# EDGETAK User Manual


**EDT | Engineering Design Team, Inc.**
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https://edt.com/



Document revision: 0.0
Model: 095-16200-EDGETAK

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# Warnings and Restrictions

- Overvoltage will damage the device. **DO NOT** apply more than 16V on the 12V input pins.
- Not FCC tested.
- Not tested by any safety agency.
- Intended for use with approved battery, AC adapter, or car adapter (up to user's discretion).
- User serviceable modules should only be serviced by trained technicians following instructions.
- Unit must be assembled with properly installed Thermal Interface Material (TIM)
- Disassembly or alterations to the enclosure may reduce the effectiveness of dust and water resistance.
- Do not reprogram with any operating system other than the EDT-provided board support package.
- Do not submerge in liquid.
- Do not allow enclosure vents to become covered or clogged.
- Intended for vertical use (connectors and faceplate pointed upwards) and/or with airflow.
- Not intended for operation in ambient temperatures over 45 ° C. See Power Mode Table.
- Store in temperatures between 18°C and 30°C for long term, or -40°C and 85°C for short term.
- We do not recommend disabling SOM protection capabilities.
- Designed for IP54, protection against dust ingress and splashes of water.
- Requires adequate ventilation to achieve maximum processing capability.
- Do not subject to high impact forces.
- Unless explicitly stated otherwise, this product and its accompanying documentation are subject to EDT's Terms of Use:

https://edt.com/downloads/edt-terms-use/

# Disclaimers

**Engineering Design Team (EDT) provides the enclosed product under the following conditions:**
This device is for evaluation purposes. Persons handling this product must have electronics training and observe good engineering practices. The enclosed device does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and therefore may not meet the technical requirements of these directives or other related directives.

**Warranty information:** EDT standard warranty. https://edt.com/downloads/edt-warranty/

The user assumes all responsibility and liability for proper and safe handling of the product. Further, the user indemnifies EDT from all claims arising from the handling or use of the product. Due to the accessibility of the circuitry in this device, it is the user's responsibility to take any and all appropriate precautions with regard to static discharge. Except to the extent of the indemnity set forth above, neither party shall be liable to the other for any indirect, special, incidental, or consequential damages.

EDT assumes **no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein**.
Please read the User's Guide and, specifically, the Warnings and Restrictions notice in this document prior to handling the product. This notice contains important safety information about temperatures and voltages.
No license is granted under any patent right or other intellectual property right of EDT covering or relating to any machine, process, or combination in which such EDT products or services might be or are used.

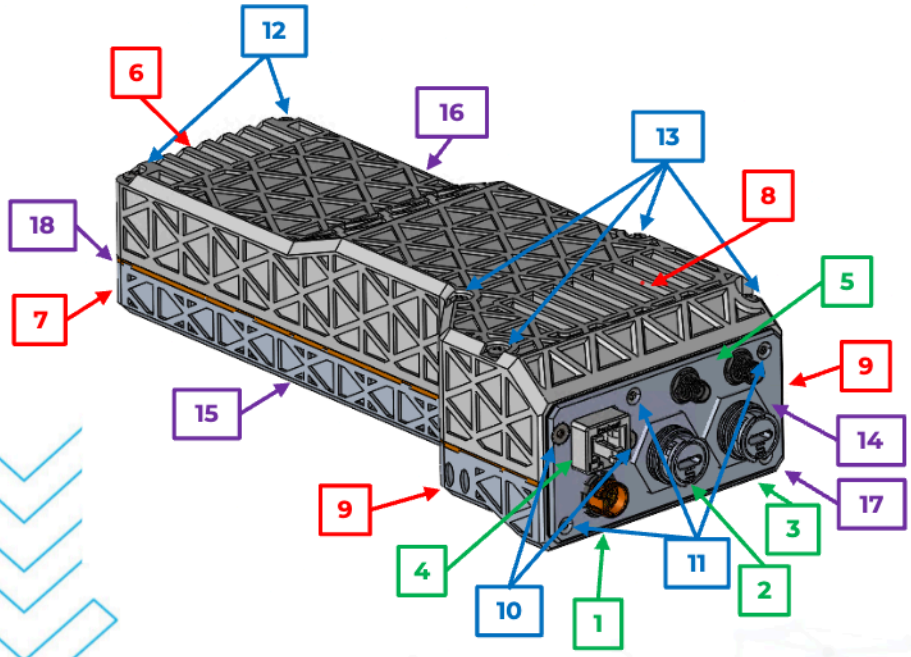
**FCC Warning**
This device is intended for evaluation purposes only and is not considered by EDT to be the final end product for customer use. It may generate or use and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of equipment in other environments may cause interference with radio communications, in which case the user at his own expense will be required to take whatever measures may be required to correct this interference.

