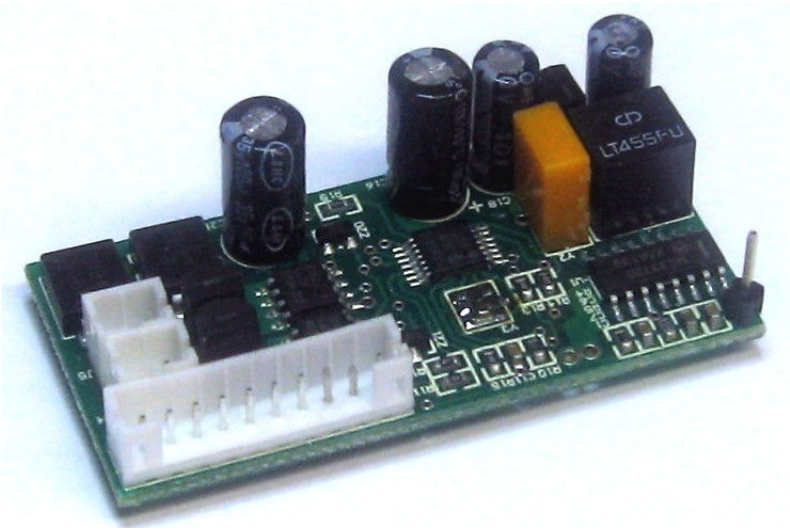
Mini Commander 2 for RMT Beep

Instruction Manual



Revised: August 2009

Mini Commander 2 for RMT Beep Kit

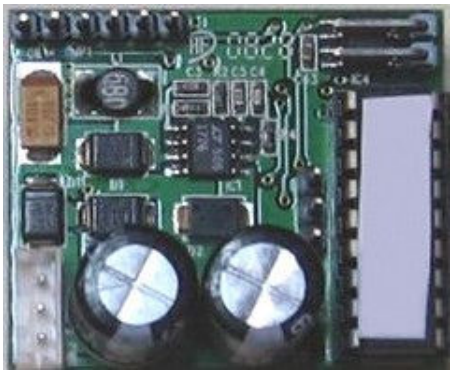
Enhanced Features

- Next generation technology, compact size, one board does it all
- Complete kit, all required parts included
- Solder-less connections make installation simple and quick
- Fully compliant with TMCC standards
- Conventional and Command mode operation
- Sound option provides unique “Beep-Beep” horn, bell, prime mover rev’s

Overview

The Electric Railroad Company Mini Commander 2 is a next generation upgrade for adding TMCC capability to conventional locomotives. The Mini Commander 2 for RMT Beep kit has been assembled specifically to address the unique aspects of these compact locomotives. The end result will be an amazing transformation and a greatly enhanced operating experience. The optional Sound Commander 2 is easily integrated to add sounds for even greater realism.

Mini Commander 2 for RMT Beep



Sound Commander 2 (Optional)

The Mini Commander 2 receives and decodes TMCC signals without the need for any additional parts or modules. It directly drives the Beep DC motors and provides directional control of the lights. A Serial Data output is also provided to run the Electric Railroad Company Sound Commander 2, which is available as an option with the Mini Commander 2 for RMT Beep kit.

Parts Included

- Mini Commander 2 for RMT Beep circuit board
- 10 Position cable assembly
- Replacement front headlamp socket assembly & bulb
- Replacement rear headlamp socket assembly & bulb (has longer wires)
- Replacement solder lug & wire for power
- Antenna cable assembly
- Mounting hardware
- Wire nuts (5)
- Cable ties (3)
- Installation & Operation manual

Sound Option Parts:

- Sound Commander 2 circuit board
- 3 Position cable assembly
- 2 Position jumper
- Low profile speaker
- Mounting hardware
- Extra cable tie
- Extra wire nut

Recommended Tools

- Small screwdrivers - phillips & flathead
- Small wire cutters
- Small long-nose pliers
- Wire strippers
- Sharp scissors or hobby knife

Reference Diagrams

At the rear of this manual are the following diagrams which may be removed and placed nearby for easy reference while performing the steps in the instructions:

- Mini Commander 2 for Beep Connector Pin Designations
- Optional Sound Commander 2 Connector Pin Designations
- Mini Commander 2 for Beep Wiring Diagram
- Mini Commander 2 for Beep & Optional Sound Commander 2 Wiring Diagram

Important Notes

- Leave the circuit board in its anti-static packaging until ready to be installed. Dissipate any static electricity before handling by touching a grounded metal object. Avoid working on carpeted floors in cool dry areas and, if possible, use an antistatic wrist strap. It's best to hold circuit boards by the edges and avoid touching contacts and components.

- Take care when connecting or disconnecting cables. When disconnecting a cable, always pull on the cable connector, not on the cable itself.

- The wire colors used in locomotive production may vary over time and differ from what is pictured in this manual. Tracing individual wires to their end point to verify identity is highly recommended.

- Pictures of products may vary from actual products received. The Electric Railroad Company reserves the right to improve the products on successive manufacturing cycles.

Installation

Before beginning, please take time to read through all the instructions and plan out your installation. Examine the wiring already present in the Beep. You will first need to remove some parts to prepare the chassis for the new upgrade components.

Preparation

Follow these preparatory steps carefully. When handling wires, be careful not to flex the soldered connections excessively or your installation will no longer be solder-less.

Refer to Figure 1 while performing the following steps:

1. Remove the Beep shell and set it aside so it will not be damaged. The shell just snaps on to the chassis and is held in place by two small round pegs that fit into holes at the fuel filler locations on each side.

2. If masking tape is securing internal wiring, carefully remove it and discard.

3. The existing lamps may be in sockets or they may have wires directly attached. If possible, remove the lamps from their sockets and set aside for use later. Next, remove the remaining sockets or directly wired lamps by using a flat blade screwdriver to slightly spread each lamp holder open and then pull out the socket or lamp. Cut the socket/lamp wires from their attachment point on each motor. Use caution and only cut the wires going to the socket/lamp. Neither sockets nor lamps with wires directly attached will be re-used.

4. Release the circuit board by removing the mounting screw and then flip it over. Cut all 6 connected wires right at the circuit board to preserve wire length.

5. Remove the black wire going down into the "well" in the middle of the weights by removing the center screw. Replace this wire with the new black wire provided. Orient the lug so the wire exits the "well" toward the rear (switch end) of the chassis. Next, carefully position the red wire joining the two end lugs together, so that it's entirely inside the "well".

6. Strip all unconnected wire ends ¼ inch and then twist the exposed strands to prevent stray stands of wire from causing problems later.

