



Chatham Main Line: London Victoria to Gillingham



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1 Route Information

History

The Chatham Main Line is one of the main arterial routes from central London through the heart of Kent via the Medway towns and heads towards the Kent Coast, the London terminus for the Chatham Main Line is London Victoria. Being the second busiest terminus in the capital, London Victoria originally opened in October of 1860 as the eventual terminus for the London, Brighton and South Coast Railway however only 2 years later, an expansion to the station was built for the London, Chatham and Dover Railway. Services can also access other termini such as Charing Cross or Cannon Street via connections to the North Kent Line and the South Eastern Main Line respectively.

For a period between 1994 and 2007, part of the Chatham Main Line was home to the Eurostar Class 373s which travelled from Waterloo International to Folkestone via Tonbridge however diversions through Maidstone also occurred. There is an emergency connection between the Chatham Main Line and the newly built High Speed 1 at Fawkham Junction which can be used by London-bound Class 395s in emergencies, the Class 373s can no longer use this diversion as they had their third rail shoes removed.

The line has passed between several operators, following sectorisation the line was ran by Network SouthEast and transferred to Connex South Eastern after privatisation. Today the line is operated by Southeastern, part of the Govia Group, who operate Class 375s and Class 465s from the capital to the Medway Towns and the Kent Coast. Southeastern operate via two different routes, services from the Kent Coast travel to Bromley South and via the original route through Kent House and West Dulwich into Victoria, while services originating in the Medway towns frequent the Catford Loop via Denmark Hill into the terminus.

To cope with modern demand and longer trains, a new station was to be built at Rochester to replace the original building which has stood since the early 1890s. The new station started construction in early 2014 and officially opened on 13 December 2015. This new Rochester station can cope with 12 car trains as opposed to the original 10 car capacity and serves as a new transport hub with links via buses into the Medway towns and will provide an excellent connection to a new housing development in the area.

Route Map



Line Features (Routes)

- Southeastern: London Victoria to Rainham Via Herne Hill (Chatham Mainline)
- Southeastern: London Victoria to Rainham Via Catford (Catford Loop)
- Southeastern: London Victoria to Orpington

2 Class 465 'Networker' Electric Multiple Unit

Class 465

The British Rail Class 465 Networker electric multiple units were built by GEC Alstom (Metro-Cammell) and BREL between 1991 and 1993, and by ABB Rail between 1993 and 1994. They were brought into service from 1992 and operated by British Rail until 1997, then by Connex until 2003, then by South Eastern Trains until 2006 and then by Southeastern until now.

Both manufacturers' units look exceptionally similar in design; the major noticeable differences for passengers are the lack of aircraft-style overhead air vents on those produced by GEC Alstom, and the BREL and ABB units (465/0 and 465/1) also feature slightly different dot matrix displays on the front and rear of the train to show the route number and destination to the GEC Alstom units. There are other visible but minor differences in door switches and audible chimes, window shapes and exterior panelling amongst the fleet. In addition, the two units employ different traction motors, which sound different. Despite the differences though, the units can be used interchangeably. Particularly during peak times when longer trains are used, it is quite common to see a train comprising two four car units, one from each batch. Both classes share many similarities with the later dual-voltage Class 365, and are also similar in design to the diesel Class 165. When first introduced, all seating was standard class only. Although the units are interoperable, the spare parts for the different units are different.

They are mostly used on suburban routes serving the South East of England, although they have also been occasionally spotted elsewhere throughout Kent including the Kent Coast Line which is normally operated by Class 375 Electrostar trains.

