



Atomos Samurai

User Manual

AtomOS

EDITION 2: NOVEMBER 2012



Have you registered your Samurai yet? Upgrade to 3 year warranty now.

Website: www.atomos.com | Sales: sales@atomos.com | Support: support@atomos.com

Contents

Warranty & Conditions	1
Introduction	2
1. What's included	3
2. What you also need	4
Spinning Disk Drives (HDD)	4
Solid State Drives (SSDs)	4
Mechanical Vibration	4
Backing up and archiving	4
HD-SDI Cables	5
Standard 1/4" Camcorder Mount	5
3. Mounting disks in the Master Caddy	6
4. Connecting and powering up	7
Batteries	7
Power ON/Power OFF	8
5. Samurai connections	8
6. Other physical features	9
Master Caddy / Screw Mounts / Modularity	9
7. Using the Samurai	10
The User Interface in detail	10
The Samurai Touchscreen	10
The Home Screen	10
Home Screen / Menu functions	11
Screen Lock	12
Batteries Screen / Auto Switching/Manual Switching	13
Storage Capacity Indicator	13
Formatting HDD/SSD	13
Unit Name	13
Audio In	14
Audio during playback	14
8. Monitoring and Recording	15
Connect to Input	15
Before recording / Choosing your recording format	15
SmartControl	16
6 ways to start recording	16
Using the Samurai as a field monitor/electronic viewfinder	17
SmartMonitor	17
Zebra / Focus Peaking / False Colour / Blue only	17
SmartLog	18
Exporting .xml	19
Organising material on disk	20
Anti-shock technology	21
File Recovery	21
9. Timecode	22
10. Pulldown	23
11. Playback & Payout	24
exFAT / FAT 32 disks	24
Play mode / Pause mode	25
Loop mode	26
12. Connecting and Editing	27
Connect to Input	27
NLE Support	27
exFAT compatibility	27
Transferring files	27
Importing / Import into Final Cut Pro	28
SmartLog with FCPX	29
13. External Power Supply	30
14. Using Connect Converters	30
15. Software Upgrades	31
Updating ATOM-OS (Firmware)	31
16. Technical Specifications	32

Safety Instructions

The Samurai is designed to a high standard but there are some things you should be aware of to prolong the life of the unit and for your own safety.

Batteries and power supplies

The batteries supplied with the Samurai are powerful, professional devices, designed to retain enough energy to supply the Samurai for hours. You should avoid short-circuiting the battery connections because this can cause a high current to flow which can damage the cells and even pose a fire hazard. For example, you should not carry batteries in a bag or pocket where they may contact other metal objects such as coins.

The power supply and battery charger included are intended for use with the Samurai and nothing else. Keep the power supply, plug and cable away from water and unplug from the mains electricity socket when not in use.

Disconnect power supplies before cleaning the Samurai or its components.

Using the Samurai safely

Although the Samurai is very lightweight compared to all the devices it replaces, it is still a solid object that could cause injury if misused.

- Always make sure that the Samurai is mounted securely and is unable to fall onto anyone nearby. This is especially important when there are children present who might be tempted to pull on cables.
- Always ensure that cable runs to the Samurai are clearly visible and do not present a trip hazard.
- Do not place on uneven or unstable surfaces.
- Do not insert anything but Samurai Master Disk caddies in the Master Disk slot on the side of the Samurai.
- Do not touch the Samurai's screen with sharp, metallic or abrasive objects.
- The Samurai can become warm or hot with prolonged use. Do not place it in contact with your lap or any part of your body where such warming could cause discomfort or injury.
- Do not expose to strong electrical or magnetic fields.
- Do not expose to or use near liquids, rain or moisture.
- Do not dispose of the Samurai or its batteries in municipal waste and do not incinerate it or its batteries, but follow local regulations for safe disposal

Care of disk drives

Spinning disks and SSDs are very sensitive to damage from static electricity. Please observe all the usual precautions when handling them.

Please see the section Mechanical shock and vibration later in this manual for information about how to handle and care for your disk drives.

Small parts

The Samurai carry-case contains small parts that could be a choking hazard for small children.

SDI Cables

Please remember that SDI cables use locking connectors and will not simply pull out if they are jerked or tripped over. They are therefore a significant trip hazard, and also a hazard to your equipment, which may be damaged if the cables are misused.

