

Informatie Bulletin MiniatuurA

Automatic bus function

Preface

This information bulletin describes the operation of the automatic bus function. We will describe the most common used bus stops and convert them into workable connection diagrams. The automatic bus function is a function of the DC-Car decoder and is standard available in every DC-Car decoder. The function is intended for layouts where the vehicles drive autonomously. We first discuss the operation of the bus function itself, then we offer a number of opportunities to create bus stops.

How the automatic bus function works

This function makes it easy to have a bus to stop at a bus stop. Of course, this function must be controlled at the spot where you want a bus to be stopped. Control can be done in two ways:

1. Through a Hall sensor (HG1) built into the vehicle and two magnets in the road.
2. By commands from the function module, this can send IR LED commands to the bus.

The bus function is primarily intended for buses. When the decoder is built-in we need to tell the decoder that it is built into a bus or similar vehicle. We do this by setting type 14 or 15 in CV100. Type 14 is a bus stop next to the road. Oncoming traffic can pass, the anti collision system is automatically turned off at the stop and turned back on at departure. Type 15 is a bus stop on the road. Oncoming traffic cannot pass, the anti collision system remains enabled.

Important to know in advance:

As you can see in the above, the choice which type of bus, has to do with whether or not the anti-collision system is turned off.

Since it is not possible to change CVs while driving, this choice applies in principle for all bus stops on your lane. A mix is possible but requires extra parts and control, we will come back to this later.

To keep things clear, we will discuss the options step by step. We therefore start with the simplest method: bus stop on the road and control via Hallsensor in the bus and two magnets in the roadway.

1. A bus stop on the roadway controlled via Hall and magnets: CV100=15

The bus function has two phases:

1. Indicate right direction indicator and reduce speed. This is the location of the first magnet. How long the direction indicator remains ON can be determined with CV109, to which speed-step is decelerated is determined with CV110

2. Stop the bus and enable light functions. This is the location of the second magnet.

The bus will stop and wait for a certain time, this is set in CV103 (1-63 sec.)

Several additional functions are possible here:

Light 2 ON during stop CV111 (this is usually the interior lighting or the entrance lighting).

Other lighting functions with CV112:

Indicator signals left, right or alarm lights, head lights, light 3 and/or light 4.

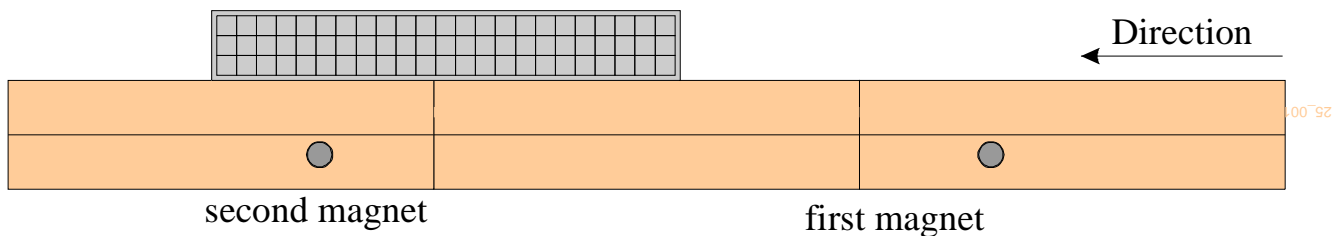
After the waiting time as specified in CV103, the bus automatically turns leftdirection light ON and will depart after some time with the speed set in CV105. The left direction indication is divided into two parts: With CV104 you set how long the left flashes **before** the bus departs. In the second part CV106 you set how long the direction indicator continues to flash **after** departure.

Installing the HG1 Hall sensor in the bus:

The position is as close as possible behind the left front wheel with the text side to the road. The HG1 is polarity sensitive and will only respond at a magnetic north pole. The magnets used in the road are Neodium 8 x 5mm. Please test the correct polarity before installing !



