Latest Trends In DCC Technology

Carl Marchand

Improvements in Mobile Decoders

- Enhanced Locomotive Control – increased operational realism
- More output functions (4 to 6 , 6 to 8)
- New form factors - two distinct 21Pin board types
- Improved sound - 16 bit and 32 bit audio outputs
- Accurate sound samples from prototype locomotives
- Increased number of “keep-alive” supported decoders

NOTES

- This clinic is meant to be an overview of some of the lastest DCC technology trends and decoder features.
- Part A of this clinic spotlights modern DCC sound decoders, as this decoder type has generated the highest interest amongst modelers and the most “buzz” in the hobby.
- We will cover some of the various changes and enhancements; too many to cover in detail (we only have an hour!)
- Hopefully, you’ll be able to dig in deeper after this clinic and explore the topics and features not presented here.

Enhanced Locomotive Control – increased operational realism

- Several DCC decoder manufacturers have raised the bar, improving locomotive operation:
- FOR STEAM
  - Smoother slow-speed operation
  - Improved sound samples
  - Added /improved loading effects
  - Increased number of whistles and / or horns (yes horns!)
- FOR DIESELS
  - Independent Braking
  - Dynamic Braking improved
  - Heavy Load effects
  - Straight-to-Eight
  - Additional sound effects

Enhanced Locomotive Control

increased operational realism

List of New Operational Features

ESU Loksound Select and Loksound 4.0	Throttle Up! (Soundtraxx) Tsunami2™	Train Control Systems WOWSound™
Drive Hold – manual exhaust control	Dynamic Digital Exhaust – BEMF Controlled	Locomotive Calibration to optimize audio effects
Dynamic Brake - engine to idle or Notch 4	Independent Brake or Train Brake (F12 to select type)	Dynamic Brake effects
Coast	Two Sound levels – switchable by Function	Independent Brake
Straight to Eight	Train Line Charge	19 Lighting Effects
Independent Brake	CV Adjustable Brightness	
Extended Library of Diesel Engine Sounds, Airhorns, Bells and Ancillary Sounds	60+ Whistles (steam), 42 Airhorns	33 Airhorns, 49 Individual Bells (Diesel), 60 Whistles, 40 Individual Bells (Steam)
Locomotive Calibration	Standard/3pt. Speed Curves	

Enhanced Locomotive Control

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Enhanced Locomotive Control

increased operational realism

List of New Operational Features

QSI Solutions Titan FX Emulator Technology™ (ET™)
Dual amplifiers – “Stereo Sound”
Dynamic Braking
64 independent sound channels
88Khz sampling rate
Independent Brake
“Sound of Power” load effects
Prototypical Head End Power [HEP]
True Dual Prime Mover sounds for Diesel
Configurable Horns – 27 independent horn bells to create your own horn assembly
Speed Dependent Doppler Shift
Steam Engine Background Ambience
Selectable Steam Fuel Sounds — Coal Shovel, Coal Auger, Wood Loading, and Oil Burner sounds all included and selectable

Enhanced Locomotive Control

increased operational realism

List of New Operational Features

What to do when you want to consist multiple locomotives with DIFFERENT decoder brands?

- **Use the common advanced features**
  - Dynamic Brake, Independent Brake, Brake Squeal
- **Group your decoders in locomotives by classification:**

Loco Type	SWITCHERS	ROAD SWITCHERS	MAINLINE FREIGHT	PASSENGER
Decoder	Econami	Tsunami2	Loksound Select or 4.0	QSI
Reason	Less focus on advanced features when kicking cars	Experience the DDE features on local / way freights	Mainline running with FULL Throttle features gives you more time to work /finesse the controls	If you've bought sound passenger units over the last 10 years, they probably have QSI factory installed

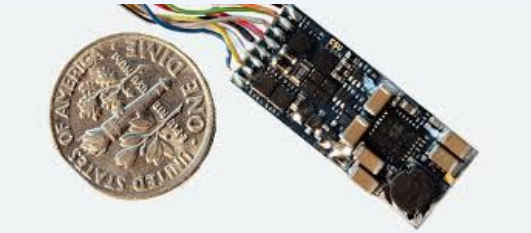
Ingredients to Realistic Operation

- Set higher values for MOMENTUM (CV3 and CV4)
- Enable BackEMF (a must for enhanced features)
- Use Advanced Consisting (CV 21 and CV22)
- Use Speed Curves and speed match using Forward and Reverse TRIM (CV 66 and CV95 respectively)