User Manual Conventions

To keep things simple but clear, we've only adopted two conventions in this manual:



A helpful tip, suggestion or something to note because it's not obvious at first

Menu **Monospaced text** indicates a menu or touch action

Warranty & Conditions

Notice

Copyright © 2012 ATOMOS Global Pty Ltd ('referred to as ATOMOS'). All rights reserved. All information in this document is subject to change without notice. No part of the document may be reproduced or transmitted in any form, or by any means, electronic or mechanical, including photocopying or recording, without the express written permission of ATOMOS. A reference to ATOMOS includes its related entities, subsidiaries and parent company.

Trademarks

SAMURAI ATOMOS are registered trademarks of ATOMOS, Apple, the Apple logo, AppleShare, AppleTalk, FireWire, iPod, iPod Touch, Mac, and Macintosh are registered trademarks of Apple Inc. Final Cut Pro, QuickTime and the QuickTime Logo are trademarks of Apple Inc. All other trademarks are the property of their respective holders.

International Hardware Limited Warranty

ATOMOS warrants that:

- the main product, not including TFT/LCD, or any external accessories, will be free from defects in materials and workmanship for a period of 1 years from the date of purchase, **the user may upgrade to a 3 year warranty upon registering their product at www.atomos.com**
- the TFT/LCD, batteries, battery charger, HDD/SSD docking station, Master Caddy and Carry Case will be free from defects in materials and workmanship for a period of 1 year from the date of purchase.

This warranty is exclusively for the benefit of the original purchaser and is not assignable or transferable.

If during the warranty period the product is shown to be defective ATOMOS may at its option:

- a) replace the goods or supply equivalent ones, b) repair the goods, c) pay the cost of replacing the goods or of acquiring equivalent ones and d) paying the cost of having the goods repaired;

The customer must notify ATOMOS of any defect in the goods in writing prior to the expiry of the warranty periods set out above. The customer will be solely responsible for returning the goods to ATOMOS or its authorized distributor. Upon acceptance of a warranty claim by ATOMOS, where ATOMOS repairs or replaces the goods, it will be responsible for reasonable shipping costs incurred in sending the goods to the Customer, provided that customer is located in a country in which ATOMOS has an authorized distributor or repair centre or agent.

Warranty Exclusions

This warranty applies only to defects in workmanship and does not cover defects caused by:

- Neglect;
- Improper or negligent acts or omissions;
- Unauthorised repairs or attempted repairs;
- Tampering with or modification of the goods;
- Connection to incompatible equipment or power sources;
- Exposure to water or weather;
- Exposure to magnetic fields or corrosive liquids or substances;
- Physical damage

EXCEPT AS STATED IN THIS WARRANTY, ATOMOS, IT'S VENDORS, AGENTS, RESELLERS AND DISTRIBUTORS DISCLAIM IN THEIR ENTIRETY ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE REMEDIES OUTLINED IN THIS WARRANTY ARE THE EXCLUSIVE REMEDY A CUSTOMER HAS ARISING FROM DEFECTIVE GOODS WHICH ARE SUBJECT TO THE WARRANTY.

ATOMOS DOES NOT WARRANT THAT THE GOODS WILL OPERATE IN A MANNER WHICH IS ERROR FREE, OR UNINTERRUPTED. THE GOODS ARE NOT INTENDED TO BE THE PRIMARY OR ONLY DATA STORAGE DEVICE FOR DATA – CUSTOMERS ARE SOLELY RESPONSIBLE FOR BACK UP AND PROTECTION OF DATA.

Software License Agreement

IMPORTANT, PLEASE READ CAREFULLY. THIS IS A LICENSE AGREEMENT.

This ATOMOS software, related documentation, any included sample images and other files (the "Software"), is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. The Software is licensed, not sold.

This End User License Agreement ("EULA") is a legal agreement between you (either an individual or a single entity) and ATOMOS with regard to the copyrighted Software provided with this EULA. Use of the Software provided to you by ATOMOS in whatever form or media, will constitute your acceptance of these terms, unless separate terms are provided by the software supplier, in which case certain additional or different terms may apply. If you do not agree with the terms of this EULA, do not download, install copy or use the Software. By installing, copying or otherwise using the Software, you agree to be bound to the terms of this EULA. If you do not agree to the terms of this EULA, ATOMOS is unwilling to license the Software to you.

