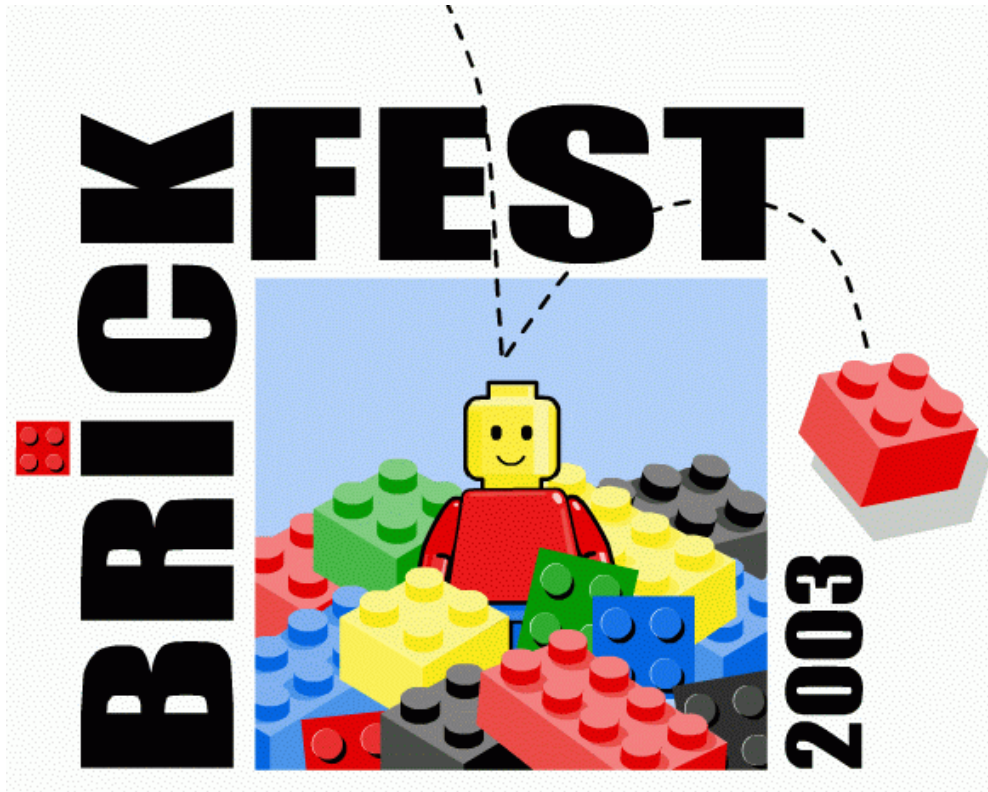




Advanced LDCC Topics



BrickFest 2003

DCC Track

Presented by:
Tom Cook

Presentation:
Mark Riley



Tethered Throttles I



Permits more than one person to control trains on the layout...

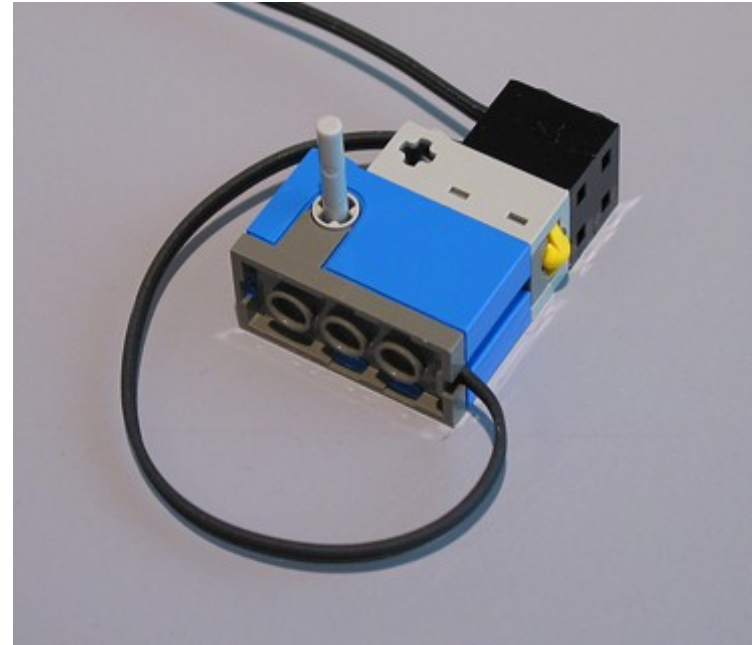


Tethered Throttles II

- Two types:
 - Rotation sensor
 - Potentiometer
- Up to three throttles supported
 - One on each of the RCX's sensor ports
- One or more function buttons per throttle:
 - Headlight
 - Motorized points
 - Additional decoder functions such as:
 - Sound
 - Ditch lights
 - Reverse Light

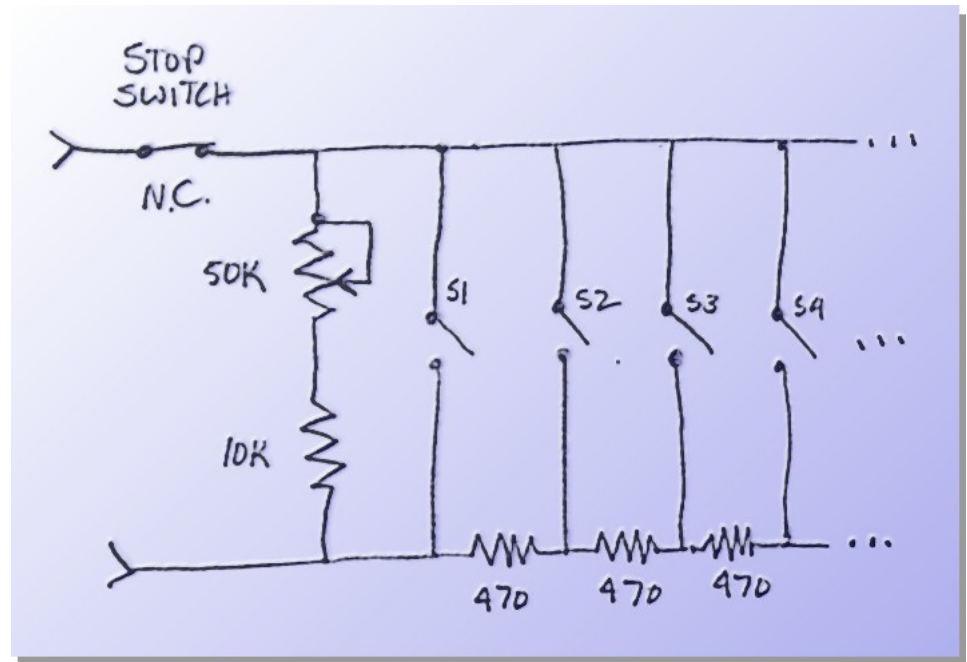
Rotation Sensor Throttle

- 100% Lego
- Single button (optional)
 - Press briefly to toggle headlight
 - Hold down to stop
- Can configure rotation angle representing full throttle



