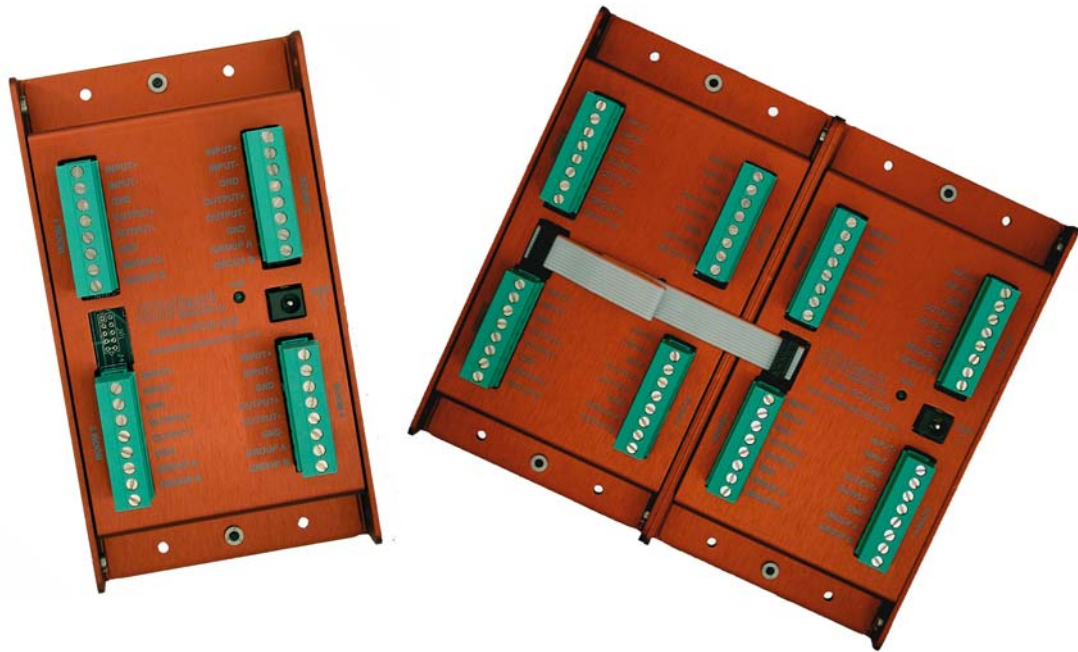




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**RCM Installation and Application Notes**  
**RCM-42B and RCM-82B**  
06-12-2003

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## **Quick Start Installation Guide for the RCM-42B & RCM-82B**

### **Description:**

The Emtech Electronics Room Combining Matrices are designed to simplify the process of connecting sound systems in multiple rooms. The RCM-42B allows the sound systems from up to four rooms to combine in any combination desired, while the RCM-82B does the same for up to 8 rooms. Each room may be operated independently, or it may be assigned to either of two program groups, where it shares program material with any other room assigned to that same group. The input channels of the matrix are normally directed back to their corresponding output.

Each room control has a Group A control input signal and a Group B control input signal (see figure 1). When either of these control inputs are connected to ground, (with a switch closure to ground) the corresponding local input is redirected to one of two internal busses, Group A or Group B which in turn are directed to the RCM output for that room. If the control inputs are left in an open (switch is open) condition, the local material for that room is connected to that room's output of the RCM only.

In any event, if program Group A or B are selected, all of the mic or line inputs that are available for that room in the local position, continue to be available in the Group A or B positions.

