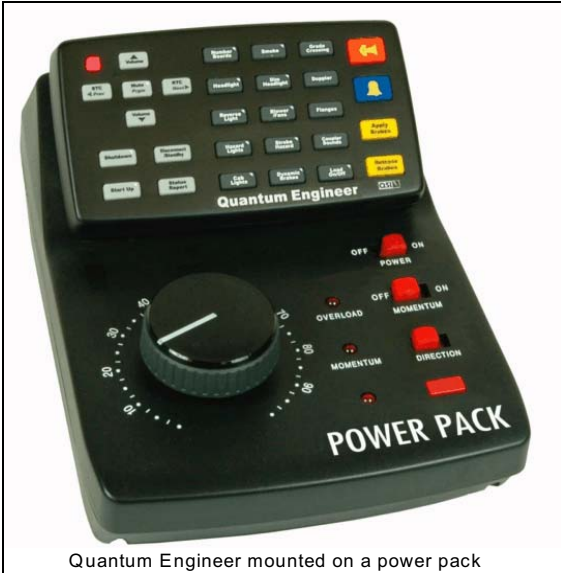


### DCC vs: dc operation

Once upon a time I wrote an short article called "To DCC or not to DCC". I was surprised at the number of comments made about my statement that DCC was becoming a defacto standard. There have been polls taken asking modelers if they run with *dc* or DCC. In both cases a large number of modelers fit into the **DC FOREVER GROUP**. My personal survey shows that there are a number of modelers that find *dc* operation meets their needs and have no plans to convert to DCC. Others are on the fence about converting to DCC.



Quantum Engineer mounted on a power pack

Even the most faithful of the *dc* only group seem to cave in when they **hear that whistle blow**. This translates to a market for operating sound on a *dc* layout. QSI has found a way to fill this market with controllable sounds in their DCC/*dc* decoders. The QSI sound decoders can be controlled either by DCC or *dc*. On *dc* sound control is done by flipping the reversing switch to signal the locomotive to operate the whistle/horn or bell. I always felt this was ingenious but still a somewhat awkward way to control sounds. The first remedy was the QSI **Side Kick** that gave push button control of the whistle/horn and bell when operating on *dc*.

The DCC/*dc* decoder lets a modeler run a locomotive at home on *dc* and at their club on DCC or the other way around. You could continue to use *dc* and when you convert to DCC your engines will work with no conversion.

QSI has expanded on the **Side Kick** concept with their new **Quantum Engineer™ (QE)** add-on control system. The QE works in conjunction with the newer QSI decoders equipped with **Quantum Analog Remote Control™ (QARC)**. The QE control box will even control the bell and horn/whistle of older QSI decoders without the QARC feature plus the many new features added by QARC. The QE adds many push buttons to control the new added features of the QSI QARC decoders.

The QE connects between a standard power pack and the track. The QE gets its power from the power pack. The decoder is sent commands from the QE using coded signals. The QSI decoder can decipher either the QARC commands from the QE or standard DCC commands. The list of features incorporated in the QE and with locomotives equipped with the QARC technology is impressive.

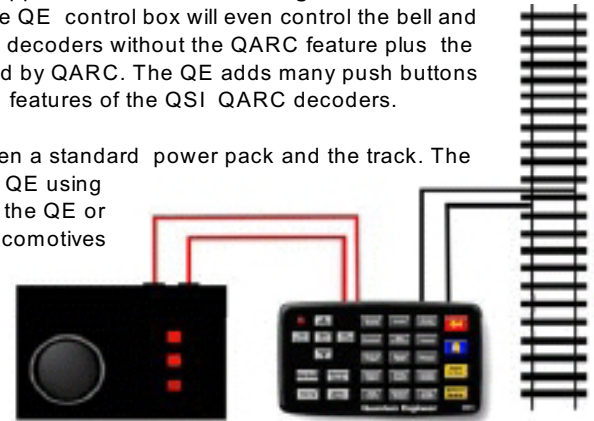
One nice feature of the QE is the keys are all labeled with the functions they control. Easier than the DCC controllers where the keys are mostly marked only with a number you have to remember for the function. Presently the highest number of function keys on any DCC cab is F0 to F19 or 20 functions. There are 28 keys on the QE. Some of the QE sounds are different depending on whether the engine is in neutral or moving. Many of the keys have a triangle in the upper right. This means the key will turn **on** with a single key press and **off** with a double click of the key.

