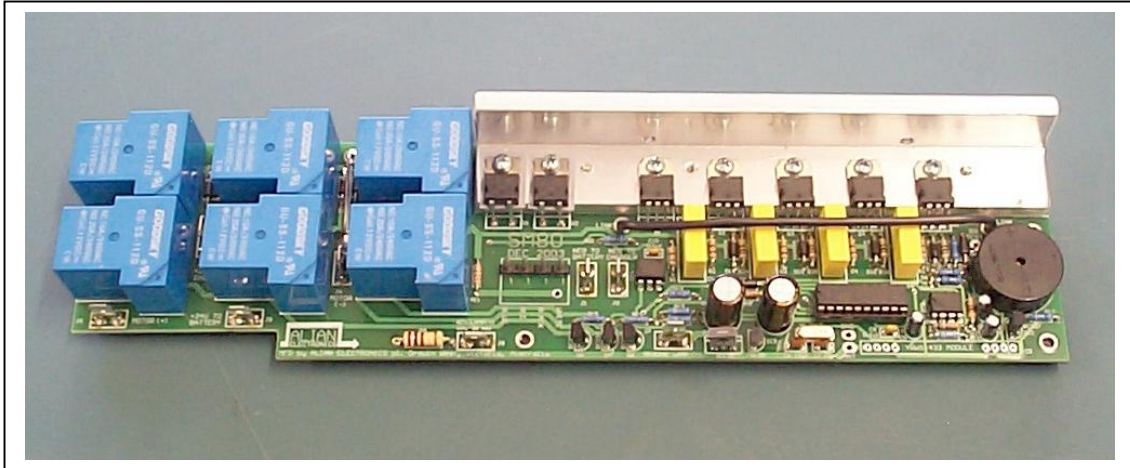




SM80 MOTOR CONTROLLER INFORMATION BRIEF

Release 2.1, NOVEMBER 2007

Manufactured in Australia by Alian Electronics Pty. Ltd.
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more information is available at www.alianelectronics.com.au



- **FULL 80 AMP OUTPUT AT 24V DC**
- **SUITS D.C.PERMANENT MAGNET MOTORS**
- **ROBUST MICROPROCESSOR CONTROLLED DESIGN**
- **DAMPED ACCELERATION CURVE – DIFERENT PROFILES AVAILABLE**
- **FULL DIRECTION CONTROL WITH SMOOTH FORWARD/REVERSE TRANSITIONS**
- **ADVANCED INTERNALLY PROTECTED FET DRIVE & SAFETY SHUTDOWN**
- **INTERNAL DATA LOGGER FOR HOURMETER & ALARM CONDITIONS**
- **SUPPORTS ON/OFF, FWD/REV & SPEED SELECTION WITH SIMPLE 2 WIRE CIRCUIT**
- **ADVANCED STALL PROTECTION**
- **AUTO STANDBY MODE FOR BATTERY CONSERVATION**
- **SUPPORTS REVERSE LAMP/ BEEPER**
- **UNIT WILL NOT DRIVE MOTORS IF THROTTLE IS STUCK 'ON' DURING POWER UP**

GENERAL DESCRIPTION

The SM80 Motor Controller has been designed for use with small 24V DC electric vehicles and buggies. The module can control the speed and direction of the vehicle with a control interface that's easy to install and use. An electronic beeper is present to provide feedback to the operator on self-test and general fault diagnosis.

