DIY Communicator & Thermal Cam
Build Instructions

ChatterBox firmware allows you to **communicate securely off-grid**. It runs on Lilygo T-Deck and looks similar to a texting app.

Instead of internet & cell service, it uses LoRa, meshing, encryption, and digital signatures for local communication and **does not require service or infrastructure** and works during a grid outage.

ChatterBox Firmware

DOWNLOAD

After assembling this device, download the firmware for free from *chatters.io*. Although certain features of ChatterBox require a license fee, use of the thermal camera does not.

User Guide
How to use the T-Deck with ChatterBox

How it Works
How messaging works in ChatterBox

Firmware
T-Deck firmware flash page

Fully Compatible with ChatterBox Clusters

If you have (or build) your own private ChatterBox comms cluster, this thermal communicator will be *fully compatible*! Learn more at: https://chatters.io

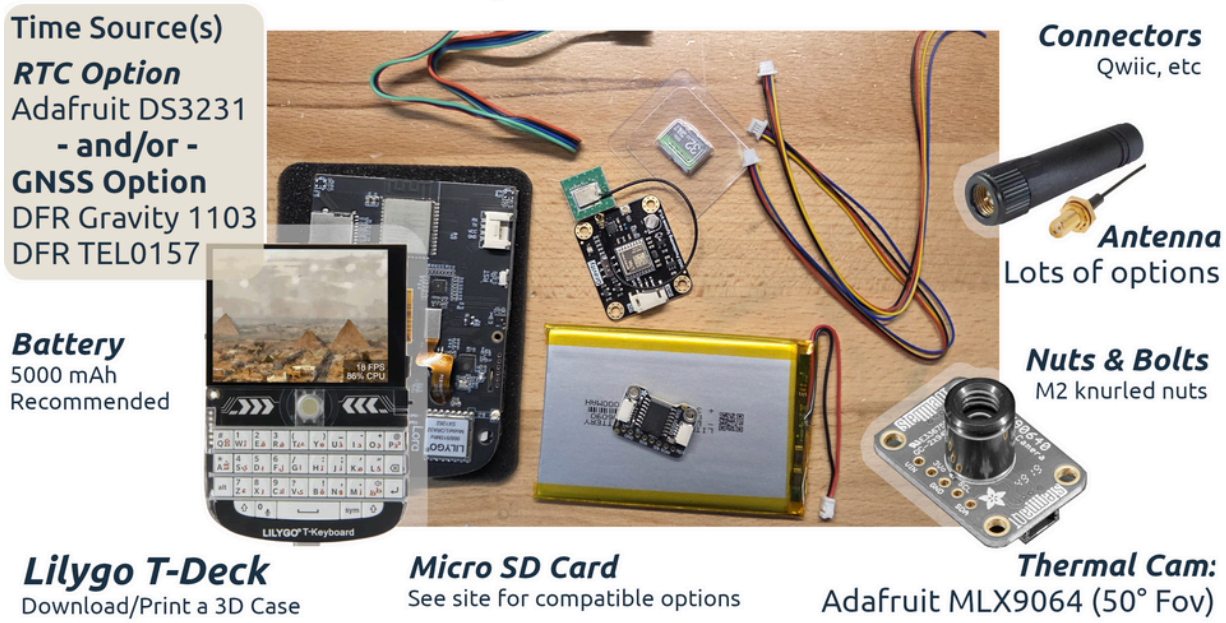
Notice: Assemble at Your Own Risk

You should be familiar with electronics and soldering before attempting this project. This document *may* contain mistakes. Often there is variation in components, such as polarity being reversed, so you need to understand this thoroughly. ***Mistakes or faulty/incorrect hardware could result in injury, fire, or other damage.***

ALTWARE DEVELOPMENT

DIY Thermal Cam + Communicator

Components Needed:

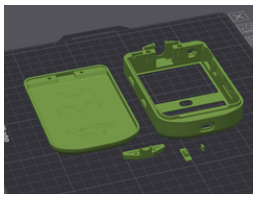


Sources we used for this build:

TDeck	Rokland, Amazon	Dev board (not complete)
Battery	Amazon	3.7 LiPo, 5000 mAh
Thermal Cam	Adafruit	MLX 90640
Realtime Clock	Adafruit	DS3231 (Stemma QT)
GNSS/GPS	DFRobot 1103, DFRobot TEL0157	Either option works, often available at Digikey
Antenna	Amazon	Antenna + pigtail
Micro SD Card	Amazon	Check compatablity list
Wires	Qwiic, Battery Connector Grove Stemma to Qwiic	*Check your battery polarity* to get correct connector!
Nuts/Bolts	M3 Heat Inset Nuts, M3 Screws, Laptop Screws	You may use other options, these are what we use

Soldering Tools
You will need some basic soldering supplies for connecting wires to one another and to the T-Deck. Heat shrink wrap is also recommended.

