



How to Install the WifiTrax WMR-10 Board Replacement Wi-Fi Controller in Atlas RS-3 Locomotive

*Practical notes by Steve Shrimpton*

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In my opinion the Alco RS-3 model locomotive manufactured by Kato in Japan and sold by Atlas in the USA was one of the best running models I have ever seen. I purchased three of them during the 1980's for my model railroad in the USA at that time and they still run exceptionally well. In this application note I explain how to install our WMR-10 board replacement Wi-Fi locomotive controllers in one of the original RS-3 models sold by Atlas.

The WMR-10 provides board-replacement Wi-Fi control for a number of similar locomotives such as the Atlas Train Master series, many Athearn locomotives as well as more recent Kato models. It receives power from the track and controls the locomotive motor and two lights, front and rear.

In the instructions, we will assume that the short-hood end of the Alco RS-3 is the front of the locomotive.

## Tools and Skills Required

1. Pointed nose pliers.
2. Small wire cutters.
3. Soldering Iron and multi-core resin solder (never use corrosive flux such as sold to plumbers, only flux sold for electronic work).
4. Tweezers may be helpful.
5. Large magnifying glass and work light (depending on your eyesight!)
6. You need to be capable of quite fine work and to be able to solder electronic wiring fairly accurately and tidily.

## Installation Procedure

1. Carefully remove all of the plastic handrail detail parts from your locomotive body using tweezers.



Figure 1 The Atlas RS-3 after removing the handrails together with the WMR-10 unit

2. Squeeze the plastic body of the locomotive as shown in Figure 2 and carefully ease it from the frame.



Figure 2 Removing the locomotive body

3. Once the body shell is removed you can see how the power is routed from the truck pick-up points to the grey plastic lamp bracket and to the brass brush retainer strips and the center lamp. You will need to cut the Brush Retainers and attach short wires and cut the crimped end clips off of the pick-up wires. These will then be soldered to the WMR-10 unit. (As an alternative, instead of soldering to the tabs on the WMR-10, you could use the plastic clips that are supplied on many locomotive such as the Atlas Train Master series. If your RS-3 has these, it will save you soldering although soldering may be more reliable.)



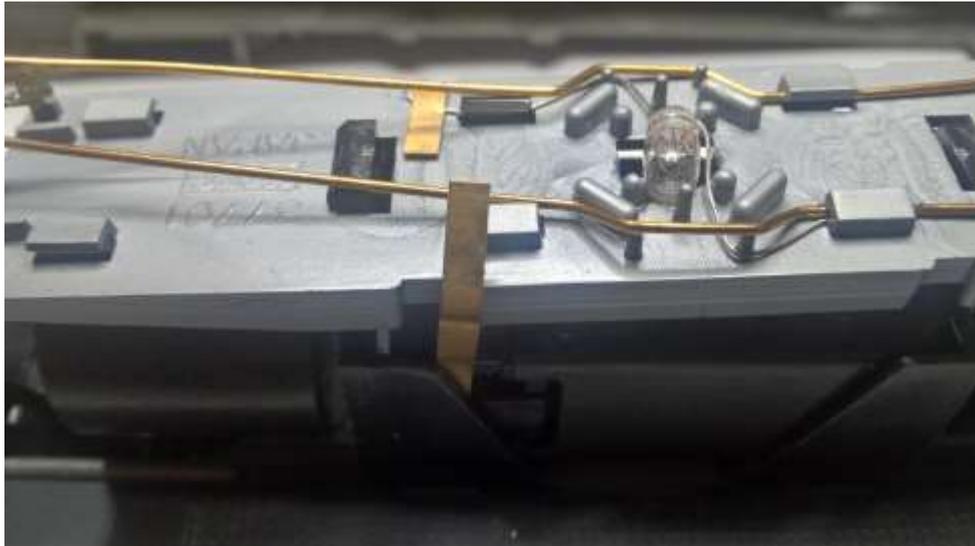
Figure 3 Original internal construction of the Atlas/Kato (Japan) RS3

4. Unclip the truck pick-up wires from the plastic lamp holder by squeezing the spring contact wires and easing them out of their plastic receptacles on the lamp holder. Repeat at each end.



Figure 4 Removing the pick-up wires from the lamp retainer

5. Release the brass strip brush retainers from the spring contact wires by removing the spring contact wires. It is not necessary to remove the brush retainers from the motor assembly!



*Figure 5 Removing the brass strip brush retainers from the plastic lamp bracket*

6. Unclip the lamp bracket from the locomotive by pulling the lamp bracket towards the front or rear of the locomotive to free one of the latches on the front and rear saddles.



