

Doc No.: AN-227

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Subject: P201 Pulse + Direction output

APPLICATION NOTE

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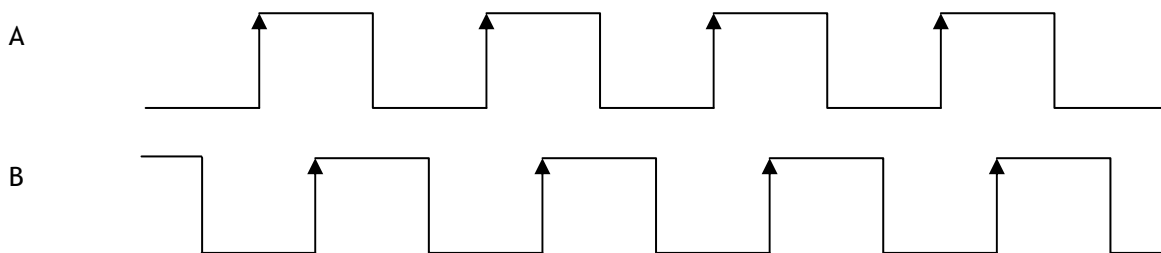
1. Introduction

The P201 Enhanced Servo Daughter Board has the capability to output simulated quadrature encoder pulses and step+direction pulses as well as the usual encoder input function. The pulse generation scheme is the same one used in the MC206X and Euro205X which is designed to match the more advanced stepper drives with microstepping capability. The step+direction mode can be used for driving servo drive / servo motor axes which use the pulse input mode to determine speed and position. This document describes the typical pulse output seen from the P201.

2. Quadrature Encoder Output

```
ATYPE = 14  
VERIFY = 1
```

With these settings, the P201 outputs a simulated encoder A and B channel signal, where each edge is counted as one "step" of the encoder signal.



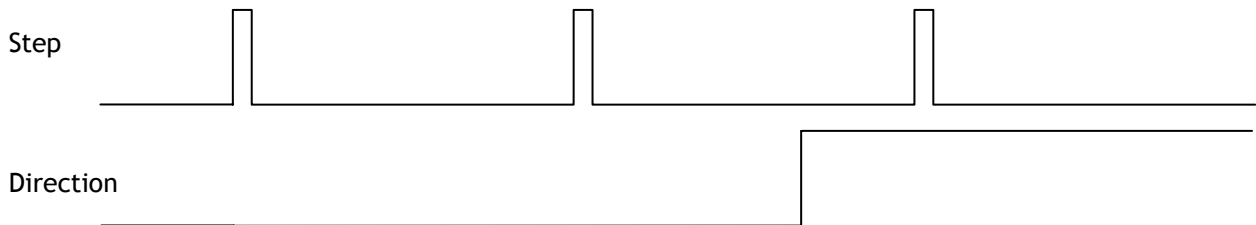
The A channel is output on pins 1 and 2. The B channel is output on pins 3 and 4.

3. Pulse + Direction Output

ATYPE = 14
 VERIFY = 0

In this mode, the encoder port becomes a step pulse generator. Pins 1 and 2 output the step pulses and pins 3 and 4 output the direction signal.

The step output of the P201 is a string of short pulses that have a varying mark-space ratio, unlike the quadrature output which is always a 50% duty cycle waveform. The step pulses always return to zero.



The output pulse width is much shorter at higher speeds. Pulse width changes when the speed reaches certain frequency thresholds and the following table gives the values.

Step Rate Band	Output Pulse Width (nominal*)
0 kHz to 31 kHz	8.0 μ s to 16.0 μ s
32 kHz to 62 kHz	4.0 μ s to 8.0 μ s
63 kHz to 499 kHz	0.7 μ s
500 kHz to 999 kHz	0.4 μ s
1 MHz to 2 MHz	0.1 μ s to 0.15 μ s

TABLE 1: P201 step output pulse width

* Note: Pulse width jitter occurs and the value will be in the range given.

4. Notes

The pulse generator circuit includes a divider which smooths the pulse output. Pulse frequency is therefore 1/16th of the given SPEED value in the software.