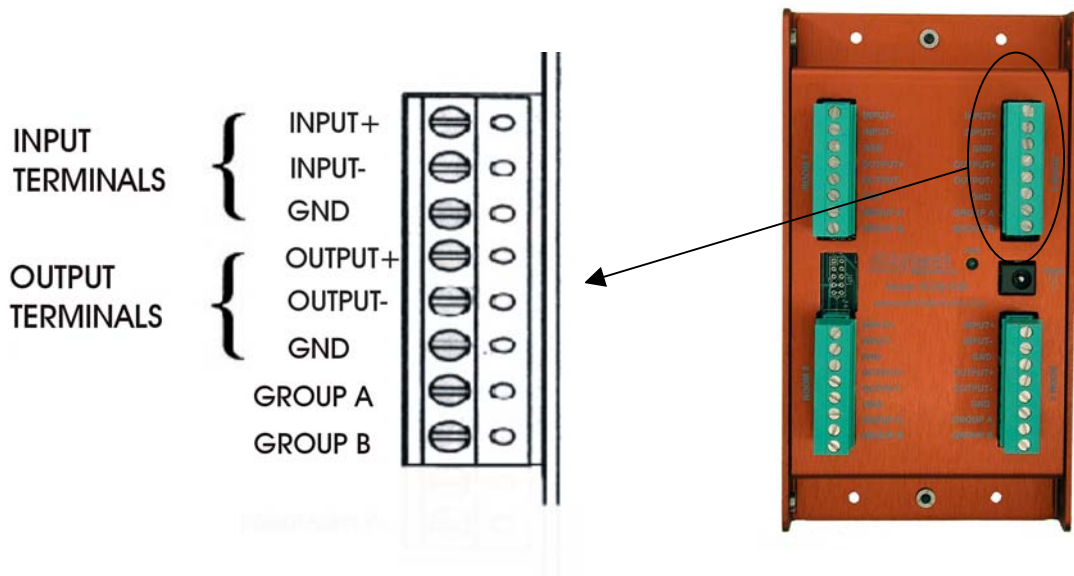
Selecting between either of the two program groups is accomplished with an SPDT switch with a center off (open) position. The use of solid state analog switches eliminates pops or clicks when switching. Signal level remains constant as rooms are switched in or out of a group. The balanced inputs and DC logic buss combining controls allow long input and control lines to the unit. If you are using the Emtech Electronics IA-204R amplifiers in your application, the previously mentioned SPDT switch is built into the front panel of each amplifier. If you are using other amplifiers and mixers, you can order from two decora style switch panels, RCM-KS (key-switch version) and RCM-S (standard rocker style switch) from Emtech that provides the needed switch for each room.

### **Installation:**

The RCM-42B and RCM-82B are fully remote controlled and can be placed in any convenient location. The unit may be mounted to a wall or other flat surface using four #6 screws through the holes in the mounting flanges. All connections to the unit are made by means of removable terminal connectors. The RCM can be mounted and then easily wired at a later time. Avoid installing the unit in close proximity to large power transformers or power lines. (AC current hum and noise may be introduced into the audio program.)

The RCM-B units now come with their own 24 volt DC power supply. You make the power connection via the DC power jack on each unit. All other connections are made via 8-pin terminal connectors. Figure 1 includes a picture of the 8-pin terminal connector.

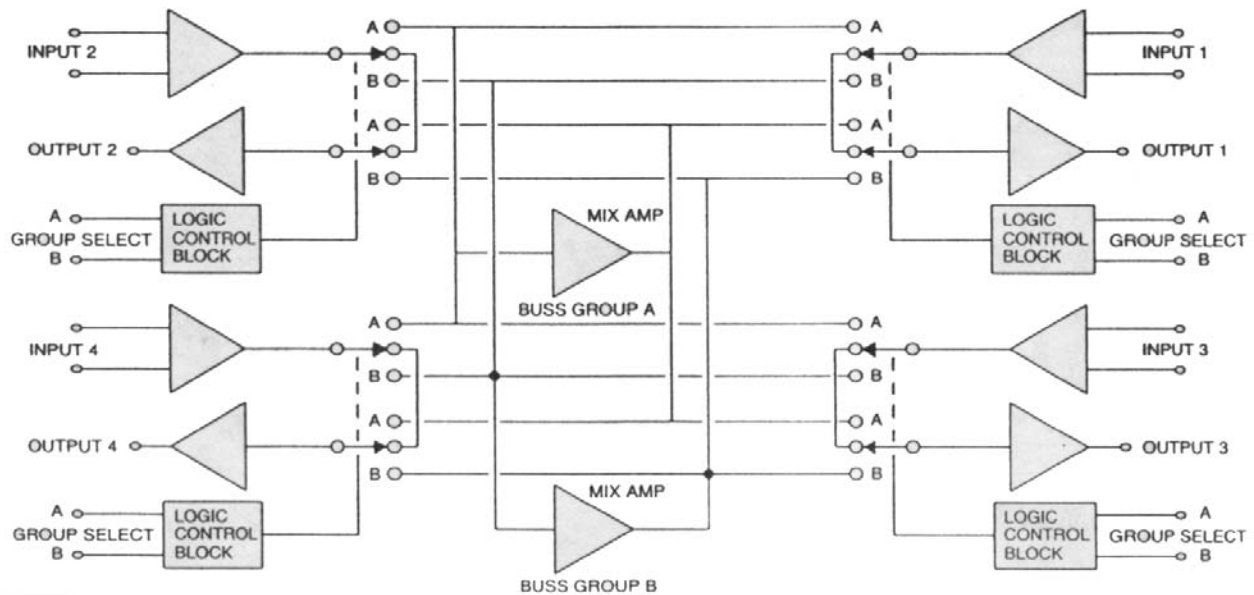
The input connection terminals are shown in Figure 1. The input signals can come from any balanced or unbalanced line level source such as a mixer/amplifier. The shield of a balanced line should be connected to the terminal marked GND on the matrix. When the source is unbalanced, strap the "input -" terminal to the GND terminal. Whether the source is balanced or unbalanced, shielded audio cable should be used for these connections to minimize noise and hum pickup. The output connection terminals are also shown in figure 1. The output signal can be sent to any line level input, such as a mixer/amplifier. As with the output connections, shielded audio cable should be used. The two control inputs terminals for each room/buss are marked GROUP A and GROUP B as shown in Figure 1. These two connections can be wired to remote switches; a simple closure to ground will then assign that room to the corresponding combining group. When Group A and Group B control terminals are open, (not connected to ground) the input signal is simply routed back to its corresponding room output.



