

How To - Train Detection axes or resistance wheels

How to make conversion of wheels for N scale (1:160)



Last years Model Railway has started using PC based control and it requires detection of occupancy of tracks/lines. Therefore each passenger car/freight wagon should have two converted axis.

Required materials

1. SMD resistor 17,4 KOhm 1% 0603 (L x B 1.6 x 0.8 mm) *)
2. Liquid silver conductive, for example, Conrad item no. 530 042
3. Superglue low viscosity, for example, Conrad Ropid 100 Ref. 240460

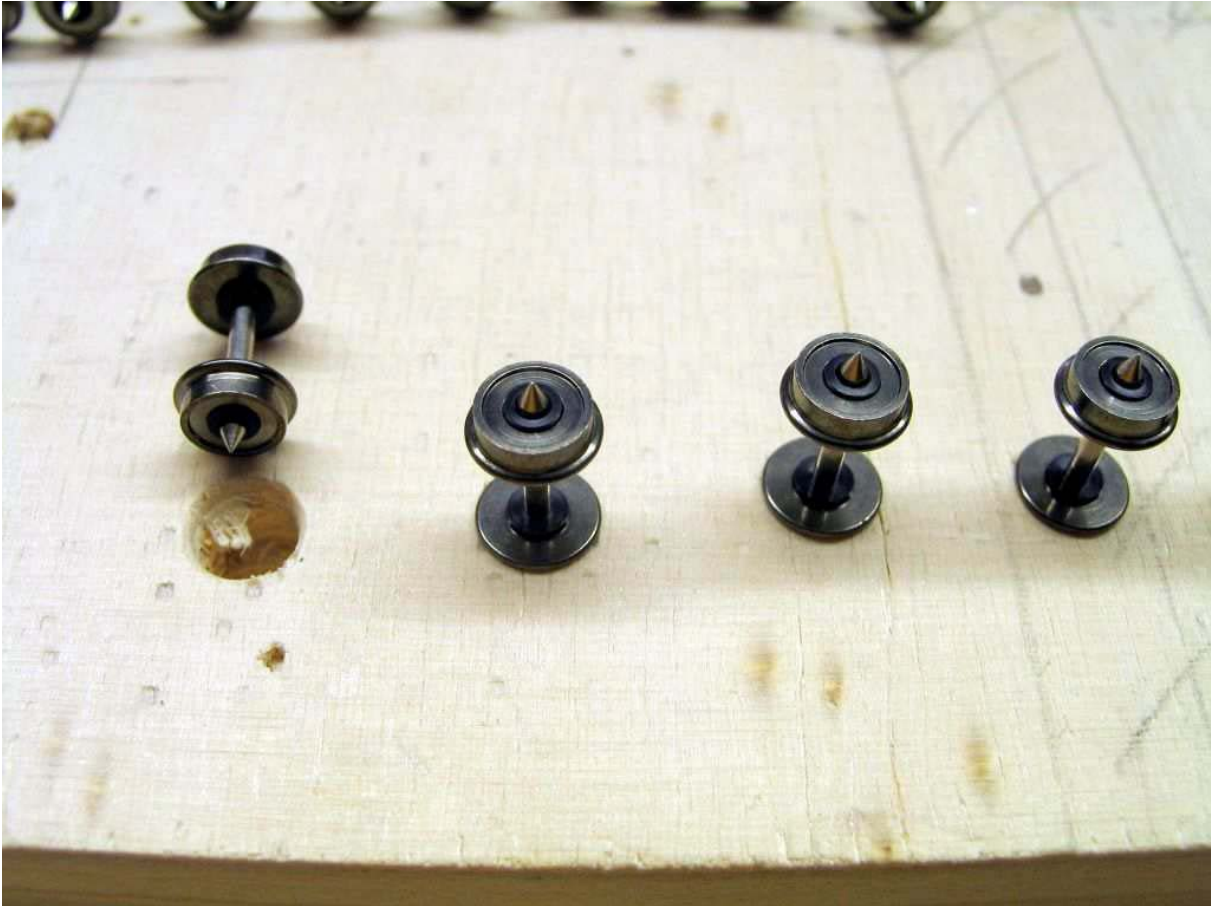
**) Possible values from 10 to 20 KOhms. The lower the value, the higher the Power consumption of the axis. The higher the value the more likely is the possibility that the axis is no longer recognized due to the very low power consumption. In principle a current of min. 1mA targeted to ensure reliable detection.*