# Overview

- User provides 12V DC supply
    - 9-16V DC input
    - Max. current draw 6.0A at 12V in
    - Recommended battery capacity 2.5Ah per 1 hour of intended intensive use or 1Ah per 1 hour of intended low load use (no intensive processing or data recording)
- Product dimensions: 88mm x 54mm x 213mm
- Weight: 2.35lbs/1.1kg
- Power connector for custom cable assembly
- Two SMA connectors available for connecting antennas to M.2 E-Key card
    - User must connect internal coax cable to the M.2 card
    - If the desired M.2 card has incompatible antenna connectors, user must replace internal coax cables with IP67 rated SMA cables
- 1x 1GbE port
- 2x USB Type C

**For adequate cooling:**

- Enclosure is recommended to be used in a vertical position with airflow.
- It should not be used for intensive processing in a small, enclosed space with little airflow.
- If the device is used in high ambient temperatures or for processing heavy loads, it may throttle to protect itself.




1. Power inlet connector
2. USB Connector 2 (Recovery Prog.)
3. USB Connector 1 (DisplayPort)
4. Ethernet
5. 2x SMA connectors for E-key antennas
6. Ventilation – intake, module side
7. Ventilation – intake, component side
8. Ventilation – exhaust, module side
9. Ventilation – exhaust, component side
10. 2x screws, T8 Torx head, 4-40 14”
11. 4x screws, T8 Torx head, M3.5x0.45
12. 2x screws, Phillips, M2.5x0.45 30mm
13. 4x screws, Phillips, M2.5x0.45 35mm
14. Face plate
15. Enclosure, component side
16. Enclosure, module side
17. Faceplate gasket
18. Enclosure gasket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# Included in Package

### EDGETAK unit

- NVIDIA Jetson Orin™ NX 16GB SOM (already programmed, need DisplayPort display with USB-C adapter to create login)
- Samsung EVO 990 2TB NVMe SSD (Jetson Linux + BSP already flashed)
- SMA Cables 2x 200mm long IP67 to AMC (U.FL, MHF) connector for user antenna (must install E-key card and plug cables into card!)
- Unit comes with single-end-terminated power cable, user adds desired connector
- 2x USB cables BCU-C-S-1.00-UC-P

### Does not include:

- M.2 E-Key Wireless card
- Antennas
- Power source and its connector
- Ethernet cable
- DisplayPort adapter

### Replacement Part Kits

| Item | Part # |
|---|---|
| Screws | 094-16229 |
| Power Cable | 016-16206 |
| Faceplate | 017-16179 |
| Gaskets | 094-16230 |
| USB Cable | 016-16183 |
| SOM/SSD | 094-16231 |

# To Access Modules

**Tools Required:**

- Phillips screwdriver
- T8 Torx driver
- Thermal Interface Material (TIM) (reuse or replace)
- Gaskets (reuse* or replace)

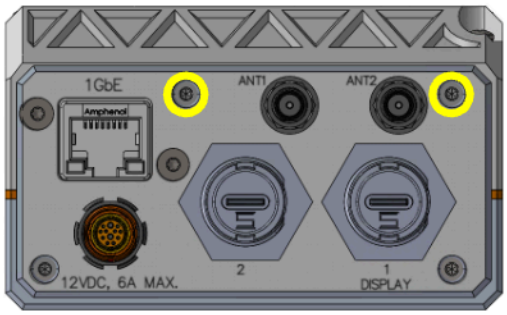
**only reuse TIM and Gaskets that are in good working condition.*

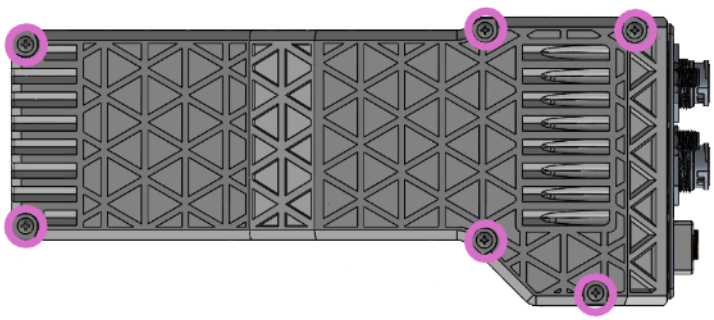
**When inserting a screw into aluminum threads, always turn the screw backwards by hand first until it drops into the existing threads. Inserting a screw and beginning to tighten it, by hand or with an electric driver, may strip the threads in the aluminum**

