



# CRH2A EMU Driver Manual

Ver. 1.2



This manual is only for use with the Train Simulator game and is not for real-world use.

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# 1 Brief Introduction to CRH2A EMU

The China Railways CRH2A EMU high-speed train was originally developed from the Shinkansen E2-1000 Series, although the newer versions of the CRH2 are not related to the E2-1000 Series despite having the same exterior styling.

The CRH2A is in widespread use and is one of the most popular high-speed EMUs in China, with over 200 sets currently in service and more planned.

CRH2A can be used in single 8-cars consist, or coupled 16-cars consist. For detailed formations please see following tables:

**Unification:** In 2013 as requested by China National Railway Administration, manufactory redesigned the CRH2A' s both exterior and its interior, as well as the entire system in order to meet the operational requirements and new standards of China railway.

Formation (single unit, non-unified consists)

1	2	3	4	5	6	7	8
T1c	M2	M1	T1p	T2k	M2p	M1s	T2c
1U				2U			

The green part represents a First-Class coach.

Formation (single unit, unified consists, 2013 onwards)

1	2	3	4	5	6	7	8
T1sc	M2	M1	T1p	T2k	M2p	M1	T2c
1U				2U			

The green part represents a First-Class coach.

## 1.1 Train data

Consist length: 201.4 m (661 ft)

Width: 3380 mm (11 ft 1 in)

Height: 3700 mm (12 ft 2 in)

Maximum operation speed: 250 km/h (155 mph)

Power output: 4800 kW (6400 hp)

Electric system: 25 kV 50 Hz AC overhead catenary

Braking system: Regenerative, electronically controlled pneumatic brakes



CRH2A has had many different exteriors and interior over its production years; This DLC features the first generation of it.

## 2 About this Add-On

We're proud to present this advanced CRH2A high-speed EMU and we hope that you will experience something you've never experienced before with it.

**Interactive MON screen:** It's a real touch screen! You can click on the screen button to see the next page or to set the train service number.



**Fully workable ATP system:** Introducing for the first time ever the "target & distance" ATP system in Train Simulator with a continuous braking curve, the CRH2A will let you drive more smoothly from station A to station B. It also comes with the constant speed control, this function will free you from the regulator lever and you will just need to monitor the system.



**Train number and auto destination display.** When you use the touch screen to input the train number, the route name and destination will also appear on your ATP and MON screen automatically, as they do on the exterior LED board. This system will also check the train's direction based on the number you entered. For example, D5103 will show Chongqing bei-Chengdu dong, while D5102 will show Chengdu dong-Chongqing bei.

Please see **Appendix 4** for detailed database information.

## 3 External Models

### 3.1 Get to Know Your Train

Now let' s take a look at the CRH2A' s cars:

Car No.1: Control car with toilet (trailer)



Car No.2: Motor car



Car No.3: Motor car with toilet



Car No.4: Trailer car with pantograph



Car No.5: Dinner car with toilet (trailer)