7. The original Direction Lock switch will remain in place and become the Program / Run switch.

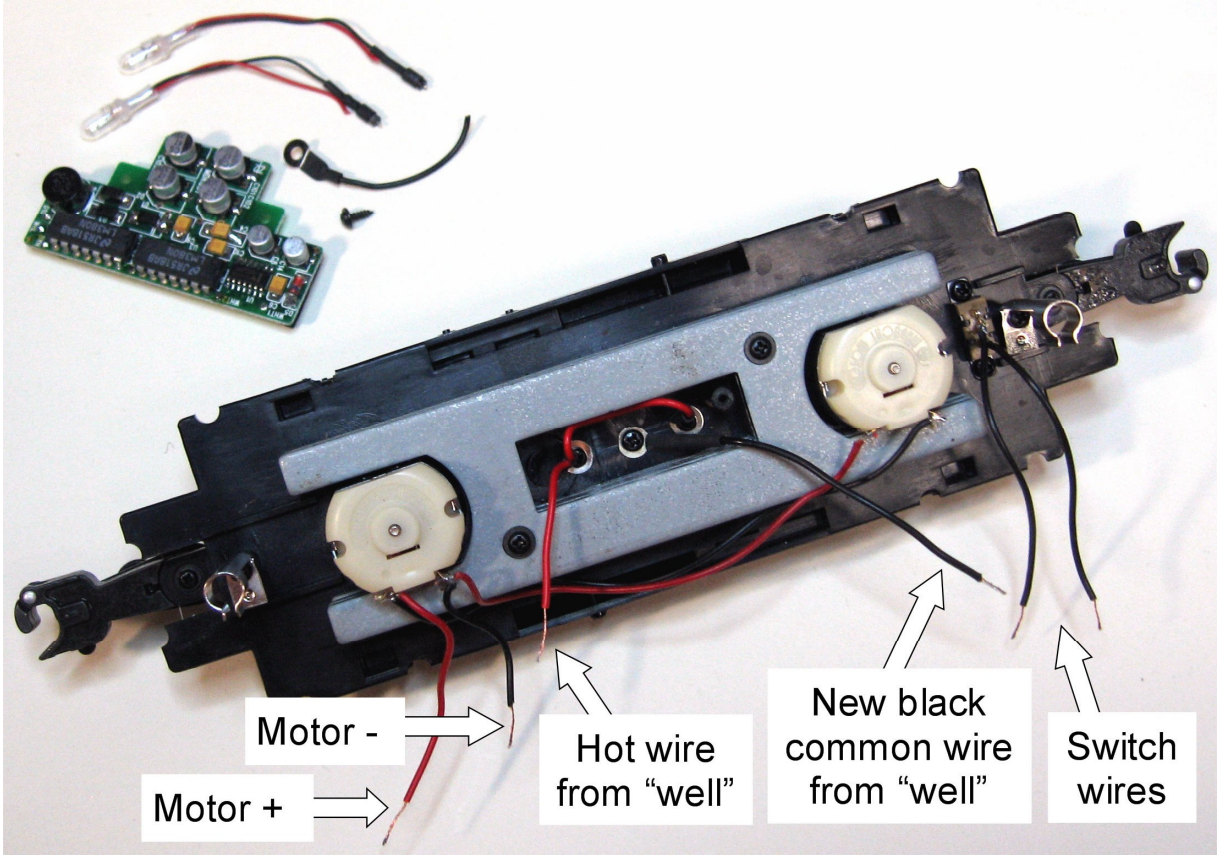


Figure 1 – Chassis preparations complete

Mounting

Before permanently mounting the Mini Commander 2 circuit board, refer to Figure 2 and spend some time test fitting the board to ensure proper placement. Verify the orientation using the switch as a reference. Align with the screw edge and center on the weights as shown.

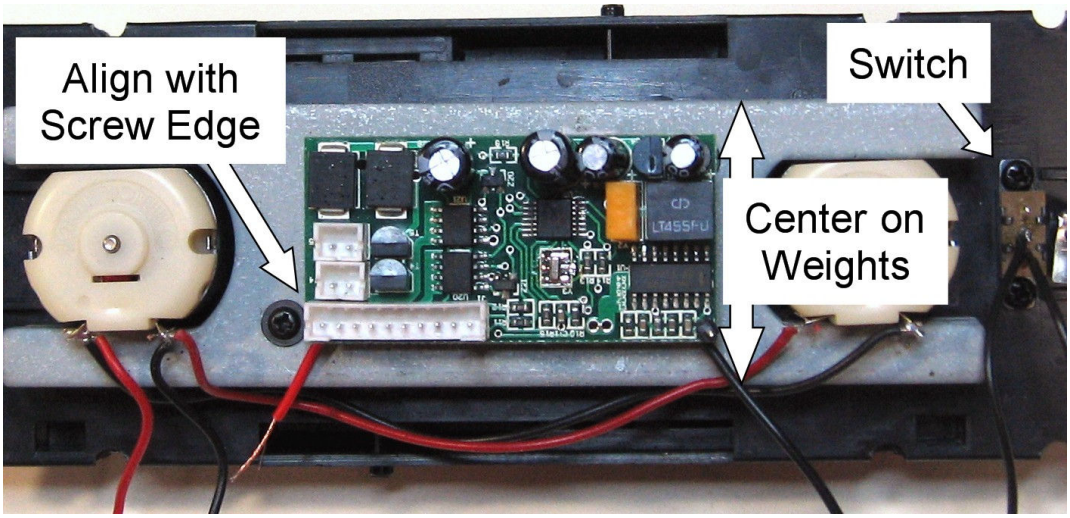


Figure 2 – Circuit board placement

Take your time, and when ready use a piece of double stick tape to mount the Mini Commander 2 circuit board to the Beep chassis weights. Use only one layer of double stick tape.

Wiring

Take your time while wiring. Wires may be trimmed to remove excess length, but don't overdo it. Strip the end of each wire ¼ inch and twist the exposed strand before making connections using the provided wire nuts.

Refer to Figure 3 while performing the following steps. Additionally, the appropriate wiring diagram and connector pin designation drawings may be removed from the rear of this manual for easy reference.

1. Locate and install the 10 position wire assembly. Pin 1 (gray wire) is located near the center of the Mini Commander 2 circuit board. Pin 10 (red wire) is near the corner.

2. Connect the Hot (red) wire on the 10 position wire assembly to the Hot (red) wire coming from one of the end screws in the "well". NOTE: If the optional Sound Commander 2 will be installed, don't tighten this wire nut all the way. An additional wire will be added later.

3. Connect the 10 position wire assembly Motor + (yellow) wire to the original red motor wire. Next, connect the Motor – (blue) wire to the original black motor wire.

4. If the optional Sound Commander 2 will be installed, skip to the next step. Otherwise, cut the end of the Feature (violet) wire on the 10 position wire assembly and verify no wire strands are exposed. This wire will not be used.

5. Attach the original (black) wire from the center terminal on the Direction Lock On/Off switch to the Pgm/Run (gray) wire on the 10 position wire assembly. The switch will now become the Program/Run switch: ON =Run, OFF = Program.

6. The next connection involves the two Common (black) wires on the 10 position wire assembly, the remaining (black) wire from the Program/Run switch, and the new (black) wire from the center screw in the "well". Create a single Common point by connecting all four wires together. NOTE: If the optional Sound Commander 2 will be installed, don't tighten this wire nut all the way. An additional wire will be added later.

7. Slip the provided replacement lamp sockets into the original holders on the chassis; the socket with the longest wires goes in the rear (next to Program/Run switch). Plug the connector from each lamp assembly into the appropriate socket on the Mini Commander 2 circuit board (black Common wires go closest to the edge). After connections are completed, screw lamps into the sockets. NOTE: use the original lamps if possible.

8. Double check all wiring and verify that there are no exposed wire strands that could cause a short circuit. Your Beep should now look a lot like the one in Figure 3.

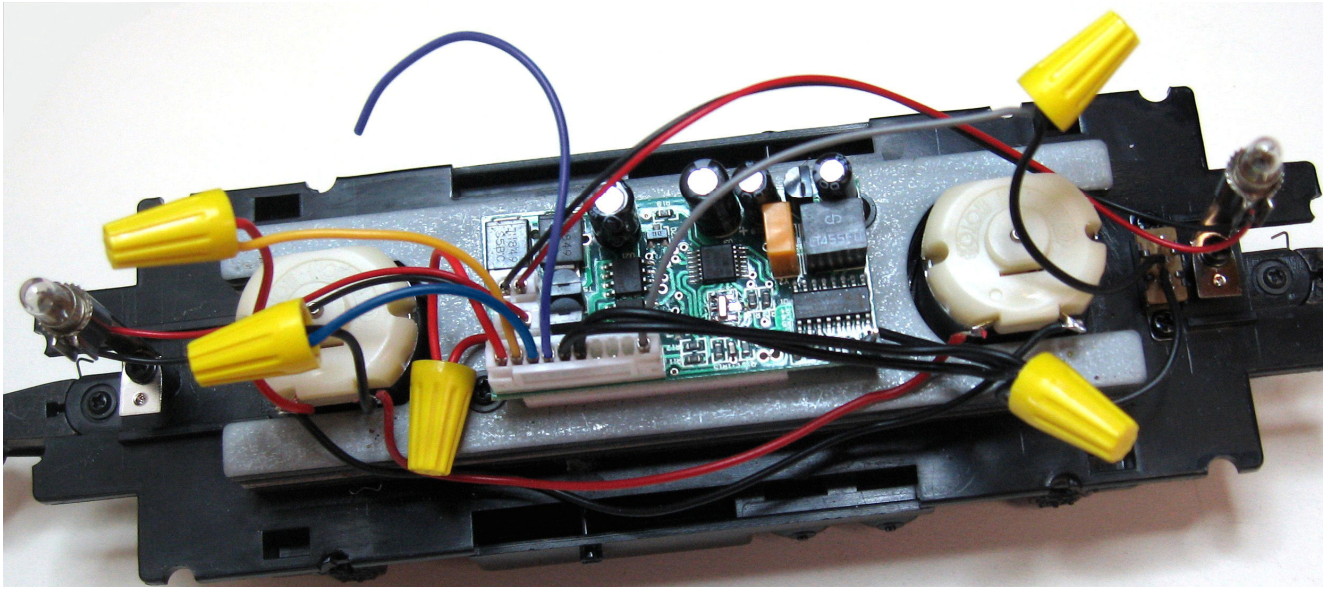


Figure 3 – Basic wiring complete

Operational Test

The Beep is now ready for its first operational test to verify everything is OK before continuing the installation.