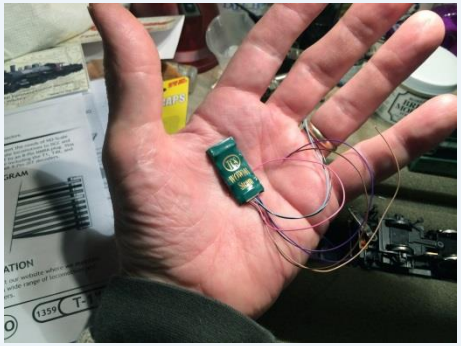
Tsunami2 DDE Demo

Soundtraxx Tsunami2 DDE Demonstration on YouTube

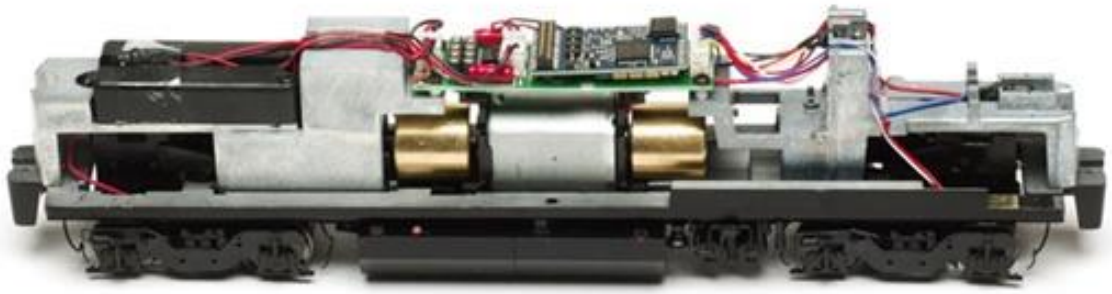
Technical Advancements

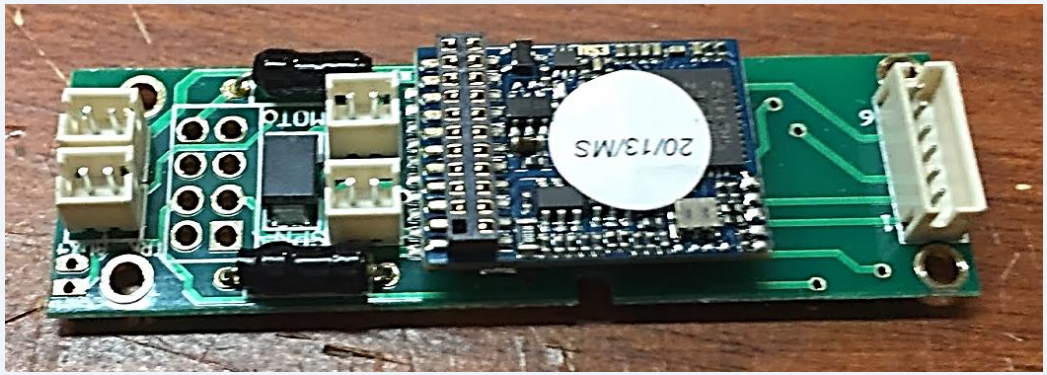


Smaller Decoder Form Factors



Technical Advancements





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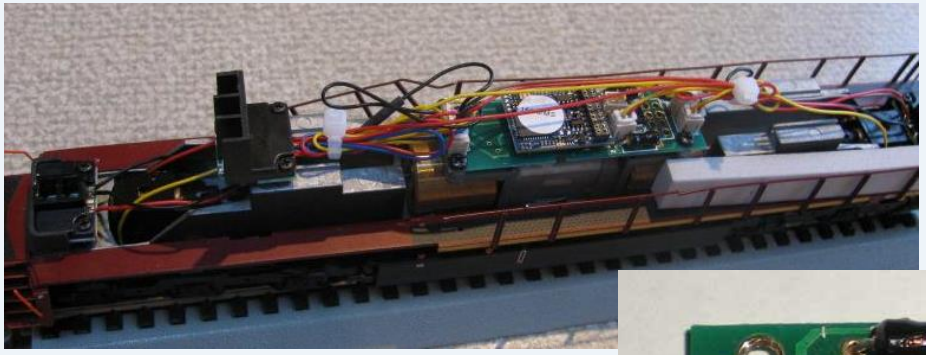
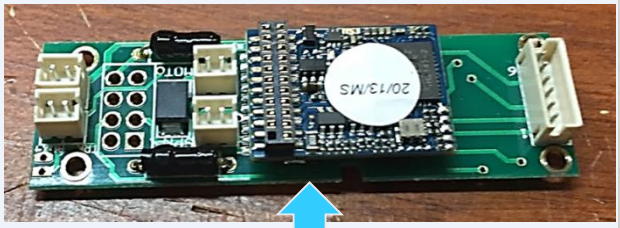
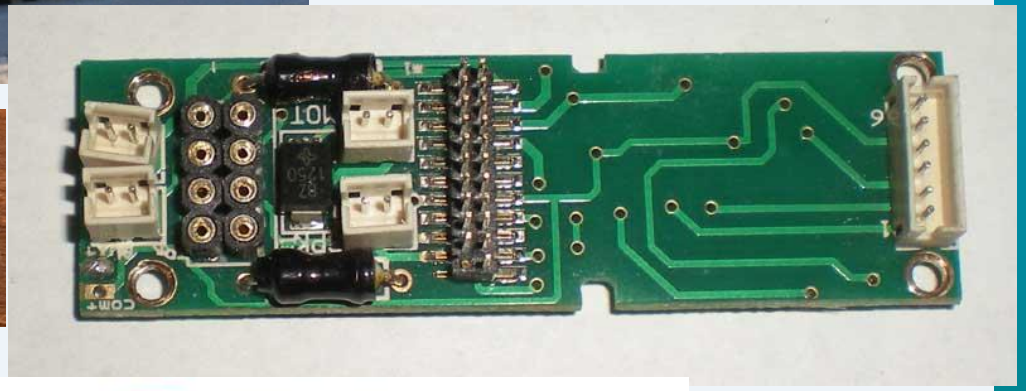
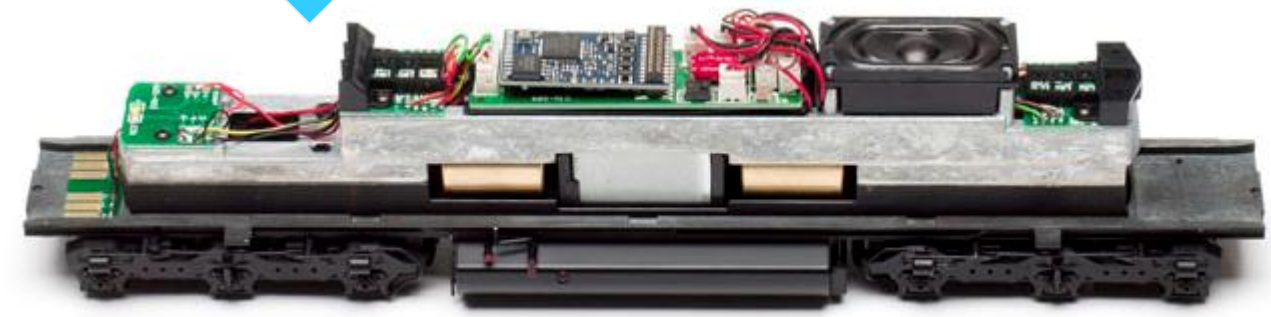


