

Black N-BCAM Assembly Manual

This manual describes how to assemble a black N-BCAM out of a loaded circuit board and mechanical and optical components.

The parts required for assembly are listed below:

- A208301A loaded flex board
- 1 of ICX-424 CCD
- 1 of RJ-45-RST Inverted
- 1 of 48mm lens (Edmund Optics)
- 1 of 5mm length brass lens holder
- Black anodized N-BCAM base
- Black anodized N-BCAM face plate
- Black anodized N-BCAM cover
- 2 of pan head, M2.5, 10mm length screws
- 2 of pan head, M2.5, 12mm length screws
- 2 of pan head, M2.5, 5mm length screws
- 4 of pan head, M2.5, 8mm length screws
- 4 of socket head, M2.5, 8mm length screws
- 2 of aluminum standoffs, 8mm length
- 2 of aluminum standoffs, 5mm length
- 1 bar code sticker and 1 reflective number sticker

The tools required for assembly are listed below:

- Phillips head screwdriver
- 2mm Allen key
- Tweezers
- DP460 epoxy
- DP270 black epoxy
- Petri dish
- Wooden applicator
- Aluminum plate lens inserter

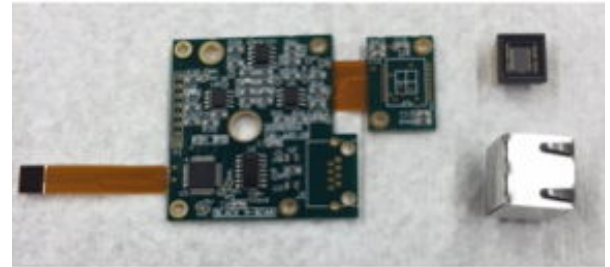


Figure 1: N-BCAM Flex Board (left), ICX-424 (top right), RJ-45 (bottom right)

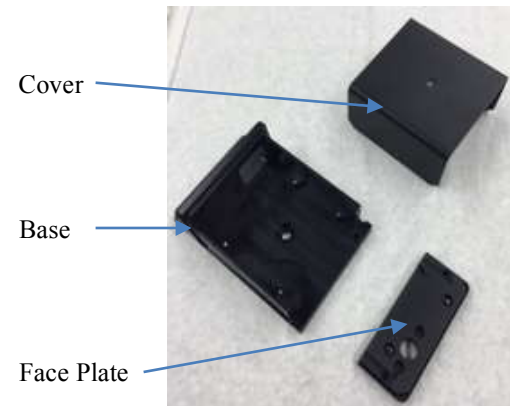


Figure 2: N-BCAM Body



Figure 3: Lens Inserter

The assembly process for the optics involved are as follows:

Step 1: Using mixing nozzle, mix DP270 black epoxy (1:1 ratio) in petri dish using wooden applicator and apply thin ring of epoxy around the ledge of clean brass lens holder. (You may want to use gloves when performing this.)

Step 2: Gently place lens flat-side-down onto ledge in lens holder, making sure it lies flat and evenly (can use clean part of applicator to gently tamp the lens down around perimeter). If you notice epoxy seeping out toward the center of the lens, remove the lens, clean the ledge, and try again. Once lens is settled properly, allow it to cure for 24 hours.



Figure 4: Lens Holder

Step 3: Take the already-assembled laser head and screw it into the face plate using the two 5mm standoffs and the two 8mm pan head screws, ensuring that the laser diodes lay flat on the face plate. For full laser head assembly instructions, see

http://alignment.hep.brandeis.edu/Electronics/A2074/NBCAM_Laser_Assembly.pdf

Step 4: Using mixing nozzle, mix DP460 epoxy (using 2:1 cartridge) in petri dish using wooden applicator and apply a thin ring of epoxy around the surface of the brass lens holder. (You may want to use gloves when performing this.)

Step 5: Using the aluminum plate lens inserter on the front of the face plate, insert the lens holder into the other side of the face plate such that it hits against the inserter and such that the lens side of the holder is facing outside of the N-BCAM. Allow lens holder to cure for 24 hours.

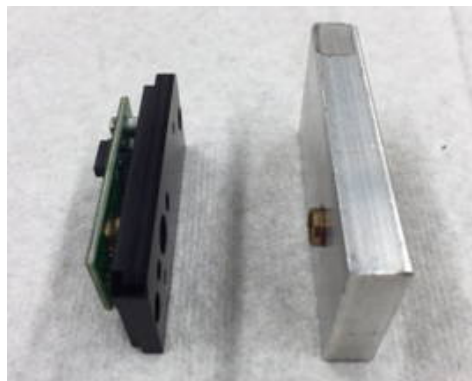


Figure 5: Proper justification of face plate and lens inserter to epoxy lens holder

The assembly procedure for the N-BCAM board and chassis is as follows:

Step 1: With the aid of water-soluble flux, solder the ICX-424 onto the A208301A flex board such that the widest pin (Pin 1) goes through the designated square hole (make sure to push the CCD all the way in such that it lays flush with the board).

