

SPECTRUM 3847 PIT DESIGN GUIDE



2012 Spectrum 3847 Pit (Lone Star Regional)

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BENEFITS TO USING THE SPECTRUM 3847 PIT

- ▲ ***Foam Tile Floor-*** As the 'pitmaster' for this past FRC year, I can tell you that standing on the foam floor for hours at a time is much better than standing on the usual concrete floor for that period of time. The foam floor looks much better than the gray concrete and draws peoples' attention. It is easy to sweep and vacuum and provides an excellent surface to get on your hands and knees to work on the robot.
- ▲ ***Tall Shelves*** - The shelves provide a lot of space to fill with the various things that you bring to competition. Things are organized and easy to get too. The shelves also provide structure for your pit. The front two shelves are excellent for hanging signs and posters and whenever you need to put something down for a second the shelves provide plenty of surfaces to keep your floors clear. We stored our printer and laptop on one of the shelves so it provided a table surface to work on. The shelves can be purchased from many hardware stores, like Home Depot or Lowes. They should be 18" wide and 72" tall. We purchased five shelving units; one for each of the four corners and then distributed the fifth among the four shelves to make them one level higher. This made them about 7.5 feet tall with one spare shelf piece. The shelves are plastic which makes them light weight. They also have holes in them so you can easily attach things to them with zip ties.
- ▲ ***PVC Support Structure*** - It helps stabilize the shelves that are standing tall. The banner covers the PVC to keep your pit looking nice. We used the crossbars to hang our bumpers when not in use. This can also be used to hang blue banners, posters, etc.
- ▲ ***Front Pit Posters*** - We printed posters for the front shelving units. When judges come by, you have the posters on the front to remind you of speaking points. The posters also give people walking by something to browse if no one is in the pit. These posters are mounted on foam board and attached with Velcro. This means that we can easily change our sponsor poster each year without having to ever print a new banner.
- ▲ ***Banner*** - The banner is 10' x 3' and covers the upper section of the pit. This puts our pit right at the 10 foot height restriction and allows our banner to be easily seen from many parts of the arena. In the future we may expand with more banners so that they can be seen from all directions.
- ▲ ***Heavy Duty Bins*** - These bins worked really well for us. We used them mostly to hold raw materials such as metal and wood. They are very strong and can be used as stepping stools when needed. For the pitmaster, the box under the table worked as a nice chair when business was slow.
- ▲ ***Wire Cart*** - We use a wire cart between the two right shelves. It stores our batteries. A bin for personal items is also placed on the lower shelf. This cart is nice because it fits exactly between the two of the shelves in the 10 x 10 area if you construct with the handles facing towards each other. This cart is also used during the eliminations rounds as our battery/tool cart. It is very light weight and also helps with load in and load out of the pit.
- ▲ ***Tool Boxes*** - the area between the two left shelves is storage for our tools. We have one large rolling tool box and two small portable tool boxes next to it. These allow us to easily know where our tools are and also the boxes help the load in and load out process.
- ▲ ***Overall*** - This pit leaves a lot of space to work on the robot. The lane is wide and accepts the robot and cart easily. You never want your pit to be too crowded, so when the robot is in you can't have too many people hanging around. The lack of seating space is great for discouraging people from lollygagging and crowding the pit. The bench-top power tools on the back table allow you to do small modifications yourself instead of having to wait in line for the NASA machine shop. We bring a table cloth with us to cover the provided table; it makes it look a little more professional. We also bring a printer, which is great for printing handouts, stickers, forms, and other things you may need during competition. All the surfaces and bins for organization make a huge difference. You can bring more items to support other teams and yourself, and easily access these items.

