

INSTALLATION INSTRUCTIONS

peterson

ELECTRO-MUSICAL PRODUCTS, INC.

CATHEDRAL CHIMES



ATTENTION:

Please leave this instruction booklet on the job site for future reference.

UNPACKING

Peterson Cathedral Chimes are packed in two or more containers. The tubes are packed in a corrugated carton, and the action is in a wooden crate. The optional chime canopy is shipped in a separate corrugated carton. Inspect all containers for signs of shipping damage. You must save the packing materials for any damage claims.

Remove the corrugated cover on the action crate. Carefully remove the plastic covering. The action rail is fastened to a plywood base using two ¼ -20 bolts. Remove these bolts. Carefully lift the action rail out and place it front side up on a clear work area. Remove the rubber bands holding the dampers and also remove the tape holding the strikers to their coils.

BE CAREFUL NOT TO DAMAGE ANY ACTION PARTS WHEN REMOVING THE RAIL FROM THE CRATE

HOW THE ACTION WORKS (Refer to Figure 2).

The action design uses an opposing magnetic field “repulsion” principal of motive force. A permanent magnet is attached to the striker arm. At rest it is normally attracted to an iron pole piece of an electro-magnet (striker coil). When current is fed through the electro-magnet a repulsion force moves the permanent magnet away, thus moving the striker into contact with the chime tube. A phosphor bronze hinge/spring arrangement is used to hold the striker in place. The return force is provided by the magnetic attraction of the permanent magnet to the pole piece, as well as the spring tension of the phosphor bronze. It is important to energize the striker coil only for the time required to hit the chime tube, regardless of keying input timing. Our driver circuit provides this pulse (approx. 50 milliseconds in duration), which gives fast enough response for any typical staccato use. This design makes the assembly of parts and their tolerances very non-critical. Since there aren't any parts moving upon each other in the striker, there is no friction involved and thus no chance for parts to bind or wear.

Two things affect the amount of force with which the striker hits the tube:

- 1.- The power supplied to the striker coil. By varying the voltage to the coil you can change the strike force. This is how we adjust the volume by means of the expression control.
- 2- The spring return force of the hinge will affect the soft strike volume significantly. This is a resistance against the striking force which has to be overcome before the striker can hit the tube.

Also, the attraction force of the permanent magnet to the pole piece must be overcome before anything can happen. All of these forces are very stable and constant, therefore providing long term stability to the volume of strike.

ELECTRIC DAMPER OPERATION

The damper is of conventional solenoid design. It follows the action of the keyboard input, returning to the tube when the key is released. The effect of the dampers can be varied by changing the size of the pad (consult factory), or by adding weight in the form of washers to the damper.

Each action mounts to the rail by one #8-32 screw into a threaded insert pressed into the rail. It is vibration isolated from the rail by a rubber bushing and felt pads for quiet operation.

SOLID STATE DRIVER BOARDS

These are the printed circuit boards that are mounted to the chime rail. The wires for each action are plugged on to these boards. This allows for easy servicing should it be required. There are four wires that connect to each action. Two are for the damper coil, and the other two are for the striker coil. The driver provides a separate output for each pair. The damper output is just a switch fed by the keyboard input (refer to schematic, Figure 4). These are the outside pins of the four pin connector and the corresponding wires on the action are green and orange in color. The output for the striker coil is unique from other actions. Its output is pulsed and produces one predetermined voltage pulse every time the key switch is depressed. Its duration is approximately 50 milliseconds. This pulse is generated by a timing network comprised of components C2, R9 and IC1.

WIRING INSTRUCTIONS

All inputs are buffered and isolated. The only connection between the chimes and the organ is Organ Negative Common to Chimes Negative. This allows the chimes to be played from the organ keyboard. Connect a wire from Organ Negative to the terminal labeled minus "ORG NEG" on the chimes Power Supply circuit board #405732. The power transformer should be mounted in any convenient 110 Volt AC, 4" square electrical box. It is internally fuse protected and its outputs should never be shorted together. This could blow the internal fuse and make the chimes inoperative. It is to be connected to the power supply board on the rail, shown in Figure 1 (Wiring Instructions). The minimum wire size that is appropriate to use depends on the distance from the chimes to the transformer, but larger wire than these minimums is always OK. See the chart below for the minimum recommended wire sizes:

Less than 20 Feet	24 Gauge
20-50 Feet	22 Gauge
50-100 Feet	20 Gauge
100 Feet & up	18 Gauge

The wire size for the control panel is not critical. Any convenient spares #26 Gauge or larger may be used for this.

CHIMES VOLUME SWITCH

A positive polarity is required to feed the rotary volume switch for “off” and “1 to 5”. The six outputs from the volume switch must wire to the Chimes Power Supply #405732, Refer to Figure 1.

Note: Organ positive is fed to the “Wiper” terminal, of the volume connector, via terminal #4 (Org +/-Optional). The volume switch wiper may alternately be fed from any convenient organ positive.

CHIMES STOP CONTROL

If the organ has a stop control for the Chimes it must provide a positive polarity organ voltage to the wiper (common) of the volume control.

KEYING INPUTS

Organ positive keying polarity is required. The driver inputs are wired to a spreader board that is attached to the rear of the chime rail. The wires are arranged in order from left to right corresponding to the order of the chime striker actions. You should wire them according to the arrangement of your chimes on the rail. The keying inputs can be any convenient wire size that you have available; typically 24 Gauge would be used.

INSTRUCTIONS FOR HANGING TUBES

The chime tubes are coated with a lacquer finish to protect them from oxidation. **Care should be taken when handling them. We strongly recommend that you wear gloves to prevent skin oils and acids from attacking the finish.** The hanger wires have lugs on each end. Refer to Figures 2 and 3

NOTE: Each chime tube is stamped to show which note it is. Be sure you hang the correct tube in each position on the action rail and coordinate that with the spreader wiring.