Car No.6: Trailer car with pantograph



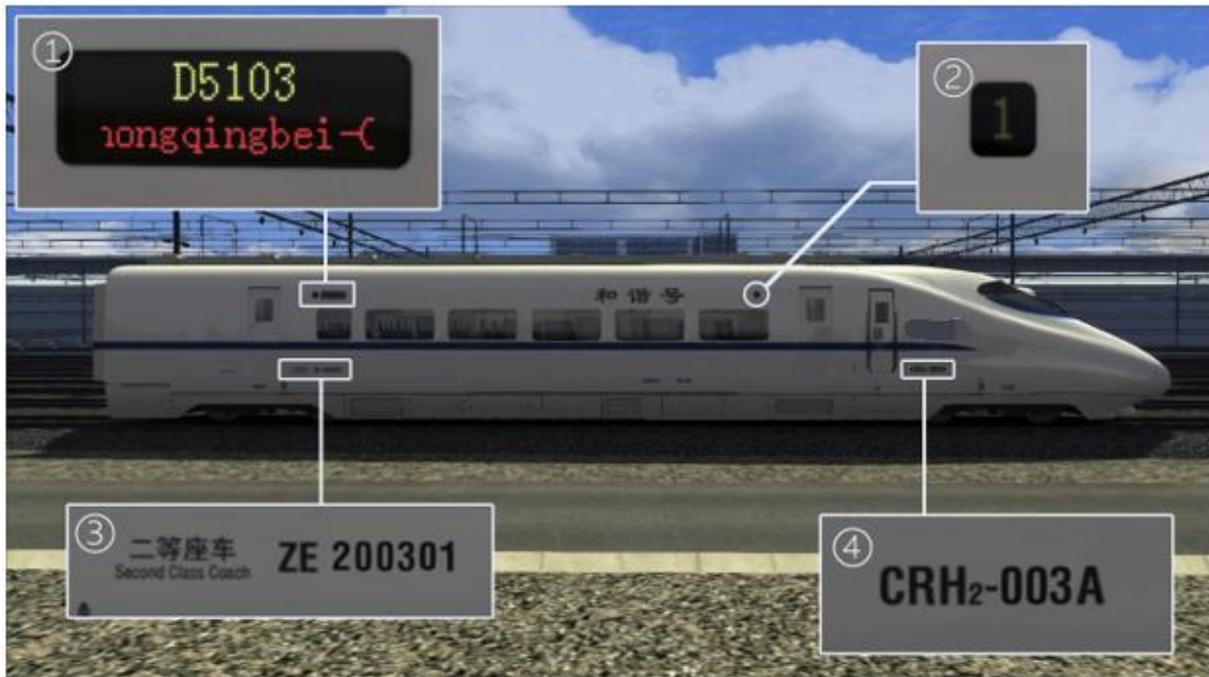
Car No.7: Moto car with toilet (first class)



Car No.8: Trailer control car



### 3.2 Functions on External Model



This Add-on allows you to set the train number, as detailed below:

- ① LED direction board. Enter this information in the cab with the MON screen.
- ② Coach number: indicate which car this is. Enter this in Scenario editor.
- ③ Train car number: Enter this in Scenario editor.
- ④ Consist number: Enter this in Scenario editor.

You need to open the Scenario editor to change the coach number, car number and consist number. You will only need to enter the car number and coach number, consist number will be changed according to what you entered.



You need to enter 4 numbers to change the car and coach numbers. The first three are for car numbers and can only use numbers. The fourth is for the coach number, and can only use capital letters B through P.

