

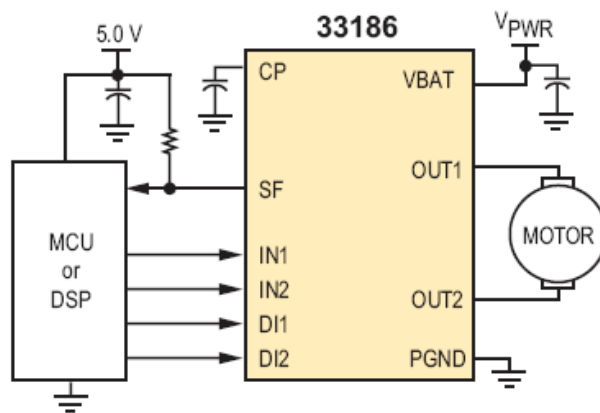
Simple, Full Featured H-Bridge Driver

The Freescale MC33186 chip provides a full H-Bridge motor driver on a single chip. It has two control lines that can be used to control direction and speed. Other (optional) lines provide output enable and fault detection.

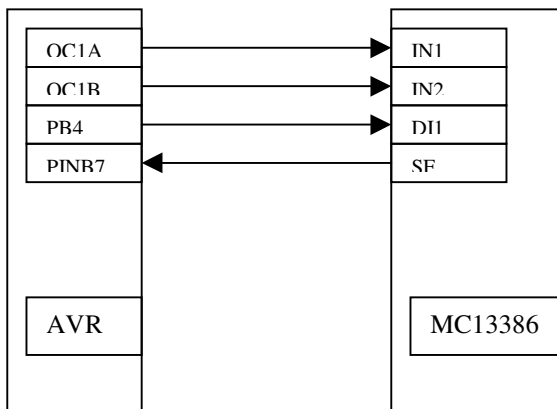
By connecting these two lines directly to two counter/PWM outputs on an AVR, a ridiculously simple but full featured PWM motor controller can be built.

By connecting two MC33186 chips and using four PWM outputs (as on the Mega128), two motors can be driven, i.e., as required for a two wheeled mobile robot.

I have developed and seen other motor controllers, of which none provide the simplicity or low cost of this solution. The MC33186 requires only two external capacitors and resistor to operate. There is no need for interface glue, charge pumps, higher voltages, or external MOSFETs as required of other circuits. The MC33186 can operate with and drive 5v motors.



Connect the MC33186 to an ATmega128 like this:



In order to connect two motors, repeat the above, but connect it to OC3A, OC3B, PE3, and PINE5. (PB4, PINB7, PE3 and PINE5 can be substituted for any other available IO port.)

You can even remove all but the IN1 and IN2 if you want slightly less control and no feedback.

Software Control

The code attached contains a library that can be used to control two motors, an example how to use the library and method to control the motors without using PWM.

In order to drive the motor one direction, one of the MC33186 IN pins is set high while the other is set low. Reversing the states causes the motor to drive the opposite direction. (see MC33186 spec.) By connecting the high IN pin to a PWM source the motor is driven in that direction but with added PWM speed control.

The attached PWM driving software works by having each motor direction driven from an AVR PWM output. When one of the PWM outputs is driving one of the IN inputs, the other PWM output is off (hence low). This results in a really simple and neat driver software (if I say so myself.)