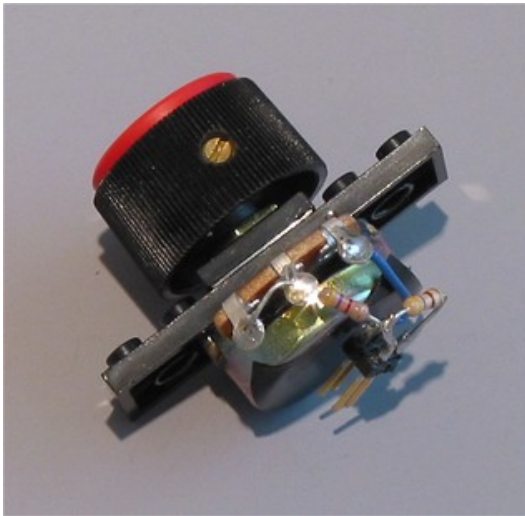
Potentiometer Throttle I

- Simple circuit
- 50K potentiometer
- Optional:
 - One or more function buttons
 - Stop button

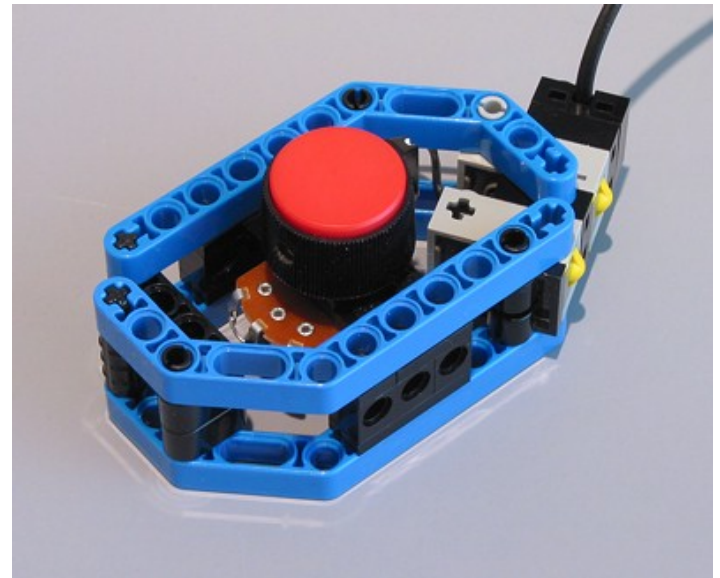


Potentiometer Throttle II

- Example using mostly Lego parts
 - 50K linear potentiometer
 - 2 function buttons

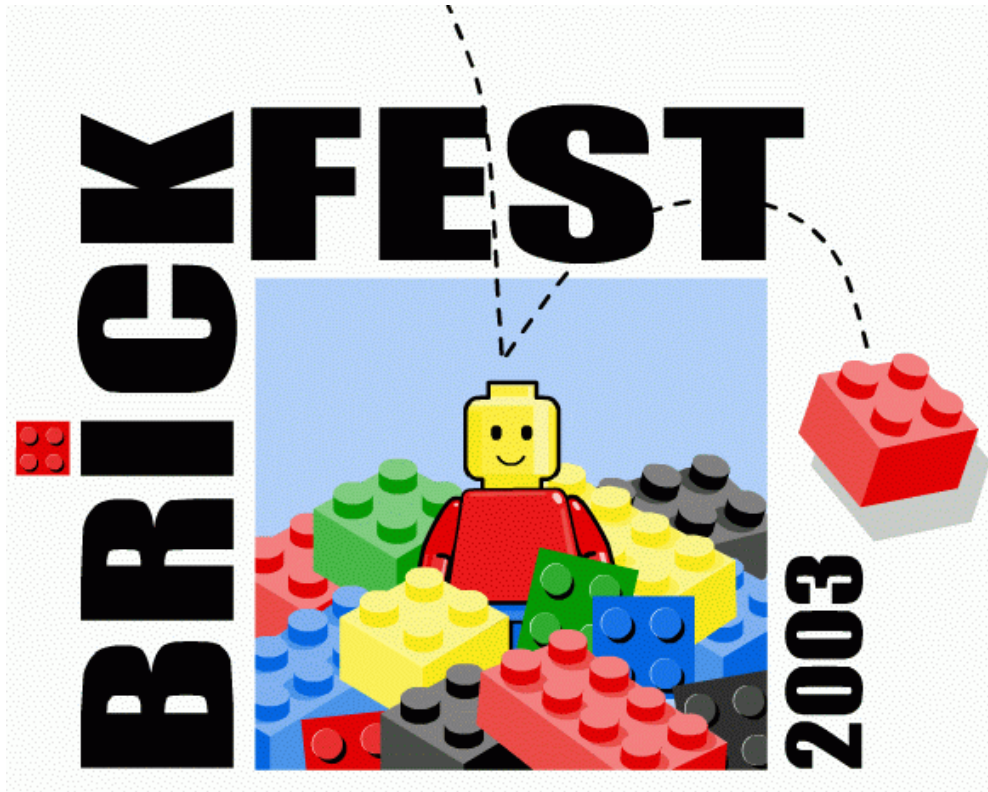


Potentiometer “element”



