

SERVO CONTROLLER SRV4



The BLOCKsignalling Smart ServoSwitch SRV4 is designed to operate up to four servos between their Start and Stop positions, whenever a control input is switched.

- Connect up to four servos
- Each servo operates between its preset Start and Stop position when its control input is switched
- Servo Start position, Stop position and movement Speed are easily adjustable using controls built into the module
- Outputs available to operate two-aspect signals and control panel leds
- Option to connect external relays to control frog polarity
- Inputs can be connected to DCC accessory decoders to allow DCC control of servo motors
- Quick and easy to set-up and program

The BLOCKsignalling SRV4 Smart ServoSwitch is designed to operate up to four miniature servos.

The servo movement can be triggered by switches, push buttons, stud and probe, or by connection to DCC accessory decoders. Whenever an input is grounded, the associated servo moves to either its Start or Stop position depending on which of its two controlling inputs is grounded.

If the attached servos are being used to operate points (turnouts), then an external 5V relay can be connected to the module which will automatically energise and de-energise whenever the servo moves past its mid-position. In this way, the frog polarity can be swapped as the points move.

Outputs are also provided to drive leds, which could be mounted on a panel or into signal heads. Two leds are lit when the servo is at its Start position and two leds are lit when the servo is at its Stop position. This allows panel mounted leds and signal leds to be connected at the same time.

Example Wiring for one Servo

There are two inputs associated with each servo.

For Servo 1 the inputs are I1 and I2.

When I1 is grounded, Servo 1 turns clockwise.

When I2 is grounded Servo 1 turns anticlockwise.

The input can be momentary (such as from a push button switch) or permanent (such as from a toggle switch).

If both inputs are grounded at the same time the servo will oscillate between its Start and Stop positions.

A positive supply (+5V to +25V) needs to be connected to the COM POS input. In the diagram below, a red wire from ACIN/+ is connected to the COM POS terminal. If a DCC decoder is being used, its COM terminal(s) will be connected to the COM POS terminal on the SRV4.

Up to four leds can be connected for each servo. This allows common-cathode or common-anode signals to be connected, and also allows control panel leds to be wired.

When the module is first powered, the servos will move to their parked positions (fully anticlockwise) and the following associated leds will be lit:

- led connected to A1 and C2: lit
- led connected to A1 and C1: extinguished
- led connected to A5 and C2: extinguished
- led connected to A5 and C1: lit

If input I1 is now grounded then Servo 1 will turn clockwise.

When the arm of the Servo 1 moves past the halfway position moving clockwise, the output RLY1 will be energised with 5V. This can be used for switching frog polarity if points are being driven by the servo. Any miniature general-purpose relay with a 5V coil can be connected.