1. Temporarily plug in the antenna wire. Loop the wire as shown in Figure 4 to keep it from touching anything else. Also ensure that no other wires will be dragging during the test run.

2. Verify the Program/Run switch set to Run (ON =Run, OFF = Program). The Mini Commander 2 comes pre-programmed as Engine #1. Use this address for testing in Command mode.

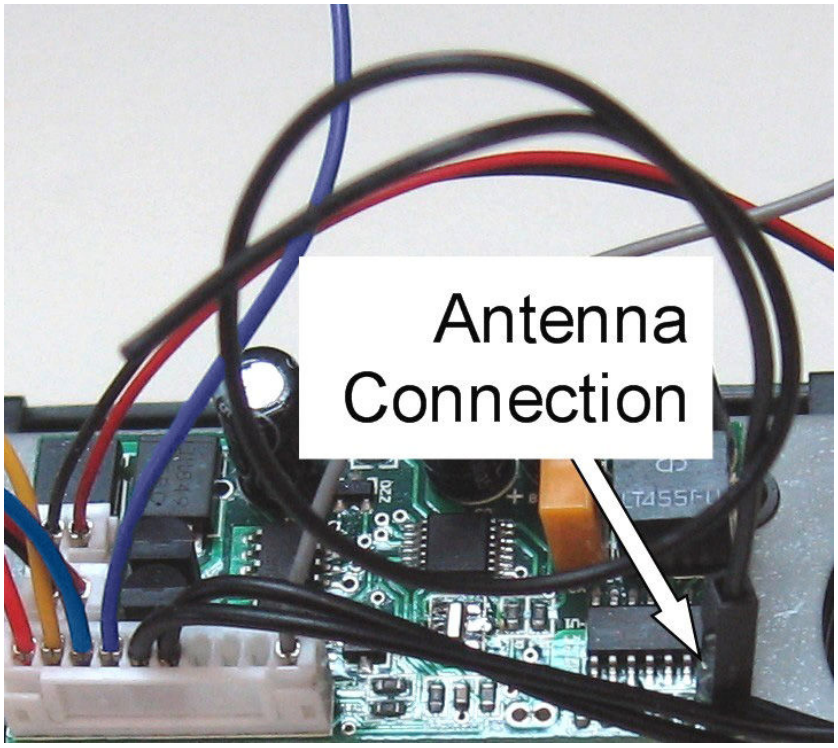


Figure 4 – Antenna installed for testing

3. Operate the Beep in Command mode (Engine #1) and conventional mode. Verify the lighting operates directionally. If a bulb does not light, check for a "glue-like" substance on the threads preventing the bulb from fully seating in the socket; carefully tighten as needed. If both bulbs do not light, try pressing AUX2.

Shell Modifications

1. After completing the operational test, unplug the antenna wire from the Mini Commander 2 circuit board. Cut the wire to about 7 inches.

2. Place the Beep shell upside down on a soft surface, to protect it from damage, and then carefully remove the windshield. Note its orientation as it only fits one way.

3. Install the antenna in the shell wire as shown in Figure 5. The antenna is best attached to the shell with hot melt glue (as shown). Tape may be used, but it tends to dry out or become gooey.

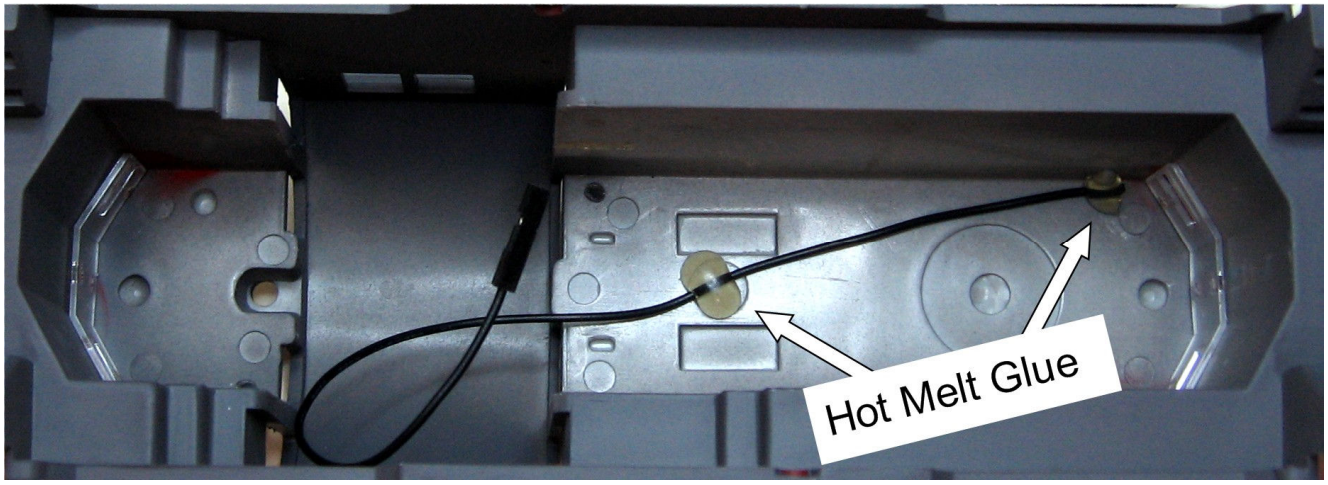


Figure 5 – Antenna installed in shell

4. If the optional Sound Commander 2 will be installed then skip ahead to the Sound Commander 2 Installation section. Otherwise, continue to the next step, Final Assembly.

Final Assembly

1. With no optional Sound Commander 2, the windshield may be re-installed as there is no need to worry about it inhibiting sound from exiting the shell. If re-installing the windshield, first refer to Figure 6 and trim the cross member portions, so they don't interfere with the newly installed electronics and wiring. After trimming, verify the windshield orientation is the same as when it was removed and then firmly press it back in place.

