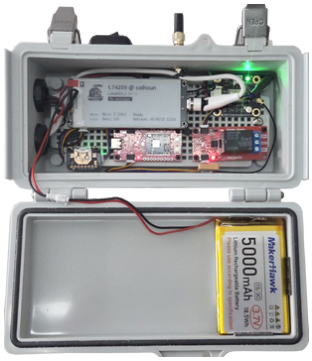
Heltec e290 Blackout Comms Link - DIY

The Heltec Vision e290 is an excellent base platform for a Blackout Comms link. You can choose whether to build a standard node, or one with additional capabilities (radar/proximity sensing, remote control, thermal) simply by plugging in more components.

What it Can Do

- Full Blackout Comms link: secure packet caching, display, and more.
- Track & share location
- Detect motion / distance and optionally notify your cluster
- Close relay automatically (switch) on motion detected
- Switch a circuit on/off remotely
- Report last motion



Required Components

- Heltec Vision e290
- 3.7 LiPo Battery + JST/PH2.0 Adapter
- Antenna & SMA Connector

Time Source and/or GNSS

- Adafruit DS3231 RTC
- SparkFun RV-8803 RTC
- SparkFun SAM-M8Q GNSS
- DFRobot TEL0157 or 1103

Optional

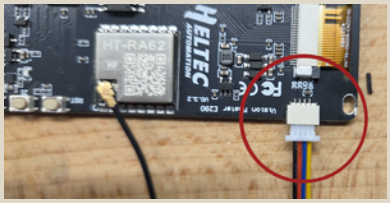
- SparkFun Qwiic Relay
- Sparkfun Pulsed Coherent Radar

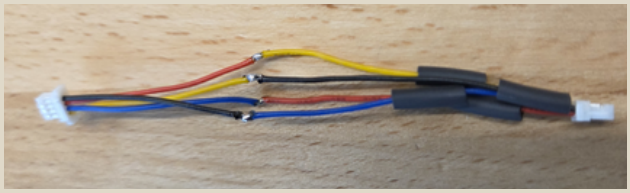
Build Summary

This build takes about 30 minutes. Once you have your chosen components, the build is essentially creating a Qwiic adapter for the e290, plugging all the components together in a chain, connecting a battery, and inserting into a case.

1. Build a Qwiic / Heltec Adapter

Heltec's plug port will physically fit a Qwiic plug, but the wiring/pins are not compatible. Make an adapter as shown.





Cut and rewire a standard Qwiic wire:

Black → Blue
Red → Yellow
Blue → Red
Yellow → Black

2. Choose the Link's Components

Basic Link

Fully functional comms link, not dependent on GPS

e290 + DS3231
– OR –
e290 + RV-8803 RTC

GPS Node

Fully functional link, regularly/securely shares its location

e290 + SAM-M8Q GNSS
– OR –
e290 + SAM-M8Q GNSS + RV8803
– OR --
e290 + [either DFR]
– OR –
e290 + [either DFR] + DS3231

Realtime Clock Options


Adafruit DS3231


SparkFun RV-8803 RTC

GPS/GNSS

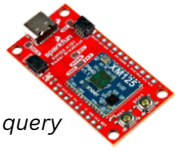

DFRobot TEL0157 or 1103


SAM-M8Q GNSS

3. Optional - Add More

These are optional components you may or may not choose to add.

Proximity Sensor
Sparkfun Pulsed Coherent Radar



Be notified of motion, query last motion/distance

Remote On/Off Switch
SparkFun Qwiic Relay

Remotely open/close a circuit, basically an on/off switch

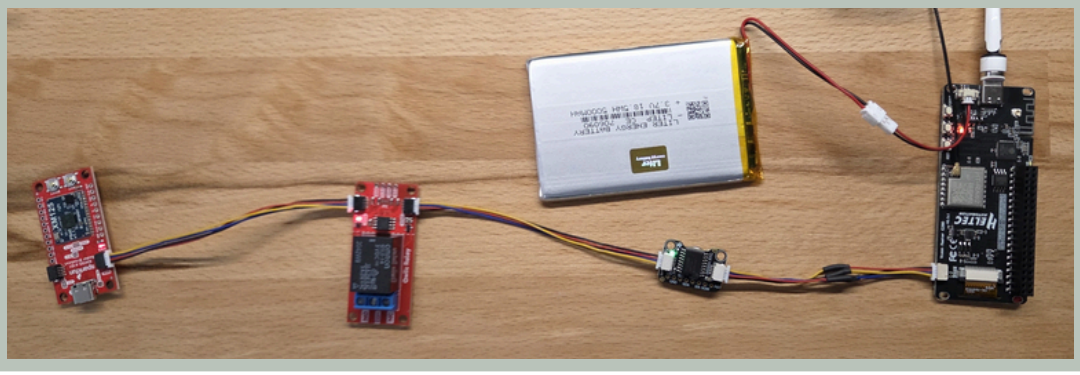
Note: If you choose a DFRobot component, see the last page of this guide.

This can be dangerous, do not attempt unless you undersanding electronics!

4. Connect All Components

The selected components can be wired together in any order, in sequence. The sequence shown is one option, but if you've selected different components, yours will look different than below.

