

DeadRail Lessons Learned

From 150+ DeadRail Installations

Duncan McRee and Steve Seidensticker, September 2026

Why Deadrail

- Don't like to clean track? Nether do we. Same with wheels.
- Your turnouts have live frogs? Dead frogs? Insulated frogs? Juicy frogs? **Deadrail** is frog species agnostic.
- Not sure how to wire a return loop? Forget polarity! Forget DPDT switches! **It's deadrail.**
- Don't know how big a circuit breaker needed to protect against shorts? Forget about circuit breakers! **It's deadrail**
- What is the best DCC command station? We don't need no stinking command station! **It's deadrail.**

Voltage, Capacity, & Run Time

- Voltage determines max speed at full throttle. Typical large scale loco requires 14-16 volts. HO scale 10-12 volts
- Capacity determines max run time per charge. Expressed as milli-amp-hours (mAh)
- Modern can motors are very efficient
- Expect several hours of run time per charge with typical deadrail installation
- To determine theoretical run time divide battery capacity by loco current draw. e.g. Loco with a 2000mAh battery drawing 1000mA will run two hours/charge

Typical Current Draw

Loco and Load	Amps Large Scale	Amps HO Scale
Medium Size Steamer/4-Axle Diesel Running Light	<1	<0.25
Pulling Short Train on Level Track	1-2	0.25-0.5
Pulling Long Train on Level Track or Shorter Train up a Hill	1.5-2.5	0.5-1
Maximum Load (Drive Wheels Slipping)	2-3	0.5-1.5

Different Approaches to Large Scale and Smaller Scales

G & O Scale	S & HO Scale
Ample Room for all Components in the Loco	Tight Squeeze. May have to Put Components into Dummy Unit or Trailing Car
14-16 Volt Battery Packs	Individual 3.7 Volt cells wired in series to get 10-12 Volt Operating Range
Super Simple Wiring	Complex Wiring Organized by Tam Valley Depot Battery Buddy

Batteries

Large Scale

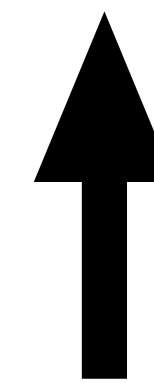
- Lithium-ion 14.8v 3350mAh 4-cell pack
- Good for 90% of installations
- Will run typical large scale loco 3+ hours
- Nice selection from RLD Hobbies, Reindeer Pass, CVP. About \$60
- Fits nicely into cab of Bachmann Shay or Climax



Batteries

S & HO Scale

- Lithium-polymer(Lipo) 3.7v
250-2000mAh individual cells
- Must be wired in series to get
10-12 volts
- Will run typical HO scale loco 2+
hours
- Many sources - Adafruit, Sparkfun,
Amazon. \$2-10



Note: Kapton tape
indicates protection circuit

Batteries

Lipo Size Code

- Not a standard but convention adopted by Lipo manufacturers
- Six digit part number usually preceded by “LP”
- First two digits=Thickness in millimeters & tenths of millimeter
- Middle two digits=Width in mm
- Last two digits=Lengh in mm



This battery is 5.0x30x42 millimeters

Battery Considerations

- Stick with lithium. Best power density. Nickel-cadmium & Nickel metal hydride were popular but are now obsolete.
- Lithium batteries **are not dangerous** when treated respectfully
- Buy & use only batteries with protection circuits. Model aircraft batteries generally do not have protection circuits
- Protection circuits protect against overcharge, under voltage, overcurrent, & shorts
- When voltage drops to protection circuit's minimum level loco will stop abruptly & not move until battery charged
- Do not store lithium battery in depleted state. They may self discharge to the point that they cannot be charged

