

Application Note: Assembling the freETarget Flatpack

INTRODUCTION

The freETarget flatpack consists of all of the components needed to build a target holder with LED illumination and witness paper transport. Assembly is done in a few steps, many of the components are preassembled for precise installation.

Assembly should take about 4-8 hours, with much of that time waiting for the glue to dry.

PACKING SLIP

Item	Description	Quantity
1	Top	1
2	Left	1
3	Right	1
4	Bottom	1
5	Back with sensor mounts installed	1
6	Door	1
7	LED Mounts	4
8	Witness Paper Mounts	2
9	Witness Paper Shaft (Dowel)	1
10	Wire Guide (Dowels)	4
11	Witness Paper Drive Assembly (Motor, Wood, Drive Train, Cable)	1
12	Switch Plate Assembly (with cable)	1
13	WiFi Cable	1
14	Pistol Target Plate Assembly (Plate, Target Holder, Paper Guide) (Pick One)	Optional
15	Rifle Target Plate Assembly (Plate, Target Holder, Paper Guide) (Pick One)	Optional
16	Try Square	1
17	Hinges with Screws (Holes drilled)	2
18	Door Magnets	2+2
19	4mm x 30mm Target Plate Bolts	4
20	4mm Target Plate Nuts	4
21	3mm x 30 Sensor Mount Bolts	8
22	3mm Sensor Mount Nuts	8
23	4mm x 20 Motor Mount Bolts	4
24	Wire Ties	9
25	White Glue	1

REQUIRED TOOLS

Item	Description
1	ALLEN KEYS 1-5mm
2	PHILIPS SCREWDRIVERS Small and Medium
3	CUTTERS

OPTIONAL

Item	Description
1	12 Volt LED strip
2	Wood clamps

BEFORE YOU START

Before you start, make sure your work area is clean and flat. Large wood clamps are nice, but not essential to the assembly.

ASSEMBLY INSTRUCTIONS

The assembly takes place in three steps

- Subassembly construction: Preparing the parts for assembly
- Frame construction: Putting the box together
- Installing in the shooting range

Subassembly Construction



The LED mounts attach to the grooves cut into the door. The LED grooves are located inwards towards the hole. This gives a place to put the LED tape in later in the assembly.

Use the white glue to hold them in place.

The grooves are cut slightly undersized to allow for precise location of the mounts. You can sand or file the edges to fit, or press fit them using a clamp or hammer.



Attach the door magnets to the right-side panel.

Align the magnets so that the edge of the white plastic lines up to the edge of the pane.

Hold in place with $\frac{1}{2}$ " (12mm) wood screws



Attach the witness paper supports into the top of the back panel using the white glue provided

Using the tri-square, make sure that the supports are square to the back panel



Attach the four round dowels into the four holes around the target hole. Use the white glue to hold them in place.

The dowels are used to prevent the cable harness from falling into the hole and getting damaged by the pellets

Assembling the Frame

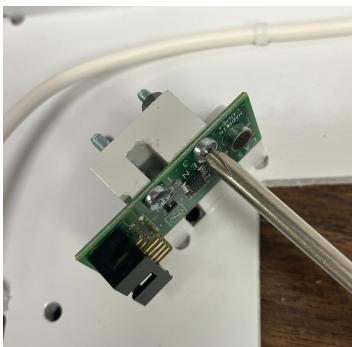


Install the four captive nuts into the sensor mounts.

They are a tight fit into the slot.

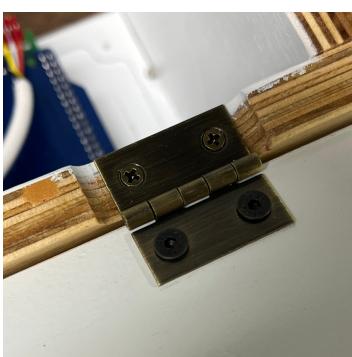
Hint

Position the nut on to the bolt as shown in the picture, and press the nut into place with a screwdriver or other flat tool.



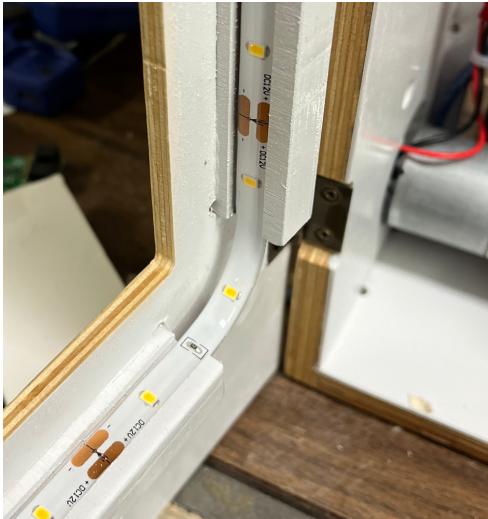
Attach the four sensors onto the sensor mounts.