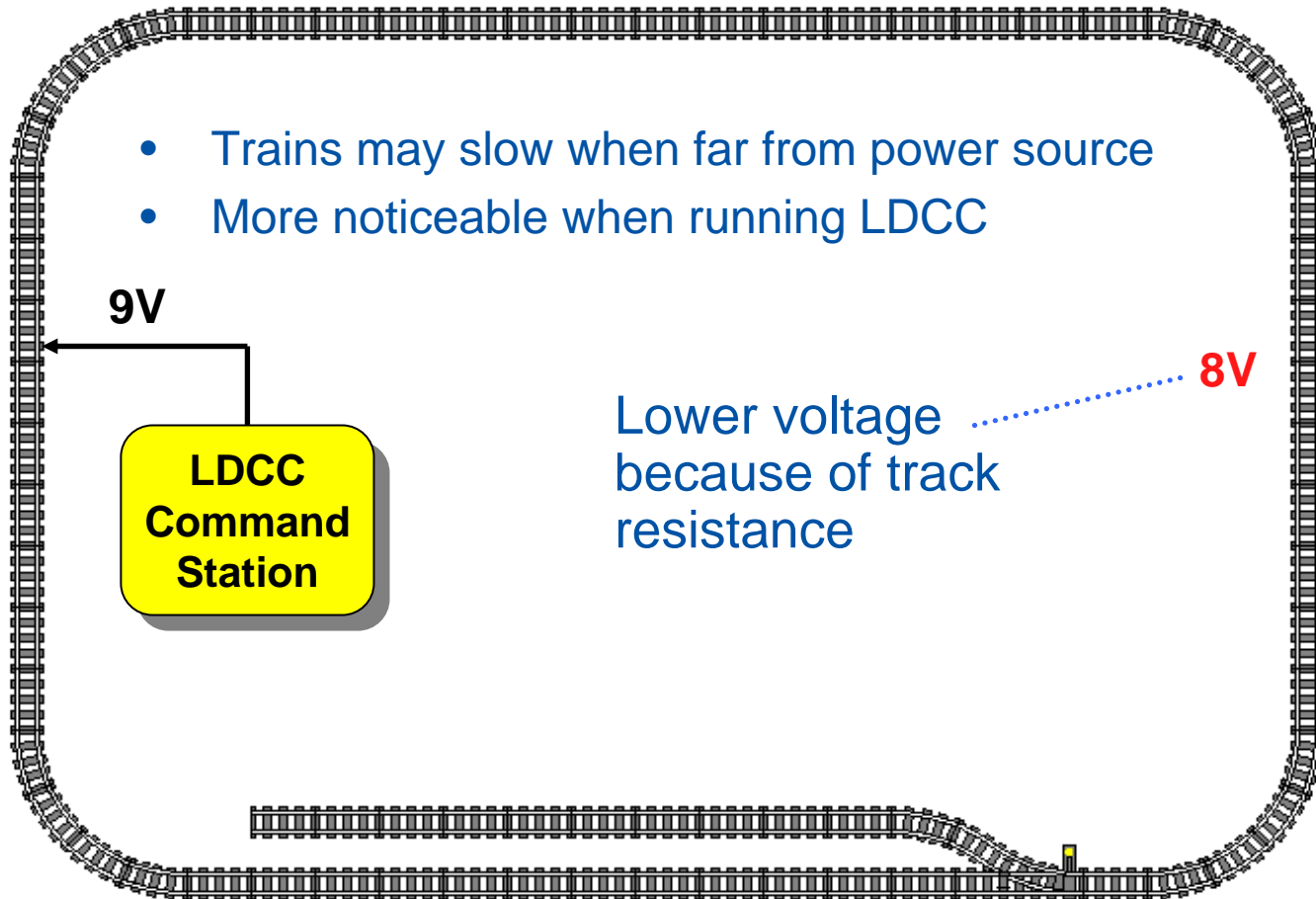


Track Work

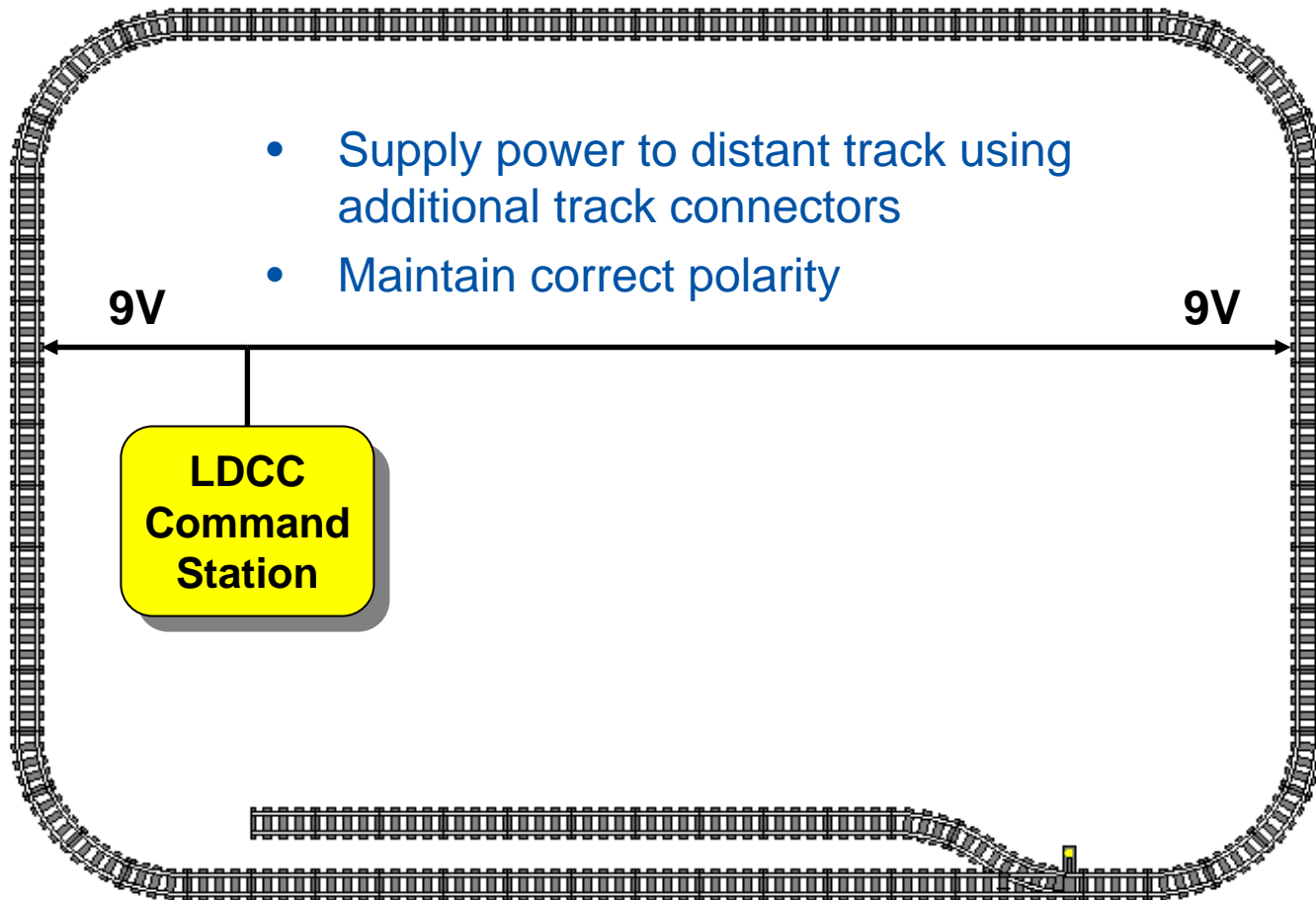


Techniques for DCC
track work...