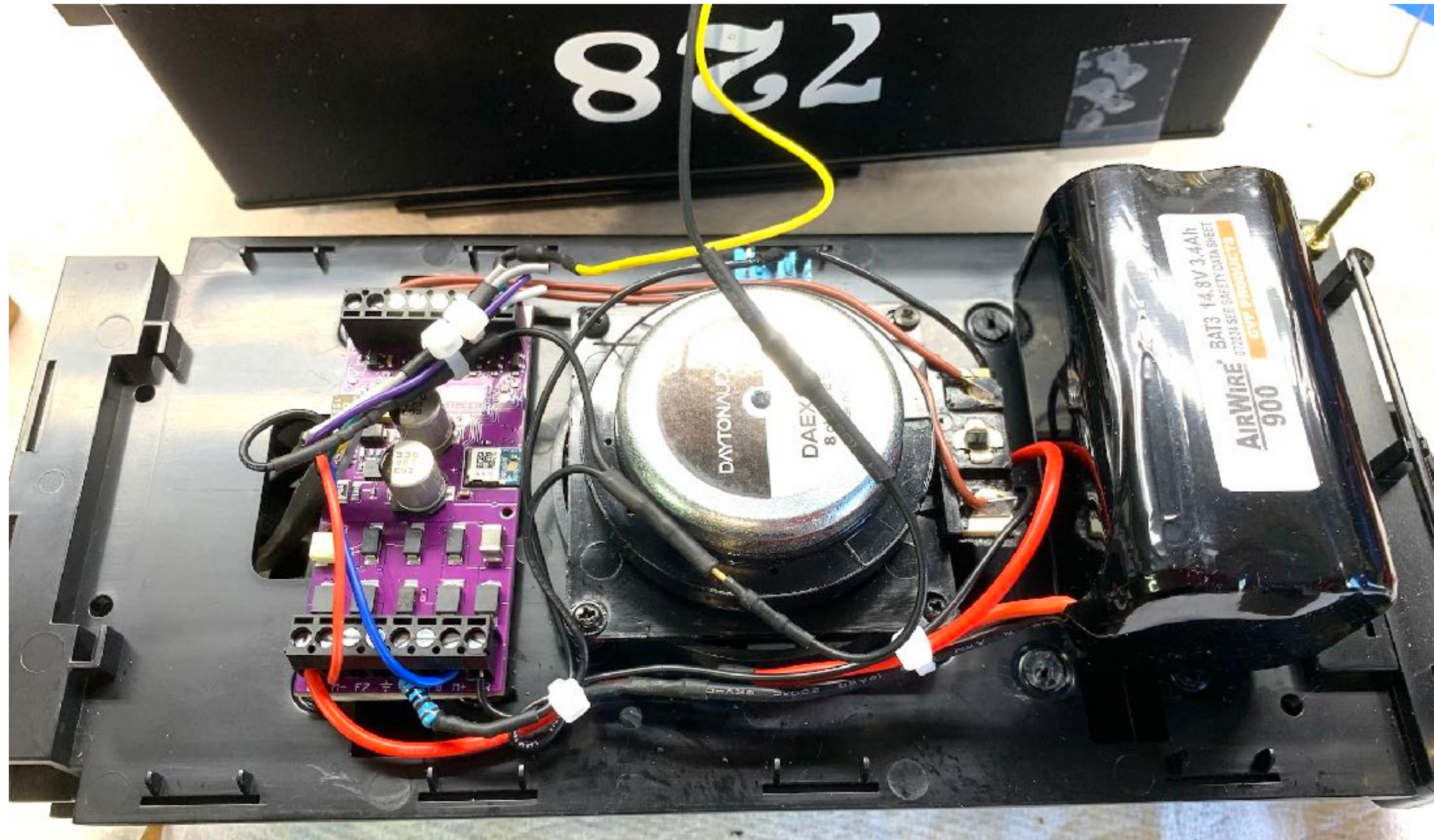
Battery Considerations

Inadvertent Overcurrent Trip

- Some sound decoders may experience a surge of “inrush” current when powered on
- This may trip the overcurrent sensor in a battery protection circuit
- This will present as a dead battery or a phantom short leading to lots of head scratching, cursing, & hair tearing
- Solution is to insert a 0.5-1 ohm 1-2 watt resistor in the power circuit

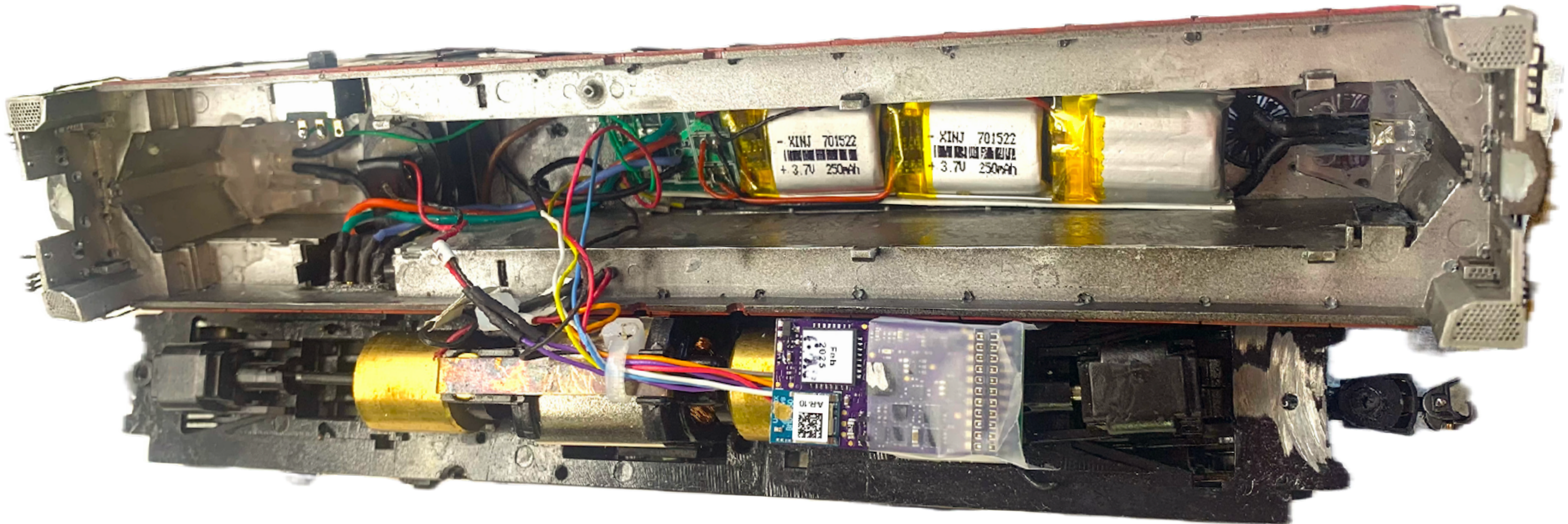
Battery Placement

- Large Scale - Almost Anywhere, Inside Diesel Body, Fuel Tank, Steam Tender, Steam Cab (wrap in black tape to make unobtrusive)



Battery Placement

- S & HO - Tuck in where possible. Remove/Modify Weights. Glue to underside of diesel roof. Steam Tender, Trailing Car, Dummy Diesel.



Power Switches

- **Large Scale**

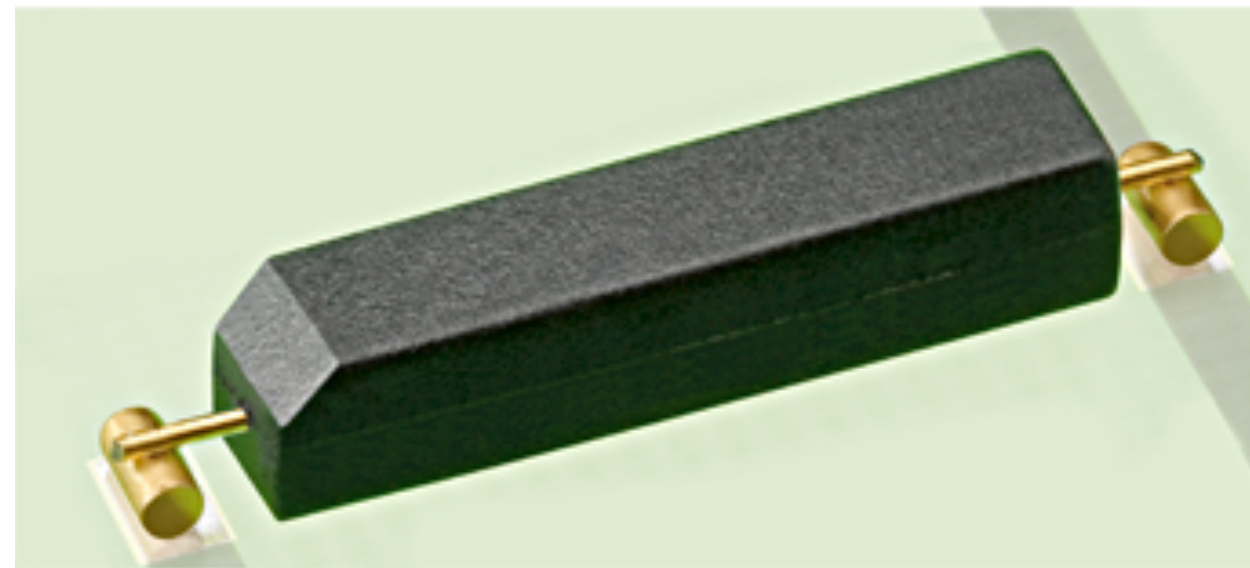


Simple on/off toggle
(mini SPST)

