



---

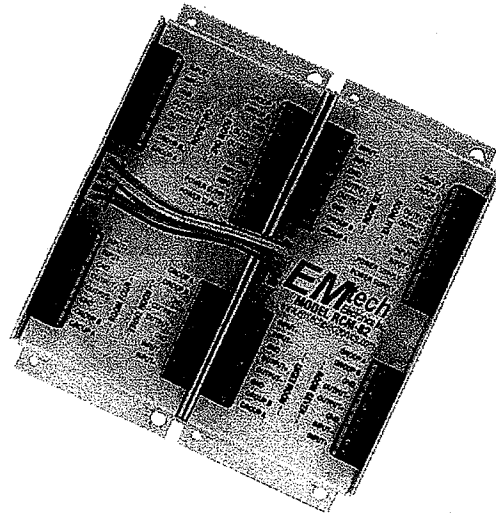
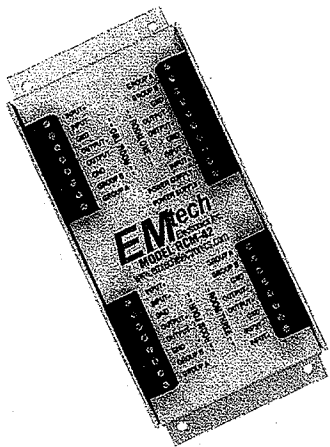
## RCM Installation and Application Notes

### RCM-42 and RCM-82

Document: RCM1001

April 11, 2002

---



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

### Description:

The Emtech Electronics Room Combining Matrices are designed to simplify the process of connecting sound systems in multiple rooms. The RCM-42 allows the sound systems from up to four rooms to combine in any combination desired, while the RCM-82 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.

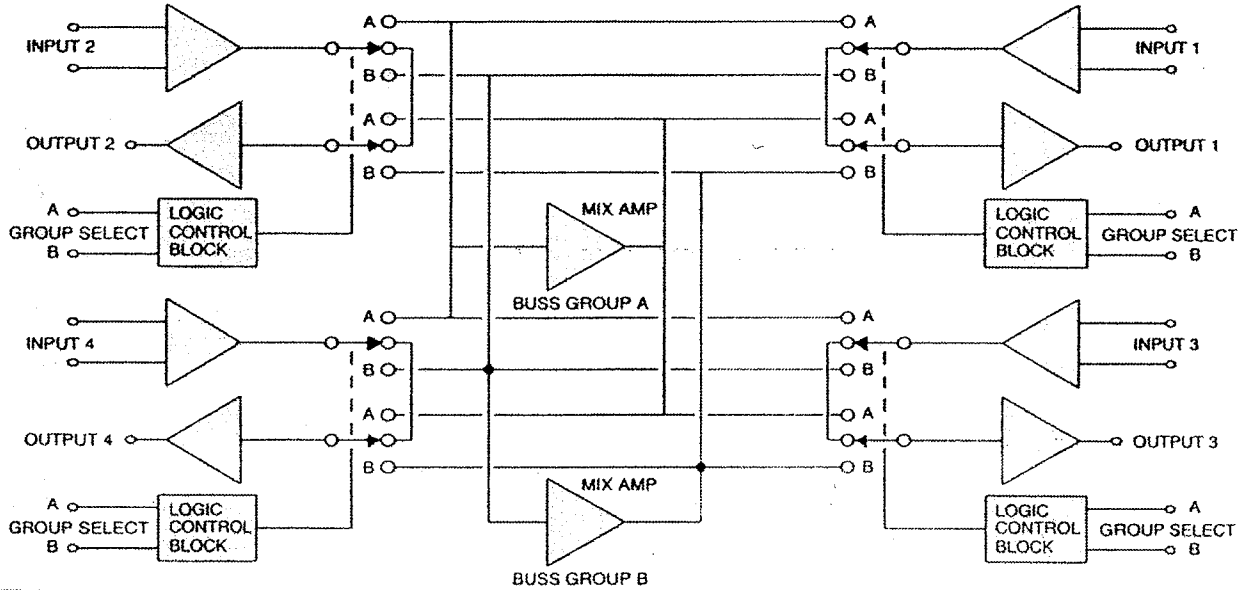
### Installation:

The RCM-42 and RCM-82 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 units require a well-filtered 18-28 volt DC power supply. We recommend a 24VDC supply with at least 50 mA of current for the RCM-42, and 100 mA for the RCM-82. Do not exceed 30VDC or you may damage the units. You make the power connection via the last two pins of the 10-pin terminal on each unit. Figure 1 includes a picture of the 10-pin terminal. The pin-out on the 8-pin terminals is the same as the 10-pin terminal, minus the two power connections.

**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.



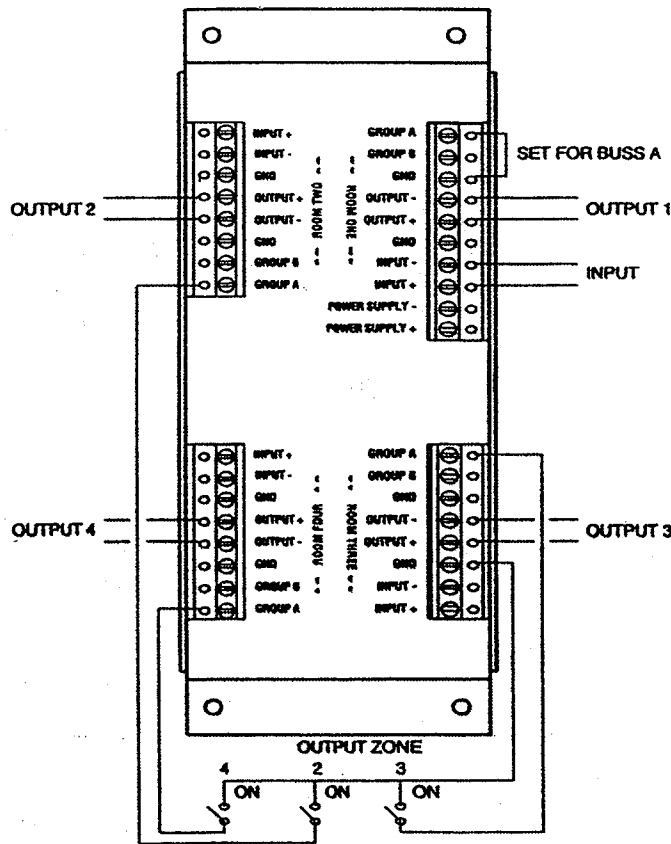
**Figure 2: Block Diagram of the RCM-42 (RCM-82 is identical, but with eight IO pairs)**

**Room Three** 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-42. This in-wall amplifier/mixer also includes a hinged locking cover. All that is needed to complete the solution, are speakers.

**Room Four** 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-42 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.

**Smart Distribution Amplifier**

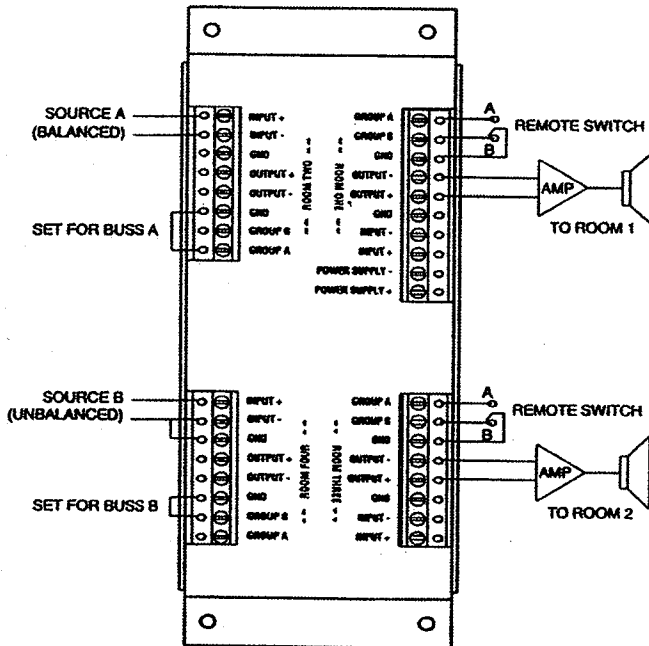
The RCM-42 and RCM-82 can also be used as smart distribution amplifiers. Figure 4 shows how a RCM-42 can be used as a smart distribution amp. A simple bank of switches allows remote selection of the active outputs. Using an RCM-82, up to eight outputs can be distributed.