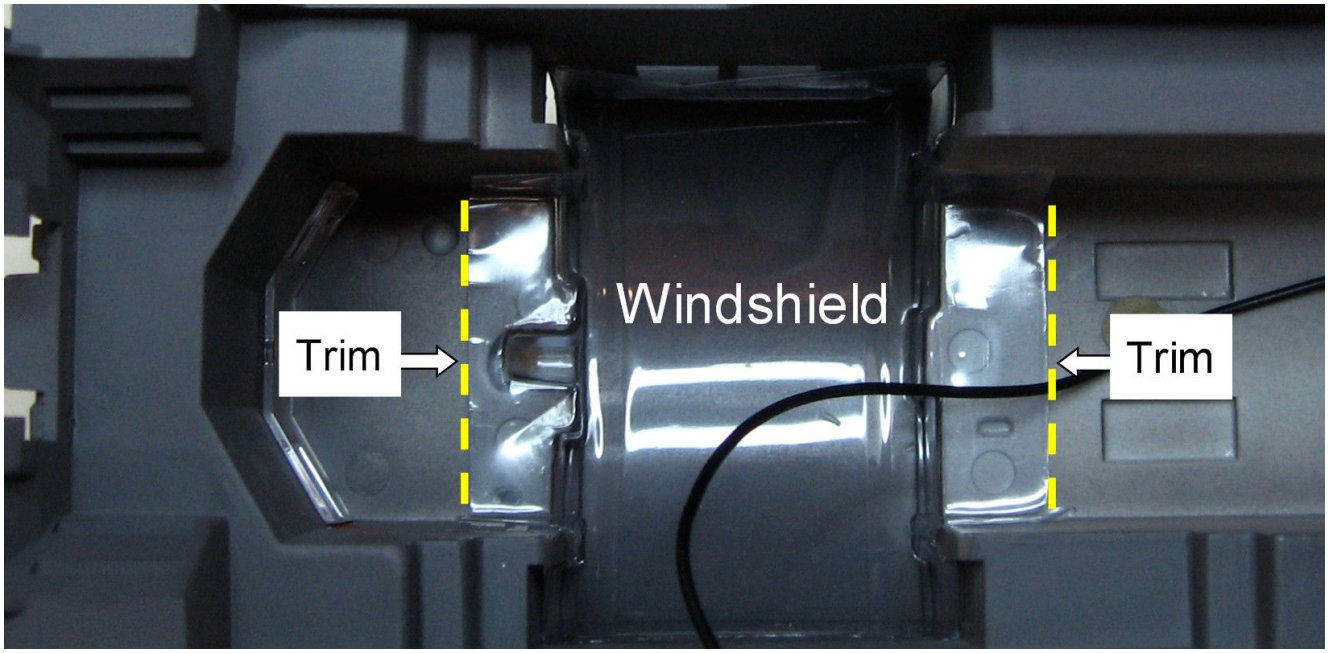


Figure 6 – Windshield trimmed and re-installed

2. Locate the provided cable ties and, while referring to Figure 7, use them to secure the chassis wiring. Wires should be positioned so they will not be pinched between the chassis and shell or other parts. Avoid placing wires directly in front of windows for a better appearance. When complete, cut the cable ties to remove any excess length.

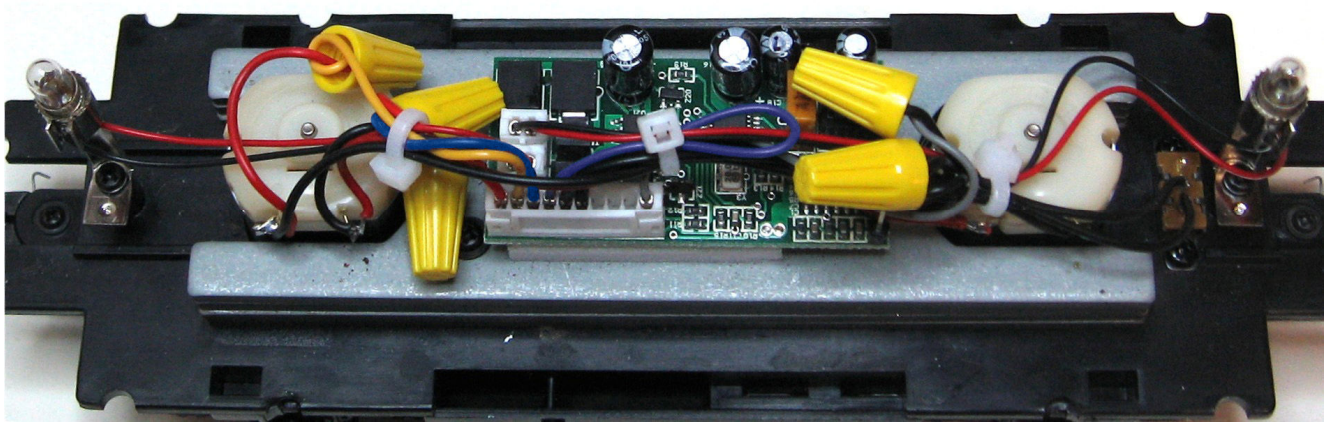


Figure 7 – Chassis complete

3. Refer to Figure 8 and connect the antenna wire to the Mini Commander 2 circuit board.

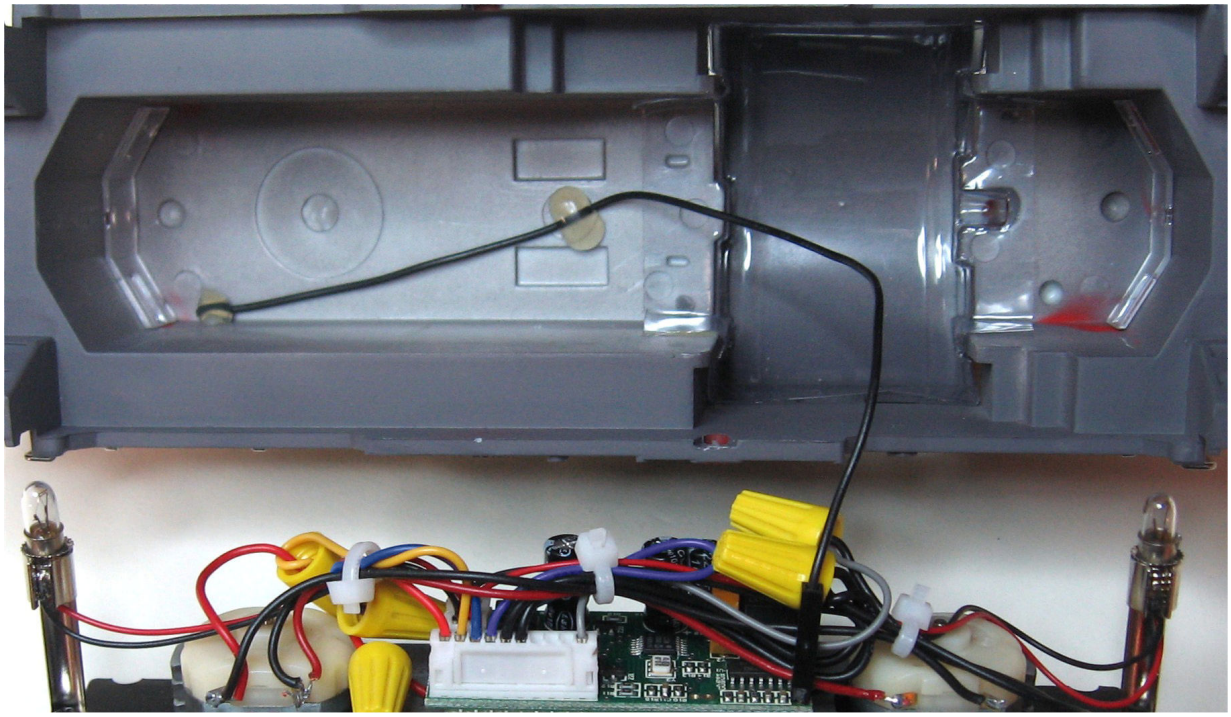


Figure 8 – Ready for shell installation

4. Re-install the Beep shell on to the chassis. The short hood faces the rear, where the Pgm/Run switch is located. Route the antenna wire as needed to prevent pinching between the chassis and the shell.

☑ The Mini Commander 2 for RMT Beep kit is now completely installed. Refer to the Operation section for additional information that will help to enhance your Beep operating experience.

Sound Commander 2 Installation (Optional)

With the antenna now installed in the Beep shell, the next steps will involve installation of the optional Sound Commander 2. Note that the windshield will not be re-installed as it would inhibit sound from exiting the shell.

1. Prepare two pieces of double stick tape 0.4” by 1.0” and apply to the speaker as shown in Figure 9. Note that one piece of tape is centered directly over the wire terminals.

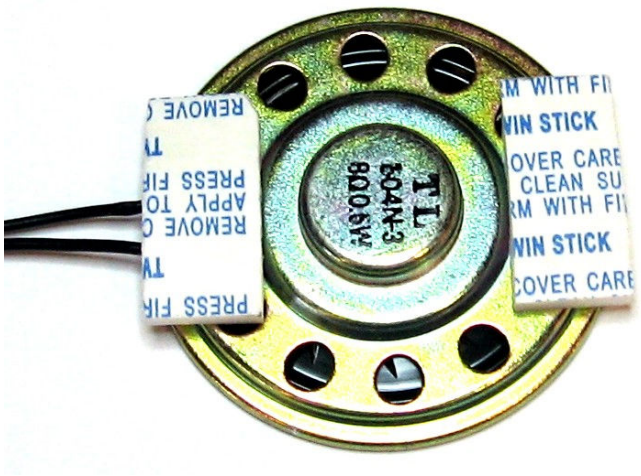


Figure 9 – Speaker prepared for installation

2. Refer to Figure 10 and test fit the speaker with the double stick tape protection on. Note that the wires should be routed down the center of the long hood of the shell. Once comfortable with the placement, permanently mount the speaker.