Fits into 0.25" hole

Put into reachable but
unobtrusive location

- **Smaller Scales**



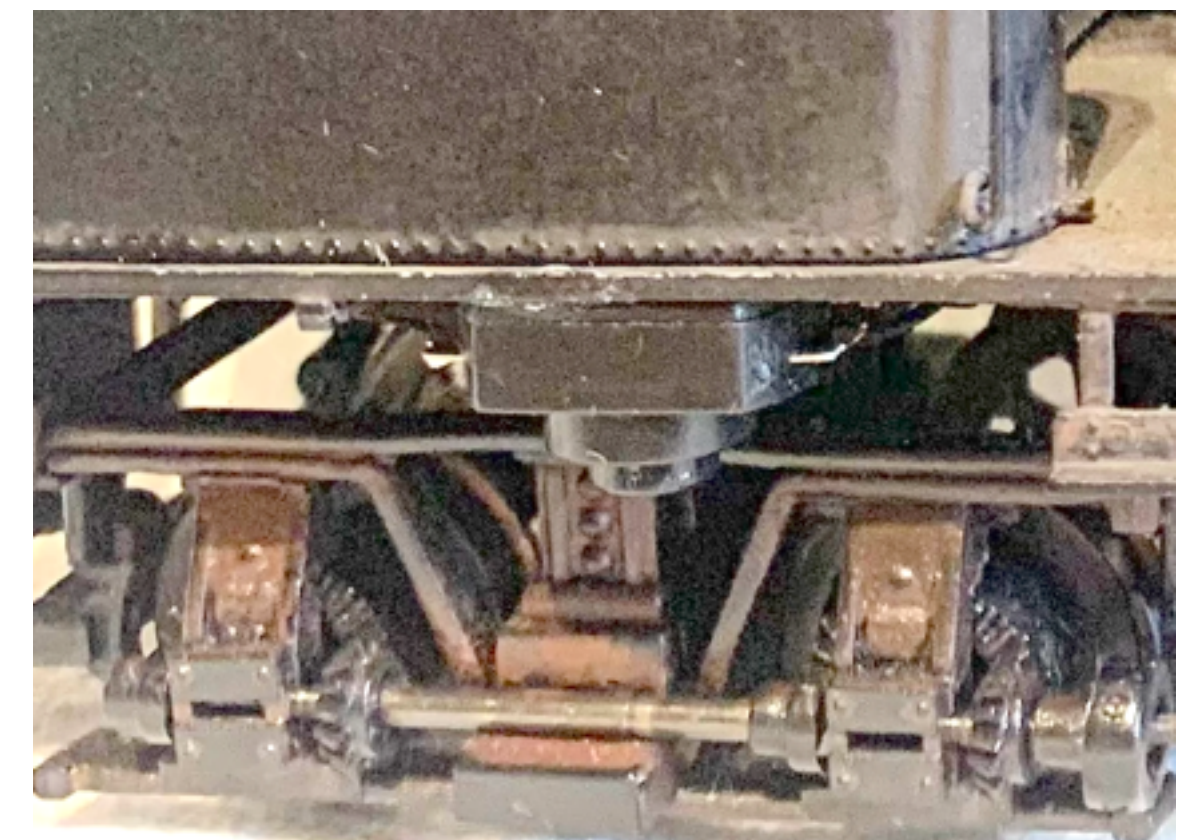
Magnetic Latching
switch

Keep away from
speakers & motors

Push Button Latching
switch



Hide in plain sight



All available from Tam Valley Depot

Charge Port

- **Large Scale**



5.5x2.5mm barrel connector

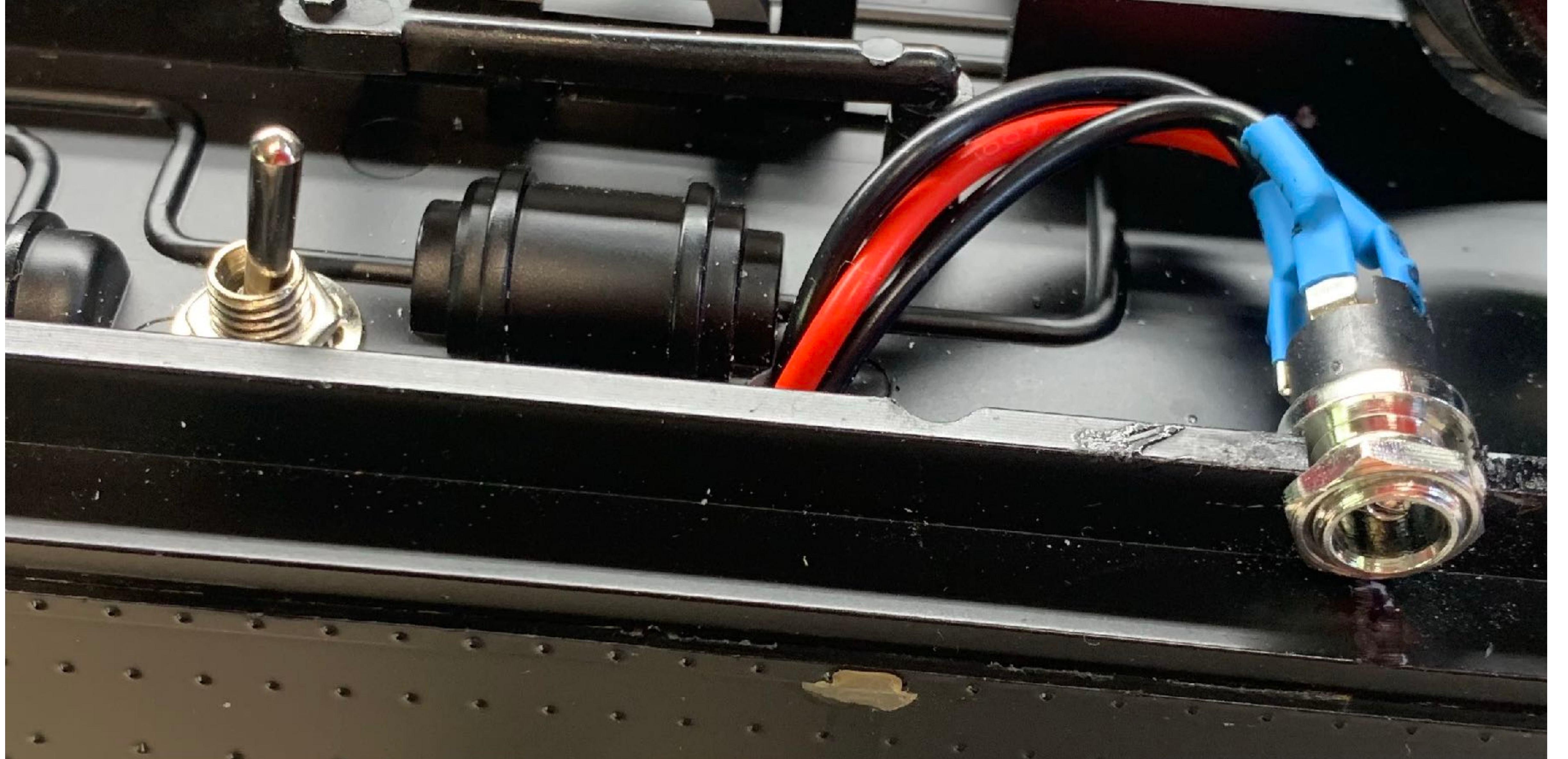
3-tab female receptacle
incorporates switch that
isolates decoder when charging
Fuel tank, tender, or under frame
Available from Tam Valley Depot

