

# Rotary Encoders Demystified

Rotary encoders translate rotational movement into pulse events for radio frequency selectors and EFIS controls such as Heading and Altitude selection. The most common variety for home cockpit hardware is the CTS288, but what exactly does this mean. Here is an explanation which should help you decipher the many codes for these little beauties.

I found this trawling the Avsim forums and it's from long standing member Tuomas in response to a question from another contributor:

## **8565, RE: Dual and Triple Rotary Encoders**

Posted by tigert, Thu Jan-01-70 07:00 AM

>I have 3 questions:

>

>First: "6 cycles 24 detents" Does this mean you can cycle only  
>6 times 360° in one direction?

At least with iocards one bit change causes one event. The "cycle" is one "full cycle" of the encoder \*waveform\*, ie: 00->01->11->10 is one cycle, which after it repeats the signal pattern - and "1/4 cycle per detent" means each of those 4 steps has a "click". So 4 clicks to go through the full waveform. 6 x 4 cycles = 24 clicks = 24 events. So it works like you hope it does - one detent causes one event, even though the "pattern" is repeated only 6 times in a full circle of the knob. But the electronics usually work in the "24 events" -level.

>Second: What means detents? For example: if I use the switch  
>to adjust a heading bug which is moving one degree per click,  
>do I need to cycle the rotary 2,5 times 360° to move the  
>heading bug 10°

A detent is the "click". So yes, turning the knob a full circle gives you 24 events. But at least FSBUS and IOCards have a "acceleration" feature in the software that you can make to "kick in" when you rotate faster, thus making it more useful for things like heading or altitude preselect which you need to move quite big values, but still need rather fine grained precision once you get close to the desired value.

//Tuomas

Here is the full thread: [http://forums.avsim.net/dcboard.php?...topic\\_id=18538](http://forums.avsim.net/dcboard.php?...topic_id=18538)

These encoders can be purchased online from [Opencockpits shop](#) complete with switch for around €3 each plus postage.