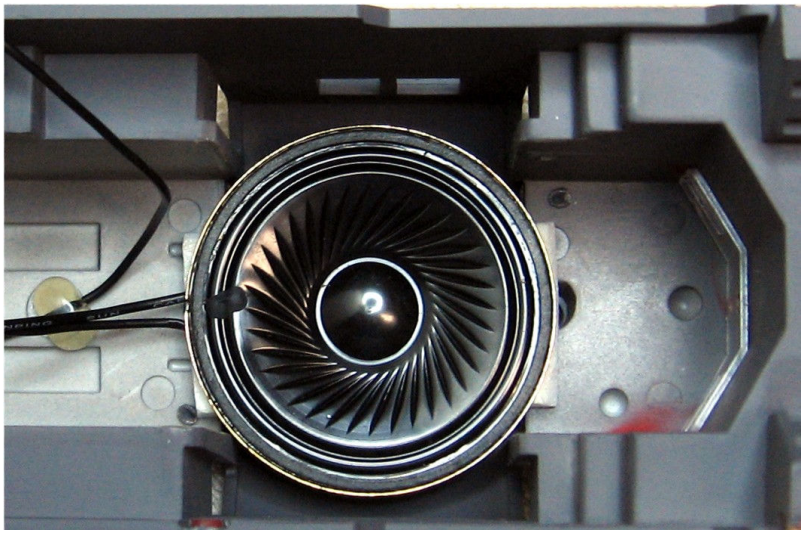


Figure 10 – Speaker mounted

3. Attach a 0.5 x 0.75” piece of double stick tape to the back of the Sound Commander 2 circuit board and, while referring to Figure 11, test fit in the long hood of the Beep shell with the double stick tape protection on. Align the card with the stanchion on the shell as indicated. Once comfortable with the placement, permanently mount the circuit board.

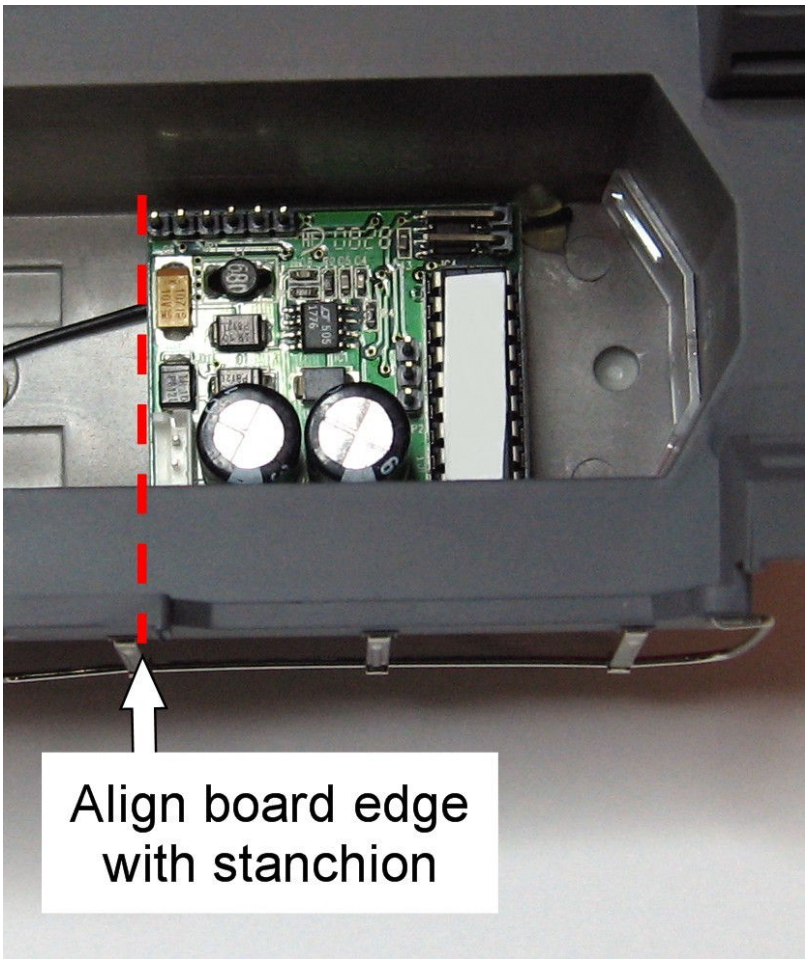


Figure 11 – Sound Commander 2 mounted

4. Refer to Figure 12 and plug the speaker connector into the 2-pin socket in the upper right corner of the sound Commander 2 circuit board. The polarity is not important.

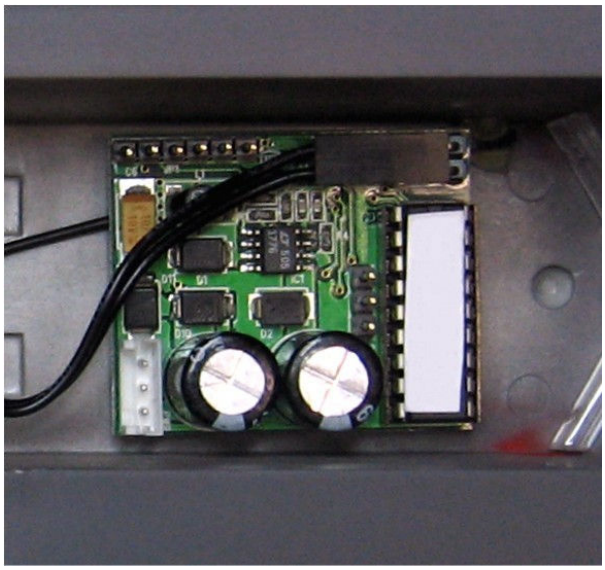


Figure 12 – Speaker connected

5. Locate the 3 position wire assembly for the Sound Commander 2. Strip the end of each wire ¼ inch and then twist the exposed strands in preparation for making connections.

6. Refer to Figure 13 and carefully remove the wire nut from the Hot connection that was made earlier. Add the Hot (red) wire on the 3 position wire assembly to this connection and then replace the wire nut. Next, remove the wire nut from the Common connection that was made earlier. Add the Common (black) wire on the 3 position wire assembly to this connection and then replace the wire nut.

7. Using a new wire nut, connect the Feature (violet) wire on the 3 position wire assembly to the Feature (violet) wire on the 10 position wire assembly that is plugged into the Mini Commander 2 circuit board. Again, refer to Figure 13.

