Class 350

Enhancement Pack

Contents

How to Install

1) Locate where you have downloaded this pack and unzip it. Information on how to do this can be found *here*.
2) Go to the location where you have extracted the files from the .zip file.
3) Now find the .exe file called 'Class 350 Enhancement Pack'. Double-click this file.
4) Follow the steps and by the end of the process, the main part of this pack will have installed.
5) If you intend to use any of the included scenarios, make sure you have the requirements installed, as listed on the product page.
6) To ensure the cab environment sounds as intended in this pack, please make sure that 'EFX' is ticked within your in-game Audio settings.

Liveries

Central Trains / Silverlink - *CT-SL AP*

London Midland:

with London Midland logo - *LM AP*

with London North Western Railway logo - *Ex-LM (LNWR) AP*

London North Western Railway - *LNWR AP*

London North Western Railway 2 - *LNWR 2 AP*

First Transpennine Express Grey - *FTPE Grey AP*

First Transpennine Express - *FTPE AP*

Transpennine Express - *TPE AP*

Keyboard Controls

Non-standard keyboard controls are listed below:

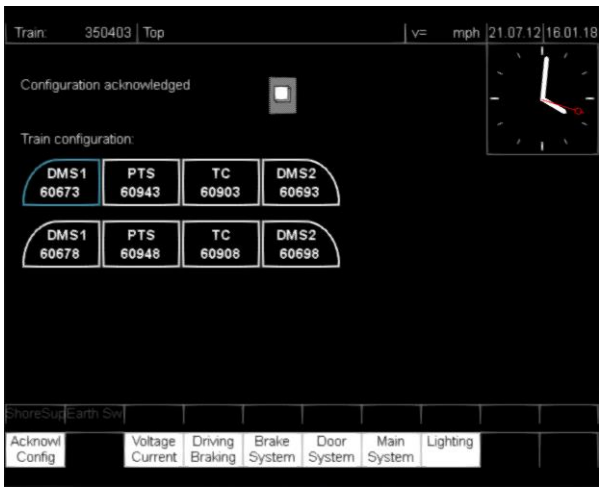
Shift+U -	Battery off button
U -	Battery on button
I -	Cab equipment light switch CLOCKWISE
Shift+I -	Cab equipment light switch ANTI-CLOCKWISE
L -	Cab light ON/OFF
E -	Deadman's pedal (DVD reset)
F7 -	Destination display DOWN
F8 -	Destination display UP
Y -	Driver reminder appliance (DRA) ON/OFF
C -	Driver to guard signal
Ctrl+D -	Driver vigilance device (DVD) ON/OFF
H -	Headlight switch CLOCKWISE
Shift+H -	Headlight switch ANTI-CLOCKWISE
O -	HSCB switch ON
Shift+O -	HSCB switch OFF
I -	Instrument lights switch ON/OFF
Shift+W -	Master key IN/OUT
P -	Pantograph UP/DOWN
J -	Power source AC/DC
K -	Tail lights switch ON/OFF
Shift+0 -	TMS key 0
Ctrl+1 to 9 -	TMS key 1 to 9
Ctrl+Page Down -	TMS scroll DOWN
Ctrl+Page Up -	TMS scroll UP
Shift+Q -	TPWS Mk4 AWS button
V -	Wiper switch CLOCKWISE
Shift+V -	Wiper switch ANTI-CLOCKWISE

Features

Train Management System (TMS)