- **Smaller Scales**



4-connection port allows
balance charge of each cell

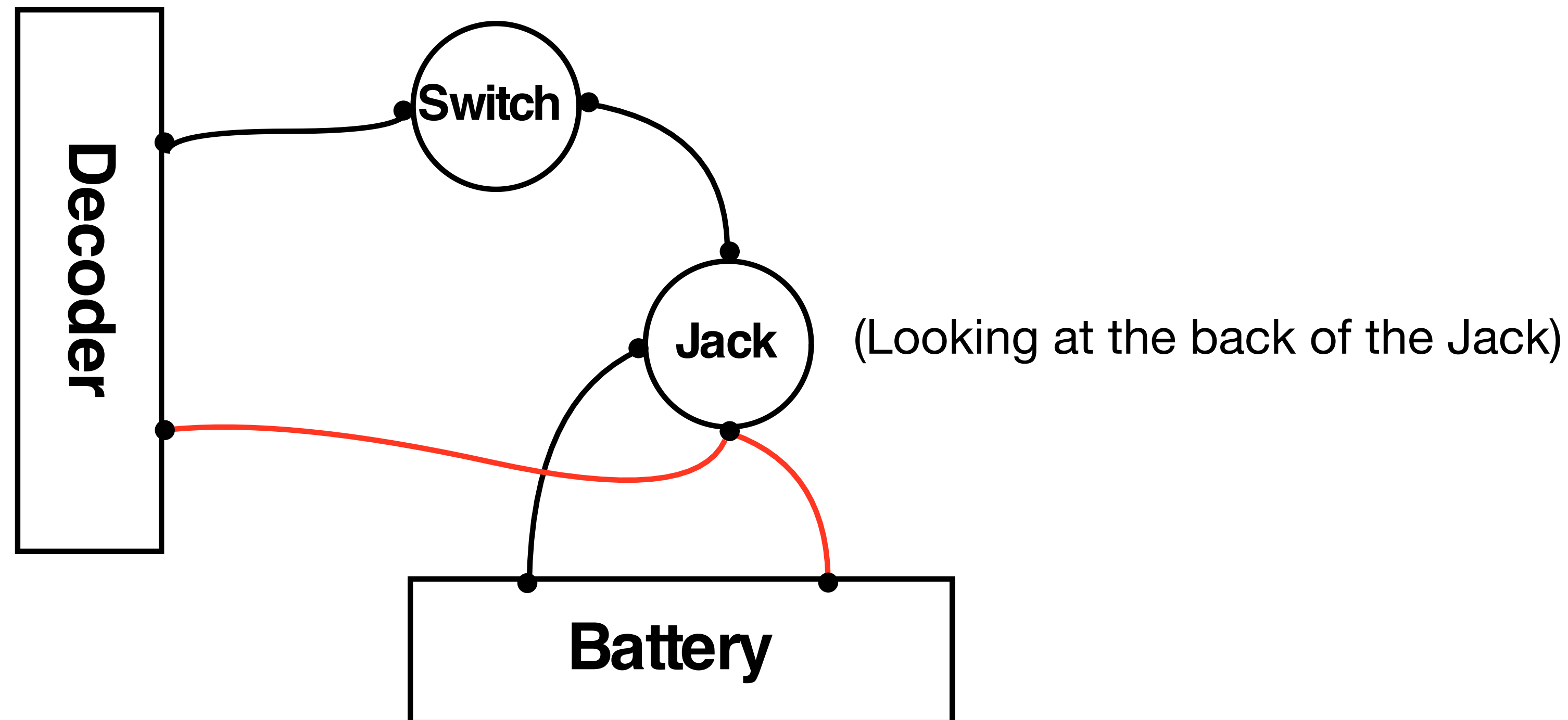
Port is part of Tam Valley
Battery Buddy