Remove at least the top two Torx screws with T8 size driver from the faceplate

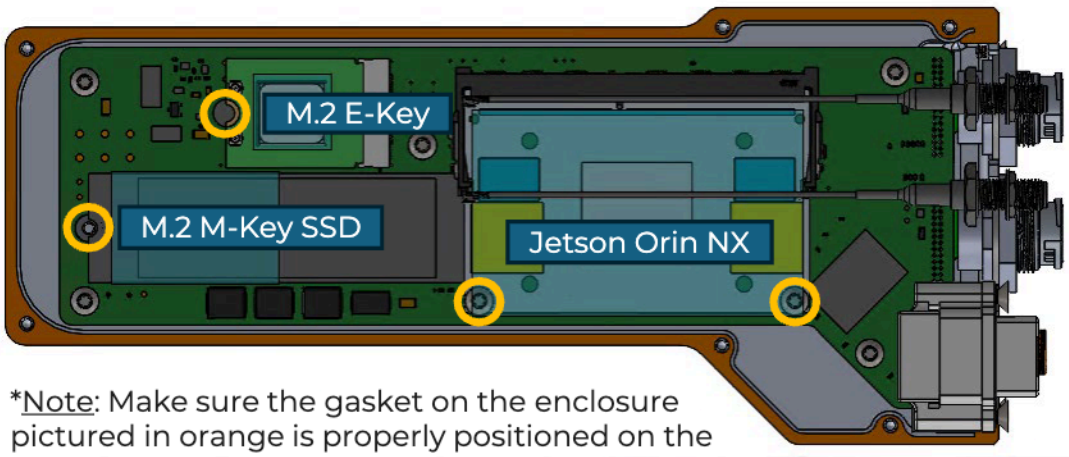
Remove six outer screws from larger half of the enclosure with Phillips screwdriver

**! DO NOT CROSS-THREAD SCREWS !**



Remove the screw(s) for the chosen module using a Phillips screwdriver




*Note: Make sure the gasket on the enclosure pictured in orange is properly positioned on the module side before closing*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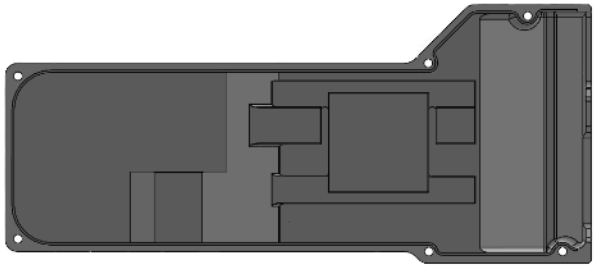
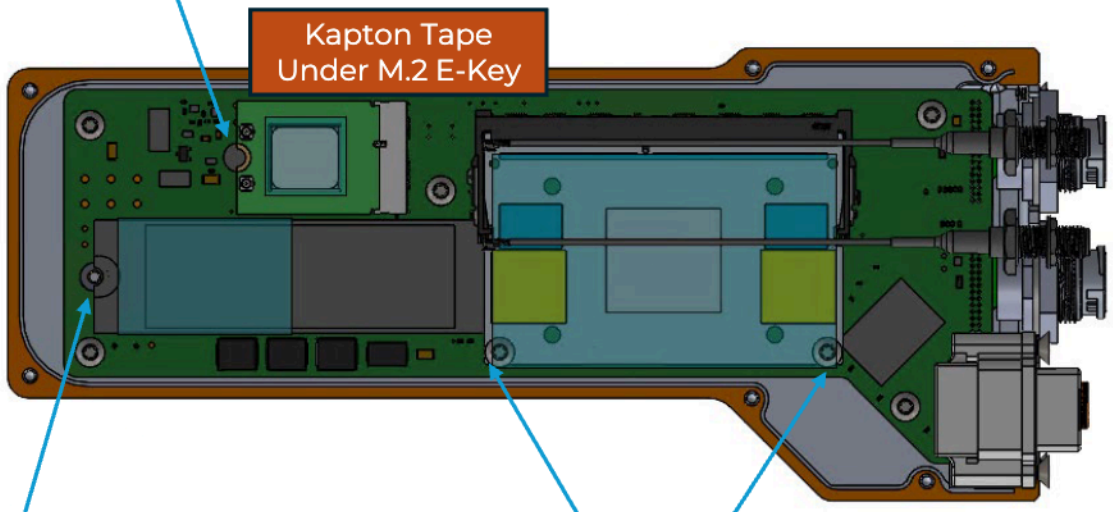
# To Remove Modules

**M.2 E-key:**
- Carefully disconnect any antenna cables that are connected with an appropriate tool.
- Unscrew one Phillips screw and remove M.2 card.