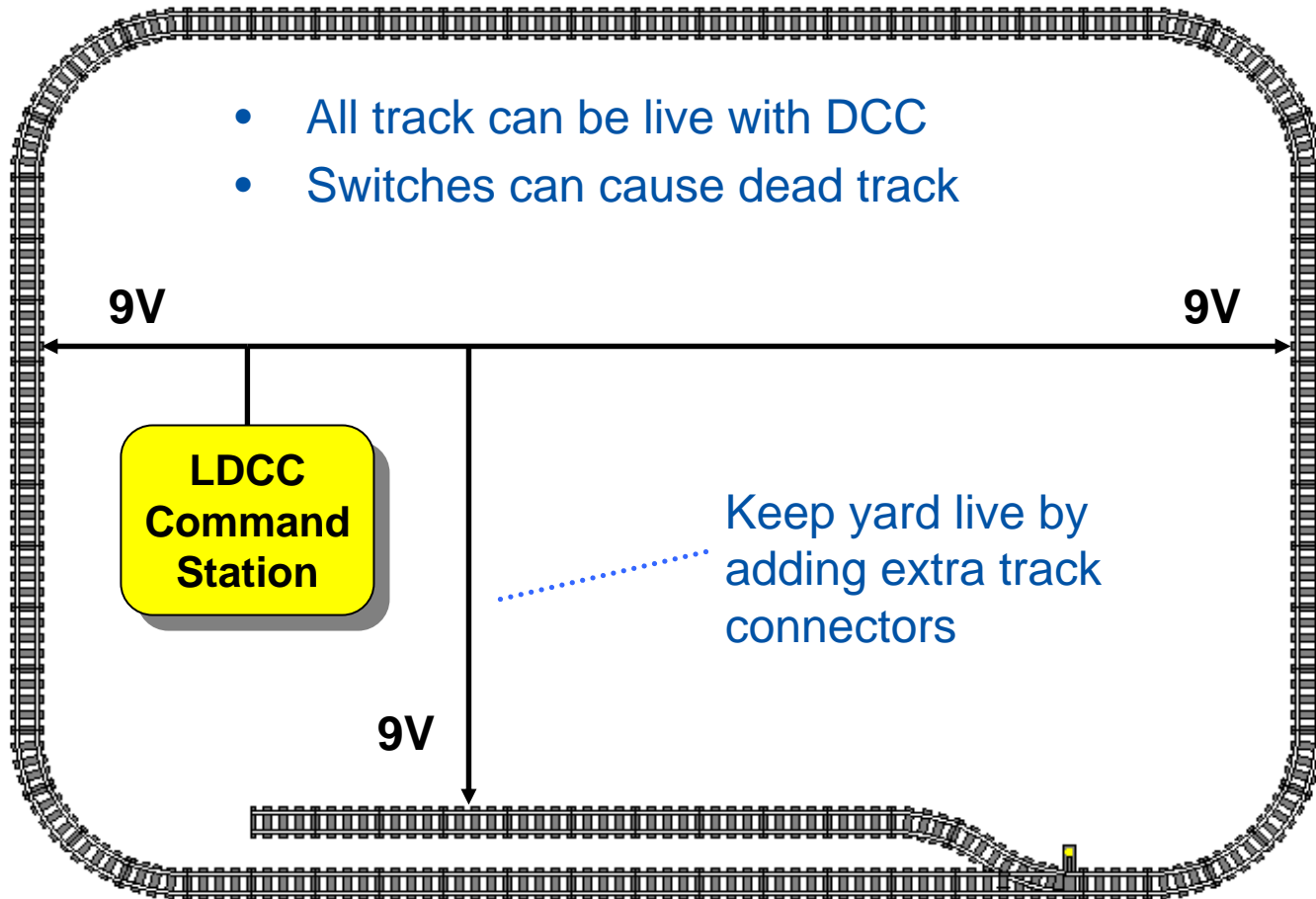
Voltage Droop



Track Wiring I



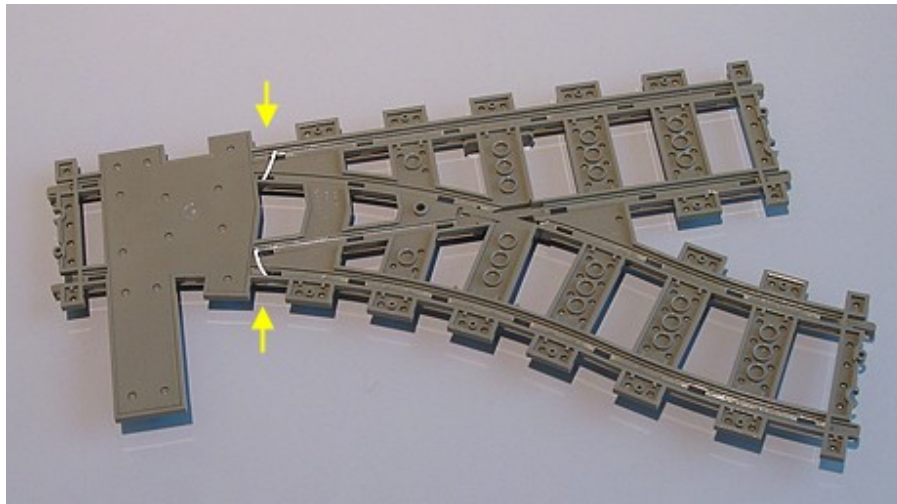
Track Wiring II



Power & Switches

- Power routing by switch not required for DCC operation
- Switching yards can be “live” since each locomotive is independently controlled
- Switches can be modified to always supply power to both routes (straight & divergent)

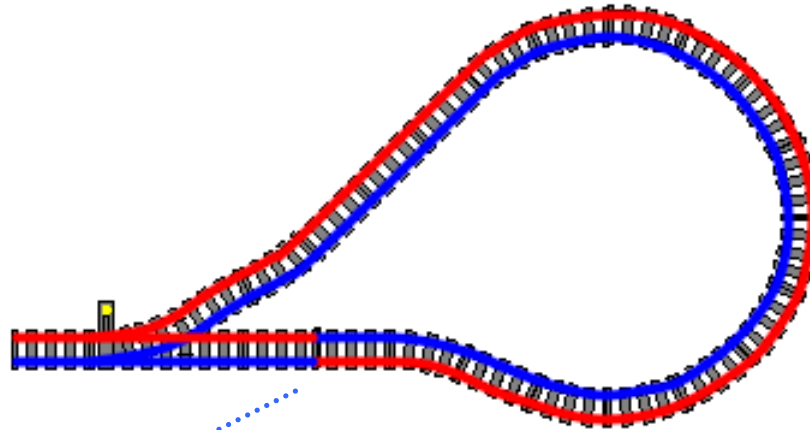
Always Powered Switch



- Solder wires as indicated to provide power to both routes
- Moderate difficulty