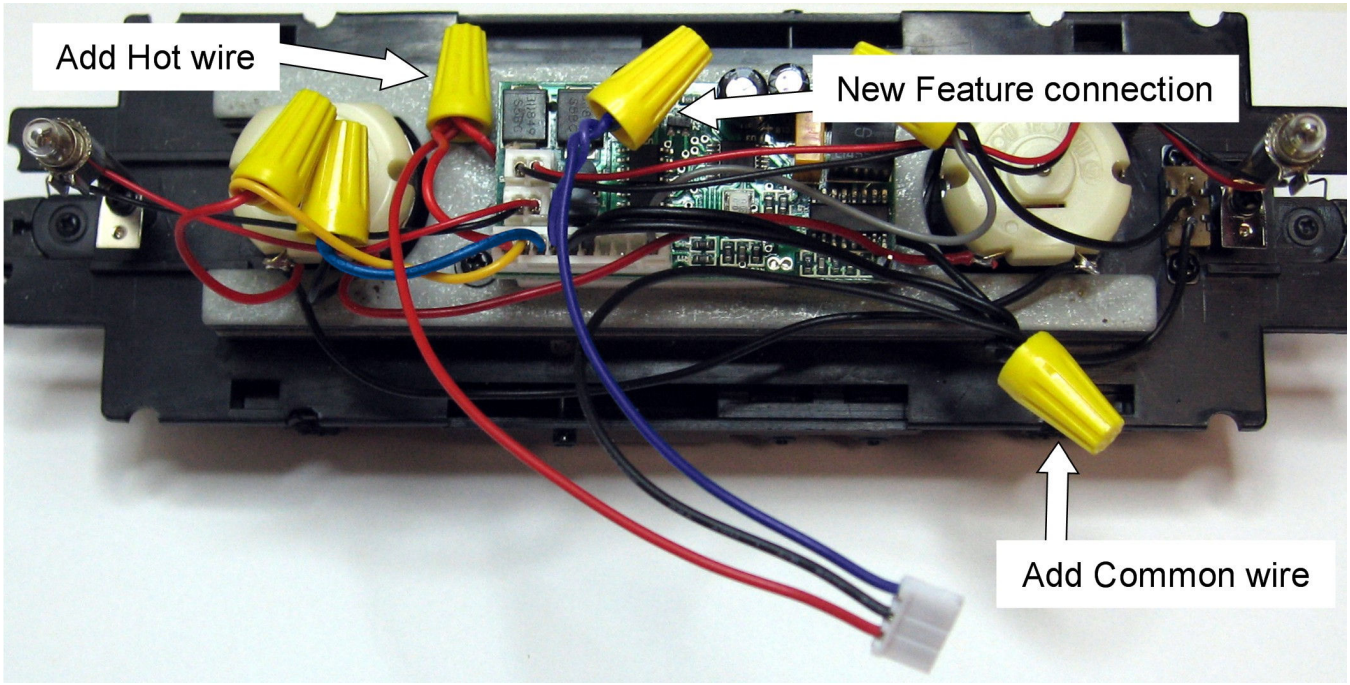


Figure 13 – Sound Commander 2 wiring

8. Locate the provided cable ties and, while referring to Figure 14, use them to secure the chassis wiring. Wires should be positioned so they will not be pinched between the chassis and shell or other parts. Avoid placing wires directly in front of windows for a better appearance. When complete, cut the cable ties to remove any excess length.

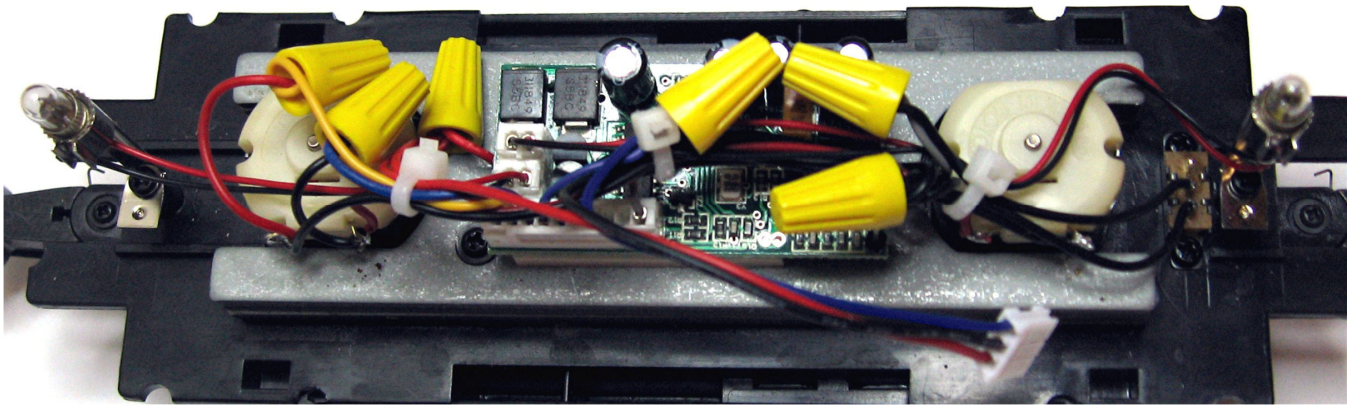


Figure 14 – Chassis complete

9. Refer to Figure 15 and connect the antenna wire to the Mini Commander 2 circuit board. Next, connect the 3 position wire assembly to the Sound Commander 2 circuit board.

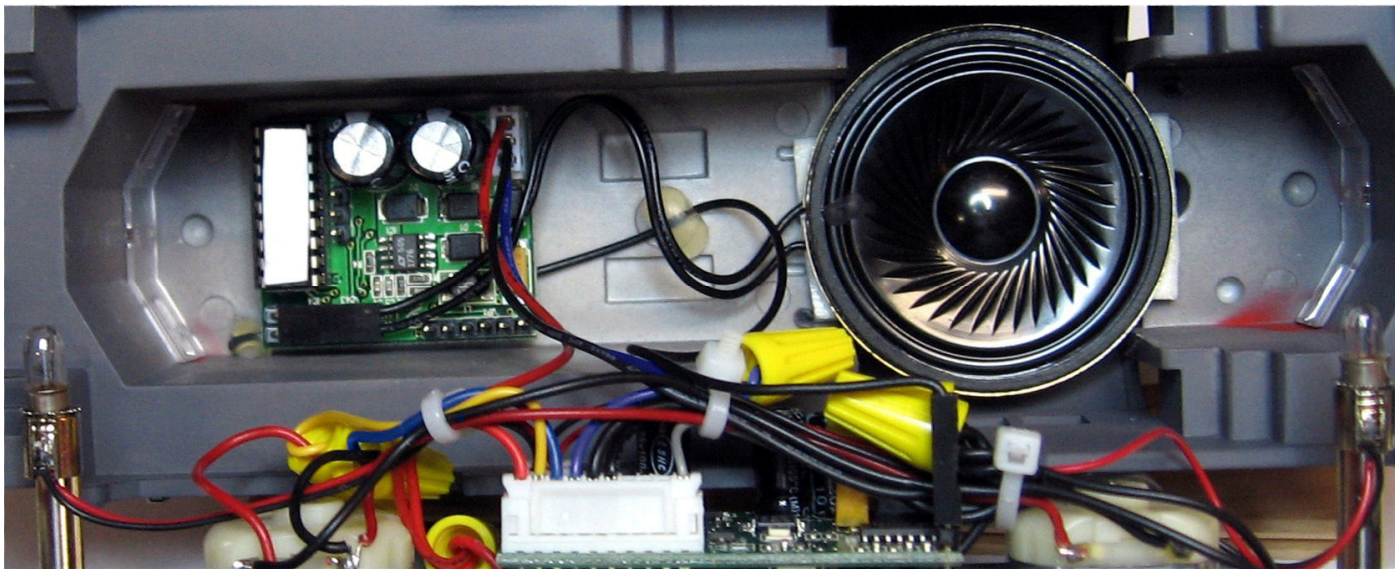


Figure 15 – Ready for shell installation

10. Re-install the Beep shell on to the chassis. The short hood faces the rear, where the Pgm/Run switch is located. Route the antenna wire and Sound Commander 2 wires as needed to prevent pinching between the chassis and the shell. Excess wire is best tucked into the long hood side, out of sight and away from the speaker cone.

☑ The Mini Commander 2 for RMT Beep kit with Sound Commander 2 is now completely installed. Refer to the Operation section for additional information that will help to enhance your Beep operating experience.

Operation

Command Mode

The Mini Commander 2 for RMT Beep comes pre-programmed as Engine #1. To change the engine ID, follow this procedure:

1. Make sure a Command Base is connected to the track.
2. Set the Beep Program/Run switch to Program (OFF = Program).
3. Place the Beep on the track and apply power.
4. On the CAB-1, press [ENG] then the number (1 - 99) for the engine selected.
5. Press [SET]. The headlight will flicker and the horn (if present) will blow as the ENG ID is stored. For example, to set the Engine ID to 4:

[ENG]
4
[SET]

5. Remove power from the track and place the switch back to Run (ON=Run)

Command & Conventional Mode

If the Beep will be run in both Command mode and Conventional mode, note that when running in Conventional mode, the cycling of engine direction can be overridden by placing the Program/Run switch in the Program (OFF) position. This will lock the engine direction to last direction traveled. Before running the Beep again in Command mode it is very important to first return the Program/Run switch to the Run (ON) position.

Sound Commander 2 in Command Mode (Optional)

The Sound Commander will normally remain silent when power is applied to the track and a solid TMCC signal is present. If a TMCC signal is not detected within 0.5 seconds then the Sound Commander 2 may start up on its own. This is normal behavior.