And this is how it looks in practice: (All drawings are based on the Streetsystem road elements)



2. Control via IR LEDs and the Function modul:

There is no need to install anything extra in the bus. What is needed are:

1x Function modul with DIP switch 5 in the ON position, the rest is OFF (command group E).

2x IR LED with serial resistor.

The Function modul can control up to 50 IR LEDs, so one Function modul can be used for many bus stops. By default, 8x IR LED 3mm and 8x 270 Ohm resistors are supplied with the Function modul.

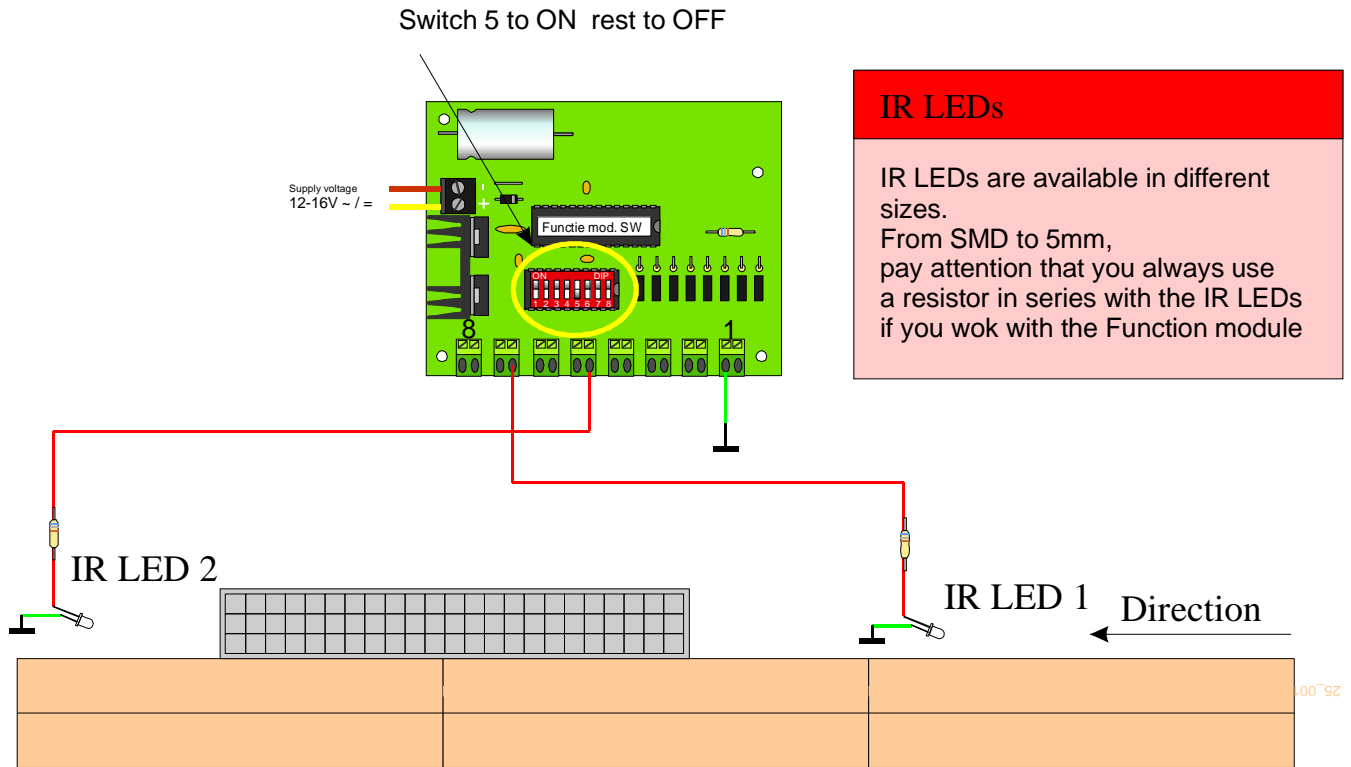
Dipswitch 5 in the ON position (command group E) deliver the following commands on the outputs:

- 1 = Speed at speedstep 0 (acting as a Faller Stop coil)
- 2 = Bus stop, direction indicators OFF, interior lighting OFF
- 3 = Bus stop, direction indicators OFF, interior lighting ON
- 4 = Bus stop, right direction indicators, interior lighting ON

- 5 = Bus stop, emergency lighting ON, interior lighting ON
- 6 = Bus departs with speed step as set in CV105 and left direction indicator
- 7 = Entering the bus stop with speed step as set in CV102 and turn on the right indicator (flashing time adjustable in Cv101)
- 8 = Speed at speedstep 0 (acting as a Faller Stop coil)

Note: Commands E2 - E7 are only executed by vehicles that have a vehicle type of 13, 14 or 15 in CV100! Other vehicle types will not react to these commands.

And this is how it gets connected:



In this example, the E7 command is set to IR LED 1, this will put the right turn signal ON (how long: is set with CV101) and reduces the speed to the speed step set in CV102. The bus will continue at this speed until the command from IR LED 2 is received. In our example, this IR LED is connected to the 5th output, command E5. The bus will stop, turning ON the hazard warning lights and the interior lighting. After the waiting time has elapsed, the bus will automatically indicate left direction, the interior lighting and the hazard lights are put OFF and the bus will depart/leave (times adjustable in CV104 and Cv106).

Note: If the time to reach the IR LED 2 command is too long the bus function is automatically terminated and the bus will accelerate.

Operation

The operation of the bus function is similar to that of a bus stop on the road as described on page 2. Provided that CV100 is now set to 14 (bus stop next to the road). When the bus reaches the 2nd magnet, the anti-collision signal sent from the rear is disabled and oncoming vehicles can simply pass. Until the bus left indicator starts flashing, then it turns on again and the traffic behind will be stopped automatically.

How does directing the bus to the bus stop work?

When a bus drives over Hall sensor 1, the Servo controller receives a pulse on the input. The controller sets the servo to deflect (adjust the appropriate potentiometer to set the right angle of the turnout servo). When the bus has driven over the turnout servo, it will operate Hall sensor 2 by the magnet on the steering guide. This gives a pulse on the other input, which ensures that the turnout servo is set to straight ahead again (adjust the right angle with the other potentiometer).

3.2 A bus stop next to the road, controlled via Hall and magnets using a Servo decoder with Input print CV100=14

Besides the Street system elements and the turnout servo you need:

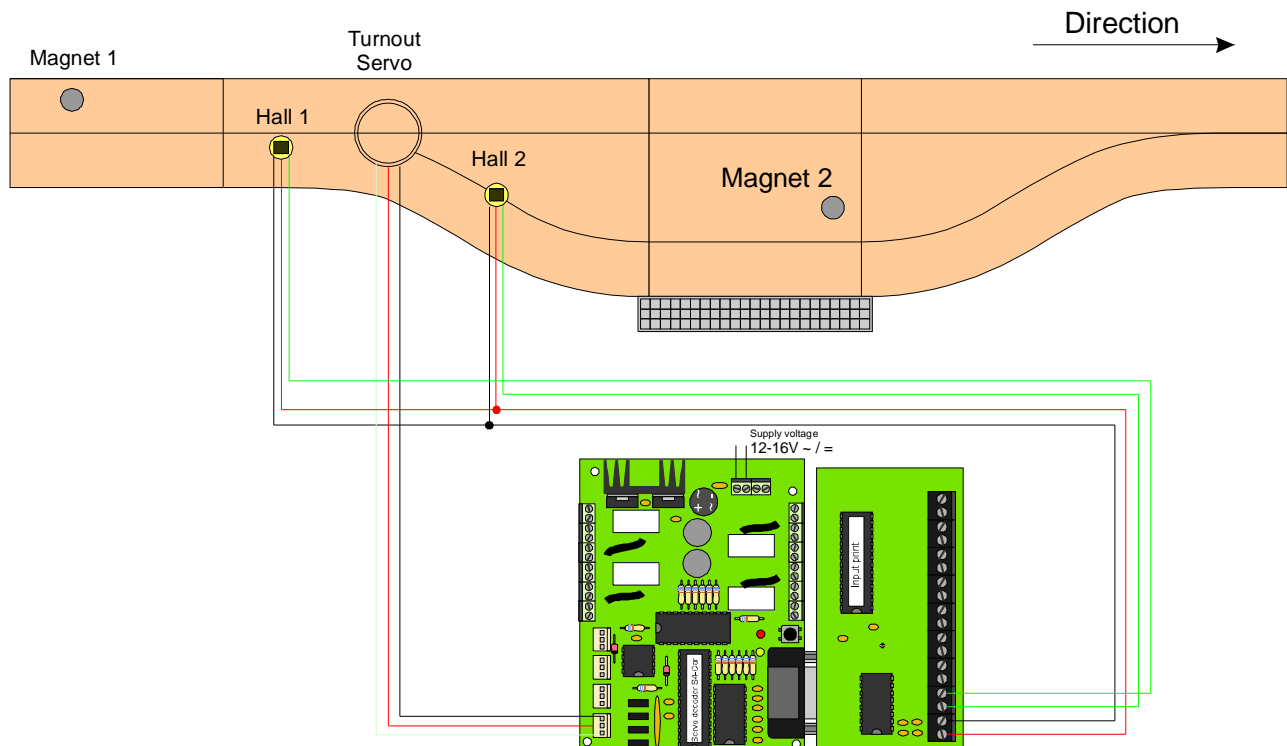
1x Servo decoder (S8, S4 or servo controller is also allowed)

1x Input board

2x Hall sensors (Streetsystem 10100)

2x Magnets

1x Turnout servo



Operation

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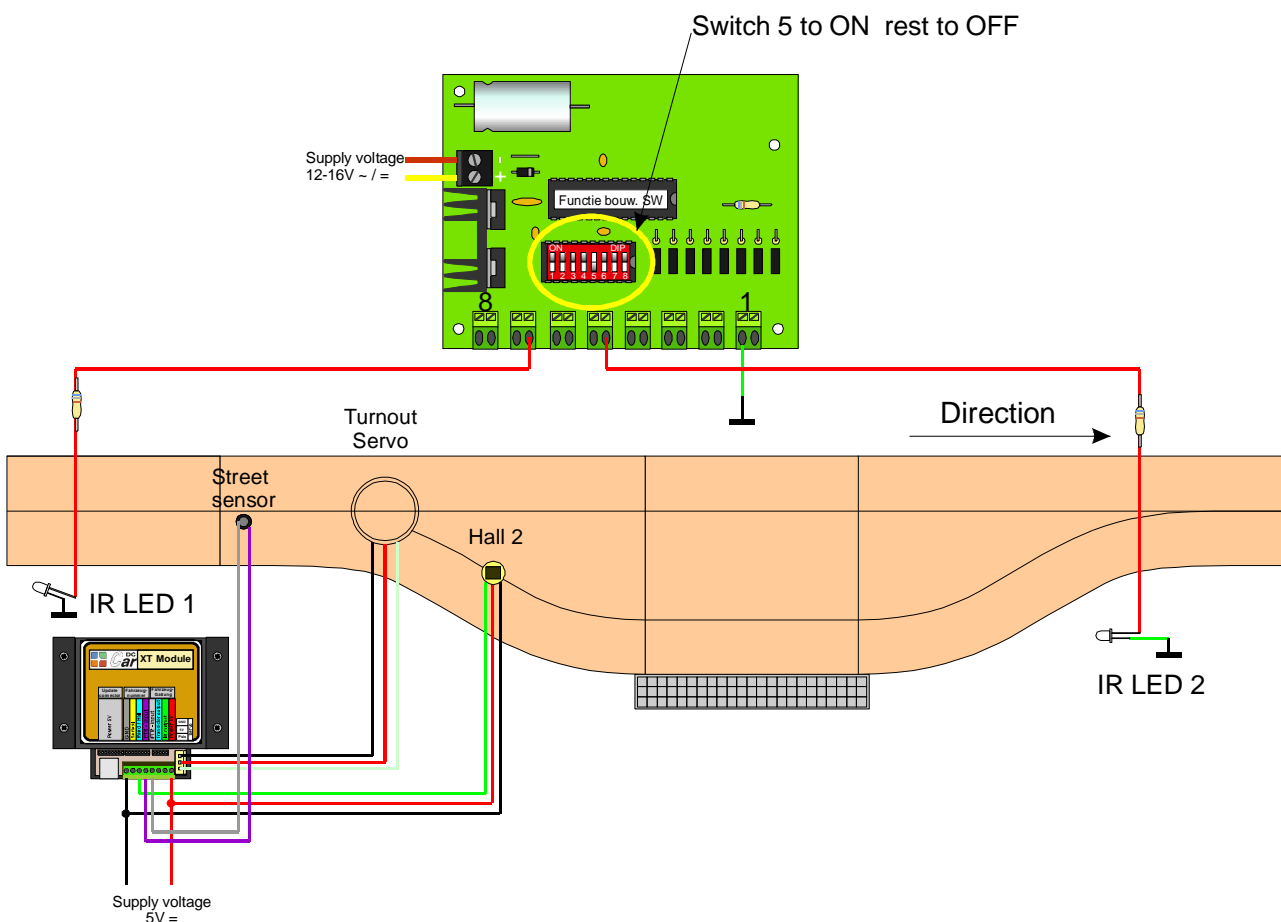
When a bus drives over Hall sensor 1, the servo decoder receives a pulse via the input print. The decoder sets the servo to deflect. When the bus has driven over the turnout servo, it will operate Hall sensor 2 by the magnet on the steering guide. This gives a pulse to the input print, which ensures that the turnout servo is set to straight ahead again.

