

Setting Up an X Box Controller to be Compatible with Centroid Acorn, Version 3.3

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The X Box Controller (XBC) has been around since 2001. It is a very solid design, rugged, excellent human/machine interface, and low cost (\$15 at Wal-Mart).

By adding a bit of software, you can set up the XBC to generate any keystroke you want on any button or joy stick position you want.



My system already has a touch screen monitor, full keyboard, and mouse. Yet when I need to move away from these controls in order to be closer to the cutting or an indicator, it is great to still have control right in my hands.

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I bought the software from reWASD (<https://www.rewasd.com>) for \$6. It lets me map any single keystroke to an action on the XBC.



For example, I have chosen to control my X axis with the upper left joy stick. Moving it to the right moves the cutter with respect to the table in a positive direction. Moving the stick to the left moves the cutter in the opposite direction. I soon realized that I also needed to be able to hold down the ALT or Cntrl keys while pushing another button. This can be done with by assigning one key to ALT, one to Cntrl, and the third to the needed letter. I would then hold down two buttons at the same time just like on a keyboard.

Then a new release of the ReWASD software came out. I spent \$8 to get the "Combo" feature which adds to my basic software. Combo lets me fire off up to four keys at the same time with a single button or action on the XBC.



Combo is handy for things like turning the jog keyboard on (ALT + J) and Cycle Start (ALT + S).

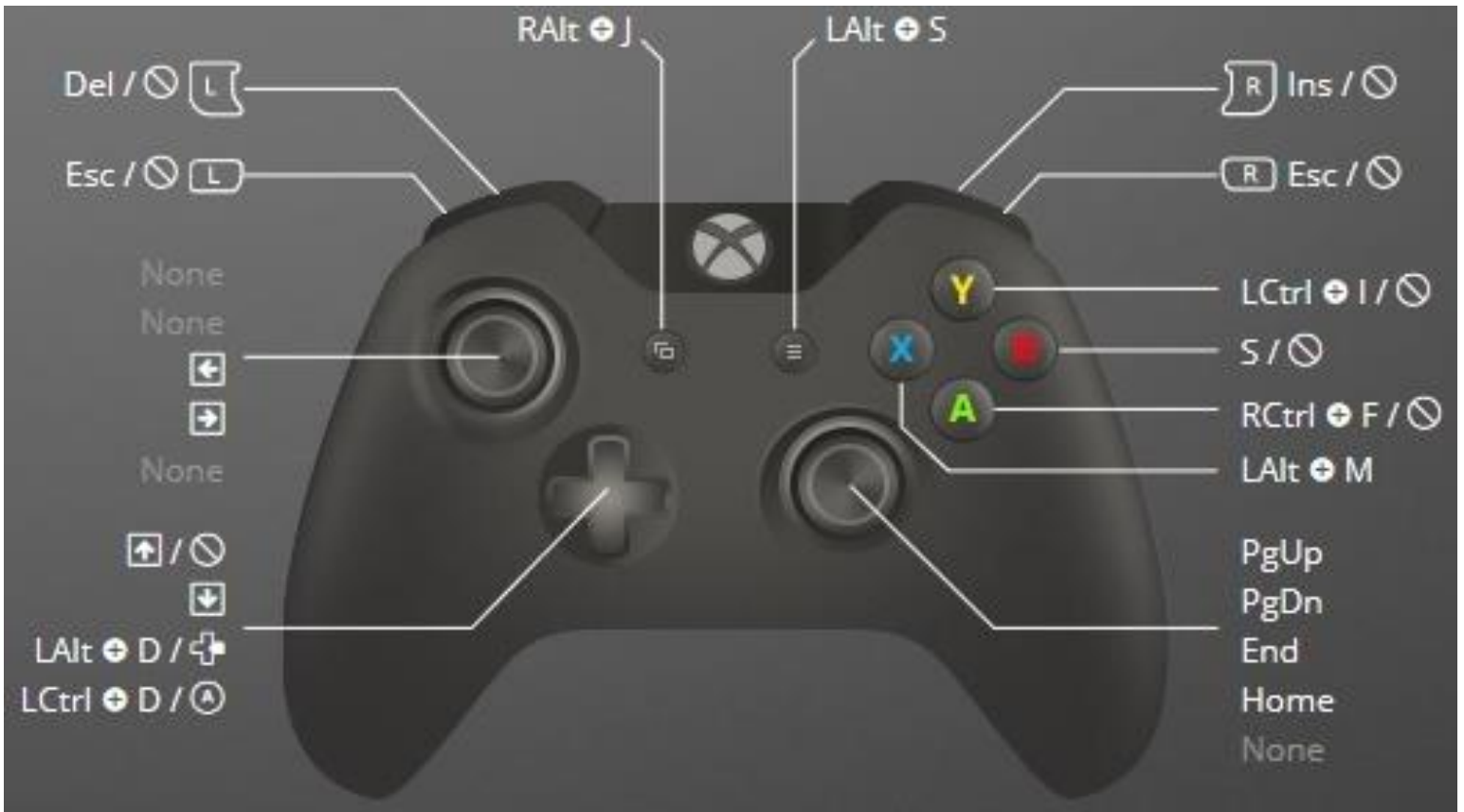
See https://www.youtube.com/watch?v=y_-tPoq_2tU&t=69s for a demonstration. I didn't have Combo installed in this video.

