

BitSetter Installation and Setup Guide

The Carbide3D BitSetter is an automatic tool offset probe. It measures the length of the end mill in the spindle and, together with Carbide Motion, automatically resets your Z-axis zero point to reflect the new length, making tool changes simple, straight forward, and FAST!

With the BitSetter, you only need to set the Z-axis zero point of your material once before running each project. All subsequent tool changes will automatically be re-zeroed.

There are minor differences in the installation and setup procedures between Shapeoko 3 and XL / XXL models, X/Z-carriage options, and Carbide Motion Board versions.

We're here to help! If you run into any issues during installation or setup, please contact us at: support@carbide3d.com.

IMPORTANT Software Information

Carbide Motion 4.26 or later is required for the BitSetter. We recommend using the latest version of Carbide Motion, which is available for download at: carbide3d.com/carbidemotion/download.

Call Outs and Directional References

Throughout this guide you will find information that we've called out for you to pay particular attention to. We use two types of call-outs, WARNINGS and NOTES:

WARNING: This is a warning—pay close attention. Information in these boxes is very important.

NOTE: This is a note—information that points out critical steps or information for future reference.

In this guide, any reference or instructions with regard to direction or placement, such as: Front, Back, Left, Right, etc. are given from the perspective of one standing in front of and facing the machine. This is true, even when a photo is taken from the rear of the machine.

BitSetter Installation and Operation Video

A video about BitSetter installation and operation is available at: <https://youtu.be/I97XwLBmyuc>.

Installation and Setup Requirements

Installation takes approximately 15 minutes. You will need the following tools:

- 2mm hex key
- Ruler or tape measure

BitSetter Kit Contents

The BitSetter Kit contains all of the components shown in *Fig. 1* and listed in the table below.