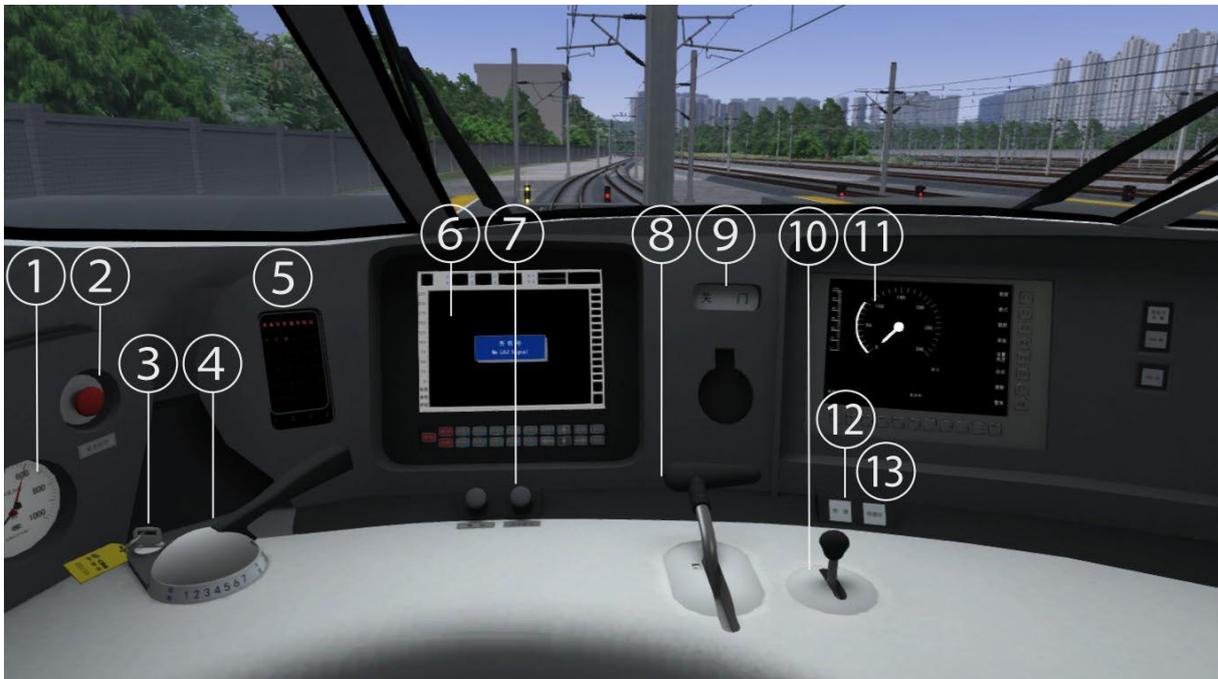
The meaning of these letters are as follows :

A	B	C	D	E	F
--	Car No.1	Car No.2	Car No.3	Car No.4	Car No.5
G	H	I	J	K	L
Car No.6	Car No.7	Car No.8	Car No.9	Car No.10	Car No.11
M	N	O	P	Q	
Car No.12	Car No.13	Car No.14	Car No.15	Car No.16	

## 4 Get to Know the Cab

This DLC provides a highly detailed and fully functional cab for the CRH2A, now let's look at it:

### 4.1 The Main Area



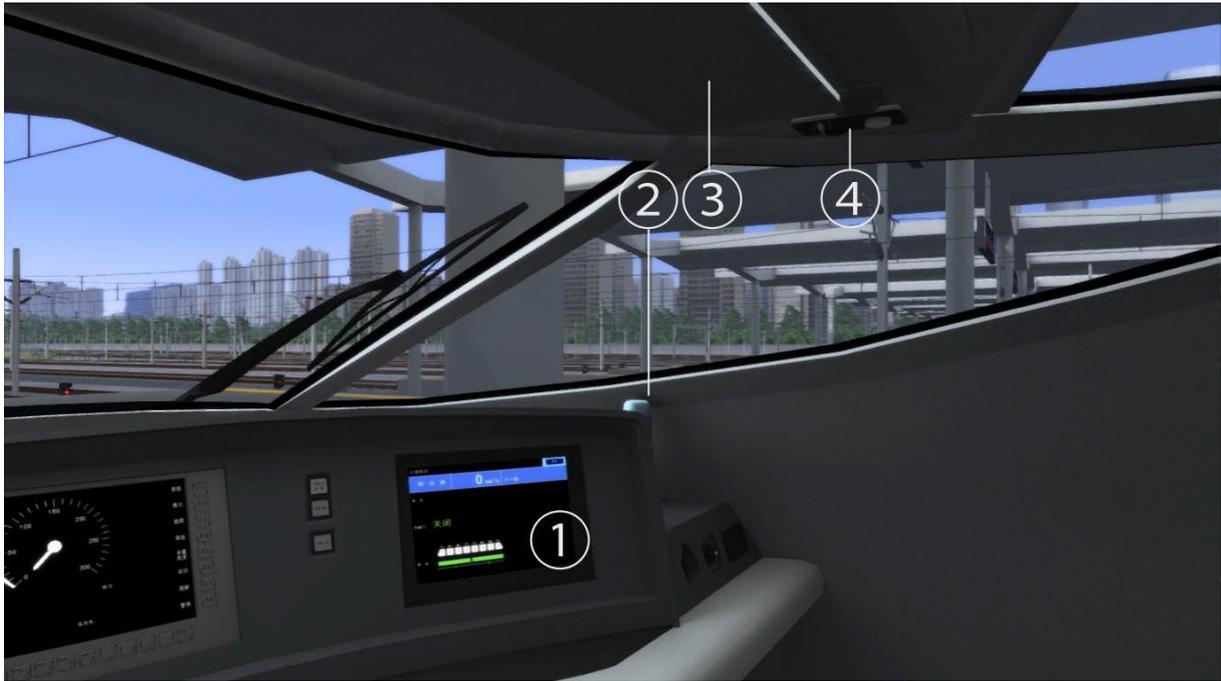
1. Pressure gage   2. Emergency brake button   3. Master key   4. Brake handle  
5. Error information display screen   6. LKJ Screen   7. Emergency brake reset button  
8. Regulator handle   9. Doors indicator   10. Reserve handle   11. ATP Screen  
12. Constant speed button   13. Constant speed off button

