

Woodworking in the Digital Domain

Digital

If you have been hanging around on any woodworking forums for any length of time you have probably heard certain woodworking accessories described as being “digital”. The term “digital” or “digital domain” is most often associated with the world of electronics and related fields, not woodworking. While some woodworking machines may have electronic components or even digital readouts, that does not necessarily mean they operate with the domain of the digital world.

My intent with this article is to explain what the term “digital” means in this case. For the purposes of this article I will define a characteristic of the digital domain (as it applies to woodworking) as the following:

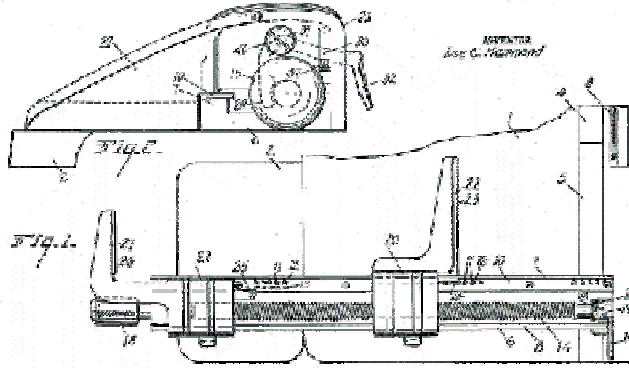
The ability to accurately and repeatedly set some machine feature (eg: rip fence) in increments of fixed units relative to a reference (eg: saw blade).

Example

Now lets consider two examples. In the first instance imagine a standard issue Biesemeyer rip fence with a digital readout system attached to it. Even though the readout is operating in the digital domain, the rip fence as a system is not. Even though the readout will very accurately tell the operator the position of the fence, the fence still can be positioned anywhere, there are no constraints.

Now lets look at a true digital system. Consider one of the tablesaw rip fence systems based upon a Precision Positioning Machine (PPM). The Inkra TS3 rip fence for example uses a PPM to position the rip fence relative to the saw blade. When the fence is moved it can only be locked down on whole units (1/32”). If a 3” setting is desired and the fence is slightly off this mark, when the lock is engaging, it will move the fence to the closest 1/32” increment. If the unlocked fence position is closer to 3” than it is to 2 31/32” or 3 1/32” then it will be set to the 3” position. This IS the digital aspect of the system; the position is forced into a whole 1/32” increment position.

The most obvious benefit of a digital feature such as the rip fence described above is that the operator only has to position the fence close to the mark and it will be automatically set into a known whole increment. One could think of it as auto correcting fence setting in this case; you get it close and it does the rest.



Note:

PPM's allow the position to be micro adjusted in increments even smaller than 1/32", even this is controlled by a digital system though.

Club Digital

PPM's and their related devices earn membership to the digital domain through a very simple but effective method. Ultimately it boils down to creating a very accurate positioning mechanism. The method used is basically a frame member with an embedded 32 pitch thread; this is clamped with a mating half-nut in some form of chassis. Since a 32 pitch pattern (or thread) can be made very accurately and uniformly, capturing it with a mating piece produces a positioning system that is as accurate as the thread.

Too Accurate?

In regards to accuracy, the makers of digital accessories claim an accuracy of plus or minus a couple thousandths of an inch. I've measured these systems and they are easily within that level of accuracy, for all intents, they are spot-on in this regard 99.9% of the time. Some may say that this level of accuracy is overkill for woodworking; after all, wood itself can change dimension more than this just due to changes in the environment.

While it is true that wood undergoes dimensional changes, the point really is that you have the ABILITY to position the fence accurately, with accuracy comes repeatability. These two aspects enable several benefits. The digital nature of the system makes the feature easy to operate.

Benefits

Accuracy:

Just because a device is digital does not mean it is accurate. I'm probably stating the obvious now, the PPM's are inherently accurate and this accuracy is a benefit in and of itself. For comparison, take for example a standard Biesemeyer rip fence. It's accuracy is determined mainly by the tape measure it uses and the users ability to read and move the fence into the desired position. Most tape measures are fairly accurate under 16" but after that they can be off significantly. These inaccuracies can lead to tapes that are easily 1/16" or more off at a specific

reading. The more distant the measurement, the more likely it is to be off from true. In the shop this can translate to some visible errors - errors which may be incorrectly attributed to the operator instead of the tool. If you have ever wondered how you have made parts for a project that were a little more or less in size than their intended measurement, this could very well be the reason.

Because of the precision and uniformity of the 32 pitch thread they use, the PPM's are very accurate across the entire range of their movement. This means that they are as accurate at 32" as they are at 2".

Repeatability:

Again using the Biesemeyer rip fence comparison; it's repeatability is based upon the users ability to move the fence into the desired position relative to a mark on the tape measure as well as some mechanical aspects that come into play when trying to nudge it into the exact location. Repeatability boils down to the skill or care of the operator.

A digital system with high accuracy is what produces repeatability. This allows the user to move the fence from one position to another then return to the previous position and very easily at any time. If the 12" mark is the desired setpoint, the user skews the fence into position close to the mark and engages the clamp. The fence will be locked down right on 12" exactly every time.

Summary

While digital devices are not always the best solution for a given situation, they do allow a new dimension of control to be more easily achieved. Consider that while woodworking could and has been done without the use of any power tools, we use them extensively now because of how easily they allow us to produce quality work. The same is really true of these digital devices, they are an extension of a theme.

The digital accessories available to woodworkers are very accurate, repeatable, and easy to operate. In woodworking, these digital systems are most often employed on saws and router tables. Consider how many woodworking project components are produced at these two workstations. With that in mind, it would not be difficult to see the positive impact an accurate digital system can bring to the shop.

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