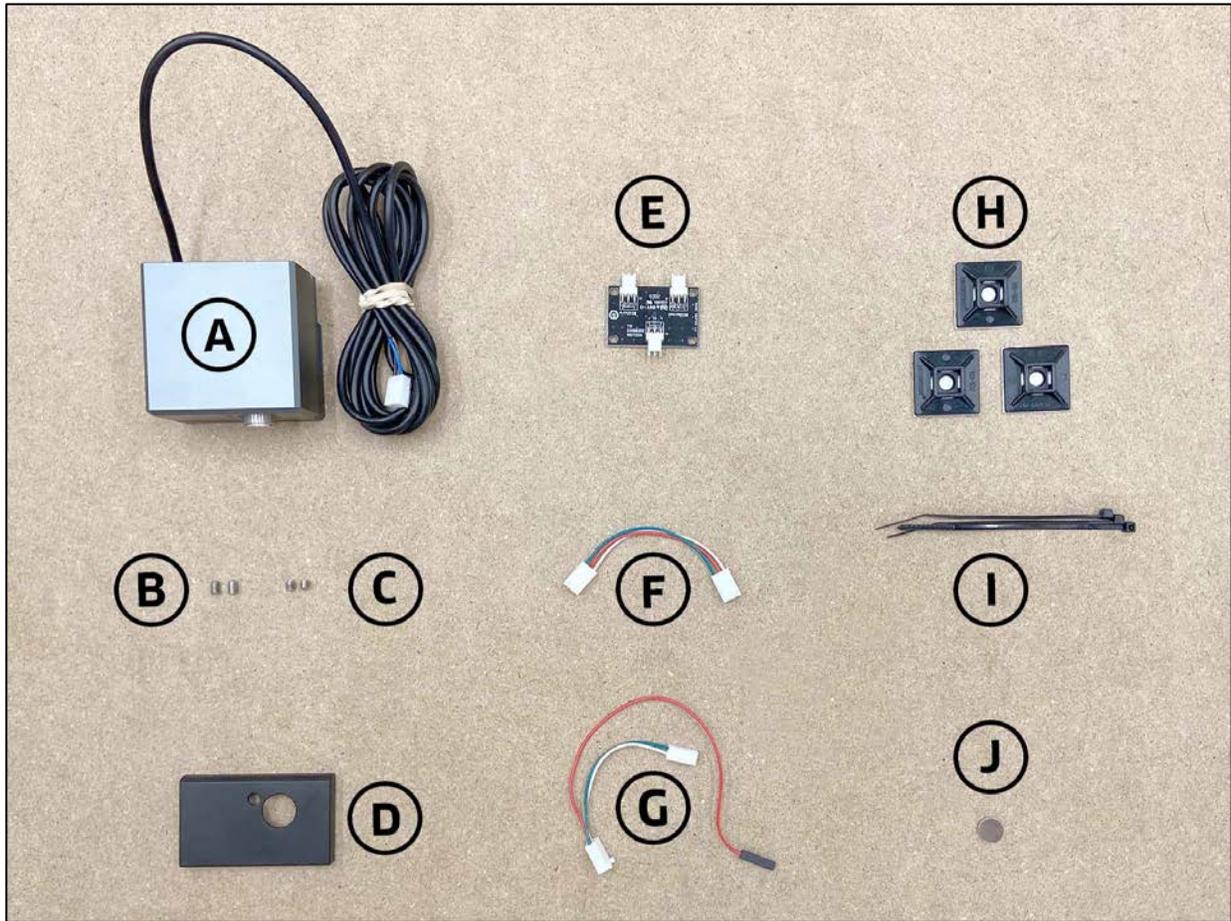


Figure 1

Item	Description	Qty	Note
A	BitSetter	1	Tool Offset Probe
B	M4 × 6mm Grub Screw	2	Attaches BitSetter to Shapeoko
C	M4 × 4mm Grub Screw	2	Attaches BitSetter to Shapeoko
D	Protective Cap	1	Protects the Top of the BitSetter from Scratches
E	Probe Adapter PCB	1	Accepts Two Probe Inputs (for BitSetter and BitZero)
F	3-Pin Cable	1	Connects Probe Adapter PCB to Carbide Motion Board
G	Legacy Adapter Cable	1	Connects BitSetter to Pre-v2.4 Carbide Motion Boards
H	Adhesive Cable Tie Mounts	3	For Cable Routing and Tidying
I	Zip Ties	3	For Cable Routing and Tidying
J	Spare Trigger Button	1	For Replacing the Original Trigger in Case of Damage

Install the BitSetter

Shapeoko XL/XXL Installation

The BitSetter attaches to the front of your Shapeoko by sliding over the lip of the front endplate. It is secured to the machine with grub screws inserted from the rear of the BitSetter. See **Fig. 2**.

1. Turn off your machine and unplug it. Disconnect the USB cable.

NOTE: If you have a wasteboard installed over the stock baseplates, you may need to remove it in order to install the BitSetter.

2. Insert M4x4mm grub screws into the top two screw holes. Start the screws so they are barely in the threads. See **Fig. 3**.
3. Slide the BitSetter over the lip of the front endplate. See **Fig. 4**.
 - a. **For machines with belt-drive X/Z:** position the BitSetter about 4.5 inches (114mm) from the right (Y2) edge of the endplate.
 - b. **For machines with Z-Plus:** position the BitSetter about 5 inches (127mm) from the the right (Y2) edge of the endplate.
 - c. **For machines with HDZ:** position the BitSetter about 4 inches (101mm) from the right (Y2) edge of the endplate.



Figure 2



Figure 3

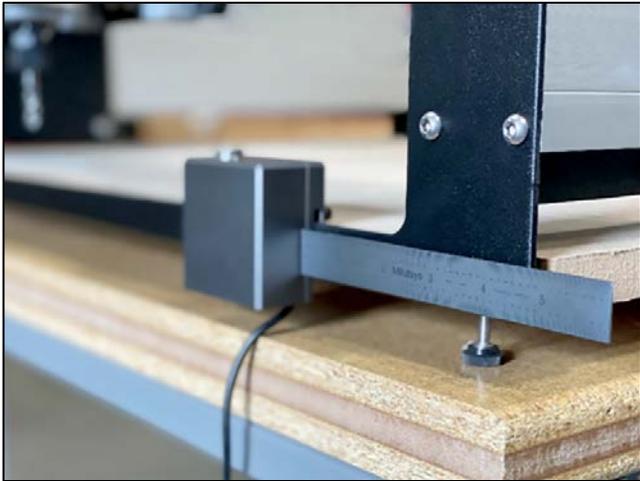


Figure 4

5. To make sure the cutter can touch the BitSetter without interference, slowly move your gantry (by hand) so it is above the BitSetter. Ensure the center of the spindle is in line with the center of the BitSetter. No need to perfectly align the two yet, we'll do that in Carbide Motion. See *Fig. 5*.
6. If necessary, slide your BitSetter to the right or left along the front endplate to align the BitSetter with the center of your spindle.



Figure 5

NOTE: Depending on your homing switch (or proximity switch) setup, it may be necessary to make minor adjustments to the position of the BitSetter after homing the machine. Therefore, we recommend holding off on re-installing your wasteboard until after the entire installation and setup process is complete.

7. Once aligned, tighten the two M4x4mm screws so they press into the rail. These need only be snug, do not overtighten.

NOTE: If you would prefer your BitSetter to sit higher in the Z direction, you may install the BitSetter per the Shapeoko 3 installation instructions on the next page.

Shapeoko 3 Installation

The BitSetter attaches to the front of your Shapeoko 3 by sliding over the lip of the front endplate. It is secured to the machine with grub screws inserted from the rear of the BitSetter. See *Fig. 6*.