3.3 What does this look like with an XT module?

With an XT Module, the servo decoder and the Input print are omitted. Hall 1 is replaced by a street sensor with photo transistor. Hall 2 can be used to reset the servo to straight position. The XT module also has the option to reset the servo in time eliminating the need for Hall 2. However, when a traffic jam occurs before the bus has reached the servo, it can happen that a preceding vehicle enters the bus stop and that the bus drives straight ahead because the servo has already been reset. Hall 2 is therefore the most reliable solution.

The XT Module is set to recognition the Type. You can best read how this works in the user manual. Controlling the bus using the Function modul is described on page 3.

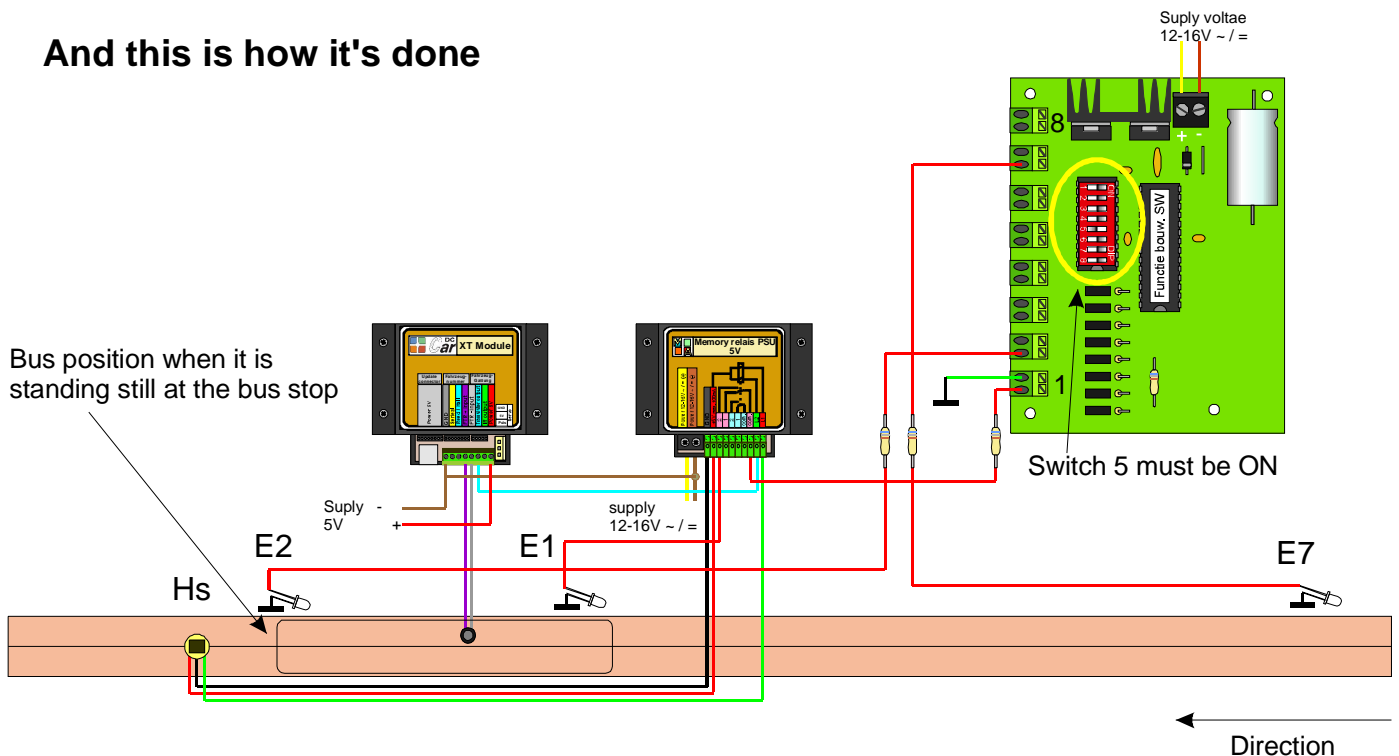
And this is how it gets connected:



5. What if you have bus stops on, but also, next to the road?

Here too, something has been devised, although this requires some more parts. We set the bus as type 14 (CV100=14). The bus will disable the anti-collision system during the stop. This setting is therefore actually intended for bus stops next to the road. When this bus makes a stop on the road, traffic coming from behind will have a collision because the bus's anti-collision system shuts down during the stop. To prevent this, we will detect the bus with an XT Module. The XT module switches a memory relay which, in turn, sends a STOP to the oncoming traffic. When the bus leaves the stop, the memory relay is switched off by a hall sensor Hs in the road and oncoming traffic will accelerate again.

