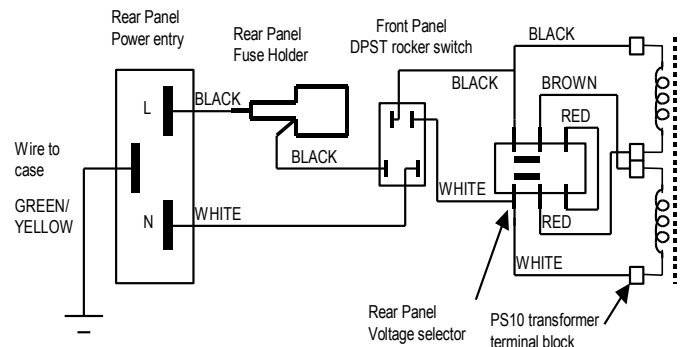


Figure 8. Power entry with voltage selector switch on rear panel and rocker switch on front panel.

### Removable line cord

Refer to Figure 1 and Figure 7 or Figure 8 when installing the power supply wiring for the removable line cord. If your kit has a DPDT toggle switch then use Figure 7. If your kit has a DPST rocker switch the use Figure 8.

Two rocker switches are included in the kit that has rocker switches. The illuminated switch with the colored lens is used for the power and the one without the lens is used for the sum switch. Note that the rocker switch has two pairs of contacts; one pair is closer together than the other. Use the pair that is close together for the wires that go to the transformer.

Use high voltage (thick insulation) #22 hookup wire to make the connections between the power entry connector, the power switch on the front panel and the power selector switch on the rear panel and the fuse holder. Install heat shrink tubing over all junctions. Use wire colors as shown in .

Make sure to securely install the grounding wire between the ground terminal on the power entry connector and the chassis. Solder a 3" piece of green/yellow hookup wire to one of the solder lugs provided. Solder the free end of the wire to the ground terminal and secure the solder lug to the chassis with one of the 6/32 screws holding the rear panel.

Set the voltage selector switch to the proper voltage before proceeding.

### Attached AND Removable line cord

Install a **1A fuse** in the fuse holder.

We will now **test the power supply**. Plug the cord in and turn on the power switch. The two LED indicators on the power supply and the front panel LED indicator should all light.

UNPLUG the power cord before proceeding.

Now the RCA connectors are to be connected to the circuit boards. Note that the circuit boards have groups of 3 holes marked P6,P7,P8 on the XM9 and P5,P6,P7 on the XM16. The twisted pairs from the RCA connectors connect to these locations according to the tables below. There are four tables (1..4), one for each configuration of the crossover network. Be sure to solder the red wire to the small hole in the center of the group, and the brown ground wire to one of the 3 larger holes in the group. The boards will have to be removed in order to do the soldering. On the 3-way units there also is a set of two **jumper wires** between the boards. Make the jumper connection by running a red wire between the center holes of the locations indicated and a brown wire between the grounds at the locations indicated. For example, for the XM16L-3KK there is a jumper wire between P5 of the left board and P7 of the left center board, etc.

There are several **trimmer potentiometers** on the crossover boards. They should *all* be set to the center position.

Connect the 2 (4) **power cables** from the power supply to the crossover boards. On the XM9 the cables are plugged into connectors marked P2. On the XM16 the power cables are plugged into the connectors marked P1.

The **sum-mode cable** is hooked to two 3-pin molex connectors according to the table 5.

The **level and damping controls** are hooked up according to table 6.

There are several **jumpers** on each board. These jumpers serve to enable the off board level and damping controls. Near each connector that was used in table 6 there is a 3 position male connector, labeled 1J2 or 3J4 or 5J6. A jumper block should be placed on each of these connectors. If a cable was connected to the P connector, then the jumper should be placed over the RIGHT two pins. If no cable was connected the jumper should be placed over the LEFT two pins.

Make sure all the jumpers have been installed.

Install the control **knobs** onto the level and damping controls. The knobs should be installed so that the arrow indicator on the knob is at the 12 o'clock position when the control is centered. The position of the knob when it is turned fully clockwise is thus left-right mirrored from when it is turned fully counterclockwise. When installed in this symmetric fashion, the calibration on the front panel will be correct.