1. Turn off your machine and unplug it. Disconnect the USB cable.

NOTE: If you have a wasteboard installed over the stock baseplates, you may need to remove it in order to install the BitSetter.

2. Insert two M4×6mm screws into the middle row of holes. See *Fig. 7*.
3. Tighten the screws until they hit the back wall of the BitSetter. These screws will raise your BitSetter up so that it does not rest on the worktable.
4. Insert the two M4×4mm screws into the bottom holes. Start the screws so they are barely in the threads. See *Fig. 7*.
5. Slide the BitSetter over the lip of the front endplate. See *Fig. 8*.
 - a. **For machines with belt-drive X/Z:** position the BitSetter about 4.5 inches (114mm) from the right (Y2) edge of the endplate.
 - b. **For machines with Z-Plus:** position the BitSetter about 5 inches (127mm) from the right (Y2) edge of the endplate.
 - c. **For machines with HDZ:** position the BitSetter about 4 inches (101mm) from the right (Y2) edge of the endplate.



Figure 6



Figure 7

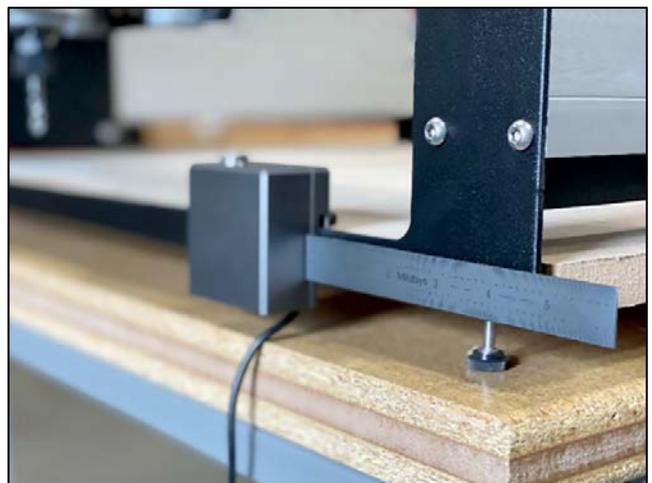


Figure 8

6. To make sure the cutter can touch the BitSetter without interference, slowly move your gantry (by hand) so it is above the BitSetter. Ensure the center of the spindle is in line with the center of the BitSetter. No need to perfectly align the two yet, we'll do that in Carbide Motion. See *Fig. 9*.
7. If necessary, slide your BitSetter to the right or left along the front endplate to align the BitSetter with the center of your spindle.



Figure 9

NOTE: Depending on your homing switch (or proximity switch) setup, it may be necessary to make minor adjustments to the position of the BitSetter after homing the machine. Therefore, we recommend holding off on re-installing your wasteboard until after the entire installation and setup process is complete.

8. Once aligned, tighten the bottom two M4x4mm screws so they press into the endplate. These need only be snug, do not overtighten.

NOTE: If you are using just the stock baseplates, you can access the bottom screws using a ball-end hex key. If you are using wasteboard, you may need to remove the wasteboard to access the screws.

Route the Cable

The BitSetter cable is designed to route to your Carbide Motion board in one of two ways.

Routing Option 1

1. Using the cutout on the bottom of the BitSetter, route the cable under the machine, directly back to the Carbide Motion board.
2. Use the included adhesive cable tie mounts and zip ties to secure the cable to the machine. We recommend putting one cable tie mount immediately behind the BitSetter and another where the cable feeds out near the controller.

Routing Option 2

1. Using the cutout on the bottom of the BitSetter, route the cable around the front-left side of the machine.
2. Use the included adhesive cable tie mounts and zip ties to secure the cable to your machine. Make sure the cable is out of the way and fastened to your machine in convenient locations.

Connect the BitSetter to the Carbide Motion Board

To make installation simple, we have included a variety of adapters to allow you to connect the BitSetter without needing to cut or solder any wires.

The instructions below apply to the following versions of the Carbide Motion boards shipped with Shapeoko:

- 2.1
- 2.2
- 2.3
- 2.4d
- 2.4e

To identify which version of the Carbide Motion board you own:

1. Remove the Carbide Motion board enclosure cover.
2. Look in the bottom-left corner of the PCB for the board version number. See *Fig. 10*.