You can see in the figures how each tube is mounted to the action. Start by slipping one of the lugs over the mounting stud on the hanger bracket. Position the hanger wire in the groove on the hanger bracket and hold the tube under the damper pad. Take the other end of the wire and slip its lug over the stud opposite the first one. Be sure the hanger wire is in both grooves of the hanger bracket. **IMPORTANT: After all tubes are in position, install the safety retainer clips over the studs between the lug and the stud end.** To remove tubes, simply remove the clips and raise the tube. The lugs will easily slip off the studs.

If you have purchased an “action only”, for use with your own chime tubes, the hanger wires are supplied with only one end terminated with a lug. Fasten the other lug to the opposite end of each wire **AFTER** slipping the wire through the chime tube. Securely fasten the lug to the wire with a crimping tool or a large pair of pliers. Follow the tube hanging instruction above. Note: A Peterson Cathedral Chime Action is recommended for chime tubes up to and including 1-1/2” diameter.

ACTION ADJUSTMENT

The action has been factory set for an even volume of strike throughout the range of the keyboard. However, there could be slight variations due to rough handling during transit that may require installer adjustments. This would show up when the volume is set at its lowest setting. Some notes may be softer than others.

SOFT STRIKE ADJUSTMENTS

Referring to Figure 2, have someone key the note of interest. To adjust the volume, gently bend the striker hinge bracket. Bending it back (away from the damper coil) will increase the spring tension and reduce the volume of the strike. This is the preferred method of adjustment.

You can also affect the volume by adjusting the chime tube position relative to the striker. This is the “striker throw adjust”. Loosen the screw at the top of the damper assembly and move the tube in and out. Moving the tube in will make the sound louder.

IN CASE OF DIFFICULTY

PETERSON recognizes the importance of giving excellent customer service. If you experience any difficulty with the Cathedral Chimes or action, please contact the factory for technical assistance. A simple phone call may save much time and money! Our phone numbers are 708.388.3311 or toll-free from anywhere in North America 800.341.3311.

WARRANTY INFORMATION

PETERSON Cathedral Chimes and chime actions are warranted against any defects in material or workmanship for a period of ten (10) years from the date of purchase. Any parts returned to the factory within this period will be repaired free of charge. Equipment that has been misused, abused or operated on power sources other than those specified, will be repaired and charged for at current rates.

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www.PetersonEMP.com * www.ICS4000.com