### **3-Channel Unit**

The 3-channel unit use 3 crossover boards and one LD28 summer board. There is no sum switch. The LD28 board is installed to the left of the 3 crossover boards, as seen from the front of the unit. The power supply cable to the LD28 is the same as for a crossover board. The output marked OUT4+ of the LD28 Should be connected to the connector marked "sum" on the rear panel. The 3 inputs marked IN1, IN2 and IN3 should be connected to the low pass outputs of the crossover boards. Use black/red twisted wire pairs for these connections; the red wire being the signal and the black wire the ground. Note that the low-pass outputs of the crossover boards now have two connections each: to the output connectors and to the summer board.

### **Frequency Modules**

Install the frequency modules for the proper frequencies. For the two way units all frequency modules have the same value. On the 3 way units, install the frequency modules with the LOWER frequency into the Left and Right-center boards, and the frequency modules with the HIGHER frequency into the Left-Center and Right boards.

The **Top Cover** of the unit can be installed now or at a later time. Fasten the top with 4 6/32 x 1/4" screws. In case it is difficult to insert the screws, *loosen* the screws that hold on the front and rear panels and try again. Now fasten all screws well.

The assembly is now **completed**.

## Installation

The crossover network can now be installed. See the Users Guide for details.

In case of problems check the following:

Solder shorts are the most common problem.

Check jumpers for correct installation. If installed wrong, the front panel control will not work.

All on-board potentiometers should be in the center position

Board Location	Input		Out High		Out Low	
	L	R	L	R	L	R
Left Center	P6		P7		P8	
Right Center		P6		P7		P8

Table 1: Connections for RCA input and output connectors, XM9L-KK

Board Location	Input		Out High		Out Low	
	L	R	L	R	L	R
Left Center	P5		P6		P7	
Right Center		P5		P6		P7

Table 2: Connections for RCA input and output connectors, XM16L-KK

Board Location	Input		Out High		Out Mid		Out Low		Jumpers	
	L	R	L	R	L	R	L	R	L	R
Left					P7		P8		P6	
Left Center	P6		P7						P8	
Right Center						P7		P8		P6
Right		P6		P7						P8

Table 3: Connections for RCA input and output connectors, XM9L-3KK

Board Location	Input		Out High		Out Mid		Out Low		Jumpers	
	L	R	L	R	L	R	L	R	L	R
Left					P6		P7		P5	
Left Center	P5		P6						P7	
Right Center						P6		P7		P5
Right		P5		P6						P7

Table 4: Connections for RCA input and output connectors, XM16L-3KK

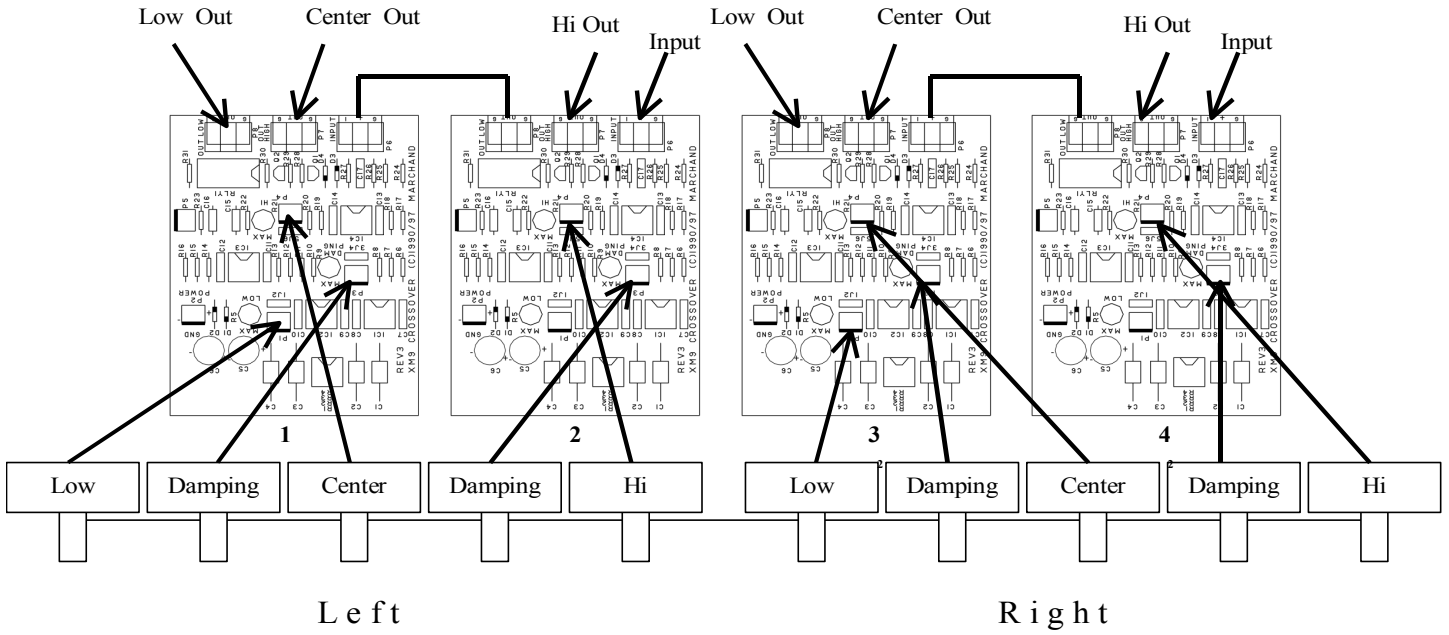
Model	First Plug		Second Plug	
	Board	Loc.	Board	Loc.
XM9L-KK	L..Ctr	P5	R. Ctr	P5
XM9L-3KK	Left	P5	R. Ctr	P5
XM16L-KK	L..Ctr	P4	R. Ctr	P4
XM16L-3KK	Left	P4	R. Ctr	P4