**M.2 M-Key SSD:**
- Unscrew one Phillips screw and remove card.

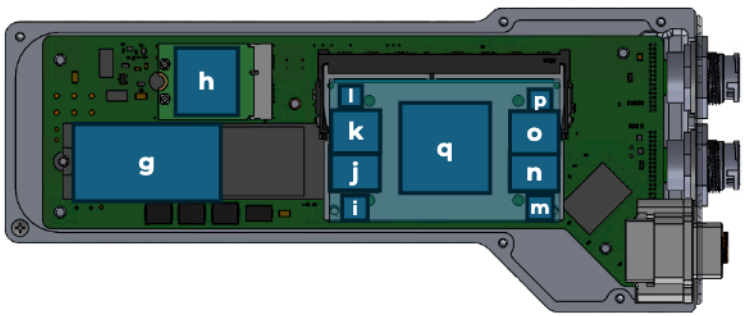
**Orin NX:**
- Unscrew 2x Phillips screws from standoffs (standoffs remain installed).
- Nudge the side arms out by a small amount and the Orin will be released.
- Remove Orin NX module.

# Replacing Modules

- Read connector manufacturer's insertion instructions.
- Be sure each module is fully seated and even.
- Ensure there is Kapton tape under the E-Key card to avoid shorts.
- Replace all TIM according to the instructions in this document.
- Route the SMA cables so they are not damaged when the enclosure is sealed or interfere with any TIM.
- Make sure gasket is adhered to the component half (smaller side) of the enclosure along the provided inner lip and that the screw holes are clear.
- Install 4 module screws.
- Add TIM (minimum Orin NX chip in middle and SSD)
    - *Ensure that the protective plastic is removed from BOTH sides of the TIM.*
- Install 6 long screws to seal enclosure.
- Install 4 T8 screws to affix the faceplate to the two assembled enclosure halves (with gasket adhered to the back of faceplate – ensure that screw holes are clear).

# TIM (Thermal Interface Material) Instructions

- Sites 'a' through 'q', each with specific min and max thickness and size.
- Install TIM onto modules.




| | Thick (mm) | Dim. mm$^2$ |
|---|---|---|
| g | 2.5 | 40 x 22 |
| h | 1 | 16 x 22 |
| i, m | 2 | 5 x 5 |
| j, n | 1 | 14 x 14 |
| k, o | 2 | 10 x 7 |
| l, p | 4 | optional |
| q | 1 | 23x21 |

**Make sure to remove plastic cover from BOTH SIDES of TIM before application!!**

**Gasket must be properly installed to preserve any environmental protection!**

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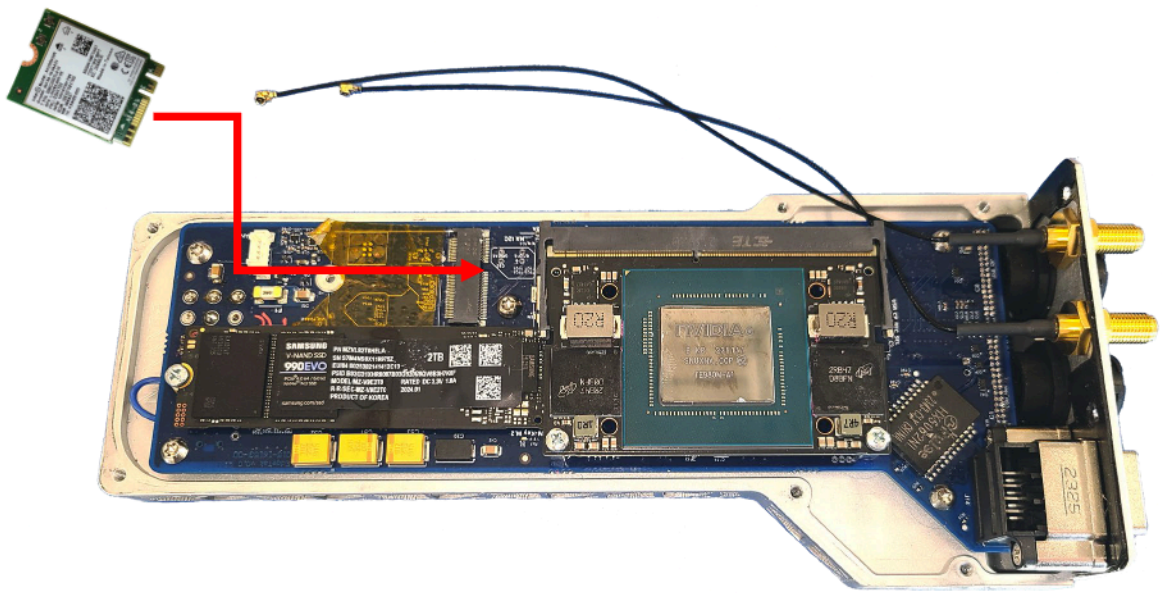
# M.2 E-Key *(Customer Supplied)*