Here are the key assignments I chose.

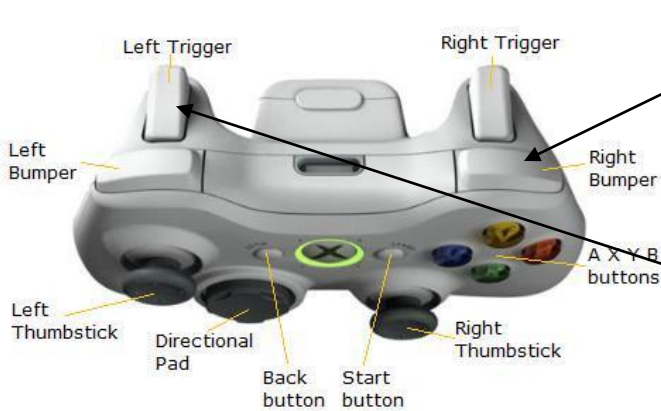
Keyboard	X Box Controller			
Function	Key(s)	input	position	notes
enable XBC	ALT + J	button	left	
Cycle Start	ALT + S	button	right	
Cycle Cancel	Esc	bumper	Left	
Cycle Cancel	Esc	bumper	right	
		button	B	
Incr/Cont jog	CTRL + I	button	Y	
slow/fast	CTRL + F	button	A	
MDI	ALT + M	button	X	
dec. jog step	Delete	trigger	left	
incr. jog step	Incert	trigger	right	
X-	left arrow	left stick	push left	do not populate up or down
X+	right arrow	left stick	push right	do not populate up or down
Y+	up arrow	cross pad	top pushed	
Y-	down arrow	cross pad	bottom pushed	
WCS/mach pos.	ALT + D	cross pad	left pushed	
position/dist	CTRL + D	cross pad	right pushed	
Z+	Page Up	right stick	push up	do not populate left or right
Z-	Page down	right stick	push down	do not populate left or right

This layout has been saved on the [reWASD web site](#).

Here is what I see on my ReWASD provisioning screen.



I have reWASD set up to start at power up. Once CNC12 is stable, I press the left button (RAlt + J)² to enable the XBC controls. Pressing the right button (LAlt + S) is Cycle Start.