Table 5: Connections for Sum Mode Cable

Model	Left Low		Left Damping		Left High		Right Low		Right Damping		Right High	
	Board	Loc.	Board	Loc.	Board	Loc.	Board	Loc.	Board	Loc.	Board	Loc.
XM9L-KK	L..Ctr	P1	L. Ctr	P3	L..Ctr	P4	R. Ctr	P1	R. Ctr	P3	R. Ctr	P4
XM9L-3KK	Left	P1	Left	P3	L. Ctr	P4	R. Ctr	P1	R. Ctr	P3	Right	P4
XM16L-KK	L..Ctr	P2			L..Ctr	P3	R. Ctr	P2			R. Ctr	P3
XM16L-3KK	Left	P2			L.Ctr	P3	R. Ctr	P2			Right	P3

Table 6: Level and Damping Controls

# XM9L-3 Three way hookup.



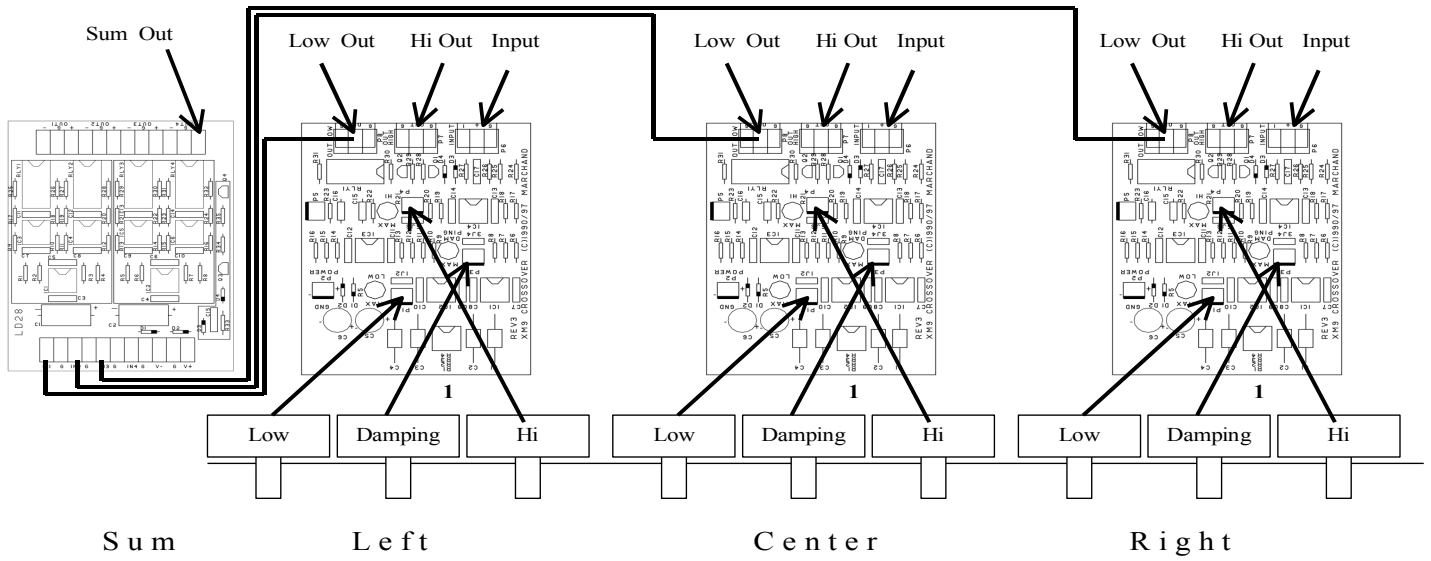
Connections for the front panel controls.