Reversing Loops

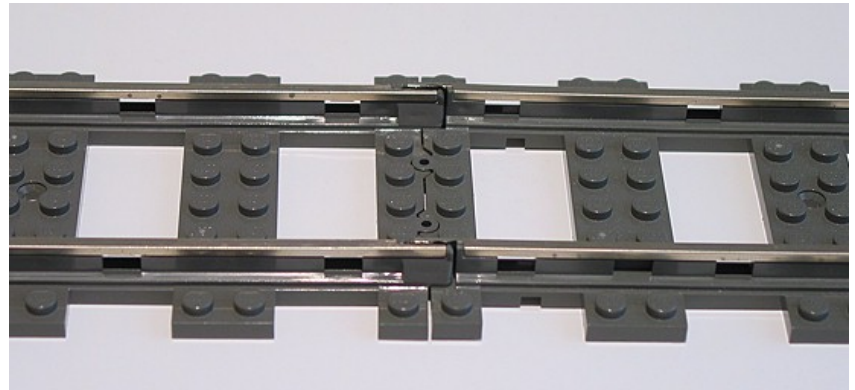
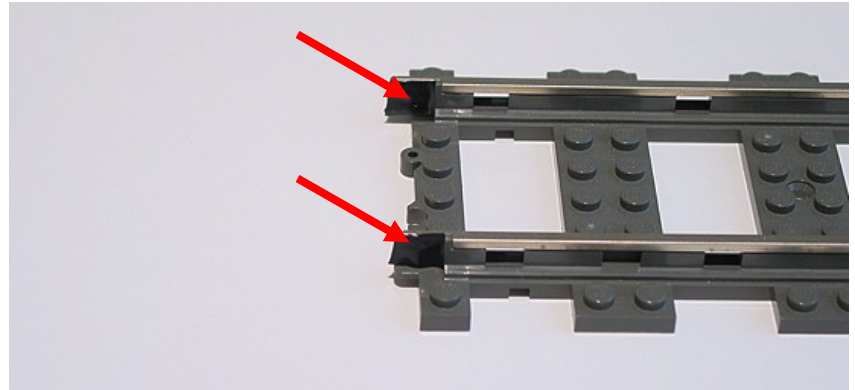
- Reversing loops cause short
- Use insulated track section to fix



Fix short by adding insulated track section here

Insulated Track Section I

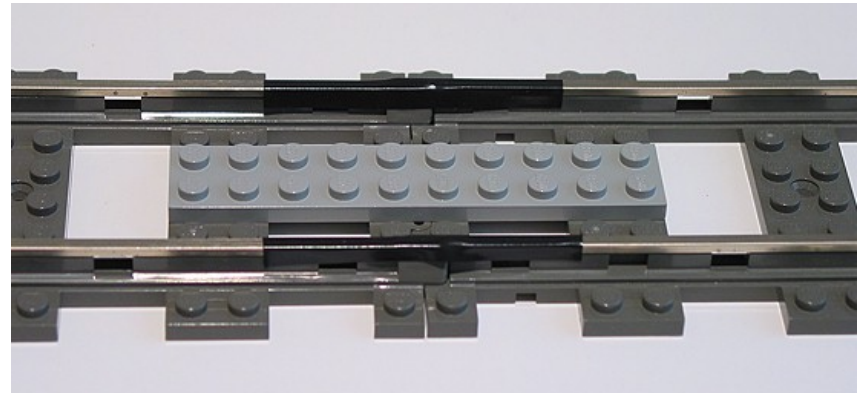
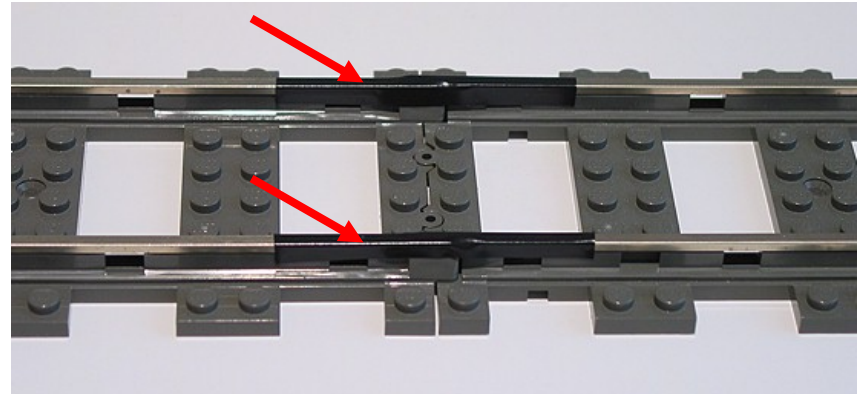
- Add 2 small pieces of tape (or paper) to track ends
- Join with second track piece



Insulated Track Section II

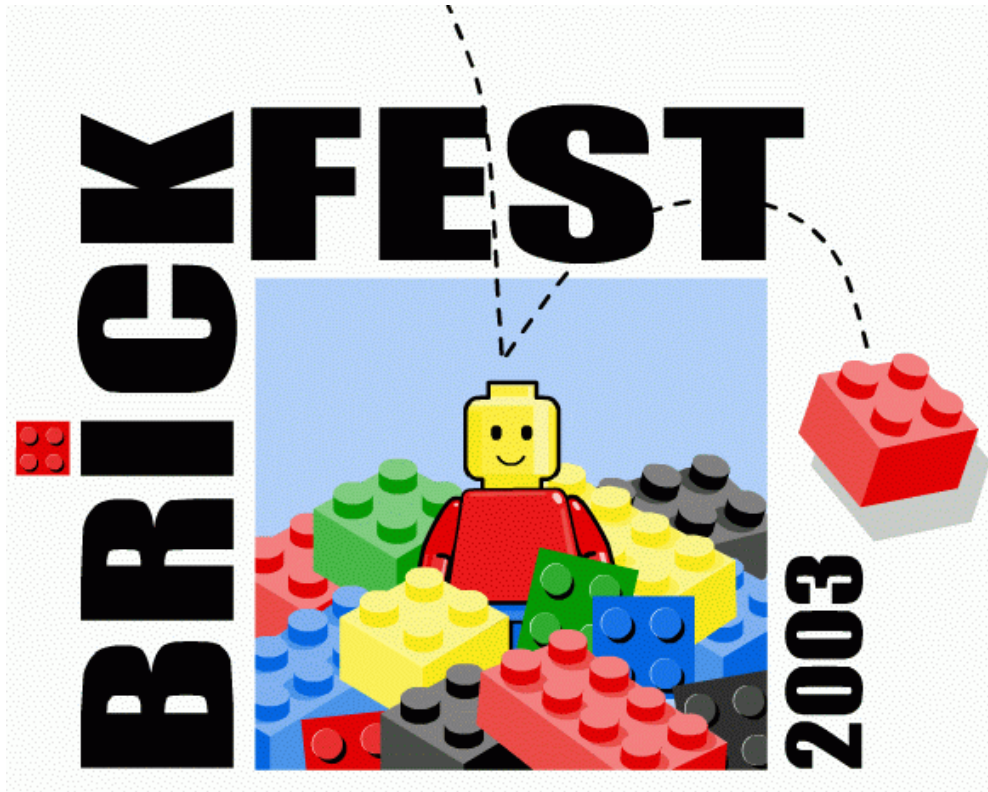
- Apply two 5cm strips of tape
- Use track ties as visual alignment aid
- Add plate(s) for strength

