

Hawk Startup Sheet

This document contains basic information needed to connect and use the Hawk or HAWC (Handheld Agricultural Wireless Camera). The Hawk is a wireless, battery powered, Linux-based, NIR/R/G multi-spectral camera designed primarily for vegetation analysis. A 6 to 24 VDC 3W minimum external power source can also be used to power the camera. An ILS (incident light sensor) is included and is under the white plate on the top side of the Hawk housing. The ILS feature can be enabled through the camera menu and may improve remote sensing accuracy under certain conditions. Orient the ILS so that the white plate on the Hawk housing is positioned with a clear view of the sky.

To begin using the Hawk camera, you may power it from one of the provided 9 V batteries or from the included 12 VDC power supply. Make sure that the switch is in the off position before attempting to connect power; the off position is when the switch is facing towards you when you are looking at the touchscreen.

The 9V batteries provided are specialized high capacity rechargeable LiPo types and should be charged in the provided charger prior to use. Do not use common 9V alkaline or Lithium batteries in the camera. These standard types of 9V batteries do not have enough capacity to power the camera and will not work. When installing the 9V battery, be sure to align the battery so that the polarity is correct and gently seat the battery into the camera battery contacts.

To power the Hawk using the provided 12 VDC power supply, insert the power connector into the power jack found on the right side of the Hawk housing. The power jack is located slightly above the position of the battery slot, near the blue plastic cover. Now, connect the provided 12 VDC power supply to the AC wall outlet.

Move the power switch on the top of the camera to the on position. The LED indicator on the camera will turn orange shortly after power is connected and the switch is in the on position, and will then turn to red during camera initialization. When the LED is green, the Hawk camera is initialized and ready to operate. This process typically takes from 30 to 60 seconds to complete.

The Hawk has an LCD touchscreen type display that should be used with the provided stylus. It is located on the left side of the case; it is the black protruding object below the blue plastic cover. Gently and firmly pull on it to release it from its protective slot.

When the Hawk is powered up and operational, a live view screen should be present on the LCD display. Take a picture by pressing and quickly releasing the white button on the top of the Hawk housing. The status LED will turn red and will change back to green when the picture has been saved. When you take pictures, the captured picture is displayed and the live stream stops until you click on the Resume button on the touchscreen.

The Hawk may be used in forward facing mode or ground facing mode. To switch it to ground facing mode, grasp the sensor housing and gently rotate it down until the sensor is facing down instead of forward. This is useful for unmanned or calibration purposes, and allows the ILS sensor to be oriented with a clear view of the sky while capturing images of objects or vegetation on the ground.

Clicking on Review takes you to the image review page. In the review page, you may view any picture by clicking on the top left drop down menu and selecting a picture from the drop down list. Once a picture has been opened, the raw image is displayed on the camera LCD screen. When Index Extractions are enabled, you will also be able to access an NIR/R/G color processed image, NDVI, or other index extractions as defined in the Edit Veg. Index page by clicking on the second drop down menu at the top of the screen and selecting the desired display format. Press the M button on the right

of the screen to view the metadata of the picture. Return to Live View by clicking the Done button on the bottom right of the screen.

Clicking on Tools button gives you access to the following buttons: Set Date/Time, Erase Pictures, Advanced, Shutdown, and Format Disk. Clicking Done takes you back to Live View. By clicking the Advanced button in the Tools page, you can change the camera operation. A status screen is visible in the Advanced page. You may edit vegetation index definitions by clicking on the Edit Veg. Index button. Edit Settings lets you have access to useful functions that include Capture Mode, Auto Capture Delay, ILS Adjustments, Index Extractions, and Disable Raw Data options. See help details by pressing the Help button next to each item. Save changes to the settings by clicking the Save Changes button. Click Tools to return to the previous page. Click Done to go back to Live View.

For wireless access to the camera's web browser interface, you can connect it to a Wi-Fi enabled device, such as a PC, tablet, or smartphone. Open the Wi-Fi network settings on your device and search for the Hawk camera's Wi-Fi hotspot, indicated by the following hostname: HAWKXXXX, where XXXX represents the last four digits of your camera serial number. Once you have successfully connected to the Hawk Wi-Fi hotspot, open up a web browser on your device. In the web browser URL navigation field enter 192.168.1XX.1, where XX is the last two digits of your camera serial number. You should now see the Hawk Live View appear in your browser. Only Google Chrome and Mozilla Firefox browsers are currently supported.