1. Eligible licensees. This Software is available for license solely to purchasers of the ATOMOS Samurai, who have purchased a unit manufactured by ATOMOS Samurai and purchased through an ATOMOS authorized reseller, with no right of duplication or further distribution, licensing or sub-licensing.
2. License Grant. ATOMOS grants you a personal, non-transferable and non-exclusive right to use the copy of the Software provided with this EULA. You agree you will not copy the Software except as necessary to use it with the ATOMOS Samurai. You agree that you may not copy the written materials accompanying the Software. Modifying, reverse engineering, translating, renting, copying, transferring or assigning all or part of the Software or any rights granted hereunder, to any other persons or reverse engineering the hardware on which the Software runs, is strictly prohibited. The software is license, not sold. You acknowledge that no title to intellectual property in the Software is transferable to you. You further acknowledge that title and full ownership rights to the Software will remain the exclusive property of ATOMOS and/or its suppliers, and you will not acquire any rights to the Software, except as expressly set forth above. All copies of the software will contain the same proprietary notices as contained in or on the Software. All title and copyrights in and to the Software (including but not limited to any images, animations, video, audio, text incorporated), the accompanying printed materials, and any copies of the Software are owned by ATOMOS or its suppliers.
3. Reverse engineering. You agree that you will not attempt, and if you are a corporation, you will use your best efforts to prevent your employees and contractors from attempting to reverse compile, derive circuits, modify, translate or disassemble the Software and/or the Atomos Samurai in whole or in part. Any failure to comply with the above or any other terms and conditions contained herein will result in the automatic termination of this license and the reversion of the rights granted hereunder by ATOMOS.

ATOMOS reserves the right to terminate this license without prejudice to any additional recourse ATOMOS may have against you if you violate any of its terms and conditions.

Registration + Warranty Upgrade
Register to upgrade your warranty **FREE 1yr → 3yr**
www.atomos.com/support

Introduction



Thank you for choosing the Atomos Samurai: your 10-bit HD-SDI Recorder/Monitor/Player. It's the most compact portable recorder available, with extremely long battery life, a high-resolution screen, uncompressed-quality playback and real-time pulldown removal.

Samurai preserves the pristine uncompressed video quality from your camera's sensor by directly encoding it into Apple ProRes® or (optionally) Avid DNxHD® as it records to HDD/SSD, making it instantly compatible with your NLE timeline. The Samurai's revolutionary 'Sensor-to-NLE' workflow is the fastest and best quality available today!

With the plummeting price of hard disk storage, the 2½" disks used by the Samurai are very cheap; the cost of storage is no longer an issue. Buying a disk for the Samurai is just like buying a tape – except that with a disk you will have instant "non-linear" access to your video.

The Samurai's one-touch TFT-LCD interface is intuitive and simple to use. There are no complicated menus or difficult to find functions – everything you need is instantly accessible from the home screen. Refer to 'Using your Samurai' for more information.

Software updates for your Samurai will be issued regularly. Registering your Samurai now will ensure you are kept abreast of any updates. Software updates and information will also be available at:

www.atomos.com/samurai

We hope you enjoy your Samurai!

*Your Samurai comes with a standard 1 year warranty on all parts and accessories. **You can upgrade to a 3 year warranty on the main Samurai Unit alone (excluding TFT/LCD) by registering your Samurai online at <http://www.atomos.com/registration.xml>. This will enable us to let you know about updates to the product and other important information surrounding your purchase.***

1. What's included

We try to provide you with as complete a package as possible: you don't have to add anything except 2.5" storage media (you can buy additional packs of empty Master Disk Caddies from your Atomos Reseller) and some cables to suit your set-up, like SDI BNC cables and tripod screws. All other parts necessary to use the Samurai (including Mini-BNC to BNC adaptor cables) are included in the carry case.

 *Atomos does not sell storage and your package will not contain any spinning disks or SSDs. You can buy these locally to keep running costs as low as possible.*

We recommend drives, please refer to Part 16 (Technical Specifications) of this manual. For the most up-to-date information please visit:

<http://atomos.activehosted.com/kb/article/compatibility/what-drives-do-we-recommend>

Here's the complete list

- Samurai body (the Samurai itself, with touchscreen, inputs and slot for Samurai disk caddies)
- 2 x empty Master Disk Caddies + 8 Screws for fixing disks
- Master Caddy Docking Station with
 - a. USB 2 & 3 Cable (Under Samurai body)
 - b. Firewire® Cable (Under dock)
 - c. USB 2.0 power cable for extra USB power when required (Under dock)
- Battery Charger with Power Supply Unit located underneath
- 2 x Atomos 7.4 V 2600mAh Batteries
- Samurai Carry Case
- Samurai Quick Start Guide (not pictured)
- 2 x Samurai Mini SDI to BNC adaptor cables



Contents may differ from those shown here.

2. What you also need

Spinning Disk Drives (HDD)

These are the raw storage medium for Samurai. You can use either traditional “spinning” disks, or the new solid state ones. Choose 2 ½” spinning drives if your Samurai is going to be attached to a tripod or if it is not going to be subject to excessive vibration. For harsher conditions, choose a solid state drive.