### 4.2 Main Upper Area



1. Left desk light   2. Left sun visor   3. Right sun visor

### 4.3 Right Area



1. Right MON Screen 2. Thermos from Forestrail route (Kiha 720, and Rintenjo station) and 22 coaches (YW) 3. Right sun visor 4. Right desk light

### 4.4 Lower left of main area



1. Cab light 2. Headlamp switch 3. Wipers switch  
4. Traction voltage 5. Control system voltage

## 4.5 Left MON Screen



1. Hotkey screen    2. Train information screen    3. Train service number input screen

## 4.6 Train Service Number Input Screen



1. Train service number display position    2. Train class input area    3. Digital input area  
4. Keyboard activation button    5. Clear    6. Confirm button



You can click on the train service number input button on the top menu to enter the new train service number input screen, then click on the button (4) to activate the keyboard (you will see a flashing cursor). To input the numbers, you need to press D/C/G first and then input the numbers. You can click the menu button to return to the main screen, or the clear button to clear up what you have just entered.

## 4.7 ATP Screen



- 1 Distance to next speed limit.
- 2 Signal mode.
- 3 Speedometer and speed limit. See ATP section for details.
- 4 Signal aspects. See ATP section for details.
- 5 Train service number.
- 6 Control mode. Display Full/Part/Shunting/On sight/Isolate.
- 7 Route name and departure/arrival station name display.
- 8 Shunting mode button.
- 9 On sight mode button.
- 10 Isolate mode button.

Please consult the ATP function section for full details.

## 4.8 Right MON Screen



1. Pantograph On/Off
2. VCB Off
3. VCB On
4. Train service number
5. Digital speedometer
6. Next station
7. Time
8. Door state display
9. Consist information (\*)

(\*): When coupled with another CRH2A train, this will display 2 consists and 16 cars.

## 5 Driving the CRH2A

### 5.1 Start-Up Procedure

In most circumstances, you need to start up the train manually, following these steps:

- 1 . Turn the key to get the power on, so that the screen turns on and the control voltage shows 120 V.
- 2 . Raise the pantograph.
- 3 . Press the VCB ON button until "unprepared" and "VCB" lights on the error screen turn off. The traction voltage should now be 25 kV.
- 4 . Press and hold the emergency reset button until the "Emergency" light on the error screen turns off.
- 5 . Move the reverser handle to its front position.
- 6 . Move train brake handle from the remove position to release position to release the brake.
- 7 . Pull the regulator handle towards you, and the train should start moving.