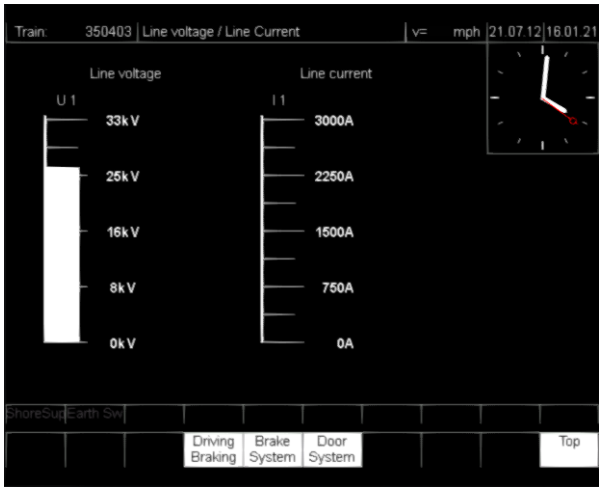
The TMS screen to the top-right of the driver provides information on many aspects of the unit. On all screens, above keys 0 to 9 are a list of screens or actions that can be accessed by pressing their corresponding key on the TMS.

Top



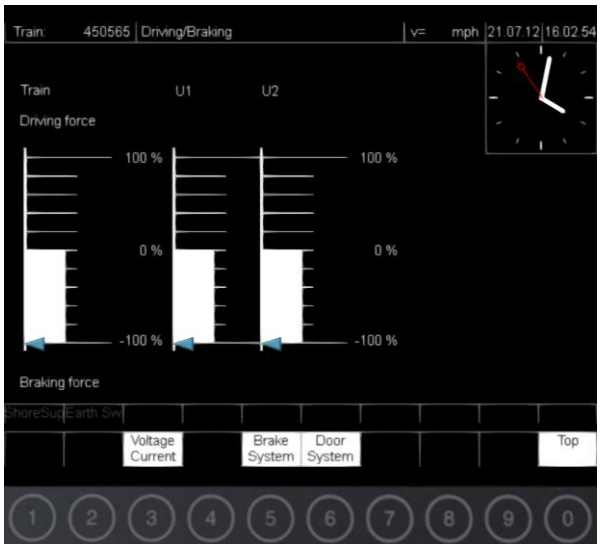
After booting, this is the first screen you see. It displays your train configuration and whether you have acknowledged it. To acknowledge the train configuration, press the **1** key on the TMS, or **Ctrl+1** on the keyboard.

Line Voltage / Line Current



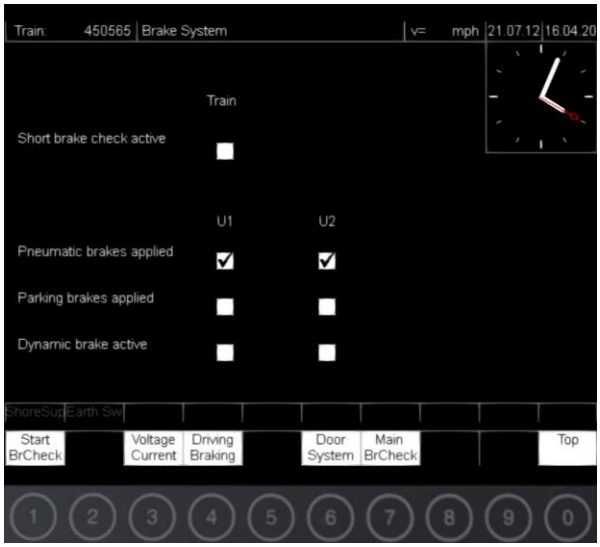
On this screen, you can see the line voltage being received and the line current produced by the train.

