Virgin Class 390 'Pendolino'

Manual

RAPIDO® TRAINS INC.

RevolutioN trains

N GAUGE 'PENDOLINO' PRODUCT GUIDELINES

THANK YOU for purchasing this model of the Virgin Trains Class 390 'Pendolino' high speed electric unit in N Gauge, which has been lovingly designed and manufactured by Rapido Trains Inc. of Markham, Canada.

The N 'Pendolino' has had a more interesting development path than most models. Now a joint project between Revolution Trains and Rapido it was originally launched in November 2014 on the Kickstarter crowdfunding platform. One of the first models to attempt to attract funding from potential customers, it fell maddeningly short (approx. 7%) of its £210,000 target by the January 2015 deadline. Happily, Rapido stepped in and agreed to make up the deficit allowing the project to proceed to the development stage.

This was the first model to be launched by the impresarios at Revolution Trains, otherwise known as Ben Ando and Mike Hale. However, it will actually be the second of its models to arrive after the N gauge bogie TEA tanker was dispatched to customers in autumn 2015. This was also produced by Rapido and garnered many plaudits. This included best item of N Gauge Rolling Stock in both the Model Rail magazine and RMWeb/BRM annual polls in 2016, as well as N Gauge Manufacturer of the Year by readers of Model Rail.

Rapido Trains Inc. launched its first North American N (1:160 Scale) models in 2008 with the Panorama Line passenger cars. The range has subsequently grown to include classic locomotives and freight cars culminating in 2017's announcement of the N Scale United Aircraft TurboTrain, which promises to be as exciting to modellers in the US and Canada as the 'Pendolino' is to British enthusiasts.

Despite Rapido's growing profile in the UK, we still mostly make North American trains, which we've been manufacturing at our factories in Guangdong Province in China since 2005. You can check them out at *rapidotrains.com*, particularly our gorgeous N EMD FL9 and New Haven Osgood Bradley Coaches. Of course, we also make models in HO and 4mm/OO gauge. We're not fussy, we just like making model trains.

By the way, if you've already taken the unit out of the box and run it three times around your layout then great. Carry on. Have fun. Sounds like you're doing just fine. We recommend reading this manual though to get full enjoyment out of this model, particularly if you've bought the version fitted with DCC sound decoders. Rapido, Revolution and DCC sound wizard Legomanbiffo have gone to a lot of trouble to make operating this unit an amazing experience and we want you to get the best out of it.

IMPORTANT: READ THIS BIT!

This is a high specification model of the 'Pendolino' and probably one of the most complex trains ever made in British N scale (1:148). Despite our best efforts there is a chance that you might find a problem with your shiny new purchase. Whatever it is, please don't hesitate to get in touch with the teams at Revolution (UK/EU orders) or Rapido (Rest of World). More warranty information is available towards the back of this manual.

Please **DO NOT** send any models back to Revolution Trains or Rapido Trains for repair without first getting in touch to receive authorisation. Contacting Ben and Mike at Revolution or us here at Rapido first will likely result in your N 'Pendolino' being returned to service much more quickly. Contact details are provided below:

Revolution Trains
Email: **support@revolutiontrains.com**

Rapido Trains Inc.
Tel/Fax: **1-855-572-6917**
Email: **trains@rapidotrains.com**

PLEASE NOTE: Rapido Trains Inc. is a Canadian company. Our galactic headquarters is in the beautiful province of Ontario If you live in the UK, **DO NOT** send us any models for repair. It will cost you a fortune!

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1. N 'PENDOLINO' DCC FUNCTION QUICK REFERENCE

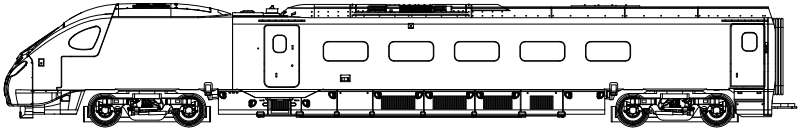
Key	Function	Key	Function
F0	Directional lights	**F11**	Guard to driver signal and optional reply
F1	Drive sounds	**F12**	Virgin welcome announcement
F2	Playable high horn	**F13**	Sanders
F3	Playable low horn	**F14**	Neutral section
F4	Passenger doors	**F15**	Virgin toilet announcement
F5	Automatic brake application (when moving) / Brake dump (when stationary)	**F16**	Nose door opening / coupling up
		F17	Uncoupling / nose door closing
F6	Driver's door	**F18**	Detonators
F7	Compressor	**F19**	Aux 1
F8	Windscreen wash / wipe	**F20**	Aux 2
F9	Automatic, variable-speed flange squeal	**F21**	Rail joint
F10	Despatch whistle	**F22**	Driver's emergency step deploy / retract

2. RUNNING IN

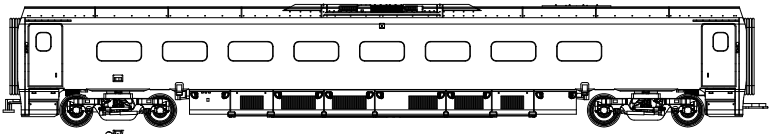
Every model train needs a running-in period. Although we are extremely impressed with the smooth operation of the twin five-pole motors that are fitted to the N 'Pendolino', we only schedule a couple of minutes per model for testing at our factory. That is not enough time to get the gears to mesh nicely or to even out any jerky operation in a new motor.