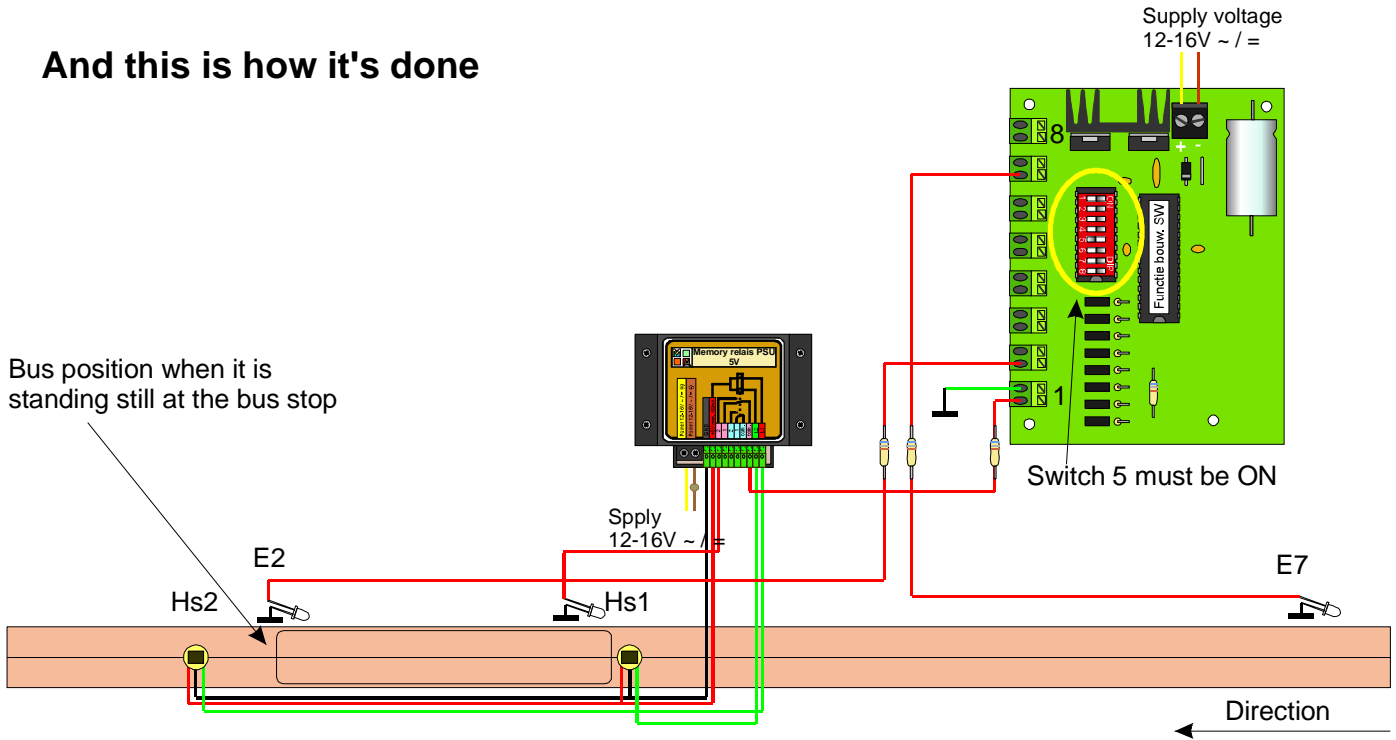
And this is how it's done



5.1. Simple version of bus stops on and beside the road with IR commands?

A simple version is also possible. This has the disadvantage that every car that enters the bus stop will stop the vehicle behind. However, this is only short period because the bus stop has a limited length. The detection of vehicle type 14 is not used anymore and with that the XT module can be omitted. Vehicles driving over Hs1 activate the memory relay. This puts oncoming traffic to halt via the STOP command from the Function module. When the vehicle leaves the bus stop via Hs 2 the traffic behind is released again and will automatically accelerate..