Not all of the QE features are included in all QSI decoder equipped locomotives. The features depend on the type of locomotive, like Mars light that may or may not be on the prototype and the model follows the prototype.

The QE comes with a 24 page instruction manual and two Velcro to mount the unit in a handy location like the power pack. You can download the instruction manual for more information than is in this review. Go to the [www.soundliketrains.com](http://www.soundliketrains.com) website to get the manual and other information.

### TESTING

In my fleet of locomotives I have a couple of engines that have the Quantum Analog Remote Control feature and one without. To test the operation of the Quantum Engineer I used two different power packs. The first was a filtered *dc* pack and the other was unfiltered. Both of these packs worked OK with the QE without any problems. There is a list of acceptable power packs in the QSI *dc* manual.



Simple wiring to connect the system to the rails.

### Quantum Engineer Features

Quantum Engineer will operate the following features in locomotives equipped with Quantum Analog Remote Control (QARC) technology:

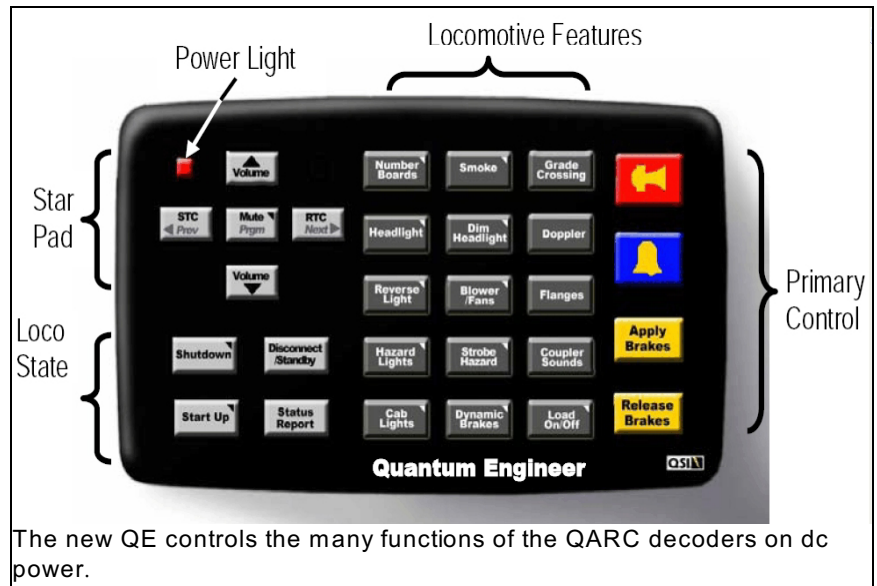
Horn	Grade Crossing Horn Signal
Bell	Smoke On/Off
Apply Air Brakes	Headlight On/Off & Dim
Release Air Brakes	Reverse Light On/Off
Loco Shut Down	Number Board Lights On/Off
Loco Start Up	Hazard Lights On/Off & Strobe
Standby Idle	Cab Lights On/Off
Flange Squeal	Blower or Fans On/Off
Squealing Brakes	Dynamic Brakes On/Off
Doppler Shift	Motor Disconnect
Coupler Lift Bar and Pin	Mute
Coupler Opening Sounds	Verbal Speedometer Readout
Coupler Crash	Locomotive Status Report
Load On/Off	Easy Quantum Programming
Heavy Load On/Off	Prev & Next Program Stepping
System Volume Control in Run Mode	
Regulated (RTC) & Standard Throttle (STC) Selection	

At first neither engine would run on dc. It took me a bit to remember (senior moment!) that I had set CV 29 (bit 2 off) in both engines so they would not run on dc. (Factory default has this bit set **on** for dc operation.) The fix was to use DCC to turn the bit **on**. Once **on** both engines worked on dc and would work with commands from the QE controller.