Driving / Braking



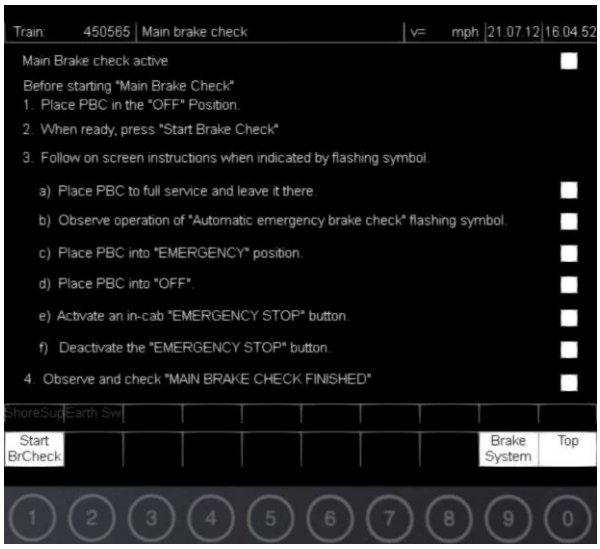
On this screen, you can view the state and level of braking or traction power currently applied. U1, U2 & U3 represent each individual unit in a formation. For example, an 8 car formation is shown above so only U1 & U2 are listed as there are only 2 units in the formation. The blue triangle indicates the position of the power brake controller.

Brake System



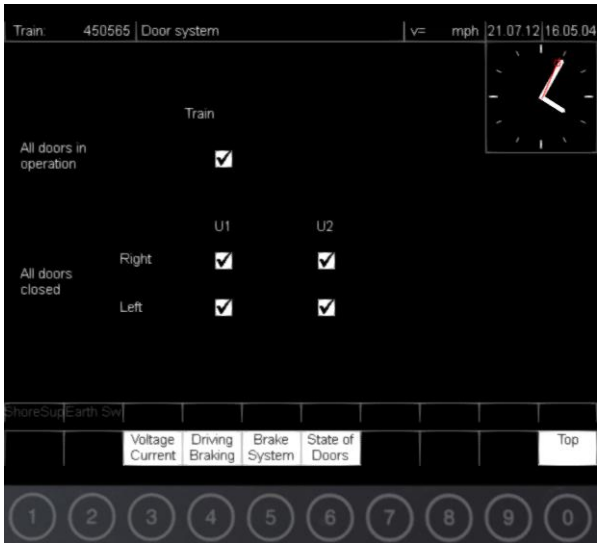
On this screen, you can carry out a short brake check and view the state of the pneumatic (air), parking & dynamic brakes. To carry out a short brake check, the **1** key on the TMS. For this to work, the doors must be closed, reverser in 'Forward' and power brake controller in 'Off'. Whilst in progress, the tick box will flash. When complete, it will return to a blank white box.

Main Brake Check



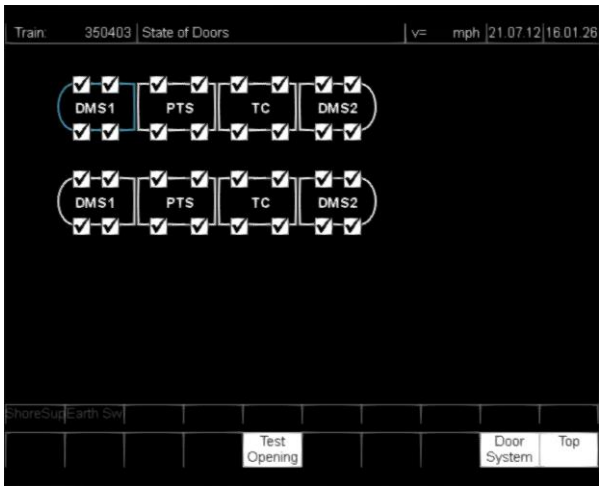
On this screen, you can carry out a main brake check. To do this, press the **1** key on the TMS. For this to work, the doors must be closed, reverser in 'Forward' and power brake controller in 'Off'. As stated on the screen, you must follow the relevant instruction when indicated by the flashing tick box.