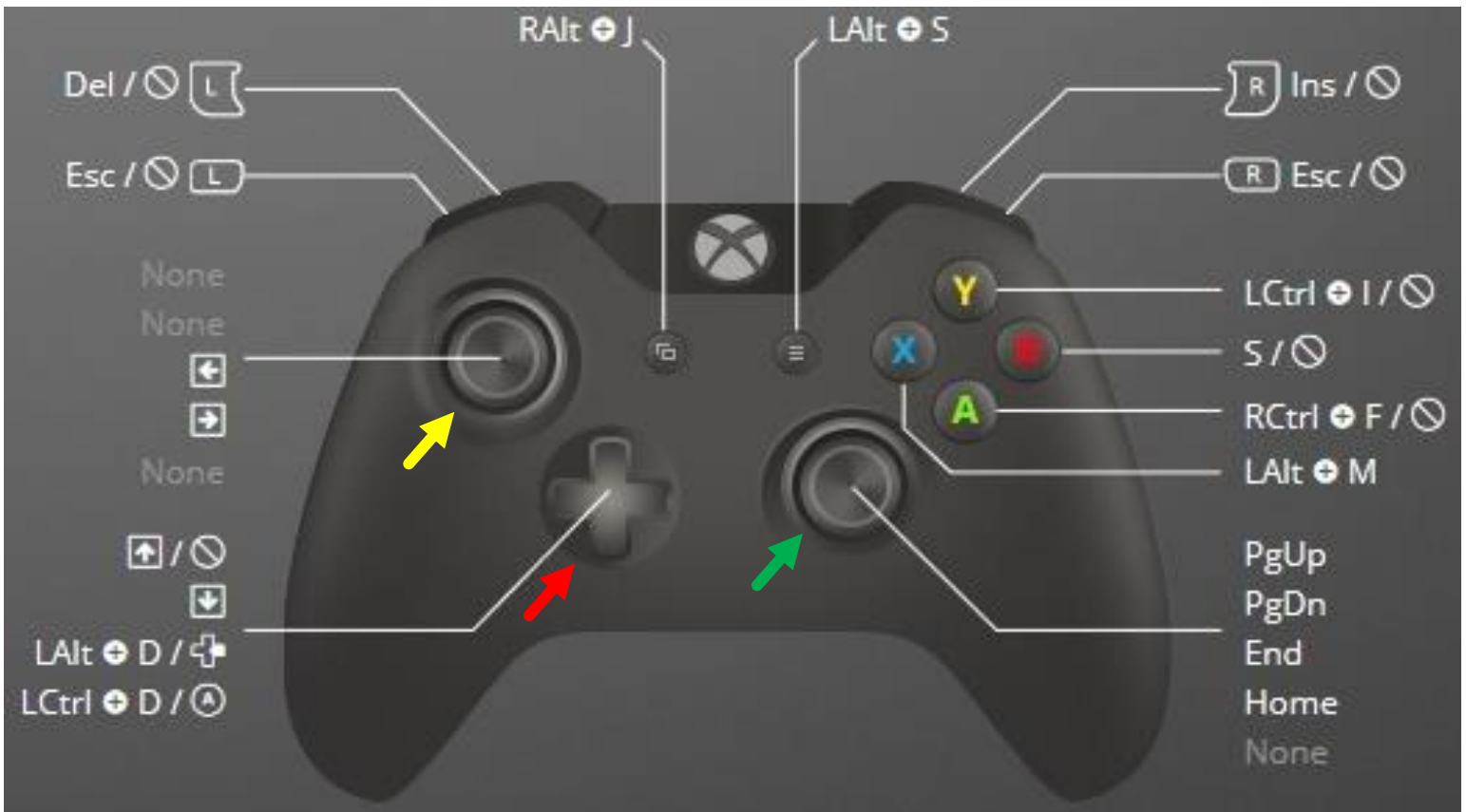


By pressing either the left or right bumpers (Esc), I cancel the active operation. With two buttons available, it is more likely I will hit one during an emergency.

The back triggers control my jog step size. There are 3 sizes so pulling the left trigger twice guarantees I'm at the smallest step size without

having to look on the computer screen.