	1 J 2	3 J 4	5 J 6
<b>Board 1</b>			
<b>Board 2</b>			
<b>Board 3</b>			
<b>Board 4</b>			

Installation of jumper blocks as seen from the front panel.

R5 on board 2 and board 4 should be in the center position.

# XM9L-3CHAN Three channel hookup.



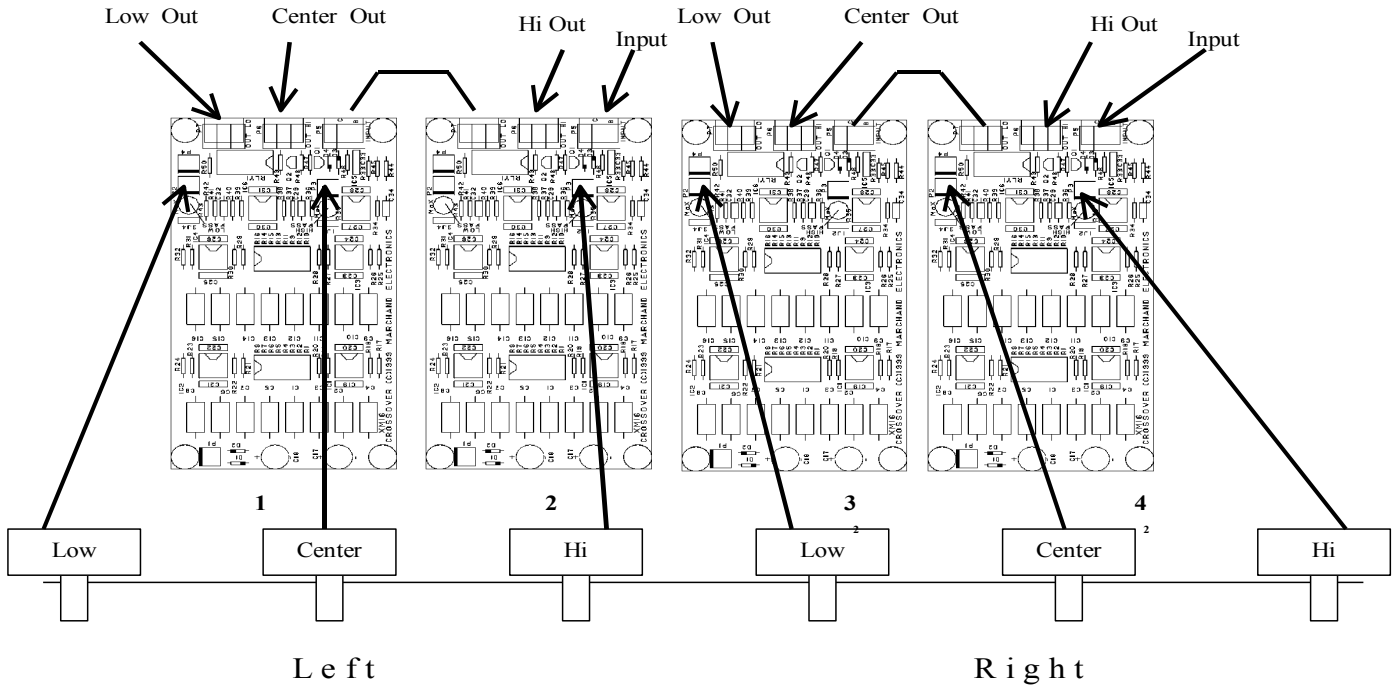
Connections for the front panel controls.