**Figure 4: Smart Distribution Amplifier**

**Remote Source Selection**

The RCM-42 and RCM-82 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-82, 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 42 or RCM-82 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 probably connected.

All amplifiers should have balanced inputs for best operation. If any amplifiers have unbalanced inputs, then the RCM-42 or RCM-82 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-42 or RCM-82 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.

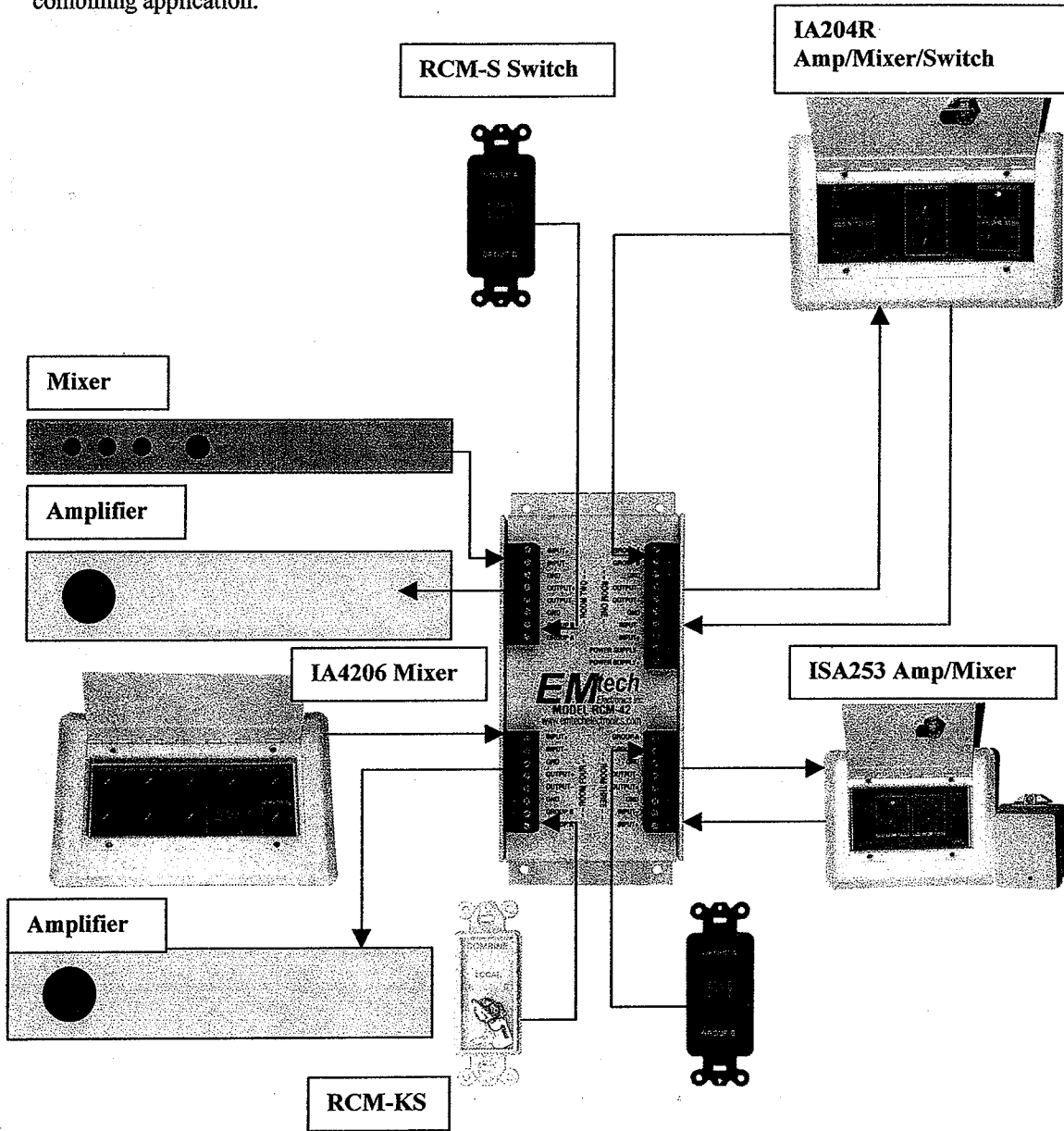
**If you have any suggestions or questions, please call or write us at:**