Credit: Jeff Elliott





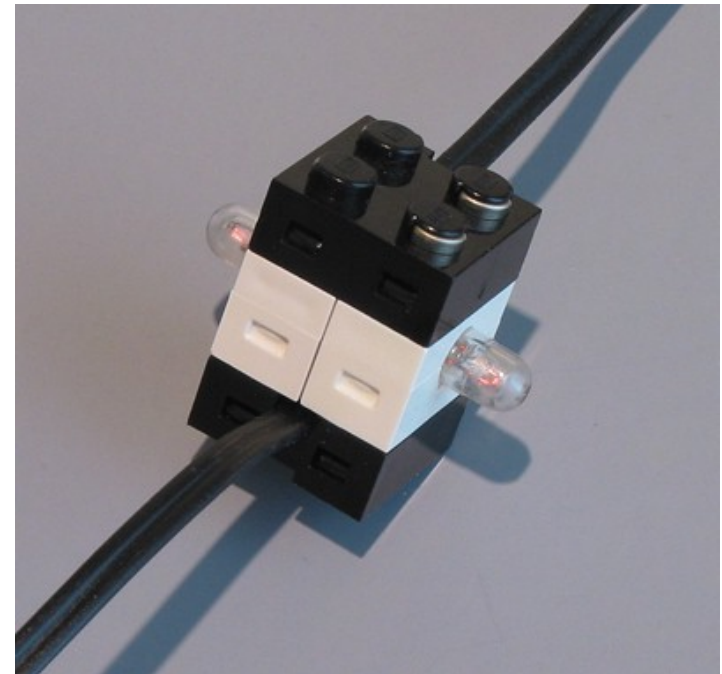
Introducing LACC



New firmware allows
RCX to become DCC
Booster or Stationary
Decoder...

Track “Sensor”

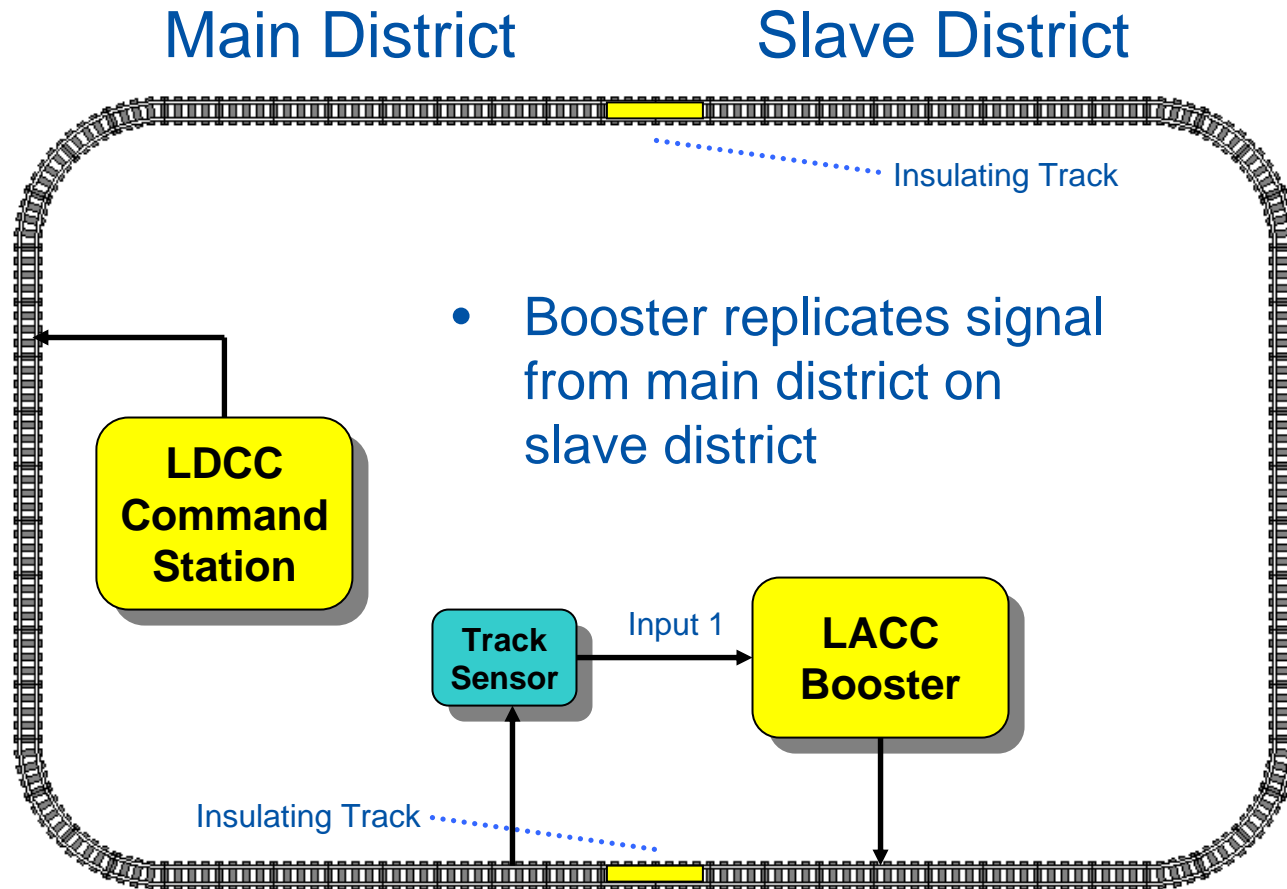
- Connects track to RCX sensor port #1
- Requires
 - (2x) Lamp bricks
 - (1x) Track connector
 - (1x) Electrical wire
- Important
 - Connect as shown to protect RCX sensor port
 - Lamp bricks face perpendicular to direction of wires



LACC Booster

- Large layouts divided into “Power Districts”
- Districts separated by insulated track sections
- Boosters copies master DCC signal onto slave district
- Enables more trains to run concurrently