	1 J 2	3 J 4	5 J 6
Board 1			
Board 2			
Board 3			

Installation of jumper blocks as seen from the front panel.



# XM16L-3 Three way hookup.



Connections for the front panel controls.

	1 J 2	3 J 4
<b>Board 1</b>		
<b>Board 2</b>		
<b>Board 3</b>		
<b>Board 4</b>		

Installation of jumper blocks as seen from the front panel.

R43 on board 2 and board 4 should be in the center position.

**Parts List (XM9L-KK)**

1		Cabinet front panel XM9
1		Cabinet Rear Panel L
1		Cabinet Top
1		Cabinet Shell
4		Rubber bumper (feet)
4	6/32x1/2"	Panhead Machine Screw
1		Fuse Holder
1	1A	Fuse
1		3-Wire Line Cord
1		Voltage Selector Switch
1		Power Entry Connector
3		RCA connector RED
3		RCA connector BLACK
1	PS10-K	Power supply Kit
2	XM9-K	Xover board Kit
6	10K	Level Control ATT12-KK
1	2.4K	1W resistor
1	DPST	Rocker Switch Black
1	DPST	Rocker Switch Green Llite
12	1/2"	Threaded Standoff
5	6/32 * 1/2	Buttonhead Machine Screw (1)
30	6/32 * 1/4	Black Panhead Machine Screw
2		solder lug
4	4/40 * 3/8	Machine Screw
4	4/40	Keps Nut
6		Black Aluminum Knob
10'	Brown	#22 hookup wire
10'	Red	#22 hookup wire
10'	Orange	#22 hookup wire
1'	Brown	High Voltage #22 hookup wire
1'	Red	High Voltage #22 hookup wire
2'	White	High Voltage #22 hookup wire
2'	Black	High Voltage #22 hookup wire
1'	Grn/Yel	High Voltage #22 hookup wire
2'	clear	Heat shrink tubing, 1/8" diameter
6"	clear	Heat shrink tubing, 3/8" diameter
1	1/16"	Hex Wrench
1	5/64"	Hex Wrench

Note (1) Some kits use black flathead swrews instead of buttonhead screws

**Parts List (XM9L-3KK)**

1		Cabinet front panel XM9
1		Cabinet Rear Panel L
1		Cabinet Top
1		Cabinet Shell
4		Rubber bumper (feet)
4	6/32x1/2"	Panhead Machine Screw
1		Fuse Holder
1	1A	Fuse
1		Line Cord
1		Voltage Selector Switch
1		Power Entry Connector
4		RCA connector RED
4		RCA connector BLACK
1	PS10-K	Power supply Kit
4	XM9-K	Xover board Kit
10	10K	Level Control Potentiometer
1	2.4K	1W resistor
1		Red LED
1		Holder for LED
1	10K	1/4 watt resistor
2	DPDT	Toggle Switch
20	1/2"	Threaded Standoff
5	6/32 * 1/2	Buttonhead Machine Screw (1)
46	6/32 * 1/4	Black Panhead Machine Screw
2		solder lug
4	4/40 * 3/8	Machine Screw
4	4/40	Keps Nut
10		Black Aluminum Knob
12'	Brown	#22 hookup wire
12'	Red	#22 hookup wire
12'	Orange	#22 hookup wire
1'	Brown	High Voltage #22 hookup wire
1'	Red	High Voltage #22 hookup wire
2'	White	High Voltage #22 hookup wire
2'	Black	High Voltage #22 hookup wire
1'	Grn/Yel	High Voltage #22 hookup wire
2'	clear	Heat shrink tubing, 1/8" diameter
6"	clear	Heat shrink tubing, 3/8" diameter
1	1/16"	Hex Wrench
1	5/64"	Hex Wrench

