

# Cosmic Ray Telescope Construction Instructions for 2017 Eclipse

## Tracking design

### Parts

1 ¼" aluminum conduit 10'

Two – aluminum (or plastic) LB Conduit boxes, 1 ¼" thread. You want the longer box.

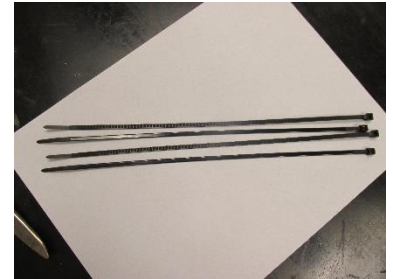
Two -- 1 ¼" conduit lock washers

Four – machine screws that match the threading of the boxes, 12 X 24 X 1".

Two 15/32" plywood, 15" X 18"

Plastic zip ties

Two – 2 ½" or larger hose clamps for attaching assembly to mount.



### Protective Box for Electronics

15 Liter plastic box with lid

2" PVC 90° (or 45°) street elbow

2" PVC Male adapter or Coupling

Painter's plastic drop cloth in case of rain.

Two large opaque plastic bags to cover each end. (Light leak prevention)



### Tools

Large pliers for conduit lock washers

Screw drivers

Drill

2 3/8" hole saw

White glue

## Assembly of Telescope

The spine of the telescope is 1 ¼" aluminum electrical conduit, threaded. As a bonus, you will get a coupling that will not be used.



Home Depot information



Unused coupling

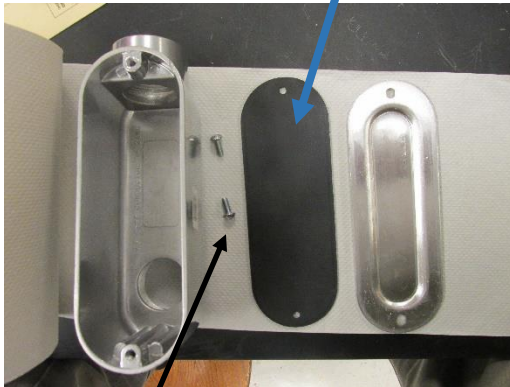
Attach one LB aluminum conduit box to each end (two total). The gasket should be removed and used as an interface between the conduit pipe and the telescope mount.

First, place the lock nut on, then attach the LB conduit box. Make sure that the two boxes, top and bottom, are parallel to each other. Lock into place.

You will need longer screws. Since there are several manufacturers, we cannot say the exact type needed. We are using 12 X 24 X 1"



Save gasket for interface between the assembly and the telescope mount.



