



Positional Registration

A tutorial covering the use of Positional Registration on Motion enabled E-Nodes.

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Companion Documentation

Full technical detail on the Motion Commands and Registration can be found in the documents, 'Control-C Language xpxx.pdf' and 'E-Nodes Technical.pdf'.

What is Registration?

Registration is performed on motion enabled nodes. It is the process of capturing an encoder position and then using that position to register or adjust a new or current motion command. 'AXIS' nodes support registration position capture on input 0. Either a rising or falling edge can be selected to initiate the capture which is performed very quickly when the edge is detected. Typically a sensor will be connected to input 0 that signals when registration capture is required. This sensor may be observing a print mark on a moving web of paper with the captured position used to synchronise a move with that of the moving web.

The Registration Signal and Unwanted Triggers

Because registration needs to be acted upon very quickly input 0 is sensitive to fast moving edges. The input is optically isolated which helps prevent electrical noise from triggering a capture. In addition two other features are provided to help prevent unwanted triggers.

Registration Window

To prevent unwanted triggers a registration window facility is provided. The pre-defined variables 'cap_window_hi' and 'cap_window_lo' can contain values representing the most +ve and most -ve encoder values. If the capture interrupt occurs when the encoder position is within these bounds the position will be captured and reported. If outside these bounds the interrupt will be ignored.

► *If cap_window_hi and cap_window_lo are both set to 0 the registration window facility is disabled.*

Input[0] interrupt filtering

Encoder capture interrupts generated by input[0] are vary fast acting. This interrupt is processed separately from the normal interrupts and is not influenced by the digital filtering facility. However to help prevent noise and false triggers occurring a blanking facility is provided. The pre-defined variable 'input0_blank' holds a value for the number of digital I/O loop periods that input[0] must remain stable for before an edge transition will be reported. Please refer to 'input0_blank' in the document 'Control-C Language xpxx.pdf' for full details.

Registration Steps

Only a few simple steps are required to set up and capture a position.

Step 1. Select Encoder capture polarity

To select either rising or falling edge polarity for the encoder capture use the 'status[]' command as follows:-

```
status[CAP_POL] = RISING; // encoder capture edge polarity = rising
status[CAP_POL] = FALLING; // encoder capture edge polarity = falling
```

Step 2. Select the input0_blank period

```
input0_blank = 6; // a 3 millisecond blank period
```

► *If input0_blank is set to zero blanking is disabled.*

Step 3. Set up a registration window

```
cap_window_hi = 20000;  
cap_window_lo = 19000;
```

► If both 'cap_window_hi' and 'cap_window_lo' are set to zero the registration window is disabled

Step 4. Enable Encoder Capture

The encoder position capture function is entirely independent of the other interrupt functions on the E-Nodes. To enable a capture use the 'status[]' command as follows.

```
status[CAPTURED] = 0; // clear captured flag and enable a new capture
```

This clears the captured flag and enables another capture to take place. When a new capture is performed the captured value is placed in the pre-defined variable 'cappos' and the captured flag is set to 1. No further captures will take place until the captured flag is set to 0.

Step 5. Read the Captured Position

To determine if a capture has taken place test the captured flag as follows:-

```
if(status[CAPTURED])  
{  
    demand = cappos + 2000; // update the demand position  
};  
  
// or use this  
  
while(!status[CAPTURED]){}; // wait until captured == 1  
// then do this
```

Repeat steps 4 and 5 to repeat the capture process.

Using the Captured Position

When a position has been captured and reported in the pre-defined variable 'cappos' it can be used to update or correct or target a new position in a new or running motion command. There is an example detailed in the document 'E-Node System Set Up.pdf'. Please refer to the 'applications' section of the web site for more examples.

Questions

If you have any questions regarding either this tutorial or any other aspect of using the E-Node range please contact the staff at Etrol Ltd.

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