**Warning:** Please use Expert mode to drive this train.

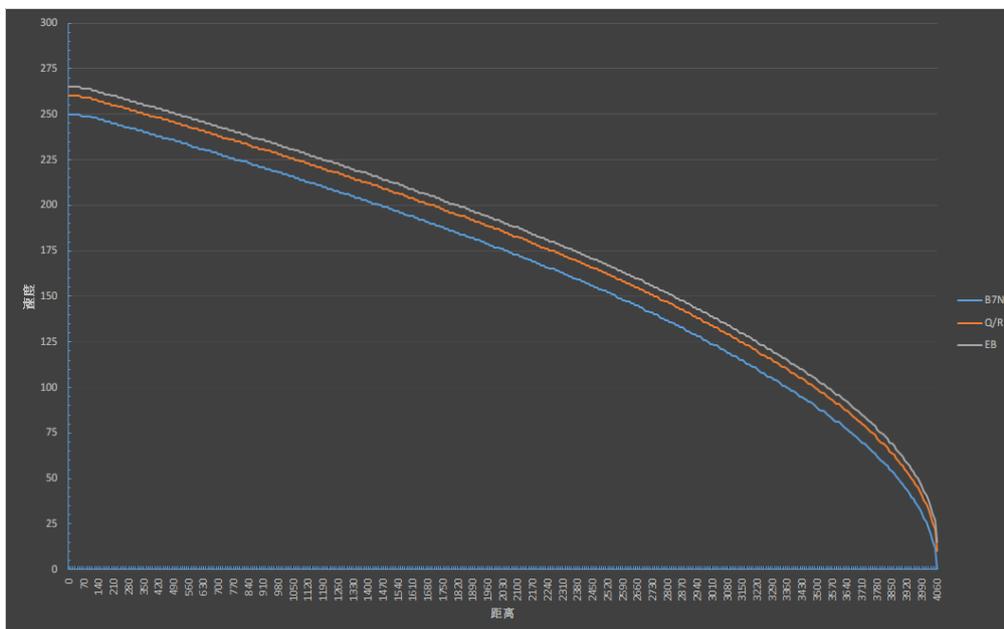
## 5.2 ATP function in Details

### 5.2.1 Introduction

Automatic Train Protection (ATP) is a system preventing the train from speeding or passing a red signal. This system uses a target speed indication and audible warnings to warn the train driver if they are likely to exceed a speed that would cause the train to pass a red (danger) signal or exceed a speed restriction. The system will apply the brakes if the driver fails to respond to these warnings. The system takes into account the speed and position of the train relative until it stops moving in terms of issuing the warnings and applying the brakes.

### 5.2.2 ATP in This Add-On

In full control mode, all signaling systems and functions are activated. The systems will get the line speed limit as well as the next speed limit and signal aspect. When approaching the next speed limit (lower than the current speed limit) or when the next signal is red, the system will calculate the distance between the current position and the next speed limit (or next red signal) and apply the appropriate brake force to slow down the train. Unlike the TVM3 or ATC-1 systems' interval speed curve, the braking curve on our ATP system will be a continuous speed curve from your current speed to the target speed.



Braking performance of the CRH2A EMU

### 5.2.3 The Information Provided by ATP Screen



- 1 . **Distance to the next speed limit.** This displays up to a distance of 9900 m away from your train. If the distance to the next speed limit is less than 1000 m then the white bar will also change.
- 2 . **Signal mode.** This shows the signal mode, which will be set to either CTCS-0, CTCS-1, CTCS-2 or CTCS-3. The ATP braking curve will only work on settings CTCS 1 through 3.
- 3 . **Speedometer and speed limit bar.** When the bar shows as only white it means that is the current speed limit; When it shows as a white and yellow bar, the yellow part represents the current speed limit while the white part represents the next speed limit; When it shows yellow bar only, it means that the next speed limit is 0, or next signal is red. When the speed limit ahead changes (and is lower than the current one), the system will calculate the braking distance and curve required based on your current speed and the distance to the next speed limit. When approaching the next speed limit and entering the braking zone, the speed limit bar (yellow parts) will change dynamically to guide you slowing down to the next speed limit. This is the continuous braking curve which displays on the ATP screen. If you fail to slow down to within the yellow bar part, the auto system will kick in to apply the brake. This system will help you apply the brakes in time and catch up with the timetable.
- 4 . **Digital speedometer and needle.**
- 5 . **Control mode.** Displays the control mode:
  - Full:** All signal systems and functions are active including the ATP continuous braking curve.
  - Part:** The signal aspect present and the continuous speed curve control aren't available, this is used when you are using the CRH2A on another route without the CTCS signal.