The QE was connected between the dc power pack and the track. The engine sounds started operating at about 4 volts. At about 6 volts the QE red power light turned on. The QE would not operate until the light was on. The engines started moving at about 8 volts.

A scope was connected to the output of the QE to look at the commands. The commands are transmitted at a slow speed using a relay that simulates reversing the polarity like flipping the reversing switch back and forth. You can hear the relay click as it sends a command. This is a reliable form of data transmission. Each command comprises of a start bit followed by 8 data bits and can be from 270 ms to 510ms long. There is a short delay between the key operation and the command transmission. On some commands the decoder acknowledges the command with one of the sounds like a short air release.

There are two settings for throttle response : **STC** for *Standard* and **RTC** *Regulated*. **STC** gave a quicker response for switching and **RTC** a momentum for mainline operation. **RTC** seemed to activate the Back-EMF function because the engine would slip the wheels at low speed if you tried to stall it. The sound volume could be changed at any time with the up and down volume keys. Handy if you need to lower the volume when the phone rings or just hit the mute key for silence.



The new QE controls the many functions of the QARC decoders on dc power.

My Atlas TrainMaster would start at about 8 volts, but the top speed was only 11 mph. How did I know the speed! I used the **Status Report** key on the QE and got a verbal readout of the speed! The speed problem was corrected by going into the program mode with the QE and stepping thru to the reset command. (Each step replies with a verbal response.) This reset the decoder to the default settings and the engine then acted normally. The V-start and V-max setting can also be adjusted in the program mode.

I wanted to run the two QARC locomotives as a consist. For consisting there is a Helper step in the programming mode that sets up an engine as -Normal, Lead, Mid, End or Pusher. The helper function controls which lights work with direction settings. The only way to be sure that only one engine decoder is changed when using the program mode is to removed the other from the rails. The red power light blinks to indicate that you are in the program mode.

The **Brake Set** and **Brake Release** keys do many things. Tap the set key and the engine will coast to a stop. Hold the key and the braking rate will increase and you may hear the brakes squealing as you stop. Once stopped a double click of the release key will get you going again. The power pack can be left set to the desired speed setting. When the brake is released the engine will return to previous speed.

The **Load** key lets the engine produce a labored sound when accelerating or drifting sounds when decelerating. This is a neat feature to use when going up or down a grade or pulling a long string of cars.

I have a steam engine with a QSI decoder that did not have the QARC feature. It would correctly respond to the bell and horn/whistle keys. Any other key pressed the bell would ring.

There are a lot more functions than can be squeezed into these few pages. The manual that comes with the QE is 24 pages long. For more information download the manual and other QE information from Sound-Like-Trains website.

Word from QSI is that QARC technology is in all Atlas, Life Like, Canadian Hobby Craft, and Intermountain Quantum equipped locomotives. QARC is in all BLI locomotives from the Pennsy K4 onward (Software released on August 14, 04). All earlier BLI engines will not have QARC technology but there will be an upgrade program through Sounds-Like-Trains available soon.

### Conclusion

The Quantum Engineer's list price of \$59.99 fills in the need for DCC like operations with out the cost of a DCC system. It is a good solution for a small layout and a single operator and only a few locomotives. This system is not a standard and it only works with locomotives equipped with QSI decoders. If you ever convert to DCC the QSI equipped locomotives will operate with no changes. The QE only works with QSI decoder equipped locomotives.

The graphics in this review were copied from the QE instruction manual.