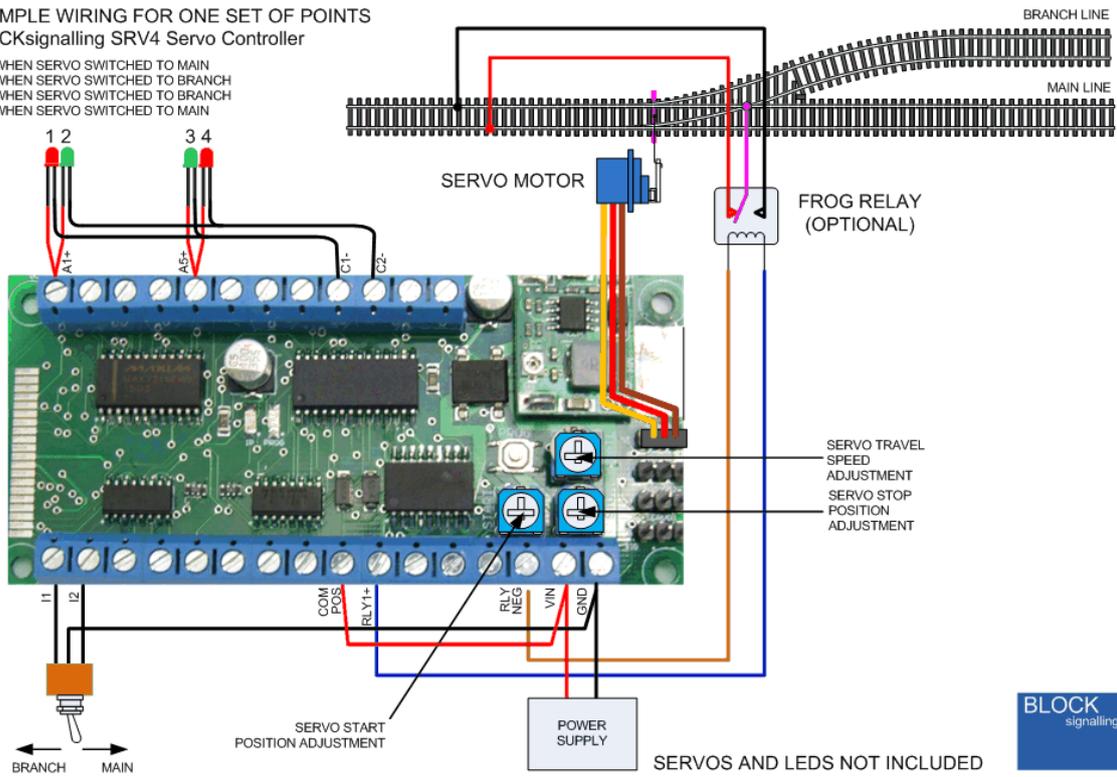
When it reaches its fully clockwise position, the following associated leds will be lit:

- led connected to A1 and C2: extinguished
- led connected to A1 and C1: lit
- led connected to A5 and C2: lit
- led connected to A5 and C1: extinguished

If input I2 is now grounded, the reverse operation occurs and the servo moves back to its fully anticlockwise position.

EXAMPLE WIRING FOR ONE SET OF POINTS
BLOCKsignalling SRV4 Servo Controller

1. LIT WHEN SERVO SWITCHED TO MAIN
2. LIT WHEN SERVO SWITCHED TO BRANCH
3. LIT WHEN SERVO SWITCHED TO BRANCH
4. LIT WHEN SERVO SWITCHED TO MAIN