**Shunting:** For doing shunting work in a yard. You need to switch to this mode manually while stopped. In shunting mode, you cannot pass a red signal either, and the top speed is 45 km/h.

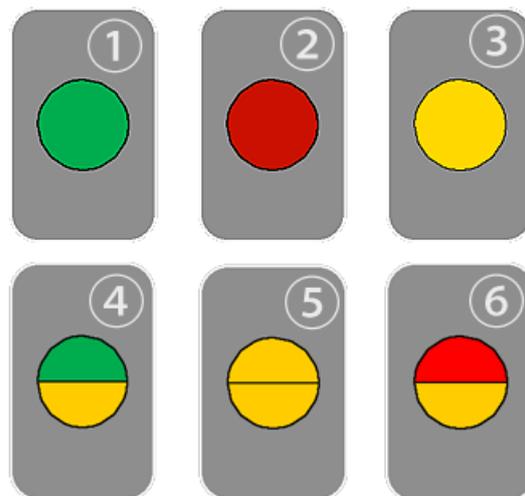
**On Sight:** In some circumstances, you may be required to pass a red signal. This time you will need use this mode. In order to switch to this mode, you first of all need to stop before the red signal, then switch to it, and then you can pass the signal with a speed of no more than 15 km/h.

**Isolate:** Isolates all systems, you can ignore any signals or speed limits. Using this mode in a normal scenario may cause the scenario to fail.



1. You can only switch to a different mode when the train is stopped. Clicking on a mode button will switch to a different mode, clicking on it again will return to Full/Partial mode.
2. Using the Isolate mode in a normal scenario may cause the scenario to fail.

#### 5.2.4 Signal Aspects



- 1 Green. The track is clear and allows you to proceed following the line's speed limitations.
- 2 Red. This signal indicates a stop. If the dispatcher allows you to pass a red, please stop the train and switch to On Sight mode first.
- 3 Yellow. On the Chengdu-suining and Southwest China high-speed networks, you're expected to travel no faster than 160 km/h once you encounter this aspect.
- 4 Green-yellow. This means that the next signal is yellow.
- 5 Double yellow. Indicates the line will lead to a siding.
- 6 Red-Yellow. Not used in Chengdu-suining and Southwest China high-speed network route.

### **5.2.5 Constant Speed Function**

The CRH2A has a constant speed function, this will allow hands-free control of the cab. Once you press the constant speed button the train will hold its current speed automatically. If speed limit changes or if you push or pull the regulator or brake handle, the constant speed function will disengage automatically. To use the constant speed function, you will need to not be speeding and to be in Full control mode.

# Appendix 1: About the Scenarios

## Scenarios for the Southwest China High Speed Rail Network

Scenario name: C2A01. Get to Know Your Train

Duration: 30 minutes

Start location: Chongqing

Destination: Hechuan

Train service number: D9999

Scenario name : C2A02. Your First Assignment

Duration : 55 minutes

Start location : Chengdu

Destination : Suining

Train service number : D5102

Scenario name : C2A03. Suining to Chongqing

Duration : 60 minutes

Start location : Suining

Destination : Chongqing

Train service number : D5102

Scenario name : C2A04. Evening Rush Hour

Duration : 60 minutes

Start location : Chongqing

Destination : Suining

Train service number : D5121

## Scenarios for Western Sichuan Pass

Scenario name: C2A05. First Direct Service on the Chenglan Route

Duration: 75 minutes

Start location: Du jiangyan

Destination: Mao xian

Scenario name: C2A06. Way Back to the Land of Abundance

Duration: 50 minutes

Start location: Wen chuan

Destination: Du jiangyan

### Quick Drive Scenarios:

This DLC also features Quick Drive scenarios; you can create your own journeys by clicking on the Quick Drive menu.