We suggest that, after reading this manual, you put your 'Pendolino' on a test loop and just let it run in each direction for an hour or so. Fast and slow. There already should be enough grease in the gearbox so you don't need to add any more. Just let the thing run. While your 'Pendo' is running you can finish reading the manual, then surf over to *revolutiontrains.com* and purchase another couple of models.

Car A - DMSO
Nos. 69201-69257



Car B - MS
Nos. 69901-69957



Car C - PTSRMB
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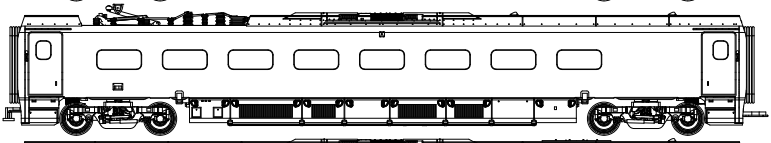
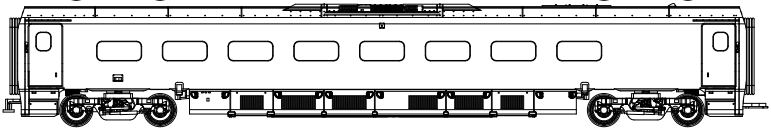


Car D - MS
Nos. 69701-69757



Car E - TS
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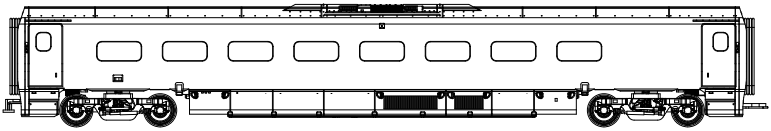
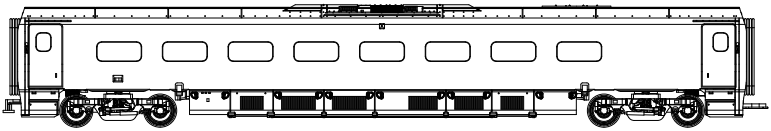
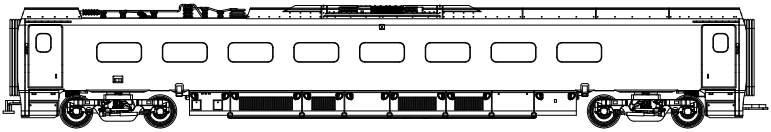


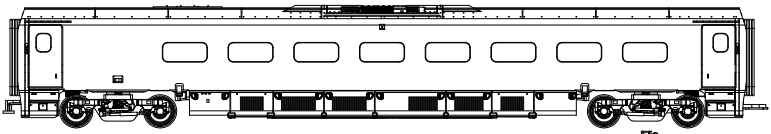
Car F - MS
Nos. 689xx *(11-car only)*



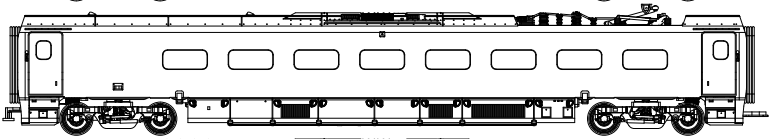
Car U - TS
Nos. 653xx *(11-car only)*



Car G - MF
Nos. 69601-69657



Car H - PTF
Nos. 69501-69557



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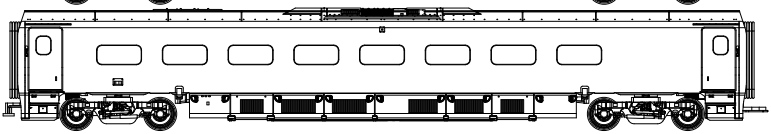
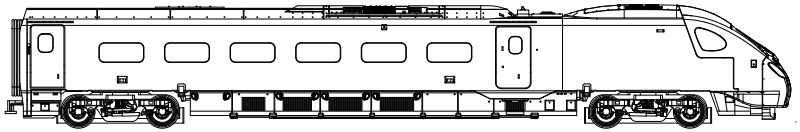


Car K - DMRF
Nos. 69101-69157



3. VIRGIN CLASS 390 'PENDOLINO' PROTOTYPE HISTORY

Introduced in 2001, the Class 390 high speed 25kV ac electric units are the principle express trains employed by Virgin Trains on the West Coast Main Line between London Euston, North West England and Scotland. They are part of the 'Pendolino' family of tilting trains developed by Alstom, previously Fiat Ferroviaria, that can trace their heritage back to the classic Italian State Railways ETR401 of 1976 (ETR meaning Elettro Treno Rapido). However, the tilting mechanism is based on the ETR450 and its derivatives, which were directly developed from British Rail's patents for its Advanced Passenger Trains (APT).

Richard Branson's Virgin Group had long tried to break into the passenger rail market in the UK and the privatisation of British Rail in the mid-1990s gave them the opportunity to bid for several of the InterCity franchises. It's competitive offers for both the InterCity West Coast and Cross Country franchises beat out both Sea Containers (GNER) and Stagecoach (South West Trains) and this included the total replacement of the existing fleet of Class 86, 87 and 90 locomotives and air-conditioned Mk.2 and Mk.3 coaches.