HDD | SSD

Which drives should you use?

There are so many drives available, and new models appear all the time. We are not able to test all drives but here are some guidelines.

Speed and reliability are the main factors. Here are a few things to bear in mind:

- Disk drive data rates tend to be given in megaBYTES per second, and codec data rates are normally given in megaBITS per second. It's very easy to get confused. But there's no need to be, because all you have to do to convert megabits to megabytes is divide by 8. So if you're recording at 220 megaBITS per second, that's going to result in 220/8 megaBYTES per second, which is 27.5 megaBYTES per second.
- To see what works for you, you may want to start working with relatively fast drives 7200 RPM, and then try slower ones 5400 RPM. This gives you a frame of reference for comparison. Just remember that the higher the bitrate of the Apple ProRes® you're using, the faster the drive needs to be.

Atomos regularly test hard drives – please check this link before purchasing drives: <http://atomos.activehosted.com/kb/article/what-drives-do-we-recommend>

Solid State Drives (SSDs)

These are Flash memory devices that come in the same form-factor as 2 ½” disk drives, and they are fully supported by the Samurai. See the section below about when you should consider using SSDs. We only recommend Intel SSDs at this stage as we have had unreliable results from all other drives.

Mechanical Shock and Vibration

Hard disks are precision mechanical devices that need to be handled carefully. You will be using the same type of drives that are normally used in notebook computers, and you can use this as a guide to whether you need to use mechanical drives or Solid State ones for any proposed projects. If you think a particular usage scenario would be suitable for a notebook computer, then it will probably be OK for a mechanical drive inside a Samurai. If you think the drive inside your notebook might suffer damage, then don't use a mechanical drive.

We can't give rigid guidelines because there are so many different kinds of drives, each with different mechanical properties. You may even find variations between drives of the same type.

What we have found is that mechanical drives are suitable for most purposes that don't involve harsh vibration or mechanical shocks. They will be perfect for tripod-mounting, and also for the majority of hand-held work. We would advise against hard-mounting them on moving vehicles

(but they would probably be OK if cushioned against the body of the camera operator) and we would not advise using mechanical disks if there is a likelihood that they might be dropped onto a hard surface.

Here are some things that you should bear in mind when using spinning disks:

- Even though spinning drives can withstand substantial shocks when they are not in use, they are more vulnerable when running. Harsh treatment that may not actually damage the drive may interrupt recordings at a much lower level of severity. We recommend that you experiment with your drives by testing them in the conditions that you normally work in.
- Spinning drives have a gyroscopic effect that you will feel faintly if you rotate the Samurai up or down or from side to side. They are particularly sensitive to this type of motion. If you do this too quickly while the drive is spinning, you may get a small gap in your recording.
- Be very gentle when changing batteries if you are recording. Practise this manoeuvre so that you are able to do it smoothly. It is always better to do this in-between takes.
- Do not bang or jolt the Samurai while recording. Gentle and cushioned movement may be OK.
- You will find noticeable differences in the ability of drives to withstand shock and to continue recording during vibration and movement. As we receive reports of drive durability and reliability, we will post them on www.atomos.com
- Your Samurai is able to detect when the drive is under stress and it will recover from any break in a recording by waiting until the drive is ready to continue, and then resuming from that point. If frames have been dropped because of shock or vibration, a “Skippy” Kangaroo symbol will appear on the home screen on the Samurai, just above the disk capacity indicator. This means that you will not normally have to restart the Samurai, even if a recording has been interrupted by mechanical disruption to the disk drive. (see *Recording and Monitoring: Atomos Anti-shock Technology* for more information)

Taking into account most usage scenarios, we think that mechanical disks will be suitable in the majority of cases. Spinning disks are most sensitive when they are rotating. It is obviously best to avoid dropping them but many disks now have a “drop detector” that will lock the most fragile mechanical parts in place and protect them from surprisingly hard knocks. We recommend that if you want to experiment with this, you do so with a drive that doesn't contain the day's shoot!

Backing up and archiving

Remember that no storage medium, including tape, optical disks, spinning disks and flash memory, is completely immune from failure. You should bear this in mind when deciding how to manage your recorded content. At the very least, you should consider the consequences for you and your business if your storage medium were to suffer from a sudden failure, and you should back up your content accordingly. Hard drives that you can use for archiving are becoming increasingly affordable. You may find that it is completely feasible for you to keep your master Samurai disks on a shelf (just like tapes!), and, as a backup, store copies on large hard drives, RAID arrays or Network Attached Storage (NAS).

