

Protocol: Behavior Cables

McDannald Lab

Part One: Assembly

Materials

Blue fiber (Thor FT20UMT)

Metal shielding (Thor FT05SS)

Stripping tool: labeled for behavior cord

Scissors

10 mL cylinder

Acetone

Helping Hands

Ruler

Scissors

PFP Epoxy part A & B

Small weigh boats

Insect pins

Transfer pipettes

Canned air

1 uncut ferrule

Stripping Ferrule (marked black)

Scribe

Cable kit (Thor 30230C)

1 modified brass connector

1 FC/PC connector

Kim Wipes

Dremel

Safety Glasses

Heat gun

Vice

Dust caps

Sharpie

Green or white tape



A: FC/PC Connector

B: Modified Brass Connector

C: Uncut Ferrule

D: Stripping Ferrule (marked black)

E: Dust Cap

Make Ahead: These parts can be made in advance in bulk and should be kept in stock.

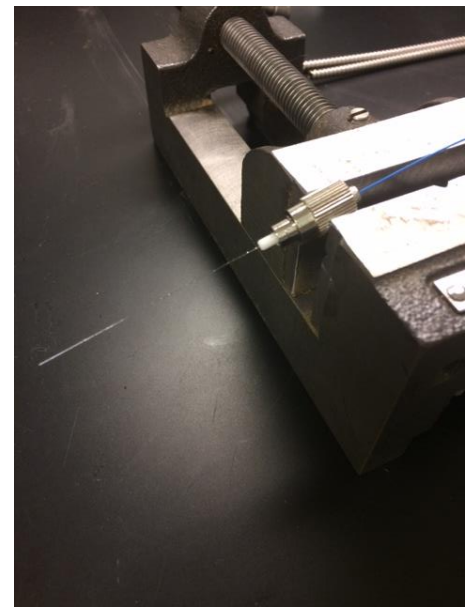
Brass Connectors

1. Take the brass connectors from the Cable kit (Thor 30230C).
2. Using a dremel with the round metal adaptor, rough up the whole connector, outside and inside. This helps the epoxy to grab onto the connector.

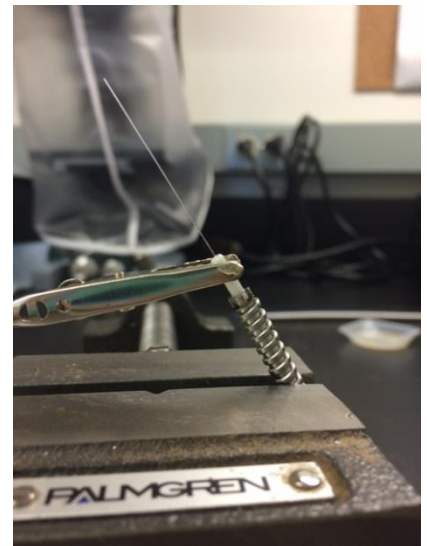
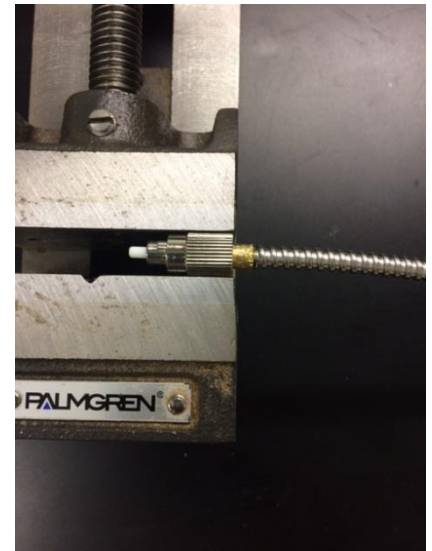
Metal Shielding

1. Measure and mark 20 inches of metal shielding.
2. Cut the shielding using the dremel with a round disk adaptor. Smooth the ends of jagged edges.
 - ✓ Remember to wear safety glasses!

