

YTH UART tool

Abstract

This tool provides UART (serial) connection to the Typhoon H drone or to the CGO3+ camera.

Once connected the tool offers three functions:

- Act as replacement for the Typhoon H GUI.
- Act as gimbal checker. With this function you can read and record a lot of data coming from gimbal or camera itself. And you can try to calibrate the gimbal.
- Act as flight controller to tilt and rotate the camera. This offers the possibility to reuse the camera for other purposes. This part is only a demo.

To use the tool as replacement of the Typhoon H GUI is the main use case. This functionality offers a deep insight how the flight controller interacts with its sensors. It is a good tool for a first diagnosis in case of problems.

Another use case is to fully calibrate the gimbal of the CGO3+. This functionality is experimental. Use it on your own risk.

Download this tool at: https://github.com/h-elsner/CGO3p_control

Binaries for Windows and LINUX are available. For MacOS you must compile it by yourself. Source code is there.

Installation: No installation, simply unzip the file. It is a portable application. You need only the executable for your OS. Copy it somewhere in the home file system or to an USB stick.

YTH tool as replacement for the Typhoon H GUI

Power up the drone. Once fully booted connect the drone to PC via data-capable micro USB cable to the PC and start the YTHtool. Select the proper COM port.

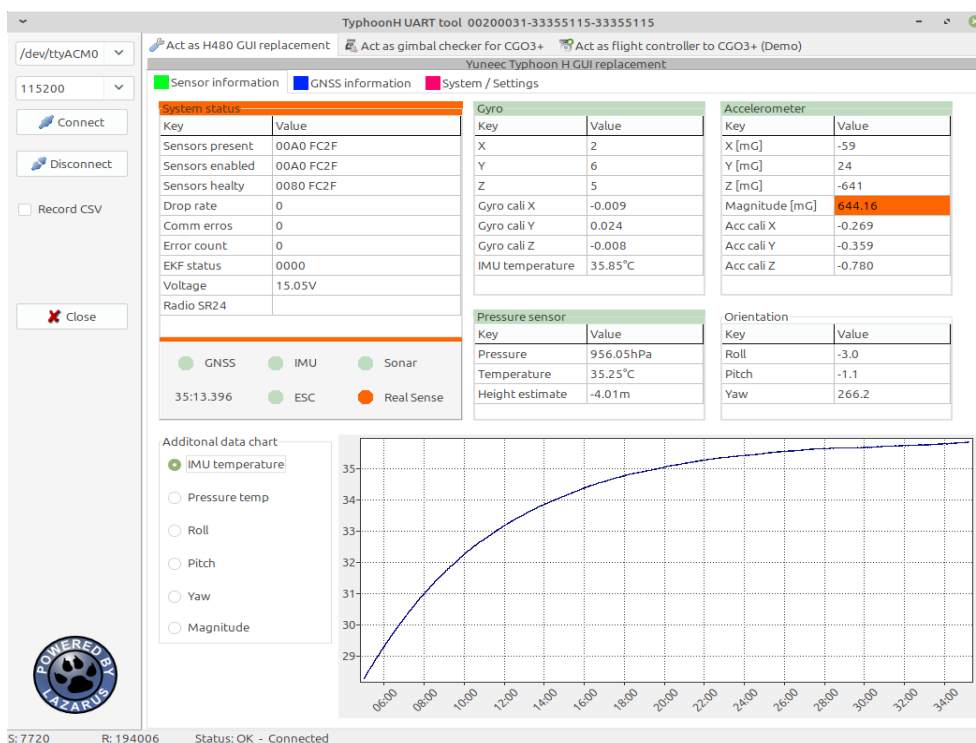
For Windows OS this is usually the last one in the list. It will be selected by default. If the COM port is missing double click on the port selection to refresh the list.

For LINUX select '/dev/ttyACM0'.

Once connected we have three pages:

- Sensor information,
- GPS information,
- System / Settings.