Door System



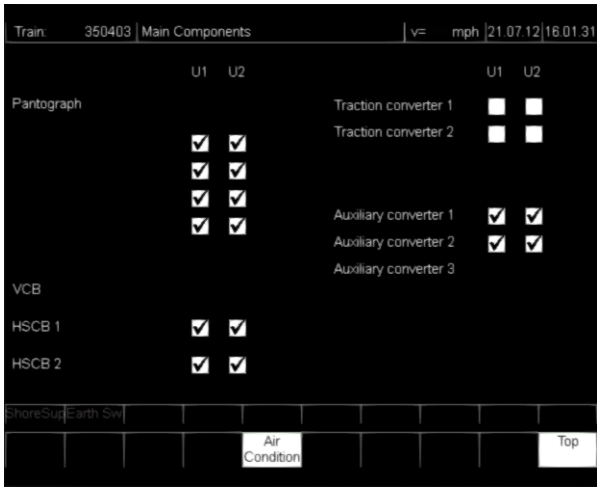
On this screen, you can see the general state of the doors.

State of Doors



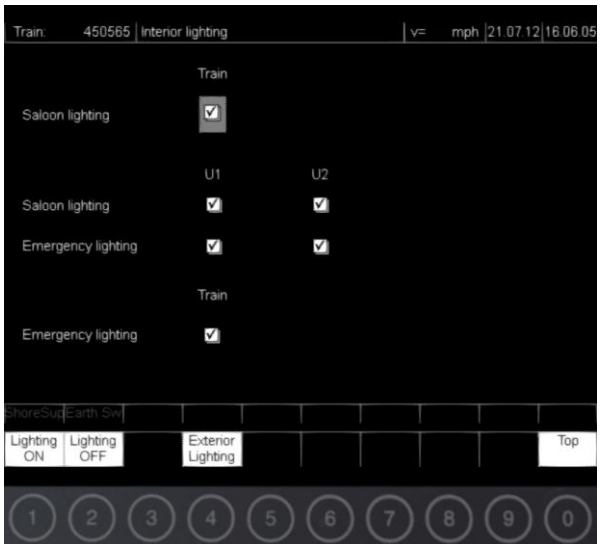
On this screen, you can see the state of each individual door in your formation.

Main Components



On this screen, you can see the state of the pantograph, HSCB, traction converter & auxiliary converter.

Interior Lighting



On this screen, you can control and view the state of the interior lighting. To control the saloon or emergency lighting, ensure the grey cursor is on the desired type of lighting by pressing the **Up Arrow** or **Down Arrow** key on the TMS**.** You can then turn it on by pressing the **1** key on the TMS or off by pressing the **2** key on the TMS.

Exterior Lighting

On this screen, you can see the state of the exterior lighting.

Train Protection and Warning System (TPWS) Mk4

TPWS Mk4 has been simulated to the greatest extent currently possible within the simulator.

Self-test

When moving the reverser away from off, TPWS & AWS will perform a self-test. All lights on the unit will illuminate and you must reset the AWS warning by pressing **Q**. You will then receive audible confirmation that TPWS & AWS are operational.

AWS

If the AWS is not reset in time (except during the self-test), the emergency brakes will apply and the AWS button on the TPWS unit will flash. Once you have come to a stop, press the AWS button to acknowledge it, then press it again to reset the system and you will be able to obtain power.

Uncoupling Procedure

Please see below for how to uncouple from another class 350:

1) Ensure you are in the cab of the vehicle you are uncoupling from and wish to stay in after uncoupling.
2) Ensure the master key is 'On' and move the reverser to 'Neutral'. The cab will not be 'live' as you are still coupled to another unit.
3) Uncouple using the F3 or F4 HUD.
4) Press the 'Uncouple' button on the cab desk. This will 'liven' up the cab.

Dual Voltage Functionality

Follow the instructions below to change the power source from AC (overhead wires) to DC (third rail) and vice versa.

AC to DC

1) Press **P** to lower the pantograph.
2) Press **J** to activate DC mode.

DC to AC

1) Press **J** to activate AC mode.
2) Press **P** to raise the pantograph.

