



S.P.A.M. Robotics
FRC Team 180

2018 Travel Pit Details



In 2018 we redesigned our team's travel pit to make better use of space for everything we bring to work on our robot and assist other teams with their robots. We also had a goal to improve functionality, improve safety, and improve our image (especially as we represent our appreciated and valuable sponsors). This travel pit was especially designed so that it could double as a display booth (without most of what you see above) that could be taken to any event where our team wants to make a branded presence.

1. Truss System

After extensive research of different pit structure design ideas and products, we chose to use Milos brand quad trusses. We purchased them through one of our sponsors (www.acousto-optics.com). The owner is Bob Farrer (bobfarrer@mac.com) and he helped us as a vendor of these trusses to work with the manufacturer to design and order what we needed. We recommend him as a source of information and as a preferred vendor of the products they offer:

<https://www.milossystems.com/products/truss/m222/quatro>

We ordered a structure with brackets to hang cabinets (see picture on front page of this document), that would fit within the 10'x10'x10' location size at our competitions. The structure is just under the 10x10x10 dimensions. The entire aluminum structure is about 250lbs.

- (4) QLM 30 Corner
- (8) QTM1500 Truss
- (8) QTM1000 Truss
- (4) MWPPQ Female Plates
- (12) CELL131 basic truss clamp
- (12) CCMM6 10 M222 Half Connector
- (12) M10X16FLATSOC C/S
- (6) BTM750 QuickTruss M222 750mm Duo
- (6) MWPPDC | MALE EA

Total Price is about \$6500 + Shipping

2. Red Cabinets in back of Pit

We decided to purchase three lockable cabinets to hang off the rear truss. They were Gladiator 30" x 30" x 12" steel 2 door cabinets. We purchased them from Home Depot.

<https://www.homedepot.com/p/Gladiator-Premier-Series-Pre-Assembled-30-in-H-x-30-in-W-x-12-in-D-Steel-2-Door-Garage-Wall-Cabinet-in-Racing-Red-Tread-GAWG302DDR/205738407>

Approximately \$690.00 (\$230.00 each)

3. Electrical Cable Assemblies

In order to get power where we needed it and improve safety in the travel pit, we researched and designed a power cable assembly that would remove any need to "daisy chain" electrical components. We had many discussions with www.lexproducts.com

www.spamrobotics.com

and especially Curt Contrata, the Branch Manager from Stage Equipment and Lighting, Inc. out of Orlando, FL (www.seal-fla.com). Curt works with Lex and helped to ensure that what we build would be made of components that would stand up to years of use, and he helped to provide details so that we would be well documented (See UL Listed Components for Travel Pit.pdf).

We also had discussions with representatives from UL who work with FIRST and showed them our proposed solutions, taking their input to ensure that we thought through safety and design. What we ended up creating were 3 cable assemblies (see details below). Two assemblies (for redundancy) that run along the top of the truss system to deliver power up high (duplexes) for lighting and TV monitors and down lower where we drop quad boxes to plug in tools, computers, chargers, etc. The third cable assembly plugs into power supplied by any venue and has a built in 15 A breaker that the other two cable assemblies plug into. This ensures that even if we try to use more than 15 A at any one time, we will not overload the venue's capacity.

DB15-QD34-6DUP-L \$280 Each + Shipping
PowerFLEX Quad String Cable Assembly
ENVIRONMENTAL RATING: Indoor
ENCLOSURE MODEL: Rubber Quad Box
LENGTH: 34FT with a 5FT leg at 20FT from Input
INPUT: NEMA 5-15 Plug
CABLE TYPE: 12/3 SOOW
FEEDTHRU: No
OUTPUT:
BOX 1: 20FT from Input, (1) Duplex
BOX 1A: 5FT from BOX 1, (2) Duplexes
BOX 2: 9FT from BOX 1, (1) Duplex
BOX 3: 5FT from BOX 2, (2) Duplexes

DB15-QD34-6DUP-R \$280 Each + Shipping
PowerFLEX Quad String Cable Assembly
ENVIRONMENTAL RATING: Indoor
ENCLOSURE MODEL: Rubber Quad Box
LENGTH: 34FT with a 5FT leg at 11FT from Input
INPUT: NEMA 5-15 Plug
CABLE TYPE: 12/3 SOOW
FEEDTHRU: No
OUTPUT:
BOX 1: 11FT from Input, (1) Duplex
BOX 1A: 5FT from BOX 1, (2) Duplexes
BOX 2: 9FT from BOX 1, (1) Duplex
BOX 3: 14FT from BOX 2, (2) Duplexes

DB15-QD20-1DUP-BKR \$120 Each + Shipping
PowerFLEX Quad String Cable Assembly
ENVIRONMENTAL RATING: Indoor
ENCLOSURE MODEL: Rubber Quad Box
LENGTH: 20FT
INPUT: NEMA 5-15 Plug
CABLE TYPE: 12/3 SOOW
FEEDTHRU: No
OUTPUT:
BOX 1: 20FT from Input, (1) Duplex protected by (1) 15A Breaker

Total: \$763.55

4. Branding

For our shirts, jackets, bags, hats, signs and banners we are fortunate to have a mentor who is the owner of Acme Printing (www.acmeprintingandgraphics.com) in West Palm Beach, FL. Guy Carroll (acmeprint@mac.com) has been very generous with his company's time and expertise. As a parent of a S.P.A.M. student and a mentor on the team, he has attended many competitions and understands the constraints and demands of this robotics community.

5. Road Cases

This year we decided to design and make our own cases to transport and store miscellaneous gear such as the trusses. After much research we chose to make the cases out of the same materials that are used to make cases to transport electronics and lighting for concerts. We used a company called DIY Road Case (www.diyroadcasesstore.com). They provided all the materials via pallet, and we designed and built two (2 lid) cases that could be used to transport materials and then be set up in our pit on site. The materials are sturdy and can be configured in any way that can be imagined. Additionally, we spent about \$2000 in materials and the finished cases would have been about \$6000.00 if purchased from a manufacturer as finished cases.

6. Miscellaneous

We use a variety of tools, mills, lathes, tool boxes, etc. If you have any questions, please send our team a message and we will get back to you.

Example of Large Road Case