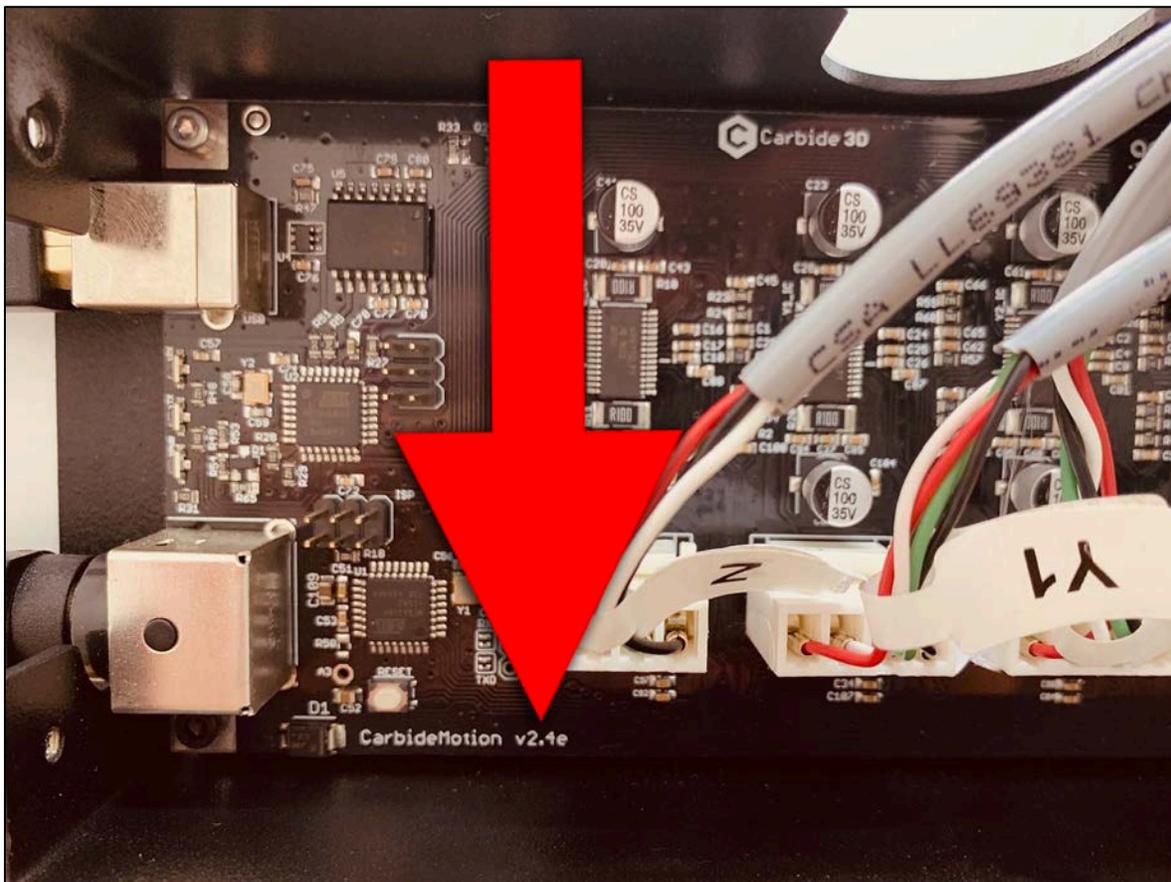


Figure 10

Connecting Board Version 2.1/2.2/2.3

To connect the BitSetter to a version 2.1, 2.2, or 2.3 Carbide Motion board, you'll need to use the included Legacy Adapter Cable and Probe Adapter PCB.

1. Connect the 2-pin connector (green and white wires) of the legacy adapter cable to the pins labeled *Probe* in the top-right corner of the Carbide Motion board. See **Fig. 11**.
2. Connect the red wire (+5V) to the upper-left pin on the *AVR Programming* label. See **Fig. 12**.
3. Once both wires are connected, your board should look like **Fig. 13**.
4. Connect the 3-pin connector of the Legacy Adapter Cable to the port labeled *To Carbide Motion* on the Probe Adapter PCB.
5. Connect the BitSetter to the port labeled *Tool Probe* on the Probe Adapter PCB.
6. If you also have a BitZero (touch probe), connect that to the port labeled *Touch Probe* on the Probe Adapter PCB.
7. Re-install the enclosure cover. Make sure not to pinch or accidentally loosen any of the cables.