Design & Specification

TOPS Number	Class 465
Formation	4-car: DMSO+TSO+TSOL+DMSO
Constructed	1991-1994
Vehicle Width	9ft 3in (2.82m)
Vehicle Height	12ft 4.5in (3.77m)
Electric System(s)	750V DC third rail
Power Output	3,004hp (2,240kW)
Maximum Speed	75mph (121km/h)
Number Built	147x 4car sets (97 Brel / ABB sets)

Rolling Stock

Class 465-0 DMOC A / B (Yellow Doors)



Class 465-0 TSO (Yellow Doors)



Class 465-0 TSOL (Yellow Doors)



Class 465-1 DMOC A / B (Blue Doors)



Class 465-1 TSO (Blue Doors)



Class 465-1 TSOL (Blue Doors)



Class 465/0 and 465/1 – BREL (Later ABB)

Both manufacturers' units look exceptionally similar in design; the major noticeable differences for passengers are the lack of aircraft-style overhead air vents on those produced by GEC Alsthom (465/2), and the BREL (465/0) and ABB (465/1) units also feature slightly different dot matrix displays on the front and rear of the train to show the route number and destination, compared to the GEC Alsthom units. There are other visible but minor differences in door switches and audible chimes, window shapes and exterior panelling amongst the fleet.

In addition, the two units employ different traction motors, which sound different. Despite the differences though, the units can be used interchangeably. Particularly during peak times when longer trains are used, it is quite common to see a train comprising two four car units, one from each batch. Both classes share many similarities with the later dual-voltage Class 365, and are also similar in design to the diesel Class 165. When first introduced, all seating was standard class only.

Assigning Destinations and Numbers

For developers wishing to make use of the units in their own scenarios and routes, it is possible to customise the Destination Display during creation of a scenario. This allows the train to correctly display an appropriate destination.

In order to display a specific destination, the correct value must be entered into the vehicle properties window. This number consists of a 12 digit value containing both a letter and numbers.

The 12 digit value is arranged like so: **dVVVVVUUUUUU**

d = the Destination code (See the Destination List below)
VVVVV = the Vehicle number displayed on the side of the coach
UUUUUU = the Unit number displayed on the front of the driving vehicle

Example: d78580465240

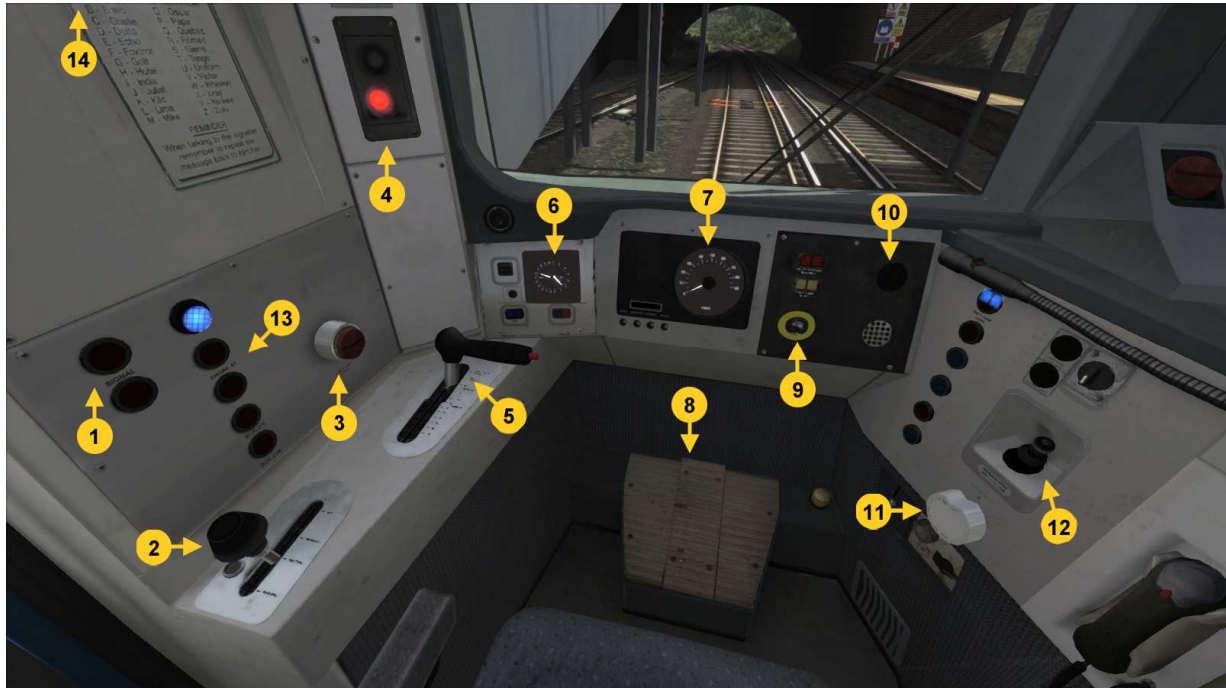
So the above value results in unit 465240, with vehicle number 78580, displaying "Dartford" as the destination

