

LEGO Motor Control

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Intro to Motor

- Lego Power Function Serie

DC motor: power function large motor



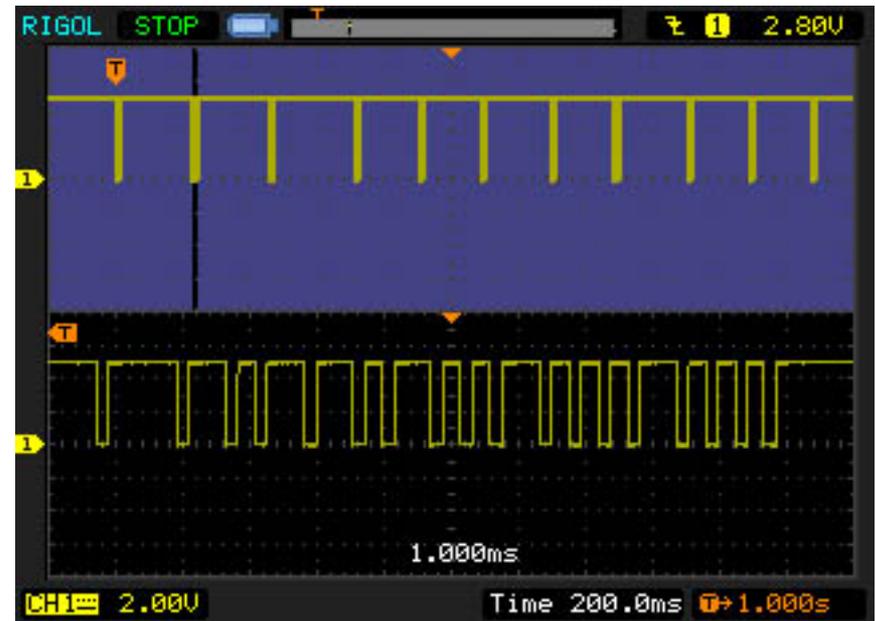
Servo motor



Detailed specification refer to : <http://www.philohome.com/motors/motorcomp.htm>

PWM generation

- Pulse width modulation(PWM): duty cycle: 0%-100%
- a custom IP: pwm_gen.vhd
- Software driver
- void motor_setting (unsigned long phase1,
unsigned long duty1,
unsigned long phase2,
unsigned long duty2,
unsigned long period,
unsigned long enable);



Details about motor_setting()

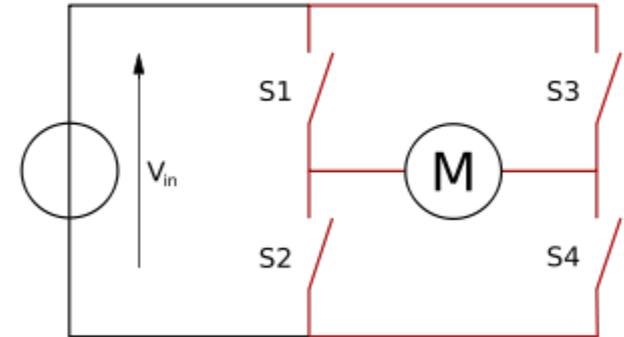
- * input parameters:
- * phase: range from 0 to value of period
- * duty cycle: set to number=period*percentage of duty cycle
- * period: according to the freq of cpu,
 - * normally the period should be set to the value
 - * that makes the freq of pwm waveform to be 10 k
 - * e.x for 50MHz, value should be 5000(0x1388)
- * enable: '0' represents off, '1' is on, lease significant bit is for channel 1
- * e.x for channel 1 on and channel 2 off, enable=0x1

Frequency should not be too small, otherwise motor would not function, around 10 kHz would be suitable for most motors

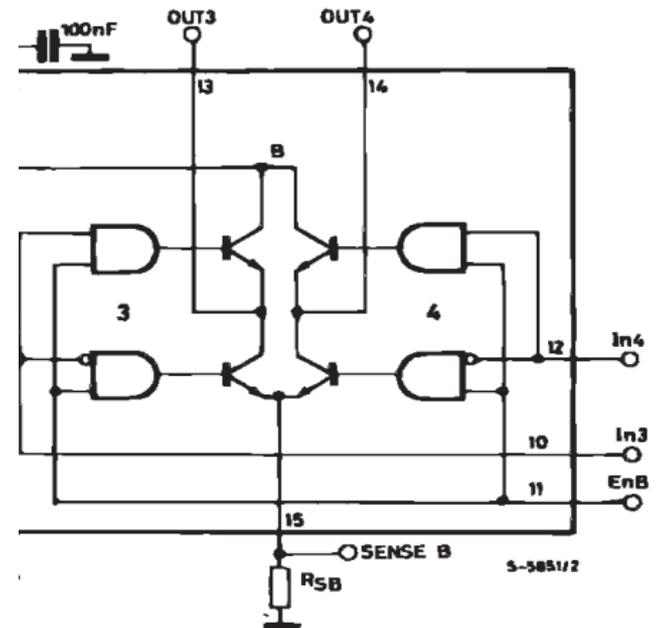
LEGO power function servo motor is different

