Class 165/166 (JT) Manual

Contents

Liveries

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Keyboard Controls

Standard keyboard controls:

A:	Move PBC backwards (decrease brakes / increase power)
D:	Move PBC forwards (decrease power / increase brakes)
W:	Move Reverser forwards
S:	Move Reverser backwards
H:	Headlight Switch Increase
Shift+H:	Headlight Switch Decrease
K:	Taillight Switch
L:	Cab Light On/Off
V:	Wipers On/Off
Backspace:	Emergency Brake Button
Q:	AWS Reset
Space:	Horn Low Tone
B:	Horn High Tone
X:	Sander
/:	Handbrake On/Off

Non-standard keyboard controls:

Shift+W:	Master Key In/Out
Q:	TPWS Brake Demand Light Acknowledge
Z:	Engine Start
Ctrl+Z:	Engine Stop
Y:	Driver Reminder Appliance (DRA) On/Off
C:	Driver to Guard Buzzer
E:	Driver Vigilance Device (DVD) Reset
Ctrl+D:	Driver Vigilance Device (DVD) On/Off
F7:	Destination Decrease
F8:	Destination Increase
Shift + F7:	Route Code Decrease
Shift + F8:	Route Code Increase
=:	Hill Start Button

Features

- 5 liveries
- Realistic acceleration and braking physics taken from real-world data
- Correctly simulated emergency braking situations
- Automatic unit numbering
- User controllable destination panel
- Various other improvements

The units will show up in-game as ‘Class 165/166 (JT)’.

Realistic Physics

The physics from the original Class 165/166 have been completely removed and rebuilt from scratch, using tractive effort, acceleration and braking curves from the real-world manual, as well as data from drivers. Therefore, the DMU should now drive more realistically and feel more true-to-life.

Emergency Braking Situations

Whilst driving, there are several situations where you may be brought to a stop by an emergency brake application. Each one has different outcomes and methods for getting underway again. Each of these is detailed below.

1) **Pressing the Emergency Brake button:**
   Once the unit has come to a stop, move the PBC to the Off position. You must then wait 60 seconds before applying power again to obtain a brake release.
   As per reality (although a heavily frowned upon practice), you can circumvent this 60 second timer by moving the PBC to the Off position, and the Reverser to the Neutral position, before uninserting the Master Key. You can then reinsert the Master Key and move the Reverser to your desired direction and reapply power.

2) **Failing to acknowledge the DVD within 2.7 seconds:**
   Once the unit has come to a stop, move the PBC to the Off position. You must then wait 60 seconds before applying power again to obtain a brake release.
   As per reality (although a heavily frowned upon practice), you can circumvent this 60 second timer by moving the PBC to the Off position, and the Reverser to the Neutral position, before uninserting the Master Key. You can then reinsert the Master Key and move the Reverser to your desired direction and reapply power.

3) **Failing to acknowledge an AWS Warning within 2.7 seconds:**
   After the emergency brake applies, the Brake Demand light will flash on the TPWS panel. Once the unit has come to a stop, move the PBC to the Off position and acknowledge the Brake Demand light by pressing Q. After acknowledging, the Brake Demand light will stop flashing and illuminate for a further 60 seconds. After this time, the Brake Demand light will extinguish, and you can obtain a brake release and reapply power.

As per reality (although a heavily frowned upon practice), you can circumvent this 60 second timer by moving the PBC to the Off position, and the Reverser to the Neutral position, before uninserting the Master Key. You can then reinsert the Master Key and move the Reverser to your desired direction and reapply power.

4) **Tripped by a TPWS TSS (after a SPAD) or TPWS OSS (approaching a red signal or permanent speed restriction (PSR) too quickly):**
After the emergency brake applies, the Brake Demand light will flash on the TPWS panel. Once the unit has come to a stop, move the PBC to the Off position and acknowledge the Brake Demand light by pressing Q. After acknowledging, the Brake Demand light will stop flashing and illuminate for a further 60 seconds. After this time, the Brake Demand light will extinguish, and you can obtain a brake release and reapply power.
As per reality (although a heavily frowned upon practice), you can circumvent this 60 second timer by moving the PBC to the Off position, and the Reverser to the Neutral position, before uninserting the Master Key. You can then reinsert the Master Key and move the Reverser to your desired direction and reapply power.

