Better Off Dead Rail?

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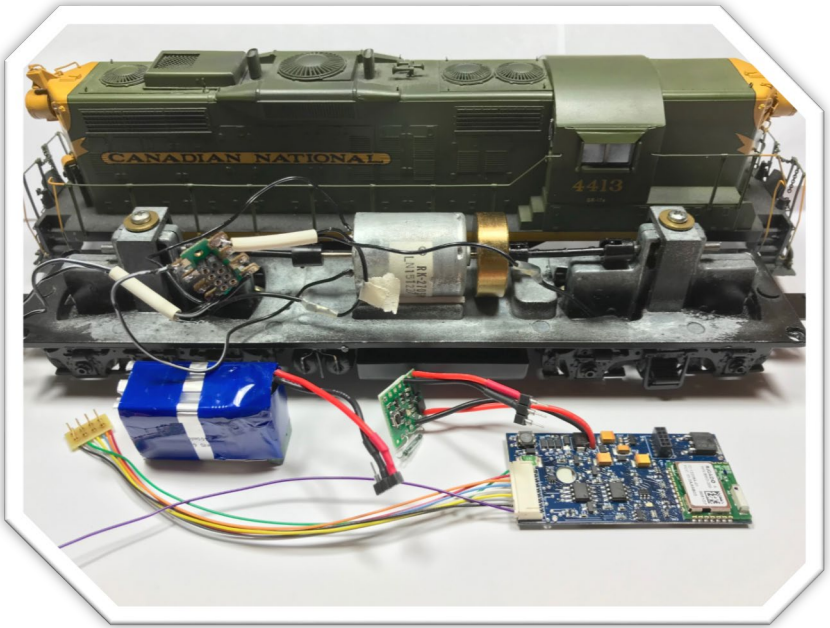
What

What is the concept of Dead Rail

- Dead Rail uses battery power instead of powered track
- Also known as Power on Board or Battery Powered Radio Control (BPRC)
- Battery can be situated in the locomotive, tender, B-unit, or in a trailing car



Why

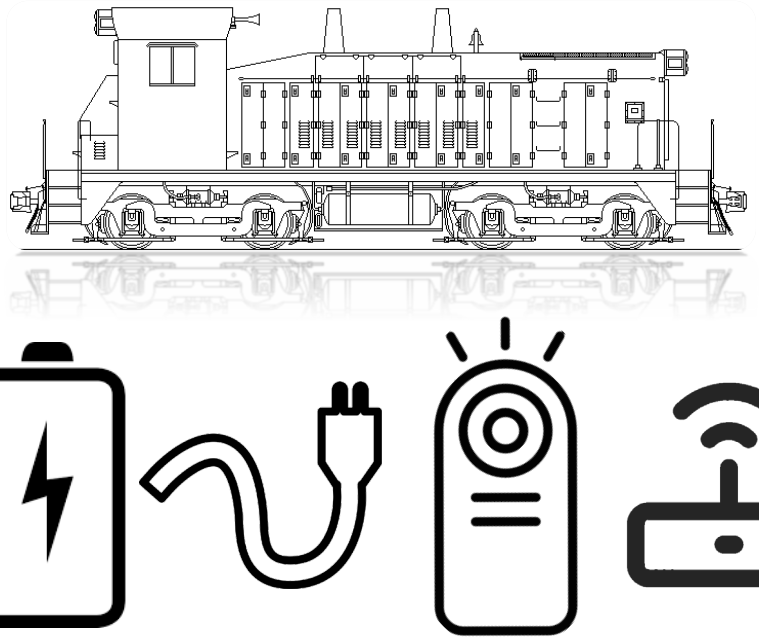
Why would you be motivated to going Dead Rail

- Improve reliability
- Smoother overall running
- Eliminate/simplify track wiring
- Deemphasize track cleaning
- Don’t want to invest in “old” technology

How

How is Dead Rail accomplished

- Suitable locomotive
- Battery power
- Battery charger/system
- Wireless RC transmitter
- RC receiver/decoder



Factors

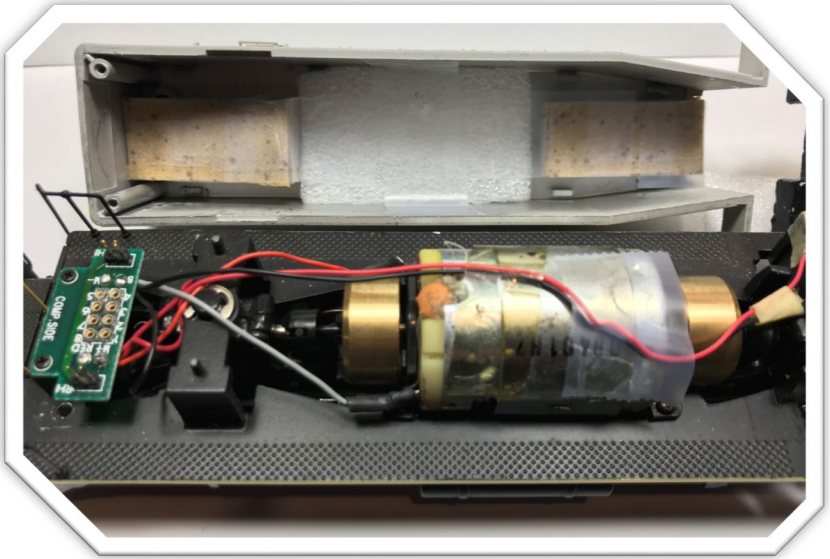
What factors make for the best match to Dead Rail

