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**INSTALLATION INSTRUCTIONS
 PAGING SPEAKERS WITH 25V/70V TRANSFORMER**

Use this product according to this instruction manual. Please keep this instruction manual for future reference.

MODELS: ST-B4, ST-C8, ST-C8V, ST-C8M AND ST-C8MV

DESCRIPTION:

Wheelock Paging Speakers are ready to be installed assemblies consisting of a loudspeaker, round white grille, and a combination 25V/70V line matching transformer. ST-B4 includes a plastic surface mount housing. ST-C8, ST-C8V, ST-C8M and ST-C8MV include a round flush grille. ST-C8V and ST-C8MV include a recessed volume control. ST-C8 refers to all models for specification and installation purposes. The volume attenuation will reduce output by 20dB.

The ST-C8 models are 8" ceiling mount speakers, used primarily in office areas, hallways and other low to medium noise level areas. The ST-B4 is a 4" surface wall mount speaker used in the same areas, when it is not convenient to mount ceiling speakers. The areas ambient noise level will determine the speaker power (volume) tap chosen for a specific installation. Table 1 shows typical noise levels in various locations.

⚠ WARNING: 1) THESE DEVICES ARE NOT INTENDED FOR USE IN HAZARDOUS LOCATIONS AS DEFINED BY THE NATIONAL ELECTRICAL CODE (NEC) AND BY THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA). 2) THESE DEVICES ARE DESIGNED FOR INDOOR USE ONLY. DO NOT EXPOSE TO RAIN OR MOISTURE.

<i>Table 1: Typical Noise Levels</i>	
Location	dB
Assembly Line	75
Supermarket	75
Transportation -	---
Waiting Room	75
Office (Noisy)	70
Shipping/Warehouse	70
Restaurant	70
Department Store	65
Bank (Public Area)	65
Office (Quiet)	55
Office/Doctors -	---
Waiting Room	55
Hotel Lobby	55
Doctors Exam Room	55

NOTE: The power taps chosen should result in the paging level exceeding the areas ambient noise level by at least 6dB, and the background music level exceeding the ambient noise level by at least 3dB.

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	Cone Diameter	ST-C8 Models	ST-B4 - 4"
Speaker	Voice Coil Impedance	8 Ohms	
	Magnet Weight & Material	5.3 oz. Ceramic	
	Power Handling Capacity (Program Material)	6 Watts Nominal 10 Watts Maximum	5 Watts Nominal 8 Watts Maximum
	Grille	Round	Rectangular
Grille	Size	12 5/8" Dia. x 3"D	5"W x 7 1/4"H x 2 3/4"D
	Finish	White	Ivory
	Material	Plastic/Metal	
	Sound Pressure Level (on axis, @ 1W, @ 1 KHz)	1 meter	94dB
Sound Pressure Level (on axis, @ 1W, @ 1 KHz)	4 feet	92dB	84dB
	10 feet	84dB	76dB
	Frequency Response	200 Hz - 14,000 Hz	200 Hz - 10,000 Hz
Volume Control Attenuation	20dB at any wattage tap (ST-C8V only)	Not Applicable	
Transformer	Line Voltage	25V/70V Combination	
	Power taps	4W, 2W, 1W, 1/2W, 1/4W, 1/8W	
Optional Mounting Accessories	Backbox	Recessed CBB-8	Surface (backbox not required)
	Speaker Support Bridge	SSB-8	Not Required

APPLICATION INFORMATION:

A. ST-C8 MODELS CEILING MOUNT SPEAKERS

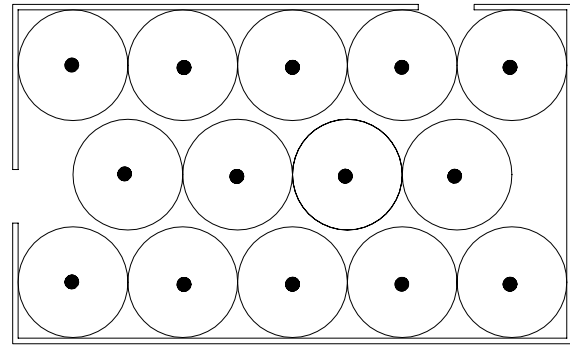
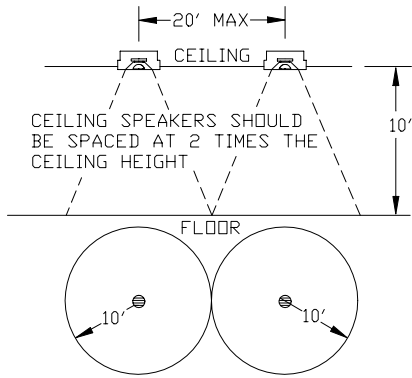
Ceiling mounted speakers should be spaced at a distance equal to twice the ceiling height. Because of their cone shaped sound projection (dispersion), ceiling speakers cover more area as the ceiling height increases. These factors are illustrated in Tables 3 and 4, and Figure 1.

Ceiling Height (Ft.)	Speaker Spacing (Ft.)	Coverage Per Speaker (Square Ft.)
8	16	250
10	20	400
12	24	575

Number Of Speakers	8	9	10	11	12
1	250	325	400	485	575
2	500	650	800	970	1,150
3	750	975	1,200	1,450	2,300
4	1,000	1,300	1,600	1,930	2,875
5	1,250	1,625	2,000	2,410	3,450
6	1,500	1,950	2,400	2,890	4,025
7	1,750	2,275	2,800	3,370	4,600
8	2,000	2,600	3,200	3,850	5,175
9	2,250	2,925	3,600	4,330	5,750
10	2,500	3,250	4,000	4,810	6,325

Figure 1: Ceiling Speaker Spacing and Coverage

Figure 2: Typical Ceiling Speaker Layout



Note that increasing volume results in the speaker being louder in its covered area, but does not increase the area covered by the speaker.

The design goal of speaker placement is to allow people to hear just about the same volume from anywhere in the room. The goal is accomplished with a symmetrical layout of the ceiling speakers which achieves edge-to-edge area coverage, as shown in Figure 2.

B. ST-B4 SURFACE WALL MOUNT SPEAKERS

Surface wall mounted speakers are used where it is not practical to mount ceiling speakers. Forward sound projection and spacing are important, and Table 5 provides a guide line.

Mounting Height (Ft.)	Forward Projection (Ft.)	Spacing (Ft.)
8	30	20
12	35	25

Wall speakers should be mounted on the same wall, as long as they are not required to project sound more than shown in Table 5 above. Figure 3 is typical for a required 30 foot sound projection (speakers mounted 8 feet high).

Figure 3: Wall Speaker Layout Speakers Mounted on One Wall

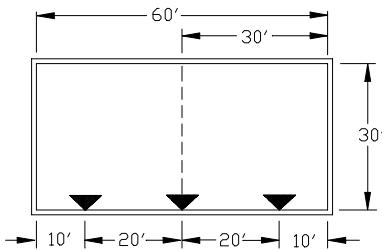


Figure 4: Wall Speaker Layout Speakers Mounted on One Wall And Pillars

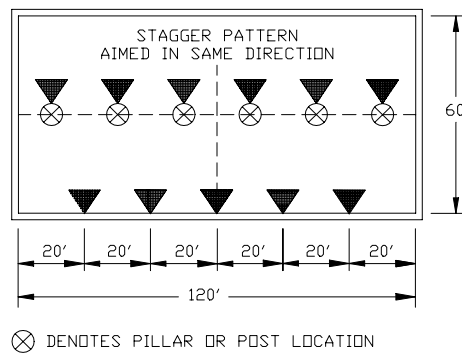
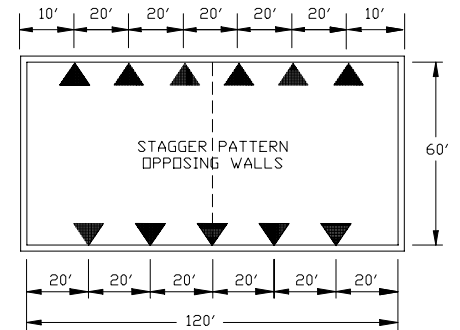


Figure 5: Wall Speaker Layout Speakers Mounted on Opposing Walls



Whenever possible, wall mounted speakers should be aimed in the same direction, when required to project further than 30 or 35 feet. Pillars or posts are often available to facilitate this type of installation. Although the pillar locations will vary, Figure 4 provides a useful guide. Note that a stagger pattern should be maintained.

