

Boostec transmission controller

clutch to clutch automatic transmission control unit
pinout

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1 About this controller

The Boostec transmission controller is a dedicated transmission and body control unit, able to run modern clutch to clutch gearboxes as well as traditional on/off solenoid boxes. The hardware is shared with the Boostec petrol engine controller, and the box becomes a transmission controller when the transmission firmware is loaded from the firmware upgrade dialog in Calibrator.

Because the hardware is shared, some of the pins are labelled here the way the transmission firmware refers to them, which is not always the way the engine firmware names the same pin. Take the digital input numbering from this sheet.

Connectors A and B sit on the back of the case. Connector C is on the front face and only exists on units with serial number 100 and up.

Build time options matter on this controller. The ignition outputs can be supplied as low side or high side drivers, and high side drivers are what most Japanese transmissions need because their solenoids are grounded inside the valve body. Flyback diodes on the connector B outputs and magnetoresistive trigger boards for the speed sensors are also specified at order time.

2 Connectors

2.1 Pin numbering

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Connector A, 24 circuits

1	2	3	4	5	6
7	8	9	10	11	12

Connector B, 12 circuits

1	2	3	4
5	6	7	8

Connector C, 8 circuits

Figure 1: Circuit numbering of the three connectors, viewed looking into the face of the header on the controller. The mating half is numbered as a mirror image of this view. Confirm the position of circuit 1 against the marking on the connector body before crimping a harness.

2.2 Connector A

Pin	I/O	Function	Note
1	OUT	5 V sensor supply	200 mA max
2	IN	Analog 0	0–5 V, 100 k Ω pull down
3	IN	Analog 1	0–5 V, 51 k Ω pull up
4	OUT	Ground return for analog sensors	
5	IN	Analog 4	0–5 V, 51 k Ω pull up
6	IN	Analog 5	0–5 V, 51 k Ω pull up
7	IO	CAN 1 H	120 Ω termination
8	IO	CAN 1 L	120 Ω termination
9	OUT	Output 1	Low-side, 5 A max, 1 k Ω pull up to 12 V
10	OUT	Output 2	Low-side, 5 A max
11	IN	Power ground	
12	IN	Power ground	
13	IN	Digital in 4	Active low, 5.7 k Ω pull up to 5 V, 12 V safe
14	IN	Analog 2	0–5 V, 3 k Ω pull up. Fluid temperature
15	IN	Analog 3	0–5 V, 3 k Ω pull up. Second fluid temperature
16	OUT	Ground return for crank and cam sensors	
17	IN	Digital in 2	2.2 k Ω pull up, 12 V safe
18	IN	Digital in 1	2.2 k Ω pull up, 12 V safe
19	IN	Digital in 3	Active low, 5.7 k Ω pull up to 5 V, 12 V safe
20	OUT	Ground for signal shields	Can also serve as an extra power ground
21	OUT	Output 4	Low-side, 5 A max
22	OUT	Output 3	Low-side, 5 A max. Clamping diode to the supply pin
23	IN	Digital in 5	Active low, 5.7 k Ω pull up to 5 V, 12 V safe. Cannot read speed
24	IN	Switched +12 V supply	Fused internally

Digital input naming under the transmission firmware differs from the engine firmware, so take the numbering above from this table rather than from an engine controller sheet.

2.3 Connector B

Pin	I/O	Function	Note
1	OUT	Output 5	Low-side, 5 A max
2	OUT	Output 6	Low-side, 5 A max
3	OUT	Injector 1	Low-side, 5 A max
4	OUT	Injector 2	Low-side, 5 A max
5	OUT	Injector 3	Low-side, 5 A max
6	OUT	Injector 4	Low-side, 5 A max
7	OUT	Output 7 / Injector 5	Low-side, 5 A max
8	OUT	Output 8 / Injector 6	Low-side, 5 A max
9	OUT	Ignition 1	5 V logic, or low-side or high-side switch at 5 A, depending on build options
10	OUT	Ignition 2	As above
11	OUT	Ignition 3	As above
12	OUT	Ignition 4	As above

2.4 Connector C

Present only on units with serial number 100 and up.

Pin	I/O	Function	Note
1	OUT	Output 9	Low-side, 1 A max
2	OUT	Output 10	Low-side, 1 A max
3	IN	Ignition switch input	12 V in to bring up the main relay. Does not power the ECU by itself
4	OUT	Main relay control	Low-side, 1 A max
5	OUT	Output 11	Low-side, 1 A max
6	OUT	Output 12	Low-side, 1 A max
7	IO	CAN 2 H	No 120 Ω termination
8	IO	CAN 2 L	No 120 Ω termination

3 Wiring notes

3.1 Grounding

Run a pair of 1.5 mm² wires, or a single 6 mm² joined to smaller wires near the connector, back to the battery negative or another solid grounding point. A poor ground shows up as electrical noise and can fault the controller outright. On a factory harness, joining all of the original ECU's supply ground wires is usually enough.

3.2 Speed sensors

The digital inputs are schmitt trigger types with 2.2 k Ω pull ups and protection diodes, so open collector, hall effect, optical and variable reluctance sensors can land on them directly. Weak VR sensors and magnetoresistive two wire hall sensors need an amplifier board fitted inside the controller.

Digital input 5 cannot record a speed signal.

At a minimum the controller needs output shaft speed and engine speed. Input shaft speed is what unlocks closed loop clutch to clutch control, torque management and PWM lock up control, so fit the sensor if the gearbox has a place for one.

3.3 Transmission solenoids

PWM solenoids need a diode from the output to the 12 V supply. Output 3 has this built in, and so do the high side drivers that can be fitted to the ignition outputs.

On/off shift solenoids are configured as *Shift solenoid A* through *E*. PWM shift solenoids are configured as *PWM transmission shift solenoid 1* through *6*. Lock up is either *Lock up solenoid* for an on/off valve or *PWM torque converter lock up solenoid* for a proportioning one.

Before driving a new install, understand what every solenoid does and check the wiring twice. Measuring the resistance of each solenoid, and where possible scoping the currents during driving on the original controller, is time well spent when there is no good base map to start from.

3.4 Main relay

On a gearbox that cannot safely lose power while the car is moving, the ZF 8HP being the obvious example, the controller has to be powered through a relay driven by its own main relay control function, fed straight from the battery. Nothing else may be able to interrupt that feed,

so the relay bypasses any cut off switch or power distribution module. The controller then shuts itself down once the ignition is off, the engine has stopped and the output shaft has stopped turning.