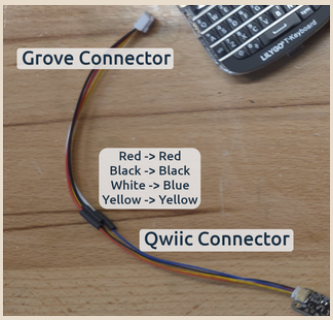
Other Supplies
There may be other miscellaneous supplies/tools not mentioned here.



Print Your Case

Download printable enclosure files (includes 3MF and STL formats).

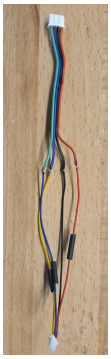
I use Black ABS for the front and colored PLA for everything else.



Connect Thermal Cam

Join the Grove Connector to a Qwiic connector as shown, or if you've got the Grove : Qwiic adapter from the parts list, just use that.

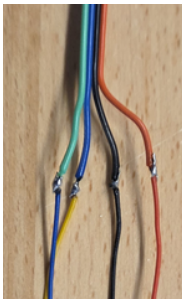
Yellow/Clk → Grove Yellow → T-Deck RX
Blue/Data → Grove White → T-Deck TX
Red → Red → T-Deck VCC
Black → Black → T-Deck GND

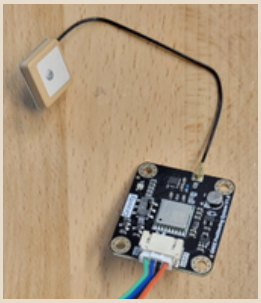


Create a DFRobot / Qwiic Adapter

Create an adapter wire that will allow the DFR cables to attach directly to any Stemma/Qwiic plug. I heat-shrink wrap the connections (they must be insulated). This one there is no pre-made adapter I could find, because the ground/vcc seem to be reversed.

Qwiic Yellow/Clk → DFR Blue/Clk
Qwiic Blue/Data → DFR Green/Data
Qwiic Red → DFR Red
Qwiic Black → DFR Black

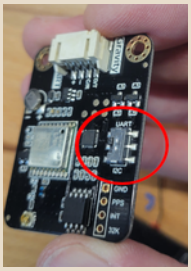


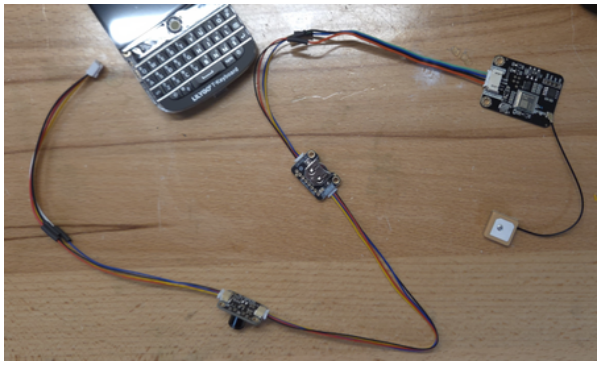


Prepare the DFRobot GNSS

Move the DFR's switch to ***IIC***, and then use a wire cutter/ clipper to clip the long plastic switch much shorter. It will just be in the way later on if you don't.

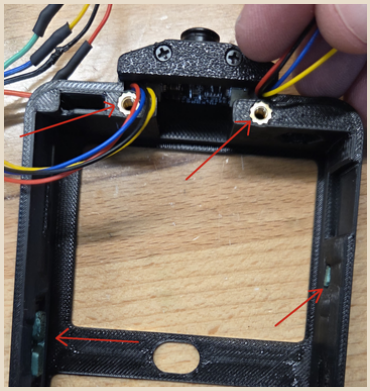
Also, attach the GPS antenna, as well as the cable you just made.



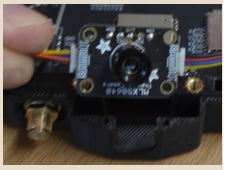


Connect all Components

Connect all components together in the order shown.