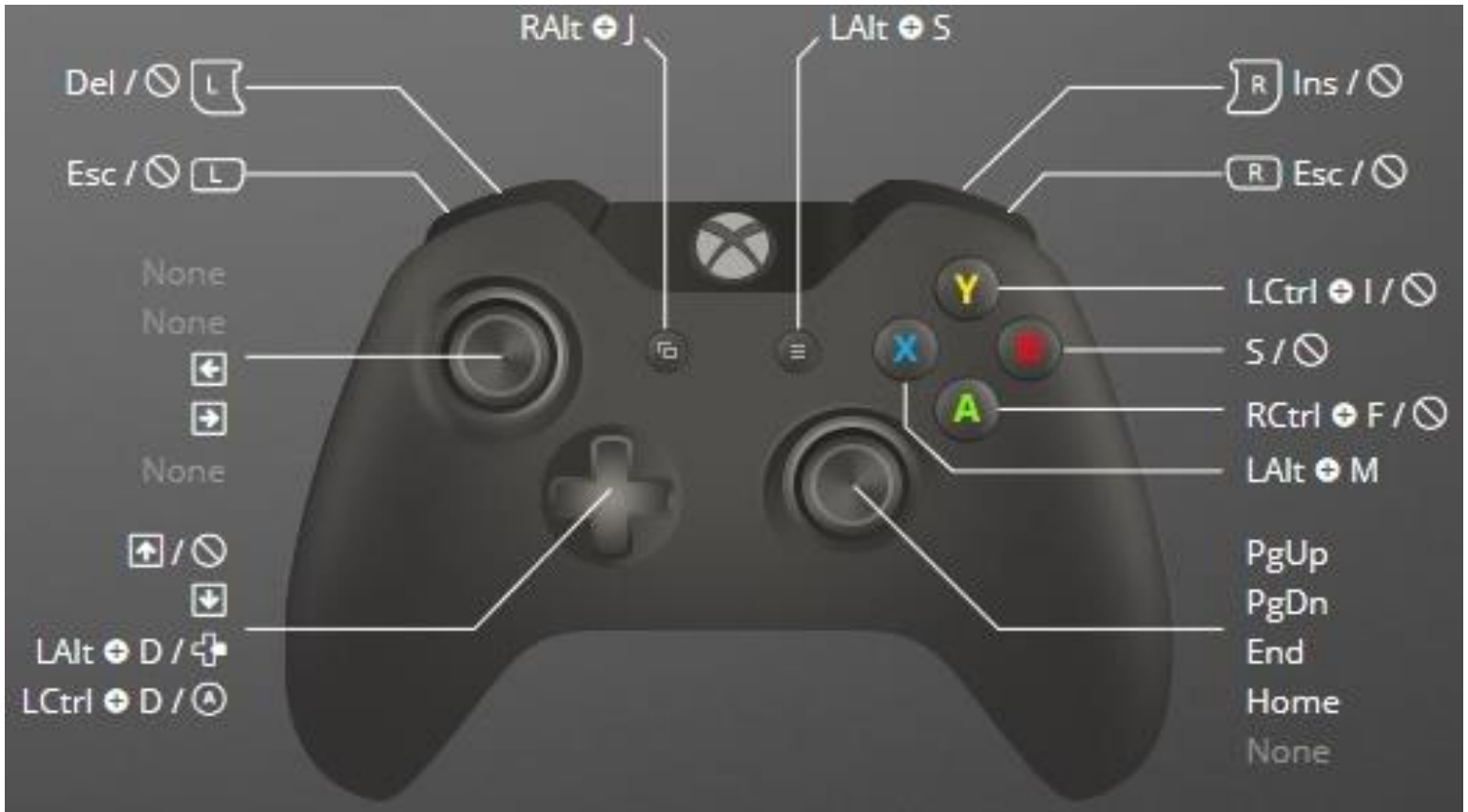
² RAlt means the Right Alt key. LAlt is the Left Alt key.



The left joy stick (yellow arrow) only controls X axis movement. Push it to the right for the cutter to move in a positive X direction relative to the table. I do not use the up and down states on the left joy stick. This is because it was too easy to trigger up/down states while trying to move left or right. When Y was assigned to the up/down, I would randomly move Y while I tried to move X with my intentional left/right movement.

Pressing the top end of the cross pad (red arrow) moves me in a positive Y direction. Pushing the bottom end moves me in a negative Y direction. A push on the right end toggles the display between position and distance. When the left end of the cross pad is pressed, I alternate between the current Work Coordinate System (WCS) and machine positions.

The right joy stick (green arrow) has the same problem as the left joy stick: it is hard to operate left/right and not hit up/down. Therefore I assign positive Z movement to moving the stick forward, negative Z when moving it backward, and done use left and right.