The old Caledonian Railway route north of Carlisle, which became the current WCML, was infamously twisty so a condition of the new franchise was that the majority of the new fleet of trains must tilt. In partnership with Railtrack, the privately owned forerunner to Network Rail, Virgin also unveiled a £2.1 billion complete modernisation of the West Coast route that would raise the maximum line speed to 140 mph (compared to the previous 110 mph limit) allowing journey times to be slashed dramatically by 2005.

Two groups bid to construct Virgin's planned fleet of WCML tilting trains, with Alstom and Fiat Ferroviaria eventually signing the £1.2 billion contract in February 1999, with financing provided by rolling stock lessor Angel Trains. The deal, for 44 eight-car and 9 nine-car sets (53 in total, at an approx. cost of £11 million per train), also included the maintenance of the new fleet. They would be assembled at Alstom's Washwood Heath, Birmingham, plant from 'kits' provided by Alstom's Savigliano plant in northern Italy. The deal also saw Alstom taking over the conventional loco-hauled trains until they could be withdrawn from service.

ALSTOM Virgin trains

Design agency Priestman Goode were handed the all encompassing contract to design the new 'Pendolino' trains in March 1998, along with the new Bombardier 'Voyager' and 'Super Voyager' DEMUs for Virgin Cross Country. The brief included almost every aspect of the project from the external aerodynamic styling and livery to the shape of the seats, interior decoration, signage and even the tableware!

A Pre-Series 'Pendolino Britannico' tilting train was unveiled to the rail industry and press by Virgin and Angel Trains at Alstom's Midlands Test Centre at Asfordby in July 2001, somewhat fitting as the former Old Dalby test track had been the proving ground for the original gas turbine APT-E in the 1970s. Two Pre-Series trains were built, PS01 and PS02, with the latter named *Red Revolution* and utilised for demonstration runs on the big day. This included speeds of 125 mph and up to six degrees of tilt with the train running at 110 mph.

By the time the first production Class 390 'Pendolino' arrived at Euston station on the last day of April 2002, the West Coast Route Modernisation was in disarray and Railtrack was just months away from being placed into administration by the Government. The complex moving block signalling system was cancelled, meaning a top speed of 125 mph only, while the innovative TASS (Tilt Authorisation & Speed Supervision) system, controlled by balises installed under the track, would be a year late in being commissioned.

Having had to shelve its ambitious schedule for introduction due to various delays, Virgin was at least able to meet its commitment to officially launch a 'Pendolino' into passenger service ahead of the 2002 Commonwealth Games in Manchester. Set No. 390010 was given the honour and operated a special Birmingham International-Manchester Piccadilly diagram from July 23rd-August 4th, for which it was named *Commonwealth Games 2002*.

By December 2002, Virgin had accepted seven trains from Alstom, although safety case issues meant that the planned introduction of services between London Euston and Manchester did not commence until January 2003, and then strictly limited 110 mph (with no tilt) and to one day a week by Network Rail. By the following May 15 trains had been delivered and Wolverhampton was enjoying 'Pendolino' operation on Tuesdays, while Manchester had been upgraded to two days a week (Wednesday and Thursday).

Services to Glasgow Central started in 2004 but it wasn't until the autumn that the full 125 mph tilting 'Pendolino' timetable could be rolled out, celebrated with a record-breaking run between London and Manchester on September 20th with Virgin boss Sir Richard Branson and then Prime Minister Tony Blair on board. This saw No. 390038 *City of London* complete the journey in just one hour and 53 minutes, although the fastest service in the regular schedule would call for two hours and six minutes, a saving of some 35 minutes over a typical loco-hauled formation. By this point 42 sets had been delivered.

The original contract included an option for Virgin to acquire another 44 trailers to make a homogenous fleet of nine-car 'Pendolinos'. During construction it became obvious that this additional capacity would be required, so from set No. 390035 all trains were delivered with the additional coach. The first 34 trains were then cycled through home depot Longsight to gain their additional standard class vehicle. Other maintenance locations include Edge Hill (Liverpool), Wembley, Oxley (West Midlands) and Polmadie (Glasgow).

The worst incident to befall a 'Pendolino' took place on February 23rd, 2007, when an emergency crossover on the WCML at Grayrigg, Cumbria, failed derailing set No. 390033 *City of Glasgow* travelling at 95 mph. Sadly one person died and 30 people were seriously injured. The 'Pendolino' set was written off in November 2007 with all but two cars from the train scrapped. The two surviving cars are now used for training at Crewe.

In December 2008 Virgin launched its VHF timetable (Very High Frequency) which included trains every 20 minutes between London and Birmingham and London and Manchester every day of the week.

Despite the fleet of extended trains, within a few years Virgin was already suffering capacity issues on its services. Having had a previous request for additional cars denied as part of franchise extension negotiations, in August 2008 a £255 million contract was awarded to provide four new 11-car trains along with 62 standard class coaches. This would allow 31 existing 'Pendolinos' to be lengthened to 11 cars. As Washwood Heath closed in 2004, all new vehicles would be constructed at Savigliano in Italy. The new 35-strong fleet of 11-car trains was given the new Class 390/1 identity (e.g. 3901xx). Longsight would again lengthen the sets, this time as part of a H3 overhaul (scheduled when trains have recorded two and a half million miles in traffic).