Emtech Electronics, Inc.  
 927 West 500 North, Lindon, UT 84042  
 Voice: 1-800-371-2102 / 801-847-1100  
 Fax: 1-801-847-1101  
 www.emtechelectronics.com

**Applications:**

**Customized Diverse System**

The RCM-42 and RCM-82 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 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 Two** is shown implemented with a standard pre-amp/mixer and amplifier of your choice, with an Emtech RCM-KS switch to control the RCM-42.

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.

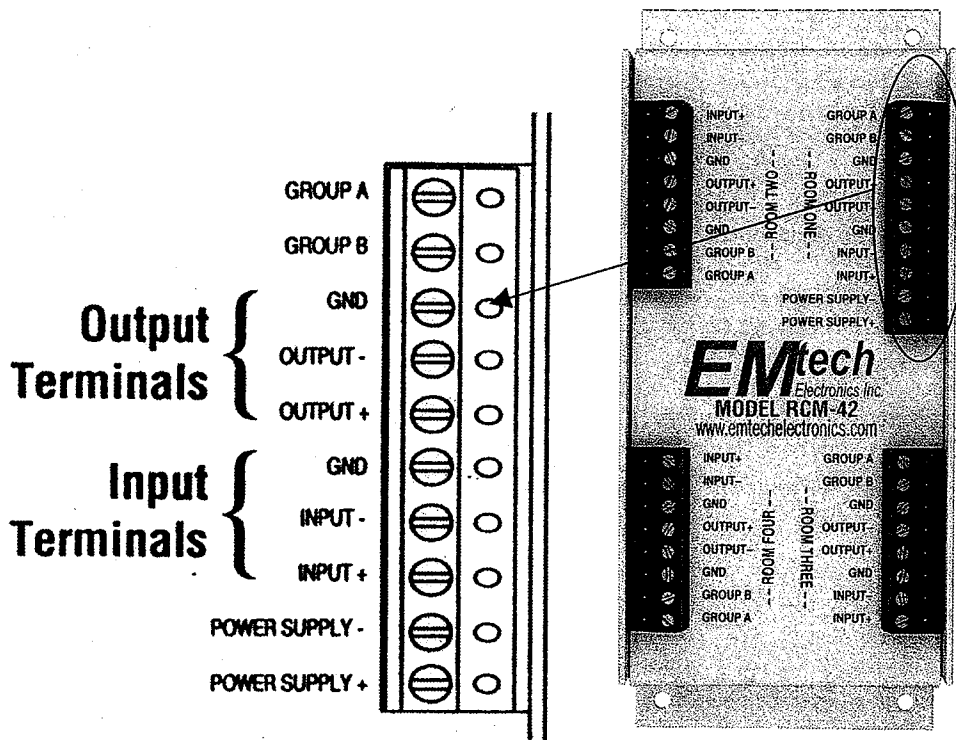


Figure 1: Terminal Connections on RCM-42