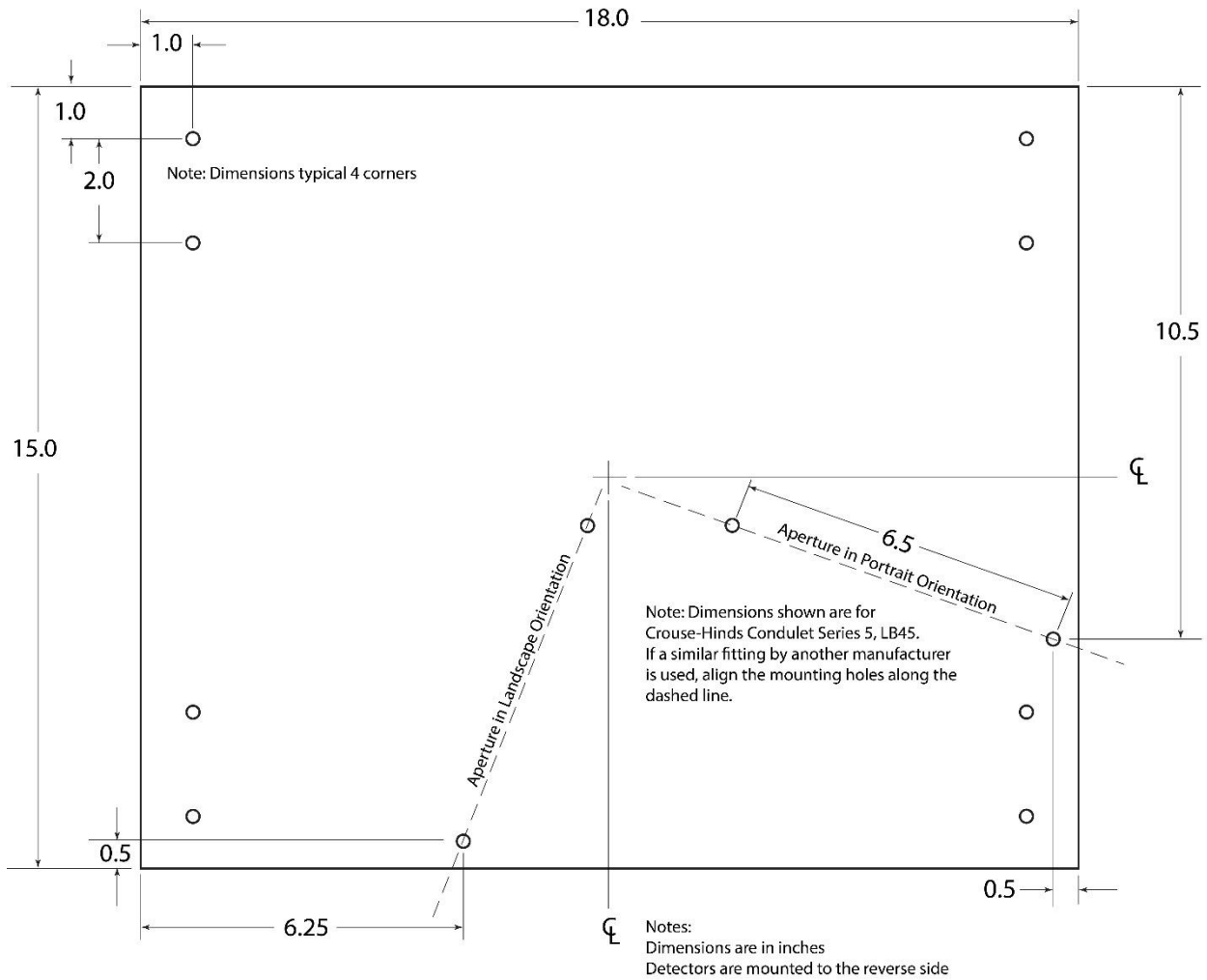
Longer screws will be needed. It will need to be long enough to go through the lid, plywood board, and into the housing. The prototype materials matched 12 X 24 X 1"



Conduit, LB Conduit Body, and locking ring nut.