**Figure 1: Terminal Connections on RCM-42B**

**Block Diagram**

If a given input's Group A (or B) control terminal is connected to ground, that input will be mixed with all other room inputs with corresponding Group A (or B) terminals connected to ground. The mixed signal will be routed back to each of the outputs with inputs assigned to that group. A room cannot be assigned to both Group A and Group B simultaneously; if both the Group A and Group B terminals on a room are connected to ground, the input signal is routed directly back to the input (in Local mode). Figure 2 shows the internal switching operation of the RCM-42 and RCM-82.

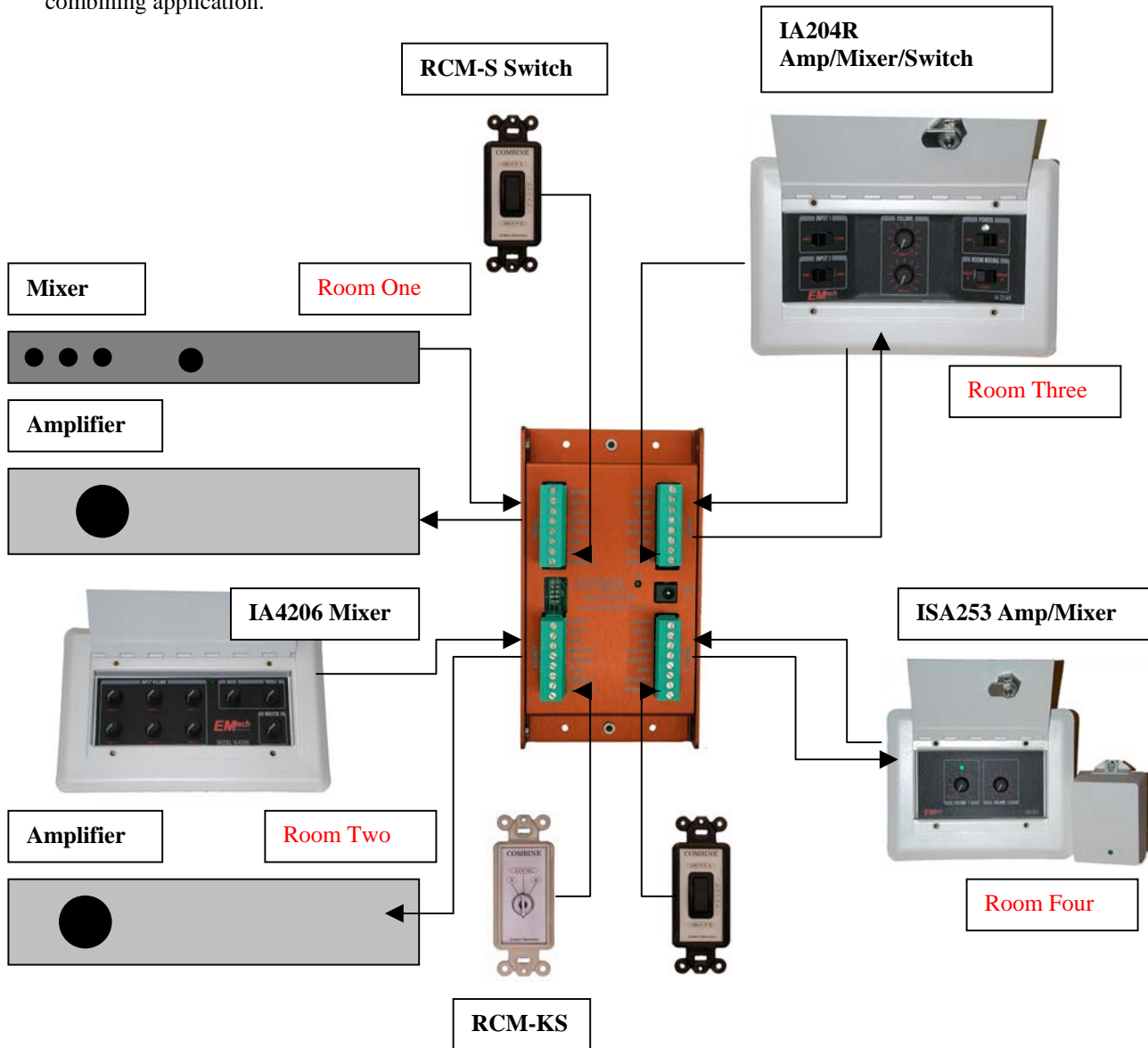


**Figure 2: Block Diagram of the RCM-42B (RCM-82B is identical, but with eight IO pairs)**

**Applications:**

**Customized Diverse System**

The RCM-42B and RCM-82B