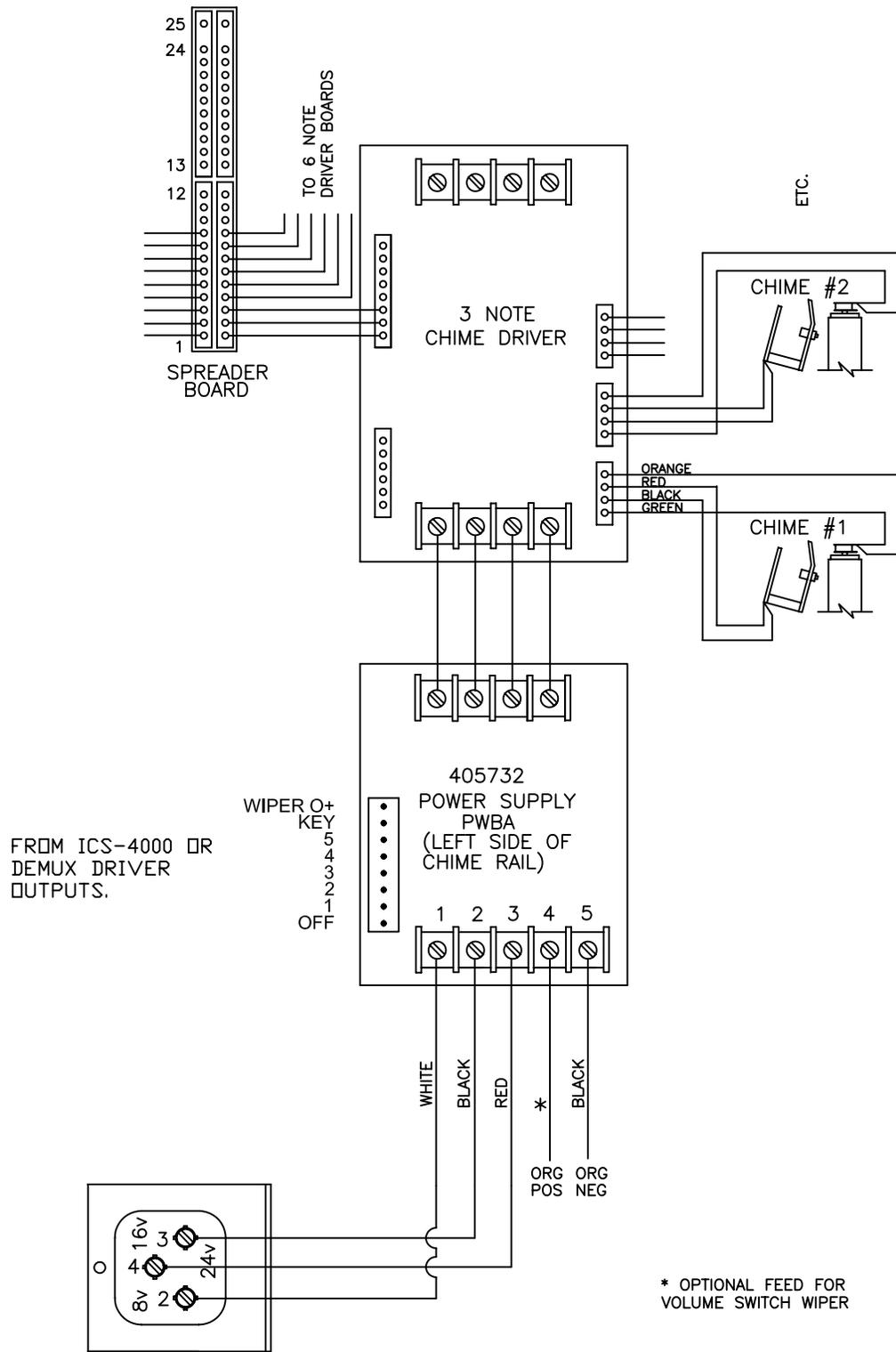


FIGURE 1
CHIME WIRING DIAGRAM

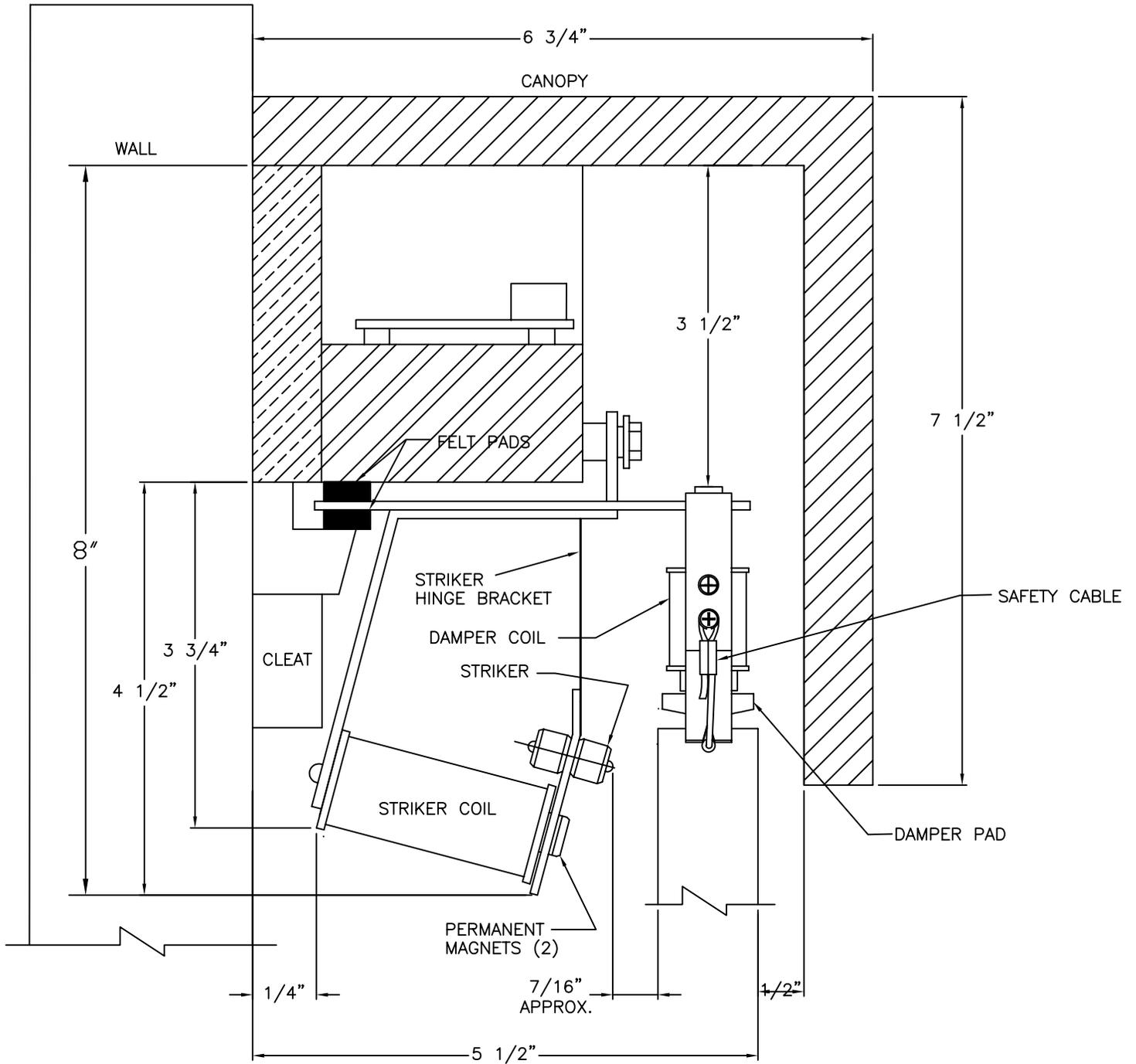


FIGURE 2

