

OpenBuild Spoil Board Project

Project Name: Beginner – Spoil board for LEAD 1010 machine

Short Description: Build a spoil board with an integrated work piece clamping solution.

Tags: LEAD 1010, Waste board, Spoil board, Spoil board for any CNC machine

Machine Type: OpenBuild LEAD Machine

Software: None

Electronics: None

Controller

Machine Time: 1 – 2 hours

Bit or Laser Size: None

Feeds & Speeds: NA

Materials:

Raw Beginning Wood Sizes:

Material	Thickness	Width	Length
MDF	3/4" (19.050 mm)	43 1/8" (1094.1 mm)	40" (1016 mm)
Plywood: Builder's Choice (Choose one)			
Plywood	1/4" (6.350 mm)	40" (1016 mm)	40" (1016 mm)
Plywood	3/8" (9.525 mm)	40" (1016 mm)	40" (1016 mm)

- T Track:

- <https://www.rockler.com/universal-t-track-universal-t-track> \$29.99
- https://www.eagleamerica.com/product/v416-0484/miter_track_t-track \$19.99
- <https://www.amazon.com/Incra-TTRACKREG48-48-Inch-T-Track-Regular/dp/B000I6LW1W> \$29.90
- https://www.amazon.com/dp/B06XSX88M9/ref=psdc_552488_t4_B000I6LW1W \$19.99

- Hardware for 1/4" Plywood:

- Threaded Insert

- Builder's Choice:

Insert Thread

Insert Size

- 10-24
- M4-0.7
- M5-0.8
- 10-24 x 1/4"
- M4-0.7 x 6.350
- M5-0.8 x 6.350

- Screws – MDF:

- Builder's Choice:

Screw Thread

Screw Size

- 10-24
- M4-0.7
- M5-0.8
- 10-24 x 5/8"
- M4-0.7 x 15.875 mm
- M5-0.8 x 15.875 mm

- Screws – T Track:

- Builder's Choice:

- Builder to determine screw size depending on the screw size needed for the selected T-Track.

- Hardware for 3/8" Plywood:

- Threaded Insert

- Builder's Choice:

Insert Thread

Insert Size

- 10-24
- M4-0.7
- M5-0.8
- 10-24 x 3/8"
- M4-0.7 x 9.525
- M5-0.8 x 9.525

- Screws – MDF:
 - Builder's Choice:

Screw Thread	Screw Size
• 10-24	• 10-24 x 5/8"
• M4-0.7	• M4-0.7 x 19.050 mm
• M5-0.8	• M5-0.8 x 19.050 mm
- Screws – T Track:
 - Builder's Choice:
 - Builder to determine screw size depending on the screw size needed for the selected T-Track.
- Counter sink bit for builder's choice of screws
- Drill bit for builder's choice of screws

Project Details

Hello friends in the fantastic world of OpenBuild solutions for CNC machines.

I would like to share with you the spoil board I designed for my first DIY CNC machine. Many years ago, I purchased plans from the crankorgan.com website. John Kleinbauer had designed several different CNC machines and sold them on his website. I purchased the plans for the machine he called the 7th Sojourn. I modified several things to the machine and rather than using a Dremel, I used a Porter Cable finish router for the cutting device.

After using the machine for several months, two things became obvious to me. One - that I needed (okay, truthfully), I wanted a bigger machine, and two, I needed a solid method to attach the workpiece securely to the tabletop. I tried several different designs and the one that work best for me and my machine is showcased here.

Let me explain that the three pictures showing the "used" spoil board on my 7th Sojourn is in desperate need of either resurfacing or replacement of the MDF field boards. I have put that task off knowing that I would be building my OpenBuild machine very soon. View it as a tool to understand the construction of the spoil board shown here.

It's easy and straight forward on the construction. I have included a drawing of the spoil board and a brief description of the construction. I just had my hip replaced and I'm not able to go my shop to finish my LEAD 1010 machine. I started the build of the machine a few days prior to my replacement surgery, and still need to finish a few items. The biggest being the spoil board, and the second modifying it with the High Z Modification just released by Mark on the OpenBuild website.

The building of this spoil board does not require a CNC machine. In fact, all you need is a table saw, drill press, counter sink bit, and lumber outlined in the materials section. Although, I have designed this spoil board for the LEAD 1010, it can easily be modified to work on just about any machine.