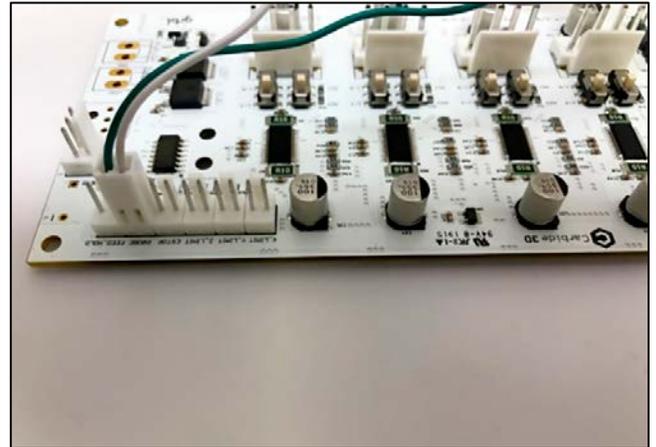


Figure 11

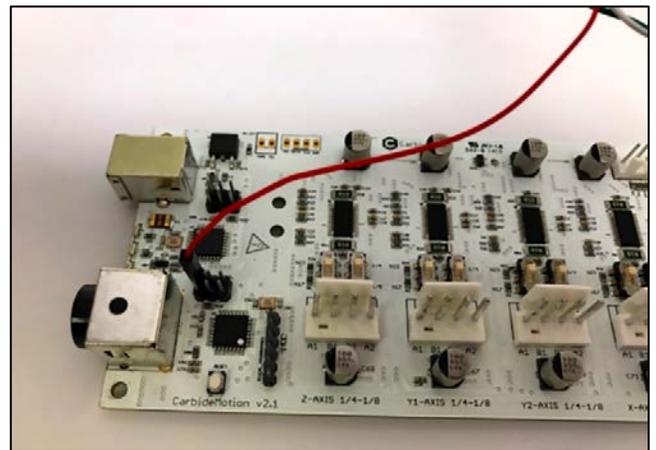


Figure 12

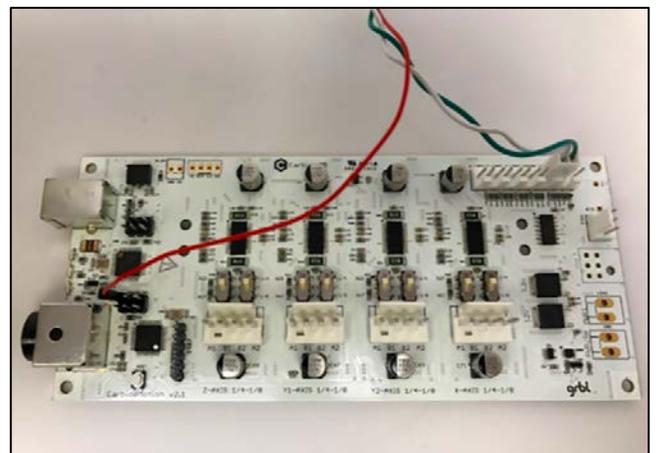


Figure 13

Connecting Board Version 2.4

Beginning with version 2.4d of the Carbide Motion Controller PCB, the controller boards have a purpose-built port labeled *Reserved*, which is intended for a touch or tool probe.

BitSetter Only:

1. If you only have the BitSetter, you can connect it directly to the port labeled *Reserved*. See *Fig. 14*.

BitSetter AND BitZero (Touch Probe):

If you have both the BitSetter and a BitZero (touch probe), you will need to use the included Probe Adapter PCB and 3-pin cable. See *Fig. 15*.

1. Connect the BitSetter to the port labeled *Tool Probe* on the Probe Adapter PCB.
2. Connect the BitZero to the port labeled *Touch Probe* on the Probe Adapter PCB.
3. Connect one end of the 3-pin cable to the port labeled *To Carbide Motion* on the Probe Adapter PCB.
4. Connect the other end of the 3-pin cable to the port labeled *Reserved* on the Carbide Motion board.
5. Re-install the enclosure cover. Make sure not to pinch or accidentally loosen any of the cables.