- Limited loco roster size
- Not wedded to current system
- Open mind to alternatives
- The S Scale advantage
  - Size and Space

Candidates

What makes a good candidate for Dead Rail

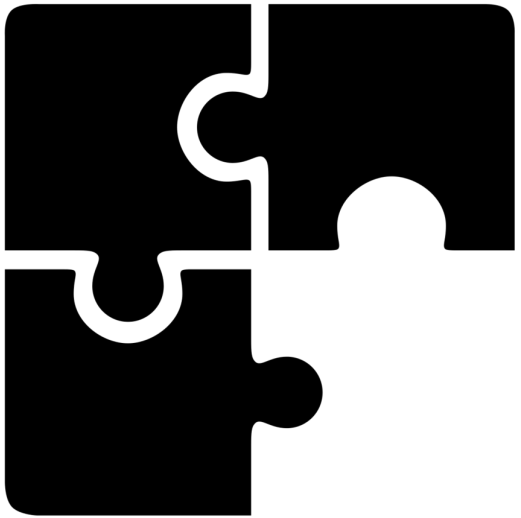
- Enough free space for the desired system
- Efficient DC can motor
- Isolated frame
  - Non-isolated uses frame for ground/negative
  - Most modern locos are isolated



Blockers

Which are poor candidates for Dead Rail

- Little to no free space
- American Flyer original motor or AC-only motor
- Smoke and large, power hungry speakers



But

Where there's a will there's a way

- If limited space, then consider trailing car or B-unit
- If AC motor, convert to DC can or new AC compatible systems
- If high power, use bigger battery

RC-What

What categories of RC systems are there

- Bluetooth
  - Low energy
  - Multiple locos
- WiFi
  - Direct: single loco
  - Router: multiple locos
- General RC
  - 900MHz and 2.4GHz
  - Some interoperability between systems (TV, S-CAB, CVP)

RC-Who

Who’s using what RC technology

- Bluetooth
  - BlueRail
  - Lionel LionChief
- WiFi
  - LocoFi
- General RC
  - S-CAB
  - CVP
  - Tam Valley
  - Rail Pro
  - DelTang
  - Loco Genie

Controllers-What

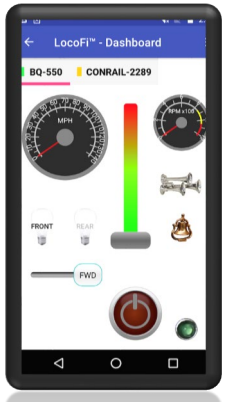
What categories of controllers are there

- Handheld
  - Tactile button controls
- Hybrid handheld+touch
  - Some buttons, some touch
- Smart App
  - Android or iOS smart device
  - Runs loco control app
  - Touchscreen controls
  - Connects direct to loco or via WiFi router

Controllers-Who

Who’s using what type of controllers

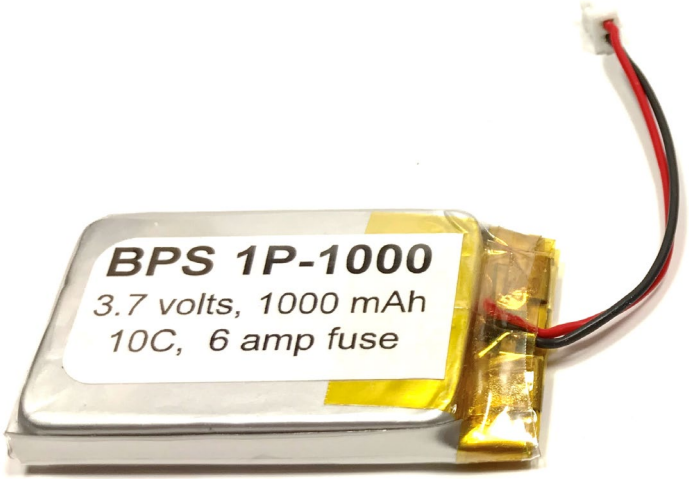
- Handheld:
  - CVP
  - S-CAB
  - DelTang
  - Loco Genie
- Hybrid:
  - Rail Pro
- Smart App:
  - LocoFi
  - BlueRail



Batteries-1 Cell

What categories of batteries are there

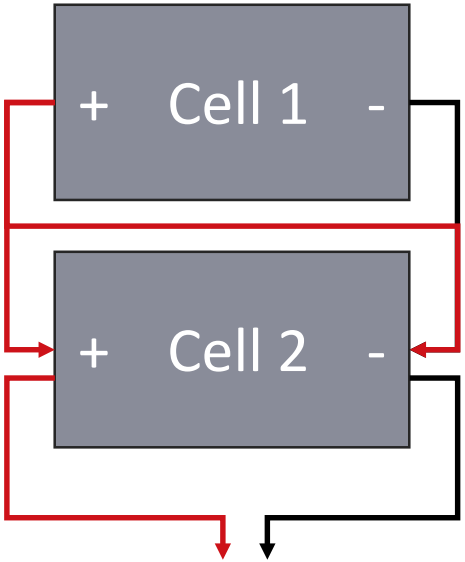
- LiPo Single Cell
  - Usually 3.7V
  - Requires step-up convertor to 9 or 12V
  - Step-up convertors only ~85-90% efficient, so factor some loss
  - The smaller the battery, the higher the C-rate required
  - Easier to recharge