If pillars or posts are not available, then wall speakers can be mounted on opposing walls, and a stagger pattern must be maintained as shown in Figure 5.

MOUNTING INFORMATION:

The ST-B4 is designed to mount on the surface of a wall. Remove the top cover by pushing the latch at the bottom of the housing base with a small screwdriver, See Figure 6. Figure 7 is the mounting dimension for the mounting screw locations. Mount the housing base to the wall with hardware appropriate for the mounting surface. Connect wires as specified in "WIRING INFORMATION", and then snap cover back onto base.

Figure 6: ST-B4

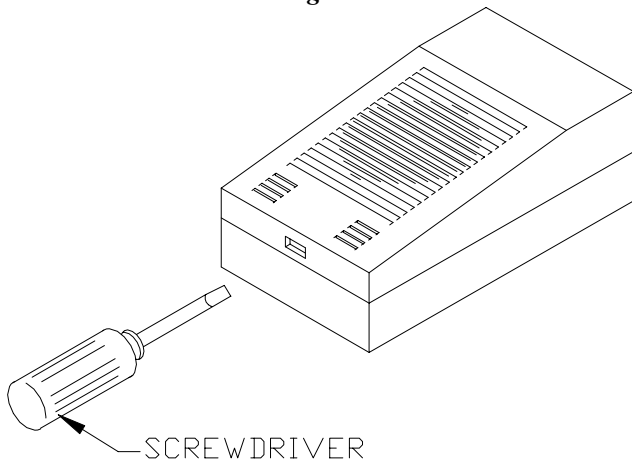
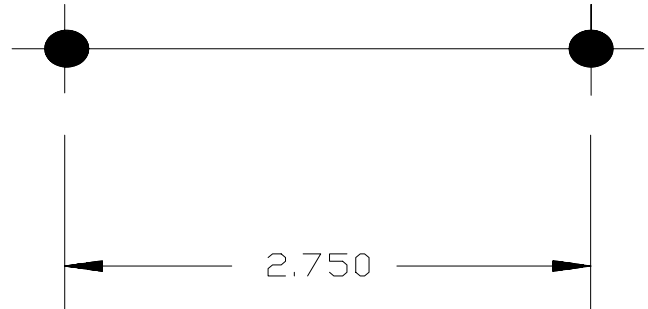


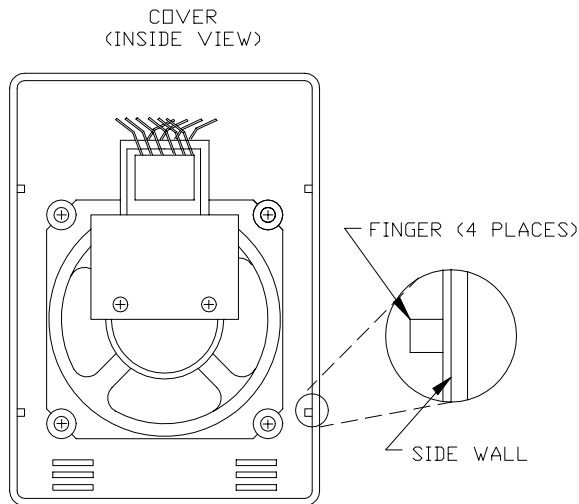
Figure 7.



**Mounting Screw Locations
(Template not to scale)**

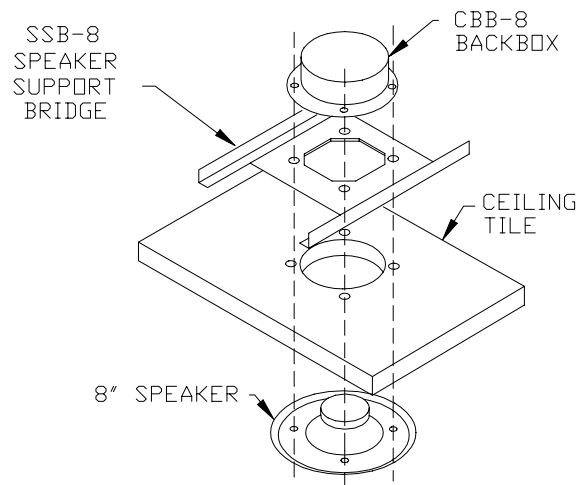
Be sure that the base sides line up between the cover sides and the 4 fingers on the cover sides, See Figure 8.