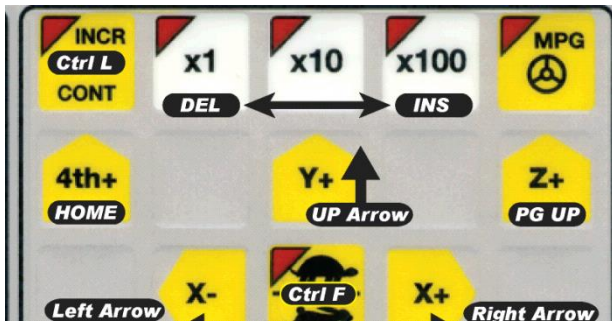
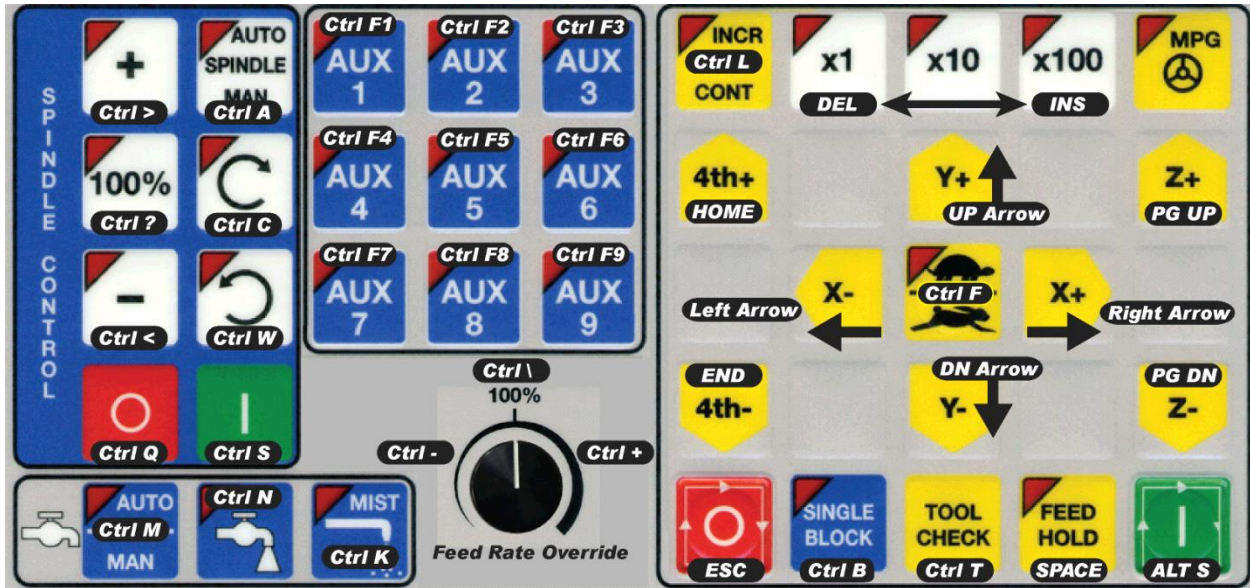
The **X** button (LAlt + M) causes the Manual Data Input (MDI) window. I can then type in G codes which are executed after Cycle Start (my right button) is pressed.

The **Y** button (LCtrl + I) switches between incremental and continuous jog modes.

Similarly, button **A** (RCtrl + F) switches between slow and fast traverse.

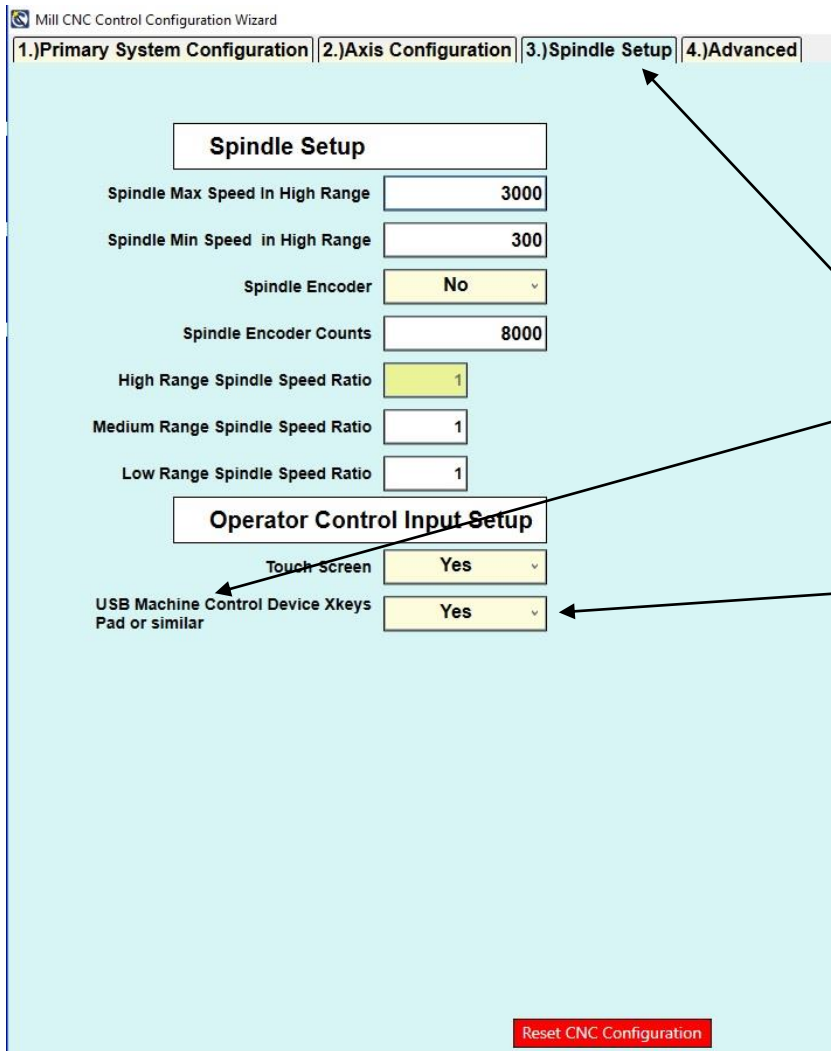
At the present time, I'm not using button **B**. The picture shows it assigned to the letter S but I have since made it "none".