Material List:

This material list corresponds with the Lead 1010 Spoil Board Exploded View.pdf file.

Part	Height	Width	Length	Material	Quantity
A Field Spoil Board	3/4"	6 11/16" ¹	40"	MDF	5 ² or 6 ³
B Edge Spoil Board	3/4"	13/16" ¹	40"	MDF	2 ² or 3 ³
C T-Track	3/8"	3/4"	40"	Aluminum	6
D Field Board Insert	Note 4	Note 4	Note 4	Note 4	46

	Edge Board Insert					
E	Plywood	1/4"	40"	40"	Builder Choice	1 ⁵
		3/8"	40"	40"		

Notes:

1. Trim board width so all boards fit on the plywood with edge boards and T-Track.
2. Make 5 boards if you are not making a pattern for making replacements
3. Make 6 boards if you are making a pattern for making replacements.
4. Holes depend on inserts purchased.
5. Builder choice on the thickness of plywood.

Screws

Purpose	Length	Quantity
Attach MDF to Plywood	22.225 mm	46
Attach T-Track to Plywood	0.3750 mm	See note 1

Notes:

1. Determined by the number of holes drilled in the aluminum T-Track.

The 3/4" (19.05 mm) MDF should measure 40" (1016 mm) x 43 1/8" (1094.1 mm). Then cut the following from the MDF:

MDF Cut Table

Quantity		Thickness	Width	Length
Required	Pattern			
2	1	19.05 mm	20.35 mm	1016 mm
5	1	19.05 mm	169.00 mm	1016 mm

When cutting the MDF, it is best to cut a pattern for when the spoil board requires replacement. This will save several minutes or hours of frustration trying to generate the hole pattern to align with the threaded inserts in the plywood base board.

After the base plywood and MDF boards have been cut to size, mark the hole location by following the measurements in the Lead 1010 Spoil Board Hole Layout.pdf

I have found it best to lay the MDF boards side by side and mark the horizontal lines across all the boards using a T-Square. Then mark all the vertical lines on each of the boards.

After all the boards have been marked, use a center punch and make a small indent where each hole will be drilled. Using a drill press drill a hole big enough for the screw size you have selected to use. Using a counter sink bit, recess the screw about 3/8" from the surface of the MDF.

After all of the holes have been drilled and counter sunk, lay the plywood on a flat surface. Start with one of the edge MDF pieces, and place it on the plywood. Use a small clamp to secure the board. Take one of the T-Track pieces and lay it next to the edge MDF. Now take a MDF field piece and lay it next to the T-Track. Lay the next T-Track on the plywood next to the field MDF piece. Continue this process until all the MDF and T-Track have been placed on the plywood. If the MDF boards extend beyond the plywood, trim the boards so they fit on the plywood without extending beyond the plywood edges.

Using clamps, secure the T-Track and MDF pieces to the plywood. You don't want them to slip while completing the next step. After they are secured, use a center punch, the drill bit used for drilling the holes in the MDF field boards, or some other tool and mark the hole locations of the T-Track and MDF pieces on the plywood base. Now that the hole pattern has been marked on the plywood base, remove the MDF and T-Track one piece at a time and verify the plywood has been marked. After verifying the plywood base is marked with the hole pattern, use a drill bit the correct size for the selected insert, and drill the holes using a portable drill.

Now is the time to locate the anchor points on the Lead 1010 machine and transfer their location to the plywood. Then drill the holes for the inserts to attach the plywood to the machine. It's now time to install the inserts into the plywood and attach the plywood to the machine. After securing the plywood to the machine, secure the MDF boards and T-Track to the plywood base using the screws purchased. You can reduce the cost of the project by not using the threaded inserts. However, they do provide greater durability to the plywood. If you are not going to use the inserts, use wood screws to secure the MDF and T-Track to the plywood. Drill a small pilot hole for the wood screw. Use caution when installing the wood screws, to prevent stripping the plywood.

If you desire, you can take a surfacing bit and skim the entire top of the spoil board. This will make the surface flat and true to your machine.

This is my first project posted on OpenBuild. If you find mistakes or suggestions, please provide feedback so I can improve on the next one.