Automatic Unit Numbering

When placing a unit in the scenario editor or when using one in Quick Drive, all coaches in the consist will automatically be given correct unit and coach numbers, meaning you don't have to individually number each coach. The unit number is controlled via the DMOS coach in the scenario editor. The destination panel and other customisable stickers on the DMOS and DMOCL coaches are also controlled via the DMOS coach.

Great care has been taken to ensure that each preload only displays the correct unit and coach numbers for the formation it is in. This means 2-car Class 165s will only display numbers inclusive of 165118-165137, and 3-car Class 165s will only display numbers inclusive of 165101-165114 and 165116-165117 (165115 was written off after the Ladbroke Grove rail crash). Class 166s will only display numbers inclusive of 166201-166221. Each coach will have the correct coach number for the unit number that is set.

Destination Panel

A present-day dot matrix destination panel has been added within the constraints of the existing model. Therefore, it is modelled as two separate dot matrix screens (as they were pre-TrainFX refurb), rather than as a single dot matrix screen as they are post-TrainFX refurb. In reality, the two-digit number display to the left of the destination has no meaning to a passenger, it is simply the first two digits of the TrainFX route code. Since there are many route codes for a single destination to account for different routings and stopping patterns, many destinations can have multiple different numbers. For example, a destination of Portsmouth Harbour may have the following numbers, depending on its stopping pattern: 51, 54, 55, 56, 57, 58, 59, 60 and 61. Lastly, in reality, a destination can be entered on its own without a route code for situations where there is no route code to match the stopping pattern – this is most often the case during engineering works and diversions. When this happens, no route number is displayed with the destination. Every destination and route code available on the current (Spring 2023) version of the Class 165/166 PIS has been represented in game. However, due to scripting constraints, it is possible to show any combination of destination and route code in game.

The destination on the player train can be changed whilst in a scenario using the F7 and F8 keys. The route code on the player train can be changed whilst in a scenario using the Shift + F7 and Shift + F8 keys.

To set a destination in the scenario editor, add ;D=x, where x is the relevant number from the table below, to the end of the DMOS unit number. To set a route code in the scenario editor, add ;N=x, where x is the relevant number from the table below, to the end of the DMOS unit number.

The table below firstly lists the destination, followed by the route codes that can show with that destination in reality. For example,

58 – Portsmouth Harbour, 51, 54, 55, 56, 57, 58, 59, 60, 61

means the destination number for Portsmouth Harbour is 58, and its corresponding route codes in reality are 51, 54, 55, 56, 57, 58, 59, 60 and 61. Therefore, to display a destination of 55 Portsmouth Harbour, you need to add ;D=58;N=55 to the end of the DMOS number.

Further details for this can be found in the Numbering section.

1 – Blank
2 – Avonmouth, 50, 52, 55, 56, 58, 60
3 – Banbury, 07, 10, 11, 12, 13, 14, 15
4 – Barnstaple, 53, 54, 55, 56, 57, 58, 60
5 – Basingstoke, 01, 11, 12, 15
6 – Bath Spa, 52, 55, 58, 59
7 – Bedwyn, 03, 04, 08, 10, 11, 13, 14, 15, 16
8 – Bicester Town, 04, 05, 06, 07
9 – Bourne End, 01, 13
10 – Brighton, 51, 55, 56, 57, 58, 59, 60, 61
11 – Bristol Parkway, 16, 50, 51, 52, 54, 55, 56, 57, 58, 59, 60
12 – Bristol Temple Meads, 50, 51, 52, 54, 55, 56, 57, 58, 59, 60, 61
13 – Cardiff Central, 16, 50, 51, 54, 55, 56, 57, 58, 59, 60, 61
14 – Castle Cary, 12
15 – Cheltenham, 52, 55, 58, 59
16 – Chippenham, 52
17 – Clifton Down, 55, 60
18 – Didcot, 05, 06, 07, 09, 10, 11, 12, 14
19 – Didcot Parkway, 11, 12, 13, 14, 15, 16
20 – Evesham, 08
21 – Exeter Central, 53, 54, 55, 56, 58, 60, 61
22 – Exeter St Davids, 50, 53, 54, 55, 56, 57, 58, 59, 60, 61
23 – Exmouth, 54, 56, 57, 58
24 – Falmouth Docks, 53, 59
25 – Filton Abbey Wood, 54, 55, 57, 58, 59, 60
26 – Fratton, 58, 61
27 – Frome, 51, 52, 54, 56, 58, 59, 60
28 – Gatwick Airport, 01, 03, 04, 10, 11, 12, 13, 14, 15, 16
29 – Gloucester, 51, 52, 54, 55, 56, 57, 58, 59, 60, 61
30 – Great Malvern, 08, 09, 10, 11, 12, 13, 14, 51, 52, 55, 57, 58, 59, 60
31 – Greenford, 01, 13, 14
32 – Guildford, 03, 15
33 – Gunnislake, 52, 53, 55
34 – Hanborough, 08
35 – Hayes & Harlington, 10, 11, 13
36 – Heathrow Terminals 2&3, 98
37 – Heathrow Terminal 5, 98
38 – Henley-on-Thames, 01, 14
39 – Hereford, 08, 09, 10, 11, 13, 14
40 – Lawrence Hill, 58, 59
41 – Lelant Saltings, 52
42 – Liskeard, 52, 53, 55, 57
43 – London Paddington, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 80, 98
44 – Looe, 52, 57

