Battery Power for G Scale
By Dan Stenger
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Why battery power?

1. You don't have to clean track!
2. Don't have to maintain connectivity or conductivity on track.
3. No wiring to track except to control switches.
4. Reverse loops, wyes and turntables…no problem.
5. Can run with live steam locos.
6. Cruise Control feature or BEMF

Why not battery power?

1. Added cost depending on whether you want sound.
2. Some locos have limited space for batteries.
3. Limited automation

Components
    a. Battery Pack 14.8v
        a. Types

Type	Pro	Con
Gel	Inexpensive	Large, heavy, has memory
Nickel Cadmium	Better option	Have memory – discharging completely can shorten life
Nickel Metal Hydride (NiMH)	Better option	Faster discharge rate, cannot handle high discharge rate, high self-discharge rate
Lithium Ion (LiOn)	Best option	Best cost/weight/size ratio, no memory, complete discharge will ruin battery
Lithium Polymer (LiPo)	Smaller	Must be balanced, lower cost/weight/size ratio compared to LiOn

        b. Runtime

maH	Runtime per motor
2600	1.5-2 hrs
4400	2.5-3 hrs
5200	4.5-5.5 hrs

        c. 18.5 volts = faster run speed
    b. Controller - Transmitter and Receiver
        a. Airwire http://www.cvpusa.com/airwire_system.php
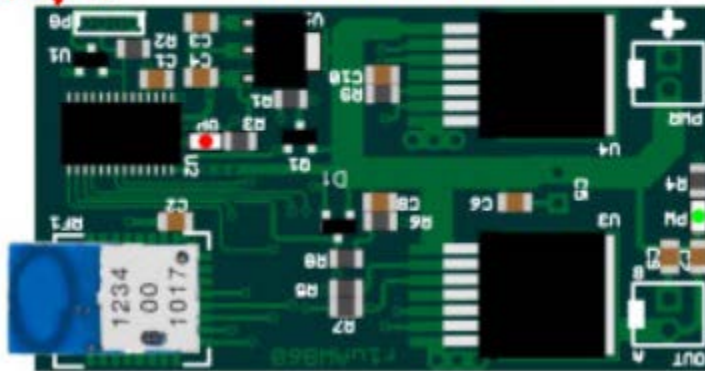   i. G4x Receiver http://cvpusa.com/airwire_g4x.php

G4X - 1.4 in x 4.0 in x 0.4 in

ii. Convrtr-60. Use with any standard NMRA compliant high current decoders such as the TCS-WOW 5A or TSU-4400 Digital Sound Decoders Some smaller locos can get by with a Convrtr-20.
http://www.cvpusa.com/airwire_convrtr_series.php#convrtrinfo

iii. T6000 PRO-OPS Wireless Throttle http://cvpusa.com/airwire_t6000.php
Note- You cannot use the T2300 Ops throttle to program.

b. Remote Control Systems - https://www.rcs-rc.com/
c. RailPro https://www.ringengineering.com/RailPro.htm
RailPro starter set - RPK-1 RailPro Starter Kit Includes one HC-2 handheld controller and one PWR-56 power supply

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Package Contents:
· HC-2 Handheld Controller
· PWR-56 Power Supply
· PWR-56 Power Adapter
· 110 VAC Power Cord
· HC-2 Battery Charger
· USB Cable
· User Manual