Intermountain-Railway

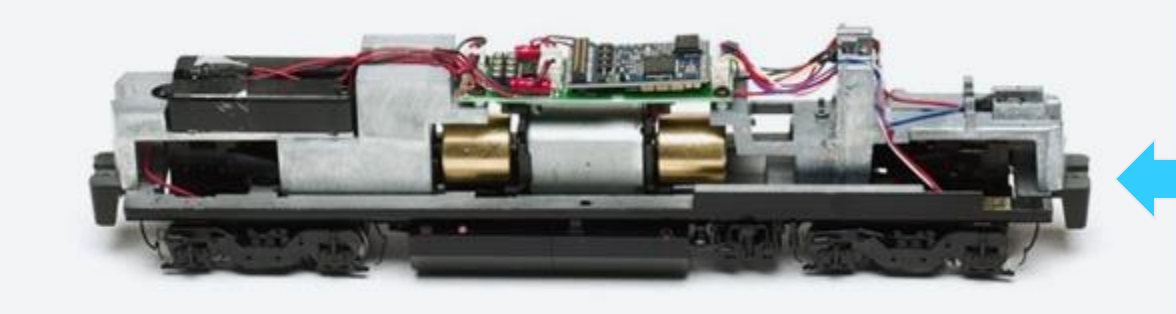




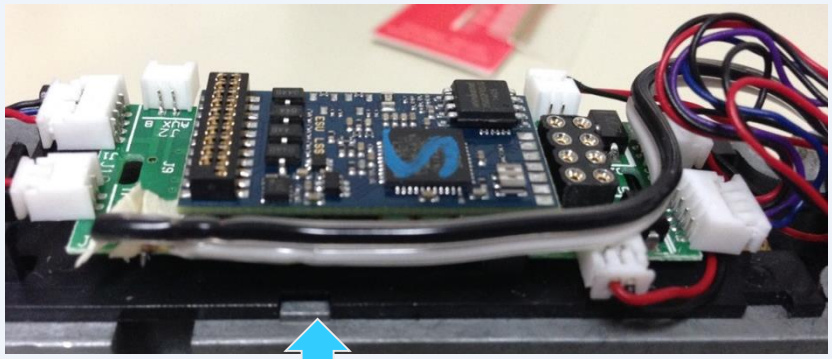


Bowser

Technical Advancements

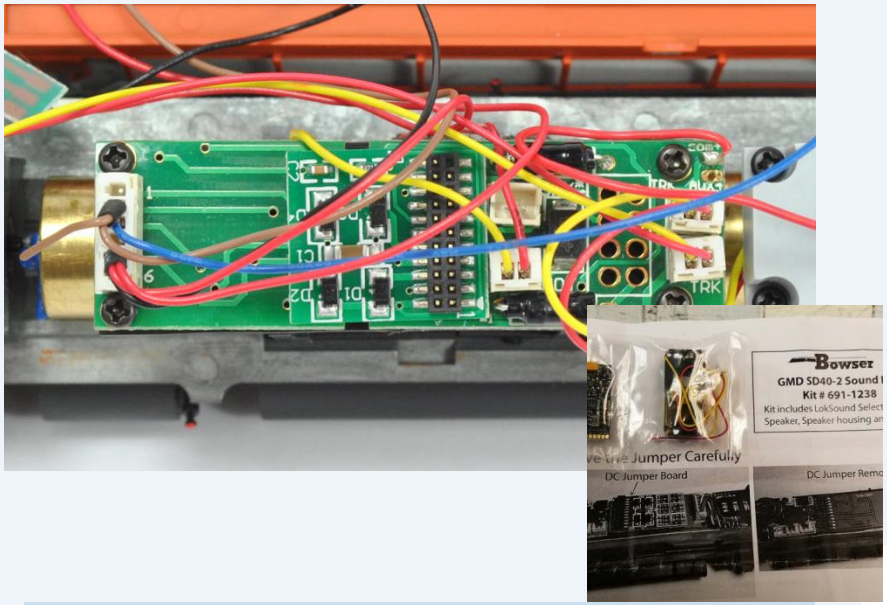


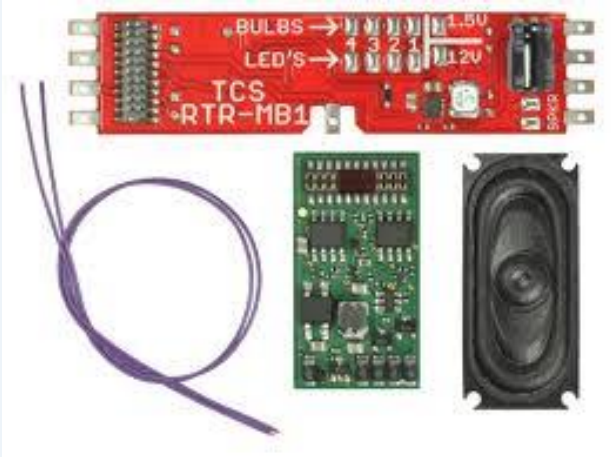
Atlas



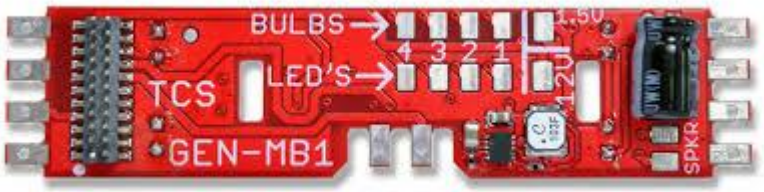
True Line Trains

Technical Advancements





TCS and Bowser offer mainboard replacements with *keep alive* caps



Technical Advancements

Keep-Alive Capacitors

The keep-alive capacitor is used to overcome intermittent current due to poor pickup, dirty track, Dead frogs, etc., mostly aimed at sound decoders

Technical Advancements

Keep-Alive (stay alive) Capacitors

The term "Keep Alive" is a registered trademark of TCS and the name for their product

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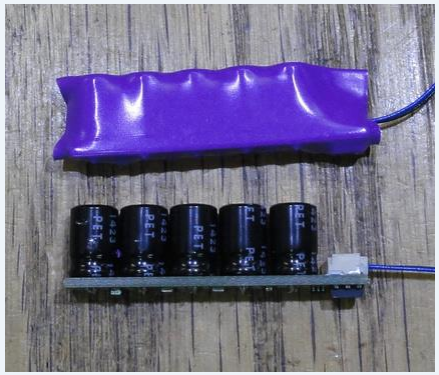

