My model railroad used to fill a quarter of the basement. Now it’s a circle under the Christmas tree! That creates a major dust problem. The need for a track vacuum was great so I designed one.

The circuit board has a reed switch on each side of the box car. When they come near a magnet, the circuit is alternately switched on/off. My goal is to make a lap counter to push/pull a magnet near the track so the vacuum is on for one lap in every ten or so. But for now, it is turned on and off every other lap by a magnet housed in a roadside shack. Great for testing purposes.

A used filter from my C-Pap machine happens to fit in the box car. Air is drawn into the car from the track cleaner/vacuum inlet resting on the rails and exits out the top, which is removed for cleaning.

The fan is a 5 VDC brushless type, 25x25x10 mm. It is driven by an 8 volt regulator. A typical 5 volt fan is rated at 6 volts maximum. Pushing it to 8 volts is a stretch. The higher voltage increases suction and makes it sound like a vacuum, but shortens the life of the fan. Replacing the fan is extremely simple and easy. It just plugs in!

The circuit board mounting holes align with the mounting holes for the wireless 8 volt camera cars, but that’s another project.

This vacuum works very well. This is year number 2 (2013). This unit was designed for Digital Command Control (DCC) but will work with standard throttle controllers, perhaps not as well. There is no need for DCC control. For normal layouts, simply vacuum the tracks a few times, park the car on a siding and turn it off with a magnet attached to the end of a stick or wand.
A roof-walk type car will not work well. A metal roof box car has more inside height.

Springs from ink pens are cut to lightly push the fan against the car roof. The fan supports are 12 AWG wire.

Blinking LED may be replaced with an LED strobe circuit (another project).

A dab of adhesive keeps springs in place.

Electrical pickup detail:
Notice the loop in the wire to prevent breakage.

Wipers are bent around the axle, keeping the pickup aligned properly.

The recommended installation of the laser-cut axle wiper caused much frustration. The wiper would slip out of alignment. The wiper is installed in a better fashion.

Original wheels had plastic axles. Replacements are now warn, but clean.

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Metal plate is drilled and tapped for 4-40 screws.

Notch keeps plate in position.

16 AWG wire is soldered onto 3/4" copper pipe. The wire extends over the top of the tube.

The track cleaner may be hardboard or PCB. The PCB is restored with a liquid cleaner. The hardboard is restored by sanding.
The holes in the box car are from fan position tests. The best ended up as a single vent in the top.

The end position stirred up dust.

Two fans in the top were attached to the roof. This was not a convenient method. The 2 fan prototype was not effective as the fans starved for air. It looked and sounded impressive though!

This view clearly shows that a roof-walk type car would not make a good presentation.

I only tried ready-to-run Athearn cars. A hobby knife drawn between the car wall and frame breaks the glue spots well. The box is easily removed and replaced.

PCB Version: The PCB plates are epoxied together. The vacuum tube is epoxied into the PCB.

Hardboard (HB) Version: The HB plates were glued together. The tube’s tight fit required no epoxy.
The tube/plate fixture moves freely up and down. The side inlets clean dust off the rails. There's enough air flow to do this as well as pick up particles from the track ties. You'll be amazed!

Reed switches are located on both sides of car. A magnet on the end of a stick makes a handy on/off device. Note that the reed switches are lifted off the board and angled against the car wall.

PCB is a snug fit. Test fit the board before populating it. 1/4" threaded hex standoffs secure PCB to car frame.

Hole for blinking LED which has yet to be made to protrude through the roof.

This car's previous role was a simple track cleaner (another project).

Caution: The methods I used to make these plates, accessories, and car modifications, could be hazardous. It is your responsibility to use care and caution. You assume all responsibility and liability!
PRESS ON/OFF LATCHING CIRCUIT

Print templates and adhere to particle board blocks. Cut/sand to template size. Roof block should be a snug fit.

FAN
7/8 HOLE
+ LED
7/32 #50 DRILL

FOOT
4-40 THREAD + #43 DRILL
FLOOR
WIRE INLET HOLE
7/32 + #50 DRILL
4-40 THREAD + #43 DRILL

POWER SOURCE
For a constant voltage to the fan, solder a wire across the jumper bypass and use only these electronic parts: BR1, C1, C2, IC1. See on parts layout.

The FLOOR template is used for both the Vacuum and Video Camera cars.

DO NOT SCALE TO PRINT