

Latest Trends In DCC Technology

Carl Marchand







This clinic is meant to be an overview of some of the latest 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. Part B will examine form factor changes for lights and speakers and how they have affected the N scale and HO scale markets.

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.

Improvements in Mobile Decoders

- Enhanced Locomotive Control increased operational realism
- More output functions (6, 8, 12 or more)
- New form factors E24
- Industry acceptance of MTC-21, Next18 and Plux22
- Improved sound 32 bit audio output and higher power output
- Accurate sound samples from prototype locomotives
- Increased number of "stay-alive" supported decoders

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**
- Dynamic Exhaust Features
- Heavy Load effects
- Straight-to-Eight
- Additional sound effects

ESU Loksound 5 DCC	Throttle Up! (Soundtraxx) Tsunami2™	Train Control Systems WOWSound™	
Dynamic Sound 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	
Treble and Bass Controls	Two Sound levels – switchable by Function	Independent Brake	
User Friendly Class Lights	Train Line Charge	19 Lighting Effects	
Independent Brake	Dynamic Brake		
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)	
BEMF Calibration	7 band sound equalizer	BEMF Calibration	

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	BlueTooth™ Control via App		

Soundtraxx Blunami

Blunami Decoder Features:



All Blunami decoders can be operated in three different ways: DC, DCC or Wireless mode.







George Bogatiuk: What is the deal with Blunami??!

In this clinic, George Bogatiuk of SoundTraxx will go into the depths of the exciting new Blunami decoder and the wireless Bluetooth connection and how that helps you as a modeler. With the new Android app updated to include consisting, and the release of a 21-Pin format in mid-2024, George will show you how Blunami can really change your operating experience. "This is what DCC should be in 2025!" says one new Blunami user. Come see what you are missing when it comes to operating your trains!



What is LCC?

LCC stands for Layout Command Control:

- This is an NMRA standard protocol designed specifically for controlling non-locomotive aspects of a model railroad layout, like signals, turnouts, and lighting.
- Peer-to-peer communication:
 - Unlike traditional DCC systems, LCC devices can directly communicate with each other without needing a central command station to relay information, allowing for more distributed control.

Wireless integration:

By utilizing wireless technology, users can control LCC-compatible devices from anywhere on their layout without being tethered to a wired connection.

Benefits:

•Reduced load on DCC bus: LCC takes the burden off the DCC system by handling layout functions separately, allowing for smoother locomotive operation.

•Flexibility: Enables complex control schemes with multiple devices interacting directly.

•Scalability: LCC networks can be easily expanded by adding more devices as needed.

QSI Website: http://www.qsindustries.com/



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> The contact tab works too. Tell us what you want. 10/08/17



List of Operational Features

QSI Solutions Titan FX Emulator Technology™ (ET™)

Dual amplifiers - "Stereo Sound"

Dynamic Braking

64 independent sound channels

88Khz sampling rate

Independent Brake – QSI was first!

"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



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Ingredients to Realistic Operation

• Set higher values for MOMENTUM (CV3 and CV4)

and use the Independent (or Train) Brake feature.

- 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)



urp off use Pasis Speed Centrel pr

To turn off, use Basic Speed Control pane









Smaller Decoder Form Factors























HO RTR DC-21 Pin Motherboard for LEDs [ATH67240]

HO Genesis DC-21 Pin Motherboard for LEDs [ATHG67140]

Technical Advancements NIXTRAINZ DECODER BUDDY





ESU



Soundtraxx



TCS

NOTE: These are intended for DCC systems only. Not recommended for DC

Adapterboard BLI steam engines Paragon 3/4 Decoder



With the help of the BLI Paragon 3/4 (P34) adapter board, H0 Scale tender steam locomotives from Broadway Limited (BLI), in which a Paragon 3 or Paragon 4 decoder was factory installed, can finally be equipped with a LokSound 5 decoder without much effort. All you have to do is open the tender, remove the standard Paragon 3 or 4 decoder and install the BLI P34 adapter board. All connections can be made exactly as before: The type and position of all plug connections is exactly like for the factory installed decoder. No soldering work needs to be done. The locomotive tender coupling can also remain. The locomotive itself does not need to be opened. The LokSound 5 decoder can communicate with the electronics built into the locomotive using a serial protocol and directly control all smoke and light functions. An integrated PowerPack ensures uninterrupted operation even on dirty rails.