Motor control circuit

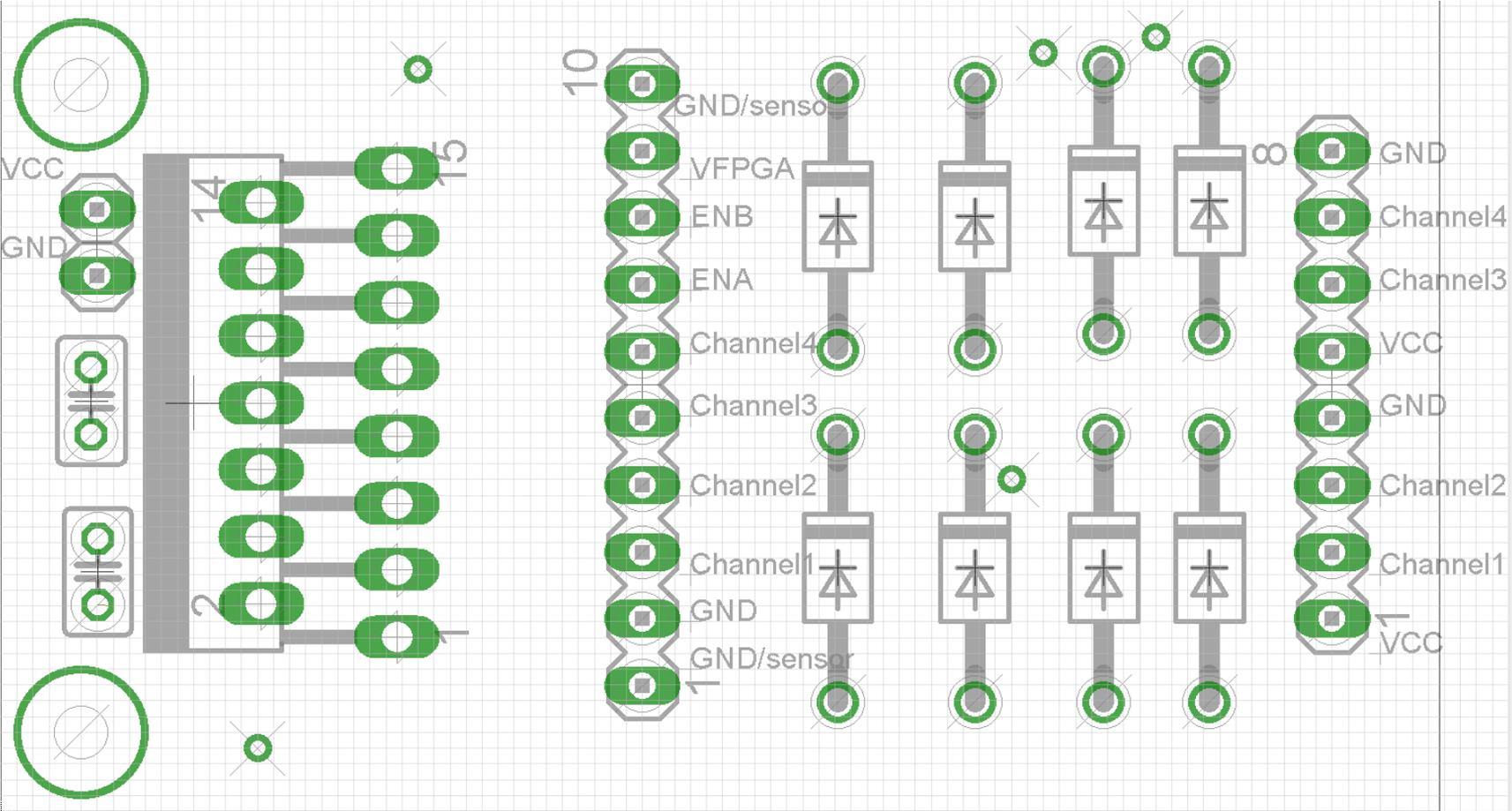
H bridge: a circuit which enables voltage to be applied in either direction



L298N: motor driving IC, $I_{max}=4A$, $V_{max}=46V$



Pin connections of motor driving board



Questions?

Thank you!