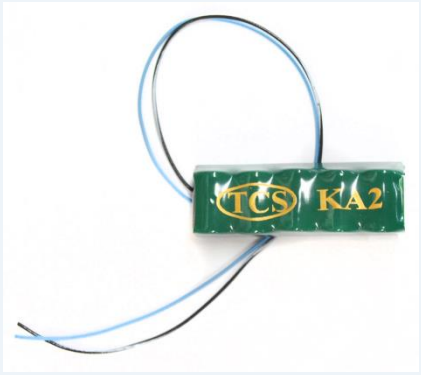

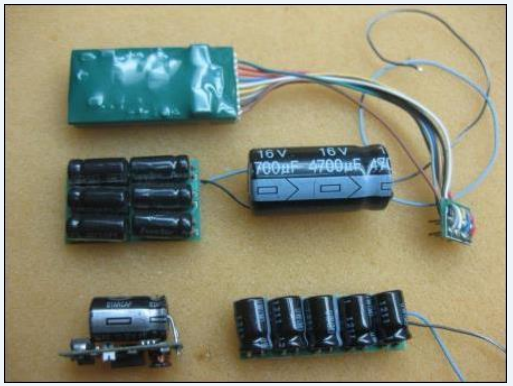

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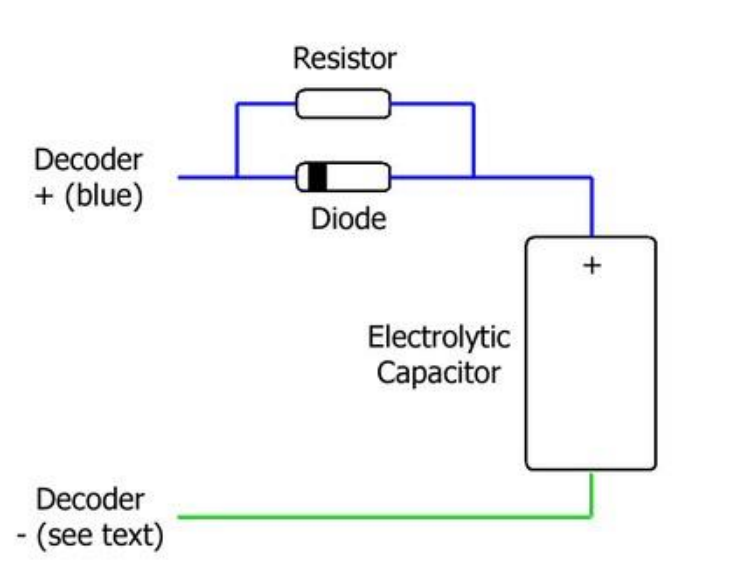

Early / Basic Stay Alive Circuit

Technical Advancements

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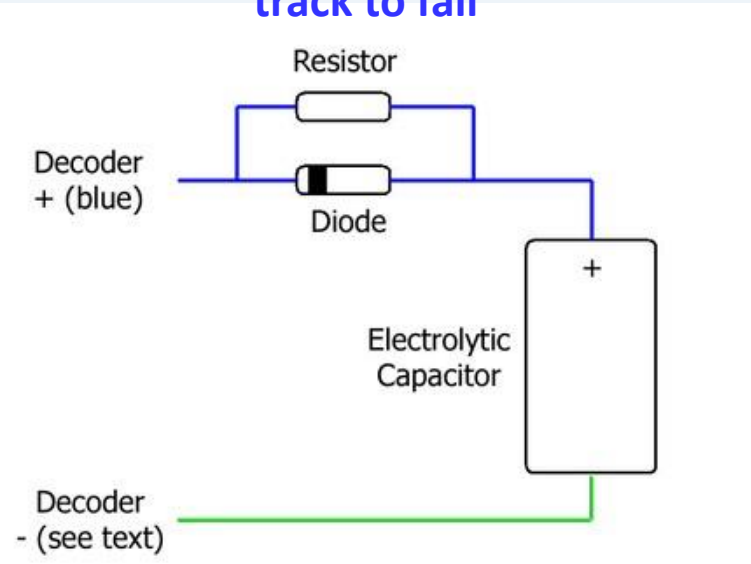
Early versions with large capacitors on pre stay alive supported decoders could false trigger circuit breakers or cause CV readback on the programming track to fail



Early / Basic Stay Alive Circuit

Technical Advancements

Keep-Alive (stay alive) Capacitors

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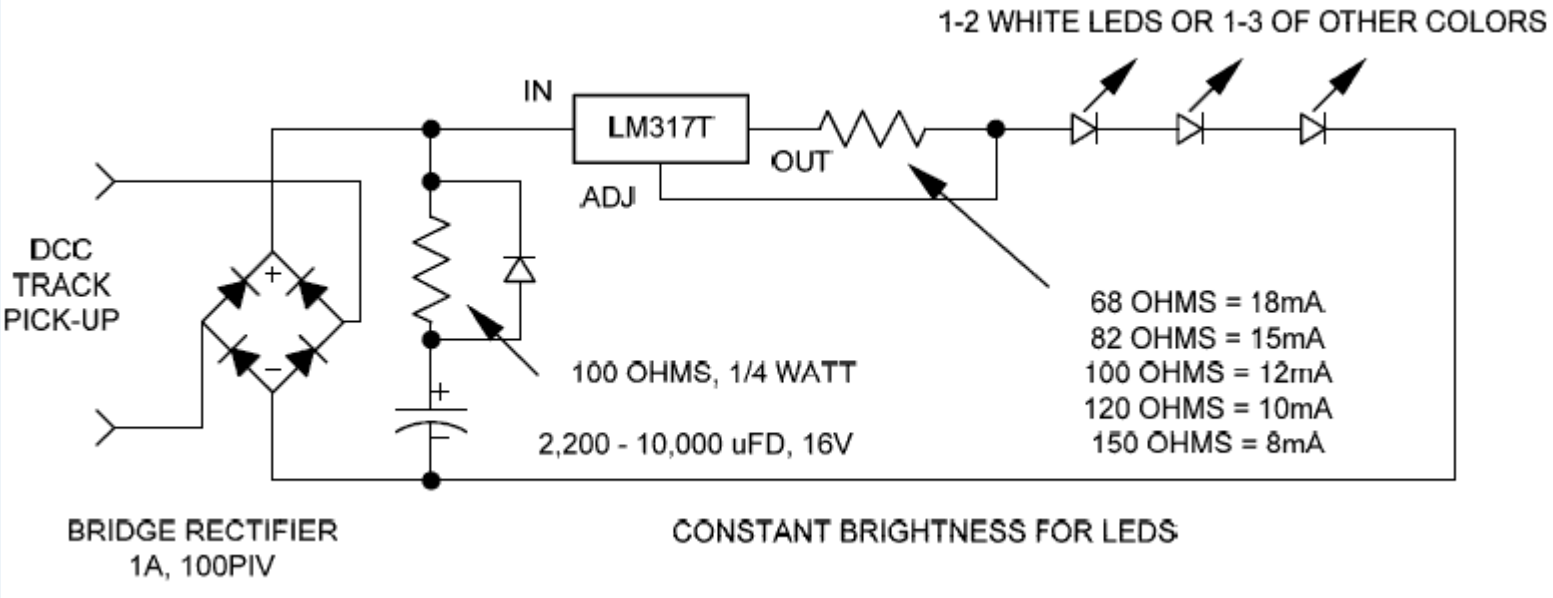
The idea is not new; its origins are based on flicker-free lighting circuits



Technical Advancements

Keep-Alive (stay alive) Capacitors

PROS	CONS
Overcomes dirty or intermittent track	May false trigger circuit breakers
Resolves sound dropout while loco is moving	Reading CVs on programming track may fail
Better power to decoder, smoother slow speed	Require additional space inside rolling stock
Flicker-free lighting effects	Not compatible with EVERY decoder
Prevents engine stalling	Locomotives will run through “dead rail” safety zones

Bowser

Welcome to Bowser Mfg.
Manufacturer of HO Freight Cars, HO Diesel Locos, HO Streetcars, N Scale Freight Cars, Brass and plastic detail parts by Cal Scale and Cary, Pewter scenics by Selley.
Over 50 years creating model trains.