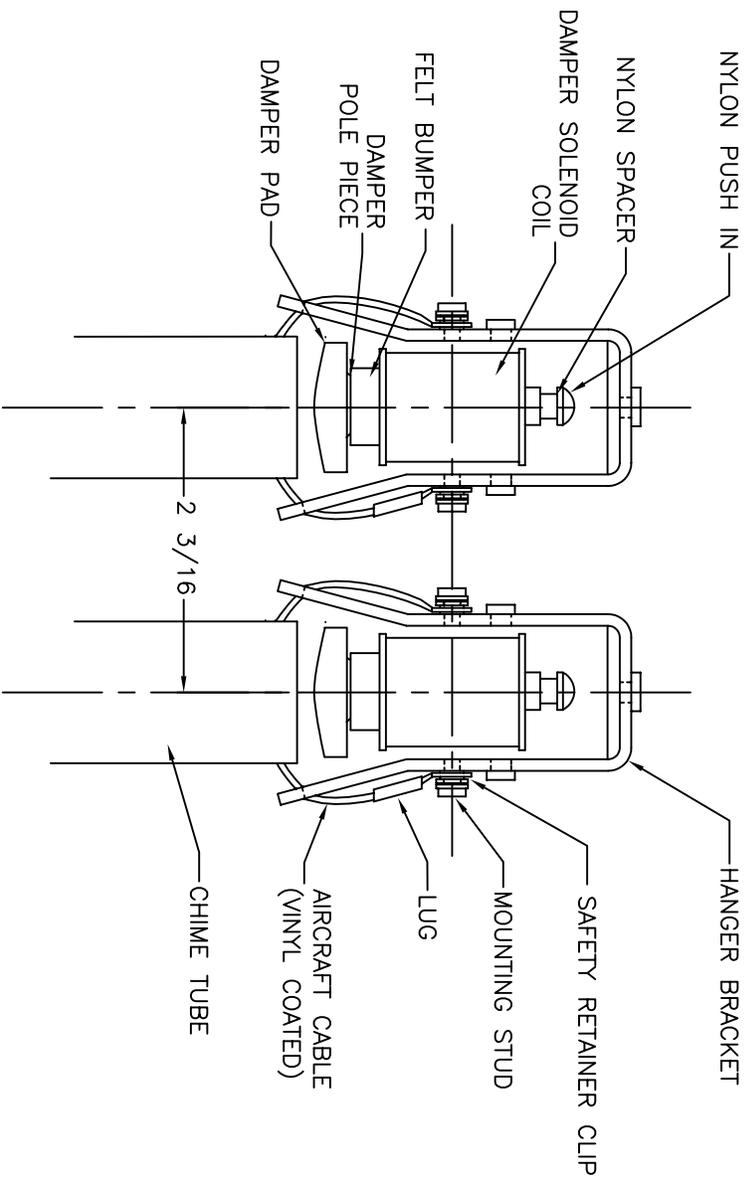
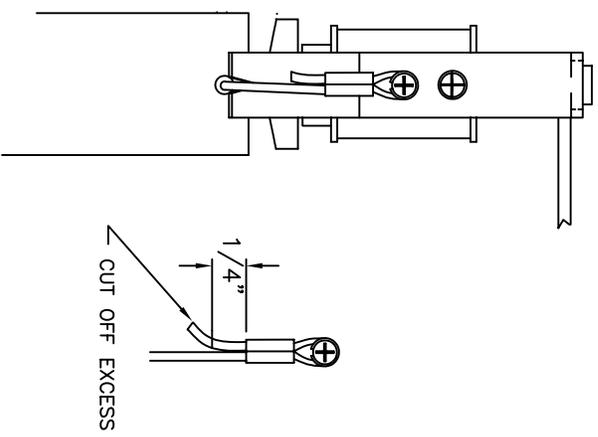


FIGURE 3

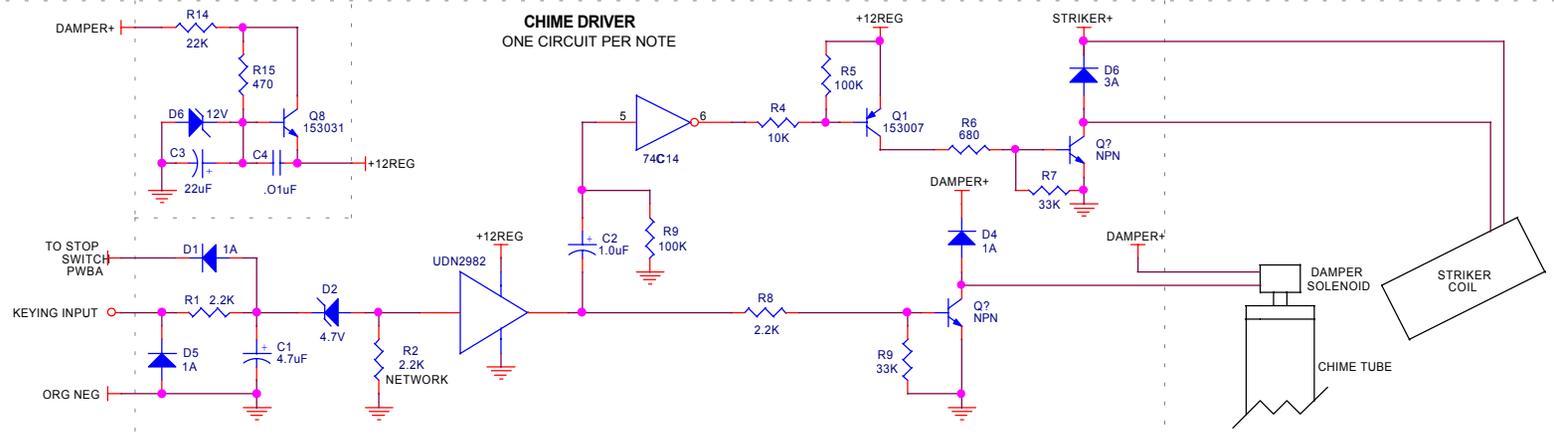