Batteries-2P

What categories of batteries are there

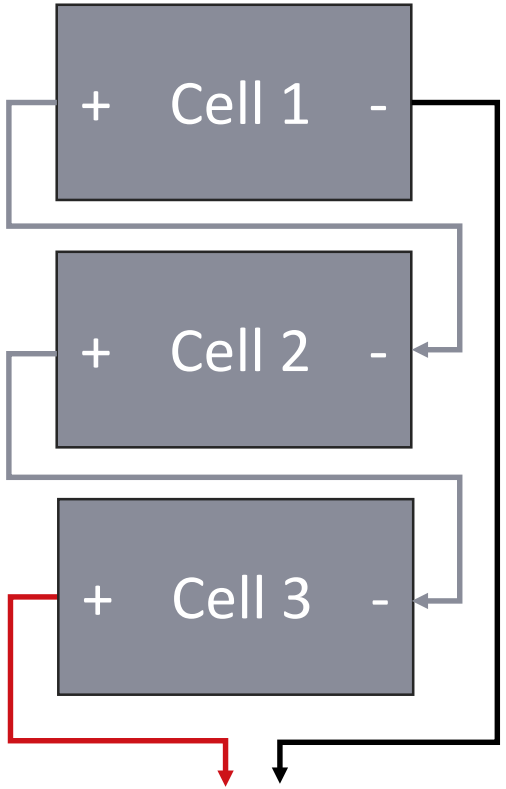
- LiPo Parallel Cells
  - Multiple 3.7V cells in parallel
  - 2-cells in parallel denoted as 2P
  - 2 cells double Amp Hours
  - Maintains same 3.7 Voltage
  - Requires step-up convertor
  - Same efficiency reduction as single
  - Same requirement for higher C
  - Same ease of recharge



Batteries-3S

What categories of batteries are there

- LiPo Series Cells
  - Usually 3-cells in series
  - 3-cell in series denoted as 3S
  - Triple Voltage: 3.7x3 = 11.1V
  - Maintains same Amp Hours
  - Fully efficient, no step-up
  - RC-type 3S usually require balance charging
  - Unbalanced 3S require high-quality cells to maintain balance
  - Doesn’t require high C-rate



C-Rate

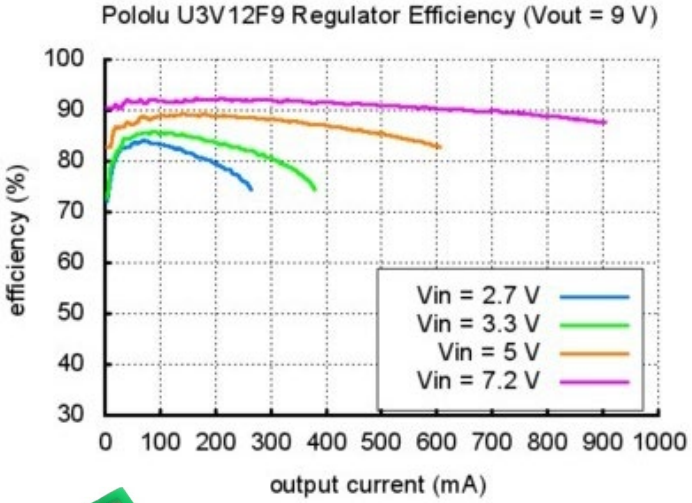
What is “C” in battery lingo

- C is the measure of the rate of battery charge or discharge
- Indicates highest “safe” rate
- Relative to Amp hours/capacity
  - Larger battery requires less C
- Example:
  - 500mAh 4C battery
  - Rated to charge/discharge at up to 2A
  - 500mAh or .5A*4C=2A

Step-Up

Why there is no free lunch when stepping up Voltage

- A step-up or Voltage convertor takes a lower voltage and “boosts” it up
- Common: 3.7V to 9V or 12V
- This does not come for free, as is only ~85-90% efficient
- The higher the difference between Voltage in and out, the lower the efficiency



Step-Up-2

How to compare two different battery topologies

- But is a 3.7V 1000mAh battery equivalent to a 3S 11.1V 1000mAh?
- No! First account for step-up loss, then divide by 3
- Example:
  - 1000 x 85% = 850mAh
  - 850 / 3 = 283mAh
- So a 3.7V actually has ~3.5x *less* usable energy than the same “1000mAh” rated 3S 11.1V battery

Detractors

What limits running time with battery power

- Smaller battery
- Inefficient/large motor
- Longer trains
- Higher rolling resistance wheels
- Steeper grades
- Sharper curves
- Larger speaker, smoke