BILL OF MATERIALS

- ▲ **Foam Tiles** - 100 square feet in whichever colors you like. We ended up with only purchasing 96 square feet and just hide an empty tile in the back of the pit under the table. <http://goo.gl/qxyAo>
- ▲ **5 x Plastic Shelving Units** - These are similar to the ones we purchased but in white. <http://goo.gl/s3f1N>
- ▲ **Wire Cart** - <http://goo.gl/kwUTg>
- ▲ **PVC Pipe Support Structure** - 1" PVC pipe: Ten pieces of 1" PVC cut into 54" pipes along with two 27" pipes and two pieces of 2" PVC. You will need six right angle PVC fittings and seven T PVC fittings.
- ▲ **3 x Heavy Duty Bins** - <http://goo.gl/JGwAT>
- ▲ **Various Other Bins or Boxes** - These are used to store and organize the many tools and materials needed during competition.
- ▲ **Large Tool Box** - We brought along the large tool cabinet that we used in our lab. It was heavy but it fit easily into our pit and kept our pit very organized.
- ▲ **Portable Tool Boxes** - We brought along some portable tool boxes. These allowed us to easily transport and store tools. We could also take these tool boxes to other team's pits to help them with their robot.
- ▲ **Power Strips** - We used four power strips to give us many more outlets. You will need quite a few for your battery chargers and power tools. These have an extra long cord which eliminates the need for extension cords. <http://goo.gl/0jgDf>
- ▲ **Bench Top Tools** - Bring any smaller scale table power tools to have on your back table for use by you or other teams. We brought a band saw, drill press, and bench-top belt sander.
- ▲ **Cleaning Supplies** - A shop-vac is very useful. When cleaning, you can sweep dust and shavings into a pile and then vacuum it up instead of using a dustpan on the foam surface. On that note, don't forget your broom and dustpan; no one likes a dirty pit area.



ASSEMBLY

Notes: Assembly can be tricky. When you first arrive at your pit with your materials, you have tons of stuff, but nowhere to put it. You want to do your best to stay out of the aisle, but having your 10'x10' area crowded will slow down your pit construction. Our team did our best to arrive early to the pit area and get the floor and shelves assembled quickly while most of our stuff was in the aisle and then place things where they go. Build your pit beforehand and have a 'pitmaster' get the feel of where everything goes. He/she will direct as everyone helps to assemble the pit at competition.

1. The floor is the first thing that you want to do. Place your tiles on the floor and put the small border pieces on the edges. Place a piece of tape over the whole front side of the tiles. This reduces the chance of tripping as you enter the pit and helps when sweeping to keep your pit area tidy.
2. The next step is shelves. The assembly is pretty self-explanatory. Put four poles into each level and attach them all to each other. Each corner shelf should stand 5 levels (7.5') tall. Put the poles with the fitted side down. The heavy duty bins listed above are a very tight fit with the shelves. We discovered that over time the shelves settle or the poles sink into the foam tiles and it makes the heavy duty boxes barely fit. One possible solution may be placing wood under the shelves to prevent the poles from sinking in. We had two boxes under the front two shelves and one under the table. Our boxes were heavy and needed room to pull them in and out repeatedly so we kept them on the lowest level. The heavy bins help to stabilize the shelves as well.
3. Next, we will construct our banner holder/ structure stabilizer. First, make a square PVC structure that has two 54" pieces per side. In between the two pieces on the sides place a 'T' PVC fitting or a PVC coupling. On the back two corners put right angle PVC fittings. On the front two corners place T's connected to right angle fittings facing upward using the two inch pvc pieces. Place the shorter PVC pipes out of these right angle fittings and then connect those two at the top using the same configuration as a side of the original square. Connect the banner using zip-ties. Place this PVC structure on top of all four shelves. Zip tie the PVC to the shelves. This should keep the PVC on the shelves and keep the shelves stabilized.
4. Organize. Find places for everything. Put the heavier stuff on the lower shelves and the lighter stuff up higher. Things that you will only need once or twice such as Chairman's supplies can go on the highest levels. Put the battery cart in between two of the shelves on the side. Put your toolboxes on the opposite side. Put handouts near the front of your pit at chest height so that you can get to them easily. We had a printer in our pit which was very handy and saved a few other teams and us several times. The tables that are usually supplied are rough and unappealing to the eye. To resolve this, we covered our table with a tablecloth to look better and allow for easy cleaning. Place all your table-top tools on the covered table. Place a 'trashcan' and your shop-vac under the table. Get your power strips plugged in and distributed throughout your pit. Place bags and other personal items on the first level of the back two shelves. This keeps them out of the way but not impossible to reach if something is needed.
5. Your pit should be mostly done. Do a sweep to clean up any mess made and get everything plugged in and good to go. Keep the pit clean of debris and people to keep things safe and organized. Have your 'pitmaster' stay in the pit most of the time to ensure that things are staying organized and to talk to judges/safety inspectors when they stop by.

Please send any comments or suggestions for improvements to team@spectrum3847.org