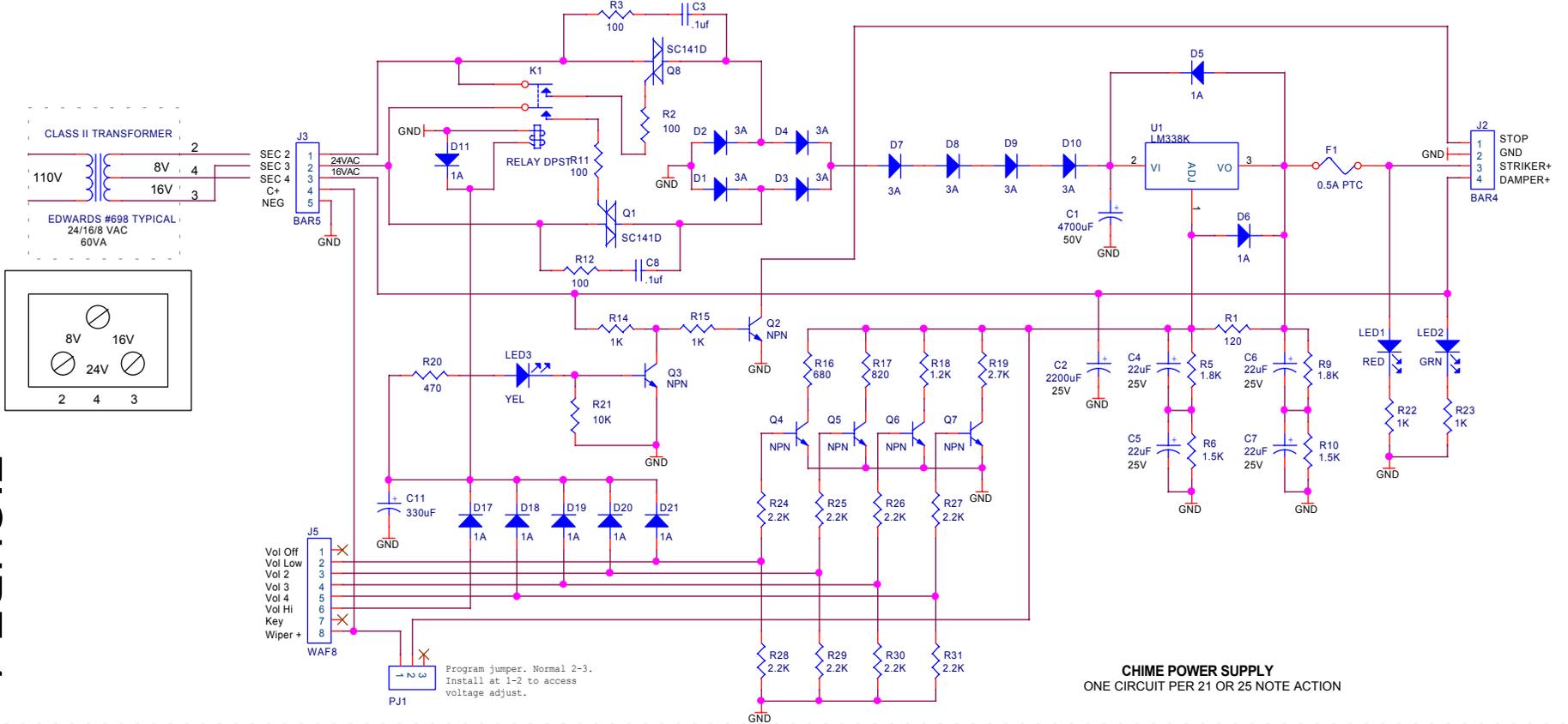
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CHIMES POWER SUPPLY AND DRIVER CIRCUITS