User Controllable Destination Display

The external destination display has been made controllable by pressing **F7** or **F8**. Also, as shown above, the display in the cab now shows the current destination displayed. Finally, the destination can be set via the unit's number in the scenario editor by adding **;D=x** to the end of the DMC1's number. For each livery, a set of relevant destinations are provided. Please see below for a list of the available destinations on each livery and the relevant number you need to insert in place of 'x':

Central Trains/Silverlink / London Midland / London North Western Railway

1 - Aston	**15 - Lichfield Trent Valley**	**29 - St Albans Abbey**
2 - Barnt Green	**16 - Liverpool Lime Street**	**30 - Stafford**
3 - Birmingham International	**17 - Liverpool South Parkway**	**31 - Stoke on Trent**
4 - Birmingham New Street	**18 - Longbridge**	**32 - Tame Bridge Parkway**
5 - Blake Street	**19 - Milton Keynes Central**	**33 - Tipton**
6 - Bletchley	**20 - Northampton**	**34 - Tring**
7 - Bromsgrove	**21 - Nuneaton**	**35 - Walsall**
8 - Coventry	**22 - Perry Barr**	**36 - Watford Junction**
9 - Crewe	**23 - Redditch**	**37 - Wolverhampton**
10 - London Euston	**24 - Rugby**	**38 - Not in Service**
11 - Four Oaks	**25 - Rugeley Trent Valley**	**39 - Empty to Depot**
12 - Hednesford	**26 - Sandwell and Dudley**	**40 - Special**
13 - Kings Norton	**27 - Smethwick Galton Bridge**	
14 - Lichfield City	**28 - Smethwick Rolfe Street**	

First Transpennine Express Grey / First Transpennine Express / Transpennine Express

1 - Carlisle	**6 - Lockerbie**	**11 - Penrith**
2 - Edinburgh Waverley	**7 - Manchester Airport**	**12 - Preston**
3 - Glasgow Central	**8 - Manchester Piccadilly**	**13 - Not in Service**
4 - Haymarket	**9 - Motherwell**	**14 - Empty to Depot**
5 - Lancaster	**10 - Oxenholme**	**15 - Special**

Global System for Mobile Communication-Railway (GSM-R)

Beginning in 2013 and completed by 2016, Global System for Mobile Communication - Railway, more commonly known as GSM-R, replaced the existing National Radio Network (NRN) & Cab Secure Radio (CSR) systems. This communication system and its accompanying unit has been simulated to the best of our ability within the simulator. Please see below for how to register & deregister your train:

Registering

1) Move the reverser away from 'Off' or hold down either the 'Registration' or 'Accept' button for 5 seconds. The GSM-R unit will begin a boot up sequence.
2) When 'GSM-R GB' appears, the unit has successfully booted.
3) Press the 'Registration' button in the top right-hand corner.
4) Using the numerical keys, insert your 4-character train reporting number (headcode), followed by the signal number you are standing at in a 3-digit format. For example, signal WH84 would require you to enter '084'. If you wish to delete a character, press the 'x' button.
5) Press the '✓' button.
6) Registration will take a moment. Once it has completed, you will hear a double beep and the train reporting number will appear in the top right-hand corner of the display.

Deregistering - Method 1

If you are closing down the driving desk, use this method.

1) Move the reverser to 'Off'.
2) Deregistration will automatically begin and you will be given the opportunity for a short moment to retain the registration by pressing the '✓' button. Simply do nothing if you would like to continue with the deregistration.
3) Deregistration will take a moment. Once it has completed, the train reporting number will no longer be displayed.

Deregistering - Method 2

If you wish to keep the driving desk active after deregistering, use this method.

1) Press the 'Registration' button in the top right-hand corner.
2) A prompt will appear on the unit saying 'Confirm deregister?'.
3) Press the '✓' button.