**Parts List (XM16L-KK)**

1		Cabinet front panel XM16
1		Cabinet Rear Panel L
1		Cabinet Shell
1		Cabinet Top
4		Rubber bumper (feet)
4	6/32x1/2"	Panhead Machine Screw
1		Fuse Holder
1	1A	Fuse
1		3-Wire Line Cord
1		Power entry connector
1		Voltage selector switch
3		RCA connector RED
3		RCA connector BLACK
1	PS10-K	Power supply Kit
2	XM16-K	Xover board Kit
12	1/2"	Threaded Standoff
5	6/32 * 1/2	Black Buttonhead Machine Screw
23	6/32 * 1/4	Black Machine Screw
4	10K	Level Control Potentiometer
2		solder lug
1	2.4K	1W resistor
1	6/32 * 1/4	Machine Screw
1		Star washer
1	DPDT	Rocker Switch Black
1	DPDT	Rocker Switch Green w. lite
4		Black Aluminum Knob
2'	clear	Heat shrink tubing, 1/8" diameter
6"	clear	Heat shrink tubing, 3/8" diameter
10'	Brown	#22 hookup wire
10'	Red	#22 hookup wire
10'	Orange	#22 hookup wire
1'	Brown	High Voltage #22 hookup wire
1'	Red	High Voltage #22 hookup wire
2'	White	High Voltage #22 hookup wire
2'	Black	High Voltage #22 hookup wire
1'	Grn/Yel	High Voltage #22 hookup wire
1	1/16"	Hex Wrench
1	5/64"	Hex Wrench

**Parts List (XM16L-3KK)**

1		Cabinet front panel XM16
1		Cabinet Rear Panel L
1		Cabinet Shell
1		Cabinet Top
4		Rubber bumper (feet)
4	6/32x1/2"	Panhead Machine Screw
1		Fuse Holder
1	1A	Fuse
1		Line Cord
1		Strain relief
4		RCA connector RED
4		RCA connector BLACK
1	PS10-K	Power supply Kit
4	XM16-K	Xover board Kit
20	1/2"	Threaded Standoff
39	6/32 * 1/4	Black Machine Screw
5	6/32 * 1/2	Black Buttonhead Machine Screw
4	10K	Level Control Potentiometer
1		solder lug
1	2.4K	1W resistor
1	6/32 * 1/4	Machine Screw
1		Star washer
1	DPDT	Rocker Switch Black
1	DPDT	Rocker Switch Green w. lite
4		Black Aluminum Knob
2'	clear	Heat shrink tubing, 1/8" diameter
6"	clear	Heat shrink tubing, 3/8" diameter
10'	Brown	#22 hookup wire
10'	Red	#22 hookup wire
10'	Orange	#22 hookup wire
2'	Brown	High Voltage #22 hookup wire
2'	Red	High Voltage #22 hookup wire
2'	White	High Voltage #22 hookup wire
2'	Black	High Voltage #22 hookup wire
1'	Grn/Yel	High Voltage #22 hookup wire
1	1/16"	Hex Wrench
1	5/64"	Hex Wrench

Note (1) Some kits use black buttonhead swrews instead of flathead screws

### Parts List (XM9L-3CHAN)

1		Cabinet front panel XM9-3CHAN
1		Cabinet Rear Panel L-3CHAN
1		Cabinet Shell
1		Cabinet Top
1		Fuse Holder
1	1A	Fuse
1		Line Cord
1		Voltage Selector Switch
1		Power Entry Connector
3		RCA connector RED
3		RCA connector BLACK
4		RCA connector WHITE
1	PS10-K	Power supply Kit
3	XM9-K	Xover board Kit
1	MX43-K	Summer board Kit
9	10K	Level Control Potentiometer
1		Red LED
1		Holder for LED
1	10K	1/4 watt resistor
1	2.4K	1W resistor
1	DPDT	Toggle Switch
1		3 pin Female Molex w. pins
20	1/2"	Threaded Standoff
46	6/32 * 1/4	Black Panhead Machine Screw
5	6/32 * 1/2	Black Buttonhead Machine Screw
2		solder lug
2	6/32	Keps Nut
4	4/40 * 3/8	Machine Screw
4	4/40	Keps Nut
9		Black Aluminum Knob
12'	Brown	#22 hookup wire
12'	Red	#22 hookup wire
12'	Orange	#22 hookup wire
1'	Brown	High Voltage #22 hookup wire
1'	Red	High Voltage #22 hookup wire
2'	White	High Voltage #22 hookup wire
2'	Black	High Voltage #22 hookup wire
1'	Gm/Yel	High Voltage #22 hookup wire
2'	clear	Heat shrink tubing, 1/8" diameter
6"	clear	Heat shrink tubing, 3/8" diameter
1	1/16"	Hex Wrench
1	5/64"	Hex Wrench