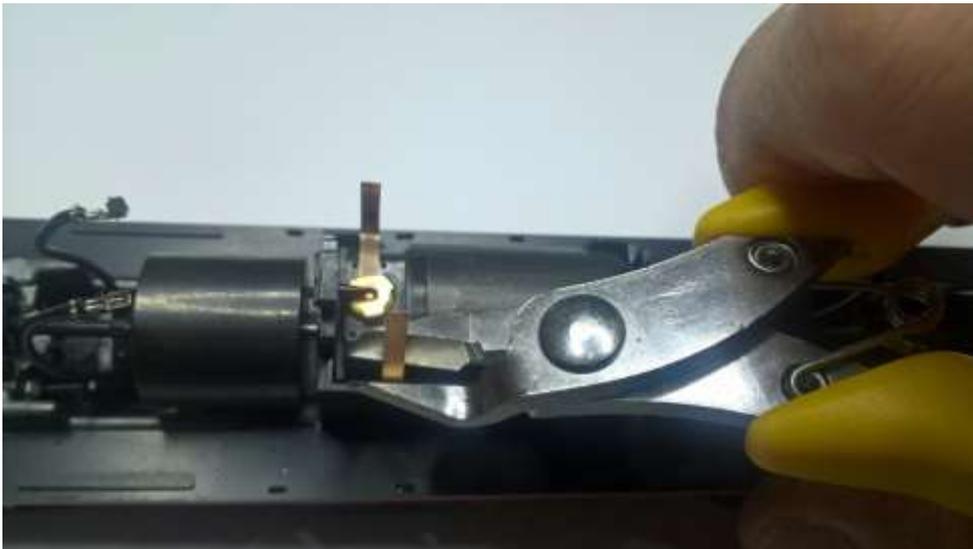
*Figure 6 The lamp bracket removed.*

7. Cut each of the four pick-up wires to remove the crimped clips.



*Figure 7 Cutting the clips from the pick-up wires.*

8. It is necessary to cut the long brass strips that form part of the brush retainers since these are not in the correct position to attach to the WMR-10 unit. Short wires can be easily soldered to the cut ends of these and then soldered to the correct tabs on the WMR-10 unit. Figure 8 shows how to cut these. Be sure to cut them long enough to easily solder wires yet not so long that they can touch on the underside of the WMR-10 unit when it is in place.



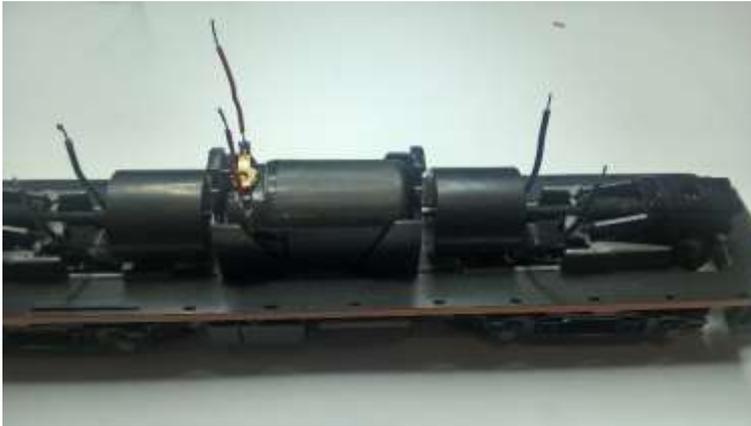
*Figure 8 Cutting the long brass strips on the brush retainers.*

9. Cut two lengths of insulated wire to about 20mm and strip the ends as in Figure 9. The wire should be thin enough so that it flexes easily into position under the WMR-10 unit. 30AWG stranded wire is ideal. Tin the ends of the wires and a small area at the top of the brass strips of the brush retainers.



*Figure 9 Wire for attachment to brush retainer.*

10. Carefully solder a wire to each brush retainer so the appearance is as in Figure 10. You now have six wires ready to attach to the WMR-10 unit.



*Figure 10 Wires attached to brush retainers.*

11. Place the WMR-10 unit in position on top of the locomotive frame and clip it over the latches on the plastic saddles at each end of the motor. Be sure to orient it so that the tabs that are about a third of the way along the sides line up approximately with the wires that you have just soldered to the brush retainers.
12. Solder the wires to these tabs as shown in Figure 11. Be very careful not to form solder bridges from these tabs to any other components on the unit or to accidentally de-solder or damage any other components. Damage to the unit is likely to occur if this happens. Use a magnifying glass to inspect your work.