## Appendix 2 : Hotkey List

### Light controls

Headlamp shift up	H
Headlamp shift down	Shift+H
Main Cab light	L
Desk light left	Ctrl+N
Desk light right	Shift+N

### Basic function

Wiper	V
Horn	Space
Increase regulator	A
Decrease regulator	D
Reverser forward	W
Reverser backward	S
Increase train brake	Apostrophe
Decrease train brake	Semi Colon
Left sun visor	Ctrl+S
Right sun visor	Shift+S
Pantograph	P
Master Key	K
Doors	T

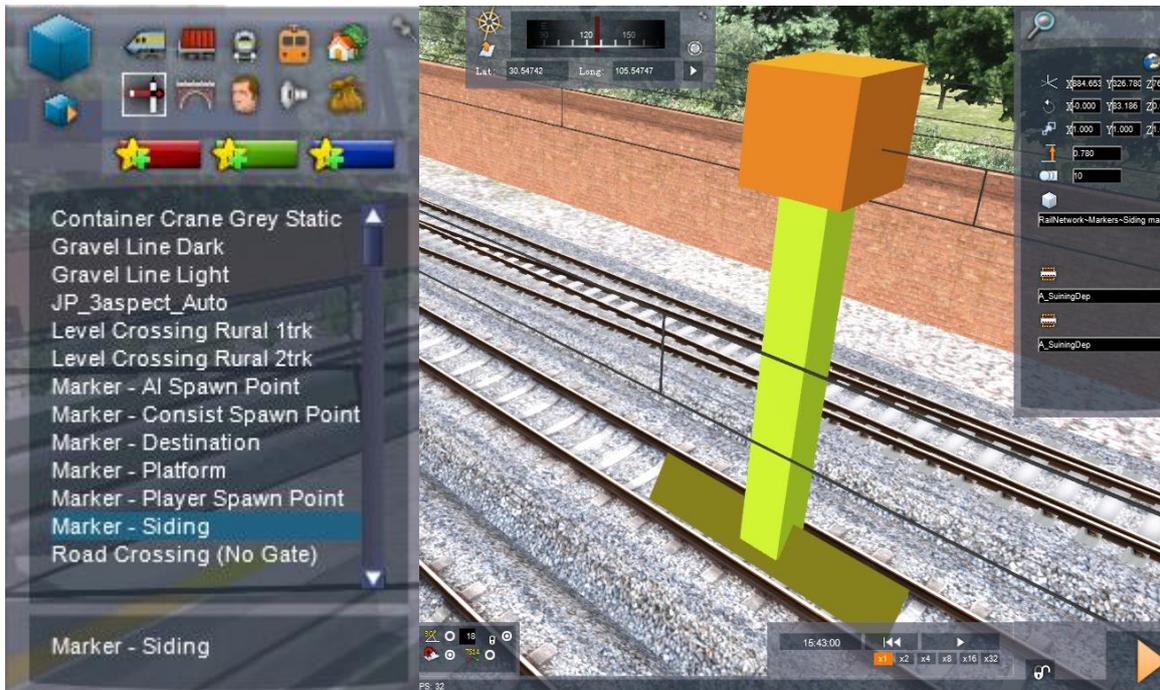
### Advanced function

VCB On	Y
VCB Off	Z
ATP Isolate Mode	I
ATP On-Sight Mode	O
ATP Shunting Mode	U
Emergency Brake	Backspace
EB Reset	E
Constant On	B
Constant Off	Ctrl+B

## Appendix 3 : How to Use Auto Broadcasting

This add-on provides an automatic broadcasting system for use during play time, if you wish to use it in your own scenario, please take the following steps:

- 1 . Click Track Infrastructures in the scenario editor, then select the siding marker and put it on the track that the player's train will have to pass, then give it a relevant name.