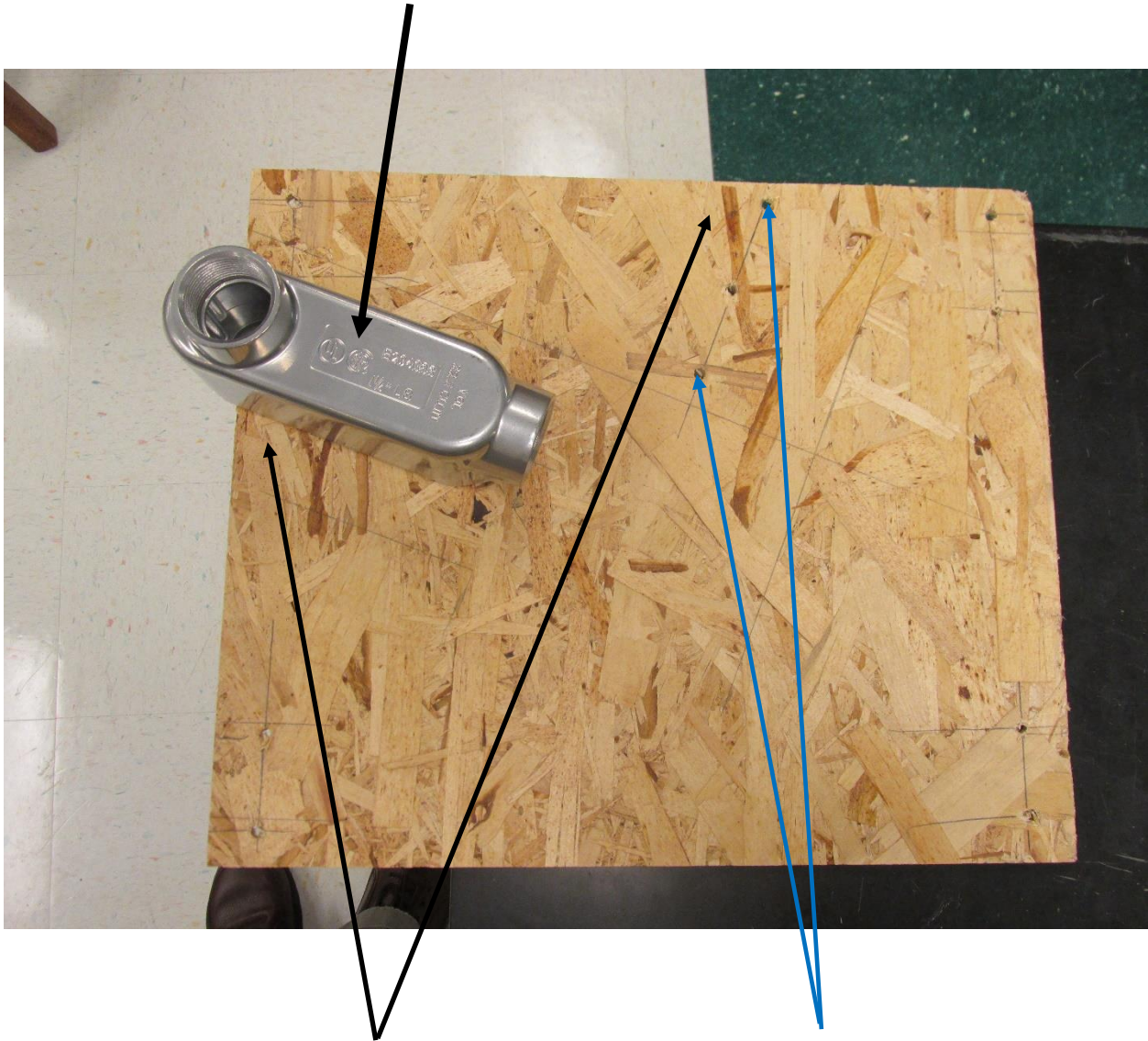
You will need two pieces of 3/8" or 15/32" plywood, cut 15" X 18".

The hole pattern on both boards are identical. There are two sets, in the event you want to rotate the board 90°. Only one set will be used at a given time. This is diagrammed below:





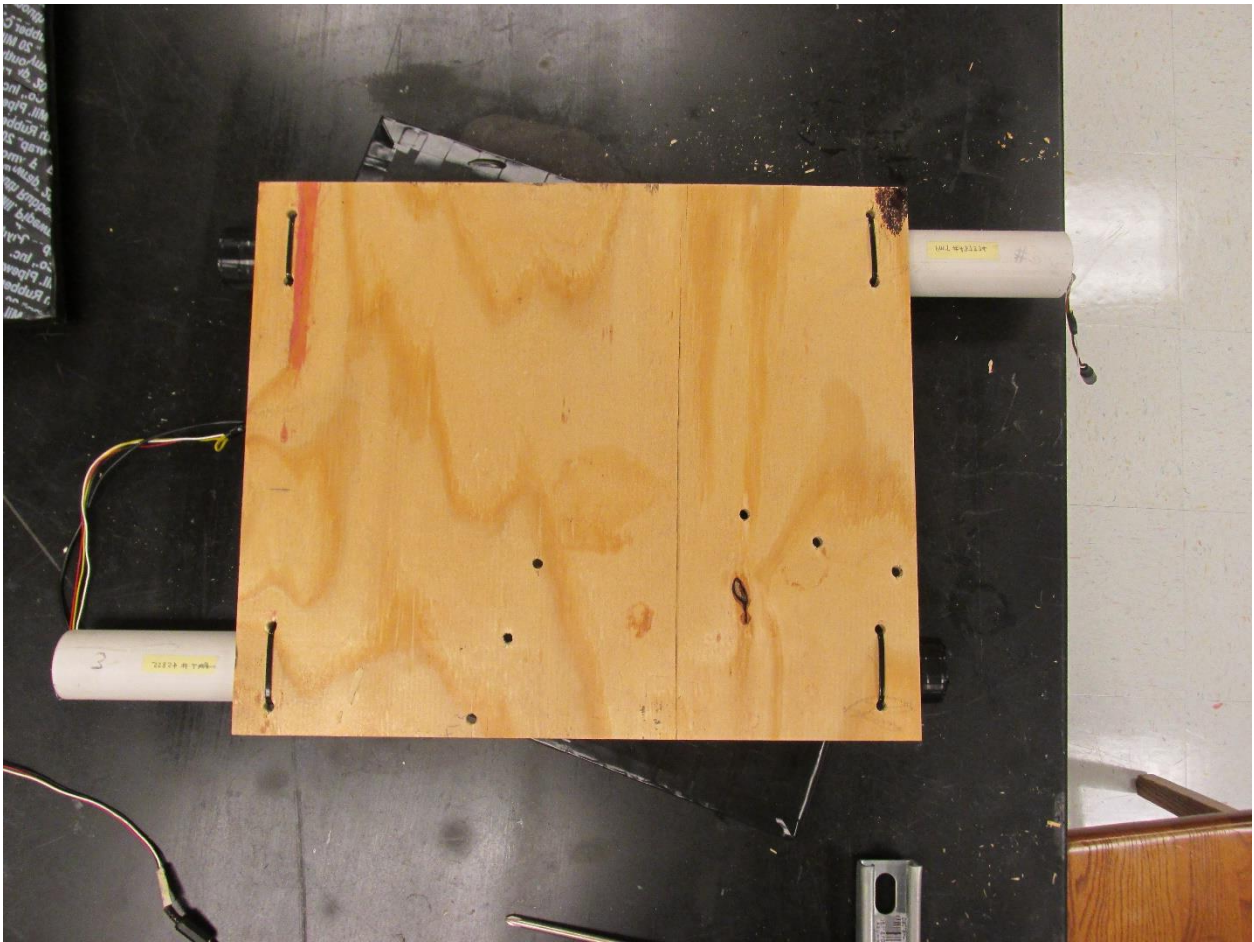
Or may be rotated 180° to bring the center of mass closer to the conduit spine.



About 68° to the edge

Second set of holes are perpendicular in direction to the other LB conduit box.

The counter over the LB conduit box should be the top counter in the stack, giving clearance for the cover.





## Final Assembly



Counters are mounted corner over center.

A large, opaque plastic garbage bag should be wrapped around each end to reduce the possibility of light leaks.





To have clearance, we needed to prop the telescope stand on top of boxes.

2 ½" hose clamps (or larger) can be used to attach the conduit spine, with the gasket from the LB conduit boxes. This gasket will prevent the spine from sliding, and will help with the interface with the telescope mount.



Convenient spacers (From tape dispenser cores.)  
These are used with the counters.



## Assembly of Box to Protect Electronics

Take a 15L plastic box with lid. On one narrow end of the box, close to the top, make a 2" hole.



Cut a 2 3/8" hole in the flat end of the plastic box, high enough so that there is clearance of the bottom of the 2" 90° PVC (or 45°) street elbow. Place a 2" 90° PVC (or 45°) street elbow at the hole, and anchor it with a 2" coupling or male adapter or coupling on the inside of the box. White glue is sufficient.



The PDU and DAQ can rest in the 15 L plastic box. It may help to raise the DAQ on a small board.