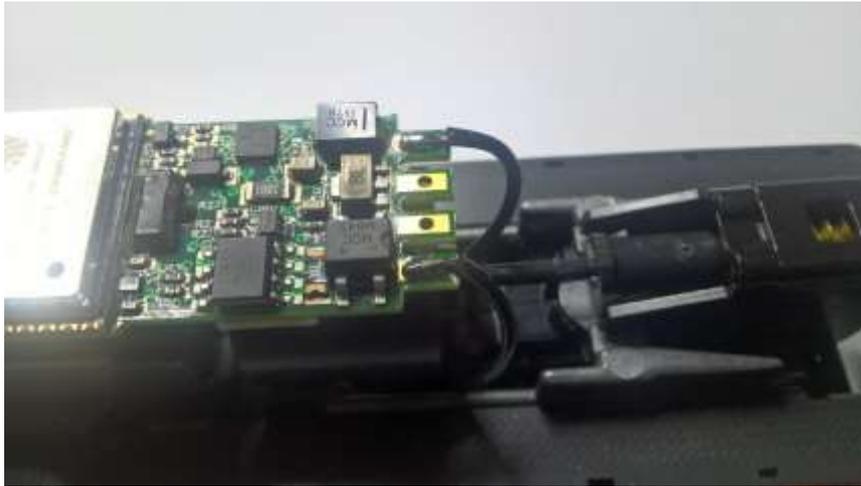


Figure 11 The wires from the brush retainers soldered to the WMR-10 side tabs.

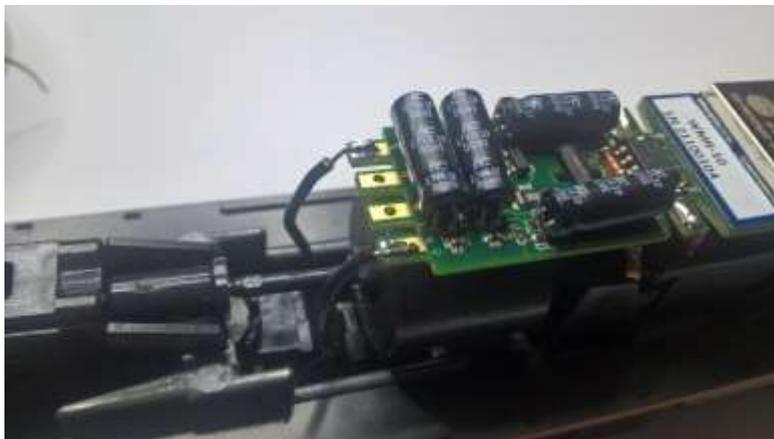
13. With the WMR-10 securely in place on the latches check at each side to make sure that the brass strips from the brush retainers do not touch the underside of the unit. Figure 12 shows the correct appearance.



14. Figure 12 Look underneath the WMR-10 unit to make sure the wires do not touch any other part.
15. Solder the power wires from the trucks to each corner tab on the WMR-10 unit as shown in Figure 13 and Figure 14.



*Figure 13 Solder the wires from the front truck.*



*Figure 14 Solder the wires from the rear truck.*

16. Bend the leads of the LEDs supplied close to the body of the LED, cut them and solder them in place as shown in Figure 16 and Figure 17. The positioning of these is rather critical since they must not protrude much beyond the edge of the tabs and stand more than 7mm above the top surface of the unit otherwise it will not be possible to replace the body shell on the locomotive. Take note of the position of the flats on the LEDs as in Figure 15. If the LEDs are soldered the wrong way around they will not be damaged but will fail to light. Consider the position of the flats before you bend the leads.



Figure 15 Notice the correct location of the flats on the LEDs.