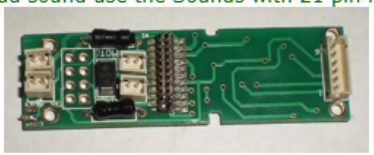
DCC & Sound Information

Retro Fit Sound Kits - Click Here

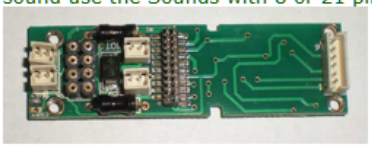
Adding DCC only decoders to Bowser Executive Line Locos:
All Bowser Executive Line locos are now equipped with 21 pin sockets.
This allows our locos to have more lighting functions.
To install DCC 21 pin decoder
ESU #53614 Recommended Decoder

Old Production with 8 pin sockets
Not recommended to be used on locos with 21 pin sockets
NCE #D13SRP and D15SRP
Digitrax #DH123PS and DH163PS
TCS #T-1A

Bowser Executive Line
Developed to create more lighting functions
Version 3 circuit board, 21 pin sockets
To add sound use the Sounds with 21 pin Plugs



Bowser Executive Line
Version 2 circuit board, 8 and 21 pin sockets
To add sound use the Sounds with 8 or 21 pin Plugs



Bowser Executive Line
Version 1 circuit board
To add sound use the Sounds with 8 pin Plugs

Bowser LOK Sound locomotive running on DC.
If you want the sounds, I recommend you get an MRC 1200 Tech 6 Sound Controller 2.0
I have used this at train shows for several years. It gives you bell, horn and other sounds
without changing to DCC.

If you must run on DC, you will only get the primer mover sounds.
To get good operation find someone that can change CV49 to a value of 18.
This will turn off the BEMF and improve performance in DC Mode.
Though BEMF is off, it does not negatively affect the running quality in DC.

DO NOT CHANGE THIS IF YOU ARE RUNNING IN DCC!

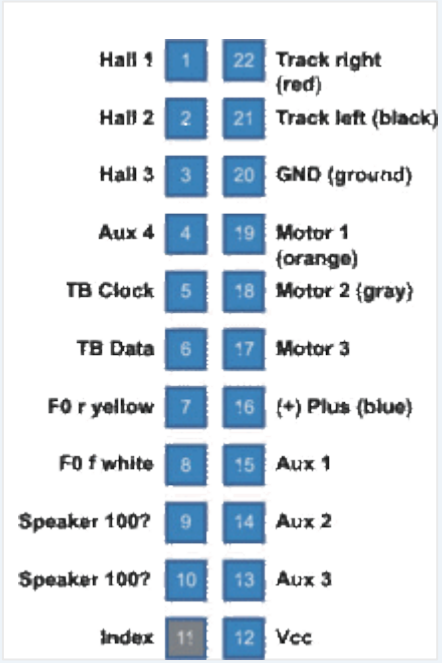
Circuit Board Used on
VO-1000, VO-660, S-8, S-12, DS 4-4-1000
#691-1229 To add Sound on these units with this board.
Adding sound requires customer to cut die cast frame for the speaker.
Or send in your frame and Bowser will send a machined frame back

Circuit Board Used on F-3, F-7, F-9.
#691-1226 To add Sound on F units with this board.

Technical Advancements

NEM660 21MTC Pinout

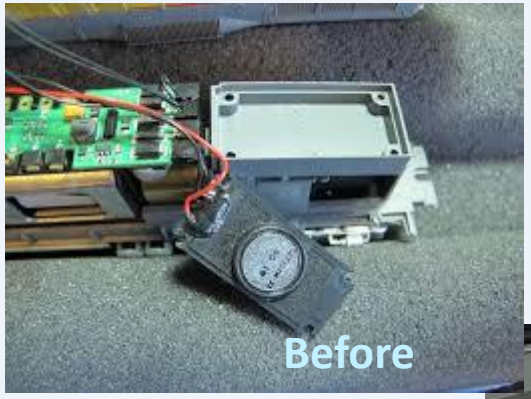
NMRA 21MTC Pinout

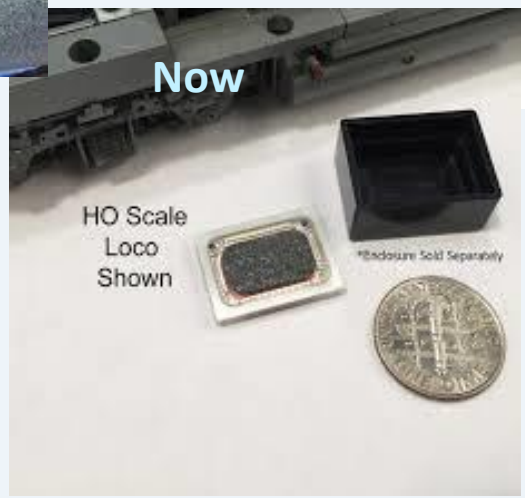


Differences

The 21 Pin Conundrum

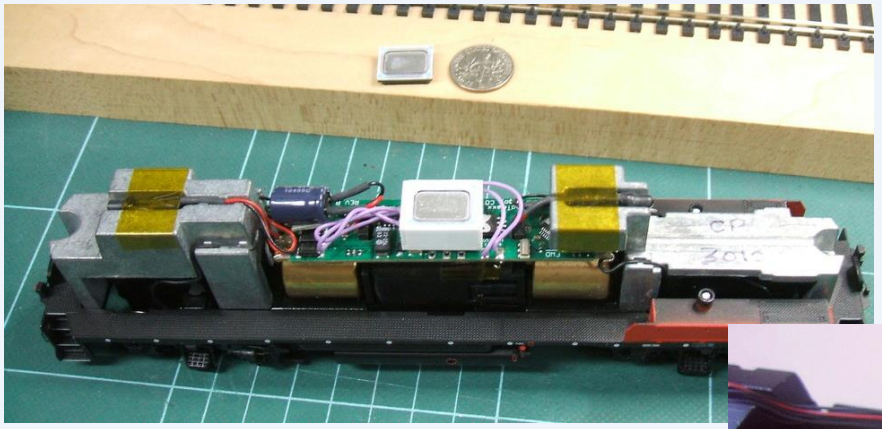
Technical Advancements





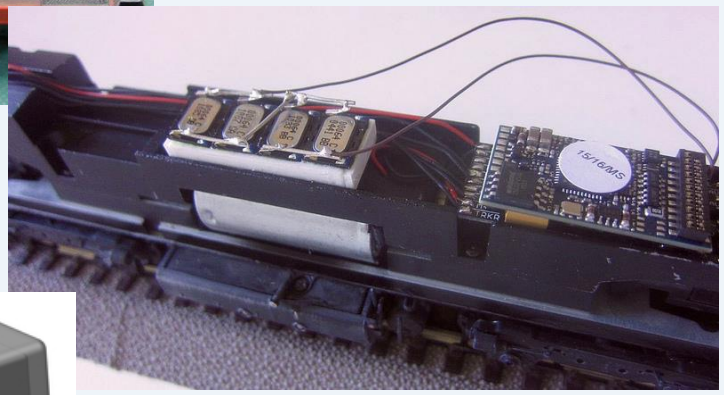
One of the **MOST** significant advancements in HO and N scale sound!

