AutoSignal Colour signal controller by MegaPoints Controllers

A 2-3-4 aspect configurable colour light signal controller with feather and relay driver. Supports Automatic Brake Control (*ABC*) for engine braking, three and four aspect divergent signalling, four aspect signalling via three lamps and timer function to simulate blocks beyond scenic sections.



User Guide

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AutoSignal - Colour light signal controller

Introduction

This AutoSignal can control any combination of 2, 3 or 4 aspect colour light signals with the following features:

- User selectable 2, 3 or 4 aspects.
- Switchable feather with divergent route display.
- Relay driver (can operate ABC braking or track section power on danger signal).
- Configurable flashing with 3 aspect signal (*four aspects with three lamps*).
- Automatic detection of a diverging route with 4 or 3 aspect (*flashing, double flashing*) when feather set.
- Automatic occupancy sensing using either infra-red (analogue) or current sense (*DCC*) detectors.
- Adjustable timers to simulate successive blocks at end of scenic sections.
- Automatic communication between upstream and downstream signals and divergent path.
- Uses jumpers to set personality.
- Built in power distribution for upstream and downstream signals.
- Designed for 12 Volt LEDs.
- Available in common cathode (*common negative*) and common anode (*common positive*) versions.
- On board test lamps for easy setup and testing.
- Built in power supply for infra-red sensors.
- Powered from 12 V regulated power source.
- Personality is set per AutoSignal, you can mix two, three and four aspect signals as necessary.

MegaPoints Controllers use static sensitive components that must be handled with care.

Avoid touching any components or the circuit printed on the bottom of the board.

Avoid placing the board on any metallic surfaces including track.

DO NOT connect any part of the AutoSignal directly to track. You must use appropriate sensors or switches to provide electrical isolation.

First use

See the image below for connection details.



- Set the aspect select jumper to the desired position (default 4 aspect).
- Connect a 12 Volt regulated power supply to the power terminals. Each board requires up to 150 mA. If using multiple signal controllers a minimum 2 Amp power supply is recommended.
- Connect signal and feather LEDs to the appropriate terminals. Ensure your LEDs have suitable resistors installed for 12 Volt operation.
- Apply power and observe all LEDs illuminate for a quick self-test.
- Press the test button (on board) to trigger danger.

Timer operation

There are two basic states of operation, timer and normal.

The AutoSignal can be used with built in timers to simulate further blocks at the end of scenic sections and should be used by the last AutoSignal in a chain.

The LED near the aspect selection jumpers indicates state. If it is flashing then normal mode is selected. If it is on without a flash then timer mode is selected.

Timer mode should be used at the end of chains only, i.e. the last signal in a connected chain to simulate further blocks. Only one AutoSignal in a chain should be set to timer mode.

Take care when removing jumpers not to short out or bridge any other jumpers.

The timer is adjustable as follows:

- Move the aspect jumper to "4 FUNC"
- Apply power (state LED is now on, not flashing)
- Press and hold the "TEST" button until the required number of LEDs are lit (approx. one second per additional LED).
- Move aspect select jumper back to desired position.

The length of the timer will be indicated by the on board five signal LEDs and is equivalent to approximately 5 seconds per LED based on 4 aspects. There will be differences between the timings and number of aspects configured. Some experimentation may be required.

To clear timer mode repeat the above procedure. Instead of holding down the test button, press it momentarily ensuring none of the LEDs light. When removing the jumper from "4 FUNC" the LED near the aspect selection jumpers will return to flashing.

Hook-up Options

Not all connections are required, however additional features become available as the AutoSignal senses more of the layout. At a minimum the AutoSignal should be connected to a block sensor, either DCC current sensor or infra-red analogue sensor.



Servo extension leads are used to connect to the next and previous AutoSignals. These distribute power along a row of adjacent blocks as well as communications between AutoSignal units. Connecting the NEXT2 on the feather AutoSignal to the first diverging routes PREV connector will activate the diverting route logic when 4ASP is selected.

Block	Block purpose / option		
Block 1	Previous block		
Block 2	 Braking block. Connect an ABC unit via a relay to trigger automatic braking when danger is set. Use consistent lengths so all locos can be programmed to stop at the same distance from the signal. For analogue layouts the relay can be used to cut track power immediately before a signal. All braking blocks on the layout should be the same length. This allows you to control the length of braking on your loco 		
	decoder chip and have it stop the same distance in front of all signals.		
Block 3	The block detector sensor is connected to and monitoring the block immediately after the braking block. If occupied the AutoSignal will trigger danger and the braking circuit.		
Block 4	Subsequent AutoSignals communicate to the AutoSignal on their occupancy state. This triggers the various aspects as defined by your selection jumpers.		
Diverging route block	Connecting a point position sensor (<i>or micro switch</i>) triggers the feather (<i>if fitted</i>). This will also activate the diverging route signalling if AutoSignal is detected on "NEXT 2" connector.		