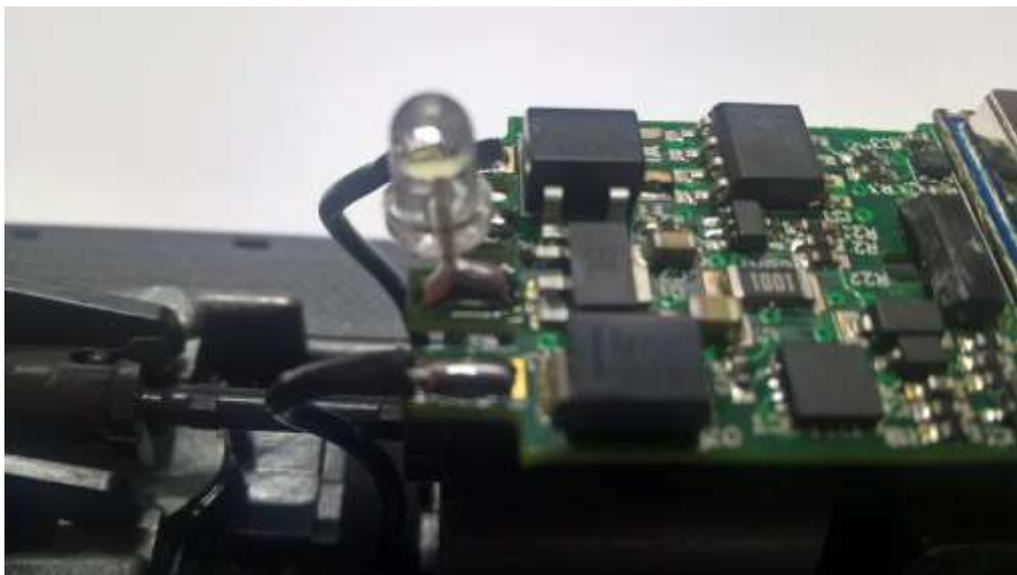
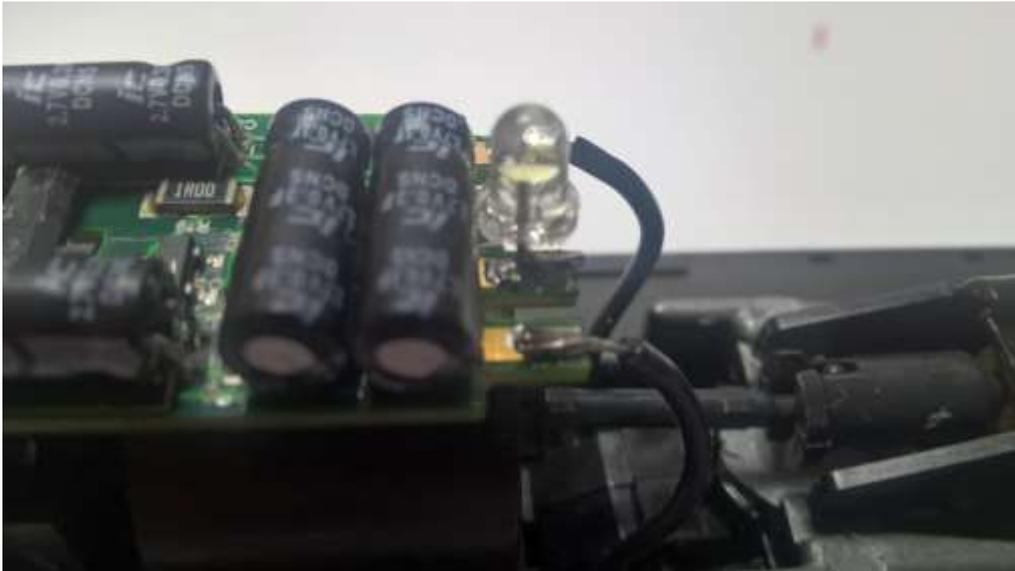


Figure 16 LED soldered in place for the rear light.

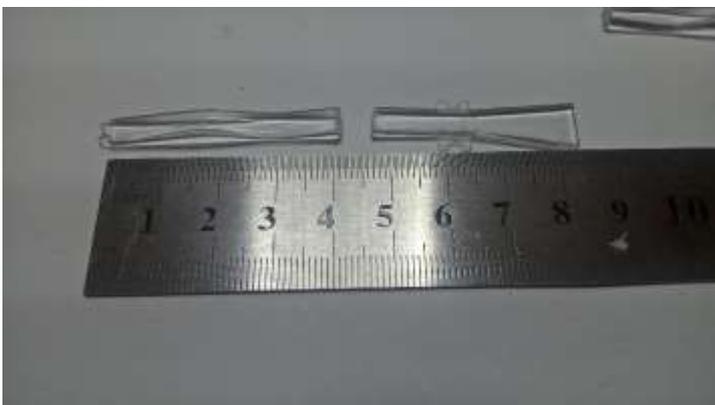


*Figure 17 LED soldered in place for the front light.*

17. Remove the lead weights and light guides from the locomotive shell.
18. Cut the front and rear light guides from the locomotive to 40 mm from the front and rear lights where they show through holes in the body shell as in Figure 18, Figure 19 and Figure 20.



*Figure 18 Cutting the light guides from the original locomotive.*



*Figure 19 Cut the front light guide to 40mm.*



Figure 20 Cut the rear light guide to 40mm.

19. Replace the front and rear light guides in the locomotive shell so that the lenses fit into the small holes in the body shell. Replace the weights. The weights should hold the light guides in place but if they keep falling out, you could glue them.



Figure 21 The cut rear light guide in place.



Figure 22 The body shell with the cut light guides and weights in place.

20. Replace the body shell on the locomotive. Be careful to ensure that the truck pick-up wires are clear of the flywheels and other moving parts. Be sure that the weights and light guides do not obstruct the LEDs before firmly pushing the body shell into place so the latches engage.



21. The conversion of your Atlas RS-3 is now complete and you are now ready to join it to your Wi-Fi network.

You can find out more about managing your WifiTrax network in the application note [Managing your Model Railroad Wi-Fi Network](#)