45 – Maidenhead, 01, 10, 11, 12, 13, 14, 15
46 – Marlow, 01
47 – Moreton-on-Marsh, 08, 13, 15
48 – Newbury, 03, 04, 10, 12, 13, 15, 16
49 – Newbury Racecourse, 03, 10
50 – Newquay, 50, 52, 55, 58
51 – Newton Abbot, 53, 54, 55
52 – Okehampton, 53, 60
53 – Oxford, 03, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 17
54 – Paignton, 50, 53, 54, 55, 57, 58, 60
55 – Par, 52, 53, 57, 58, 59
56 – Penzance, 50, 52, 54, 55, 56, 57, 58, 59, 60, 61, 80
57 – Plymouth, 50, 52, 53, 55, 57, 58, 59, 60
58 – Portsmouth Harbour, 51, 54, 55, 56, 57, 58, 59, 60, 61
59 – Portsmouth & Southsea, 57, 59, 60
60 – Reading, 01, 02, 03, 04, 05, 06, 07, 10, 11, 12, 13, 14, 15, 16
61 – Redhill, 03, 10, 11, 15, 16
62 – Salisbury, 51
63 – Severn Beach, 50, 51, 54, 56, 58, 59, 60
64 – Shalford, 03, 15, 16
65 – Slough, 01, 10, 11, 16
66 – Southampton Central, 52, 56, 57
67 – St Erth, 52, 53, 56
68 – St Ives, 53, 56
69 – St James' Park, 54, 56
70 – Swindon, 16, 52, 54, 56, 59
71 – Taunton, 50, 54, 55, 56, 57, 59
72 – Theale, 11, 12
73 – Truro, 53, 55, 59, 60
74 – Twyford, 01, 02, 10, 12, 13, 14
75 – Warminster, 51, 52, 54, 55, 56, 57, 59, 60
76 – West Ealing, 14
77 – Westbury, 51, 52, 54, 55, 56, 57, 58, 59, 60, 61
78 – Weston-super-Mare, 50, 55, 56, 57, 58, 60
79 – Weymouth, 52, 54, 55, 56, 57, 58, 59, 60
80 – Windsor & Eton Central, 01
81 – Wokingham, 01, 03, 10
82 – Worcester Foregate Street, 08, 09, 10, 11, 12, 13, 15, 51, 57, 58, 59, 60, 61
83 – Worcester Shrub Hill, 08, 09, 10, 11, 12, 13, 16, 51, 52, 56, 57, 58, 59
84 – Not in Service
85 – First Great Western
86 – Great Western Railway
87 – Top Display Lights
88 – Bottom Display Lights

Other Improvements

This section details various other improvements to the Class 165/166 that don't warrant their own section but are still worth noting.

