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The DigiSnap Pro can automatically move images from the camera to two storage locations, one of which is local (attached to the DigiSnap Pro), and the other remote (a network server / 'cloud'). By transferring images automatically, the operator can reduce the need to access the camera in the field, or gain faster access to the images when visiting the camera system.

## Local Storage

Local storage is attached via one of the USB ports on the DigiSnap Pro, which will support a USB hard-drive, SSD or a USB flash drive (memory stick).

Please note that there are only two USB ports on the DigiSnap Pro, and one will be attached to the camera to extract the images, leaving only one port for local storage. The USB ports support USB 2.0, so the local storage device must also be compatible with USB 2.0.

When disconnecting a Local storage device, please command the system to safely disconnect the device, either via the App, or Debug Module.

### Hard-drives & SSDs

There are many USB hard-drives and SSDs on the market, some with capacities as high as 4TB. This can be useful in a standalone application (no networking), in locations where the camera may not be accessed for extended periods (for instance, once per year). A high capacity hard-drive might also be useful in application that uses a very high resolution camera (i.e. Medium Format), taking RAW images at a reasonably short interval (1 minute for instance). At faster intervals, the image transfer speed might be insufficient, and at long intervals an external hard-drive might not be required.

Hard-drives can draw a significant amount of power in operation. Some are powered via the USB port, which will generally mean that they are more power efficient. For instance, a USB 2.0 port can supply only up to 2.5 watts of power, so self-powered hard-drives are a safer choice.

Other hard-drives are externally powered, and may not be as efficient. Some will draw more than 10 watts! The DigiSnap Pro has a switched 5V power source via another connector, which could be used to power a hard-drive that requires an external 5V power source. Lastly, there is a switched battery output, which could also be used, possibly through a DC-DC converter.

For optimal power management, we recommend a one-port powered SSD. Harddrives and SSDs should be pre-formatted to the FAT32 filesystem before use with the DigiSnap

### **Flash Drive (memory stick)**

The most compelling application for a flash drive is for periodic, manual collection of images. Consider a time-lapse system on a utility pole overlooking a construction site. If there is a USB cable routed from the DigiSnap Pro down the pole to the base, and a flash drive connected, images could be collected instantly by simply swapping with an empty flash drive!

Some flash drives that are given away for free with advertising information on them could present a problem, so we recommend using new flash drives with no additional partition.

### **Remote Storage**

The DigiSnap Pro can connect to a network, via WiFi, Ethernet, or a Cellular modem attached to a USB port. When connected to a network, images can be automatically transferred to a server on the internet or the local network.

Some network connections are bandwidth limited. The most extreme example would be a satellite modem. It is impractical to send numerous large image files via a satellite connection, and Cellular systems in remote locations may also have difficulty transmitting large files. Some Cellular systems charge high prices for data transmission, so limiting the amount of information sent can be useful. The DigiSnap Pro can be configured to send either full size images or thumbnail images to remote storage. (Full size images are always sent to local storage, when in use.) A thumbnail image is a very low resolution representation of the image, but it may still be very useful to monitor the operation of the system, and they are small enough to be transmitted. Alternatively, the camera could be set to take images at a desired rate, but only a few of these images transmitted for the sake of monitoring progress.

When limiting the amount of information sent to Remote Storage, and no Local Storage is connected, the images are retained in the camera memory for later access.

### **Power Considerations**

The DigiSnap Pro is specially designed to minimize power draw so that it may operate from small solar panels. Automatic image transfer to local or remote storage activates the networking hardware within the DigiSnap Pro, that is normally asleep and drawing no power. Image transfer is a relatively power

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hungry process, so some thought is needed to handle transfer the most efficient way possible. In practice, it can take a few minutes to boot up the networking hardware, connect to the storage, transfer a single image, and then shut down properly.

It is certainly possible to transfer each image after it is taken, and for systems with greater access to power, or when taking only a few pictures per day, this is completely fine. The DigiSnap Pro may also be configured to transfer images in bulk, which reduces the amount of power required on average for each picture.

## Configuration

### Local Storage:

- One of several transfer methods must be selected, depending on the application. Images may also be transferred when commanded by App, or Remote connection.
  - Do not save any images to Local Storage
  - Save all images on camera to Local Storage whenever convenient (network hardware is already active)
  - Save all images on camera to Local Storage after each new picture is taken
  - Save all images on camera to Local Storage after every 30 pics are taken
  - Save all images on camera to Local Storage only at midnight
  - Save all images on camera to Local Storage only at midnight on Sunday

### Remote Storage:

The location and login for the remote storage must be specified. Images may also be transferred when commanded by App, or Remote connection.