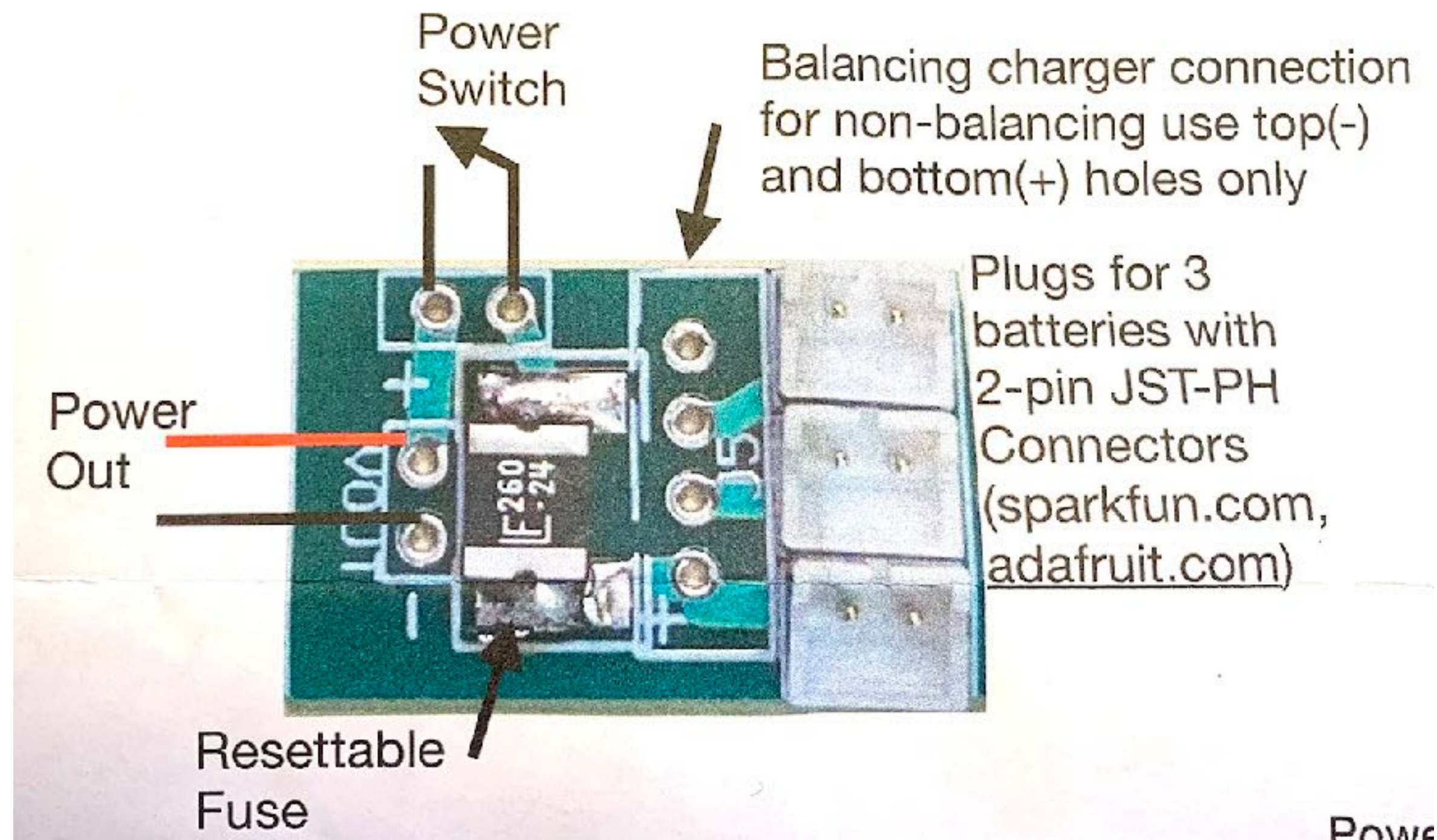
Simple Large Scale Wiring

Circuit to Use Three Connection Charging Jack

Jack will Connect Charger to Battery and Disconnect Decoder when Plug is Inserted