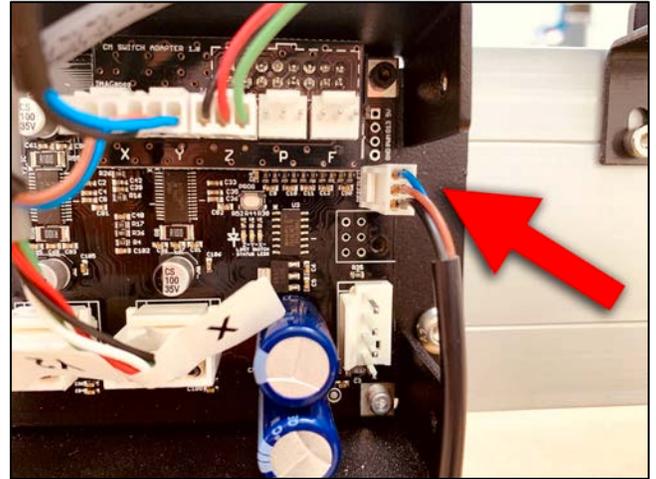


Figure 14

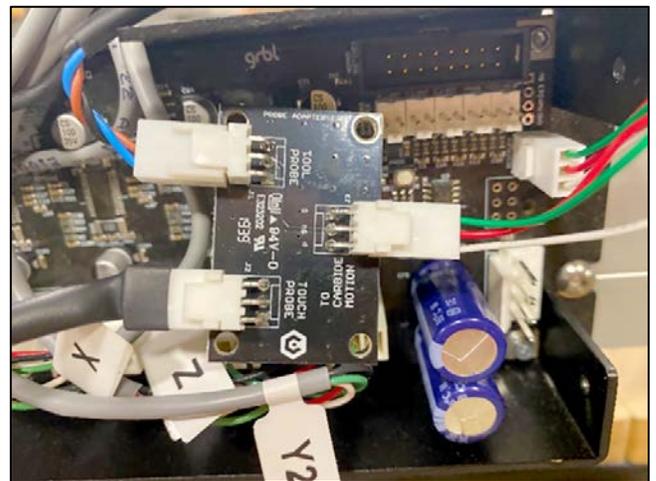


Figure 15

NOTE: If your 2.4d/e board is missing the *Reserved* label, you'll need follow the **Connecting Board Version 2.1/2.2/2.3 instructions** above to connect the BitSetter (and BitZero, if you have one) using the legacy adapter cable and probe adapter PCB.

NOTE: If you happen to have a prototype 2.4a/2.4b/2.4c Carbide Motion board, send us an email at: support@carbide3d.com and we'll exchange it.

Set Up and Calibrate the BitSetter in Carbide Motion

Now it's time to setup the Carbide Motion control software to recognize and calibrate your BitSetter.

WARNING: Carbide Motion v4.26 or later is required to use the BitSetter. We recommend using the latest version of Carbide Motion, which is available for download at: carbide3d.com/carbidemotion/download.

1. Open Carbide Motion.
2. Power on the Shapeoko, then click **Connect to Cutter**.
3. After the machine connects, click the **Initialize Machine** button. See *Fig. 16*.

Position the Spindle over the BitSetter

Clear Offsets

1. After homing completes, click **Jog** in the top menu bar.
2. Click the **Set Zero** button. See *Fig. 17*.

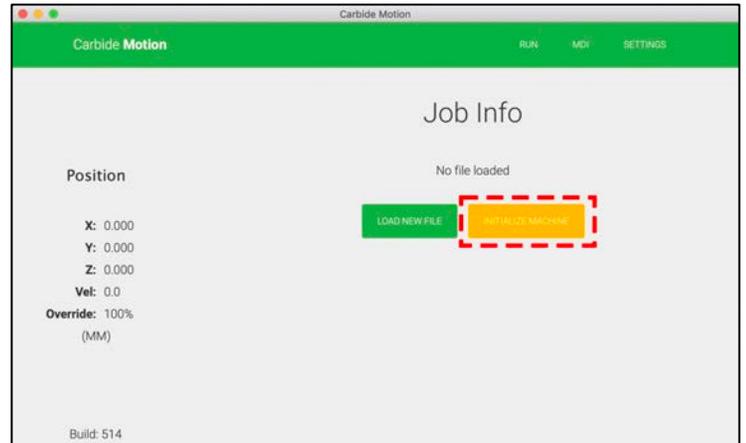


Figure 16

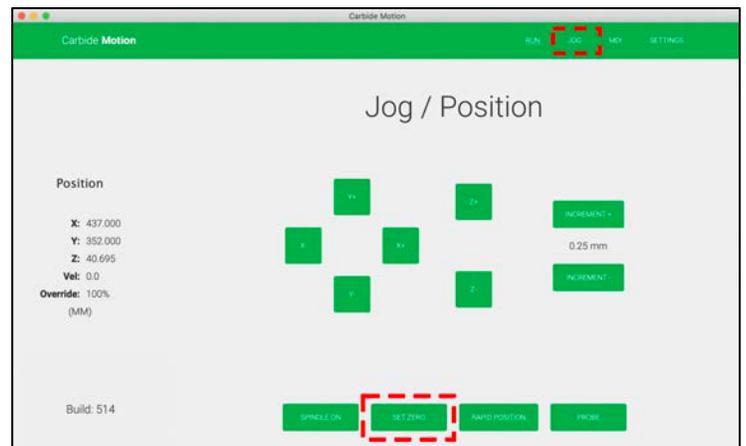


Figure 17

3. Click the **Clear All Offsets** button. Then, click **Done**. See *Fig. 18*.
4. On the *Jog* screen, click the **Rapid Position** button. See *Fig. 19*.
5. Click the **SE** button to move the spindle to the front-right corner of the machine. Once in position, click **Done**. See *Fig. 20*.