Sound Features & Commands:

- Horn
- Bell
- Beep – Beep
  AUX1 + 2 (CrewTalk)
- Coupler clank
- Volume control:
  AUX1 + 1 Volume Up
  AUX1 + 4 Volume Down
- Shutdown all sounds:
  AUX 1 + 5
- Prime mover rev's:
  Vary with the throttle settings. The volume of the prime mover rev's may be adjusted independently of other sounds:
  AUX1 + 3 Volume Up
  AUX1 + 6 Volume Down
  (In DCS this works with Labor/Drift)

  NOTE: If desired, the Prime Mover Rev's sounds may be disabled by inserting a jumper across the two RPM Mute pins on the Sound Commander 2 circuit board. Refer to the Sound Commander 2 Connector Pin Designation diagram at the rear of this manual to locate the RPM Mute pin locations.

Sound Commander 2 in Conventional Mode (Optional)

The Sound Commander 2 requires a minimum of 9 volts AC applied to the track in order to operate properly. The sounds will continue to operate during direction changes as long as the track power interruption is not unusually long.

The Horn/Whistle and Bell buttons on the transformer operate the respective sounds on the Sound Commander 2. The horn will sound as long as the button is pressed. The bell will stay activated until the Bell button is pressed again.

The following devices have been tested and determined to be compatible with the Sound Commander 2:

- Lionel 1033
- Lionel KW
- Lionel ZW
- Lionel Sound Activation Button
- Lionel TPC 300/400

- Lionel PM-1 (✳ see note below)
- MTH Z750
- MTH Z1000
- MTH Z4000 (🛑 CAUTION: Do not advance the track voltage over 20volts)

Notes:

🛑 Excessive track voltage (greater than 20 volts) will damage the Sound Commander 2 and trigger a protection device. Activation of the protection device will void the warranty on the Sound Commander 2.

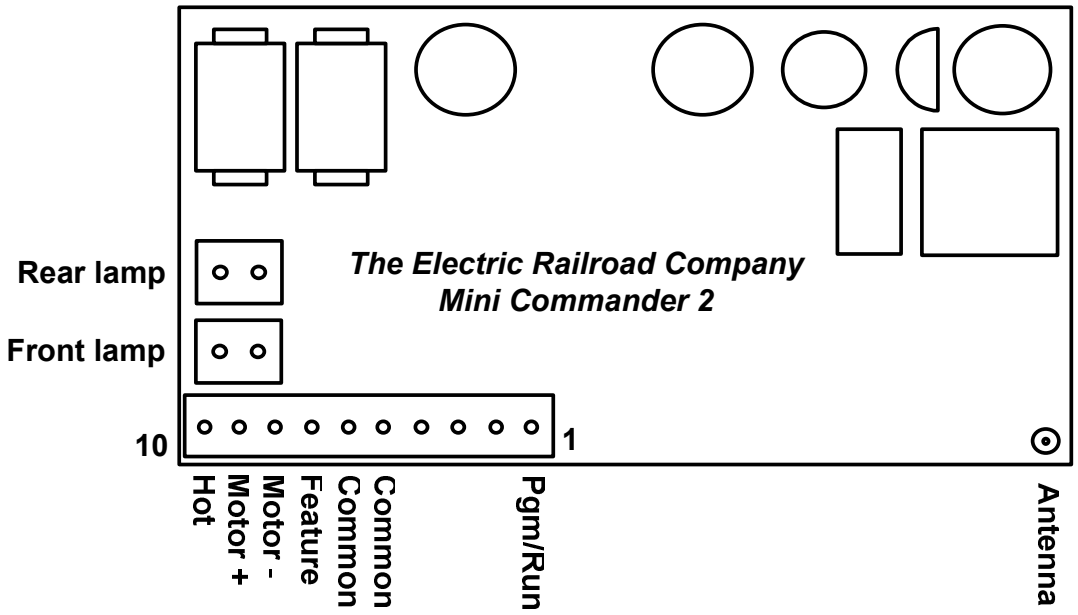
☒ The CW-80 is NOT compatible with the Sound Commander 2.

✳ The PM-1 will not develop sound control signals at full throttle. To operate the sounds, simply back off from full throttle slightly.

✳ Sufficient load must be present on the transformer for the offset voltage, necessary for proper horn & bell operation, to be developed. If the horn or bell does not operate, try adding a lighted caboose to the "consist" to increase the transformer load.

✳ If the horn and bell sounds are reversed from the activation buttons then the track power is reversed. Switch the connections on the transformer power terminals to correct this condition.

Mini Commander 2 for Beep Connector Pin Designations



Connector Pin Description

Hot - 3rd rail power connection (red wire)
MOT + - Motor connection (yellow wire)
MOT – - Motor connection (blue wire)
Feature - Optional feature/RS output (violet wire)
Common - Outer rails power connection (black wire)
Common - Outer rails power connection (black wire)
- (not used)
- (not used)
- (not used)

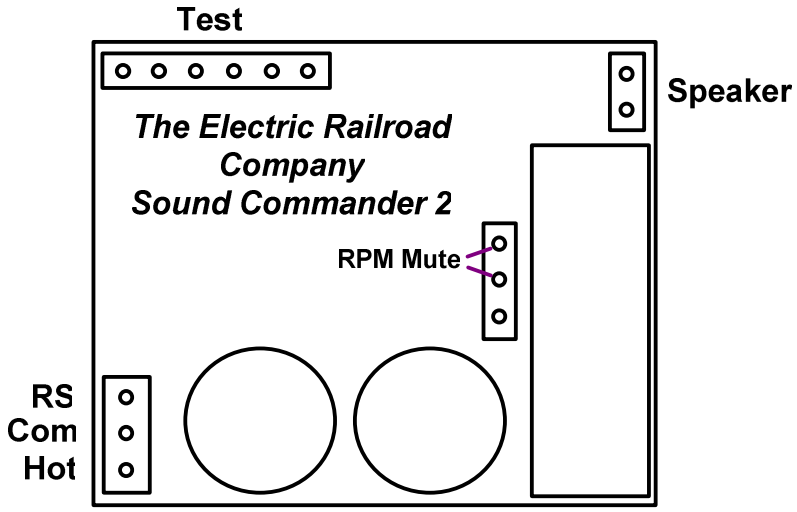
Prog / Run - Program/Run switch connection (gray wire)

Antenna - Antenna wire connection

Rear Lamp - Rear headlamp hot connection (red wire)
Common - Rear headlamp common (black wire)

Front Lamp - Front headlamp hot connection (red wire)
Common - Front headlamp common (black wire)