- 1 second delay between passing over an AWS magnet and the AWS Warning sound playing.
- Prototypical AWS and DVD (if DVD is enabled first) self-test when inserting the Master Key.
- Master Key can only be turned if the Reverser is in Neutral.
- Reverser cannot be moved if the Master Key is not inserted.
- Engines can only be started/stopped when the Master Key is inserted and the Reverser is in Neutral.
- Functioning Driver Reminder Appliance (DRA).
- Driver Vigilance Device (DVD) sounds after 57 seconds unless the PBC is moved, the AWS Reset button is pressed, or the DSD foot pedal is raised.
- Hill Start button applies the equivalent of a step 1 brake application when pressed if the speed is less than 5mph.
- New two-tone horn sounds.
- New Driver Vigilance Device (DVD) sound.
- New AWS sounds.
- New PRM door sounds on relevant liveries.
- Driver to Guard Buzzer added.
- Ride Height Modification stickers and Coach Letter stickers on appropriate liveries. Further details for customising this can be found in the Numbering section.
- AWS sunflower is now visible at night (no illumination previously).
- New BMAC light models (old and LED – set depending on livery) within the constraints of the original model to allow Off / Day + Markers / Markers Only / Night + Markers.
- Taillights are now on their own switch and are turned on by default.
- AI services display the correct lighting configuration and no longer turn off when stopped at a station.
- Headlights and taillights now only cast light before sunrise and after sunset to prevent the unrealistic appearance of cast light during the day.
- The visible driver moves to the cab currently in use.
- Newly modelled front, roof and bodyside details.
- Experimental air conditioning equipment modelled on 166201.
- Other miscellaneous improvements.

Driving Instructions

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) Cancel the Driver Vigilance Device self-test by pressing E (if enabled).
3) Cancel the AWS self-test alarm by pressing Q.
4) Turn the headlights on by pressing H.
5) Ensure your destination panel is set correctly.
6) Move the reverser to the Forward position by pressing W.
7) Turn the Driver Reminder Appliance (DRA) off by pressing Y.

You should now be ready to move off.

The commonly taught driving technique for these units is notch 4 to build revs (holding hill start as applicable), into notch 5 once you start moving, then into notch 6 at 5mph and finally into notch 7 at 10mph.
For braking, step 1 should be used predominantly, with step 2 used as necessary to reduce speed.

How to Use in the Scenario Editor

Numbering

All numbering is controlled via the DMOS coach in the scenario editor. This allows you to control a number of features as detailed below. You should not change the number of the DMOCL or MOS coaches.

Destination Code
Please refer to the Destination Panel section earlier in the manual.

Destination Number Code
Please refer to the Destination Panel section earlier in the manual.

Ride Height Modification Sticker
FGW Plain Blue and GWR Green liveries have a ride height modification sticker on the front of each unit enabled by default. You can control the visibility of them with **;RHM=1** to enable, **;RHM=0** to disable.

Coach Letter Sticker
FGW Plain Blue and GWR Green liveries (excluding 3-car Class 165s: 165101-165117) have a coach letter sticker on the front of each unit enabled by default. You can control the visibility of them with **;CL=1** to enable, **;CL=0** to disable.

Doors Isolated and Locked Out of Use
Controls whether the doors on the unit are isolated and locked out of use. This will stop all doors from opening on the unit (not the full consist if multiple units are coupled together). **;DI=1** to enable, **;DI=0** to disable.

Air Cooling Equipment
From 2017 to 2019, Class 165 units were fitted with an air cooling system. On GWR Green liveries, the associated equipment for this is enabled by default. You can control the visibility of it with **;AC=1** to enable, **;AC=0** to disable.

GSMR Equipment
FGW Plain Blue and GWR Green liveries have GSMR antennas on the roof of driving coaches by default. On all liveries you can control the visibility of them with **;GSMR=1** to enable, **;GSMR=0** to disable.

FGW Dynamic Lines LED Headlights
FGW Dynamic Lines liveries have as fitted BMAC G1 halogen lights by default, with all other liveries having the newer BMAC G3 LED lights by default. However, some units were fitted with the newer lights whilst still in FGW Dynamic Lines livery. You can control the visibility of LED lights on FGW Dynamic Lines units with **;LED=1** to enable, **;LED=0** to disable.

Example number:
166208;D=13;N=51;RHM=1;CL=1;GSMR=1

Key:
166208 – unit number.
;D=13 – destination.
;N=51 – route code.
;RHM=1 – ride height modification stickers
;CL=1 – coach letter stickers
;GSMR=1 – roof GSMR antennas

Credits

Jack Hales – scripting, liveries, destinations, sounds
Benammi Swift – invaluable scripting assistance
Lewis Clowes – TrainFX font
Ashley Clark – PRM Door Sounds
Luca Whatling – additional 3D modelling