Tam Valley Battery Buddy



Organizes wiring for S & HO installations

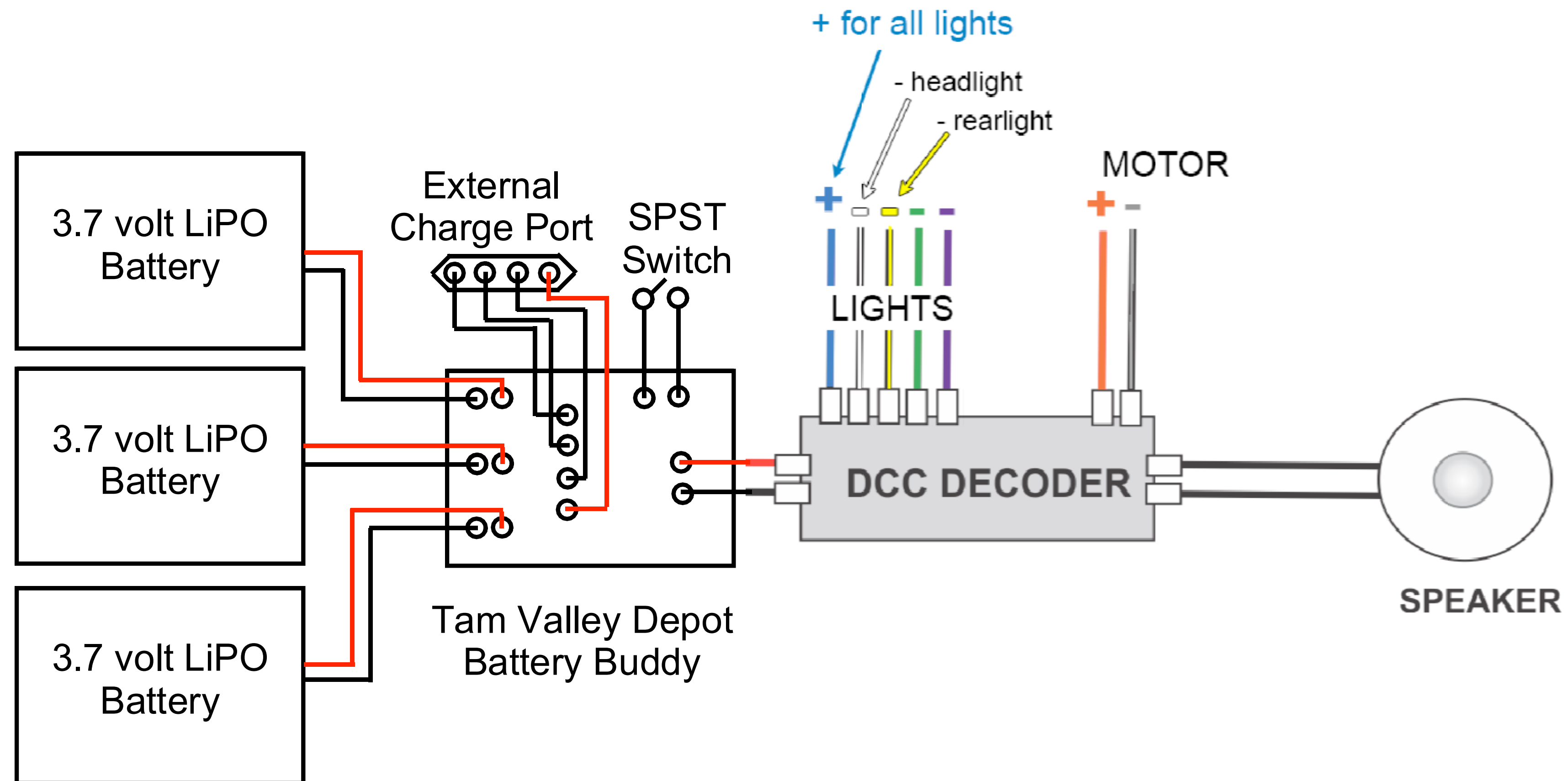
3.7v Lipo cells plug into the Buddy

Cells can be located wherever there is room

Charge port can be attached or located elsewhere & wired to the Buddy

4-connector port allows balance charging & individual cell monitoring

Tam Valley Battery Buddy



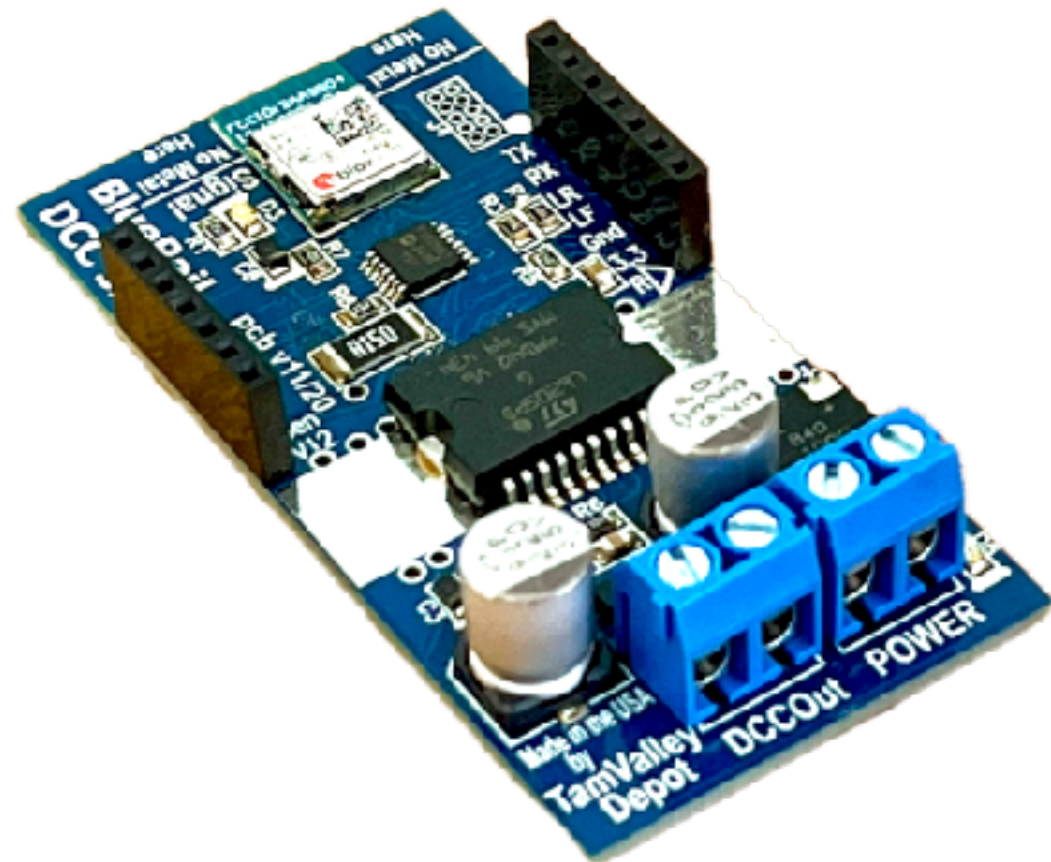
Blunami

- Control app that runs on IOS & Android smartphones & tablets
- Maintains 2-way Bluetooth link between app and decoder
- Control range greater than 100 feet (uses different protocol than Bluetooth audio)
- Sophisticated & comprehensive user interface
- Licensed to Tam Valley Depot & Soundtraxx
- Free download
- Extremely popular

Preferred Decoders - Tam Valley Depot

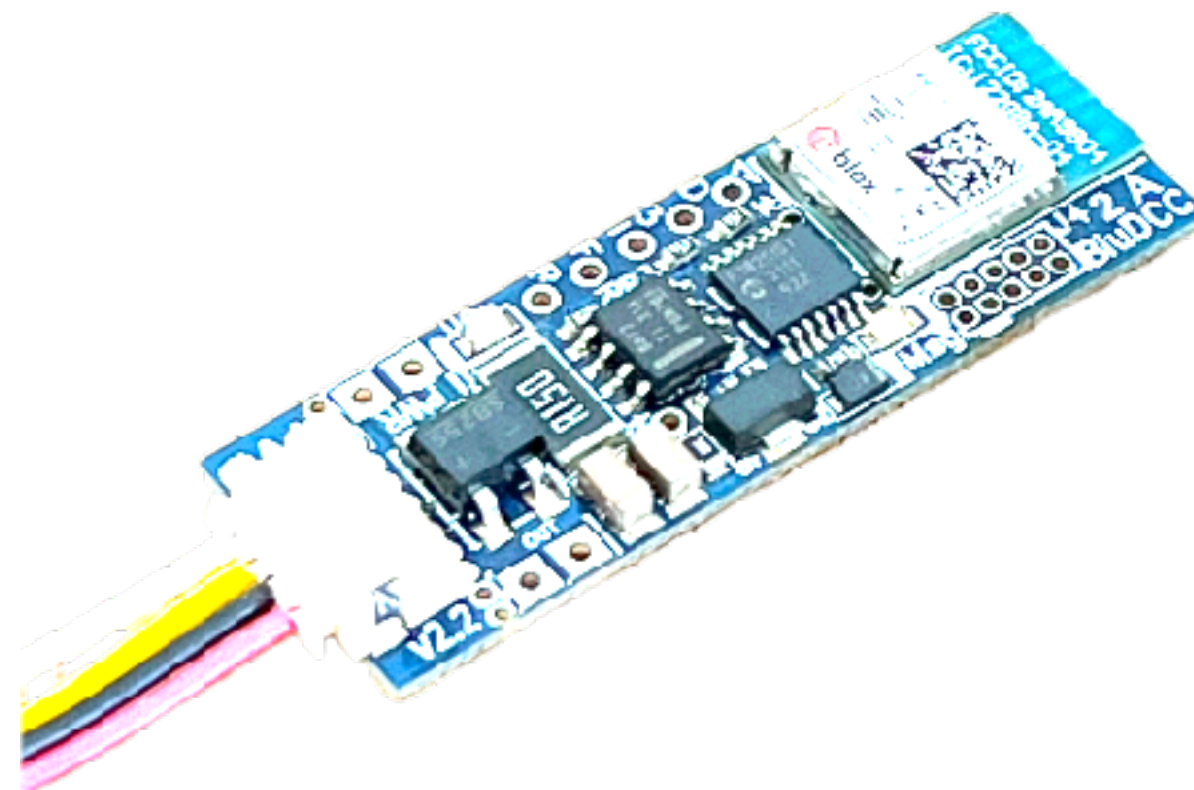
- Controlled by Blunami app via Bluetooth link
- Can function as mobile decoder or can drive any NMRA DCC decoder
- Available directly from Tam Valley Depot

BlueRailDCC 5A



- 1.35x2.75 inches
- \$99
- 5 amp load

BlueRailDCC 2A



- 0.57x1.73 inches
- \$59
- 2 amp load

Preferred Decoders - Soundtraxx

- Controlled by Blunami app via Bluetooth link
- Full sound with 100s of prime mover sounds, steam sounds, whistles, bells, & horns
- Available from Soundtraxx and many dealers