•User provides antenna and E-key card.
•Always cover the PCB under the M.2 E-Key module with Kapton tape before use to avoid shorts.
•Can replace SMA connectors with other to match E-key connectors.
    •Alternate or replacement SMA cables EDT suggests:
        •SMA to AMC 200mm from Amphenol 336319-12-0200 *(used by EDT)*
        •SMA to AMC4 200mm from Amphenol 095-902-502-200
        •SMA to MHF 200mm from Amphenol 095-902-585-200
•Wi-Fi/Bluetooth card tested:
    •Intel Wi-Fi 6 AX200 (Gig+)
•GPS card that exists:
    •Auvidea M.2 Key B/E GPS module Model# 70899
•Reference antenna connector compatibility chart below

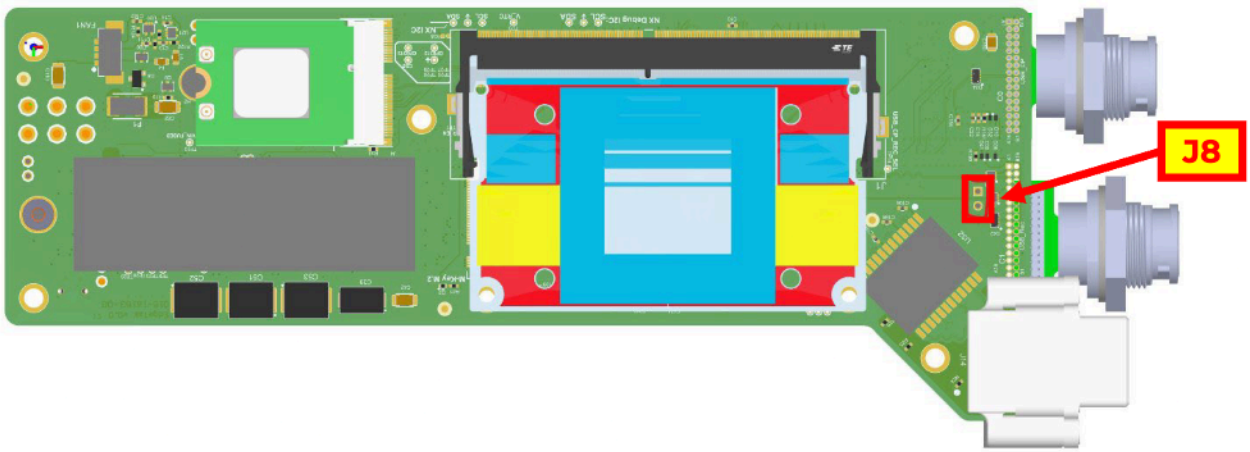


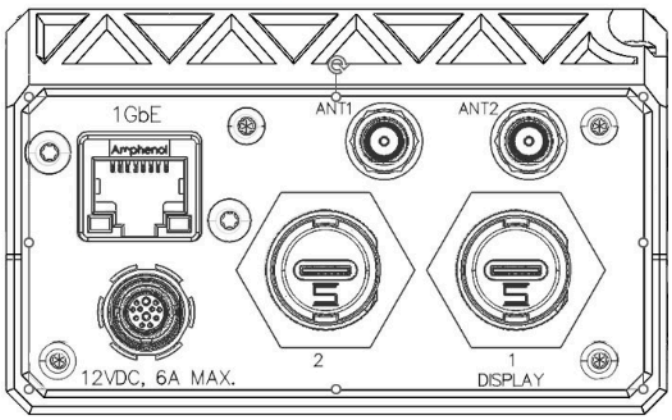
| Antenna Connector Compatibility | | | |
|---|---|---|---|
| | PCB Footprint | Mated Height | Compatibility |
| AMC | 3 mm x 3 mm | 2,5 mm | Hirose U.FL. IPEX MHF |
| AMC4 | 2 mm x 2 mm | 1.4 mm | IPEX MHF4 |
| AMMC | 2 mm x 2 mm | 1,4 mm | Hirose W.FL. IPEX MHF3 |