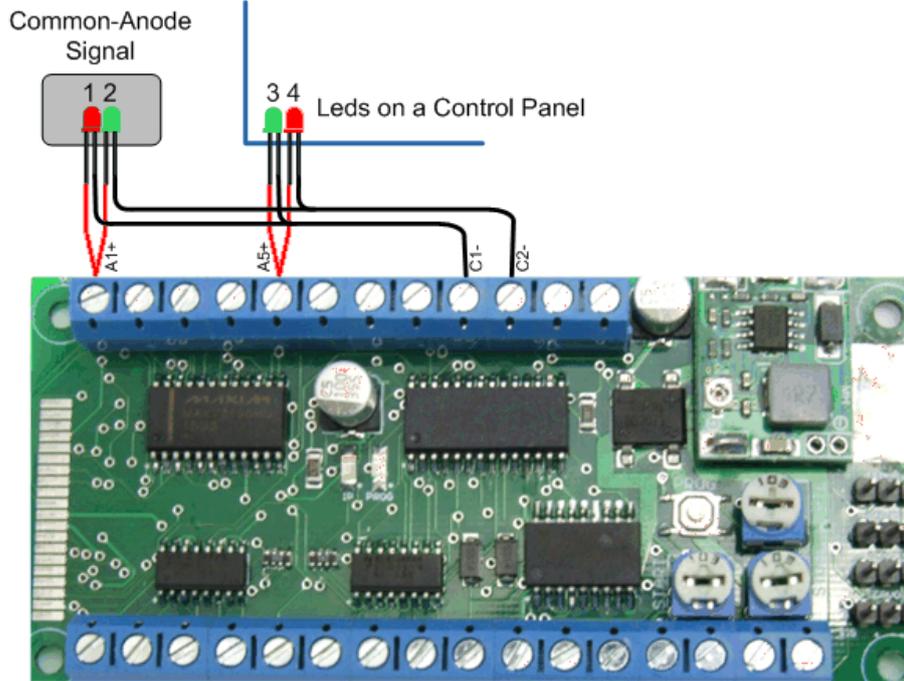


The following diagram shows example wiring to common-anode signals, such as those manufactured by Beko, Eckon, Traintronics, Train Tech, and Absolute Aspects.

EXAMPLE WIRING COMMON-ANODE SIGNALS

BLOCKsignalling SRV4 Servo Controller

1. LIT WHEN SERVO SWITCHED TO MAIN
2. LIT WHEN SERVO SWITCHED TO BRANCH
3. LIT WHEN SERVO SWITCHED TO BRANCH
4. LIT WHEN SERVO SWITCHED TO MAIN

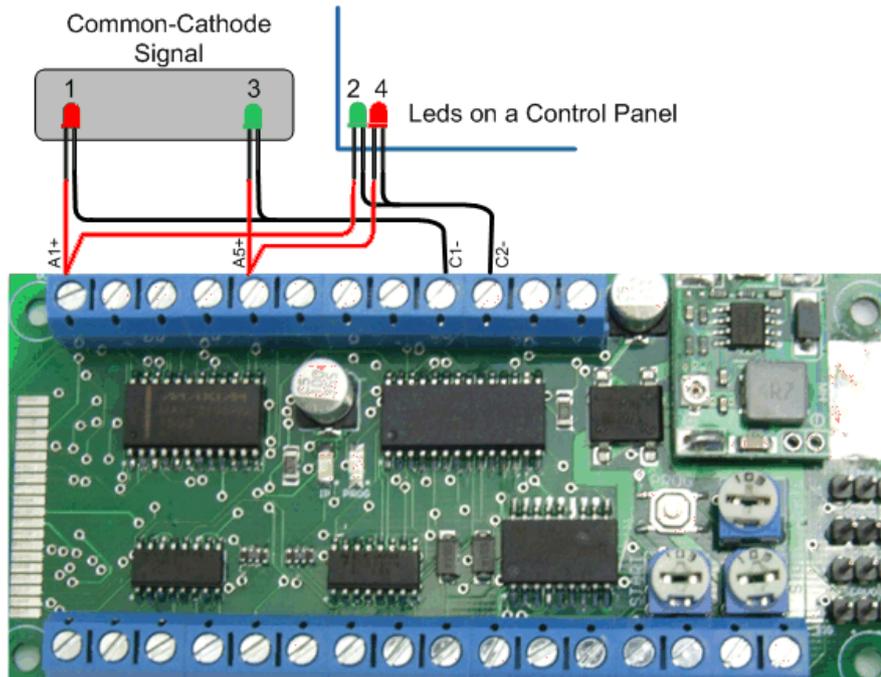


The diagram below shows example wiring to common-cathode signals, such as those from continental or Asian manufacturers.

EXAMPLE WIRING COMMON CATHODE SIGNALS

BLOCKsignalling SRV4 Servo Controller

1. LIT WHEN SERVO SWITCHED TO MAIN
2. LIT WHEN SERVO SWITCHED TO BRANCH
3. LIT WHEN SERVO SWITCHED TO BRANCH
4. LIT WHEN SERVO SWITCHED TO MAIN



Servo Motors

Servo motors consist of a small dc motor and gearbox combination, designed to drive an externally mounted arm (horn) through a limited range of angles. The motor operates at high speed, and the gearbox reduces the speed to a more appropriate level and so increases the torque significantly. An in-built control circuit varies the motor direction and speed to allow the output shaft to turn to the desired position.