FIGURE 4



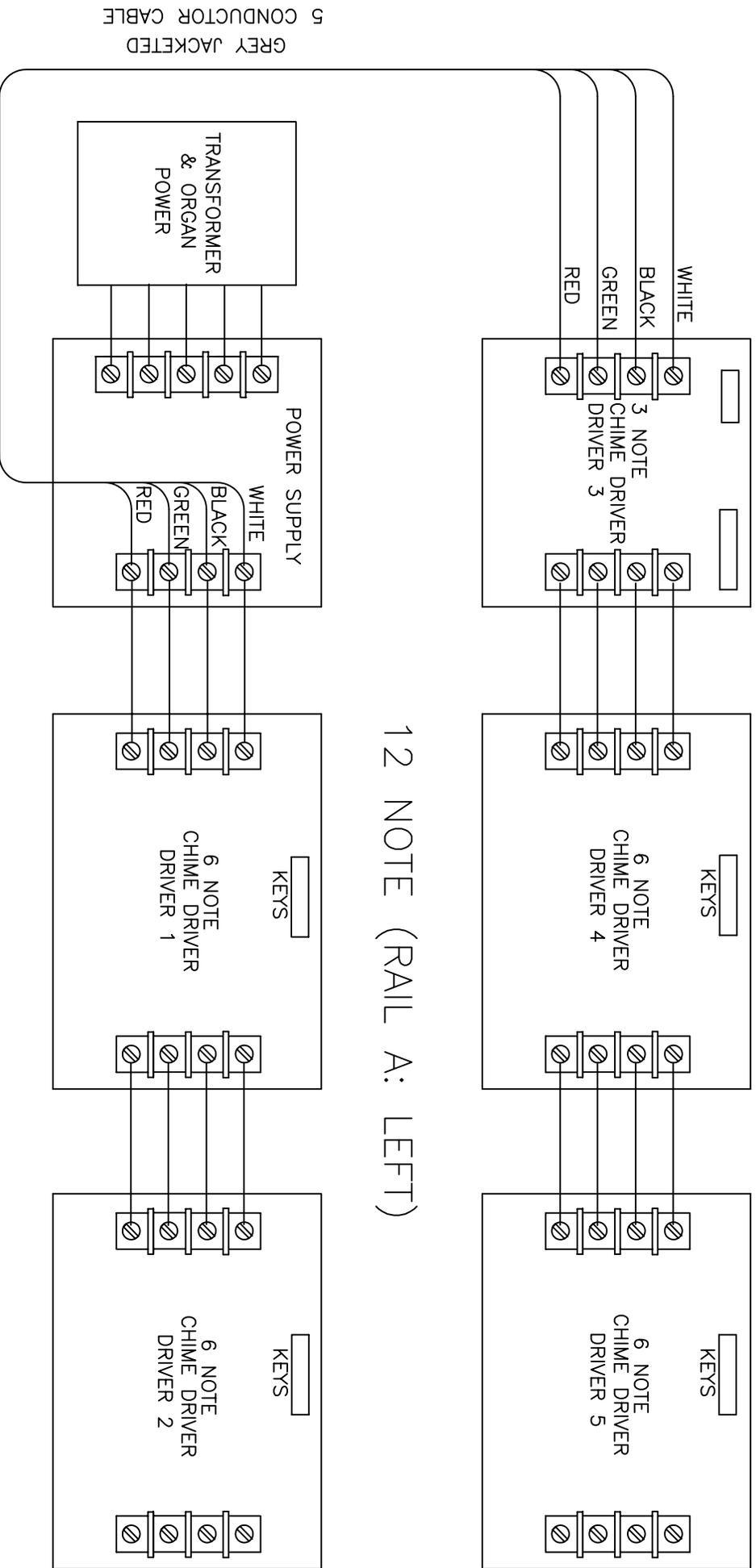


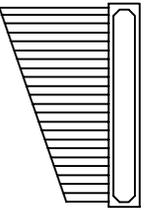
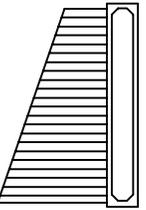
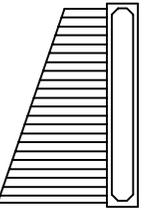
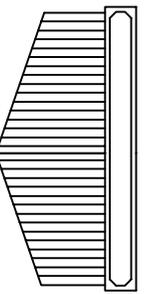
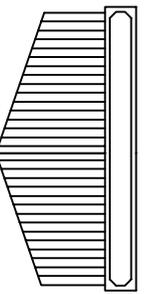
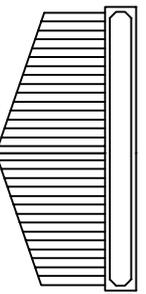
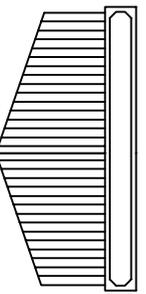
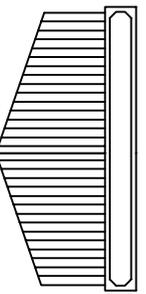
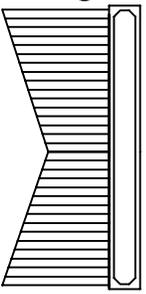
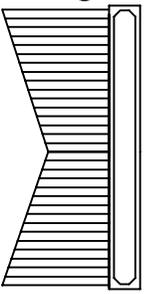
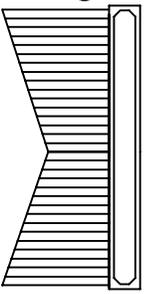
FIGURE 5
SPECIAL WIRING FOR 21 & 25 NOTE SPLIT RAIL
(25 NOTE NOT SHOWN)

Peterson

CATHEDRAL CHIMES

TUBE ARRANGEMENTS

KEY ASSIGNMENT CHART

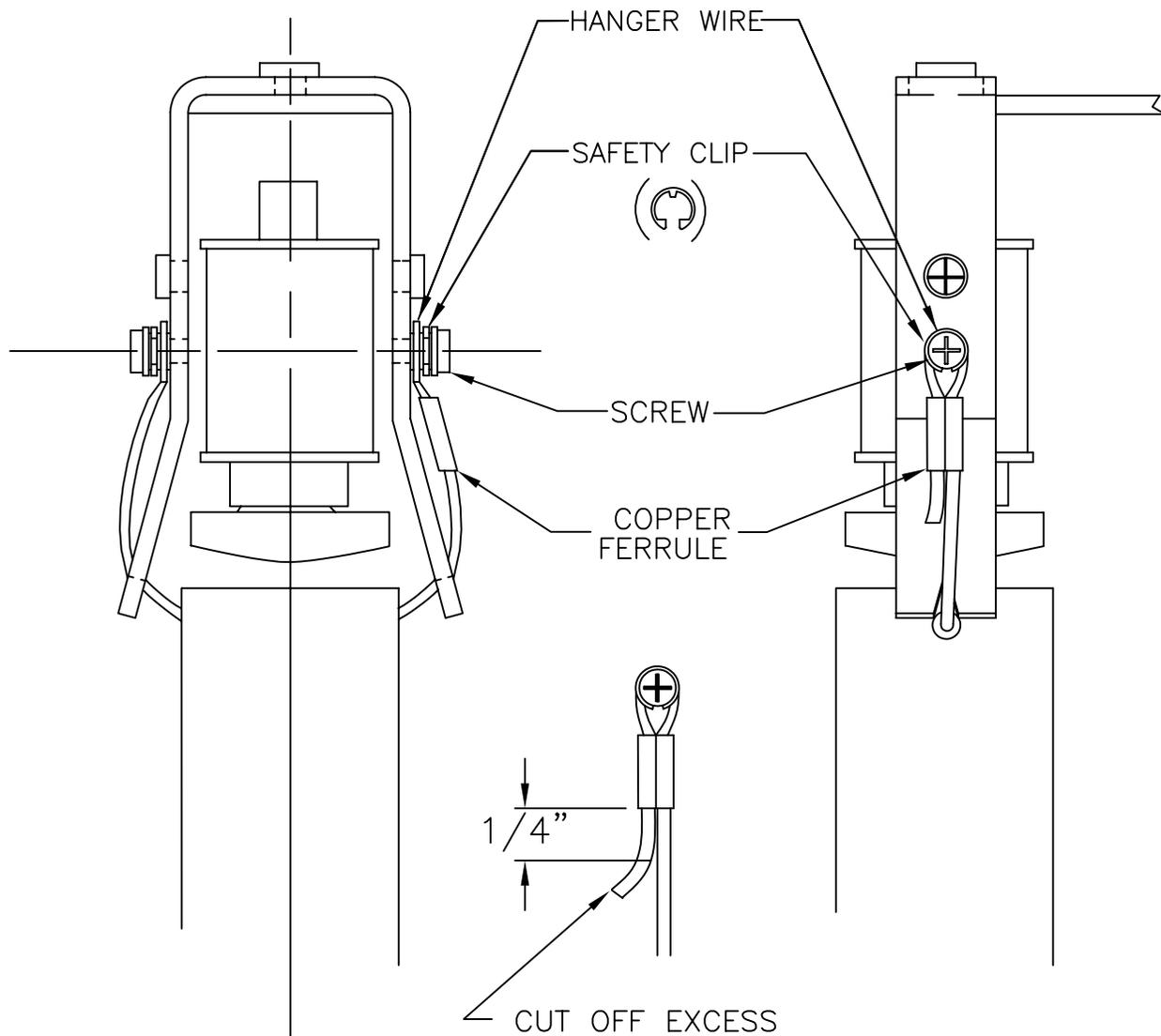
KEY INPUT # – 25 NOTE CHIME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
CHROMATIC LOW NOTE LEFT	G 20	G# 21	A 22	A# 23	B 24	C 25	C# 26	D 27	D# 28	E 29	F 30	F# 31	G 32	G# 33	A 34	A# 35	B 36	C 37	C# 38	D 39	D# 40	E 41	F 42	F# 43	G 44
																									