Optional Sound Commander 2 Connector Pin Designations



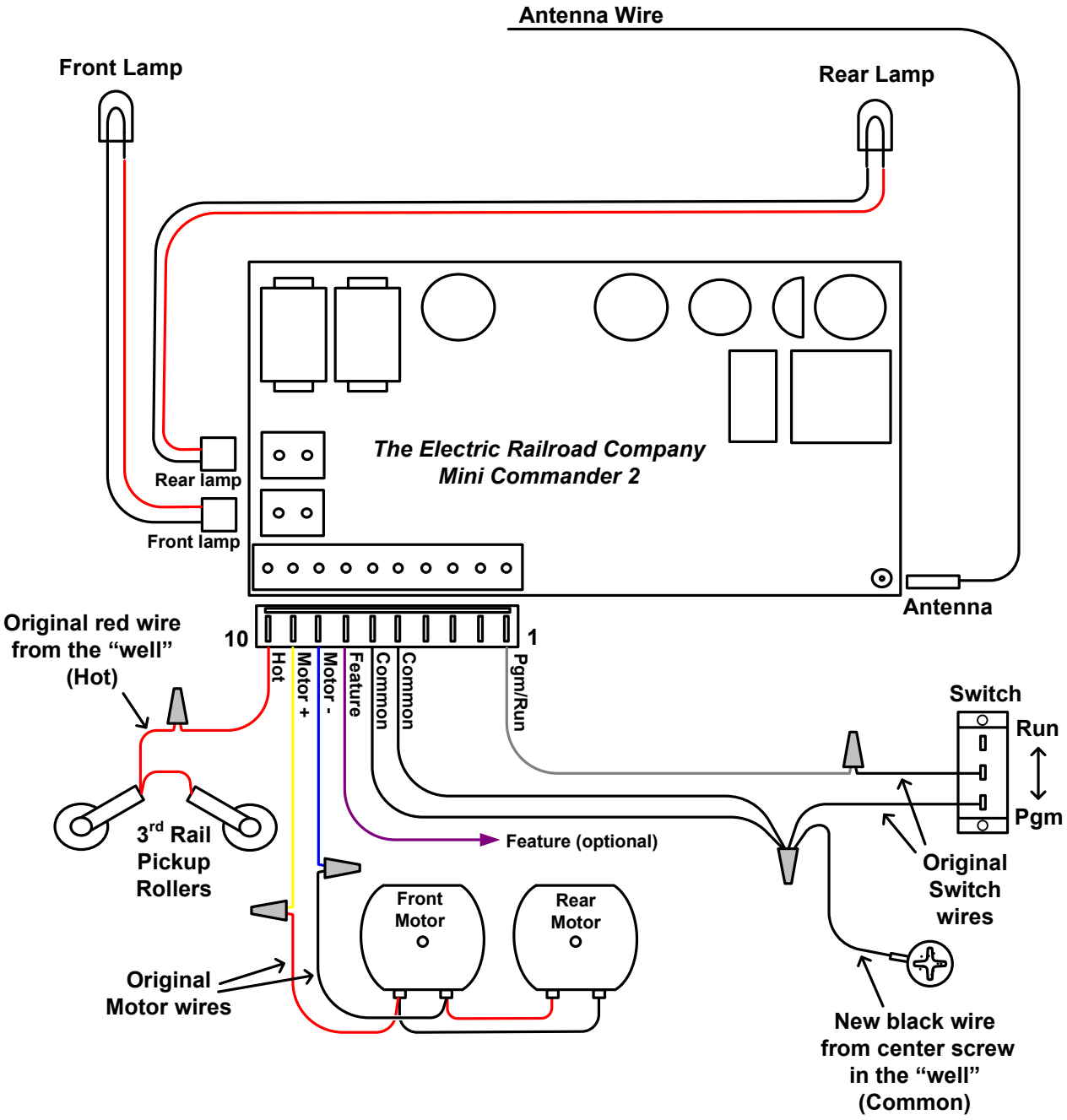
Connector Pin Description

Hot - 3rd rail power connection (red wire)
Com - Outer rails power connection (black wire)
RS - RailSounds™ Serial Data input (violet wire)

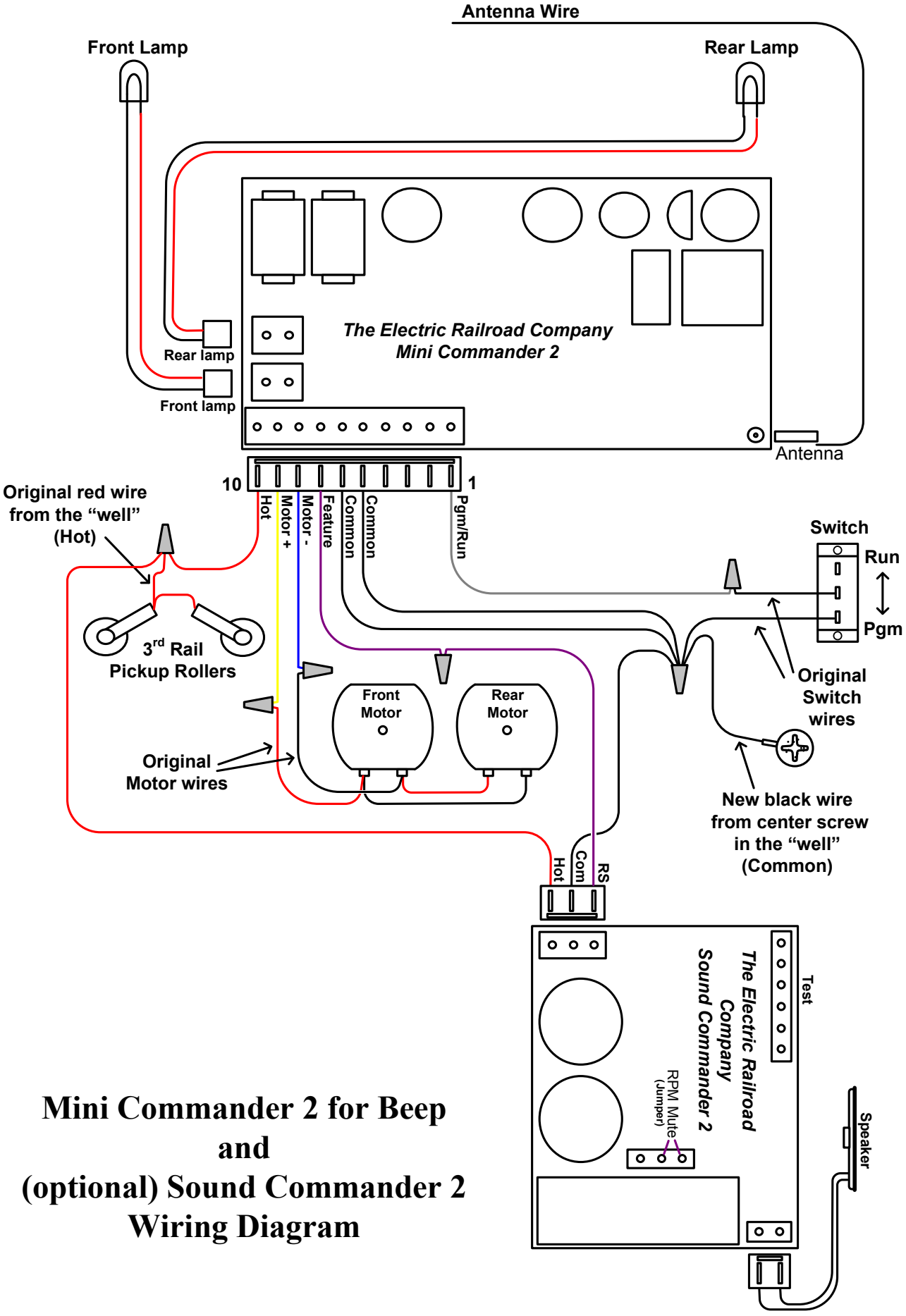
Speaker - 8 ohm speaker connector

RPM Mute - Jumper to mute prime mover rev's sound

Test - Factory programming and test connector



Mini Commander 2 for Beep Wiring Diagram



Mini Commander 2 for Beep and (optional) Sound Commander 2 Wiring Diagram

Limited Warranty

The Electric Railroad Company warrants to the original consumer purchaser that this product will be free of defects in materials and workmanship for a period of 90 days from the date of original purchase. This warranty does not cover service, repair, or replacement to correct any damage caused by improper installation, improper connection, external electrical fault, accident, disaster, misuse, abuse, or modifications to the product. All other express or implied warranties, including the implied warranty of merchantability and fitness for a particular purpose, are hereby disclaimed. If this product is not in good working order as warranted, the sole and exclusive remedy shall be repair or replacement. In no event shall The Electric Railroad Company, or any dealer, distributor, or authorized installation and/or repair service provider be liable for any damages in excess of the purchase price of the product. This limitation applies to damages of any kind, including but not limited to, direct or indirect damages, lost profits, lost savings or other special, incidental, exemplary or consequential damages whether for breach of contract, tort or otherwise, or whether arising out of the use of or inability to use the product, even if The Electric Railroad Company, or any dealer, distributor, or service provider has been advised of the possibility of such damages or any claim by any other party. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. During this warranty period, the product will either be repaired or replaced (at our option) without charge to the purchaser, when returned either to the dealer with proof of the date of purchase or directly to The Electric Railroad Company when returned prepaid and insured with proof of date of purchase. Some states do not allow limitations on how long an implied warranty lasts, so such limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

Repairs

Each and every product is thoroughly tested before it is shipped. The likelihood that it is not working when it reaches you is very small. However, if after troubleshooting it yourself you cannot get it to work properly, you should contact us to help determine the problem.

Should your product ever need repair, you should return it postpaid directly to The Electric Railroad Company. If the product is within the warranty period, it will be repaired or replaced and returned to you free of charge. Units out of warranty will be repaired or replaced for a service charge of $30.00 at our option.

Please email to support@electricrr.com for return authorization before returning any product.

Disclaimer

Improper installation or configuration of the Mini Commander 2 and Sound Commander 2 boards can cause overheating and fires! Since it is not possible to understand every installation, it is the consumer's responsibility to verify proper operation of the upgrade kit parts to prevent malfunction. If you are unsure of your installation, please contact us first before taking any risks!