BLU-4408



- 2.72x1.2 inches
- \$259
- 4 amp load

BLU-2200



- 1.65x0.74 inches
- \$170
- 2 amp load

BLU-1100



- 1.22x0.41 inches
- \$176
- 1 amp load

Preferred Chargers - Large Scale

Super Simple Operation

- No Controls - Two Indicators
- Red light=Charging
- Green=Charged

Only for 14.8v Li-on/Li-Po Packs

Depleted battery charge may take several hours

Available from Tam Valley with correct plug



Preferred Chargers - S & HO Scale

Super Simple Operation

- No Controls - Indicators for each cell
- Red light=Charging
- Green=Charged

Only for 3.7v Li-on/Li-Po Cells

**Charges each cell separately-
Better for small cells**

**Available from Tam Valley with
correct plug - Cable also
available separately**



Tam Valley Large Scale Kit

Power Toggle

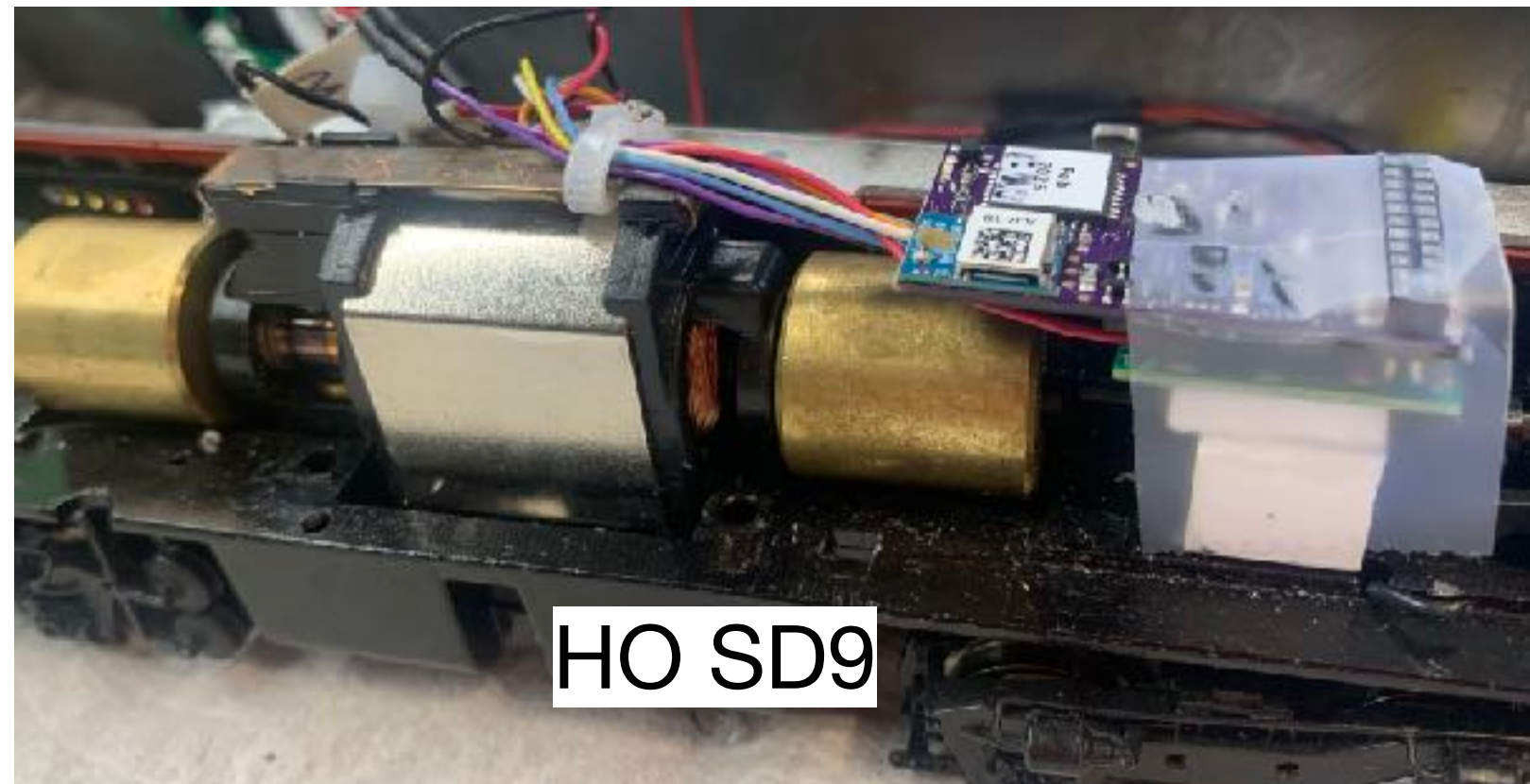
Power Plug

3-tab Receptacle

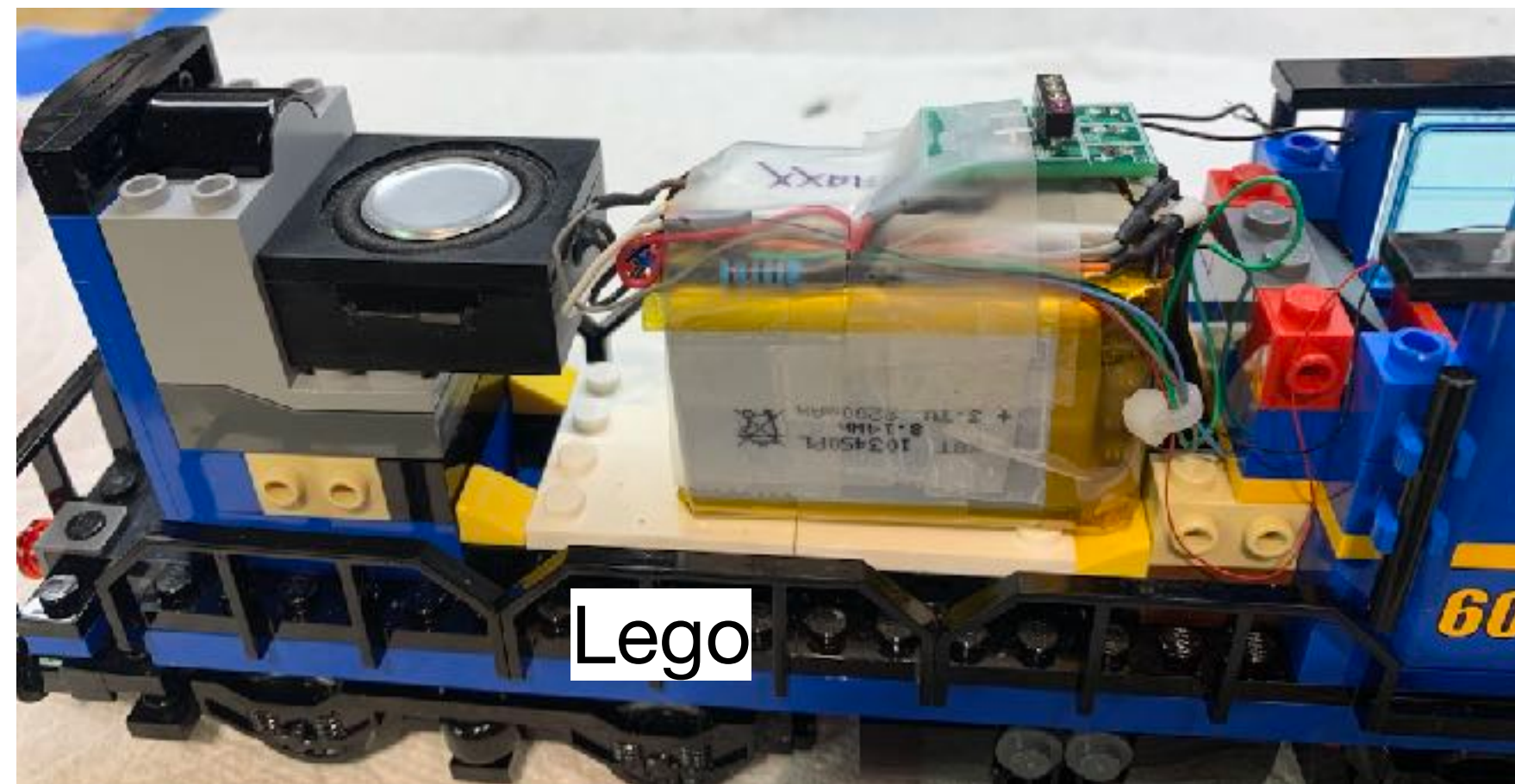
Charger (optional)