# USB Type-C connectors

**Connector 1**
- USB 3.2, up to 10 Gbps
- DisplayPort over USB-C (DP Alt Mode)
- USB PD sources power up to 7.5W / 5.0V ⎓1.5A

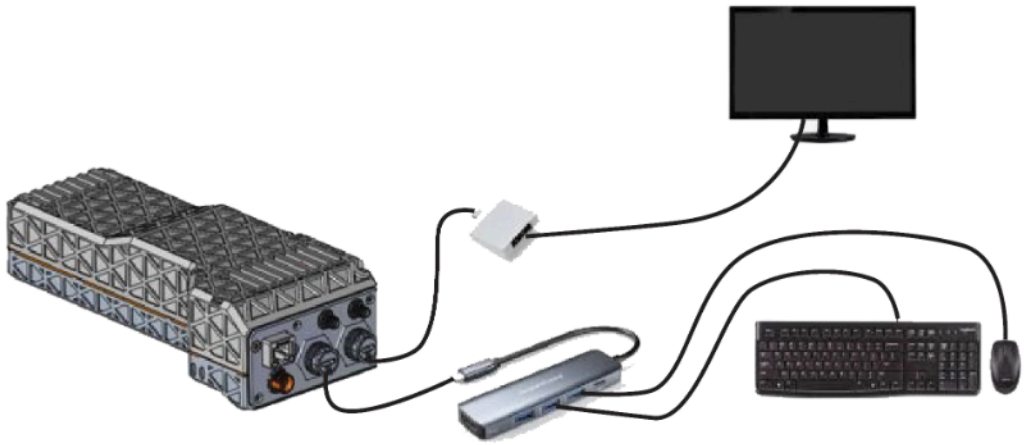
**Connector 2**
- USB 3.2, up to 10 Gbps
- Recovery Programming port (short jumper J8)
- USB PD sources power up to 7.5W / 5.0V ⎓1.5A



# Once programmed, Display is used to create login – only the first time after install

- Connect DisplayPort display through USB Connector1 using an adapter or dock that supports DP Alt Mode.
- Using GUI, finish OS setup and create username and password.
- Then the device can be accessed via the graphical desktop, remotely over SSH, or locally with serial UART.



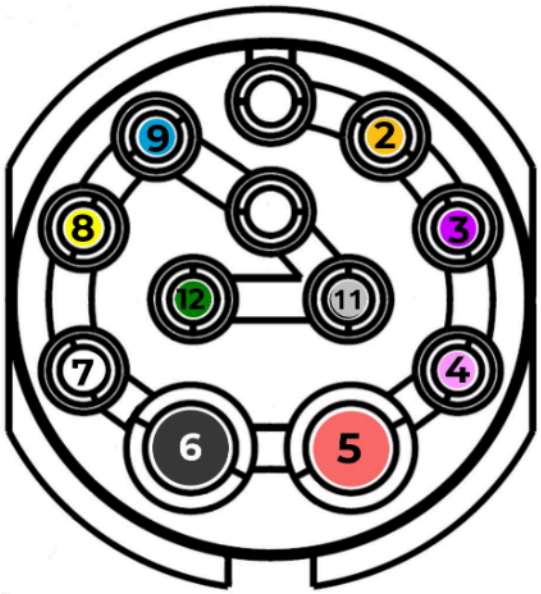
# USB C and DisplayPort adapters tested

•https://frame.work/products/displayport-2nd-gen-expansion-card

**To use DisplayPort:**
•· Framework DisplayPort Adaptor (2nd gen) https://frame.work/products/displayport-2nd-gen-expansion-card
•· UGREEN NVMe Enclosure, model CM559 -https://www.ugreen.com/products/ugreen-m-2-nvme-sata-ssd-enclosure-adapter?variant=39915665063998
•· VisionTek VT2000 USB-C Dock, model 901284 - https://visiontek.com/products/vt2000-triple-display-usb-c-docking-station-with-power-passthrough

# Cable Mount Connector – 1meter pigtail

Pins 1, 10 are No Connect

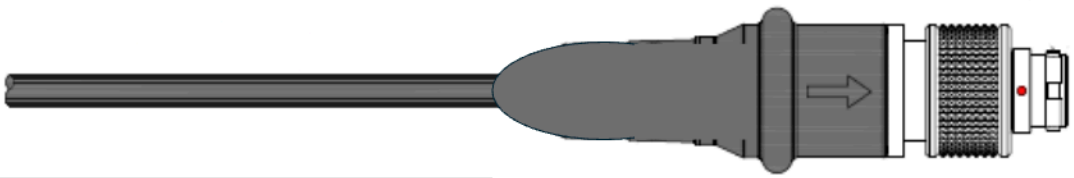



| Pin | Color | Gague | Signal |
|---|---|---|---|
| 1 | n/c | | |
| 2 | Orange | 28 | MCU Rx |
| 3 | Purple | 28 | MCU Tx |
| 4 | Pink | 28 | 12V |
| 5 | Red | 22 | 12V |
| 6 | Black | 22 | GND |
| 7 | White | 28 | GND |
| 8 | Yellow | 28 | NX Tx |
| 9 | Blue | 28 | NX Rx |
| 10 | n.c | | |
| 11 | Mithril | 28 | 12V |
| 12 | Green | 28 | GND |