Destination List

a	Ashford Int. via Maidstone	A	Beckenham Junction
b	Blackfriars	B	Cannon St Via Bexley Heath
c	Cannon St	C	Cannon St Via Woolwich Arsenal
d	Dartford	D	Canterbury West
e	Sittingbourne	E	Dartford Via Bexleyheath
f	Faversham	F	Dartford Via Woolwich Arsenal
g	Gillingham	G	Dover Priory
h	Canterbury East	H	Folkestone Central
i	Ashford Int. via Tonbridge	I	Folkestone West
j	Gravesend	J	Hastings
k	London Bridge via Dartford	K	Hayes Via Lewisham
l	London Bridge via Orpington	L	Maidstone West
m	Maidstone East	M	Margate
n	Slade Green	N	Rainham
o	Orpington	O	Ramsgate
p	Paddock Wood		
q	Strood		
r	Rochester		
s	Sheerness		
t	Tonbridge		
u	Bromley North		
v	Victoria		
w	Tunbridge Wells		
x	Charing X		
y	Out of Service		
z	Depot		
#	Blank		

3 Driving the Class 465

Cab Controls



- | | |
|---|---|
| 1 - Guards Buzzer | 8 - Driver Vigilance Device (<i>NumPad Enter</i>) |
| 2 - Reverser (<i>W/S</i>) | 9 - AWS Acknowledge Button (<i>Q</i>) |
| 3 - Emergency Brake Plunger (<i>Backspace</i>) | 10 - AWS Sunflower Display |
| 4 - Driver Reminder Appliance (<i>Y</i>) | 11 - Windscreen Wiper Control (<i>V</i>) |
| 5 - Combined Throttle/Brake Handle (<i>A/D</i>) | 12 - Horn Paddle (<i>Spacebar / B</i>) |
| 6 - Brake Pressure Gauges | 13 - Train Start/Shutdown (<i>Z</i>) |
| 7 - Speedometer | 14 - Headlight Switches (<i>H</i>) |

4 Class 375 'Electrostar' Electric Multiple Unit

Class 375

The Class 375 third-rail DC 4 car electric multiple units began service during 2001. Built by Bombardier in Derby, England, they are a member of the 'Electrostar' train family, the most numerous EMU built in post-privatisation Britain. Due to their high power consumption major upgrades were carried out to the 750V DC third-rail power system used on the Southern region. The trains are used extensively on services in south London and on rural commuter services throughout Sussex and Kent where they replaced the ageing 4CIG and 4VEP slam-door stock. The Class 375 trains feature external CCTV, a disabled seating area, and toilets in both intermediate coaches. Dual voltage units are fitted with a high-speed pantograph to allow operation under 25kV lines as well as the native third rail shoes.

Southeastern have started to refurbish their roster of 4 car Class 375s that operate on the Chatham Main Line to the Kent Coast into their new Dark Blue livery, while at the same time some of the Class 465/9s that operate out of Gillingham/Rochester are receiving an interior refresh all as part of their three-year #SERefurb programme.