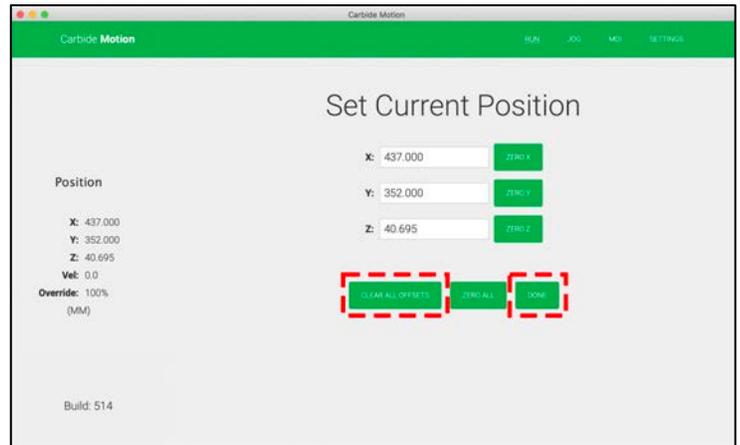


Figure 18

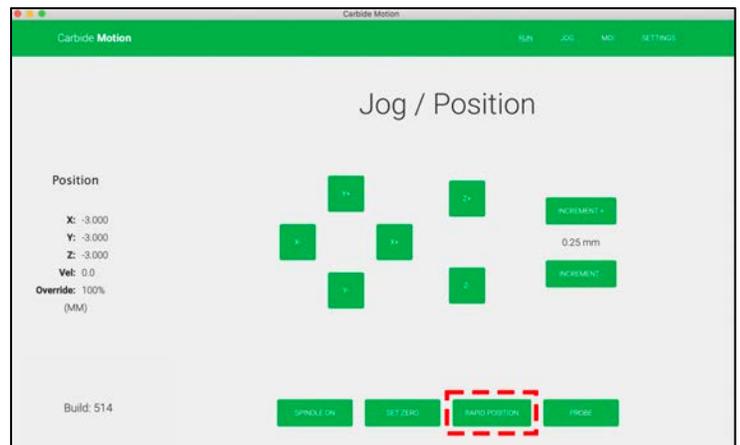


Figure 19

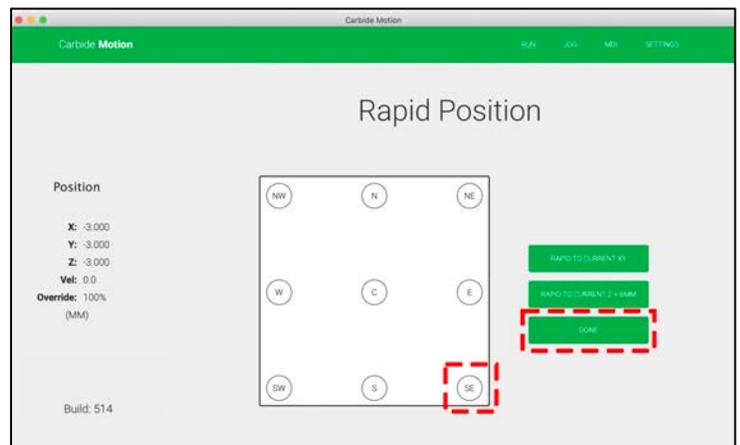


Figure 20

6. On the *Jog* screen, use the **Y+ / Y-** and **X+ / X-** buttons (or the arrows on your keyboard) to jog the gantry so the spindle is directly above the BitSetter. See *Fig. 21*.

Configure the Permanent X/Y Position of the BitSetter

1. Click **Settings** in the top menu bar.
2. In the *BitSetter* section, select the **Enabled** checkbox. See *Fig. 22*.
3. With your spindle still positioned directly above the BitSetter, click the **Use Current Location** button to set this location. This will permanently save the X/Y location of your BitSetter.

NOTE: If you physically change the location of your BitSetter, you will need to re-run this setup.

4. Click **Ok** to save and close the Settings window.

CONGRATULATIONS! Your BitSetter is ready to use!