- No Thru-The-Rails charging

Charging

What are the different methods of battery charging

- Remove
  - Requires removing the battery to place on charger
- Plug
  - Accessible plug to connect charger
- Track
  - Powered rails for systems like BPS
  - Charger connected to isolated rails

Charging-2

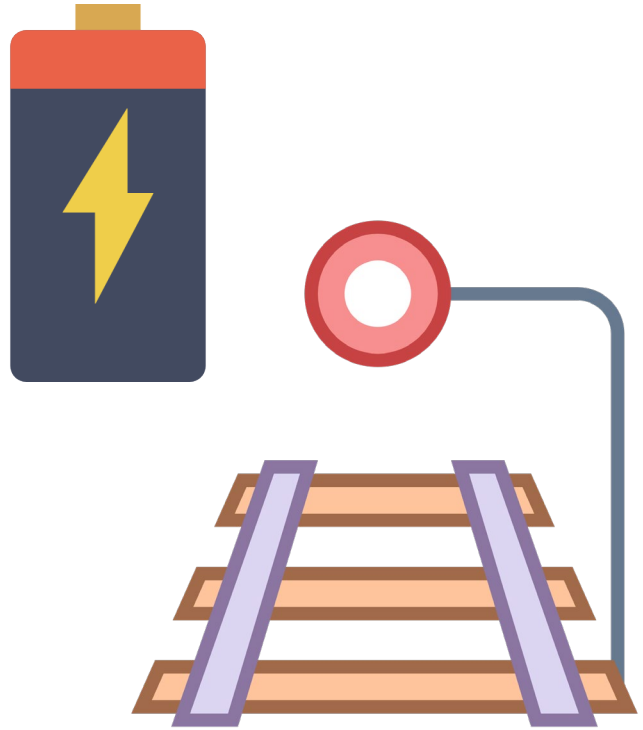
What are the pros and cons of charging methods

- Remove
  - Pros: easy to replace, safest
  - Cons: must handle loco
- Plug
  - Pros: limited wiring
  - Cons: hard to hide, some handling
- Track
  - Pros: no handling, invisible
  - Cons: extra wiring or electronics

Hybrid

What about hybrid vs. Dead Rail

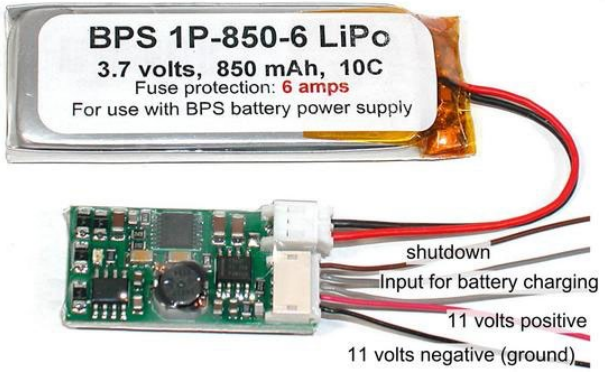
- Hybrid battery power and track power
- Use track power on wired sections
- Some systems also charge on track power
- Requires some track to be powered
- Still must clean track



Hybrid-2

What about hybrid vs. Dead Rail

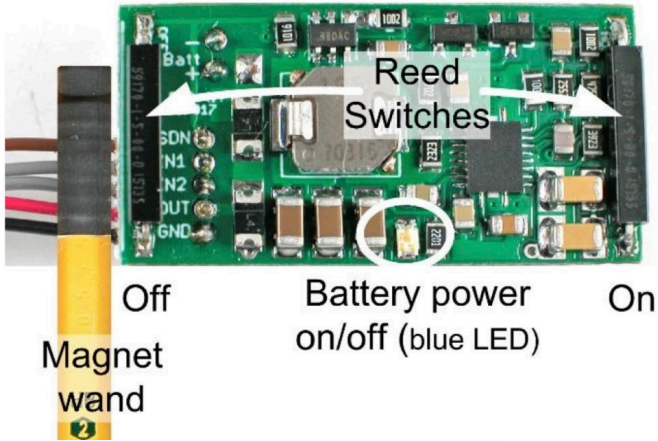
- Remove complicated wiring like turnouts and reverse loops
- Use smaller battery
- Example hybrid systems:
  - BlueRail
  - S-CAB or any BPS powered system
  - LocoFi Amrit

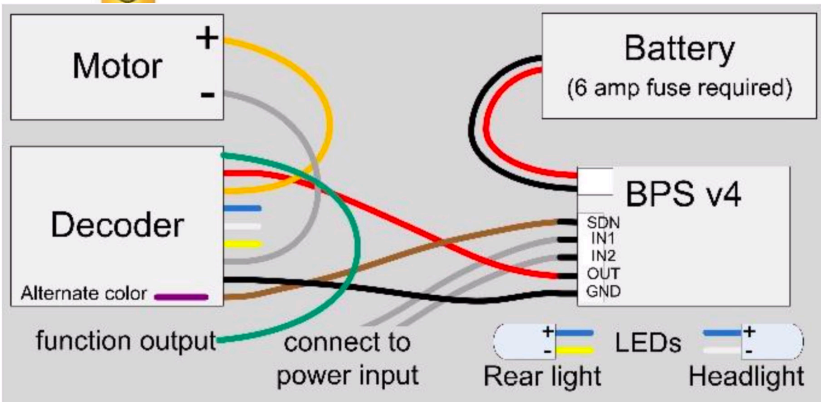


BPS

What special about Stanton S-CAB BPS

- BPS or “Battery Power Supply”
- Hybrid battery or track power
- Allows use of simple single or parallel (2P) batteries
- Integrated step-up to 11V
- Charges battery through basic DC powered track (either polarity)
- Integrated on/off reed switches as well as function key off
- Latest BPS-v4 is modest size