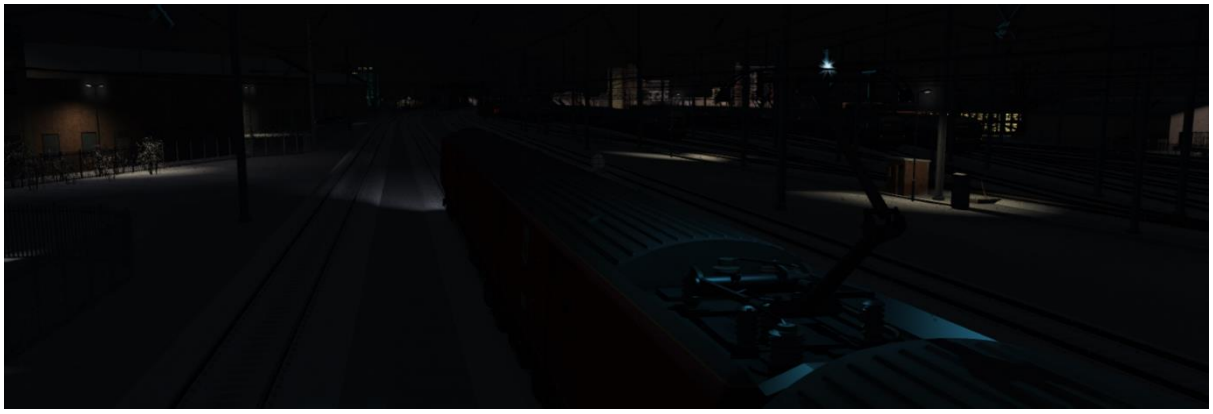
Deregistration will take a moment. Once it has completed, the train reporting number will no longer be displayed.

Gradients

By default in Train Simulator Classic, only gradients of 1 in 185 or steeper have a gravitational effect on a train and this is only suitably realistic on gradients of approximately 1 in 125 of steeper. This means on gradients shallower than 1 in 125, the train does not experience the gravitational forces upon it than it should.

With this information in hand, we have managed to get rid of this limitation by making the train invisibly power or brake itself to simulate the effect that gravity has where Train Simulator Classic by default doesn't do so. This is all invisible to you as the player so you won't suddenly find the power or brake handles moving without your say so, but it does mean you have to drive to the gradients of the route a lot more than before, just like a real driver, especially on mainline routes where gradients rarely reach the severity where Train Simulator Classic has them behave realistically. You will also now find that if trying to recreate real timetabled runs, your timings will much more closely match reality.

Arcing Pantograph



Special attention has been given to simulating arcing between the pantograph and overhead wire.

From one hour after sunrise to one hour after sunset on a dry day, there is only light arcing.

From one hour after sunset to one hour after sunrise, there is moderate arcing to simulate the moisture that tends to build up on the overhead wire once night falls. There is also moderate arcing when raining at any time of day.

During the winter, from one hour after sunset to one hour after sunrise, there is heavy arcing to simulate ice/frost that tends to build up on the overhead wire once night falls. There is also heavy arcing when snowing at any time of day during the winter.

Finally, arcing becomes more frequent as you gain speed.

When arcing, you will visually see it on the pantograph which illuminates the area around it to a varying degree with each arc. Please note that the illumination of the surrounding area will only occur after sunset and before sunrise. This is to avoid the unrealistic appearance of projected light in broad daylight.

You will also audibly hear it if the arcing is moderate or heavy.

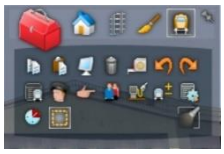
Automatic Unit Numbering

When placing a unit in the scenario editor or using one in Quick Drive, all vehicles will automatically be given correct unit and coach numbers, instead of you having to select each vehicle and changing their number manually so they match. The unit number is controlled via the DMC1 coach if you wish to change it.