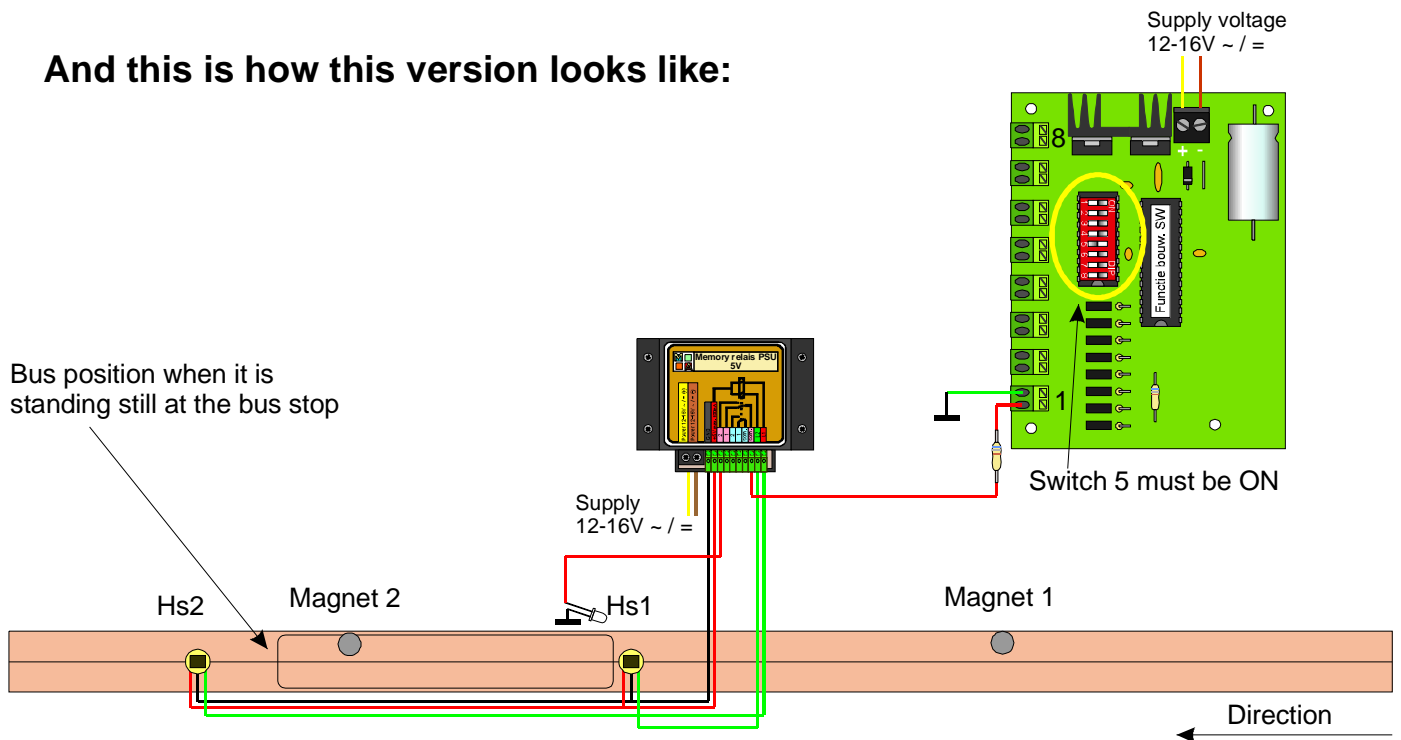
And this is how it's done



5.2. Simple version of bus stops on and beside the road with Hall and magnets

As in the previous examples, you may also replace the function module and IR LEDs with a Hall sensor under the bus and two magnets in the road. However, there is still a DC-Car STOP command needed from the function module to stop oncoming traffic.

And this is how this version looks like:



6. A bus stop on call

To involve the spectators in road traffic on your layout, it is also possible to use a bus stop to be made on demand. The public can let the bus go to the bus stop via a push button. How this is made can be found below we will do this based on control via Hall sensor in the bus and magnets in the road.

How it works

The operation is the same as that of the bus stop next to the road as described earlier. In this case we make the first magnet movable. This can be done by using the Streetsystem parking servo. It is placed in the road in such a way that the magnet can operate the hall sensor in the bus, so with the magnet to the left instead of the right. The idea is as follows: by pressing a button, the magnet goes up and will therefore switch on the bus function via the hall sensor in the bus. Via the relay (on the S4-Car servo decoder), belonging to the servo output to which the parking servo is connected, the hall sensor 1 sends the bus to the bus stop. This hall sensor is connected to the input that drives the turnout servo. As a result, the recognition magnet under the bus will operate the junction and sends the bus to the bus stop. The rest of the bus stop is controlled by the 2nd magnet as described earlier. Hall sensor 2 ensures that the turnout servo and the parking servo are both set back to normal position.

And this how it is done

Besides the street parts and the turnout servo you will need:

- 1x S4-Car Servo decoder
- 1x Input print
- 2x Hallsensors (Streetsystem 10100)
- 1x Parking servo
- 1x Magnet
- 1x Push button