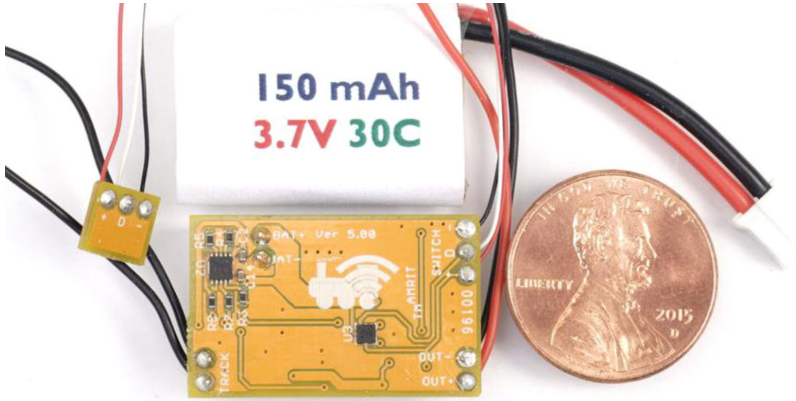




Amrit

What is coming with new LocoFi Amrit

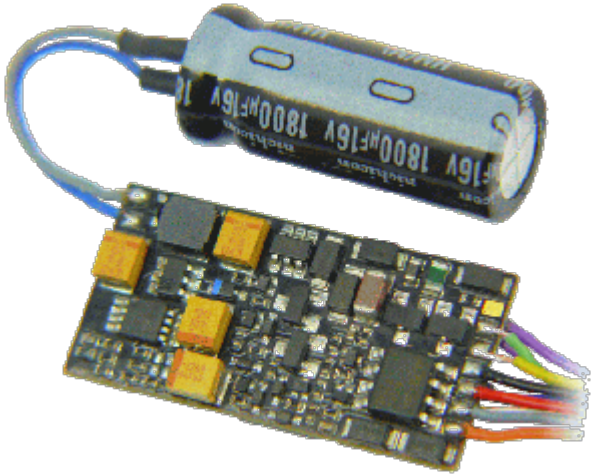
- Hybrid battery or track power
- Includes small 150mAh battery
- ~5 minutes of running
- Larger and longer running than Keeper
- Smaller and shorter running than most Dead Rail
- Eliminate some track wiring



Keeper

What about keep alive vs. Dead Rail

- Keep alive capacitors also allow for smoother running
- If used with RC system, won't lose control
- Requires most track to be powered
- 3-20 seconds of running
- Still must clean track
- Requires some added space



LED Lighting

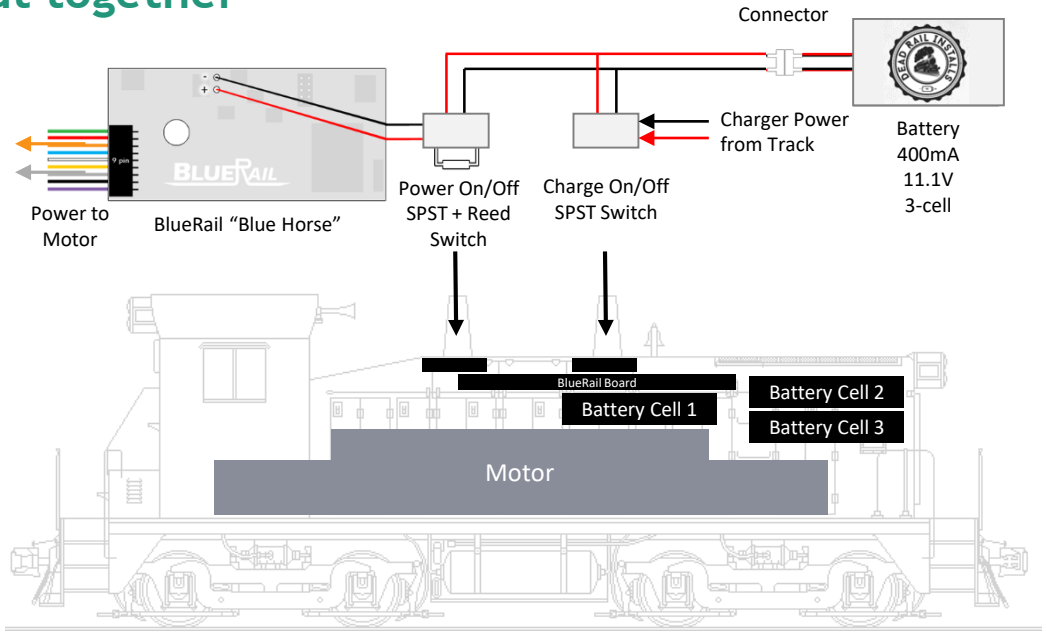
Why are LEDs needed

- LED lights required for many modern systems
- Need to replace old grain-o-wheat bulbs with LED and resistors
  - Typically 3mm LED
  - Confirm resistor specs
- Choice of color temps
  - Recommend warm white
- Use tint if LEDs too bright
- Will increase time for conversion