2. What you also need cont.

HD/SD-SDI cables (included)

- 2 x Mini-BNC > BNC cable adaptors are provided.
- 1 x 70cm Mini-BNC Male to BNC Female to connect a camera or switcher to the Samurai input, or the output directly to a monitor.
- 1 x 23cm Mini-BNC Male to BNC Male is also provided. This is used to connect the Samurai's SDI input or output to standard BNC SDI cables coming from, or going to, other devices.

 Note that the 1 x 23cm Mini-BNC cable is provided for use with a normal male>male connector, and a normal SDI cable female>female is required for operation with this cable.

HD/SD-SDI cables are robust physically and electrically: you should rarely have problems with signal transmission unless your cables are either damaged or too long. Please remember that HD-SDI cables use locking connectors and will not simply pull out if they are jerked or tripped over. They are therefore a significant trip hazard, and also a hazard to your equipment, which may be damaged if the cables are mishandled.

 If the SDI cable is removed while recording the **“Skippy”** image will also be displayed. To remove touch Skippy and he will disappear.

 Refer to **Part 8: Atomos Anti-skip Technology** for more information about “Skippy”.

Replacement cables are available from your Atomos dealer. The Atomos cable adaptors provided are extremely tough. They are also more flexible than “traditional” SDI cables, which means that your camera and Samurai are less likely to suffer stresses caused by stiff or inflexible cables.



Standard 1/4” Camcorder Mount

This must fit a standard 1/4” screw mount. Select the type that best suits your application and conditions.