Required tools

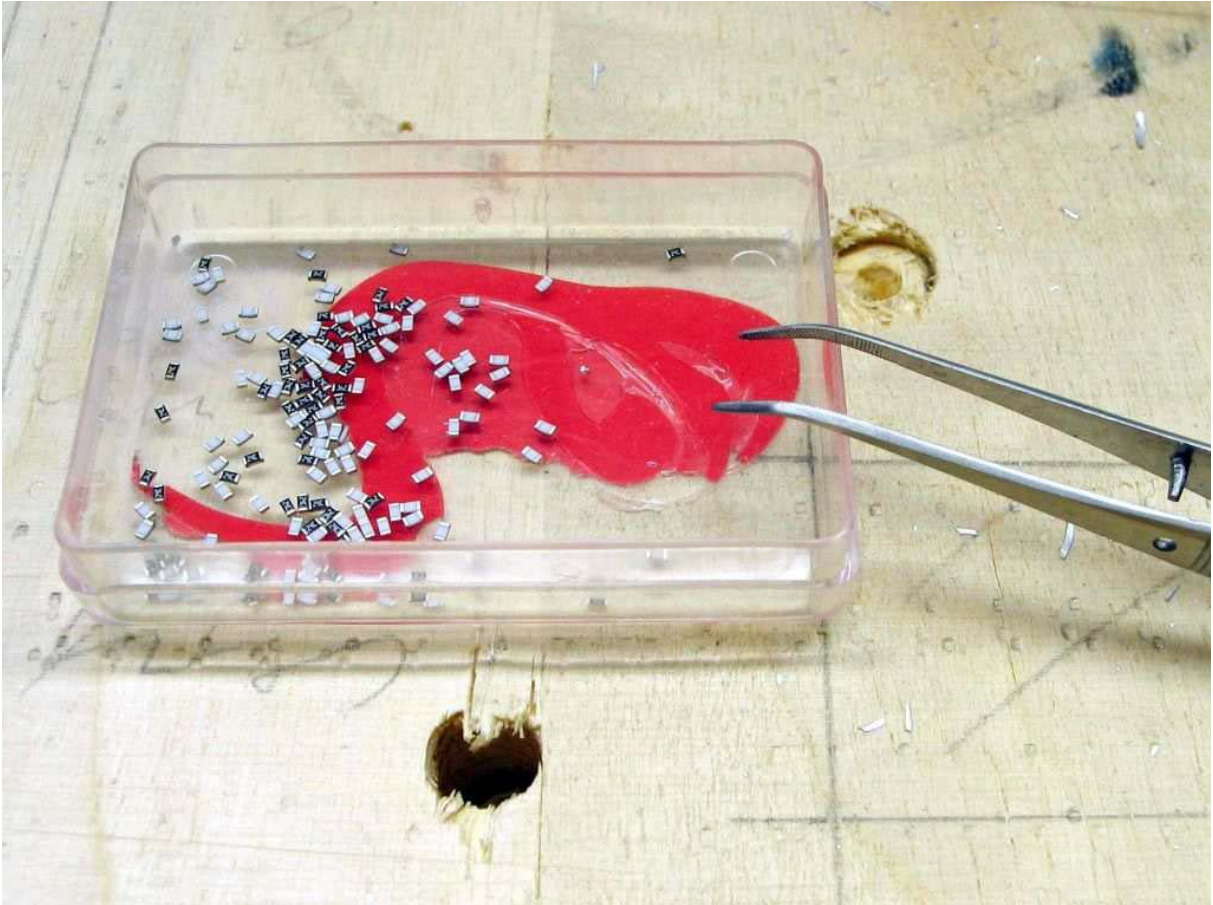
- Fine Tweezers
- Brush, size 10/0 or a wooden toothpick
- Ohmmeter / multimeter
- Wooden board with holes $d = 6 \text{ mm}$
- Pin

Procedure:

Install the axes perpendicular to the wooden board in the 6mm holes with wheel's disk with insulated axes side down.

