Speaker Distribution Wall Plates
Installation Instructions

Essential for distributed residential sound installations, these plates provide a convenient method of connecting numerous pairs of speakers to a single pair of binding posts. Allows bulky wire bundles to be located inside the wall and out of sight. **Note:** It is important to understand that this wall plate assembly does not provide any impedance protection to the stereo amplifier. Therefore it is critical that consideration be given to this fact, prior to installation. See the reverse side of this sheet for additional information.

Depending upon the model, this plate allows easy connection of up to four, eight or ten pairs of speaker systems, to a single amplifier output. In the event that more pairs are needed than available on the given model, it is acceptable to "double-up" pairs on a single screw terminal, noting that this will significantly decrease the maximum usable wire gauge.

Safety Notes

- Speaker plates and volume controls should be mounted separately from AC powered devices. Never mount speaker connection devices in the same electrical box as AC outlets or switches
- Speaker lines should not be run in close proximity of AC power lines. If lines must cross paths, it is essential that they cross perpendicular from each other to minimize induced noise
- Never pass speaker lines through the same stud holes as AC lines
- When inserting wire in the rear terminal strip, be sure to strip no more than 1/4" insulation from each lead. Take care to twist stranded leads together, prior to inserting into the screw terminal, to ensure that frayed ends to not cross connect

Specifications

- Maximum Power Capacity: 200W RMS, per channel
- Max wire size: 14AWG
- Dimensions: 4-1/2" x 4-1/2" including plate (double gang)
- Mounting Depth: 1"

Available Models

50-7400	Single Gang, Four Output
50-7402	Double Gang, Eight Output
50-7404	Double Gang, Ten Output

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Calculating Impedance of Multiple Speaker Systems

This wall plate connects multiple speaker systems to a single amplifier output in a parallel wiring configuration. All (+) are tied together, and all (–) are tied together, to form a single (+) and (–) lead. The traditional method of calculating the total impedance of systems in this manner is to use the following Ohms Law formula, where R_T is the total resistance:

$$\mathbf{1/R_1 + 1/R_2 + 1/R_3 + 1/R_4 + 1/R... = 1/R_T}$$

For example, if four sets of 8Ω speakers are connected, the formula reads as follows:

$$\mathbf{1/8\Omega + 1/8\Omega + 1/8\Omega + 1/8\Omega = 1/R_T\Omega}$$
Or
$$\mathbf{1/2\Omega = 1/R_T\Omega}$$
Or
$$\mathbf{R_T\Omega = 2\Omega}$$

If six sets of 8Ω speakers were used, the formula would read as follows:

$$\mathbf{1/8\Omega + 1/8\Omega + 1/8\Omega + 1/8\Omega + 1/8\Omega + 1/8\Omega = 1/R_T\Omega}$$
Or
$$\mathbf{6/8\Omega = 1/R_T\Omega}$$
Or
$$\mathbf{0.75\Omega = 1/R_T\Omega}$$
Or
$$\mathbf{R_T\Omega = 1.33\Omega}$$

While some amplifiers today will safely handle a 2ohm load, most will not handle loads below 4ohms. In these cases, if the overall impedance is too low, a strong risk of amplifier damage exists. If the minimum load of an amplifier is unknown, total speaker impedance, per output channel, should not fall below 4ohms.

It is important that MCM Speaker Distribution Wall Plates be used in conjunction with devices that will adequately compensate for low speaker impedances. The most effective way to accomplish this is to install an MCM Impedance Matching Volume Control (MCM #50-6570, 50-6571 or 50-6377A) on each speaker pair. In addition to providing local volume control of individual pairs of speakers, they provide selectable x2, x4 and x8 impedance multiplier, allowing multiple speakers to be connected to a single amplifier.

The following formula illustrates how as many as 16 pairs of speakers are connected to a single amplifier. With each volume control set to x8, connected to an 8ohm speaker, the net impedance of each speaker is 64ohms. With 16 speakers connected in parallel, the formula reads as follows:

$$\mathbf{1/64\Omega + 1/64\Omega + 1/64\Omega + 1/64\Omega +}$$
$$\mathbf{1/64\Omega + 1/64\Omega + 1/64\Omega + 1/64\Omega +}$$
$$\mathbf{1/64\Omega + 1/64\Omega + 1/64\Omega + 1/64\Omega +}$$
$$\mathbf{1/64\Omega + 1/64\Omega + 1/64\Omega + 1/64\Omega}$$
$$\mathbf{= 1/ R_T\Omega}$$

Or more simply put:

$$\mathbf{16 \times (1/64\Omega) = 1/R_T\Omega}$$
Or
$$\mathbf{1/4\Omega = 1/R_T\Omega}$$
Or
$$\mathbf{R_T = 4\Omega}$$

In this manner, 16 pairs of 8ohm speakers are connected to a stereo amplifier, and appear as a 4ohm load.