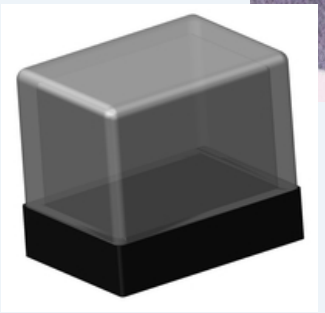
Technical Advancements



Install speakers without removing valuable weight

Add more speakers for depth and greater volume

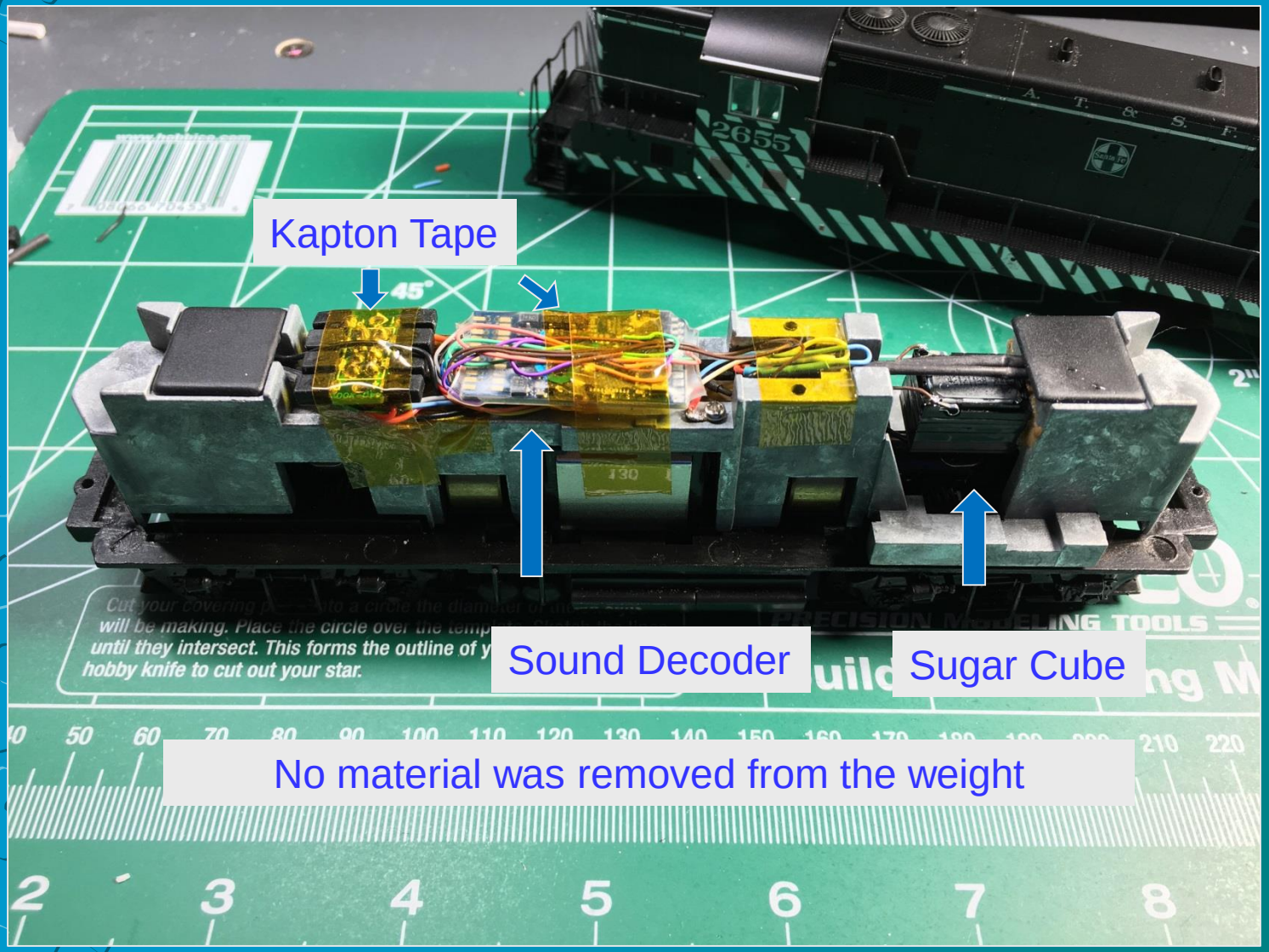




Larger enclosure for deeper bass (lower frequency response)

One of the **MOST** significant advancements in HO and N scale sound!

Technical Advancements

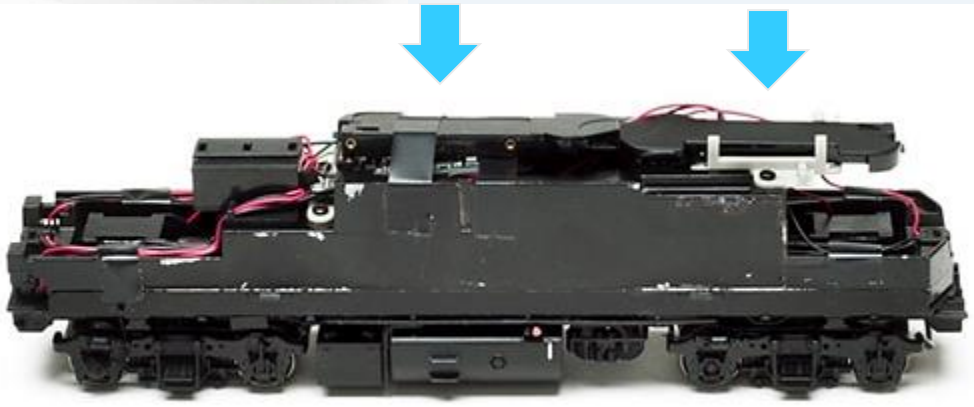


Technical Advancements

Technical Advancements

Did I hear you right? (no pun intended) An iPhone4 speaker?