1. First, measure out 26 inches of the blue fiber and cut with a scissor. Measure and mark the blue fiber to be stripped 2.5 inches on one side and 3 inches on the other.
2. Put the fiber in the stripping tool just until you can see the mark you made through the first opening of the stripping tool. Hold the tool down and pull the fiber out.
 - ✓ Remember to clean out the blue insulation from the stripping tool with canned air.
3. Fill a 10 mL cylinder with acetone and bend the fiber so each end sits in the acetone without touching the bottom. Let the fiber sit for 10 minutes.
4. Then, prepare the PFP epoxy by adding part A to part B in a 5 to 1 ratio. Mix these together with an insect pin in a small weigh boat.
5. Once the fiber is ready, slide the stripped fiber ends through the black marked ferrule to remove the inner cladding and gently clean off any extra cladding with a kim wipe. Clean out the ferrule with canned air after each use.
 - ✓ The fiber is now **bare** and more fragile than it was when you started. Be careful!
6. Take the metal FC/PC connector and place it upside down in the metal vice. Apply a 5-6 small drops of PFP epoxy with an insect pin to the opening, enough to coat the entire length of the FC/PC connector.
7. Carefully slide the longer end of bare fiber into the connector until it stops. Leave enough space on the other end for the bare fiber to exit.
8. Heat the whole connector with the heat gun until the epoxy turns black/brown. Gently pull on the fiber to check if the epoxy is set. This may take longer than setting fibers into a ferrule because the junction is much bigger.
 - ✓ Be careful not to melt the blue insulation on the rest of the fiber.
9. Next, slide the brass connector, larger side first, over the fiber to the FC/PC connector. Apply epoxy to the scored metal collar of the connector and then slide the brass connector over the collar until it is firmly in place.
 - ✓ Avoid putting epoxy near the sliding portion of the FC/PC connector.
10. Clean off any excess epoxy that may be oozing from the junction and set with the heat gun.



11. Then, slide the metal shielding over the blue fiber to the brass connector. Apply epoxy on the smaller end of the connector and slide the shielding over it until it is firmly in place.
 - ✓ Do not let the metal shielding hang on the blue fiber.
12. Fill in any gaps between the shielding and the brass connector and set with the heat gun.
13. Next, place the uncut ferrule upside down in the vice and apply 4-5 drops of PFP epoxy with an insect pin to the inside of the metal portion of the ferrule.
14. Slide the bare fiber into the uncut ferrule until it stops at the blue insulation. Apply PFP epoxy under the metal collar of the ferrule and the inside of the shielding. Use the helping hands to hold the ferrule in the center of the shielding.
 - ✓ Before setting, push the bare fiber back into the shielding to ensure the fiber is not taut inside.
15. Set the epoxy with the heat gun on the lowest setting and gradually increasing power to avoid blowing the ferrule out of place.
16. Once it is cool, score the bare fiber as 3 times as close to the ceramic ferrule as possible.
17. Cover both sides with dust caps to protect the ferrules.



Part Two: Polishing

Materials

Polishing films

Alcohol Wipes

Rubber pad: 70 durometer

Hardman Epoxy

Glass polishing plate

Small weigh boats

1. Assemble the polishing papers on the glass plate:
 - a. Select rubber mat (70 durometer)
 - b. Stack films in order, with the thickest film on top (12 μm , 3 μm , 0.3 μm , 0.05 μm)
 - c. Place the stack of film sheets and rubber mat on top of the glass plate.
2. Watch the video for proper polishing technique: [Polishing Video](#)
3. While holding the end of the cable, polish the ferrule using the thickest, yellow sheet for about 20 seconds. Then, place the ferrule into the polishing disc and place on top of the

yellow polishing paper on the glass plate. Make 3 small circles until the adhesive is gone. Clean the ferrule with a kim wipe.

4. Then, move on to the next polishing paper and make small circles for about 20 seconds.
5. Clean the ferrule with an alcohol wipe and test it using the laser.
 - ✓ Output: should not have to raise laser past 4.
 - ✓ Point the laser at the wall to check for concentric circles.
6. Lastly, mix together the hardman epoxy in a weigh boat and epoxy each end of the cable from the metal shielding to the metal collar on the ferrule end and over the brass connector on the FC PC connector end.
7. When complete, label the cord with a green piece of tape for a laser cable or a white piece of tape for a dummy cable and cover the ferrule ends with a dust cap.