Note:
Silk on board is swapped, labels Tx and Rx backwards for NX UART at P3 and P4

View From Front

***Actual Connector Image***



Note:
ODU Panel Mount Plug Connector
GC0WDM-PD1WMM0-000L

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# Troubleshooting

| Issue | Suggested Actions |
|---|---|
| **Unit is not powering on** | Is the 12V power cable working? Test continuity.<br><br>Is the recovery jumper shorting J8? Disconnect jumper or de-press pushbutton. Used only for programming OS.<br><br>Has the unit been overvoltaged? May be damaged if over 17V. |
| **Unit is getting too hot (more than about 122°F* at 75°F ambient temperature) or throttling**<br><br>***140°F for ambient temperature of 113°F.*** | Check that there is no debris in the enclosure vents and air can flow.<br><br>Increase airflow around/through enclosure.<br><br>Could be a broken or defective unit.<br><br>Reduce workload in heat. |
| **RJ45 LEDs do not light up** | By default they are disconnected. Contact EDT for instructions if LEDs are desired by either reaching out to your EDT point of contact or email tech@edtcom |
| **No Wi-Fi or Bluetooth** | Make sure Wi-Fi card is installed in E-key slot.<br><br>RF cables connected correctly to E-Key and faceplate.<br><br>Antenna installed.<br><br>Check if Wi-Fi modem appears in the 'lspci' Linux tool output.<br><br>Check if Bluetooth modem appears in the 'lsusb' Linux tool output. |
| **No GPS** | Install a GPS card instead of an E-Key, or use a GPS USB dongle. |

# Appendix

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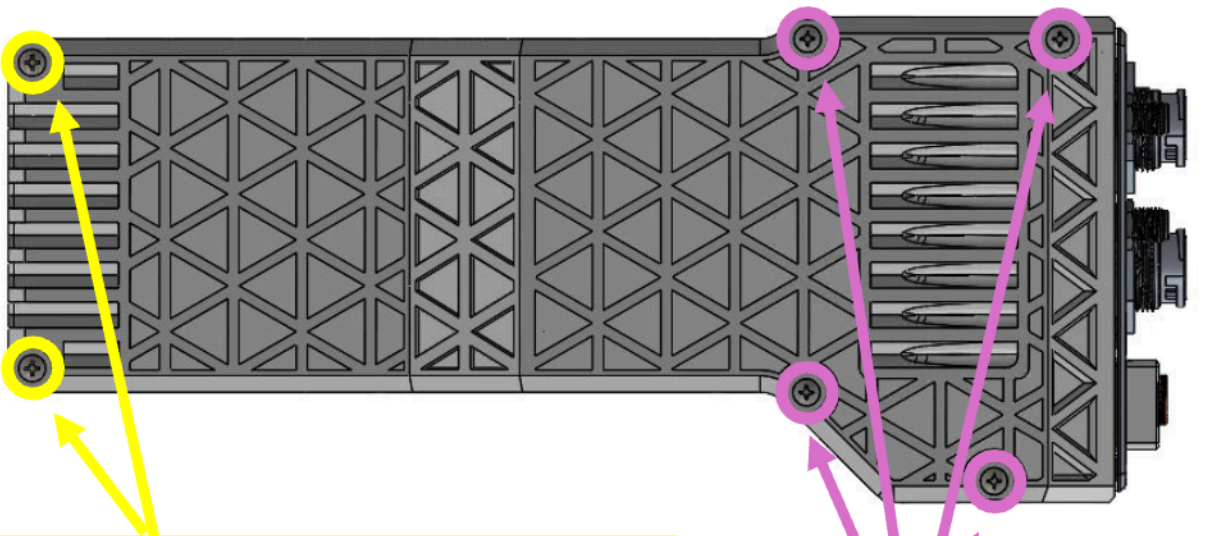
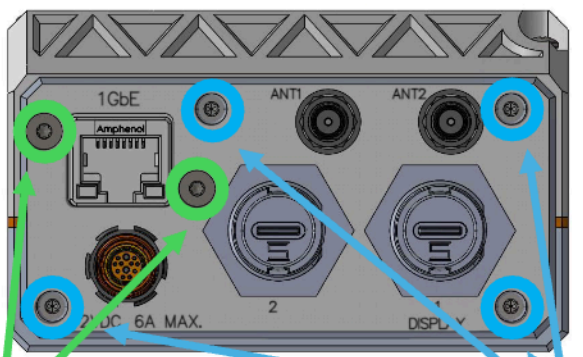
# Clamshell screws – Phillips head