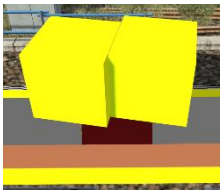
AI Horns

To blow an AI train's horn in a scenario, you must edit the speed limit properties of the section of the track at which you would like the AI train to sound its horn. Please see below for instructions:

1) In the scenario editor, go to the location at which you would like the AI train's horn to sound, and press **Spacebar** 3 times. The track will now display a certain colour which represent its speed limit.
2) Go to the top-left-hand fly-out and click the 'Select' icon.



3) Hover your mouse over the piece of track where you like the AI horn to sound. A yellow border will appear around the track when it is selected.
4) Click and drag the yellow box in either direction until the measurement reading at the bottom of the screen says at least '1.0 metres'.



5) Go to the right-hand fly-out and change the two 'Speed Limit' values to '900'.

6) Click outside of any menus and the section of track you selected will now say 'Unspecified'. Any AI train which passes over this section of track will now blow its horn.

The manner in which the AI train blows its horn is randomly calculated each time, meaning no horn is ever the same. You may hear a single tone (any post-2007 liveries only), a two tone, a three tone, or now and then, even the infamous 'Ilkley Moor' sequence.

If you wish to be more specific in how and when the horn is sounded, please see the table below for values other than '900' which can be inputted in the speed limit field for different behaviour:

Speed Limit Value	Notes
900	Random number of tones
901	1 tone (low)
902	1 tone (high)
903	2 tone (low/high)
904	2 tone (high/low)
905	3 tone (low/high/low)
906	3 tone (high/low/high)
907	'Ilkley Moor' sequence
921	Same as 900 but 1 in 20 (5%) chance of horn sounding
922	Same as 900 but 1 in 16 (6.3%) chance of horn sounding
923	Same as 900 but 1 in 12 (8.3%) chance of horn sounding
924	Same as 900 but 1 in 8 (12.5%) chance of horn sounding
925	Same as 900 but 1 in 6 (16.6%) chance of horn sounding
926	Same as 900 but 1 in 4 (25%) chance of horn sounding
927	Same as 900 but 1 in 3 (33.3%) chance of horn sounding
928	Same as 900 but 1 in 2 (50%) chance of horn sounding
929	Same as 900 but 1 in 1.33 (75%) chance of horn sounding
930	Same as 900 but intended for use at platform ends*
931	Same as 921 but intended for use at platform ends*
932	Same as 922 but intended for use at platform ends*
933	Same as 923 but intended for use at platform ends*
934	Same as 924 but intended for use at platform ends*
935	Same as 925 but intended for use at platform ends*
936	Same as 926 but intended for use at platform ends*
937	Same as 927 but intended for use at platform ends*
938	Same as 928 but intended for use at platform ends*
939	Same as 929 but intended for use at platform ends*
940	Whistle boards**
950	Tunnels***

* **Platform ends** - Horn will sound only if train is travelling over 50mph, which at platforms of 12 car length of less, ensures that stopping trains do not sound their horn. Also, the point at which the train sounds its horn randomly varies from 1m to however fast the train is travelling. For example, if a train is passing at 125mph, the maximum possible distance it will sound its horn away from the trigger point is 125m. This simulates the propensity for drivers to sound their horn earlier if they are travelling at speed.

** **Whistle boards** - Intended for use at whistle boards. Pre-2007, trains sounded at least two tones at all times of day. From April 2007, following increasing concerns about noise, drivers were instructed to use only a single low tone and only between the hours of 07:00 & 23:00. This was later changed to between 06:00 & 23:59 in 2016.

To simulate this, any pre-2007 liveries will exhibit pre-2007 behaviour (at least two tones/no time restriction) and any post-2007 liveries will exhibit a hybrid of post-2007 & 2016 behaviour (single low tone/between 06:00 & 23:59 only). The point at which the horn sounds varies randomly from 1m to 40m away from the trigger point.

*** **Tunnels** - Historically, trains always blew their horn when entering & exiting tunnels to warn potential track workers of their presence. With increased health & safety regulations reducing the presence of track workers in 'live' tunnels, and to allay complaints of increasing noise pollution due to louder modern horns, this requirement was removed on Saturday 6th November 2004.