- Remote Storage URL (FTP address)
- Remote Storage User Name
- Remote Storage Password
- One of several transfer methods must be selected, depending on the application.
  - Do not save any images to Remote Storage
  - Save all images on camera to Remote Storage whenever convenient (network hardware is already active)

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- Save all images on camera to Remote Storage after each new picture is taken
- Save all images on camera to Remote Storage after every 30 pics are taken
- Save all images on camera to Remote Storage only at midnight
- Save all images on camera to Remote Storage only at midnight on Sunday
- The size of the image file to be transferred to Remote Storage can be specified. If the camera is set to take JPEG images, the full size image, or a thumbnail can be saved. If the camera is set to take RAW images, there may be other size thumbnails available.
  - Send Thumbnail images to Remote Storage (small, medium, large)
  - Send original images to Remote Storage
- Select whether to send a reduced (decimated) set of pictures to Remote Storage. Only every other N'th picture is sent. (N is configurable: 1, 5, 10, 25, 50, 100, 250, 500, or Noon). If N=1, there is essentially no decimation... all images are transferred at selected time. If N is set 'Noon', only one image is transferred to storage, at Noon each day. Selecting decimation will over-ride the transfer method setting for Remote Image Storage, if there is a conflict.

### Camera File Purge:

If the images are removed from the camera as they are transferred, the memory card in the camera will never fill, so the operator would not need to periodically empty the card. Some operators may wish to keep the images on the card as well as transfer them, as a backup.

The DigiSnap Pro also uses some safety measures to prevent data from being lost. When Local storage is used, full size images are sent, so the data is considered safely transferred. There are several modes available with Remote storage that only transfer some images, or thumbnails of images. Since all of the data isn't transferred, nothing will be deleted from the camera unless fully transferred to Local storage.

- Purge image from camera, if successfully transferred?
  - Yes (images should be removed from the card, if transferred)
  - No (all images will be left in the camera memory, regardless of image transfers)

### Network Access

In order to connect to a network to transfer images remotely, or for remote login to the DigiSnap Pro, there are several additional bits of information that may be required.

If attached to a local network via Ethernet cable, or if using a Cellular modem connected to a USB port, the connection should be automatic.

If connected via WiFi to a network router, the router may have security enabled.

- SSID name

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- Key

When connected to a network, it may be possible to communicate with the DigiSnap Pro from a computer or smartphone anywhere in the world, by logging into the DigiSnap Pro. Please note that the networking hardware in the DigiSnap Pro must be active, and the DigiSnap Pro already connected. This consumes a fair amount of power, which must be considered when the system is powered by a small solar panel.

- Remote Access Login
- Remote Access Password

### **Emails**

Status emails containing a variety of status information, and the latest image thumbnail may be sent depending on a number of conditions.

- Email address (name@provider.com)
- Email Mode: A check-box for each 'condition' selects whether an email is sent.
  - When a problem is detected. Status Emails are sent at 7AM, Noon, and 5 PM if a problem is detected (Battery Low, Camera has Failed, or Humidity is high)
  - After every picture taken
  - Every Noon (A picture is taken if none available within the last hour)
  - Every Friday Noon (A picture is taken if none available within the last hour)
  - When Input Trigger is activated (door switch, motion sensor, etc.)

### **Switched Power:**

The two switched power outputs (5V and Battery) can each be configured for a number of functions.

- Switched 5V Output | Switched Battery Output
  - Switched power output is always off.
  - Switched power output is always on.
  - Switched power supplies a Local Storage / Network device. The output is enabled whenever the networking hardware is active.
  - Switched power is enabled for a number of seconds before the camera takes a picture, and off after the picture is taken. This can be used for illumination (LEDs, Lamps, Strobe

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charging). The 'before' amount of time can be configured.

- Switched power is off before the camera takes a picture, and enabled for a number of seconds after the picture is taken. This can be used to power a motor (Shoot-Move-Shoot motion control), or triggering another device. The 'after' amount of time can be configured.
- Switched power is enabled for a number of seconds before the camera takes a picture, continuing for a number of seconds after. The 'before' and 'after' amounts of time can be configured.

### **Device Boot Time Estimate:**

A flash drive (memory stick) should be available very quickly when it is powered, but a hard-drive may take some time before it can be accessed. If a network device like a router or modem is used, it can take some time for it to establish communication with a network as well. By estimating the amount of time it takes, the network hardware can better judge when to check for connection.

- Boot Time Estimate
  - Local Storage / Network device boots very quickly/instantly when power is applied
  - Local Storage / Network device will take less than 1 minute to boot & connect
  - Local Storage / Network device will take less than 2 minutes to boot & connect
  - Local Storage / Network device will take less than 5 minutes to boot & connect