Sensor information

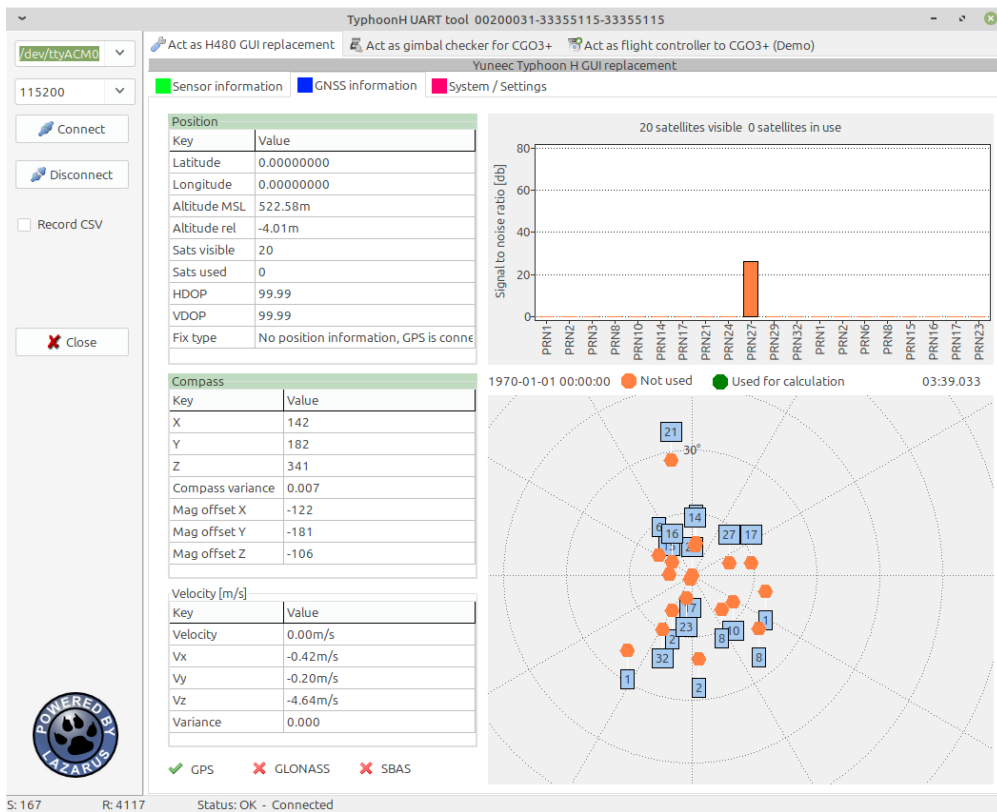


This page shows the values from IMU (Gyro and accelerometer), pressure sensor (Barometer) and the Orientation as output from the AHRS (Attitude Heading Reference System). For some values you can create a chart.

Sensor status (present, enabled, healthy) for a Typhoon H should be **00A0 FC2F** and for a Typhoon H with RealSense module **02A0 FC6F**. The status represents a bitmap with flags for different internal systems. All three values should be the same.

The EKF (Extended Kalman Filter) status should always be 00A5. The example in the screenshot above represents a flight controller with defective IMU.