Design & Specification

TOPS Number	Class 375
Formation	4-car: DMOC+MSOL+PTSOL+DMOC
Unit Weight	173.6 tonnes (35-48 tonnes per vehicle)
Vehicle Length	66ft 11in (20.4m)
Vehicle Width	9ft 2in (2.8m)
Body Construction	Aluminium body with steel ends
Power Collection	750v DC 3rd Rail
Vehicle Power	2,000HP (1,500kW)
Design Speed	100 MPH (161km/h)
Coupling Type	Dellner
Brake Types	Air
Seating	242 Standard

Class 375 Consist Formations

Class	Consist	Number Range
375/3	DMOC - TOSL - DMOC	375301 - 375310
375/6	DMOC - MOSL - PTOSL (Low) - DMOC	375601 - 375630
375/7	DMOC - TOSL - MOSL - DMOC	375701 - 375715

The pantograph well should be at the centre of the formation.

3 and 4 car formations are often used on local and branch stopping services.

4, 8 and 10 car formations are used on off-peak fast services.

8 and 12 car formations are commonly seen on peak time fast and express service.

Rolling Stock

Class 375 DMOC SE Dark Blue / Class 375 DMOC 1st SE Dark Blue



Class 375 PTOSL SE Dark Blue



Class 375 TOSL SE Dark Blue



Class 375 MOSL SE Dark Blue



Destination List

a	London Victoria via Maidstone East	A	Ramsgate/Dover P via Ashford
b	London Victoria via Bromley South	B	Ashford International via Maidstone East
c	Cannon Street	C	Barnehurst
d	Charing Cross	D	Beckenham Junction
e	Ashford International	E	Bromley South
f	Canterbury East	F	Dover Priory via Tonbridge
g	Canterbury West	G	Gravesend
h	Dartford	H	Hayes
i	Dover Priory via Chatham	I	Hither Green
j	Faversham	J	Lewisham
k	Folkestone Central	K	London Blackfriars
l	Gillingham	L	Maidstone East
m	Hastings	M	Meopham
n	London Bridge	N	Ore
o	Margate	O	Ramsgate via Tonbridge
p	Orpington	P	Rainham
q	Paddock Wood	Q	Shepherdswell
r	Ramsgate via Chatham	R	Slade Green
s	Rochester	S	Tunbridge Wells
t	Sevenoaks	X	Depot
u	Sheerness on Sea	Y	Special
v	Sittingbourne	Z	Blank
w	Strood		
x	Tonbridge		
y	Ramsgate/Dover P		
z	Sorry, Not in Use		

5 Driving the Class 375

Cab Controls



Main console

- | | |
|---|-----------------------------|
| 1 | Master key |
| 2 | Reverser |
| 3 | Combined throttle and brake |
| 4 | Emergency brake |
| 5 | Brake pressure gauges |
| 6 | Speedometer |
| 7 | Cruise control speed |

- | | |
|----|-------------------|
| 8 | Cruise Control |
| 9 | AWS flower |
| 10 | AWS Reset |
| 11 | Windscreen wipers |
| 12 | Horn |
| 13 | Depot whistle |
| 14 | Sander |
| 15 | Cab light |

- | | |
|----|---------------------|
| 16 | Guard communication |
| 17 | Notice board light |

Side panel

- | | |
|----|------------------------------------|
| 18 | 3 rd Rail Shoe controls |
| 19 | Pantograph controls |
| 20 | Headlights |
| 21 | Taillights |
| 22 | Blinds |

Additional Controls

The following additional keys can be used with the Class 375 units.