	G 44	F# 43	F 42	E 41	D# 40	D 39	C# 38	C 37	B 36	A# 35	A 34	G# 33	G 32	F# 31	F 30	E 29	D# 28	D 27	C# 26	C 25	B 24	A# 23	A 22	G# 21	G 20
																									
	G 44	F 42	D# 40	C# 38	B 36	A 34	G 32	F 30	D# 28	C# 26	B 24	A 22	G# 21	G# 21	A# 23	C 25	D 27	E 29	F# 31	G# 33	A# 35	C 37	D 39	E 41	F# 43
CHROMATIC LOW NOTE RIGHT																									
	G 44	F 42	D# 40	C# 38	B 36	A 34	G 32	F 30	D# 28	C# 26	B 24	A 22	G# 21	G# 21	A# 23	C 25	D 27	E 29	F# 31	G# 33	A# 35	C 37	D 39	E 41	F# 43
																									
	G 44	F 42	D# 40	C# 38	B 36	A 34	G 32	F 30	D# 28	C# 26	B 24	A 22	G# 21	G# 21	A# 23	C 25	D 27	E 29	F# 31	G# 33	A# 35	C 37	D 39	E 41	F# 43
																									
REGULAR "V" NOTE																									
	G 44	F 42	D# 40	C# 38	B 36	A 34	G 32	F 30	D# 28	C# 26	B 24	A 22	G# 21	G# 21	A# 23	C 25	D 27	E 29	F# 31	G# 33	A# 35	C 37	D 39	E 41	F# 43
																									
	G 44	F 42	D# 40	C# 38	B 36	A 34	G 32	F 30	D# 28	C# 26	B 24	A 22	G# 21	G# 21	A# 23	C 25	D 27	E 29	F# 31	G# 33	A# 35	C 37	D 39	E 41	F# 43
																									
INVERTED "V" NOTE																									
	G 20	A 22	B 24	C# 26	D# 28	F 30	G 32	A 34	B 36	C# 38	D# 40	F 42	G 44	F# 43	E 41	D 39	C 37	A# 35	G# 33	F# 31	E 29	D 27	C 25	A# 23	G# 21
																									
	G 20	A 22	B 24	C# 26	D# 28	F 30	G 32	A 34	B 36	C# 38	D# 40	F 42	G 44	F# 43	E 41	D 39	C 37	A# 35	G# 33	F# 31	E 29	D 27	C 25	A# 23	G# 21
																									
KEY INPUT # – 21 NOTE CHIME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21				

For your convenience in wiring the keying inputs for your PETERSON CATHEDRAL CHIMES, this chart shows the assignment of notes to each pin on the keying junction for four popular configurations.

FIGURE 6

CAUTION

AFTER HANGING THE CHIME TUBES. PLEASE BE SURE TO INSTALL THE SUPPLIED SAFETY CLIPS AS SHOWN BELOW TO PREVENT THE HANGER WIRES FROM SLIPPING OFF THEIR SCREW. THE CLIPS ARE PACKAGED IN THE ENVELOPE WHICH ALSO CONTAINS THE INSTALLATION INSTRUCTION BOOKLET.



AFTER ADJUSTING CABLE FOR PROPER TUBE HEIGHT, BE SURE TO FORM CABLE LOOP LARGE ENOUGH TO SLIP OVER PHILLIPS HEAD SCREW, YET SMALL ENOUGH TO PREVENT IT FROM SLIPPING OVER THE SAFETY CLIP. CRIMP THE COPPER FERRULE WITH AN ADEQUATE SIZE TERMINAL CRIMPER. TRIM EXCESS CABLE AS SHOWN FOR NEAT APPEARANCE.