Servos are compact and easy to mount. The attached points, barrier or gate can be directly attached to the servo by fixing a wire into the centre of the output shaft with epoxy, or a variety of horns can be mounted on to the output shaft and then extended with thin modelling wire to connect to gates, barriers and signals, etc.

The servos must be plugged in to the SRV4 with the correct orientation. The signal wire (usually orange or white) must be close to the centre of the module. No damage will occur if the plugs are inserted in reverse.

The SRV4 is designed for operation with all types of miniature analogue servos.

Power Supply

The module operates from AC, DC or DCC (track bus) supplies.

You can use a DC power supply between 12V and 25V DC, or any AC power supply between 12V and 16V AC.

If using DCC, the feed can be between 12V and 25V, which covers all normal DCC layouts.

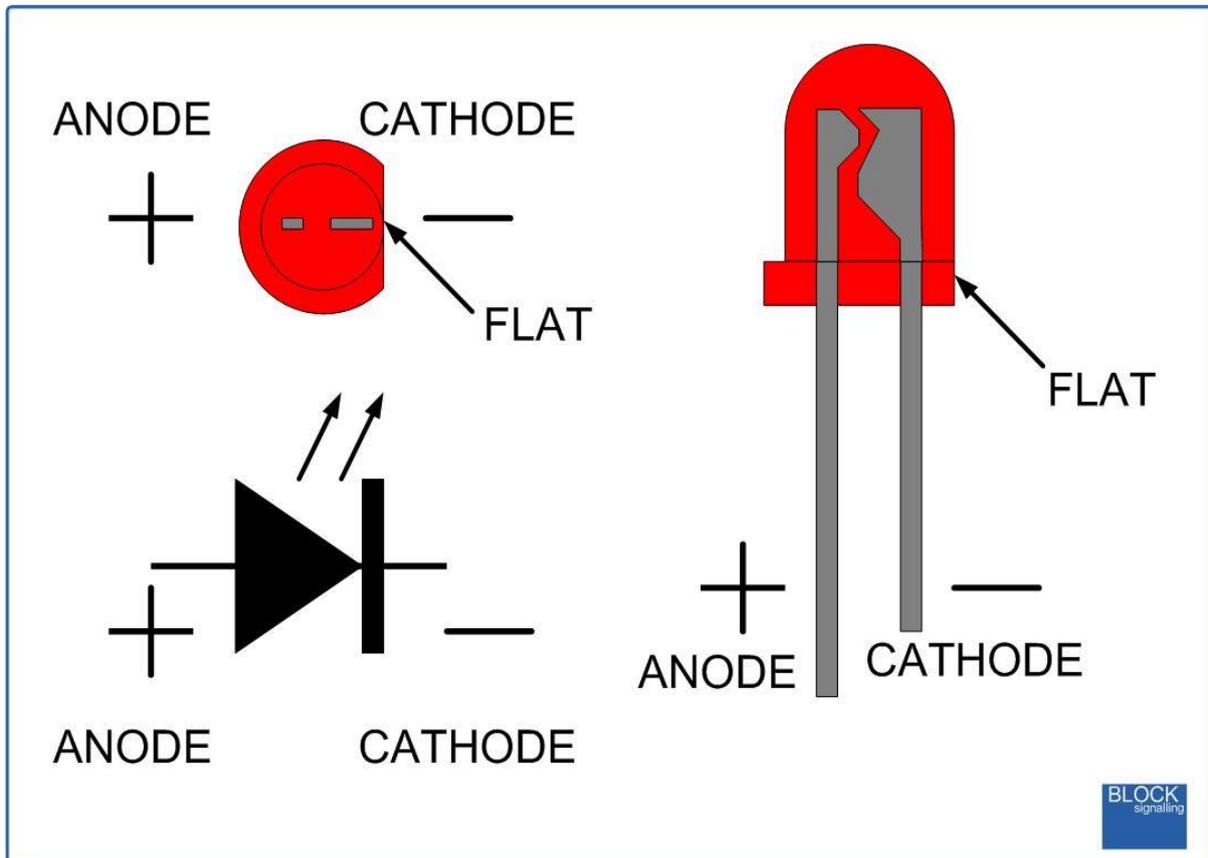
A 12V DC supply is recommended.