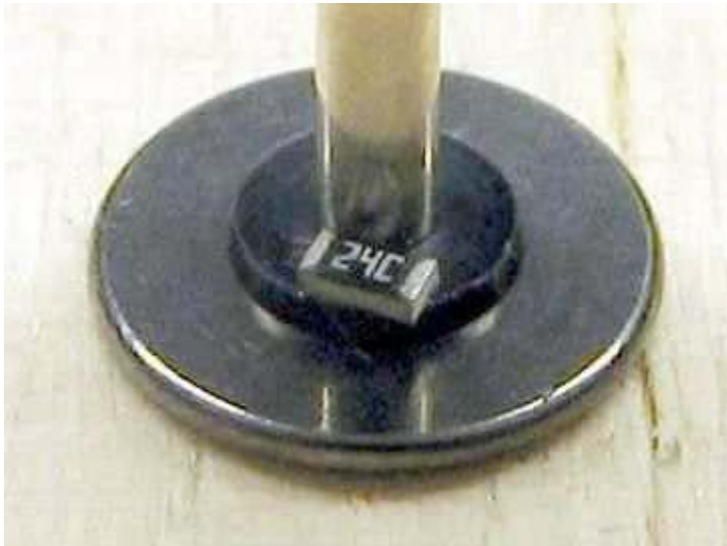


Now the resistors are released from the belt and placed in the bowl.



Put the drop of superglue on a smooth, dry, non-absorbent surface, ideally glass surface. Then with needle tip put small drops in the insulated part of the wheel. After install the SMD resistor and place it on the adhesive dots. Try to make contact between axes and contact surface of the SMD. No matter what visible side of SMD will be used. I prefer the black side.

ATTENTION! Since the superglue has insulating characteristics, you should avoid that the contact surface of SMD's are wetted with superglue. So the drops should not be so large that the SMD "drown" in it.



If the super glue is dry (a few minutes you should treat him), the conductive silver are applied.



After having the conductive silver well shaken, taking a small amount with the brush (or toothpick) and establish a connection between the axle shaft and the contact surface of the SMD resistor that contacts the axle shaft. Then connects to the other side of the resistor with the wheel disk. You have to proceed this operation with some feeling and a steady hand in order to avoid a short circuit. For this operation I detach the axis of the wooden board and hold it in hand.

The result should look something like this:



For double insulated axes (eg Fa. Luck), on the other side of wheel disc a connection between the axle and wheel disc to be established!



Now you should let the conductive paint to dry for some time. If you prepare a lot of wheels when you apply the silver conductive on SMD **) till the last one probably the first prepared will be dry. Than then you can measure the wheels with Ohmmeter.

For measurement you should touch measuring contacts of Ohmmeter to the wheel's disk .

- then a value of approximately 17,4 KOhms (or corresponding resistance of installed SMD) appears and it is well and axes can be installed.
- If the value "infinite" is displayed, no electrical connection has been established and we should rework silver conductive again.
- If value of zero Ohms displayed a short circuit is presented. Than we should remove SMD with small scalpel or screwdriver and after cleaning the body apply a new SMD resistor.

**) If you make conversion of larger amount of axes at once the conductive paint should be shake from time to time.

All in all the conversion by hand could be very quickly with a little practice and in hour to have a numerous of converted wheelsets

Have lots of fun with it!

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Contact: Olaf Saenger
Mosbacher. Str 9
D-76131 Karlsruhe
Email: Olaf (at) saenger.com