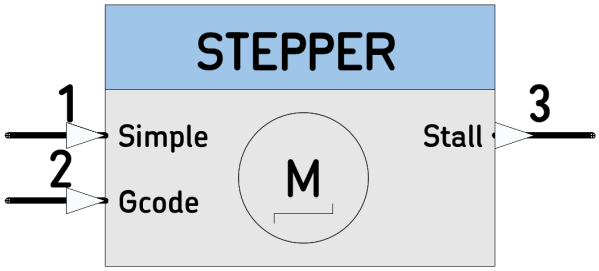
STEPPER

Node for simple Stepping Motor Control. Will work with: SilentStepstick, StepStick, or a any Step/Dir driven Step Motor driver



- Category:Motor
- HAL: mbed
- Tested: with LPC1768 and TMC2130 Silentstepstick
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Implementation Details

`EndSwitch` Input stops the movement automatically and captures/outputs the `endSwitchPosition` as a number of executed steps.
If TMC2130 driver is used, then Stall Detection and `StallPosition` reporting is supported by connecting TMC2130 DIAG1 pin to `EndSwitch` Input.

L298 compatibility

For simple use-cases, the L298 commands are implemented as in the Input section below for input1 (Schematic pin 1).

Gcode commands

For more complex use-cases, Gcodes G0 and G1 are implemeted for input 2 (Schematic pin 2).

Stall Detection

By configuring registers `TCOOLTHRS` and `GCONF`, the TMC2130 DIAG1 pin is set to signal the Stall condition. The microprocessor pin connected to TMC2130 STALL pin is configured to create an interrupt.
A Timer is set to the desired stepping frequency. A Timer ISR is attached to the Timer. The Timer_ISR pulses the STEP-Pin and increments a SteppingCounter. The DIAG1 Interrupt ISR Stops the Timer (this stops the movement) and Captures the SteppingCounter value to a StallPosition parameter.
The next endFrame, outputs the StallPosition to the Node output creating a stall event.

Accessing TMC2130 Registers

Registers are accesed with 40bit SPI transactions, sending a 40 bit command and getting back 40 bit status.

Inputs

```
  * (Schematic pin 1) integer: Value
     * 0 or 0x30 STOP
     * 1 or 0x31 RIGHT  STATE MACHINE: ACTIVATED ONLY IF IN STOP
     * 2 or 0x32 LEFT   STATE MACHINE: ACTIVATED ONLY IF MOVING RIGHT
     * 3 or 0x33 BRAKE
* (Schematic pin 2) * string: Gcode string
```

Output

```
*  (Schematic pin 2)
   * int: `StallPossition` or `EndSwitchPosition`
```

Parameters:

```
*  PinName:  pinMOSI
*  PinName:  pinMISO
*  PinName:  pinSCK
*  PinName:  pinSS
*  PinName:  pinSTEP
*  PinName:  pinDIR
*  PinName:  pinENABLE
*  PinName:  pinEndStop Connect to a microswitch or TMC2130 DIAG1 pin
*  uint32_t: speedDefault
*  char8_t:  Axis the Node executes Gcode for (X,Y,Z,E,A,B,C,D)
*  bool:     MC2130
```

Example:

```
[Ticker]-->[Counter]-->(1)[SilentSTEPPER]
```