Please check the wiring carefully before turning on the power to prevent damage to the module.

Led Connection

When using leds it is important to connect them the right way around.

The negative lead (cathode) is identified by a flat on the side of the led body, and by having a shorter lead.



Factory Reset

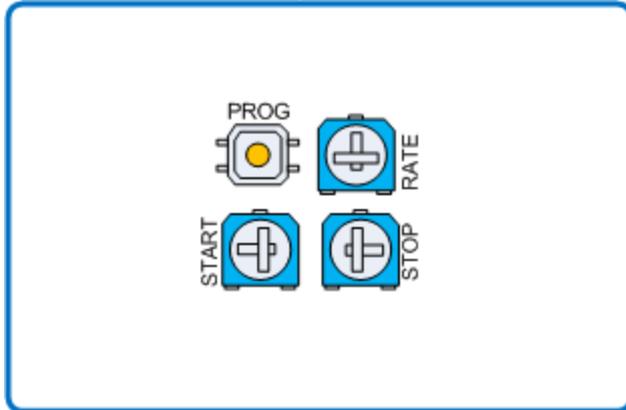
By performing a factory reset, any changes which have been made to any settings will be returned to the standard factory defaults, with the Start position for each servo being approximately 45 degrees anticlockwise of the servo mid-position. The stop position will be approximately 90 degrees clockwise of this position.

Note that servos will immediately move to their fully anticlockwise starting positions.

Programming the Servo Start and Stop Positions

To program the servo Start and Stop positions it is initially recommended that the servos be removed from the layout. During the programming, the servo arms will move through a range of angles, and if this is unexpected, then damage may result to the components attached to the servo.

First set the three adjusters on the module as shown on the diagram below.



Turn off the power to the module. Holding down the push button on the module, turn the power back on. The red led on the module will be seen to flash. When two flashes have been seen, release the button.

There will be a long flash of 5 seconds, then the red led will begin flashing again. To program servo 1, wait until 1 flash has been seen, then press the button again.

The SRV4 will restart, so first all the attached leds will flash, then servos 1 and 2 will park, then servos 3 and 4 will park. This takes about 3 seconds.

Servo 1 will then begin to oscillate between its Start and Stop positions set by the START and STOP adjusters, at a speed set by the RATE adjuster.

Carefully adjust the START adjuster to see how this sets the start position of the servo arm. Then adjust the STOP position in the same way.

When you are happy with the start and stop positions, adjust the RATE setting to achieve the speed of movement desired. Note the speed setting is only changed at the end of each movement, so if a very slow rate is selected it will be necessary to wait some time until the arm has reached the end of its movement before the rate setting is changed.

When the desired settings have been achieved, press and hold the push button until the servo stops moving.

The module then stores the settings for servo 1 and then reboots. Repeat the process for any remaining servos you wish to program.