The first new 11-car set (No. 390054) arrived in December 2010. However, it didn't enter service with Virgin until July 2011 due to issues with the changeover to a new franchise contract, and even then it only entered service in nine-car form! All four of the new trains were in service by April 2012, which also saw the debut of the first 11-car set (No. 390156). By the autumn some 20 11-car formations were in service. H3 overhauls of the entire original fleet of 53 trains, along with the lengthening programme, were completed in July 2013.

4. CHECKING AND ADJUSTING YOUR N 'PENDOLINO'

We try and make sure that every model is perfect before it leaves the factory but it's possible there may be a couple of operational issues. Doing a quick pre-service check will solve most glitches.

- Check to see that all wheelsets are correctly in gauge. Should any of the wheelsets be out of gauge, then remove the problem wheelset from the truck by prying off the bottom lid of the gearbox with a small flat screwdriver. The wheelset can be regauged by grabbing each wheel and twisting. Reverse the steps to replace the wheelset, and ensure the gearbox cover is snapped into place before placing on the track.

- Check that all underbody piping and appliances are firmly installed and clear of the track.

- Make sure that the trucks swivel freely and without binding. If they catch on anything, check to ensure that the ends of the trucks don't bind against the underframe or end fairings under the doors. If they do, see that everything is firmly installed.

5. MISSING OR DAMAGED PARTS

The N 'Pendolino' is a high specification model with quite a few separately separate parts, including rather lovely yaw dampers on the bogies, Brecknall-Willis high speed pantographs, electrical trunking and etched roof grilles and windscreen wipers. If you open your 'Pendolino' packaging and discover that many of them are floating around without a care in the world then we're sorry.

In our defence, this model has been shipped from Guangdong Province, China, to either Revolution Trains in the UK or Rapido Trains Inc. in Canada and then almost certainly from one of those locations to wherever you're now sitting. That's a lot of miles! Don't worry though. Revolution Trains (UK/EU orders) and Rapido Trains Inc. (Rest of World) both pride themselves on excellent warranty service and if you drop the appropriate company a line they'll discuss the best way to proceed.

That said, if we're talking about a handrail or windscreen wiper then you might be better off fixing it yourself with a dab of PVA. Two more trips by courier (to and from Revolution or Rapido for repair) are likely to cause more damage. If you're not confident about repairs then give Revolution or Rapido a call. They'll try and help. By the way, we don't recommend using contact adhesive for repairs as it can cause a horrible 'ghosting' effect - plus PVA dries clear and any excess can easily be removed with warm water.

If there are big gaping holes where something obviously fell off but there is nothing floating around the box then it looks like a part has gone AWOL. It may have pinged off when your model was being packaged or when you took it out of the box. Maybe it's camouflaged itself the colour of grey EPM foam and is determined to never been found.

Whatever the reason, it doesn't matter. Give Revolution or Rapido a call or send them an email and they will arrange to send you a replacement part or authorise you to return it to them for repair.

6. THE POLYBAG (CUSTOMER-FITTED PARTS)

If you're looking at the little polybag that is provided in each N 'Pendolino' box you may be wondering what all these additional parts are for. The following should be included:

- 2x "Male" power couplers
- 2x "Female" power couplers
- 1x NEM coupler for front of train
- 2x Brecknall Willis high speed pantographs
- 2x Windscreen wipers
- 8x Bogie Yaw Dampers (4 each side)
- 1x Front nose plate

The 'Pendolino' isn't the first model in N to use kinetic couplers that pass an electrical connection between cars, but we reckon its amongst the most elegant variations on this concept. We've had our test units thrashing around smaller than second radius curves, up 4% grades and through ridiculously tight pointwork at full pelt and we've not broken one yet. We've also coupled them and uncoupled them hundreds of times. However, these couplers are crucial to ensuring flicker free lighting and ensuring that one power car doesn't die over dirty or poor trackwork causing a major derailment. If you do happen to break an inner coupler then don't panic, we've included a two pairs in the polybag.

As well as extra yaw dampers, we've also included a couple of spare pantographs because these parts are very easy to get caught in your jumper never to be released or ping off into the Twilight Zone when you accidentally brush your arm over the model when rerailing that locomotive that fell off at the back of your layout. We've been there, that's why we include spares!

The final two parts are for those wishing to replicate locomotive-hauled Class 390 'drags'. The nose plate can be removed on the front of the driving cars and an NEM coupler slotted in place (apologies, not only is this not a 1:148 scale Dellner coupling, but we also don't provide an N gauge Class 57/3 'Thunderbird' locomotive in the polybag). We have, however, included a painted spare front plate because we know these will be lost! We look forward to seeing your North Wales Coast and Settle & Carlisle 'drags' replicated in N gauge.