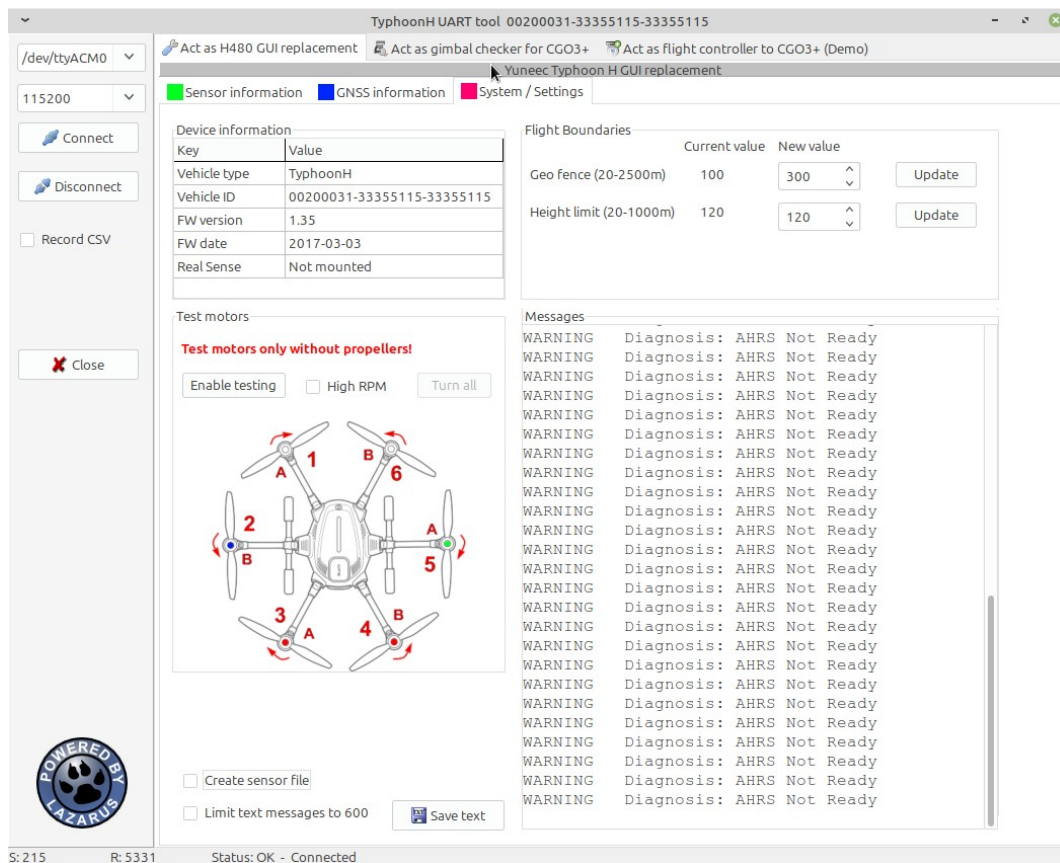
GNSS information



This page shows the values from GPS module and magnetometer (Compass) and the velocity. Comprehensive information about the satellites gives us the possibility to estimate the status of the backup battery and the antenna of the module. More on this later...

SBAS (Satellite Based Augmentation System) satellites should be included in the calculation for accurate positioning. Check if SBAS is green.

System / Settings



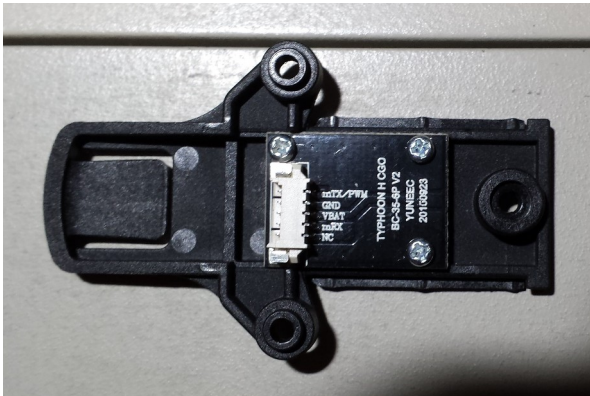
This page contains the system information, settings, text messages, and motor test.

CGO3+ gimbal calibration

NOTE: This is an experimental process, not an official tool. This may work or not, no warranty. You use it on your own risk.

Preparation

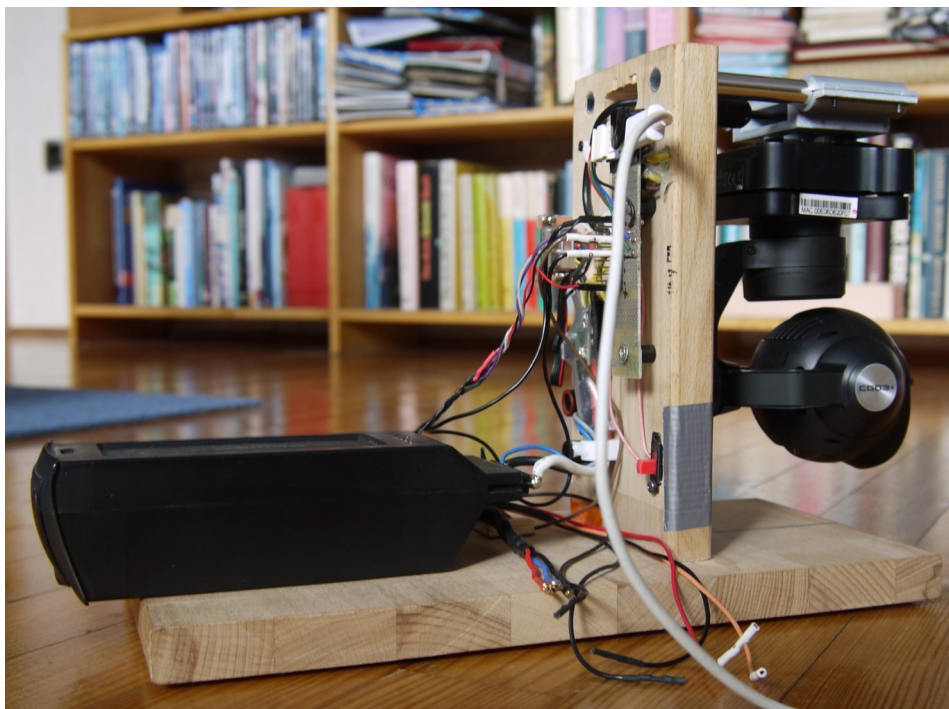
You need a mount for the CGO3+ where it can rotate and tilt freely. Connect a Serial-USB converter (also known as programmer cable) to Ground, Rx and Tx. You can use The USB cable YUNA100 from Q500 if you have one or any other converter that has 3.3V level. Do not connect power. Rx and Tx must have 3.3V level.



