Lenz Power Module Review

by Don Fiehmann

Contact Reliability

Years ago TVs had a rotary type of tuner for VHF channels. This type went clunk-clunk as you changed channels. Sometimes you had to wiggle the channel knob to make good contact. When this happened, you got out the can of TV Tuner Cleaner to clean the contacts. Today the TV turners are all electronic and replace the dirty contact problem of the past. New TVs with all electronic solid stat turners have eliminated the dirty contact problem. Wouldn't it be great if there was an electronic way to eliminate our wheel and rail contact problems? There is hope, an electronic solution has been found!

The Solution

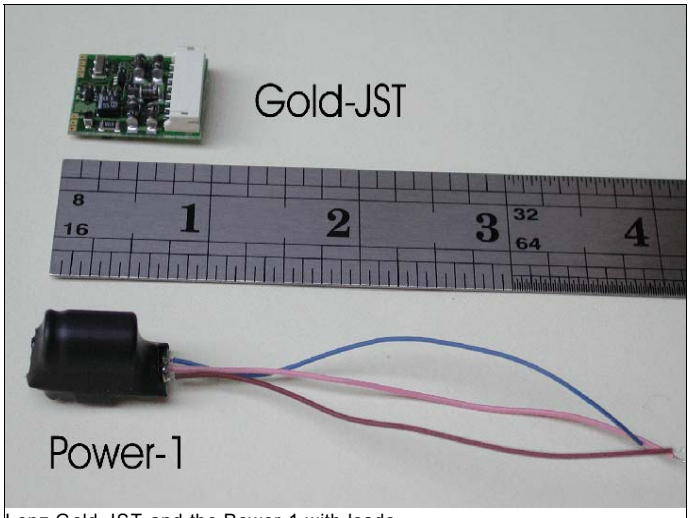
The new Lenz series of Gold decoders have an impressive list of features. Added to the list is the **Power-1** energy storage add-on module. It stores energy for use when the engine hits a dirty spot and power from the rails is interrupted. Lenz calls this feature **USP** or **uninterruptible signal processing.** Not only does this module supply power it also allows the decoder to continue to process commands with the power interrupted.

How it works

The Power-1 is a small add-on module with three wires that solder to a Gold series decoder. The Power-1 module is charged from track power. The power is stored in what is most likely one of the new super capacitors. Energy from the rails is stored while contact is made with the rails. When power is interrupted, the stored energy is released back to the decoder. The Gold decoder continues to receive and process DCC packets even with the break in power. There is also enough power to keep the motor running for a short period of time. The Power-1 acts like an electronic fly wheel. The length of time the motor continues to run depends on the amount of current the motor requires. (See the chart.) This should keep the locomotive running until it passes over the dirty spot on the rails. If you should derail and short the rails the decoder senses the loss of the signal and shuts down the motor. The length of time to run after the loss of the signal is set by the value in a CV. The default is 0.25 seconds.

Current in mA	Current in amps	Time until POWER-1 output drops to less than 5 volts
250	0.25	1000 ms (1second)
500	0.50	400 ms (0.4 seconds)
750	0.75	100 ms (0.1 seconds)
1000	1.0	<50 ms (0.05 seconds)

The Power-1 module measures 0.9" x 0.55" x 0.39" and has three 3-1/4" leads. This is small enough to fit onto an N scale tender and should fit in most HO and larger locomotives. The three leads connect to solder pads on the Gold series decoders. The Power-1 is covered with black shrink wrap and can be connected to either a Lenz Gold-JST or the Gold-mini decoder.

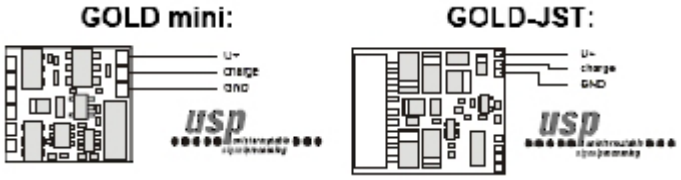


Lenz Gold-JST and the Power-1 with leads

TESTING

Lenz has been demonstrating the Power-1 feature at NMRA conventions. The demo ran an engine across a piece of paper on the rails without stalling.