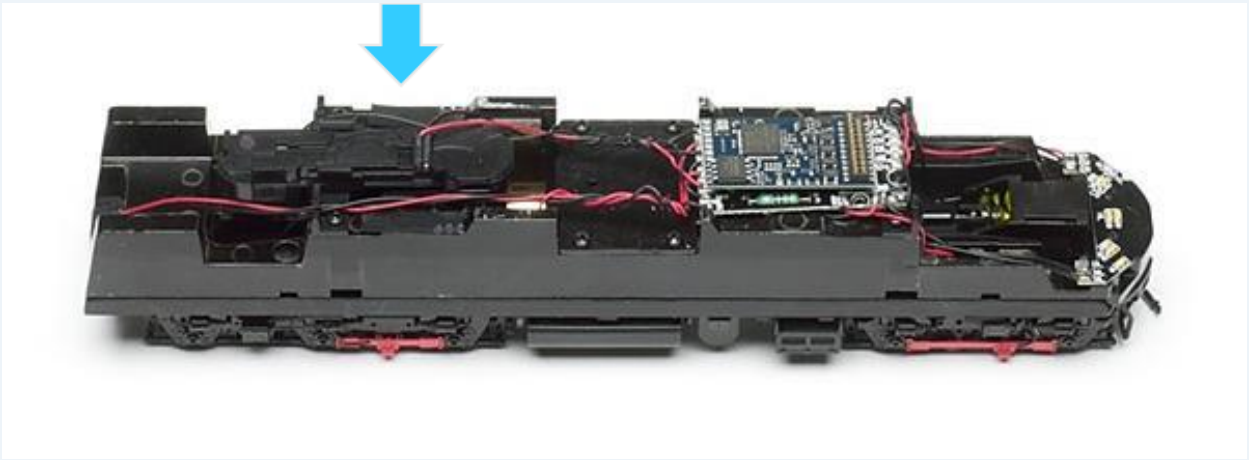
Rapido HO F40PH



Technical Advancements

Yeah? Well that's only one locomotive!

Rapido HO FL9



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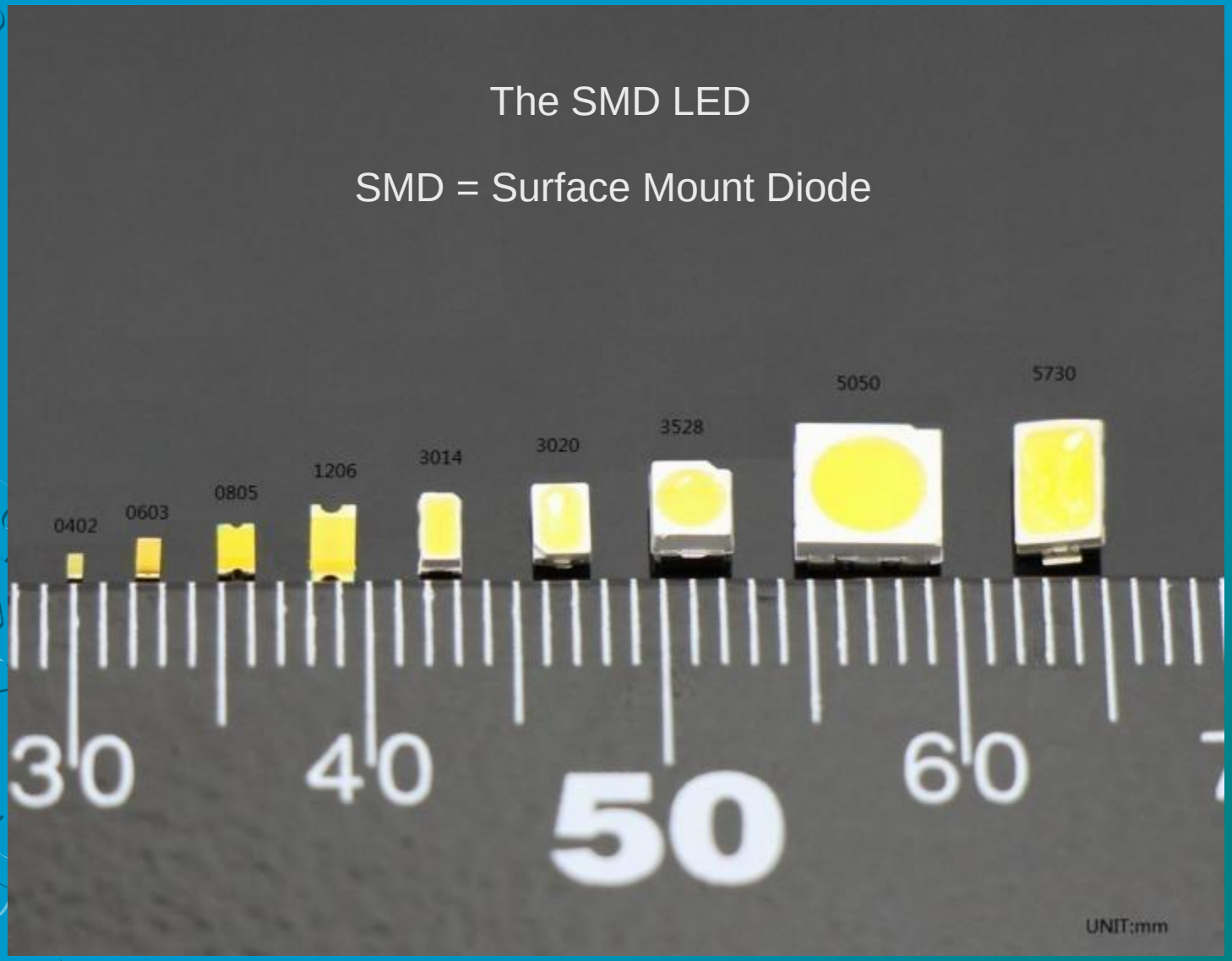
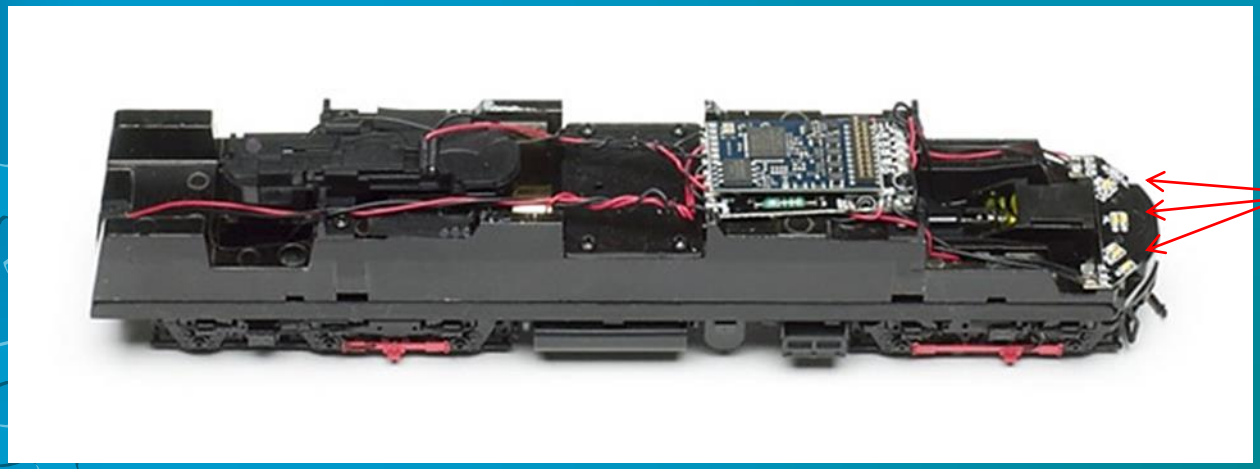