This is a camera mount YUNTYH108. You need one with contact PCB.

Connect Ground to GND converter Tx to mTx/PWM and converter Rx to mRx.

My setup is a wooden mount for the camera and a serial to USB converter with a CP2104 chip.



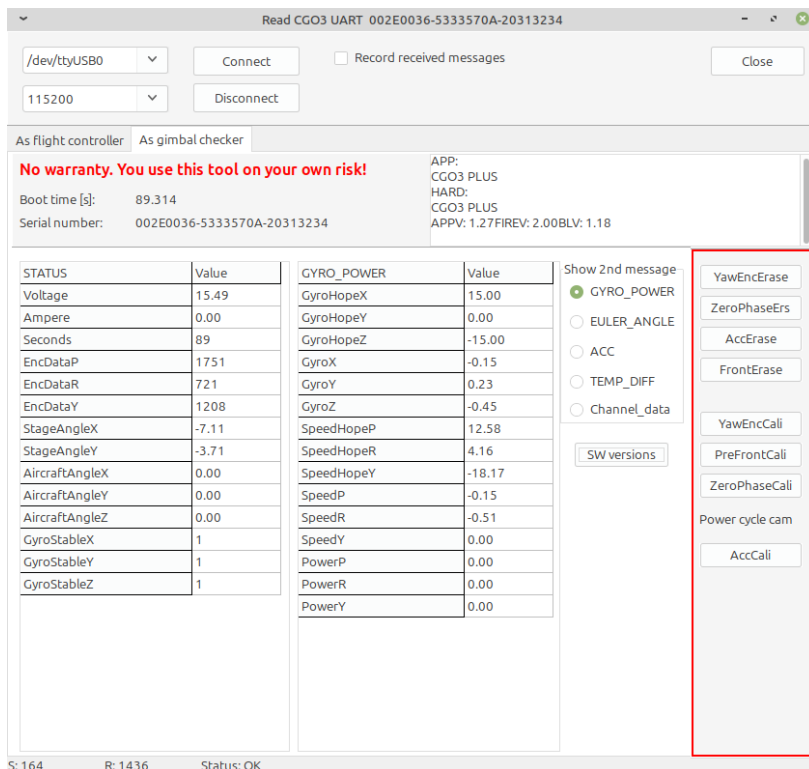
This training video from **Yuneec** describes the calibration process:

<https://www.youtube.com/watch?v=sATbbMajMCk>

Please watch it before you try your first calibration.

In short:

Connect Serial to USB converter to CGO3+ UART;
Start YTHtool;



Select the proper serial port. For Windows OS this is usually the last one in the list. It will be selected by default. If the COM port is missing double click on the port selection to refresh the list. For LINUX select '/dev/ttyUSB0'.

Click on 'Connect'

Power on CGO3+

Erase:

- Yaw encoder
- Zero phase
- Acc
- Front

Begin with Yaw encoder calibration, wait until success message will appear;

Hold the camera faced forward and leveled (I use the CGO3+ gimbal lock) and start Pre-front calibration;

Then Zero phase calibration;

Click on 'Disconnect';

Power cycle the camera;

Click on 'Connect' again;

Do Accelerometer calibration;

