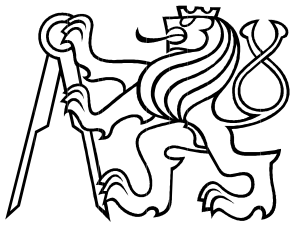
ARTIST2

Real-Time Motor Controller



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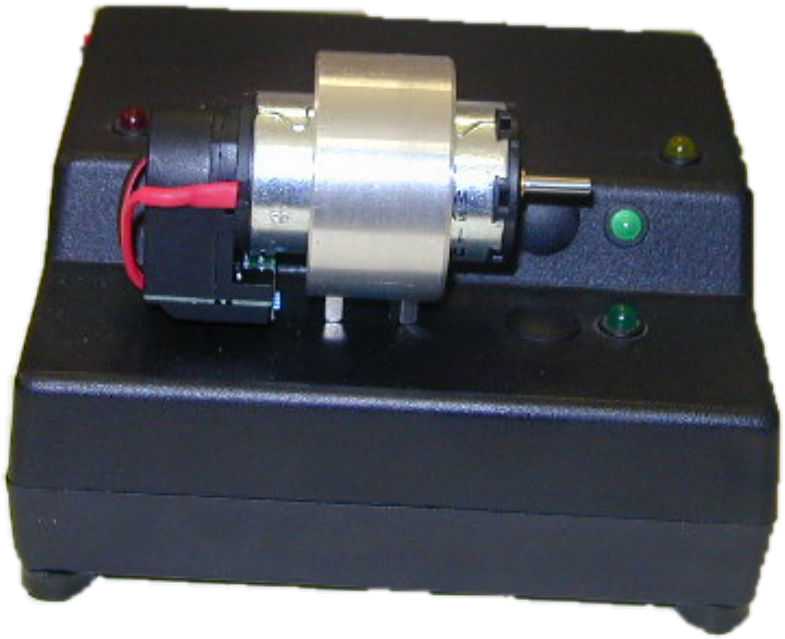
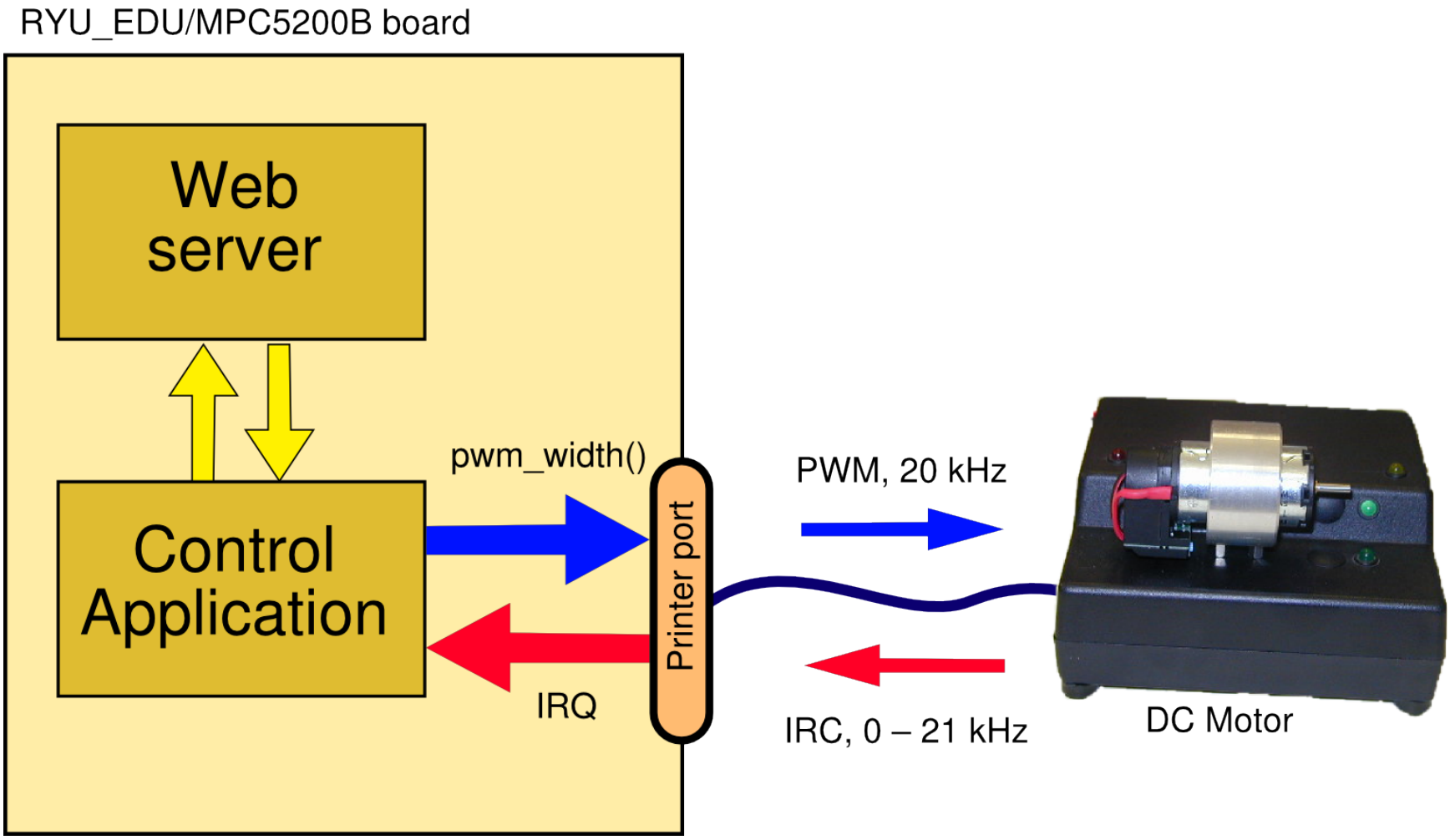
DC Motor Controller in Linux