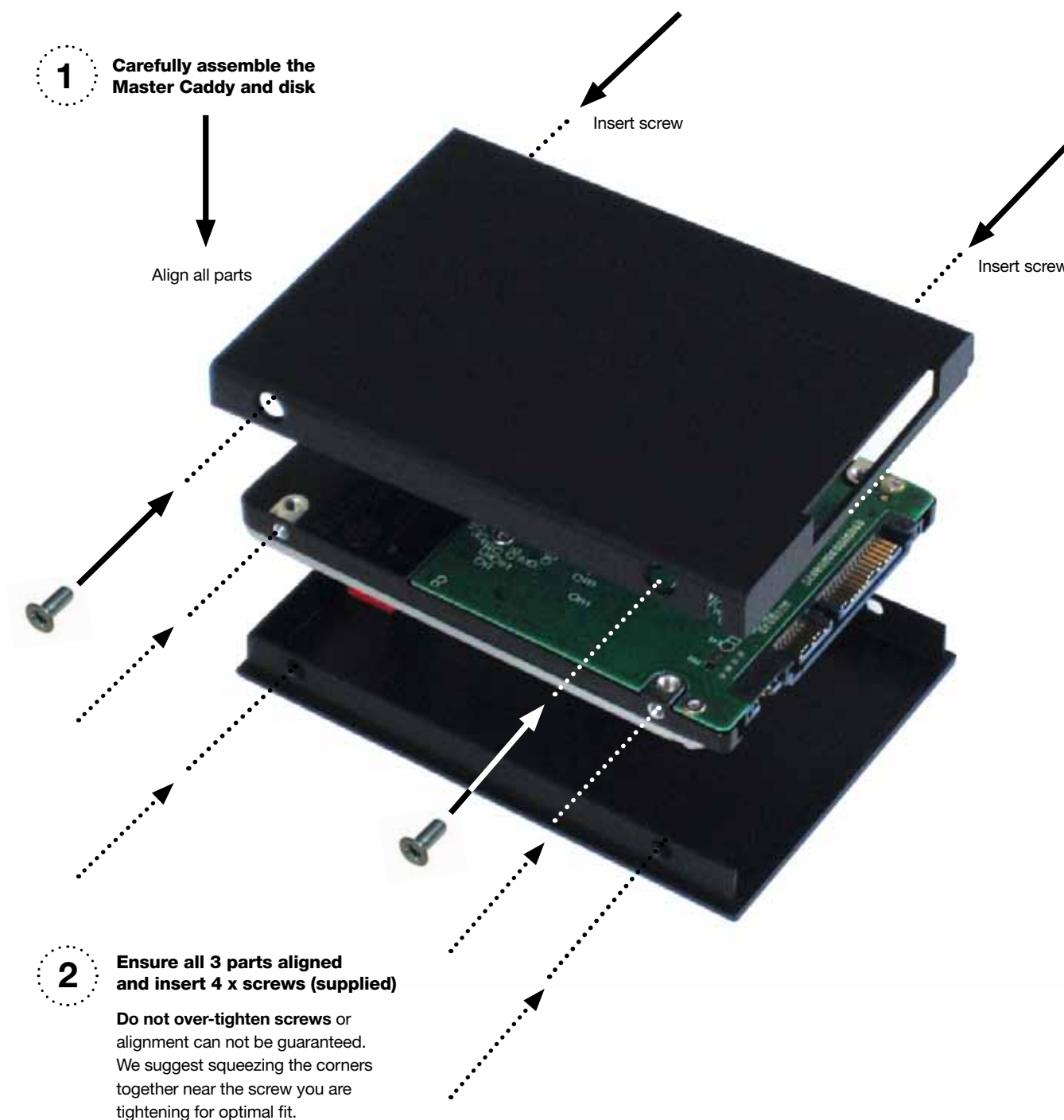
3. Mounting disks in the Master Caddy

Mounting drives in the Master Caddy

This is simplicity itself. Just insert the disk into the caddy, and secure with four screws. The caddy is light and the disk just needs to be held securely. Don't over-tighten the screws. There are no connections to make because pushing the caddy into the Samurai or the Docking station makes all the connections for you.

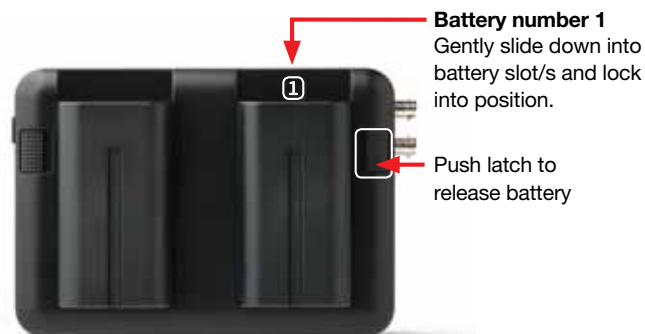
The Master Caddy can't be inserted the wrong way round. Always make sure that the disk connector faces the slot in the Samurai. You have to be quite firm to push the Master Caddy into place, but don't push too hard, just in case something isn't set up or aligned properly. There is very little that can cause problems and the most likely thing is that the Master Caddy isn't properly flush with the drive inside. A quick visual check will confirm this.

⚠ Spinning disks and SSDs are very sensitive to damage from static electricity. Please observe all the usual precautions when handling them, especially **DO NOT EVER touch the exposed SATA connector** as static electricity may be harmful to your disk.



4. Connecting the Samurai and powering up

Batteries



The Samurai is a battery powered device, and has a special feature to ensure that you never have to interrupt a recording to change a battery. We will come to this shortly.

Like all batteries, you will need to take care of them. Make sure that you don't short circuit the connections because this can result in very high currents that can damage the cells and could pose a fire hazard.

Charge new batteries before using them. The supplied Samurai charger can charge two batteries simultaneously. There are four red LED indicators for each battery. This will show the approximate stage the charging process has reached.

 Batteries do not charge in a linear way. At first they charge very quickly, and then the rate slows down to a trickle. While charging, one or more red lights will blink. When 90% charge is reached, all the lights will flash. It is perfectly OK to use the batteries at this point and **we recommend stopping at this stage for the longest battery life**. If you leave the batteries on charge after all four lights are flashing, the charger goes into trickle charging mode for the final 10%. Eventually, when trickle charging is complete, and the batteries are at 100% charge, all the lights will go out.

Always use battery slot **1** for the first battery. This is effectively your primary battery and the Samurai will not start without it.

Battery slot No.2 is the secondary or back-up battery and is not marked. Once the Samurai has been started from battery slot No. 1, it will operate on battery slot No. 2 alone. No. 1 is only required for start up.

To insert the batteries, gently slide them down into the slot and lock them into position. To remove a battery, push the latch to release it. Each battery has its own latch, which is located to the right of batter No. 1 and to the left of batter No. 2 as you look at the back of the Samurai. Pull the latches towards the batteries to release them.

 Samurai batteries and modular accessories (Connect Converters, etc) are held in place very tightly because they are on the outside of the device and there has to be no possibility whatsoever that they could work loose, so you will have to be quite firm with the battery latches. We suggest that you familiarise yourself with the force required to remove the batteries and accessories so that you can do this quickly in the field. Make sure that you hold the top and the bottom of the battery or accessory module when sliding it off to avoid dropping it when it is released from the main unit.

The Samurai introduces an Atomos technology called Battery Looping for continuous power. When power is running low on one battery, the Samurai will automatically switch to the second battery, you can remove one of the batteries and replace it with a fully charged one. Samurai will continue to operate as you do this. You can continue this process indefinitely.

 The Samurai may be powered from NiMH & Li Ion 14.4V battery systems. Battery adaptor required.