Keystroke			Feature
Shift	+	D	Brake Hold. This can also be activated by pressing the button on the end of the brake/throttle control (3)
Shift	+	P	Raise the 3 rd rail shoes. Also activated by pressing the blue button on the upper left panel (18)
Ctrl	+	P	Lower the 3 rd rail shoes. Also activated by pressing the yellow button on the upper left panel (18)
		L	Cab Light
		B	Depot Whistle
		C	Guard communication (16)
Shift	+	Numpad Enter	Toggle the Driver Vigilance Device. This is an audio only device so has no visual prompt. By default this feature is turned off.
		Numpad Enter	Acknowledge a Driver Vigilance alert

6 Scenarios

****For driving tutorials, please visit the Academy from the main TS2016 menu screen****

[375] 01. 1S24 0937 London Victoria to Ramsgate

Operate a semi-fast Southeastern service to Ramsgate via Rochester, as far as Gillingham.

Duration: 55 Minutes

Difficulty: Easy

[375] 02. 2C74 2103 Dover Priory to London Victoria

Operate a late night Southeastern service that has been diverted into London Victoria.

Duration: 25 Minutes

Difficulty: Medium

[465] 03. 2P52 0530 Gillingham to London Victoria

Operate a Southeastern service to London Victoria from Gillingham, calling at all stations to St Mary Cray, then Bromley South and London Victoria.

Duration: 60 Minutes

Difficulty: Medium

[465] 04. 5M90 0748 London Victoria to Beckenham Junction

Operate an empty coaching stock move from London Victoria to Beckenham Junction.

Duration: 25 Minutes

Difficulty: Easy

[465] 05. 2M82 1540 London Victoria to Orpington

Operate a Southeastern service to Orpington, calling at all stations.

Duration: 45 Minutes

Difficulty: Easy

[465] 06. 2K78 1452 Dover Priory to London Victoria

Operate a Southeastern service to London Victoria calling at all stations to St Mary Cray, then Bromley South and Denmark Hill.

Duration: 80 Minutes

Difficulty: Easy

[465] 07. 1B90 0932 Bromley South to London Victoria

Operate a Southeastern service fast from Bromley South to London Victoria via the Catford loop.

Duration: 30 Minutes

Difficulty: Easy

[465] 08. 2K08 0758 London Victoria to Rochester

Operate a Southeastern service to Rochester calling at Denmark Hill, Bromley South, St Mary Cray and then all stations to Rochester.

Duration: 65 Minutes

Difficulty: Hard

7 Railfan Mode Scenarios

Railfan Mode provides a unique chance to observe and enjoy the operations of trains without the pressure and involvement of driving them. Railfan Mode scenarios are positioned at various key points along the route and provide camera functionality to sit back and watch the action unfold.

These scenarios are located on the Drive screen under the Career tab.

[RailfanMode] Brixton

Duration: 10 Minutes

[RailfanMode] Rochester (New)

Duration: 10 Minutes

[RailfanMode] Shortlands

Duration: 10 Minutes

8 Signals

Main Signal Head Aspects



Colour light signals are used for controlling running movements. They display aspects by means of red, yellow and green coloured lights.

Signal Aspect	Description	Instruction to Driver
Red light	Danger	Stop.
Single yellow light	Caution	Proceed: be prepared to stop at the next signal.
Double yellow lights	Preliminary caution	Proceed: be prepared to find the next signal displaying one yellow light.
One flashing yellow light	Preliminary caution for a diverging route	Proceed: Be prepared to find the next signal displaying one yellow light with feather junction indicator for diverging route(s).
Double flashing yellow lights	Indication of diverging route ahead of the next but one signal	Proceed: Be prepared to find the next signal displaying one flashing yellow light.
Green light	Clear	Proceed: The next signal is displaying a proceed aspect.