PROTECTION CIRCUITRY

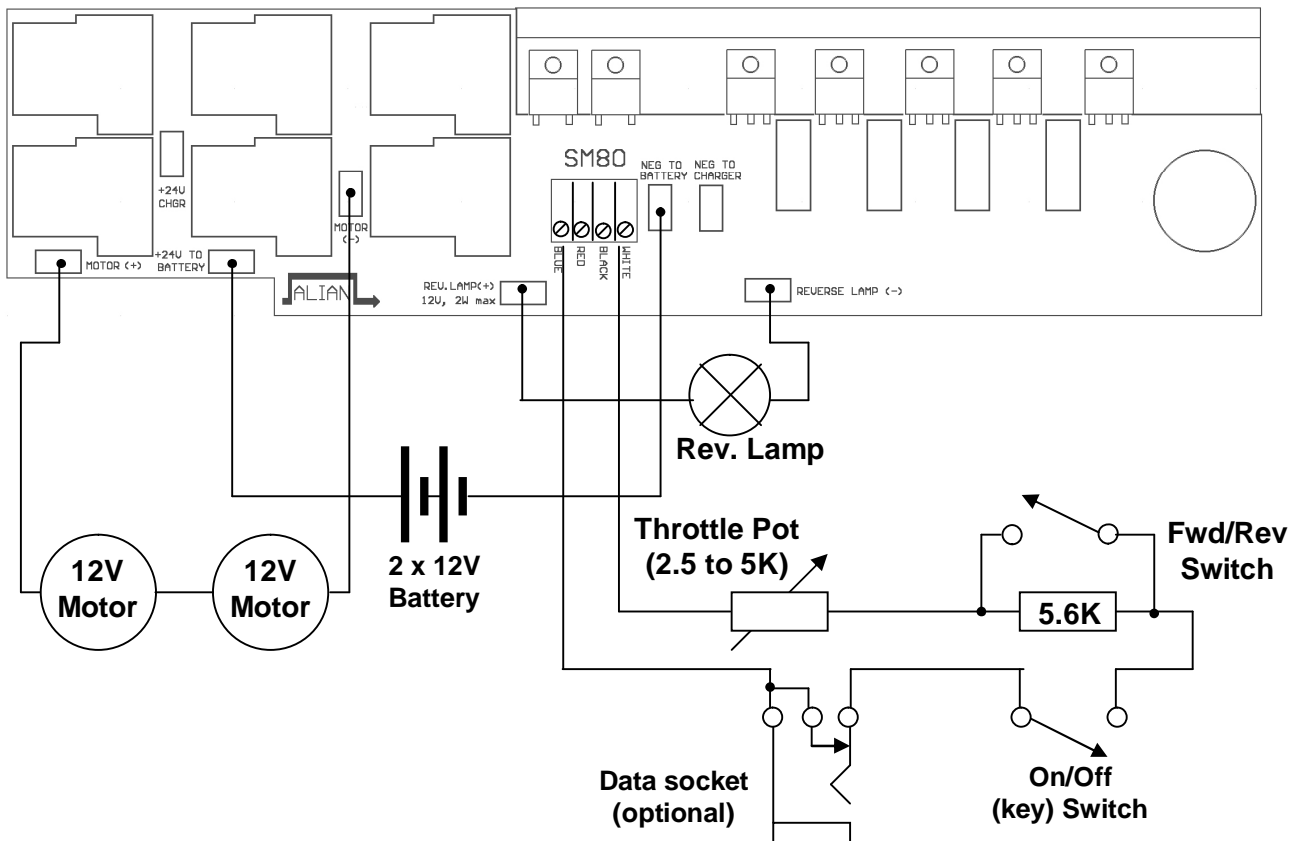
The power semiconductors used to drive the motors feature internal protection against over current and over temperature conditions. Special anti-stall software provides further protection against prolonged stalled motor events. Should a full locked-rotor stall occur for more than a few seconds, a rapid beep will warn the operator that a brief power reduction down to 20% drive will occur if they persist.

Additional safety software monitors the integrity of the power semiconductors when the throttle is at rest which will automatically isolate the motors should any drive fault conditions be detected.

DIRECTION CONTROL

Motor rotation activity is monitored by the microprocessor to prevent the user going into hard reverse while still moving or rolling forwards. This protects both the user from experiencing sudden changes in acceleration and the gearbox/transmission from mechanical stress damage. Should a direction change be selected by the user while still moving, the motor drive will stop and the vehicle will slow to a halt. Only when the vehicle is (briefly) stationary will acceleration in the opposite direction be enabled. This ensures that current surges are minimised and the operating life of the vehicle and its electronics are greatly extended. The SM80 has a separate output that can be used to operate visual indicator, a reversing beeper or a reversing light for rear illumination.

TYPICAL WIRING CONFIGURATION FOR THE SM80



BEEPER WARNINGS:

- . . . F12 = MOTOR FAULT DETECTED
- F14 = DRIVE TRANSISTOR FAULT
- RAPID BEEP = STALLED MOTOR

TWO-WIRE THROTTLE CIRCUIT

As may be observed from the above diagram, the **Throttle Potentiometer**, the **Fwd/Rev switch**, the **On/Off switch** and the optional **data download socket** are all part of a common wiring loop. This greatly minimises the connections between the controller module and the user interface or tiller. Where a 'centre-off' throttle potentiometer is used for **forward-off-reverse** control profile, the direction switch and resistor are omitted.

AUTO-STANDBY MODE

A throttle activity timer will release power and direction relays after approximately four minutes of inactivity. This will reduce standby consumption to around nine milliamps, which is a level so low as to be close to the self-discharge rate of the battery. If the throttle is moved during the standby mode, the controller will immediately 'wake up', respond to the new throttle setting and accelerate normally.

OPTIONS AVAILABLE FOR THE SM80

Customised acceleration profiles. Where a potentiometer has been fitted to a vehicle with a known 'resistance' between zero and maximum throttle, a special profile can be ordered to match the physical scope of the throttle. This can be with a fixed zero-to-maximum throttle with an additional Forward/Reverse switch, or a 'centre off' throttle where rotating forward moves the vehicle forward and rotating backwards, reverses the direction. A special 'customised acceleration profile' form is available upon request.

Statistical information stored includes:

- Hours of operation (accumulated since date of manufacture).
- The number of hard motor stall events. (where prolonged stalls have been instigated by the user)
- The number of shutdowns events recorded as a result of power FET faults or anomalies.