Exmaple-1: BlueRail

How a BlueRail Dead Rail loco is put together

- SHS SW9 S Scale Switcher
- ¾” motor clearance
- 7/8” front strut clearance
- 3S 500mAh battery “butterflied” to extend over front strut and drive
- Switches under smoke stacks
- BlueRail board atop motor
- LED converted lights

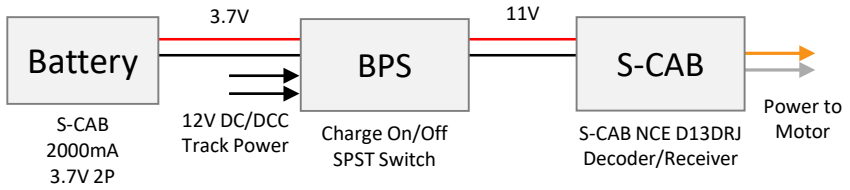


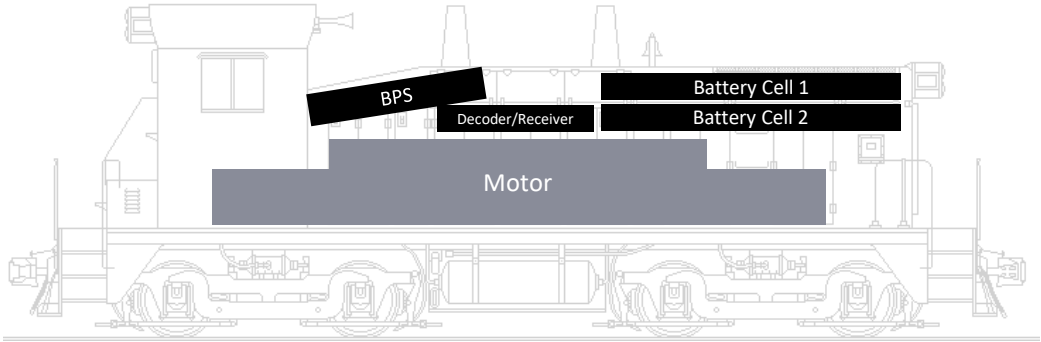
Darby Marriott

Exmaple-2: S-CAB

How an S-CAB Dead Rail loco is put together

- SHS SW9 S Scale Switcher
- 2P 2000mah battery fits over front when plastic protrusions shaved off
- BPSv4 in front of cab
- Wireless decoder/receiver between battery and overlapping BPS
- LED converted lights



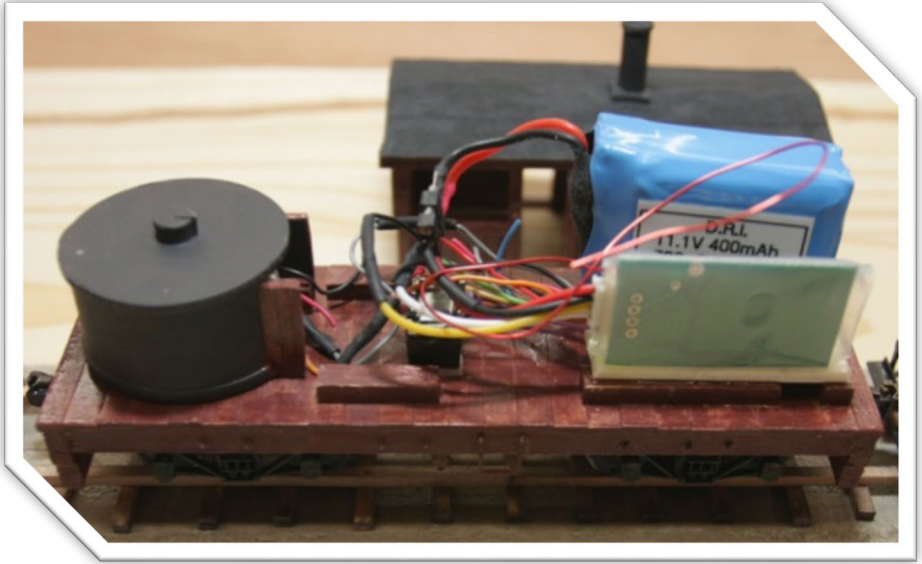


Alex Binkely

Exmaple-3: Tam Valley

How a Tam Valley Dead Rail loco is put together

- Sn42 Class A Dunkirk
- 3S 400mah battery fits inside cab
- TV DSR1 receiver
- Zimo MX646 DCC Decoder
- Small cube speaker
- Cab fits over
- Remove battery to charge



David Heine

Exmaple-4: CVP

How a CVP Dead Rail loco is put together

- American Flyer 21004
- DC can motor swap
- Airwire G3 Decoder/Receiver in tender
- 850mAh Battery in trailing car
- Remove battery for safe recharging