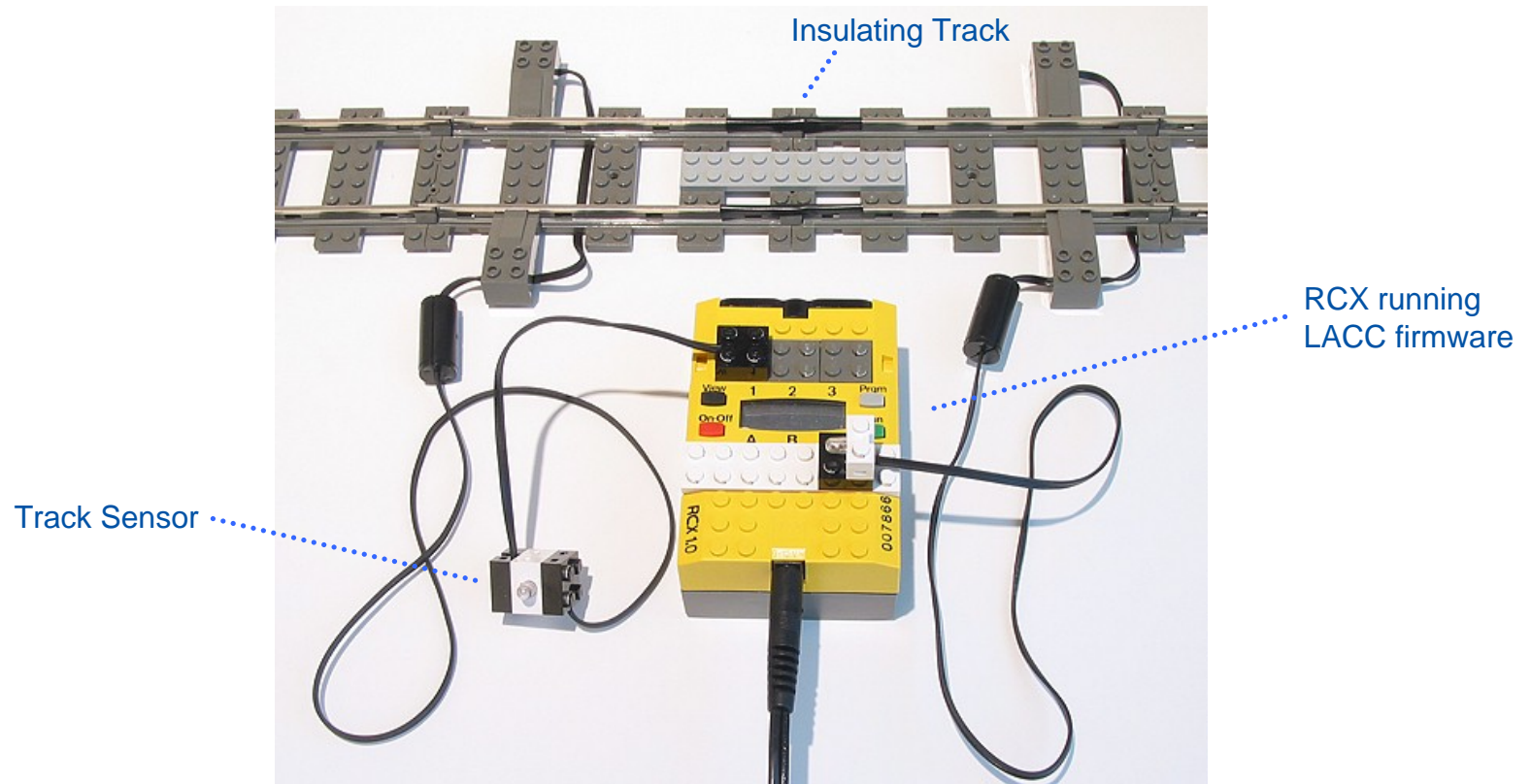
Power Districts Layout



Booster Hookup

Main District

Slave District

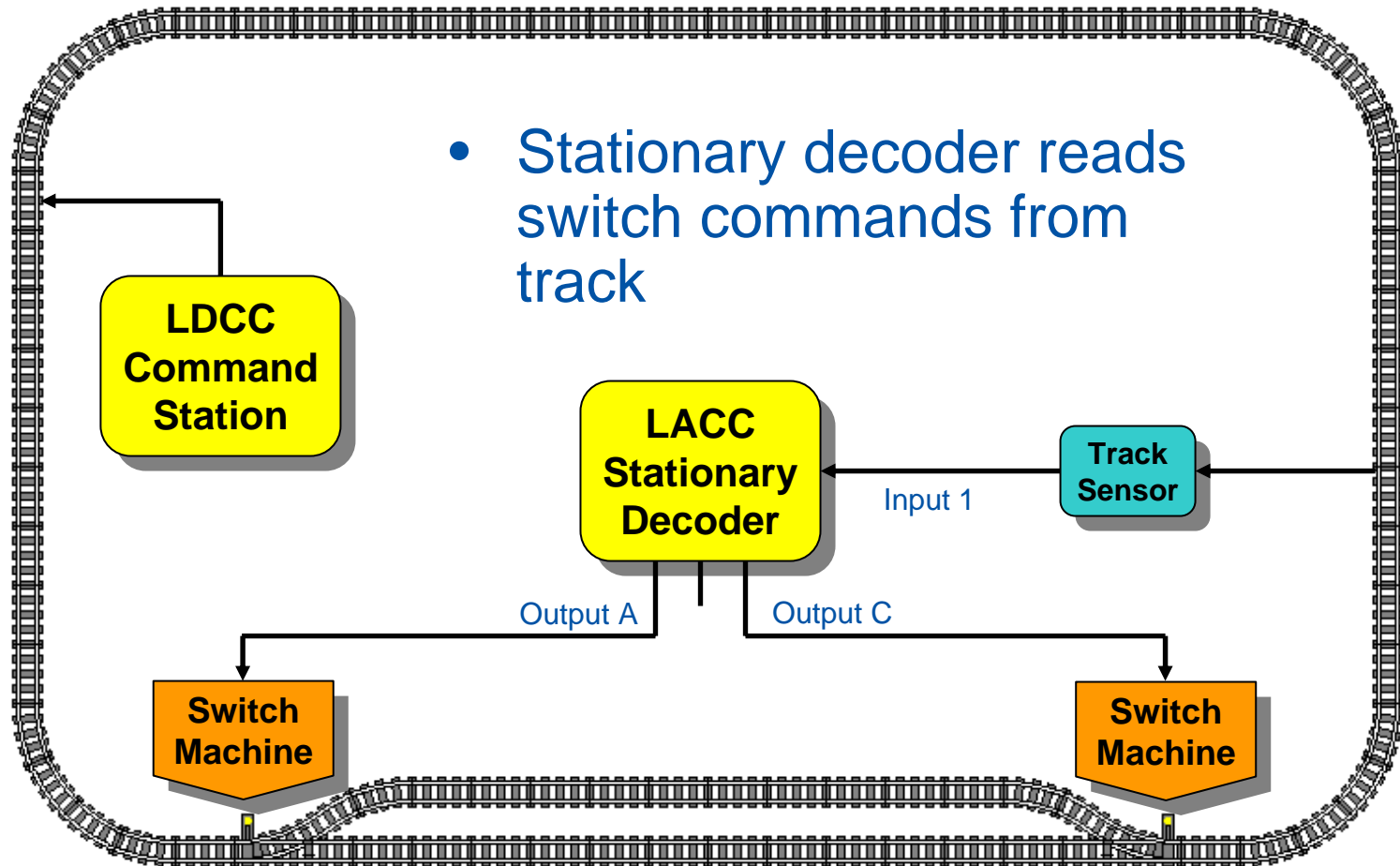




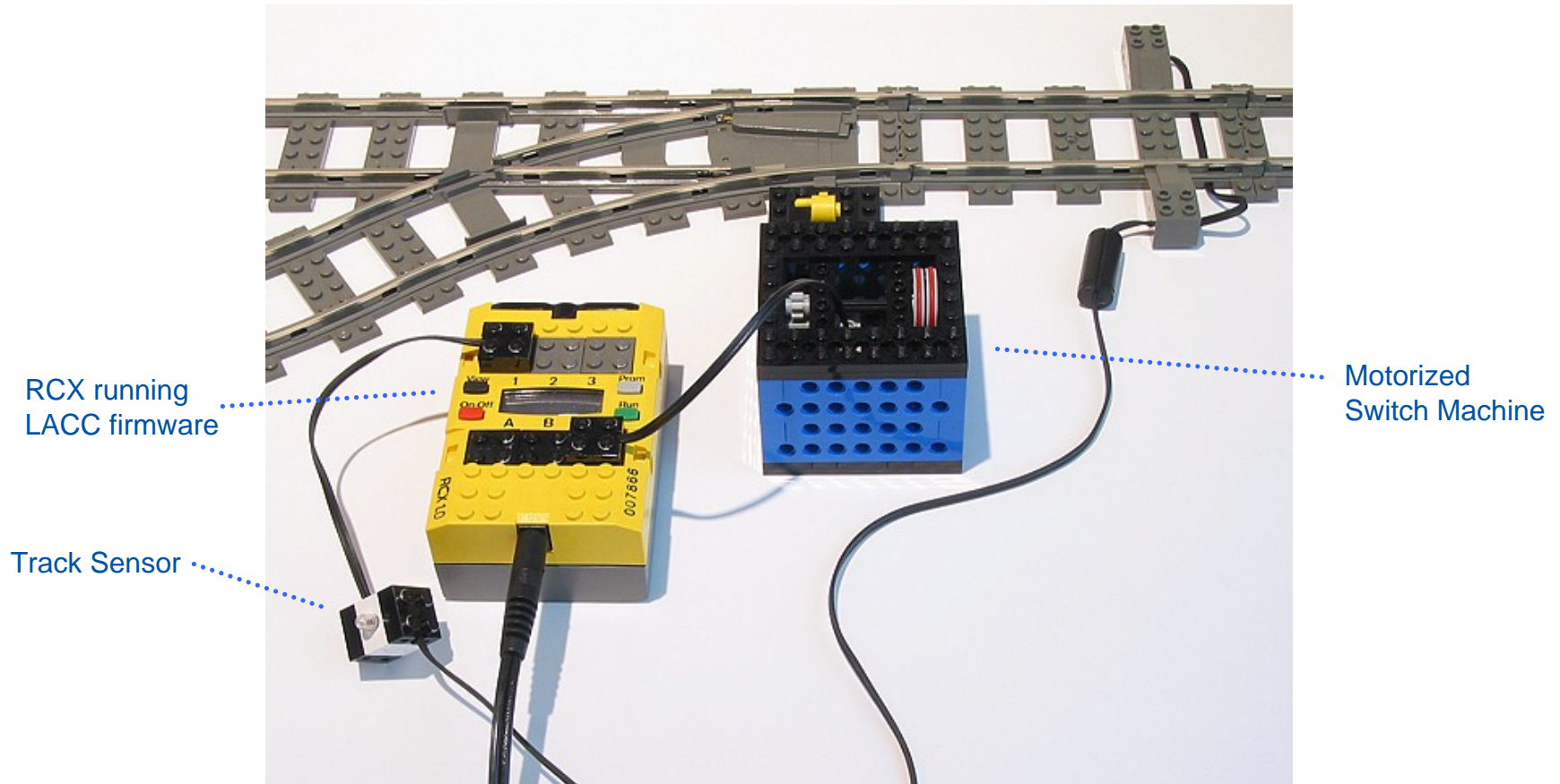
LACC Stationary Decoder

- Control up to 3 motorized switches per RCX
- Switches operated by RCX remote control
- Configurable
 - Base address (default is switches 1 through 3)
 - Stroke duration (default is 0.8 second)
- RCX can be battery powered
 - Permits use of RCX 2.0 (or 1.0 w/o power jack)
- AKA “Accessory Decoder”

Stationary Decoder Layout



Stationary Decoder Hookup



Operating Switches