Theatre Type Signals

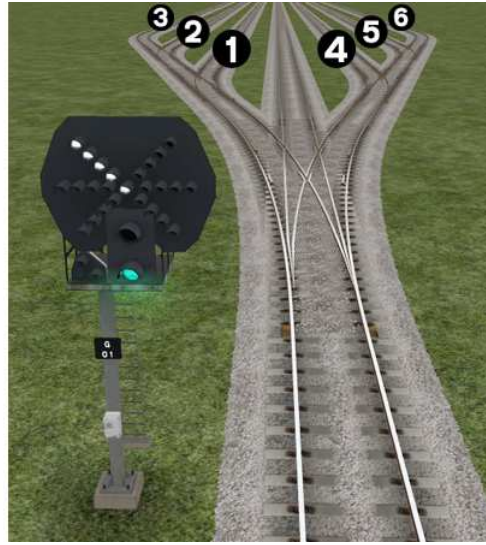
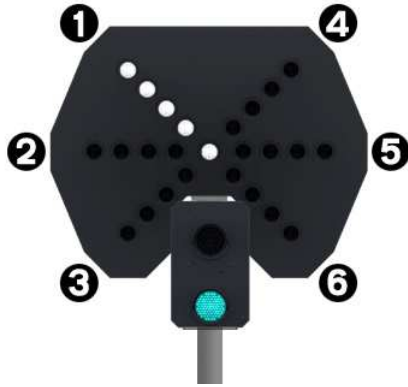


A Theatre alphanumeric route indicator indicates the route to be taken using numbers or letters (or a combination of numbers and letters).

A Theatre indicator is often used to show the arrival platform number.

Feather Type Signals

A Feather junction indicator indicates a diverging route to be taken by the angle at which a line of five white lights is displayed. (*Position 1 shown*)



Feather Indication	Instruction to Driver
No Feather Indication	Obey main aspect, straight-ahead route is set
Position 1 indication	Obey main aspect, expect divergence to left
Position 2 indication	Obey main aspect, expect divergence to left more extreme than that for position 1
Position 3 indication	Obey main aspect, expect divergence to left more extreme than that for position 2
Position 4 indication	Obey main aspect, expect divergence to right
Position 5 indication	Obey main aspect, expect divergence to right more extreme than that for position 4
Position 6 indication	Obey main aspect, expect divergence to right more extreme than that for position 5

Ground Signals and Position Light Signals



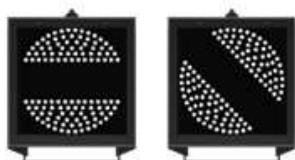
Ground Signals and Position Light Signals (PLS) display their aspects by means of the position and colour of lights. Ground Signals are always illuminated and can have miniature theatre indicators attached whereas PLS only illuminate to allow a train to pass in to an occupied section of line and are mounted as an addition to a main signal head.

Signal Aspect	Description	Instruction to Driver
Two red lights	Danger	Stop.
No aspect (located on a main aspect)		Obey main aspect.
Two white lights	Caution	The line ahead may be occupied. Proceed cautiously towards the next stop signal, stop board or buffer stops. Be prepared to stop short of any obstruction. The associated main aspect (where provided) may be passed at danger

Entering an Occupied Section of Track

During a scenario your train may be scheduled to enter a platform or section of track that is already occupied by another train or rolling stock. In this situation you should stop at the red signal protecting this section of track as normal. Once your train has stopped press the TAB key on your keyboard to request permission from the signalling centre to enter the occupied section of track. When your train movement is approved the signal will illuminate the two white lights on the position light signal if it has one.

Repeater Signals



A banner repeater signal indicates whether the signal ahead is displaying a proceed aspect or is at danger. Modern fibre optic banner repeating signals, as shown opposite, consist of a rectangular unlit black background displaying a white circle with a black bar.

Signal Display	Instruction to Driver
Horizontal arm	Be prepared to find the related signal at danger
Arm at an upper quadrant angle of 45°	Related signal is exhibiting a proceed aspect



The recent signal updates between Longfield and Rainham have an additional green aspect display as shown opposite.

Signal Display	Instruction to Driver
Horizontal arm	Be prepared to find the related signal at danger
Arm at an upper quadrant angle of 45° with white background	Related signal is exhibiting a warning aspect
Arm at an upper quadrant angle of 45° with green background	Related signal is exhibiting a proceed aspect

Repeater signals are intended to provide a driver with advance information of a signal that may be obscured on approach. A train does not need to stop at a repeater signal, only at the related signal if it is at danger.