Step 2: Solder the RJ-45 RST Inverted connector onto the A208301A flex board. Clip the shield tabs of the RJ-45 to make it easier to insert the board into the chassis later.

Step 3: Wash flex board using warm water with a brush as well as squirting water under the image sensor with a thin jet nozzle and then blow dry, allowing the plastic cover on the image sensor to blow off during drying.

Step 4: Program the logic chip on the now fully-loaded board using the P2083A02 .JED file in Lattice. Test the board by making sure it takes pictures and flashes lasers.

Step 5: Place flex board into the N-BCAM anodized base at a slight angle and then push down so that the RJ-45 is properly sitting in its designated slot in the wall of the base.



Figure 6: Make sure RJ-45 sits properly in the base as shown.

Step 6: Using the four 8mm pan head screws, screw the flex board into the bottom surface of the base with the Phillips head screwdriver.

Step 7: Using tweezers, hold one of the 8mm standoffs in place in the lower hole of the wall of the anodized base with the CCD. Use your other hand to partly screw in one of the 12mm screws through the CCD board and standoff. Be careful not to damage capacitor C16 on the main board while doing this.

Step 8: Do the same with the higher-placed standoff and then finish screwing both screws in completely with the Phillips head screwdriver. Ensure that the pins of the image sensor do not get bent and shorted together as you do this.

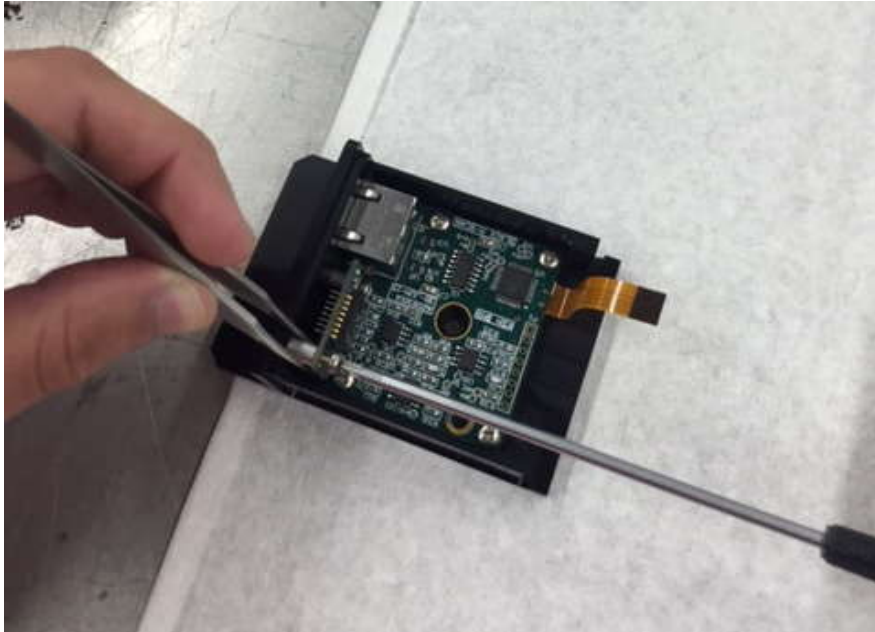


Figure 7: Recommended technique for screwing CCD board into the wall of the base through the standoffs

Step 9: Plug the flex cable of the main board into the connector on the laser board of the face plate.

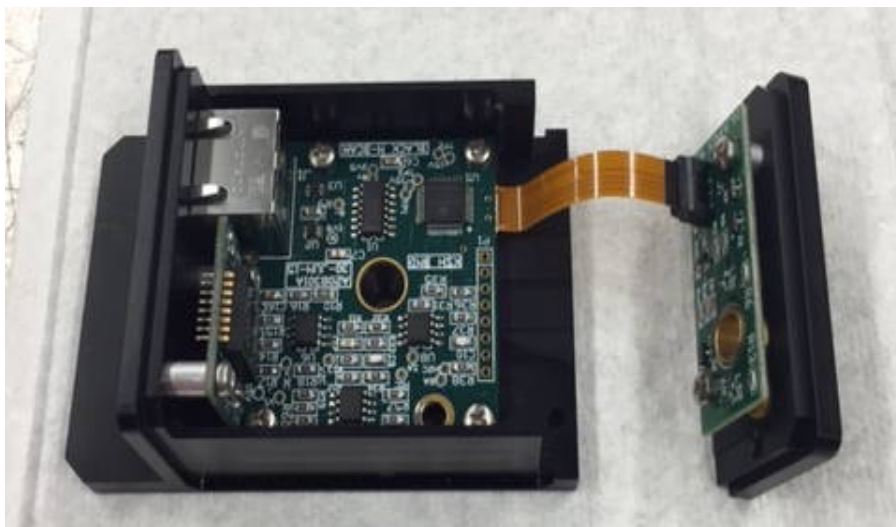


Figure 8: Assembled base attached to face plate through flex cable

Step 10: Using the 2mm Allen key, screw the four socket head 8mm screws into the face plate to connect the face plate to the base.

Step 11: Place the anodized cover on the chassis and screw it in on the sides using the two 5mm pan head screws.