7. VIRGIN TRAINS CLASS 390 'PENDOLINO' TRAIN FORMATIONS

5-Car Virgin Trains standard livery (Item Nos. 2003 & 2503)

Car A 69201 DMSO | Car C 69801 PTSRMB | Car G 69601 MF

9-Car Virgin Trains standard livery (Item Nos. 2000A/B/C/D & 2500A/B/C/D)

Car A 692xx DMSO | Car B 699xx MS | Car C 698xx PTSRMB

Car H 695xx PTF | Car J 694xx MF | Car K 691xx DMRF

11-Car Virgin Trains standard livery (Item Nos. 2001B/C/D & 2500B/C/D)

Car A 692xx DMSO | Car B 699xx MS | Car C 698xx PTSRMB

Car U 653xx TS(P) | Car G 696xx MF | Car H 695xx PTF

11-Car Virgin Trains Alstom livery (Item Nos. 2001A & 2500A)

Car A 69203 DMSO | Car B 69903 MS | Car C 69803 PTSRMB

Car U 65303 TS(P) | Car G 69603 MF | Car H 69503 PTF

11-Car Virgin Trains Britain is Great livery (Item Nos. 2001E & 2500E)

Car A 69251 DMSO | Car B 69951 MS | Car C 69851 PTSRMB

Car U 65351 TS(P) | Car G 69651 MF | Car H 69551 PTF

11-Car Virgin Trains Poppylino livery (Item Nos. 2002 & 2502)

Car A 69204 DMSO | Car B 69904 MS | Car C 69804 PTSRMB

Car U 65304 TS(P) | Car G 69604 MF | Car H 69504 PTF

Car H 69501 PTF Car K 69101 DMRF

Car D 697xx MS Car E 688xx TS Car G 69601 MF

Car D 697xx MS Car E 688xx TS Car F 689xx MS

Car J 694xx MF Car K 691xx DMRF

Car D 69703 MS Car E 68803 TS Car F 68903 MS

Car J 69403 MF Car K 69103 DMRF

Car D 69751 MS Car E 68851 TS Car F 68951 MS

Car J 69451 MF Car K 69151 DMRF

Car D 69704 MS Car E 68804 TS Car F 68904 MS

Car J 69404 MF Car K 69104 DMRF

8 REMOVING THE SHELL

If you need to open up your N 'Pendolino' driving or trailer cars (to install a crew, passengers, trolley service, lighting, decoders, etc.) it is actually quite easy to do. Just be sure to remember these important points:

- The bogies sideframes are nicely rendered with separate yaw dampers. These can break if roughly handled. However we do provide spares (see above) and they are easy to replace.
- Remove the end fairings under the doors. These are simply clipped into the body. Note that these are handed so please make a note of which side the small square box is on.
- Using your fingernail, pull the bodysides carefully apart below the jacking pads at one end of the car. Then simply lift the body off the underframe by gripping the body with one hand and the bogies with the other. The driving and trailer cars will come apart in the same way although be careful not to pull the bogies off on the driving cars (they will simply clip back into place).
- To reassemble your 'Pendolino' vehicles do everything in the last paragraph in reverse. Then reattach the end fairings and you are good to go!

9. OPERATION – DC (SILENT)

Connect the cars being careful to ensure each car is correctly oriented and the electrical contacts are touching (we've printed car letter and direction to front on the base of each vehicle to help). Put the 'Pendolino' on the track. Make it go. That's it.

In DC operation, the headlight, marker lights and tail lights all work directionally. The first class table lamps (and passenger interior lights if installed) are also illuminated. These are always on.

If you are new to the hobby (or just like to occasionally "play trains") and you have a DC-powered train set, a vintage controller or one of indeterminate heritage, please contact Rapido or Revolution Trains before operating your 'Pendolino' as it may not be safe (for your model and/or your wallet) for you to use it.

We know that some people get grumpy when we recommend caution before using some controllers and think that we're in league with the Secret Society of DCC Manufacturers to force you to switch to DCC. The real reason is because some train set throttles put out a very high maximum voltage that is not suitable for scale model trains. The maximum recommended voltage is 15 volts DC. Similarly, controllers designed for large scale trains put out a much higher voltage than your 'Pendolino' can handle.

If you use a train set controller or a controller designed for large scale trains, your model's circuitry may end up looking like those "your brain on drugs" commercials. In such situations, we'll try our best to fix it for you. But we may have to charge you for the replacement parts and/or the labour involved. That's because you didn't read this bit of the manual.

10. INSTALLING THE DCC DECODERS

The N 'Pendolino' contains an ESU-designed motherboard in both driving cars. Yes, the N 'Pendolino' requires two decoders. This is for two reasons. This model has designed to achieve a high level of sophistication in DCC sound and lighting features. To operate all of these on both vehicles from one decoder would have require a huge multi-pin connector between as many as 11 cars.

Why didn't you use an accessory decoder at one end we hear some of you cry? Well, having only one powered car was never a serious proposition for this train. It's heavy and every car has electrical pick ups to improve running and make fitting interior lighting a breeze. That means more rolling resistance.

The motherboard is connected to the track, motor and lighting outputs. A blind plug is attached to this using a six-pin connector. To install a decoder, remove the blind plug and install a six-pin decoder.

