QUANTUM

ON-BOARD SOUND AND TRAIN CONTROL

System

Quantum Sound and Train Control System offers full sound and train control features in both Analog and Digital Command Control environments. The realism of sound is unsurpassed.

Communications

Quantum currently supports four different communication systems commonly used in model railroading:

Legacy™: Quantum DC operates with any standard DC power pack with a reverse switch (Patented) and Quantum AC operates with any AC transformer with a horn button.

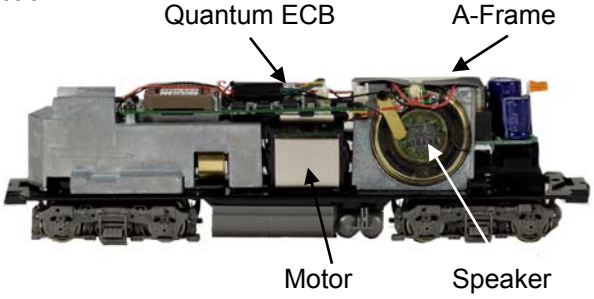
Advanced Analog™: Quantum Analog Remote Control (QARC) technology allows the operator to control features that are otherwise available only in DCC.

NMRA DCC: QSI supports the National Model Railroad Association Digital Command Control (DCC) standard including all relevant Recommend Practices (RP's).

TMCC®: Lionel's proprietary command control system, TMCC, is available on QSI Quantum UCS systems for operation of O' and G'Gauge locomotives.

Acoustics

Because of our innovative acoustic design, Quantum Systems provide realistic sound in model trains regardless of scale. Although an N'Scale locomotive has less internal physical space than a G'Gauge engine, it still has realistic presence and character appropriate to its size. In particular, our unique A-Frame speaker enclosure (Patent Pending) allows placing full-width speakers in narrow bodied locomotives like GP9's and other modern diesels.



Regulated Throttle Control

With Regulated Throttle Control (RTC), engines operate as though they have the mass and inertia of prototype locomotives; model railroaders can now control their locomotives at very slow prototypical speeds without having to adjust the throttle continually. Standard Throttle Control (STC) is also available on Quantum. Other features related to RTC and STC are:

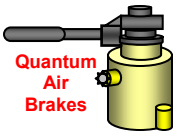
Inertial Control™: RTC operates using a special algorithm called Inertial Control which ensures that locomotives will resist changes in speed once it is moving and will resist starting up quickly if at rest. RTC prevents the locomotive from reacting quickly to changes in track voltage or minor impediments such as misaligned track joints, tight curves, rough turn-outs, etc.

Power Share™: Since the RTC algorithm, like STC, is a true throttle control, locomotives operating together under either STC or RTC will attempt to share power equally. This is not true for locomotives that use true electronic speed control.

Load: The locomotive Load can be programmed to change the rate of acceleration and deceleration. At the highest load setting, the engine will take many minutes to reach full speed or coast to a stop.

Heavy Load: Heavy Load is like cruise control except it uses Quantum Inertial Control to allow the engines to Power Share. Under heavy load, Quantum locomotives will take over ten minutes to accelerate to full speed or to coast to a stop. This allows the train under Heavy Load to move over hill and dale on model train layouts with little overall change in speed.

Air Brakes:



This is a QSI first. Our Air Brakes act like the real thing. An initial "quick tap" of the Apply Brakes button causes the engine sounds to reduce to idle and the locomotive to coast to a slow stop. Pressing and holding the Air Brake button creates the sound of air escaping the locomotive air-lines causing the train to brake. The more the pressure is reduced the faster the train slows.

Sound System

In addition to superb acoustics, Quantum sounds also include many other innovative concepts:

Sound of Power: The locomotive will produce Sound-of-Power labored sound effects based on the programmable Load setting. Under acceleration, the engine sounds will be more labored; under deceleration, the engine sounds are less labored.