Using a Windows 10 PC, you can directly access the files in the Hawk by connecting with the Samba file sharing service that runs in the camera. Open the Windows File Explorer and type \\192.168.1XX.1 where XX represents the last two digits of your camera serial number. TTCHAWK should come up as a network folder. Opening TTCHAWK will provide access to images, settings, log files, extractions, and the DOCS folder.

In order to be processed and analyzed, the original images saved by the camera in the HAWKJPGS folder must be converted to RAW format using PixelWrench2. Under the PW2 File menu, use the Convert Auk Jpeg to RAW function. To process multiple images, use the Convert Auk Jpeg to RAW function found in the Batch tab of the IndexTools form. IndexTools can be launched from the "Index Tools" selection under the View menu, or by right clicking in the PixelWrench2 active window and selecting "Index Tools". Where XXXXXX is your Hawk serial number, note that opening the XXXXXX.cpf file from the Matrix tab in IndexTools is highly recommended before color processing RAW files. Refer to PixelWrench Help in the Help menu for detailed instructions.

As mentioned above, if the Index Extractions setting is enabled the Hawk has the capability to internally process and save images to TIF format under the EXTRACTIONS folder. Most common would be to enable the RGB Extractions in the Edit Veg. Index page to process and save NIR/R/G rendered images. Vegetation index extractions such as NDVI can also be created and saved in TIF format if those extraction types are enabled. Although camera performance and file storage space will be reduced, processing images in the camera can greatly simplify the data collection and management of images captured by the system.

There is a micro SD card installed in the Hawk. It is located underneath the blue cover next to the power connector. This micro SD card contains the Hawk system as well as stored images, settings, and log files. It is strongly recommended to not remove this micro SD card under normal use. There are multiple partitions on this micro SD card that will not be recognized properly on a Windows PC and the contents of the card could be corrupted. To access images, settings, and log files, please use Samba as directed in the previous paragraphs.

There is a folder called DOCS located in TTCHAWK, accessible via Samba. The DOCS folder contains this document as well as other documents and software. Please note that if you use the Format Disk function in the Hawk web browser interface, this folder will be permanently lost. The documents and software in the DOCS folder are also provided in a Tetracam CD.

The Hawk camera also has Ethernet and USB ports. A protective cover may be installed over both the Ethernet and USB connectors. For certain uses such as testing or hardwired only installs, it may be necessary to use the Ethernet connection instead of Wi-Fi. To access the Ethernet connector, remove any protective covers from the Ethernet connector and USB port. Plug a network connected Ethernet cable into the camera Ethernet connector to allow the Hawk to communicate on with the network via DHCP, and power up the Hawk. Once you have looked up the private IP address assigned by the network to the Hawk, you can access the Hawk web browser interface and Samba using this new IP address as well as the IP address associated with the Wi-Fi hotspot. A typical Ethernet IP address may be something like 192.168.1.XX, where XX are the two digits assigned by your modem or router.

The Hawk USB ports are intended only for use with an optional USB type GPS. If a GPS has been provided by Tetracam, before installing the GPS, make sure the Hawk is powered down. As noted above, slide and remove any protective covers to expose the Ethernet connector and USB ports. Install the GPS into the USB port. You may now power on the Hawk. When the GPS blinks a blue LED, it has obtained a GPS location fix, and will transmit position data to the Hawk. The GPS data is visible on the LCD screen, through the Hawk web browser interface, log files, and image metadata.

To power down the Hawk system from the touchscreen or from a web browser, select the Shutdown button in the Tools page. You may also power down the system by holding down the white button on the case until the LED blinks red and green rapidly; upon witnessing this, release the white button. The Hawk LED will turn red, orange, and then off. At this point, it is safe to turn the switch to the off position then unplug power from the system. The Hawk User's Guide should be consulted for more detailed product information.