Sensors

Sensors are available separately depending on your installation and options required.

DCC Occupancy sensor

The block occupancy sensor is connected in series with one of the DCC feeder wires. It is used to trigger the red (danger) signal when a train

enters the monitored block.



Block Occupancy Sensor Hook-up in series with any single power feeder.



DCC Points Position sensor

Points position sensors detect the direction of turnouts and enable automatic switching of the

feather. The points Position sensor can be connected to your frog polarity switch or closure rails whichever is more convenient. The Feedback Module user guide has the following detailed hook-up diagrams for the points position indicator.





Hook-up via frog polarity switch allows easy installation into existing switching. DCC only.



Hook-up via closure rail does not require frog polarity switching. DCC only.

Infra-Red sensor

The infra-red sensor allows connection to an analogue layout. Connect to the sensor input using the cable provided. Not all features are available with an analogue hook-up.



Switches

In place of sensors switches can be used. For example a micro switch for turnout position or a danger override toggle switch. This will allow you to set danger on a signal and if coupled to the ABC braking system, automatically stop and hold a loco.

Diverging route hook-up

One additional connection is required. Connect the NEXT2 to the PREV with a single wire. When a green signal is detected on this input and the feather is set, the diverging route logic will be displayed automatically.



The diverging route is available in "4 ASP" and "3 ASP" modes and is automatically enabled when a separate chain of AutoSignals is connected via the "NEXT2" connector.

When the feather is active the signal at the diverging route will show an initial steady yellow as the train approaches the signal. After six seconds this will change to green if the next signal on the diverging route is green.

Signals before the feather indication will show a flashing yellow and flashing double yellow to indicate a diverging route is active.

The AutoSignal with the feather installed should have at least one subsequent AutoSignal downstream if the divergent feature is used.

Selectable modes and use cases

4 ASP

This mode uses four LEDs.



4 ASP with diverging route

This mode uses four LEDs and flashes the LEDs when the feather is active and the next signal in the diverging block is clear (*green*). Connect the NEXT2 cable to the PREV on the first diverging AutoSignal. The yellow signal on the feather will change to green after six seconds if the first diverging signal is green.



3 FUNC

This mode uses three LEDs to indicate four aspects. The LED flashes to indicate preliminary caution.



3 ASP

This mode uses three LEDs.



2 ASP

This mode uses two LEDs.



Occupancy detectors in blocks A & B set danger when occupied for respective AutoSignals.

Linking units

You have two options to connect units together. Either:

a) Use the three pin servo type connectors to connect to adjacent signal controllers (lead supplied). This connector will carry power to adjacent units. Servo extension cables may be used to provide a plug and socket wiring solution. Only connect power to one AutoSignal board. It will be automatically distributed to the other members of the chain. (*See next picture.*) Suggested maximum length of chain is 10 AutoSignals in each direction.

AutoSignal – Linking units

Power and signal cabling using an all in one plug in servo lead



b) Connect each unit to a power supply using the screw terminals and use a wire from the next and previous screw terminals (bottom of board next to feather terminals) to communicate with adjacent signal controllers. (*See next picture*.)



Do NOT connect power to the power terminals and use a three way servo cable. Combining a & b options above may lead to a short circuit.

Feather switch

The feather switch is shorted to its ground connector to activate. Use a toggle switch to manually set the feather.

Use a micro switch or turnout position indicator to provide automatic feather operation.



Danger switch / sensor

Danger may be set by a toggle switch manually or automatically via an optional DCC block detector or infra-red sensor (*analogue*). Danger is set when the SW terminal is shorted to ground.

When danger is released there is a 1 second delay.

Complimentary products

Use the following products to hook-up to your layout depending on your needs:

Product	Purpose	Part No
DCC Block Detector	Sense train occupancy on block	FB01-01
DCC Turnout Position Sensor	Determine points position on DCC layouts	FB03-03
Block Detector (Infra-red)	Sense train position (analogue layout)	FB-01-01-1
Relay for AutoSignal	Switchable relay triggered on danger. Use for stopping trains in front of signals.	ASR01-01
DCC ABC Controller	Activates the ABC (Automatic Brake Control) circuit on suitable equipped locos. Requires the above Relay (ASR01- 01) to operate.	ABC01-01

References

Divergent signalling

GERM8000 RSSB, flashing signalling.

https://www.rssb.co.uk/standardscatalogue

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If you have any product improvement suggestions we'd be very pleased to hear from you.

NOTE: We operate on a policy of continuous improvement. Colours, specifications and even the placement of components may vary from time to time.