To make sense out of these assignments, we need to look at Centroid's shortcut legend. It appears when you enable keyboard shortcuts via ALT+J unless disabled.



Notice in the right window at the top is "x1" and under it is **DE**LEte. Press **DE**LEte on the keyboard and the jog step size decrements by one order of magnitude. Press **INS**ert and the jog step size increments by one order of magnitude. In this way you can

sequence from times 1 to times 10 to times 100 and back again. On the XBC I do this by pulling those triggers on the back of the unit.



I prefer to turn off this legend. This is done via the Mill CNC Control Configuration Wizard.

Select the Spindle Setup tab. At the bottom you will find USB Machine Control Device Xkeys Pad or similar.

Select Yes and the graphic will *not* be displayed.

Here is the full list of keyboard shortcuts.

CNC12 Operator Commands

Keyboard Keystroke(s)

Turn ON/OFF Keyboard control	<ALT J>
X axis + jog	Right Arrow key
X axis - jog	Left Arrow key
Y axis + jog	Up Arrow key
Y axis - jog	Down Arrow key
Z axis + jog	Page Up key
Z axis - jog	Page Down key
4 th axis + jog	Home key
4 th axis - jog	End key

Cycle Start	<Alt S> (press ALT and S keys at same time)
Cycle Cancel	ESC key
Tool Check	<CTRL T>
Feed Hold	Space Bar
Single Block mode	<CTRL B>
Switch between Incremental and Continuous Jogging	<CTRL L>
Incremental Jog amount, x1,x10,x100	DEL to increase, INS to decrease
Feedrate Override increase	<CTRL +>
Feedrate Override decrease	<>CTRL ->
Feedrate Override 100%	<CTRL \>
Switch Spindle Auto / Manual control	<CTRL A>
Spindle Start Manual	<CTRL S>
Spindle Stop Manual	<CTRL Q>
Spindle direction CCW	<CTRL C>
Spindle direction CW	<CTRL W>
Spindle Speed Override increase	<CTRL > >
Spindle Speed Override decrease	<CTRL < >
Spindle Speed 100%	<CTRL ? >
Switch Coolant Auto Manual	<CTRL M>
Flood Coolant ON/OFF	<CTRL N>
Mist Coolant ON/OFF	<CTRL K>
Aux Key 1	<CTRL F1>
Aux Key 2	<CTRL F2>
Aux Key 3	<CTRL F3>
Aux Key 4	<CTRL F4>
Aux Key 5	<CTRL F5>
Aux Key 6	<CTRL F6>
Aux Key 7	<CTRL F7>
Aux Key 8	<CTRL F8>
Aux Key 9	<CTRL F9>

Found one annoying problem. Where do I put the XBC when not using it for a moment? With time, I realized a magnet was the answer:



I had a neodymium disk magnet³ with a countersunk center hole. By replacing a mounting screw with a longer one, the magnet was attached.



Most of the time I just drop the XBC onto the corner of my vise.



But it can go on my belt cover or



on the end of my Z drive just as easily.

Update

While trying to build a device that would simulate a handwheel feeding into the CNC system, I came to the realization that I cannot smoothly move an axis while also changing the feed rate. It then occurred to me that I could take the Y axis joy stick's side to side motion and map it to controlling the percent of feed rate. The left tilt maps to Control - while the right tilt maps to Control +. This is not as good as a handwheel but it about as close as I can get without turning off CNC power and turning the existing handwheels. Unfortunately, I lose the CNC's DRO function when I do this. It might still be worth this loss when I want to quickly machine a simple part. The jury is still out on this approach.

³ See <http://www.kjmagnetics.com/proddetail.asp?prod=RC22CS-N>

Thanks to Alain Roy for locating the file on the reWASD site.

I welcome your comments and questions.

If you wish to be contacted each time I publish an article, email me with just "Article Alias" in the subject line.

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