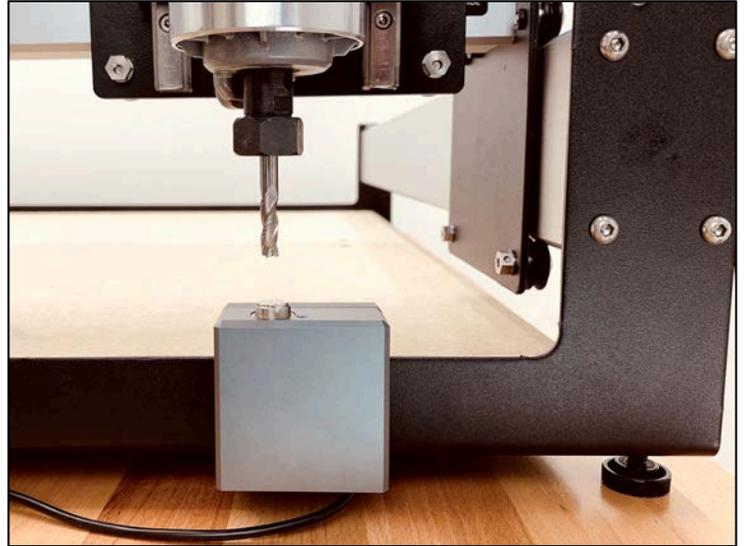


Figure 21

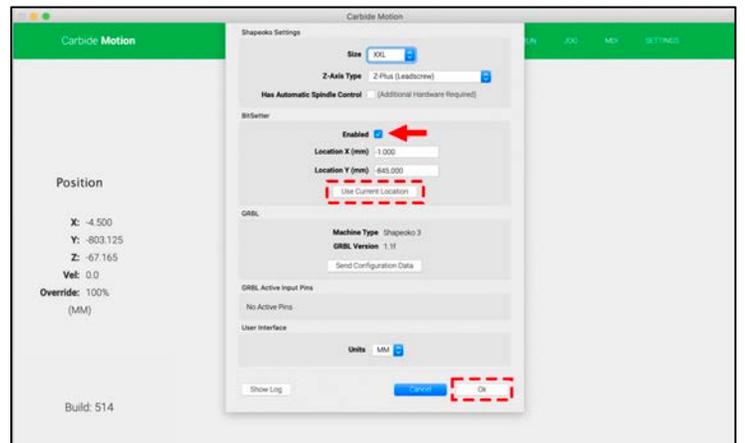


Figure 22

Operate the BitSetter

The start-up workflow using the BitSetter is as follows:

1. Power on and connect to the machine.
2. Home the machine.
3. After the homing cycle completes, the gantry will automatically move to the front-center location and Carbide Motion will prompt you to insert a tool. Think of this as ‘homing’ the tool offset.
4. After the tool is inserted, click the **Resume** button in Carbide Motion. See *Fig. 23*.
5. The machine will then use the BitSetter to measure the length of the tool in the spindle.
6. Once the initialization sequence is complete, you can load and run a job by clicking the **Load New File** button. See *Fig. 24*.

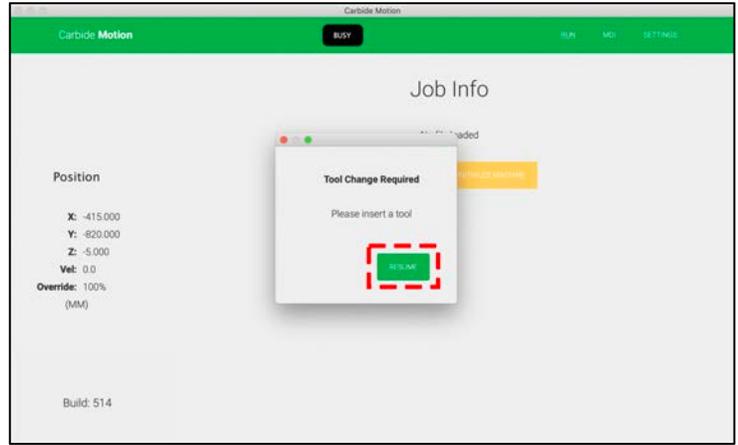


Figure 23

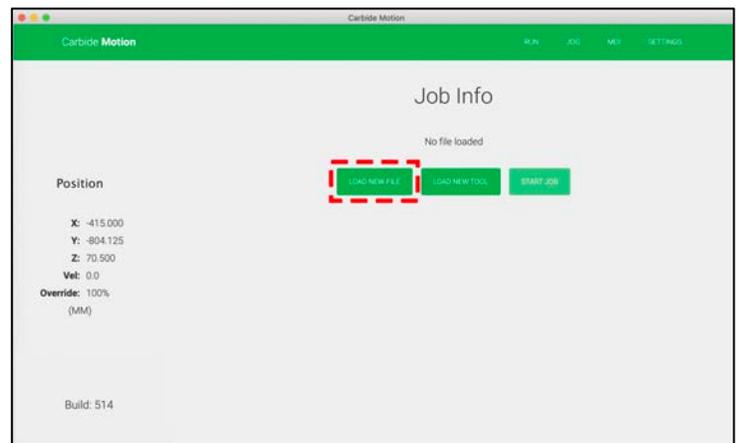


Figure 24

Notes About Using Your BitSetter

- Ensure tools are long enough to reach the BitSetter trigger button. The minimum length the tool must extend from the collet is 0.5”.
- In order to instantiate a tool change and offset measurement, your CAM program must post unique tool numbers with each new tool. Carbide Create does this by default.
- If you ever physically move the BitSetter, you will need to reconfigure its new location by following the [Set Up and Calibrate the BitSetter instructions](#) again.

Replace a Damaged Trigger Button

The BitSetter trigger button is magnetic to allow for easy replacement. In the event that your original trigger button is ever damaged, you may replace it with the included spare:

1. Use the magnetic spare trigger to remove the damaged trigger.
2. Separate the two magnetic triggers.
3. Put the spare trigger in place.