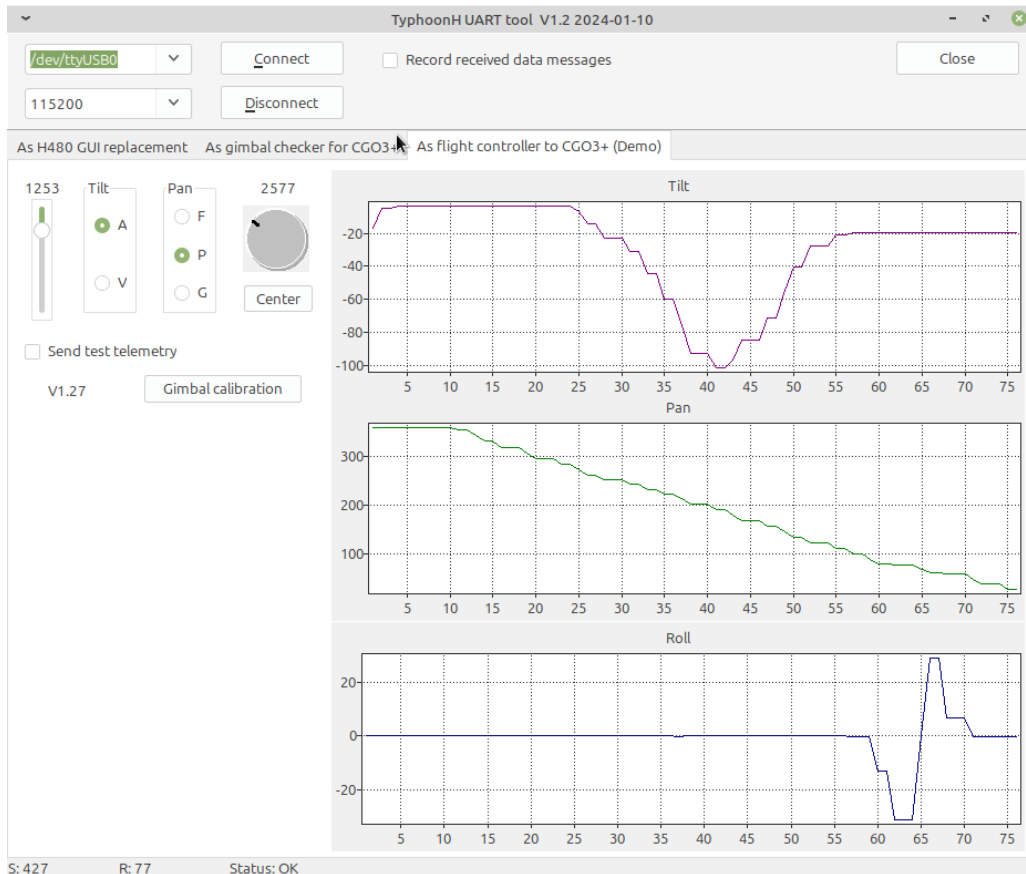
Power cycle the camera;

Note: If „No ACC Offset,, will be reported or Accelerometer calibration never ends, then try a Camera Calibration on the drone started by ST16. If successful it will result in „ACC Offset OK“.

Simply buttons from up to down, always wait on success message.

YTHtool as Flight controller (demo)

This is a demo project how to control tilt and pan by your own application. It offers all possibilities that ST16 has including Gimbal Calibration as it would be initiated from ST16 menu.



You can record the messages that come from camera (SysID=3) and gimbal (SysID=2). Data from MessageID=3 (Gimbal position) will be displayed in the 3 charts.

More information about communication between flight controller and gimbal/camera in "Format_CamUART_messages.ods".

See also the tool, described here: https://github.com/h-elsner/H480_UART_reading

Troubleshooting

UART connection problems

- If you start the app before you connect the drone or the camera double click on the port selection field to update port list.
For Windows usually the last (highest) COM port number is the one you need. It will be selected automatically.
For LINUX the port `/dev/ttyACM0` is for the drone, and `/dev/ttyUSB0` is for the gimbal. If more than ACM or USB ports are in use again the highest port number is probably the one you need.
- For other connection problems unplug and plug again of the USB cable may help.
- Also a reboot of the connected device may help. Do reboot always when USB is disconnected.
- Disconnect the UART in the tool if you power off drone or the camera. It takes 2s before the app recognizes that the connection was cut.

Power cycling the drone

- Switch off and switch on is only correctly working if the USB cable is unplugged. Because the flight controller is supplied by USB 5V it will never fully shut down when connected to USB.

Gimbal calibration

- If „No ACC Offset,, will be reported or Accelerometer calibration never ends, then try a Camera Calibration on the drone started by ST16.