Steve Galka

Exmaple-5: LocoGeni

How an MRC Loco Genie Dead Rail loco is put together

- SHS 2-8-0 + additional locos
- Stanton BPSv4 w/ 2000mAh 2P battery in tender
- Each loco has its own controller
- Each with lights, sound, momentum
- Throttle push buttons up/down

Luther Stephens

Manufacturers

Who makes Dead Rail or compatible systems

- BlueRail Trains
- Stanton S-CAB
- CVP
- Tam Valley/Dead Rail Installs
- Ring Engineering Rail Pro
- DelTang/The On30 Guy
- LocoFi
- MRC Loco Geni*

Installers

Who's in the business of Dead Rail installs

- Rerailer Hobbies (Robert South)
  - rerailerhobbiesllc@gmail.com
  - www.facebook.com/Rerailer.Hobbies.LLC
- Dead Rail Installs (Pete Steinmetz)
  - info@deadrailinstalls.com
  - www.deadrailinstalls.com
- Remote Control Systems of New England (Don Sweet)
  - donsweet@rcsofne.com
  - www.rcsofne.com

BLUERAIL Trains
Bluetooth Smart Train Control

S-CAB

DT RC
CONTROL SYSTEMS

BLUERAIL Trains
Bluetooth Smart Train Control

Tam Valley

CVP Products
AIRWIRE

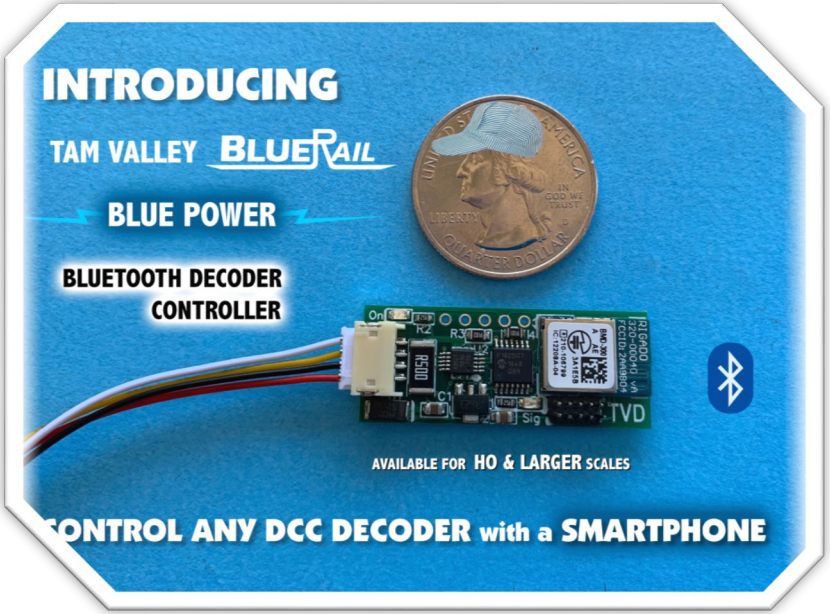
RailPro™

Precision RC
TRAIN ENGINEER 2.4 GHz
REVOLUTION

New: BlueRail

What's new from BlueRail

- New BlueRail "BluePower"
- 2Amp and 6Amp versions
- Hybrid AC/DC/Dead Rail
- Mates to your DCC decoder
- Control and configure DCC decoder values via updated smart app
- Developed in cooperation with Tam Valley
- http://bluerailtrains.com/tam-valley-dcc/

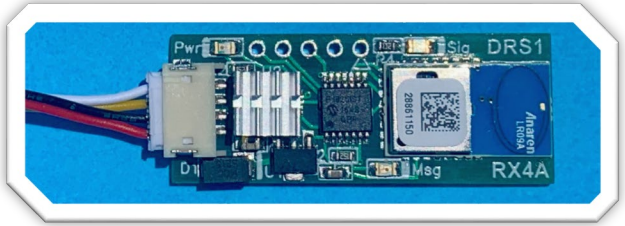


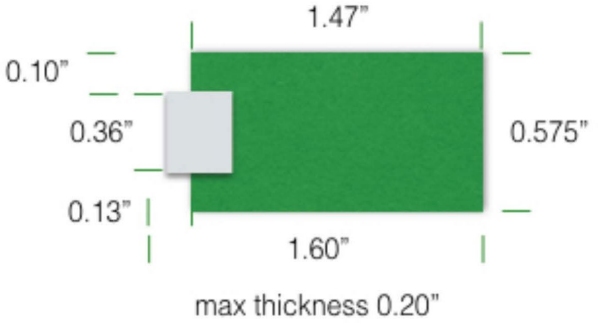
www.bluerailtrains.com

New: Tam Valley

What's new from Tam Valley

- New Tam Valley DRS boards
  - DRS MkIV (2Amp, up to 30V)
  - DRS MkIV High Power (5Amp)
- Mates to your DCC decoder
- Compatible with existing control systems
  - CVP 1-16 frequency
  - Autosenses between 916mHz and 869mHz