Splitting banner signals provide two banner signal heads combined to form a splitting banner repeating signal. These are used to indicate the aspect of a signal with a feather junction indicator. If the related junction signal is displaying an illuminated feather then the lower banner head displays an arm at an upper quadrant angle of 45°. Alternatively, if the related junction signal is not displaying an illuminated feather and is indicating a straight ahead route then the higher "main" banner head displays an arm at an upper quadrant angle of 45°.

9 Speed Signs

Permissible Speed Indicators



These signs display the permissible speed in M.P.H. applicable to the section of line beyond the sign up to the commencement of any subsequent permissible speed section.

Remember to wait for the complete length of your train to pass these signs before accelerating if the permissible line speed is increasing. If the permissible line speed is decreasing then you must reduce your speed before passing these signs.

Permissible Speed Warning Indicators



These signs provide advance warning of a reduction in permissible speed ahead. Permanent AWS Ramps (Automatic Warning System) are often installed in conjunction with these signs. In these cases the driver must cancel the AWS warning when triggered on approach to these signs.

10 Safety Systems

AWS (Automatic Warning System)



AWS is provided to give train drivers in-cab warnings of the approach to signals, reductions in permissible speed and temporary/emergency speed restrictions, and to apply the brakes in the event that a driver does not acknowledge cautionary warnings given by the system.

As a train approaches a signal, it passes over AWS track equipment (magnets) which are fixed to the sleepers between the running rails. The

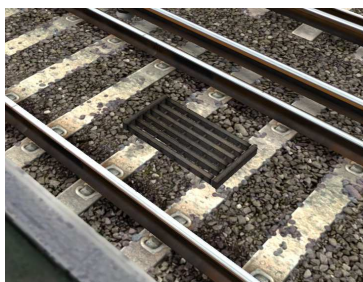
magnets are sensed by a receiver mounted under the leading end of the train.

If the signal ahead is displaying a clear aspect (green), a bell (or an electronic ping) sounds in the driver's cab, and the AWS Sunflower indicator displays "all black". No action in respect of the AWS is required of the driver.

If the signal is displaying a caution or danger aspect (yellow, double yellow or red), a horn sounds in the driver's cab and the display shows "all black". The driver has to acknowledge the warning by pressing the "AWS Acknowledgement" push button. When the driver operates the push button, the horn is silenced and the AWS Sunflower changes to a segmented yellow and black circular display. If the driver fails to acknowledge the warning horn within a set time period, the brakes are applied automatically.

Where AWS equipment is provided on the approach to reductions in permissible speed and temporary/emergency speed restrictions, the cab equipment always operates in a manner equivalent to the approach to a signal displaying a caution or stop aspect. The driver receives a warning and has to respond to it accordingly; otherwise the brakes are applied automatically.

OSS (Over speed Sensor)



At a terminus platform where a line ends a train should be approaching the buffers at a speed of no more than 10mph. To ensure this is adhered to an over speed sensor grid may be installed 65m from the buffer. Continuing over one of these grids at a speed higher than 10mph will cause an emergency brake application to bring the train to a halt.

Whistle Signs



These are used at footpath crossings where it is not possible for pedestrians to see approaching trains. When the train passes a board, the driver must sound the horn so that pedestrians know a train is coming. Apart from emergencies, drivers cannot use horns at whistleboards between 11pm and 7am.

11 Credits

As usual with all projects there is a long list of people to thank. So in no particular order here are the stars of the show.

Route Builders:

Danny Leach
Stuart Galbraith
Jeffrey Douglas

Artists:

Ben Jervis
Kevin McGowan
Colin Ross
Skyhook Games
Gameshastra

Track:

Danny Leach

Signals:

Jeffrey Douglas

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Sounds:

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