Doppler: Instantly recognizable, the engine sounds get louder as the train approaches, then immediately drop to a much lower pitch and lower volume as the train passes by. Our patented Doppler effect is a function of the locomotive's scale miles per hour.

Stat Chat: Quantum provides verbal information about the locomotive's current operating state when the locomotive is stopped or the locomotive's current speed in scale miles per hour when the locomotive is moving.

Random Sequence Sounds (RSS): This QSI Patented concept keeps continuous digital sound from becoming boring and repetitious.

Segmented Horns: This QSI Patented invention allows the Horn or Whistle to be very responsive to horn commands. A very short Hoot is also included on all Quantum sound systems.

Special Whistle/Horn Endings: This allows the operator to "play" his Horn by selecting special Horn Endings on demand.

Mute and Fade: Our special Mute command causes the locomotive's sounds to fad slowly to a lower volume. This is ideal for operating trains in the background of the layout. Pressing the Mute key again will gradually increase the sound to full volume for operation at the front of the layout.

Multiple Sound Channels: Individual digital sounds can be heard at the same time (e.g. the Bell does not shut off when the Horn is blown). The Quantum ASIC has 32 independent sound channels.

Electronic Power Supply

PROPOWER

The Quantum System is resistant to problems caused by momentary interruptions of power that are common occurrences for model train engines.

Magnetic Wand

MAGNETIC WAND

Volume can now be adjusted on new factory installed Quantum Systems with out touching the engine by using a Magnetic Wand. In addition, the locomotive can be Reset, or Shut Down or Started Up using the Magnetic Wand. The QSI Magnetic Wand allows these basic operations without the expense of designing and retooling for access doors or hatches using potentiometers and jumpers. There is less chance of the customer scratching the painted surface of his locomotive, damaging the access doors, or loosing hatch covers and jumpers. QSI Patent Pending.

Lighting

The basic Quantum lighting package provides control of up to five independent lights. These can be used for Headlight, Reverse Light, Cab Light, Mars Light, Ditch Lights (requires 2 lights), Over Head Blinking Light, Number Board Lights, and Marker Lights. Additional lighting expander boards can add any number of extra lights.

Additional Features and Sounds

Blower or Diesel Fan Sounds	Programming: DCC, DC, TMCC
Dynamic Brakes Sound	Directional lighting
Motor Disconnect	Feature "Take Control"
Grade Crossing Horn Signal	Diesel Turbo Whine
Loco Shut Down	Electric Traction Motor Sound
Loco Start Up	Air Releases
Standby Idle	Air Pumps
Flange Squeal Sounds	Neutral State w/ Special Sounds
Squealing Brake Sounds	Programmable Helper Types
Coupler Sounds	Independent sound programming
Grade Crossing Horn Signal	Steam Dynamo w/ light up effect
12+ Function Keys in DCC	Articulated Steam Chuff effect

Quantum Systems

Four Quantum System types are available. Each type corresponds to different motor drive capability, track voltage and audio power output. There are also different models for each type depending on space or mounting requirements.

Quantum N: Suitable for N scale and some low current DC HO. Includes Legacy DC, QARC and DCC.

Quantum HO: Suitable for all HO and some low current DC O scale. Includes Legacy DC, QARC and DCC.

Quantum O/G: Suitable for all DC O'Scale and most G'Scale. Includes Legacy DC, QARC and DCC.

Quantum UCS: Designed for high-voltage, high-current AC Power O'Gauge, and AC or DC powered G'Gauge. Includes battery backup, battery w/ auto-shutdown, coupler drives, Legacy AC and provision for TMCC R2LC or other command control systems.

Specifications

	Maximum Peak Track Voltage	Maximum Avg. Motor Current	Audio Power Output
Quantum N	21.5 V	500 mA	300 mW
Quantum HO	25 V	1 A	300 mW
Quantum O/G	30 V	5 A	125 W
Quantum UCS	35 V	5 A	1.25 W