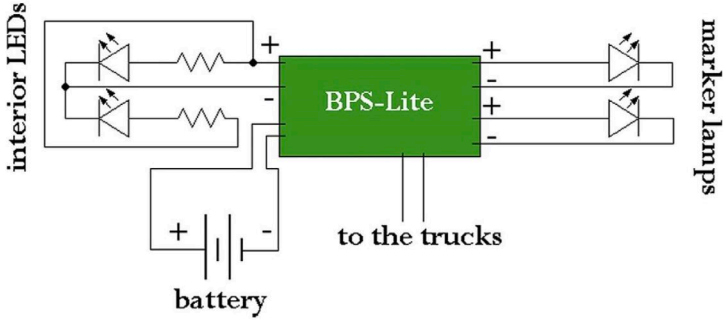


www.deadrailinstalls.com

New: S-CAB

What's new from S-CAB

- Working to innovate on new product development in 2019
- Orders still being accepted (see webpage for details)
- "BPS-Lite" A Battery-Powered Caboose by Peter Vanvliet
  - April-May S Scale Resource
  - https://sscale.uberflip.com/i/1097359-april-may-2019

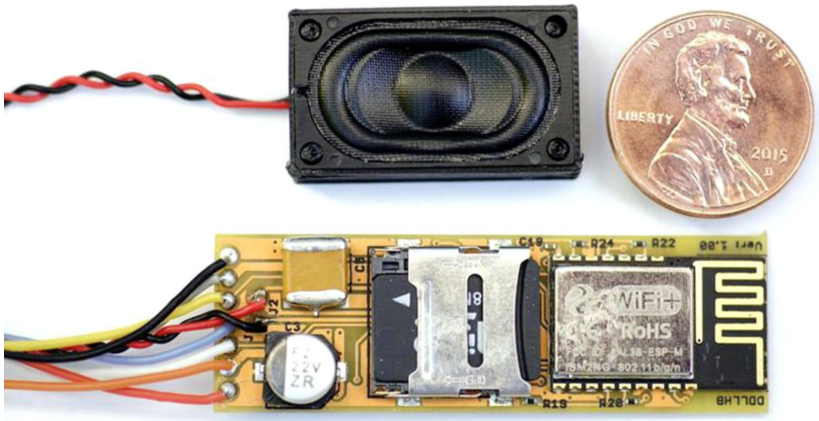


www.s-cab.com

New: LocoFi

What's new from LocoFi

- New LocoFi2 smaller board
- Jim Kellow article in S Scale Resource June-July page 20:
  - https://sscale.uberflip.com/t/147961-sscale
- Still to come:
  - Amrit hybrid battery backup solution

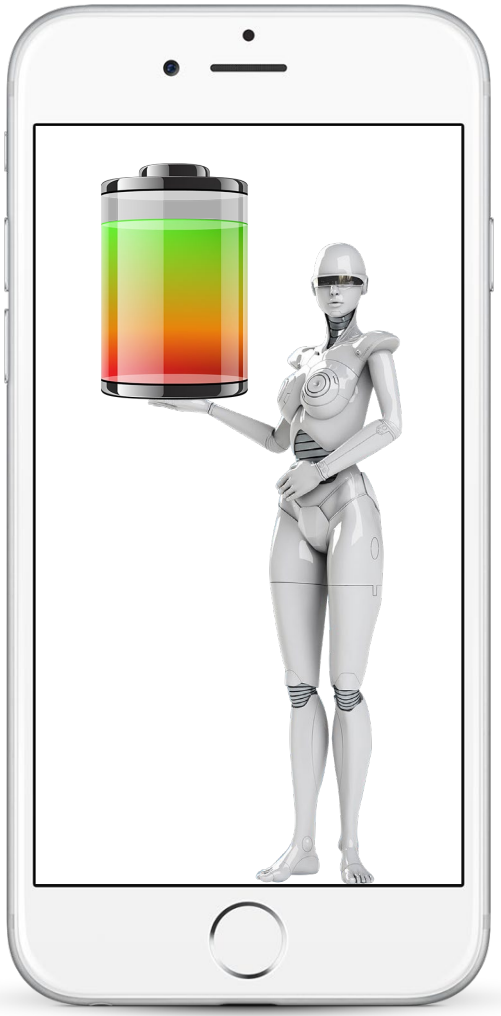


www.wifimodelrailroad.com

Future

What can we hope for in the future for Dead Rail

- Smaller boards, more features
- Smaller, high-energy batteries
- Safer, non-LiPo battery tech
- Smaller charging system via rails or via induction
- More major industry support for RC control and Dead Rail
- More turnkey options
- Battery voltage monitoring



Links

Some great Dead Rail links to explore

- Tam Valley
  - http://www.tamvalleyrr.com/images/DRS_Book_version_Oct_2013.pdf
- S-CAB
  - https://www.s-cab.com
- ON30 Guy (see links across the bottom of this webpage)
  - https://www.on30guy.com/dead-rail-primer/
- CVP
  - http://www.cvpusa.com/doc_center/r1_B&W_CONVRTR-15_web.pdf
- Dead Rail Society
  - https://www.deadrailsociety.com

Social

Social Media and Online forum links

- Facebook:
  - https://www.facebook.com/groups/deadrailsociety/
- Groups.io:
  - https://groups.io/g/DeadRailSociety/
- Freerails:
  - http://www.freerails.com/view_forum.php?id=45

Questions?