I was very interested in just how this would work on a layout. One of my Atlas TrainMasters has a Lenz Gold decoder installed, and a second Atlas TrainMaster has the QSI decoder. With the combination of the two I could run a comparison test.



The solder pads on the Gold Series decoder for the Power-1 connection are very small. Soldering the wires requires a small tipped soldering iron. The solder pads are close to each other and it is easy to get an accidental solder bridge between two of the connections. Only a small amount of solder is needed for the connections. There are holes in the decoder solder pads, but they are too small for the three wires. The blue wire connects to soldering surface "**U+**", the pink wire to soldering surface "**charge**" and the brown wire to soldering surface "**GND**." After installing the wires I checked with connections for shorts with an Ohm meter.

The first test was on the program track to determine if the added capacitors would affect the CV read-back from the decoder and to be sure of no shorts in the wiring. The read-back worked fine.

To test the ability to run over dirty track I covered a 16-inch section of rail with a piece of tape. On the first run at high speed the engine continued across the tape and only slowing near the end and then continued. At a moderate speed the engine ran until the last wheel of the engine was about 10 inches into the taped rail. By contrast the other TM at about the same speed stopped with the last wheel about 1/4 inch into the taped rail. One small switcher I ran a crossed the tape and stopped with one wheel still on the uncovered rail.

I ran the TrainMaster over a speed trap at speed step 1. It took a long time and the speed registered "0". It must have been at less than 1 SMPH. I continued at this very slow speed until it got to the taped section of rail. The last wheel went in 1.5 inches before the engine stopped. Normally when you run an engine at this slow speed, it stalls when hitting a dirty section of rail. What impressed me was with the Power-1 the engine never stalled at this very slow speed!

One of the claims is the decoder will still receive command even with the power interrupted. I ran the engine at a moderate speed and when it was fully on the tape I pressed the emergency stop. The engine came to a quick stop with all the wheels still on the tape. What surprised me is when I released the brake with a forward command the engine started to move! It got the command, but there was only enough charge left to start the engine. At slow speed I tried to change direction while all wheels were on the tape and that worked too.

Next was operation on the mainline. I had not cleaned the rails for a couple of weeks. Normally I have an engine push a rail cleaning car around the layout otherwise I get stalls. There are two types of block detection on my layout. The older section uses relays to control signal lights. On this part of the layout you can hear the relays chatter when you hit a section of dirty track, usually accompanied with a stall. With the Power-1 there was the relay chatter, but no stall. The only stall was at slow speed over the 16 inches of unpowered rail! I continued to operate the engine and it ran exceptionally smooth especially at slow speeds.

If the Power-1 capacitor was to charge instantly it could trip booster and circuit breakers. My testing indicated that the module did control the speed of re-charge so it would not trip circuit breakers.

Conclusion

The Power-1 eliminates the practice of ***table thumping*** when an engine stalls. The addition of the super capacitor technology to decoders is almost as good as using full battery power. This may even be better when you consider the problems and size of batteries. The super capacitors are a new addition to the electronic field. These capacitors have very high capacity and act a bit like a battery. I'm very impressed at the amount of energy that the small Power-1 module provided to keep the engine moving. I'm sure that the super capacitor technoloy will expand in model railroad electronics. When used in a constant lighting circuit they produce flicker free lights. With the success of the Power-1, I hope that this function will become included in more decoders. The list price of the Power-1 is $49.95. This may a bit high and should come down as the price of super capacitors drop.

If you are going to install this Gold series decoder along with the Power-1 module, select an engine with a low current motor, like most of the newer locomotives. This technology will work great in switchers that run at low speed on yard rails that may not get at cleaned.

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