At the time of writing, we recommend the following six-pin decoder:

- ESU Select Micro Decoder

The necessary resistors for lighting are included on our ESU-designed motherboard so you don't have to mess around with resistors. Just plug in the recommended decoder and you have DCC. Don't forget you'll need to add decoders to both cars. We know it's not cheap. But it is worth it!

11. OPERATION – DC (SOUND)

To operate your sound-equipped N 'Pendolino' trainset on a DC layout, just give the controller some juice. The engines will start up once sufficient voltage has been reached (around seven volts). See the note above (in **Operation – DC (Silent)**) about using train-set or large-scale controllers. With DC layouts, you have very little control over the sounds of your model. You also won't be able to access the DCC controlled lighting functions, but the same lights as standard DC will work.

If you like running sound-equipped locomotives, multiple units and use advance lighting features, you might want to think about upgrading to DCC. If you love DC and cab control but want a taste of what you are missing, please read on...

12. OPERATION – DCC (SOUND)

The Rapido/Revolution N 'Pendolino' was designed first and foremost to be a DCC sound model. Companies like ESU, Lenz and Zimo, etc. have been pushing decoder technology forward and this model was intended to take advantage of these advanced features. Rapido Trains Inc. and Revolution Trains have worked closely with Ian Bishop, otherwise known as Legomanbiffo, to record and master the sounds.

TRAIN ADDRESS

Your N 'Pendolino' comes from the factory with a decoder address of 3. We suggest if you are using DCC control that you first test that the unit responds on address 3. Once you have verified that the unit is responding you should assign it a unique address before going any further (we use the last three digits of the TOPS number, but whatever system you have that works is fine). This can be done either on your programming track (recommended) or on the main if your system supports programming on the main.

Be aware however that if you do program the N 'Pendolino' on the main and you have any other locomotives or multiple units on your layout assigned to address 3 (the normal default address for new models) that ALL of them will likely also be changed to your new address!

FUNCTIONS

Please read the notes below before trying your DCC-fitted Class 390 'Pendolino' for the first time as some features may not work in the manner you are used to.

Function Keys – Introduction
Please note the following regarding operation of the function keys;

- Some sounds are disabled when the train is stationary (e.g. flange squeal), and others are disabled when the loco is moving (e.g. despatch whistle).
- Some sounds operate automatically and are enabled by pressing the appropriate function key (e.g. playable brake applications). The sounds will only be heard when certain prototypical criterion are met.
- Some sounds such as horns, air release & driver's door sounds are playable with the engine switched off, as per the prototype.

Function key summary (see following pages for full descriptions)

Key	Function	Key	Function
F0	Directional lights	**F11**	Guard to driver signal and optional reply
F1	Drive sounds	**F12**	Virgin welcome announcement
F2	Playable high horn	**F13**	Sanders
F3	Playable low horn	**F14**	Neutral section
F4	Passenger doors	**F15**	Virgin toilet announcement
F5	Automatic brake application (when moving) / Brake dump (when stationary)	**F16**	Nose door opening / coupling up
		F17	Uncoupling / nose door closing
F6	Driver's door	**F18**	Detonators
F7	Compressor	**F19**	Aux 1
F8	Windscreen wash / wipe	**F20**	Aux 2
F9	Automatic, variable-speed flange squeal	**F21**	Rail joint
F10	Despatch whistle	**F22**	Driver's emergency step deploy / retract

PROTOTYPICAL OPERATION

We've enlisted the aid of Ian Bishop, otherwise known as **Legomanbiffo**, to record and master the sounds. Legomanbiffo is widely regarded as the most accomplished and most accurate sound engineer for British models and it has been a pleasure to work with him on this project. We hope that you will consider him for all of your diesel and electric sound needs in future. The following text was written by Legomanbiffo.

Directional lights (F0) - Turns the lights on and off!

Drive sounds (F1) - Pressing F1 raises the pantograph, closes the vacuum circuit breaker, energises the transformer and starts all the underframe equipment. Opening the throttle then starts the traction motor blowers. Acceleration and deceleration sounds are produced automatically when moving. At higher speeds, F14 can be pressed to simulate a neutral section, causing the traction motor blowers to stop and then restart.

Turning off F1 when stationary turns off the underframe equipment, de-energises the transformer and lowers the pantograph.

Turning F1 off or on when moving causes the sound to fade out or back in again.

'Playable' horns (F2 & F3) - F2 is the high horn tone and F2 the low tone. Turn either function on to play the horn and off again to stop it. This allows you to sound the horns in any manner just like the real unit.

Some DCC controllers can be set to momentary operation such that the horn only plays whilst the key is held down.

Passenger doors (F4) - Press F4 to open the passenger doors. Release F4 to sound the hustle alarm and close the passenger doors.

Automatic braking & brake dump sound functions (F5) - F5 can be used in three different ways;

1. When the unit is stationary, pressing F5 will produce the sound of the driver 'dumping the brake'.

2. If the unit is decelerating, F5 may be turned on and then off to produce a single brake application sound. There are three different brake application sounds (light, medium and heavy) depending upon the rate of deceleration. This can be repeated any number of times.

3. If F5 is turned on when moving at a steady speed the brake application sounds will be produced automatically each time the throttle setting is reduced. This is particularly effective when repeated a number of times when the unit is coasting up to a red signal (for example).