Figure 8.



NOTE: SIDES OF BASE LINE UP BETWEEN SIDE WALL AND FINGERS ON COVER SHOWN.

Figure 9.



The ST-C8 models are designed to mount flush in a hung tile ceiling. An optional installation method uses speaker support bracket, (model number SSB-8) and/or backbox (model number CBB-8) as shown in Figure 9.

WIRING INFORMATION:

ST-C8 models are equipped with a constant voltage line matching transformer which matches the 8 ohm speaker to a 25V/70V line (i.e., an amplifiers 25V or 70V output). It has six power taps for either voltage ranging from 4 watts down to 1/8 watt. The power tap leads are 6" long and have a 3/8" strip for ease of field wiring. Table 6 shows the wire color codes and their power (wattage) tap designations.

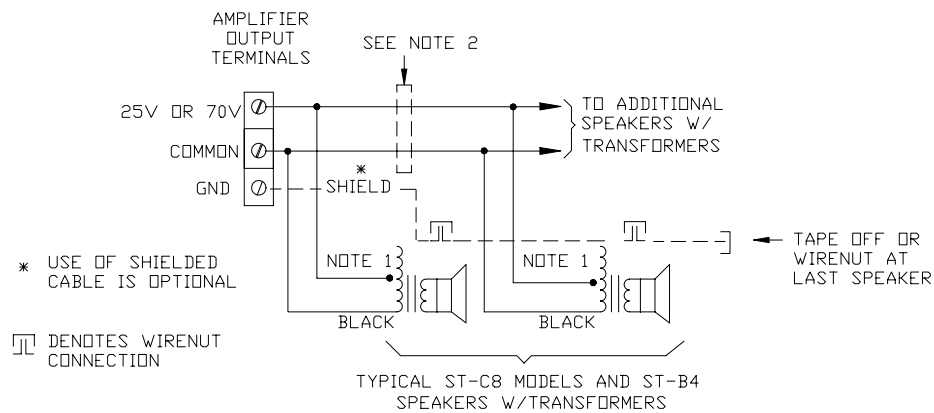
Wattage	25V Line	70V Line
4W	Brown	Yellow
2W	Red	Green
1W	Orange	Blue
1/2W	Yellow	Violet
1/4W	Green	Gray
1/8W	Blue	White
Common	Black	Black

Ceiling Mount Speakers	
Quiet Office	1/2 Watt Tap
Noisy Office	1 Watt Tap
Surface Wall Mount Speakers	
Quiet Office	1/2-1 Watt Tap
Noisy Office	1-2 Watt Tap
Quiet Office = 50-64dBA	
Noisy Office = 65-75dBA	

Typical wattage tap selections for ceiling mount and surface wall mount speakers is shown in Table 7.

Connect each speakers transformer to the 25V or 70V line as shown in Figure 10.

Figure 10: Speaker Connection To 25V/70V Line



INSTALLATION:

1. For each transformer, connect the one power tap wire chosen for the required wattage and line (See Table 6).
2. To insure proper speaker phasing, maintain a consistent color code connection to all speaker transformers. To simplify phasing, use interconnecting cable with color coded wires.
 - A. Connect the same color wire (in the interconnecting cable) to the amplifier output terminal marked COM (Common), and to the black "common" wire of all speaker transformers.
 - B. Connect one other color wire (in the interconnecting cable) to the amplifier output terminal marked 25V or 70V and to all of the selected power tap wires at each speaker transformer.
 - C. If shielded cable is used, then connect the shield (in the interconnecting cable) to the amplifier output terminal marked GND (Ground). The shield is not connected to the speakers. The shield is made continuous using wirenuts (as shown in Figure 10, above), and taped off at the last speaker on the cable run.
3. On ST-C8V and ST-C8MV only, adjust volume control as required, using a small screwdriver.
4. The total system wattage requirement should not exceed 85% of the system amplifiers rated output. The total system wattage requirement is the summation of the wattage tap selections of all system speakers.

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