Make sure that the sensor name matches up to the sensor holder ID (south sensor goes to the S holder)



Hold the door onto the hinges by inserting the 12mm flat head crews through the hinge and door

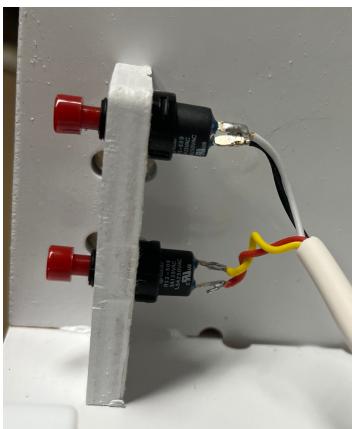
Hold in place with the 3mm nuts



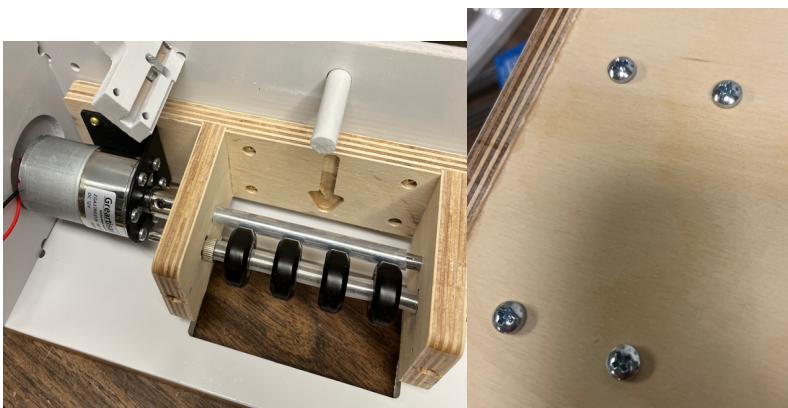
Install the LED lighting into the grooves.

Important

The LED lighting is not included in the kit since electrical and regulatory rules vary by country. Obtain the LED lighting locally



Install the MultiFunction Switches into the base of the target holder.



Install the witness paper drive using the 4mm screws from behind the target holder

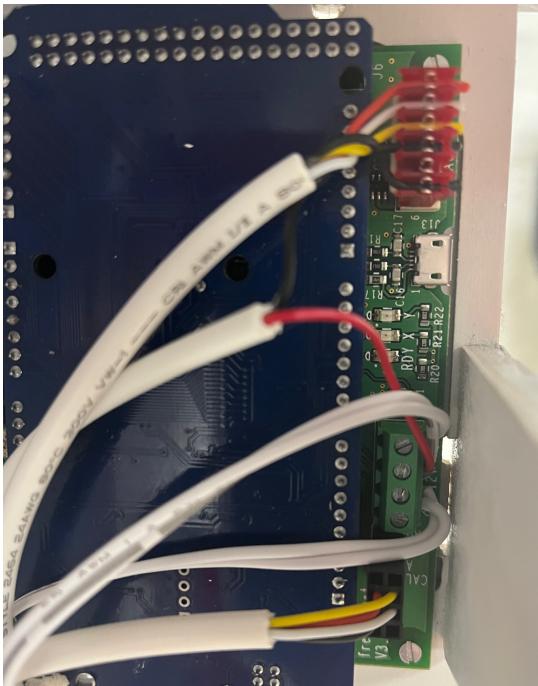
Note the back end of the motor fits into the recess on the left hand panel.



Dress the cables using the holes on the back side.

Put the tie wrap from the back, around the wire, and then back through the hole.

Cinch and cut the excess tie wrap



Attach the cable harnesses to the Arduino and shield.

WiFi Connector

Green Screw Terminal

LED –

LED + & Motor Red

12V (from LED power supply)

GND (from LED power supply)

Multifunction Switches

White wire matches to A on board

USB Cable

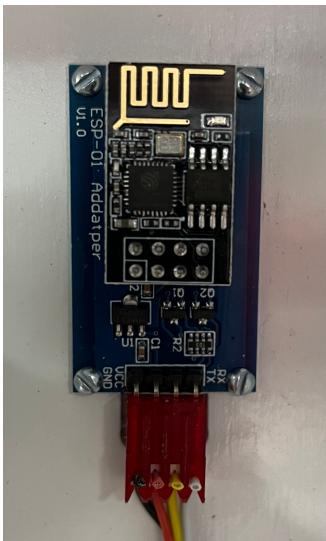
Hint

Attach the cables to the board and then mount the board to the back using the small flat head screws

Attach the WiFi cable to the adapter.