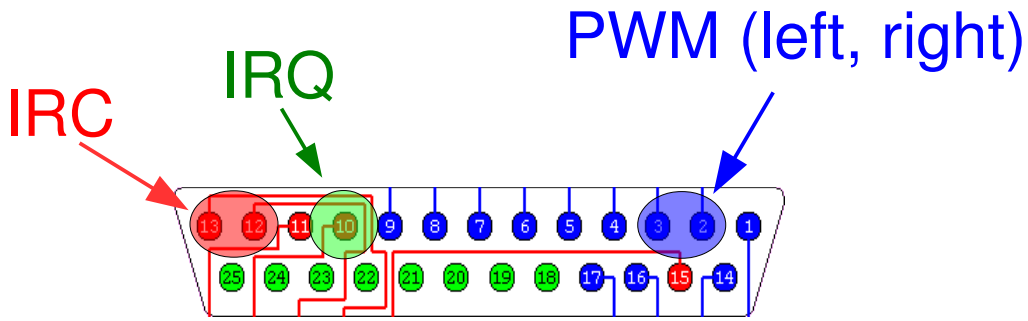
–The goal is to create a controller in ANSI C language, which controls the angular velocity of the motor.



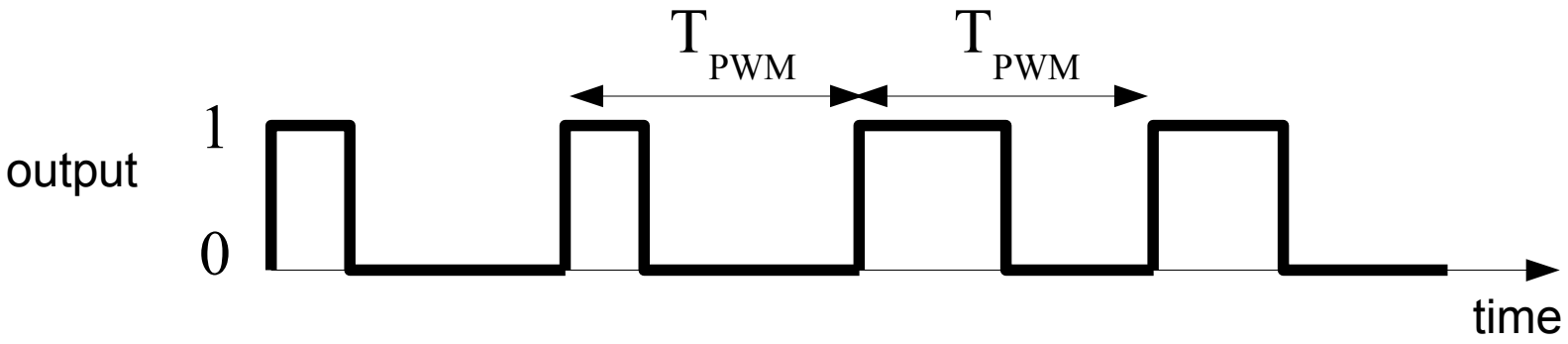
Description of the Model



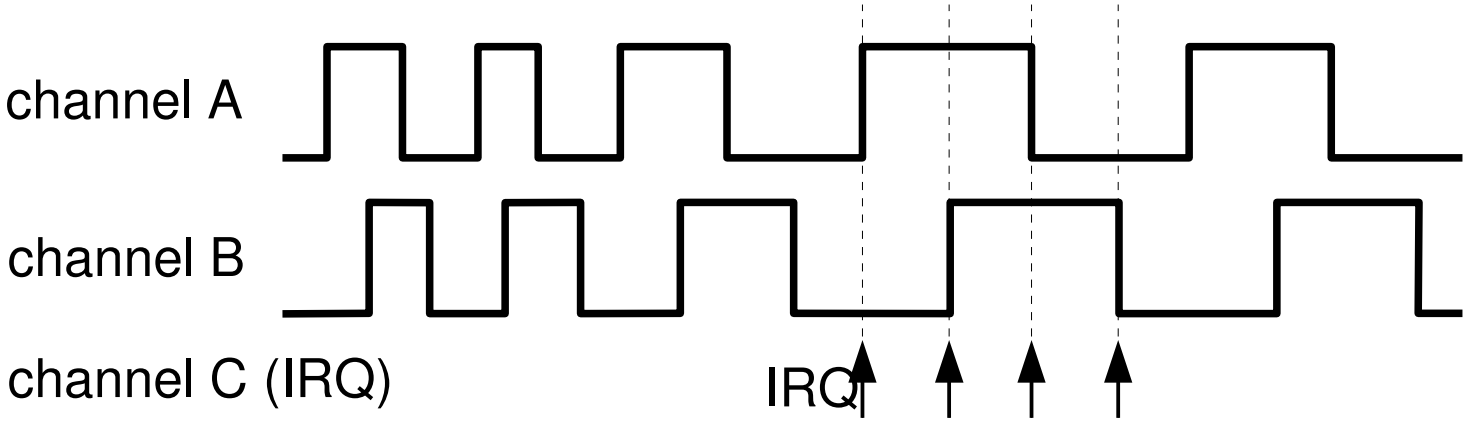
Connector pinout



Pulse Width Modulation (PWM)

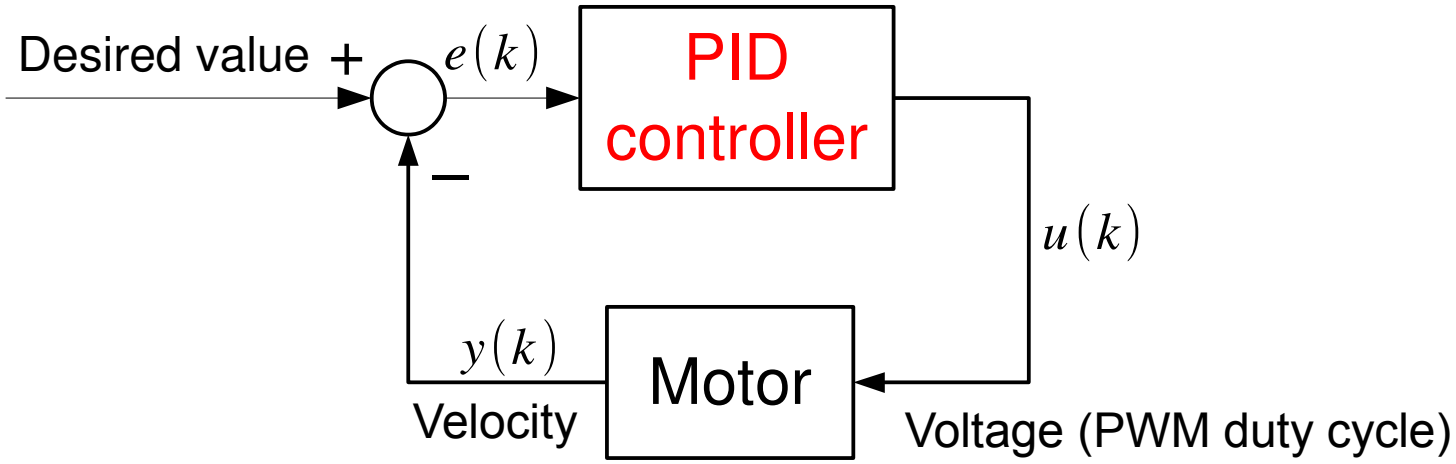


Signals From an IRC sensor



- Whenever the value of any IRC sensor channel changes, electronics in the motor generates the IRQ.
- The motor is equipped by IRC with 100 pulses per turn and there are 4 IRQs per one step. So there are 400 IRQs per turn.

PID Controller



- Control error:
  - `e = motor->reference - motor->velocity;`
- P controller:
  - `action = P * e;`
- PID controller:
  - $u(k) = P \cdot e(k) + I \cdot \sum_{i=0}^{k-1} e(i) + D \cdot (e(k) - e(k-1))$