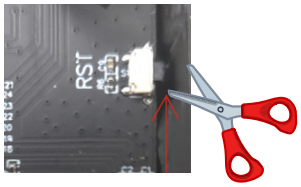
Add Enclosure Nuts & Switch Covers



Insert the power switch cover and reset button cover into the T-Deck enclosure. You may need to trim the button areas of the enclosure slightly so the switches slide easily.

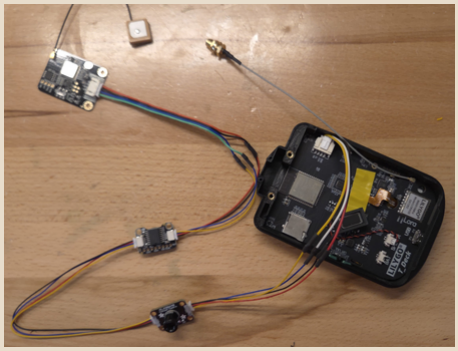
Insert the two heat-sink nuts into the enclosure. A special soldering tip makes this extremely easy, but you can also use a heat gun and apply pressure with a phillips screwdriver.

Finally, add the thermal cam (upside down as shown) and attach the cover tiny laptop screws.



Clip the T-Deck's Reset Button

The T-Deck's reset button is too long for the enclosure. If you don't clip it to be flush with the side of the T-Deck, the case will hold the reset button down, and the T-Deck will appear to be dead.



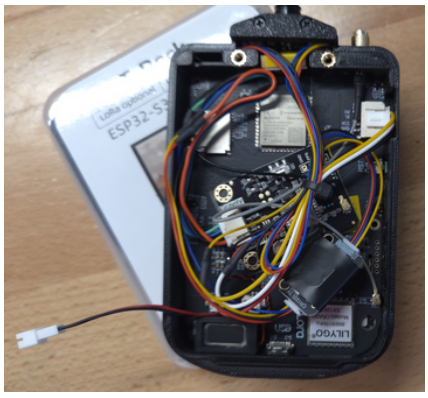
Connect Components & T-Deck

Plug the Grove Connector into the T-Deck.

Remove the T-Deck Screen Protector.

Insulate metal surfaces of the GNSS and RTC, using electrical tape. Insulate the metal surface of the GNSS, as it could short the thermal camera when inserted.

Finally - Insert the T-Deck as shown. This is tricky, you'll have to align the USBC port of the T-Deck to the enclosure, and then carefully wedge the top of T-Deck into place. You'll have to slightly pry apart the edges and top of the enclosure to make room, while not applying too much pressure to the T-Deck screen...all while making sure the enclosure button covers don't fall out.



Insert GPS Antenna, LoRa SMA, & Components

Insert the GNSS antenna into the top of the case.

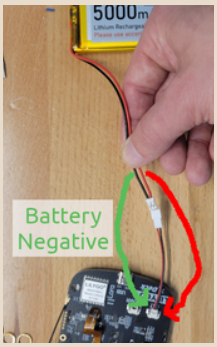
Push the LoRa SMA connector through the case opening and use a nut to keep it securely in place.

Arrange all the other components/wires as shown, so the battery will fit.

Add the Battery and Attach the Cover

Pay special attention to battery polarity vs T-Deck polarity!
For my particular battery and T-Deck, the adapter shown on the right matches up perfectly, as it switches the T-Deck's polarity to match the battery. Yours may be different!

Do not connect any battery to the T-Deck unless you are sure the polarity is correct, or you could ruin the T-Deck or worse.



Add the Battery, Attach the Cover & Antenna

Attach the enclosure's back using a couple of M3 screws.

Insert a compatible SD card.

Now you are ready to flash the firmware.

ChatterBox Firmware

DOWNLOAD

After assembling this device, download the firmware for free from *chatters.io*. Although certain features of ChatterBox require a license fee, use of the thermal camera does not.

User Guide
How to use the T-Deck with ChatterBox

How it Works
How messaging works in ChatterBox

Firmware
T-Deck firmware flash page

Firmware Download Mirrors

https://chatters.io/firmware

https://www.offgridcomms.club/firmware/esp32/

https://www.meshcomms.club/firmware/esp32/

https://www.meshcomms.club/firmware/esp32/

ALTWARE DEVELOPMENT