Note the colours of the wires, Black to the left.

Hold in place using the small round head screws.

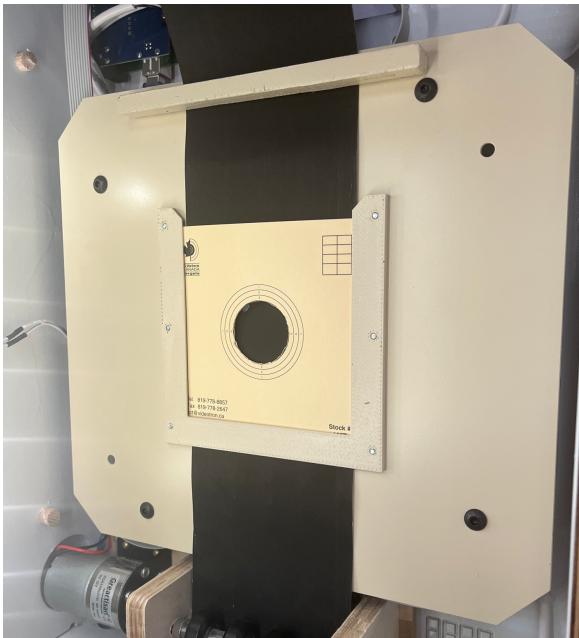




Connect the sensors to the Arduino using the long flat cable.

Note, the FACE connector is not used at the moment.

Be sure to keep the flat cable outside of the target area by using the dowels.



Install the face plate.

The face plate attaches to the blind mounting nuts using the long (30mm) bolts.

Install the witness paper and put through the target holder

The 3D printed target holder can be removed and target masks can be used. There are holes pre-drilled for 165mm rubber masks

Finishing Up

The target holder is intended to be fastened directly to the pellet trap and wall(Figure 1), or onto a set of upright supports (Figure 2).

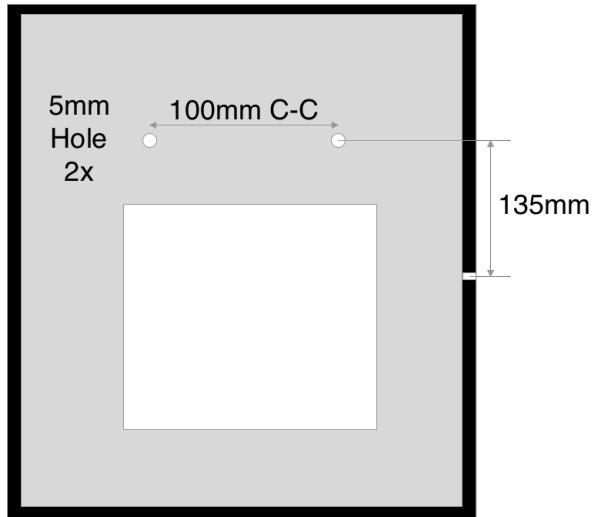


Figure 1: Wall Mounting Holes

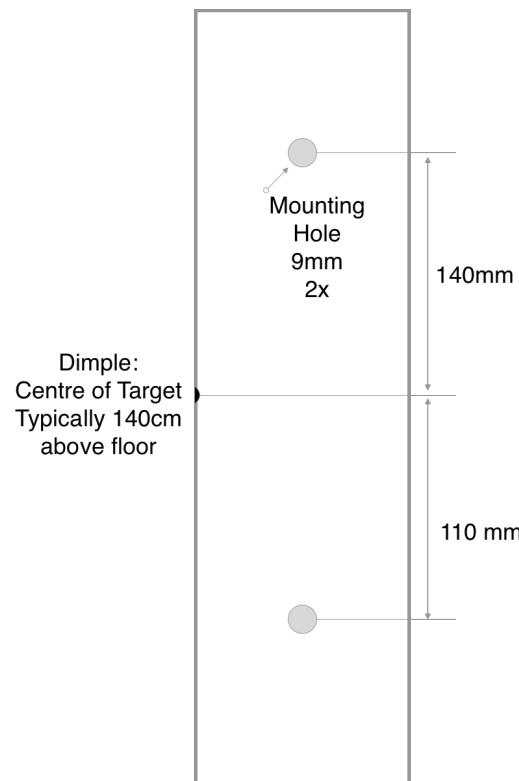


Figure 2: Support on Uprights

Make sure that the following settings are

Setting	Description
PAPER_TIME	Control how far the witness paper moves. Should remove the pellet hole from the target area on each shot. Typically 50-100 (500 – 1000 ms)
MFS	Multifunction Switch Sets the functions of the multifunction switch. A value of 1 configures the switch to be used to advance the witness paper. Example MFS: xx1. The #1 identifies that switch 1 will be used for function 1 (paper advance)