Program Flow Diagram

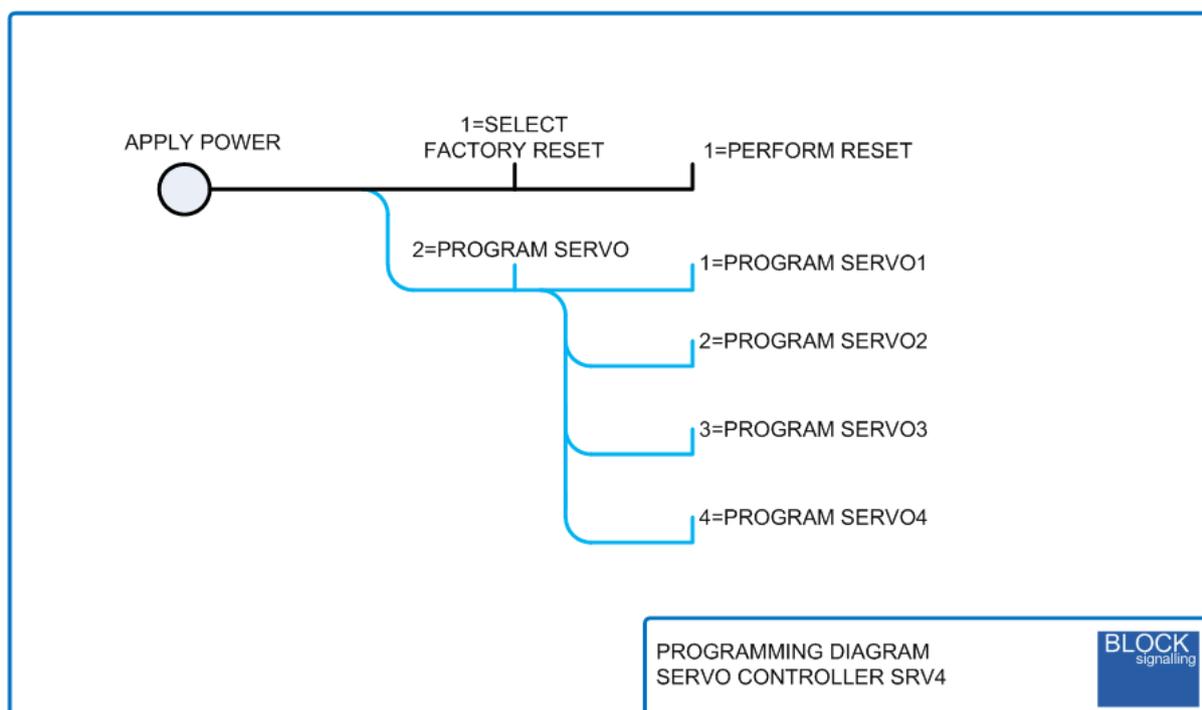
Programming is performed by holding down the Push Button when switching on the power.

The red led on the PCB flashes at 1 second intervals. When the required number of flashes is seen (see later for the list of possible choices) the button is released to store the first value. At this point the led comes on for five seconds to confirm the value is stored.

The led then starts flashing again, and this time the button needs to be pressed to store the second value.

Once the two values to be stored are entered, the led flashes 10 times rapidly, and the module starts operating.

If the programming is aborted by switching off, then the programming must be repeated.



Leds are not included.

This module is available as the controller only (SRV4) or as a pack with the controller and four servos (SRV4A).

Troubleshooting

Q. I think the module isn't working.

A. Firstly, narrow down the problem. If the red led on the module is not lit, remove all the wiring from the module and only connect the power supply. When you switch on, the red led should initially flash, and then be extinguished for about two seconds whilst the servos park. It then stays lit, unless a servo is operated, in which case it extinguishes briefly.

Q. The servos do not move when I connect a ground to an input.

A. Each time an input is grounded the yellow led on the PCB should light. If this does not light, then it is probable that the COM POS terminal is not connected to the positive of the same supply that feeds the input. Try connecting a 9V battery to COM POS and I1 to check the yellow led lights.

Q. Each time I switch an input the yellow led lights, but the servo does not move.

A. Check the servo is plugged in the correct way around and that you have connected your input to the correct input for the servo connected (I1 or I2 for Servo 1, I3 or I4 for Servo2, etc). The servo may be faulty.

Q. What resistor do I need to use with leds and signal I connect?

A. No resistor is necessary, but if your signal or leds have a resistor already wired, this can remain.

Q. What relays can I connect?

A. Any relay with a 5V coil that draws less than 100mA can be connected.