4. Connecting the Samurai and powering up

Turning ON power to the Samurai

The start button is located on the right hand side of the unit (as you look at the screen). Momentarily press the circular button on the right side of the Samurai as you look at the screen to power up the unit. After a couple of seconds you will see the Atomos logo, and then the Samurai Home Screen.

Turning OFF power to the Samurai

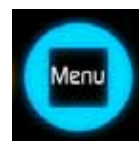
To turn the unit off, touch **menu** on the home screen, and then **press the red Power off icon for 4 seconds** the icon will go white when touched to indicate activation of the button. The unit will then power off. You can also do a forced power down by **depressing the on/off button for four seconds**.

 **Four seconds** can seem like a long time! We've made it this way to make absolutely certain that the Samurai can't be turned off accidentally.

ON
+ forced
power
down



Turning OFF power via touchscreen (preferred)



menu



power off

5. Samurai connections

Master Caddy Slot

Simple, locking **HDD/ SSD system**. Less than €5 per HDD/SSD case, this is a safe practical solution to video media management



HD-SDI In

HD-SDI out

→Record loop through
→PLAYOUT

LANC in Optionally control the Samurai using LANC remote control connected here (use 2.5mm TRS/ 3-pin plug)

LANC Loop out Share remote control with other devices (loop thru) by connecting them to the second LANC connector.

Stereo line in

Stereo line out/Headphone

HD SDI in: The video input to the Samurai is HD SDI. This is the signal that is recorded to the Samurai's storage media.

HD SDI out: This is for connection to an external monitor or other device with an HD SDI input. It carries a delay-free loop-through of the incoming signal in record and standby mode, and the playback signal when the Samurai is in playout mode.

 To make it possible to fit an HD SDI input and an output without making the Samurai unnecessarily large, we have used miniature SDI connectors (and supply you with Mini SDI to SDI adaptor cables).

LANC Remote: In addition to direct control through HD SDI, you have the option of controlling the Samurai remotely using the LANC remote control protocol. The Samurai has a LANC input and a LANC loop-through connector to allow you to chain LANC-controllable devices together.

Audio: The Samurai can record 12 channels of digital audio embedded in the HD SDI signal. There is a 3.5mm Stereo Line-in socket for recording audio in sync with incoming video. Depending on your set-up, you may find that this gives you better results than the microphone on the camera.

You can switch between Analogue Audio Line In and HD SDI as your audio sources in the user interface, where you can also adjust the analogue audio input level.

There is also a 3.5mm output that doubles as a Line Out or Headphone Out, which has its own independent level control in the user interface.

6. Other physical features

Master Caddy Slot

On the left hand side of the unit (as you face the screen) is a slot for Samurai Master Disk Caddies. To insert a caddy, gently push until it clicks into position.

Formatting disks - see page 14



Release and remove Master Caddy

To eject it, use the latch on the right hand side of the Samurai (as pictured)

The Master Caddy is hot-swappable, so you can do this at any time - even while the unit is turned on. But don't do it while recording or you will get a corrupted file that may be unplayable.

 *Samurai Master Disk Caddies are held in place firmly. Push the latch upwards and grip the protruding part of the Samurai Master Disk Caddy at the top and bottom, pulling strongly but carefully. You may want to practise this manoeuvre a few times until you are completely familiar with the process.*



Screw Mounts

The Samurai features standard tripod 1/4" screw mounts on the top and bottom of the unit, allowing you to configure your recording setup various ways (1/4" camcorder mount not included in Samurai kit).



Samurai Modularity

The Samurai was designed to be a flexible and modular system. It doesn't need any drivers to connect to a computer, you have a choice of spinning hard disk storage or solid state, and it will work with any battery system as long as it connects to the Samurai's NP-type slots, or via a DTap connector.

The Samurai's battery slots are the key to it's modularity. They provide secure attachment and continuous power, through Atomos' feed-through power system.

The first of the modular add-ons to be announced by Atomos are the Connect converters (pictured). More on this in Part 14.



7. Using the Samurai

Using the Samurai

The Samurai is controlled via an intuitive touchscreen interface. There are large, obvious controls for Record, Play, Monitor, and Menu, as well as the following information:

- Current input format and status
- Codec currently in use
- Remaining battery power
- Which of the two batteries is currently active
- Headphone/Line Out volume
- Audio Input Level meters
- Remaining Recording time on disk
- Timecode
- Record Trigger
- Unit name

  Watch out for any items on the screen that are marked by a small blue arrow. If you touch these items you will be taken to other options depending on context. If you touch them repeatedly, you will cycle through related options

  A large blue arrow in the top right of the screen will take you out of lower-level menus back to the main control screen

The User Interface in detail

Even though the Samurai is an extremely sophisticated and technically advanced device, we have taken a minimalist approach to the interface. We've only included controls that you really need. This is important in a device that has to be ready for use at all times and must therefore be simple to operate while in use.