   d. Sountraxx Blunami – Sound and wireless control using your Android or Apple Smartphone; SOUNDTRAXX BLU-4408
 c. Miscellaneous
   a. Connectors
http://www.allelectronics.com/make-a-store/item/CON-440/4-CONDUCTOR-LOCKIN
   b. G-CONNECTORS-W/LEADS/1.html
http://www.allelectronics.com/make-a-store/item/CON-240/2-CONDUCTOR-LOCKIN
   c. G-CONNECTORS-W/LEADS/1.html
   d. 2.1 mm coaxial power jack https://www.amazon.com/HiLetgo-Supply-Socket-FemaleConnector/dp/B07XCNSM81/ref=sr_1_18?crid=2MQ1L5UBBQ9K7&keywords=2.1+coaxial+power+jack&qid=1697326826&sprefix=2.1+coaxial+power+jack%2Caps%2C106&sr=8-18
   e. 2.1 mm coaxial power plug https://www.amazon.com/Fancasee-Replacement-Solder-Connector-Adapter/dp/B07Y8M8TWM/ref=sr_1_35?crid=34K6PCRA8DMHQ&keywords=2.1+coaxial+power+plug&qid=1697327067&sprefix=2.1+coaxial+power+plug%2Caps%2C124&sr=8-35
   f. Miscellaneous 24-28 gauge stranded wire
   g. SPDT center off switch

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Sound System – Sound only requires Airwire Convertr or similar.
1. Phoenix P8, P11 http://www.phoenixsound.com/
2. QSI Sound Solutions http://qsisolutions.com/
3. Train Control Systems WOW DCC Controller with Sound. Use with Airwire Convertor
   https://tcsdcc.com/1600
4. Soundtraxx Tsunami DCC Controller with Sound.
   https://www.soundtraxx.com/dsd/tsunami2/products/tsu4400.php

Battery Charger
1. Tenergy B6S smart charger, w/ included power supply.
   a. Will charge Lithium- ion, Lithium - Poly, NIMH and NICAD.
   b. Adjustable charge rate, full digital display,3 mode safety shutdown, will auto detect voltage of pack up to 22.2 v.
   c. 5 pack memory function , will also discharge and auto cycle pack for conditioning.
   d. $74.95
   e. http://www.rctrains.com/BatteriesandChargers.htm
2. Triton http://www.ebay.com/itm/like/190788875083?lpid=82 $99.95
   a. Charges 1-24 cell NiCd, NiMH (1.2-28.0V), 1-6 cell LiPo, Li-Ion, LiFe (3.3, 3.6 or 3.7V cells)
   b. Adjustable charge current from 0.1-8 amps makes this charger ideal for many applications including tiny to large electric planes and helis, TX and RX batteries, field batteries and more
   c. 0.1-3.0A adjustable discharge current
   d. Built-in balancing for up to 6S LiPo, Li-Ion or LiFe (A123) cells with FlightPower and ElectriFly adapters (GPMM3200 and GPMM3201)
   e. Precision peak detection with adjustable sensitivity for NiCd and NiMH batteries
   f. Constant current/constant voltage charge method for Pb and lithiums
   g. Performs 1 to 10 cycles on NiCd and NiMH batteries, and recalls all data
   h. Configures up to 10 batteries in memory for instant, easy recall and charger setup
   i. Adjustable discharge cutoff voltages for NiCd/MH, pre-set voltages for Pb and lithiums
   j. Temperature sensing capabilities (GPMM3151 Thermal Probe available separately)
   k. Top-off charge feature fully charges NiMHs without overheating
   l. Reversed LCD with backlight plus a 0-45° adjustable view angle clearly displays input and output volts, peak volts, average discharge volts, charge and discharge capacity, currents and time data for 10 cycles, errors and individual lithium cell voltages
   m. Banana plugs on DC input with mating gator clips
   n. Safety features include cool-off time delay, maximum NiMH charge input, fast charge safety timer, current overload and reverse polarity protection
   o. Warning messages for improper input voltage, poor connections, unsuitable battery condition, reverse polarity on output
   p. Built-in cooling fan, for better charge efficiency and extended charger life
   q. One year limited warranty

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Where to buy?

Reindeer Pass http://www.reindeerpass.com/

1. RLD Hobbies http://rldhobbies.com/

Tips

1. Make sure your polarity is correct from your battery. Test with meter or LED; don't rely on color coding on wires or you can damage your board.
2. Charge your battery before storing them or they can be damaged.
3. If you can solder, tin the ends of your wires before attaching them to the board.