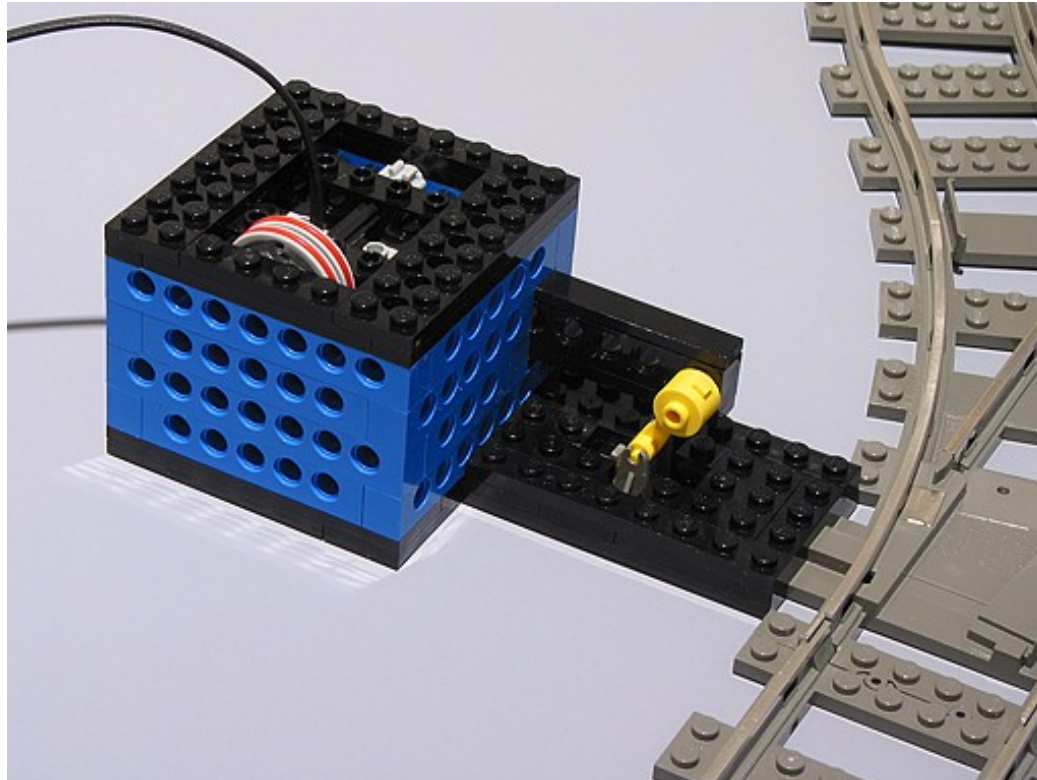
P1 to P5 on
remote operate
switches 1 to 5



Hold down sound
key to operate
switches 6 to 10

- Switches 1 to 255 can also be controlled by LDCC IR Protocol

Motorized Switch Machine



- Example design



Acknowledgements

- Tom Cook
 - Idea to use RCX as booster
- Jeff Elliott
 - Insulated track section using 5cm tape
- Matthew Bates
 - Track Designer imagery



Online Resources

- Mark Riley's LDCC Page
<http://home.surewest.net/markril/lego/dcc/index.html>
- Motorized Switch Plans
<http://home.surewest.net/markril/lego/mswitch/index.html>