can be used with any mixer/amplifier combination with line level outputs, or as a stand-alone zone control/distribution/summing unit. Figure 3 shows the different ways that the RCM-42 can be wired in a combining application.



**Figure 3**

**Room One** is shown implemented with a standard pre-amp/mixer and amplifier of your choice, with an Emtech RCM-S switch to control the RCM-42B.

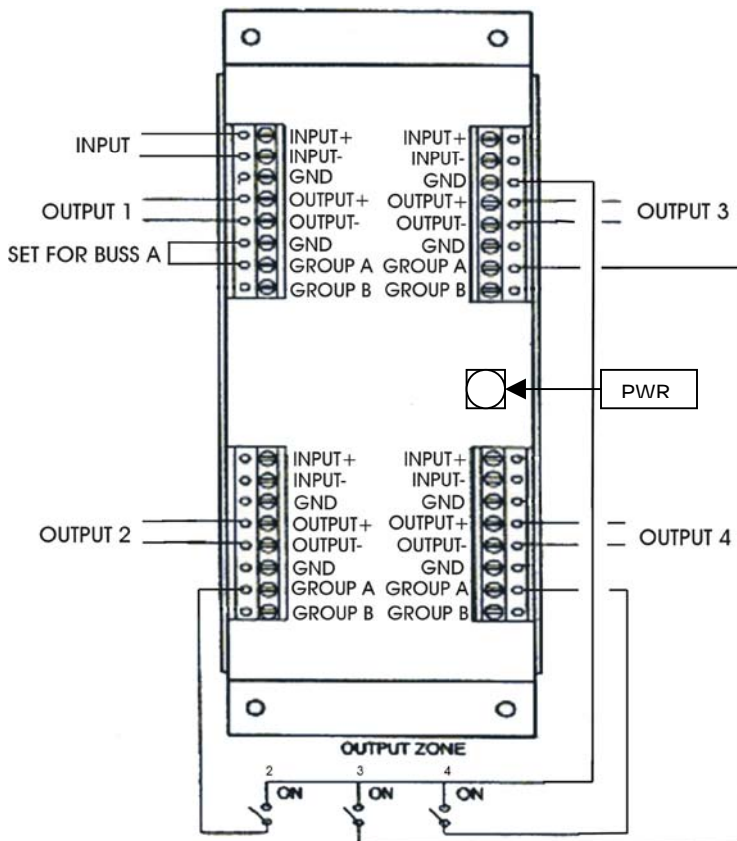
**Room Two** is shown using an Emtech Electronics IA-4206 six channel pre-amp/mixer for six mic or line inputs. It also provides tone controls. An Emtech RCM-KS key switch provides the RCM-42B program select capability. This switch helps secure the system from tampering since the key can be removed in any of the three positions. All that is required to finish the room sound reinforcement, is an amplifier with speakers.