FIGURE 7
CHIME HANGER CLIP INSTRUCTIONS

		21 NOTE 25 NOTE	
CANOPY (A)	51"	59 3/4"	
ACTION RAIL (B)	49 7/8"	58 5/8"	

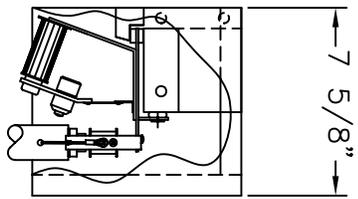
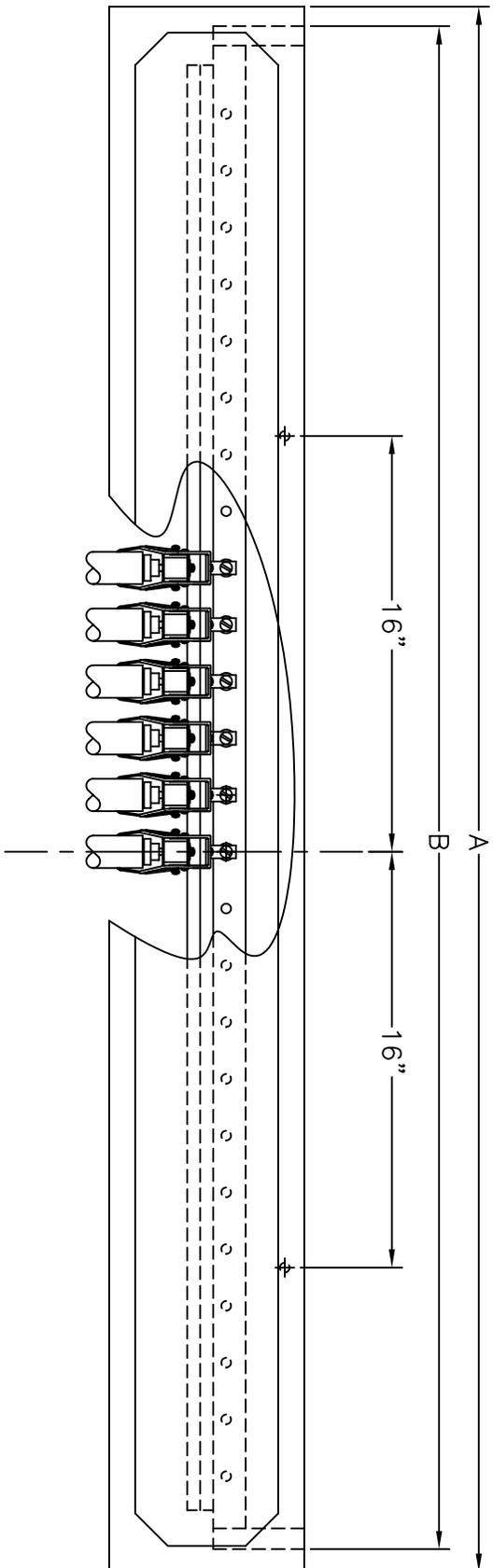
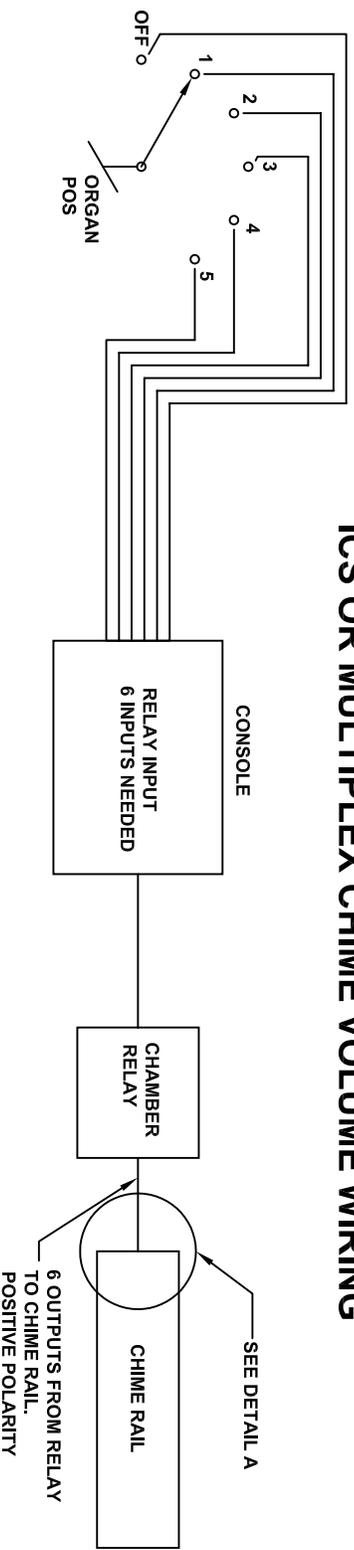


FIGURE 8

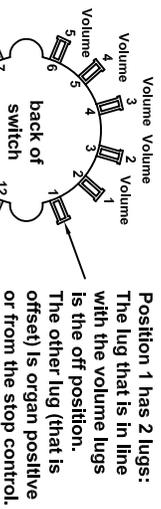
21 & 25 NOTE CHIME RAIL, CANOPY MOUNTING DIMENSIONS

CHIME VOLUME WIRING

ICS OR MULTIPLEX CHIME VOLUME WIRING



SWITCH WIRING



CHIME VOLUME WIRING WITHOUT RELAY

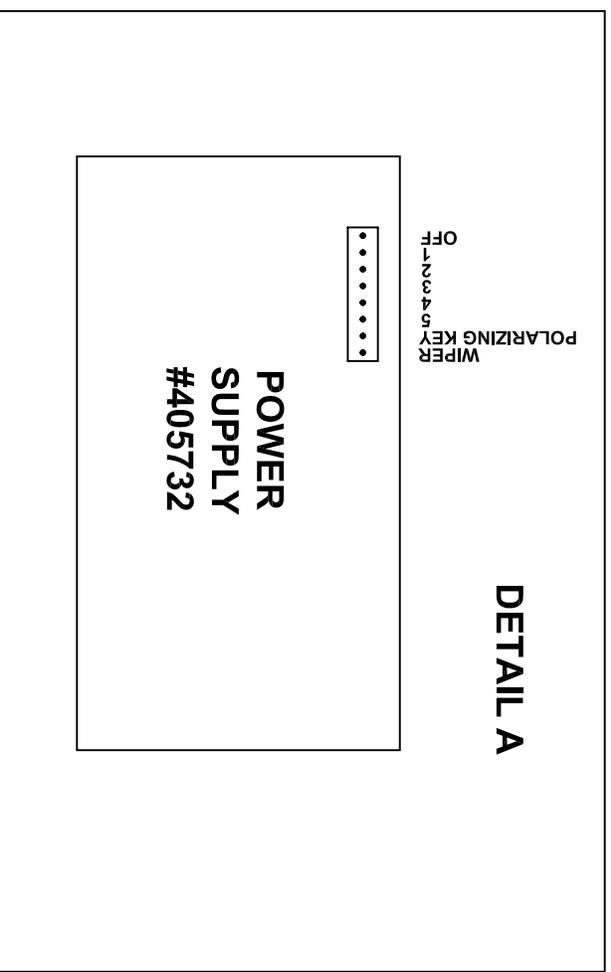
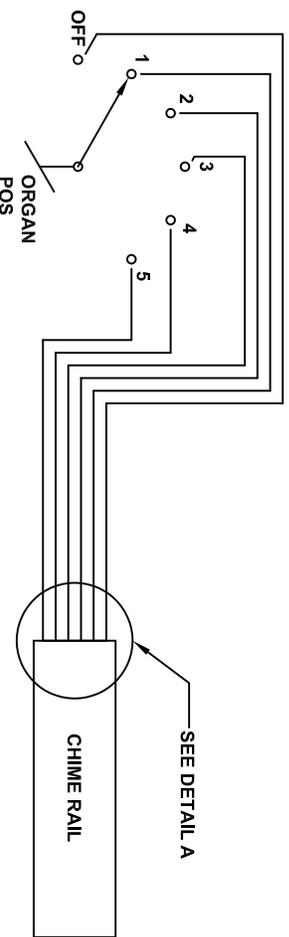


FIGURE 9