The 21 Pin Conundrum

Next18 / Next18–S Pin Assignments

Description

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Name	Next18	Pin	Next18-S	Group
Track, Right	Connection to right hand rail	1	Connection to right hand rail	1
Motor +	Motor connection 1, Positive/Forward	2	Motor connection 1, Positive/Forward	2
AUX1	Output 1	3	Output 1	3
AUX3	Output 2	4	Output 2	4
GND	Decoder Ground connection after rectification	5	Decoder Ground connection after rectification	
V+	Decoder positive supply, after rectification	6	Decoder positive supply, after rectification	
	AUX 6 / Output 6	7	Speaker B	4 or 5 ^[1]
F0f	Headlight forward	8	Headlight forward	3
Track Left	Connection to left hand rail	9	Connection to left hand rail	1
Track Left	Connection to left hand rail	10	Connection to left hand rail	1
Motor –	Motor connection 2, Negative/Reverse	11	Motor connection 2, Negative/Reverse	2
AUX2	Output 2	12	Output 2	3
AUX4 / TBDATA	Output 4	13	Output 4	4
GND	Decoder Ground connection after rectification	14	Decoder Ground connection after rectification	
V+	Decoder positive supply, after rectification	15	Decoder positive supply, after rectification	
	AUX 5 / Output 5	16	Speaker A	4 or 5 [1]
F0r	Headlight Reverse	17	Headlight Reverse	3
Track, Left	Connection to right hand rail	18	Connection to right hand rail	1

Group 3 = Open Collector

Group 4 = Logic Level

S-9.1.1.5 Next18 & Next18-S Multifunction Decoder Interface



There are two variants: *Next18 and Next18–S*. Next18 supports motor control, front and rear headlights and 6 auxiliary output functions; two of those function pins may be used to provide an on-board TrainBus serial interface. A Next18–S decoder sacrifices two auxiliary function outputs for the speaker connections.

Motor –	Motor connection 2, Negative/Reverse	11	Motor connection 2, Negative/Reverse	2
V+				
	S-9.	1.1.5 N	Next18 & Next18-S Multifunction Decoder	Interface

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Figure 3: ScaleTrains C44-9 SDXN167n18 decoder installation





Soundtraxx Next18 Decoder

Displaying 1 to 5 (of 5 Products)



N Scale DCC Ready locomotives with Next18 sockets

E24 Pinout				
DCCWiki.com				
Molex 5050702422				
Function	PIN	PIN	Function	
Track Left	X1B	X1A	Track Left	
P AUX11/SUSI Data	24	1	Speaker –	
P AUX12/SUSI Clock	23	2	Speaker +	
GND	22	3	GND	
P AUX3	21	4	Motor	
P AUX4	20	5	MOLOF -	
P AUX10/Sensor	19	6	Matar	
V _{CC}	18	7	MOLOF +	
U+	17	8	V+ Cap	
AUX 5 (Power)	16	9	LampF (Power)	
AUX 6 (Power)	15	10	LampR (Power)	
AUX 7 (Power)	14	11	Aux 1 (Power)	
AUX 8 (Power)	13	12	Aux 2 (Power)	
Track Right	X2B	X2A	Track Right	

Note: AUX3, AUX4, AUX10 - 12 are logic level (0-5V) outputs. All others are powered.

The E24 decoder is used in the US by:

- Atlas
- ScaleTrains



PLUX22 socket

DCC, MM, DC, AC

FO3 Logic LevelSwitch inputSUSI (Data) or Servo 2SUSI (Clock) or Servo 1Capacitor PositiveGround (= capacitor neg.)Motor RightFront HeadlightMotor Left+ common positiveRight RailNo pin (coded)Left RailHeadlight RearFu-output FO1-Fu-output FO2-Fu-output FO5Fu-output FO4Fu-output FO7Fu-output FO6

Note the stay alive capacitor has it's own + connection!

Locomotives with PLUX22 sockets in the US

Piko Krauss Maffei ML4000 (HO Scale)





Piko Whitcomb 65-ton Road Switcher (HO Scale)





- Be careful when using these connectors with decoders having powered and logic outputs!











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





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!







Courtesy MRH Magazine











Courtesy ESU LLC



A passive radiator is a device that looks like a woofer but doesn't have a voice coil or magnet assembly. It's powered by air pressure fluctuations in the speaker enclosure, which are created by the speaker's driver.

Benefits

Passive radiators are ideal for smaller speakers, like Bluetooth speakers, because they can extract extra power and resonance from a small system. They're also useful in compact systems where it's difficult to create a vent





The SMD LED





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The SMD LED



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Thank You Very Much!