Typical Installations



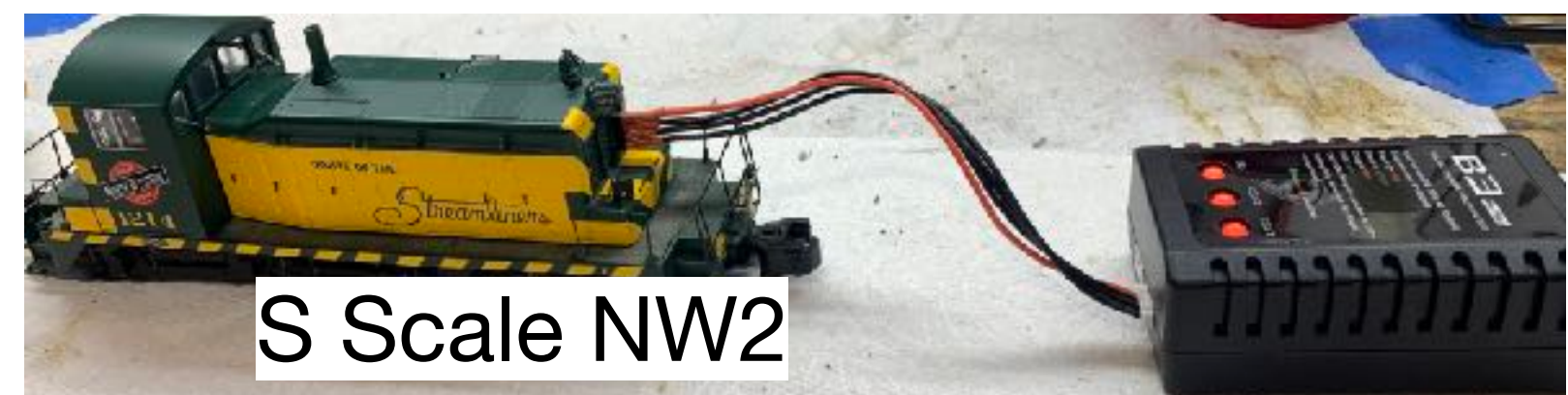
HO SD9



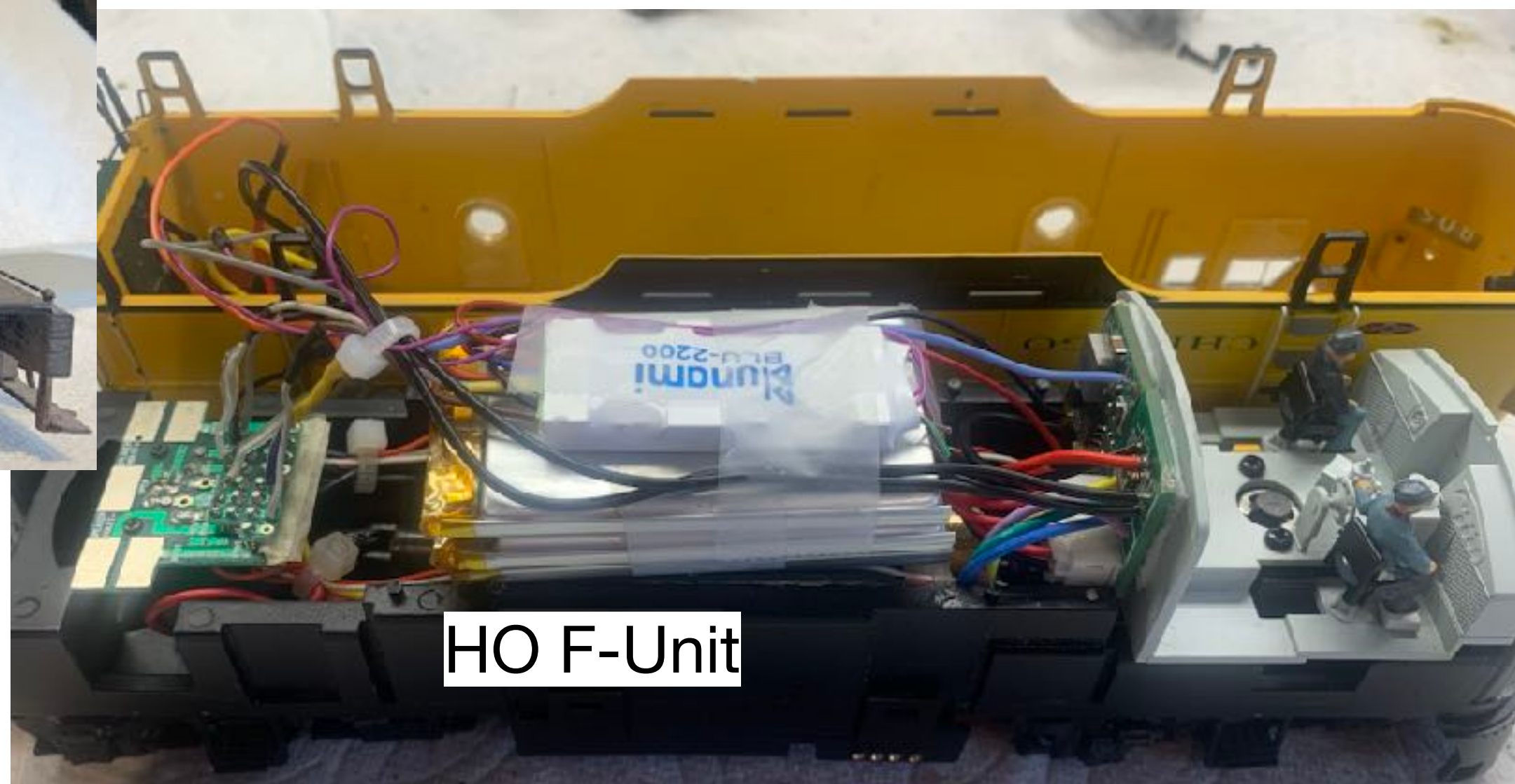
Lego



Bachmann ON30 Shay



S Scale NW2



HO F-Unit



S Scale SW?