Driver's door (F6) - Press F6 to close the driver's door.

Compressor (F7) - Press F7 to run the compressor. Press F7 again to stop it.

Windscreen wash / wipe (F8) - Press F8 to operate the high pressure windscreen wash / wipe. Press F8 again to stop it.

Automatic, variable-speed flange squeal (F9) - Turning F9 on will produce a flange squeal sound proportionate to the current speed of the unit. If turned on when stationary the sound will begin when the unit starts to move and increase in intensity as speed increases. As the unit comes to a standstill the squeal will slow and stop automatically. F9 can be turned on and off at any time and speed to produce a realistic effect over pointwork etc.

Despatch whistle (F10) - Pressing F10 when stationary will produce a despatch whistle sound from the platform staff.

Guard to driver 'right away' signal & optional reply (F11) - Pressing F11 when stationary produces a randomised 'beep-beep' signal from the guard to the driver which indicates that it is safe to depart. If F11 is left on, there will also be a randomised reply from driver to guard as an acknowledgement. To select the guard's signal without a reply from the driver, turn F11 on and then off again.

Virgin welcome announcement (F12) - Press F12 to play the Virgin Trains welcome announcement, as used on the real train.

Sanders (F13) - Press F13 to operate the sanders. Press F13 again to stop them.

Neutral section (F14) - When running at more than 30 per cent of top speed, pressing F14 will simulate the train passing through a neutral section. Releasing F14 or stopping the train will 'prime' the sound for use again, if required.

Virgin welcome announcement (F15) - Press F15 to play the Virgin Trains toilet announcement, as used on the real train.

Nose door opening & coupling up (F16) - Press F16 to play the sound of the nose doors opening and release it to play the sound of the coupler engaging.

Uncoupling & nose door closing (F17) - Press F17 to play the sound of the coupler disengaging and release it to play the sound of the nose doors closing.

Detonators (F18) - F18 is used to simulate the use of three track detonators as an 'emergency stop' indication to the driver, if the line is blocked ahead for example. The three bangs will be closer together the faster the train is moving.

Aux 1 (F19) - Press F19 to enable the Aux 1 auxiliary output.

Aux 1 (F20) - Press F20 to enable the Aux 2 auxiliary output.

Rail joint (F21) - Pressing F21 at more than 40% of top speed will play the sound of a Pendolino passing over a rail joint at high speed.

Driver's emergency step deploy / retract (F22) - Pendolino's are fitted with an emergency step just below the door to the rear of the cab, which enables the driver to climb safely down to the track in an emergency. Press F22 to deploy the step and release it to retract it.

SOUND VOLUME SETTINGS

The sound volumes on your decoder have been pre-set to levels suitable for exhibition use. You will probably find the train **WAY TOO LOUD** for use at home or in your shed. Fortunately all sound levels can be easily adjusted to best suit your own requirements and we recommend that you experiment with different settings if you don't care for the default levels. The easiest way to turn the volume down is simply to reduce the value of CV 63, which is currently set at its highest volume of 192. If you want your N 'Pendolino' to be even louder then we can suggest a good ear doctor.

To set the volume levels go into the program mode on your DCC system (refer to your system's manual for instructions on how to do this as each system is slightly different); enter the desired CV number; then enter the desired levels. Note that this can be done either on a programming track or on the main ('ops' mode) if your DCC system supports programming on the main.

We strongly recommend that you keep notes on which settings you have changed and which values were used. If you ever need to do a reset on the decoder (see "Factory Reset" below) then having good notes will allow you to easily re-enter any changes that you might want to keep.

VERY IMPORTANT: Before you change any of the volume control CVs apart from the Master Volume, please make sure that CV32 is set to 1. CV32 is used as an index selection register and if you don't set it first then we are not responsible for your resulting rage and the fact that you will probably throw all the cars of your N 'Pendolino' against the end of the attic in frustration.

N 'PENDOLINO' SOUND VOLUME SETTINGS

Key Function	Sound slots	Volume CVs	Volume values	Your value
Drive	1, 2, 22	259, 267, 427	128, 128, 128	
Playable high horn	23	435	128	
Playable low horn	24	443	128	
Passenger doors open / close	4	283	60	
Playable brake application	5	291	80	
Driver's door slam	6	299	128	
Compressor	7	307	110	
Windscreen wash / wipe	8	315	100	
Variable speed flange squeal	9	323	90	
Despatch whistle	10	331	60	
Driver to guard signal	11	339	80	
Welcome announcement	12	347	90	
Sanders	13	355	30	
Toliet announcement	15	371	90	
Nose door opening / coupling up	16	379	128	
Uncoupling / Nose door closing	17	387	100	
Speed-dependant detonators	18	395	128	
Aux 1	21	419	50	
Rail joint	20	411	128	
Driver's emergency step	19	403	128	

FACTORY RESET

On your N 'Pendolino', you perform a factory reset by entering a value of "8" into CV8. Note that this will cause all of your new volume and motor settings to be lost, so you will need to reprogram any settings that you want to keep. You did keep notes like we suggested earlier, didn't you? However, you can NOT lose all of the pre-recorded sounds on your N 'Pendolino' decoder by doing a factory reset, not matter what that guy told you on an Internet forum.