020-16189-00 Screw; PPH, M2.5x0.45, 30mm, S/S
92000a065 McMaster-Carr

020-16188-00 Screw; PPH, M2.5x0.45, 35mm, S/S
92000A202 McMaster-Carr

# Front plate screws – T8 Torx head




020-16190-090
Screw; Torx T8 FH, 4-40 Thread 1/4cm, S/S
92703A205 McMaster Carr

020-16187-00
Screw; Torx T8 FH, M2.5x0.45, 6mm, S/S
92703A158 McMaster-Carr

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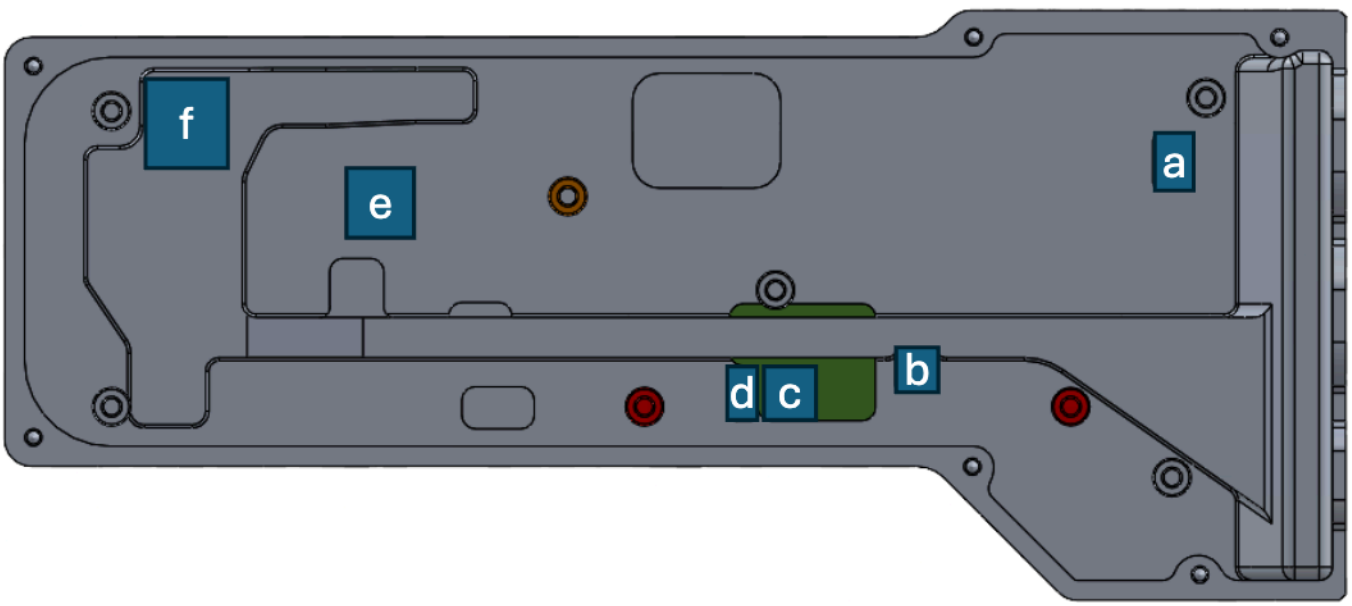
# Don’t take the board out of the smaller half of the enclosure…

- But if you do, put TIM back on! *(do not reuse uneven, damaged, or over-compressed TIM material)*
- Route the wires carefully in the designated channel.
- Install 6x T10 Torx head screws – Be Careful to not cross thread the aluminum threads!




**Make sure to remove plastic film from BOTH SIDES of TIM before application!!**

| | Thick (mm) | Dim. $Mm^2$ |
|---|---|---|
| a | 0.5 | 7 x 9 |
| b | 0.5 | 7 x 7 |
| c | 1 | 7 x 7 |
| d | 0.5 | 5 x 9 |
| e | 1 | 10 x 10 |
| f | 2.5 | 12 x 11 |

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