**Room Three** is shown using an Emtech Electronics IA204-R including mic/line level inputs, pre-amp, mixer, 20 watt amplifier and integrated RCM switching. This in-wall amplifier/mixer includes a locking cover to prevent tampering. The IA204-R single unit coupled with speakers provides the entire sound reinforcement package for a small room.

**Room Four** utilizes an Emtech ISA-253 two channel mic/line pre-amp/mixer and 15 watt amplifier with an Emtech RCM-S switch to control the RCM-42B. This in-wall amplifier/mixer also includes a hinged locking cover. All that is needed to complete the solution, are speakers.

**Smart Distribution Amplifier**

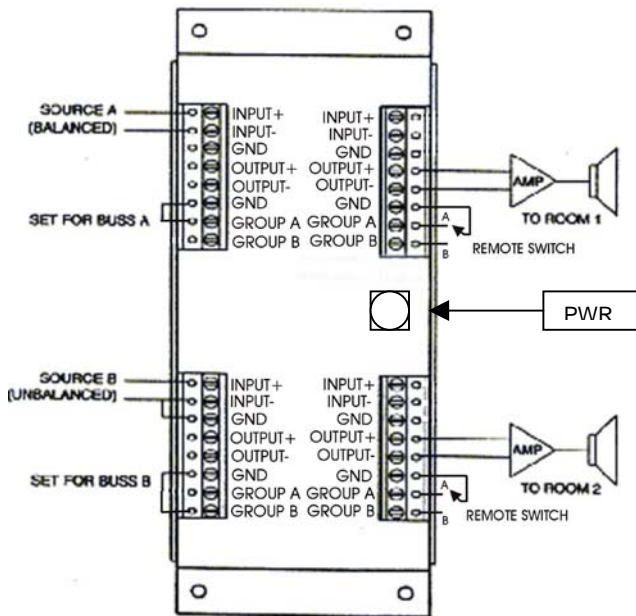
The RCM-42B and RCM-82B can also be used as smart distribution amplifiers. Figure 4 shows how a RCM-42B can be used as a smart distribution amp. A simple bank of switches allows remote selection of the active outputs. Using an RCM-82B, up to eight outputs can be distributed.



**Figure 4: Smart Distribution Amplifier**

**Remote Source Selection**

The RCM-42B and RCM-82B can also be used as a remote source selector. Figure 5 shows a way of remotely selecting one of two program sources to feed a number of rooms. Rooms 1 and 2 can select between music source A or B. Using the RCM-82B, six rooms can have independent remote selection of two program sources.



**Figure 5: Remote Source Selection**

**Connections:**

When using the room combining switch on an Emtech Electronics product, from the IA-204 series, the ground pin for the room combining function does not need to be connected as long as the IA-204 amplifier and the RCM 42B or RCM-82B share a common power supply. If each unit has a separate power source, then you will need to make sure that the ground pin is properly connected.

All amplifiers should have balanced inputs for best operation. If any amplifiers have unbalanced inputs, then the RCM-42B or RCM-82B should be located as close as possible to the amplifiers inputs.

The shields of any interconnecting cables should be grounded at one end only. A terminal point is provided on each of the RCM-42B or RCM-82B connectors for grounding both the input and output shields (See Figure 1).

For best results, limit the length of wire between the source selection switches and the RCM to 200 feet.

**If you have any suggestions or questions, please call or write us at:**

**Emtech Electronics, Inc.**  
**1126 No. 1200 West, Orem, UT 84057**  
**Voice: 1-866-200-2878 / 801-426-8333**  
**Fax: 801-426-8334**  
**[www.emtechelectronics.com](http://www.emtechelectronics.com)**