Also connect the battery (using the adapter in the parts list) and the antenna SMA connector.



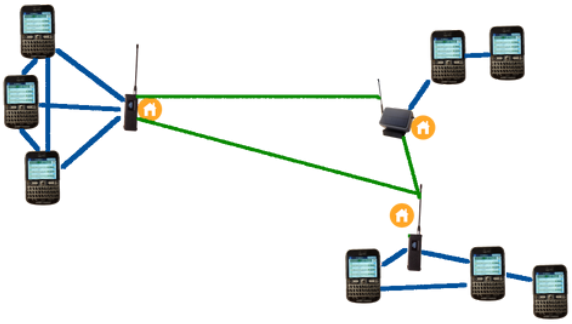
5. Install Firmware

Flash the Blackout Comms firmware (free) onto the new link by following instructions on the firmware page.

https://chatters.io/firmware

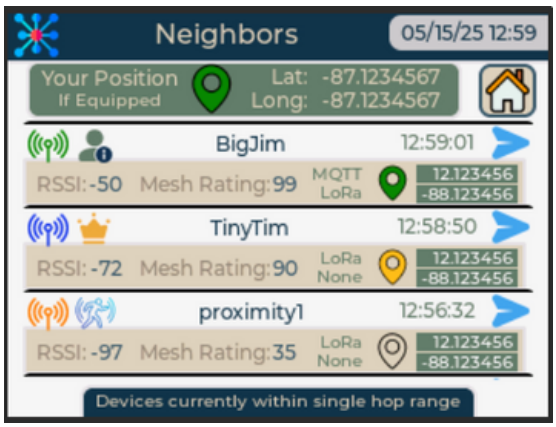
6. Onboard the Link

- *Power up the link*
- *On your Root communicator, select "Settings / Cluster / Onboard New Device"*
- *Wait a minute or two, it should automatically join*



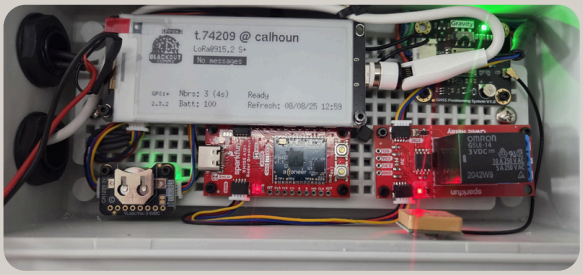
Your cluster will automatically learn about (and use) the new link!

Within minutes, other devices in your cluster will automatically exchange public keys with the new link, and it should show up on neighbors screens. While existing devices are learning, it may temporarily show up as "unidentified".



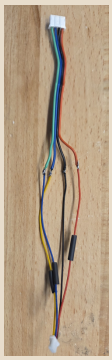
Enclosure Example

This is my base station assembled inside of a 7.9 x 3.9 x 2.8 outdoor enclosure, purchased at Amazon.



Additional DFRobot GNSS Steps

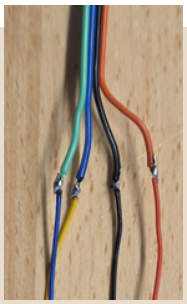
***If you have chosen to use one of the DFRobot GNSS** modules, there is an additional step required to modify the DFRobot cable into a Qwiic adapter, by soldering 4 wires as shown below:*

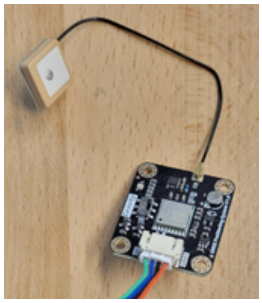


Create a DFRobot / Qwiic Adapter

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

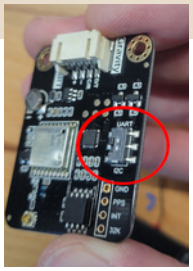




Prepare the DFRobot GNSS

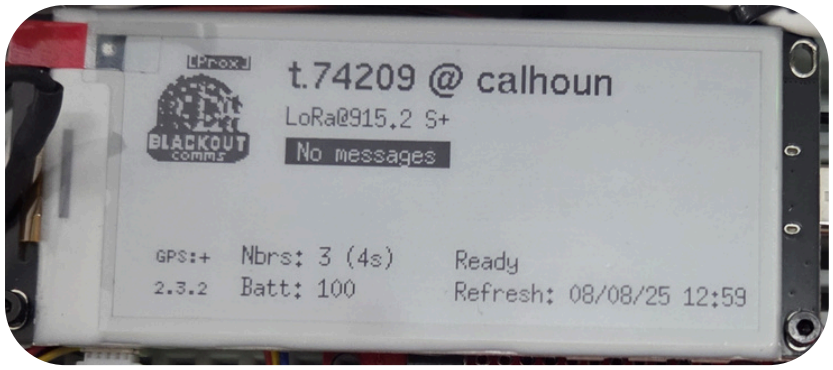
Move the DFR's switch to ***IIC***, and then use a wire cutter/ clipper to clip the long plastic switch much shorter. It will just be in the way later on if you don't.

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



Now your DFRobot GNSS is ready to chain with the other components using this newly created adapter cable.

This GNSS will have to be positioned as the last device in the "chain".



ALTWARE DEVELOPMENT