- 2 . In timetable view, create an event such as "Go Via" and give it a name, such as "DepSuing".



3 . Write the following script in your scenario script.

```

if event == "DepSuining" then
    SysCall ( "PlayerEngine:SetControlValue", "BroadCasting", 0, 2 );
    return TRUE;
end

```

Here the *DepSuining* is the name of event. We will need this to trigger the broadcasting. You will also require resetting the broadcasting value to 0 when the player is at the platform:

```

if event == "Tongnan" then
    SysCall ( "PlayerEngine:SetControlValue", "BroadCasting", 0, 0 );
    return TRUE;
end

```

*Tongnan* is the station event. You can set up a pick-up passenger event here and enter this event name in Trigger Success section.

### Broadcasting code and meanings

Departure (bound for)		Next station		Arrival	
Code	Meaning	Code	Meaning	Code	Meaning
001	For Chengdudong	101	Chengdudong	201	Chengdudong
002	For Chongqingbei	102	Chongqingbei	202	Chongqingbei
003	For Emeishan	103	Emeishan	203	Emeishan
004	For Mianyang	104	Mianyang	204	Mianyang
005	For Nanchong	105	Nanchong	205	Nanchong
006	For Shanghai	106	Cangshanzhen	206	Cangshanzhen
007	For Wuchang	107	Dayingdong	207	Dayingdong
008		108	===	208	===
009		109	Hechuan	209	Hechuan
010		110	Huaikou	210	Huaikou
011		111	Jijin	211	Jijin
012		112	Longsheng	212	Longsheng
013		113	Nanchong	213	Nanchong
014		114	Pengxi	214	Pengxi
015		115	Sanxing	215	Sanxing
016		116	Shizishan	216	Shizishan
017		117	Suining	217	Suining
018		118	Tongnan	218	Tongnan
019		119	Zitong	219	Zitong
020		120	Mianyang	220	Mianyang

## Appendix 4 : Train Service Number Database

Train number range	Service section
C5003-C5020	Wuchang to Xianning nan
D401-D450 D5401-5510	Shanghai to Nanjing
D651-D680	Shanghai to Hangzhou
D5101-D5132	Chongqing bei to Chengdu dong
D5133-D5142	Chongqing bei to Emeishan
D5143-D5152	Chongqing bei to Mianyang
D5161-D5194	Chengdu dong to Nanchong
D8231-D8238 D8241-D8244	Nanning dong to Hezhou
D211/D212 D2801-D2820	Guiyang bei to Guangzhou nan
D2831-D2844	Guilin bei to Guangzhou nan

## Appendix 5 : Screen Chinese to English Translation

Chinese text	Meaning	Chinese text	Meaning
列车信息	Train information button	下一站	Next station
应急手册	Hot key information button	车次	Train service number
列车号码设定	Train service number input button	车厢门	Train doors
菜单	Menu button	准备未完	Unprepared
输入	Enter	紧急制动	Emergency brake
清除	Clear	恒速运行	Constant speed
确认	Confirm	目视	On Sight
完全	Full	隔离	Isolate
调车	Shunting	部分	Part
开启	Open	关闭	Closed

## Credits

Developer: Union Workshop

Supervisor: CNAurora

3D Model: T9Express

Textures: CNAurora, T9Express

Program: CNAurora

Scenario: T9Express

Voice : 节操酱 (Jie Cao Jiang)

Audio Effect: T9Express, CNAurora

Special thanks: Justtrains.net

Beta testing team of Dovetail Games

3rd party team of Dovetail Games