To simulate this, any pre-2004 liveries will sound at least two tones. The point at which the horn sounds varies randomly from 1m to 40m away from the trigger point.

Whilst these tools are primarily intended for use by scenario creators, they can also be used by route editors to 'bake' these features into a route. The platform end, whistle board & tunnel values being of particular use in this respect.

Finally, due to the custom speed limits being of such a short distance, they do not affect AI train performance or appear as the current speed limit on the F3/F4 HUD. Also, assuming the route you are using is configured to only show signed speed limits (the majority do this), custom speed limits will not appear in the part of the F3/F4 HUD which shows forthcoming speed limit changes.

Depot Preparation Procedure

Class 350s are rarely 'cut out' so a 'cold start' is not offered in this pack. When a unit is prepared for service though, there is a certain procedure that must be followed and we have simulated that.

To carry out this procedure, please follow the instructions below:

1) Insert the master key by pressing **Shift+W**.
2) Move the reverser to 'Neutral' by pressing **W**.
3) Reset the AWS self-test by pressing **Q**.
4) Turn the High Speed Circuit Breaker (HSCB) off by pressing **Shift+O**.
5) Turn the battery off by pressing **Shift+U**.
6) Wait 30 seconds and turn the battery on by pressing **U**.
7) Turn the HSCB on by pressing **O**.
8) Carry out a 'Main Brake Check' via the TMS.
9) If required, turn on the saloon lighting via the TMS.
10) Acknowledge your configuration via the TMS.

After carrying out this procedure, your unit will be successfully prepared,

Bits and Bobs

This section is dedicated to aspects of this pack that don't warrant a dedicated section but are still of note:

- Correct push button functionality for cab light switch.
- Power reduction button reduces power output by 50%.
- Visual alarms outside of cab when AWS or DVD are active.
- Amended cab camera angle.
- In-cab unit and vehicle numbers.
- The visible driver automatically moves to whichever cab you are in.
- Doors locked button changed to be blue as per reality.
- 1 second delay between train passing over AWS magnet and AWS warning sound occurring. The F3/F4 HUD will show the warning immediately so you must wait 1 second before trying to cancel it.
- The headlights only provide illumination before sunrise and after sunset. This is to avoid the unrealistic appearance of projected light in broad daylight.
- Main headlight texture amended to be more orange

Setting up the Driver's Cab

Please follow these steps to set up the cab so you are ready to move:

1) Turn the master key in by pressing **Shift+W**.
2) Move the reverser to the 'Neutral' position by pressing **W**.
3) Cancel the AWS self-test alarm by pressing **Q**.
4) Turn the headlights on by pressing **H**.
5) Acknowledge your configuration via the TMS by pressing **Ctrl+1**.
6) Set your destination by pressing **F7** or **F8**.
7) Turn the Driver Reminder Appliance (DRA) off by pressing **Y**.

You should now be ready to move off.

Scenarios

APC350EP: 17:06 Glasgow Central - Manchester Airport
Route = WCML Over Shap
Track covered = Carlisle - Preston
Traction = London Midland 350373 & FTPE 350402
Year = 2014
Duration = 1 hour 15 minutes

APC350EP: 1M97 12:13 Edinburgh - Manchester Airport
Route = WCML Over Shap
Track covered = Carlisle - Preston
Traction = Transpennine Express 350404
Year = 2017
Duration = 1 hour 10 minutes

APC350EP: 1S35 07:00 Manchester Airport - Glasgow Central
Route = WCML Over Shap
Track covered = Preston - Carlisle
Traction = Transpennine Express 350408
Year = 2017
Duration = 1 hour 10 minutes

Credits

Nicolas Schichan - Advanced scripting
Alan Hingston - Assistance in recording sounds and providing invaluable knowledge on the operation of these units