INCREDIBLE SLOW SPEED RUNNING

There is an incredible trick that you can use to get even better slow speed running and smoother operation. It's called the Automatic Motor Tuning Feature. This feature will automatically adjust the Back-EMF in most cases and give you phenomenal slow-speed performance.

In order to use this automatic adjustment you need to use 'Ops' mode programming, i.e. programming on the main. Make sure your 'Pendolino' is in 'forward' (Car A 692xx leading) and that you have lots of room in front of it. And we mean LOTS of room. Set CV54 to a value of 0. Then get out of programming mode and press F1.

Your N 'Pendolino' will quickly take off at full speed and suddenly stop while the decoder reads the motor responses. You'll have fabulous motor control after you do this. If you ever have to reset your unit, you can do the automatic adjustment again - it just takes a few seconds.

13. LIMITED LIFETIME WARRANTY

Revolution Trains or Rapido Trains Inc. will do our best to solve any problems or issues that you may have with your N 'Pendolino'. If your unit has any defects that originate from the factory, Revolution (UK/EU customers) or Rapido (Rest of World) will repair it using new components or replace it outright should a repair not be possible. However, they can only replace your 'Pendolino' while they have additional ones in stock. As this is an extremely limited edition they can not guarantee that it will still be in stock six months after the model has been released. If you purchased this unit or first opened it after that time, it is possible that there are no longer any replacements and that a repair is the only option. Please give Revolution or Rapido a call or send us an email. We will see what can be done to help you out.

There are a number of things that this warranty can't cover. If your 'Pendolino' arrives with a loose wiper or detail part, there is a very good chance that you can effect a repair in less time and effort than it would take to contact us. PVA works wonders for securing all sorts of bits and will not mar or damage your paint. However, if parts are missing that is another story – contact Revolution or Rapido and we'll send you some replacements.

If catastrophe does strike and your N 'Pendolino' gets damaged, please give Revolution or Rapido a shout and we'll do our best to help you out. Yes, even if it was your fault we will try our best to fix your model for you. Don't be shy!

14. ACKNOWLEDGEMENTS

We'd like to say a special thanks to Virgin Trains (especially Damian Henderson and the team at the Crewe Training Centre), Alstom (especially the management and staff of Longsight depot), Paul Priestman of Priestman Goode (designer of the 'Pendolino' exterior and livery), Scantech International, Ian Bishop (Legomanbiffo), Matt Herman (ESU), Tom Smith and everyone who had faith in the crowd-funding dream and backed Revolution Trains.

Designed and manufactured by:

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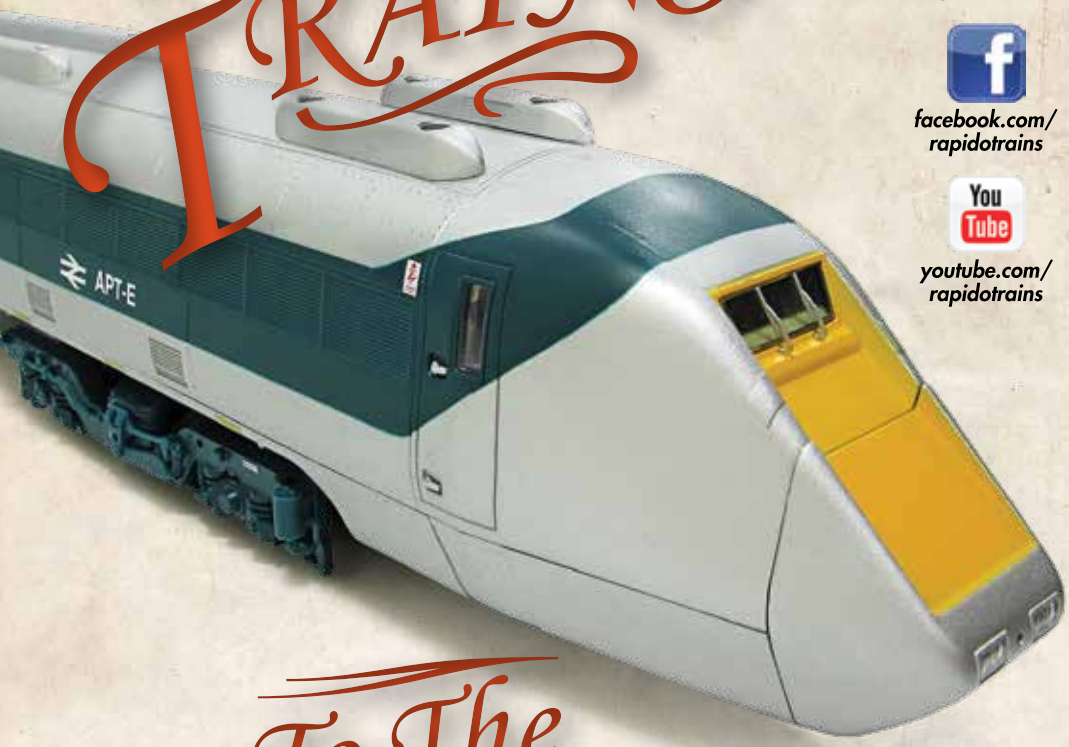

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