

Welcome to the official release of the PVS-69 ALPHA.

PVS-69 ALPHA is the 4th generation night vision housing in the 69 line.

ALPHA features a lightweight yet durable housing with an assembly cost of around \$100 not including lenses or tubes

ALPHA is an analog/digital housing. depending on your budget you can build it either way.

ALPHA accepts MX-10160 format tubes or the MX-69 Digital image intensifier tube (DIIT).

Before I get into the parts list you can save yourself some money and hassle by just ordering a hardware kit on vonscherfarms.com the hardware kit comes with everything you need except the cams and displays.

Parts list.

1x Pushbutton switch

<https://amzn.to/3KjFyI2>

4x Brass Flat Washer 8mm ID, 16mm OD, 1mm Thick

<https://amzn.to/3QMApJP>

4x m3x40 Bolts

<https://amzn.to/3w8DBWK>

3x M3x8 bolt (you can always just cut down some of the 40mm bolts)

<https://amzn.to/3QRMrSh>

3x M3 heat set

<https://amzn.to/3kt2Ctd>

**m3 Fender washer (optional) it's good to use them if you're printing a soft plastic.

<https://amzn.to/3XAU5CL>

Female Dc jack

<https://amzn.to/3iMiJBI>

M3 Nylock nuts

<https://amzn.to/3lVNejl>

4x leaf connector.

https://www.digikey.com/en/products/detail/harwin-inc/S1761-46R/3728117?utm_medium=email&utm_source=oce&utm_campaign=4251_OCE22RT&utm_content=productdetail_US&utm_cid=3364715&so=79008458&mkt_tok=MDI4LVNYSy01MDcAAAGIfd1T6fnkkL8NJDOJRinSx1vh9dnhIINw2Y1bYghJ7wcMj-GoAH0maJPkp0pcGx3uOWwrfYj783DADxEZEJ3iw5lyaO8uF1ZmlKNqyDHe

2x PVS-14 eyepiece. these can get rather expensive but the Chinese ones work well.

<https://vonscherfarms.com>

2x objective lenses. if you're using analog you will use PVS-14 lenses. if you're going digital use the 8mm CS lens or use the 8mm PVS-14 lens available on Alibaba or my website

<https://vonscherfarms.com>

all lenses can be bought on vonscherfarms.com or Alibaba

PCBs.

the files are in zipped folders. drop those zip files into JLCPCB Oshpark or PCBway and order them. you will need 2 sets of tube pcbs and 1 bridge pcb

for printed parts, you will need the following. (All parts are in the.3mf file)

1x bridge

1x front plate

1x dovetail

1x left pod

1x right pod

2x PVS-14 eye piece bodies

**2x 69 adjustment rings (you can use the PVS-14 adjustment rings)

2x lock rings

*2x D rings (optionally you can use the ones that accept M3 grub screws)

**2X C rings (the C clips from the PVS-14 lens work better)

1x TPU Button

Step 1: Tube PCB Assembly

1. Tube PCBs are small rectangular boards with a few holes in them. They come as a pair, so you need to split them and clean the edges to ensure a snug fit into the pods.
2. Once you've ensured a good fit, solder the spring connector of your choice onto the boards. The pogo pins are easy to solder since they pass through the board. Leaf springs are harder to solder but make tube installation easier. Note that pogo pins can break during tube installation and removal.
3. The double hole on the board is where you solder the contacts. When looking at the boards, the double hole side goes towards the eyepiece. In this orientation, the right side is always positive.
4. Attach 5-7 inches of wire to the boards. For the alpha build, you can ignore the middle holes. To attach the wire, pass it from the top down through one of the non-plated holes and back up through the corresponding plated hole. Solder the wire in place on the top of the board.
5. Once you have both leads attached, put 1 inch of sleeve from paracord on the wire.

Step 2: Eyepiece Parts Cleanup

1. The eyepiece's main body is intentionally printed thick, so the lens cell won't fit without sanding.
2. To sand the eyepiece body, check a tube onto your drill, screw the eyepiece body onto the tube, and spin the drill while sanding the eyepiece body on the outside and inside. You may also need to clean out the rectangle cutouts to ensure smooth sliding of the eyepiece.
3. Do not sand the 69 adjustment ring. Although stringing may occur due to difficult printing of the threads, it won't affect the performance.
4. Clean up major stringing to ensure the ring fits on the printed eyepiece body. The ring is reverse threaded, so remember "lefty tighty" to get the ring on. Spin the pod on the drill with the ring on to allow the two parts to wear together, enabling the ring to spin freely. The end result should be smooth movement of the lens cell in and out by twisting the adjustment ring with minimal friction. Once achieved, install the spring from the PVS-14 eyepiece, followed by the 69 adjustment ring and the C clip.

Step 3: Bridge Assembly

1. Install 3 M3 heat sets into the bridge: one in the top and two in the bottom.
2. Bend the tabs of the switch at a 90-degree angle and solder them to the slots on the bridge. Press the switch down so that it's centered and flat against the board.
3. Install the TPU button into the front plate. You can add some glue to the edges for a better seal, although it has been tested and didn't leak without glue.

4. Solder 3-inch leads to the DC jack and heat shrink the connections. Install the jack in the rear hole of the bridge.
5. With the tube PCBs installed in their pods, pass the wire through a brass washer, through the front plate, and through the non-plated holes. Then pass the wire back into the plated holes in the bridge PCB. Screw the bridge PCB to the front plate using small M2 plastic screws.
6. At this point, you can mix up some 5-minute epoxy and apply it to the bridge PCB as makeshift potting. Use enough epoxy to cover the Pololu buck.
7. It's a good idea to start the M3 bolts now to ensure they don't grab onto the wires. You can put heat shrink on the bolts if desired.
8. For the final assembly, pull the stack out of the wires passing through the bridge board. Send the M3 bolts all the way through the pod. Install the last 2 brass washers on the bridge nubs, and then start threading the M3 bolts into the bridge. Make sure to tuck all the extra wire in so that nothing gets pinched. Install M3 fender washers on the two outer bolts and add M3 nylock nuts to all the bolts. Tighten everything down.
9. Slide the dovetail in place and install the M3x8 bolt to hold it in place.
10. Install two M3x8 screws on the bottom. These act as IPD stops, so adjust them as needed for your preference.
11. If you're assembling an analog device, slide the D-ring on your objective lenses, insert your tubes, and install the tube lock rings and eyepieces.
12. If you're assembling a digital device, you'll need to build your MX 69. Refer to the livestream on building one of these for detailed instructions. There isn't a final assembly instruction for the MX-69 yet, but in the .3mf file, you'll find two display side halves and one cam side.
13. Disassemble your V760, wire the cam to a 5V boost converter, and create contact pads. You can use copper tape with solder or another set of Tube PCBs. Once assembled, use the holes on the objective side for potting. Cover the large opening that the ribbon cable passes through with tape, then inject potting compound or epoxy into one of the two holes on the top and one of the two on the bottom. If you have a vacuum chamber, degas the potting material to remove any bubbles. Otherwise, tap the assembly to ensure proper filling of gaps. You can also potentially fill the tubes with hot glue through those holes.
14. Once the potting is set, install the tubes and lenses, and you're good to go!