Technical Advancements

The SMD LED

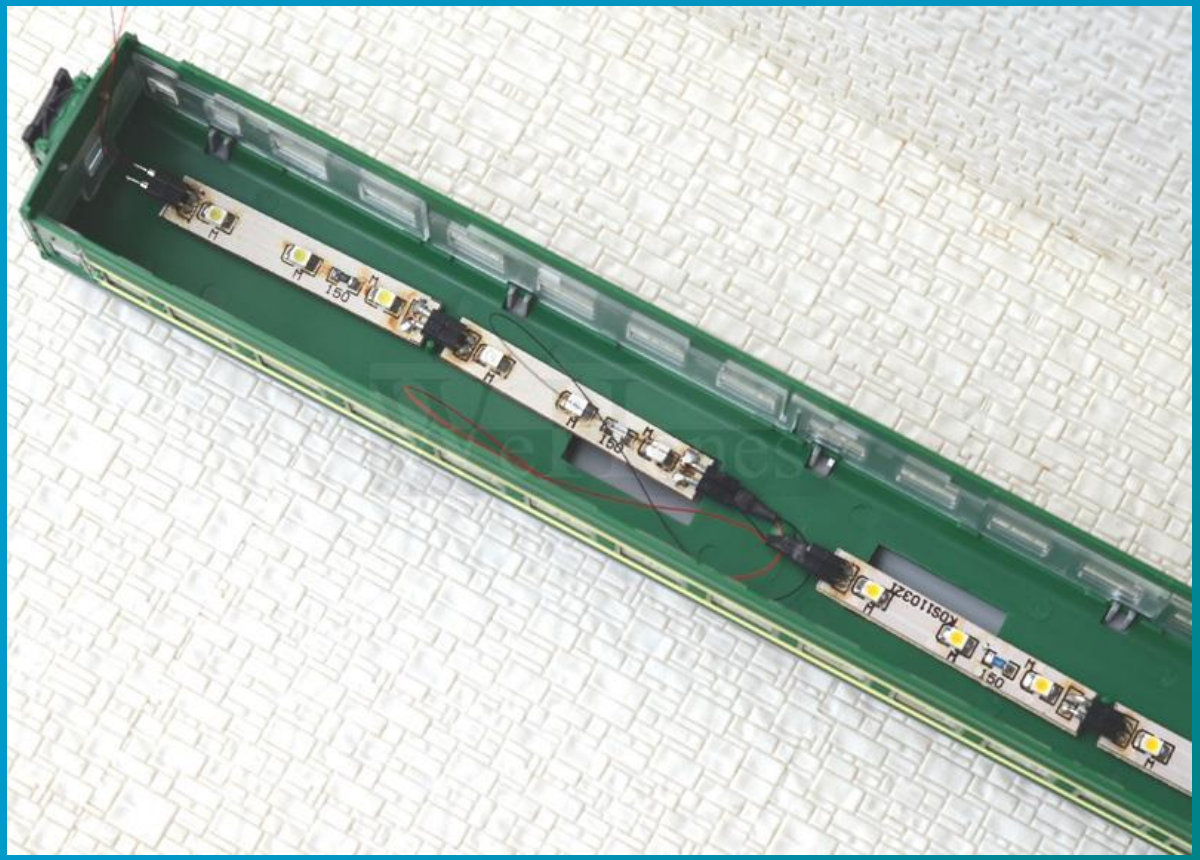
- Small – can fit almost anywhere
- Current draw is VERY low (2mA – 5 mA average)
- No heat
- Inexpensive (Ebay, Digikey, Internet surplus suppliers)



The era of the light bulb is OVER!

Technical Advancements

The SMD LED



Great for lighting rolling stock!

Technical Advancements

The SMD LED

http://model-railroad-hobbyist.com/node/18133?page=1

MRH Model Railroad Hobbyist magazine™ mrhmag.com

Home / Blogs / ICE's blog / Under $2 solution for Flickerfree LED coach lights

Under $2 solution for Flickerfree LED coach lights

Tue, 2014-06-03 18:59 — ICE DC - Electrical DCC - Electrical Tools, tips and tricks Personal journal (editorial or commentary)

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Commercially available Flicker Free (Supercaps or Stay Alive) circuits are good for driving a chain of LED's if you hard wire these or use the manufacturers PCB. These are all designed around an output voltage of 3V, since the supercap is rated for max. 5.5V at say 1F or 1.5F. The capacitor itself is a $1.50 min. on eBay

Unfortunately they cannot drive the Flexible LED strips which use SMD 3528 or 5050 LED's and are rated at 12V. These strips require min. 7.9VDC to turn on for any visible light output. A supercap will explode if subject to higher voltage than 5.5V so they have a 5.1V Zener to shunt them (across the capacitor) and limit the voltage to 5.1V max.int he commercial Flicker Free products.

Also driving Flexible LED strips at full brilliance with 12V is non-protypical and too bright. So I use warm white LED's (not the harsh bright white, good for a florescent lamp effect) run them at at 9V to give the soft effect you would normally see in a prototype coach. Use Bright white LED's if using in urban commuter trains for a more modern look.

I found that a 4700uF capacitor works best to remove the flicker due to dirty track contacts or going over switch points or trouble spots or insulated block sections, but if you want the cars to have a gradually dimming effect till the lights go out, I suggest using a 10000uF capacitor which will give a drain timing of just over a minute when the power is removed from a block.

Questions?

Thank You Very Much!