The Samurai Touchscreen

Samurai features a very high quality 800x480 pixel video touch screen. Most of us are now familiar with the idea of touchscreens, but there is an important difference between Samurai's screen and those you might find on a smartphone.

Samurai's screen is pressure and touch sensitive. It takes more than a glancing brush of a finger to trigger the screen. For some applications, (like dragging and dropping) this would be a disadvantage, but for the Samurai it is an important feature, because if the screen was too sensitive, it would be easy to accidentally trigger Samurai operations, potentially interrupting a recording, for example.

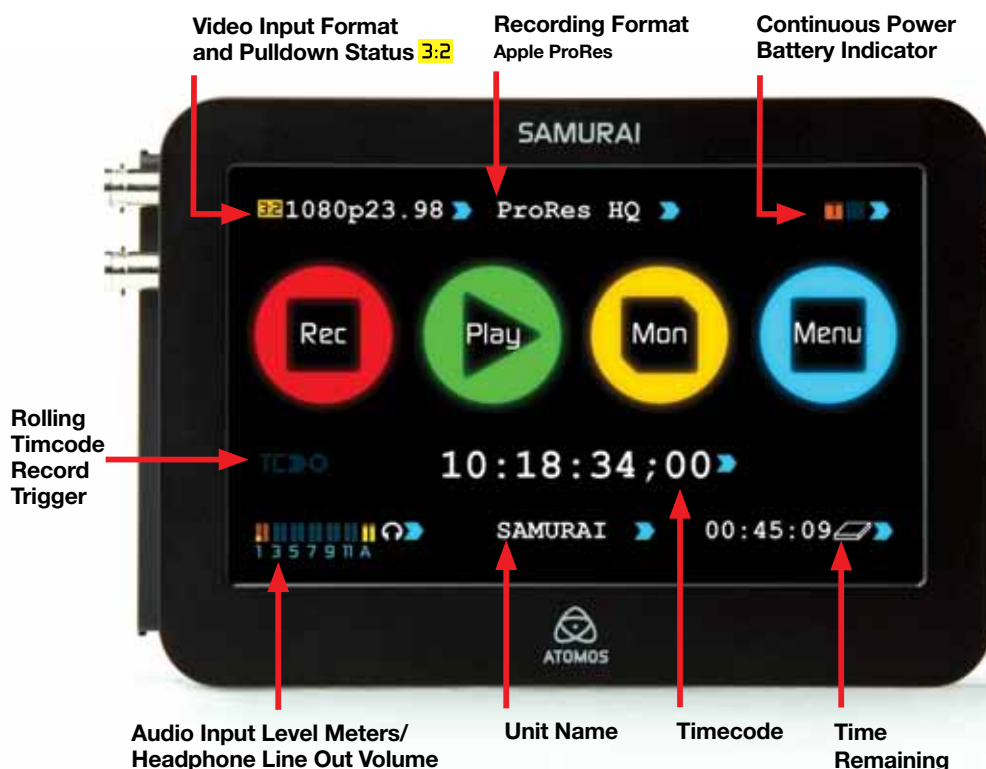
With the Samurai screen, you have to firmly push the screen for an instruction to register. This gives a very positive feel to the device and confidence that commands won't be given in error.

Be definite and deliberate in your pressing on icons on the screen and the Samurai will be very responsive. Remember this is not a capacitive touch device like many Smart Phones; holding contact with the icon for a millisecond will ensure accurate and rapid response.

The Home Screen

This is the screen you see whenever you are not in a function or sub-menu, and it is the first screen that the Samurai boots into when you turn it on. All functions are one touch away: simply touch the screen on any function to be taken to that function's screen.

There are four brightly coloured icons labelled Rec, Play, Mon and Menu. In the lower centre of the screen is a timecode display with Hours:Minutes:Seconds:Frames. Below this, on the lower edge is the Unit Name: a customisable label that identifies media from your when it is connected to a computer.



7. Using the Samurai

Home Screen and Menu Functions

Rec (Record)

This is the icon you touch to begin a recording. Touch it again to stop a recording. While recording the Rec icon changes to a Stop icon. Once your recording has started you have the option to touch the Mon icon to view the signal you are recording.



STANDBY



RECORDING



The **Rec** icon is dimmed and disabled if there is no valid video input OR if the disk is full. The buttons is dimmed because you cannot record.

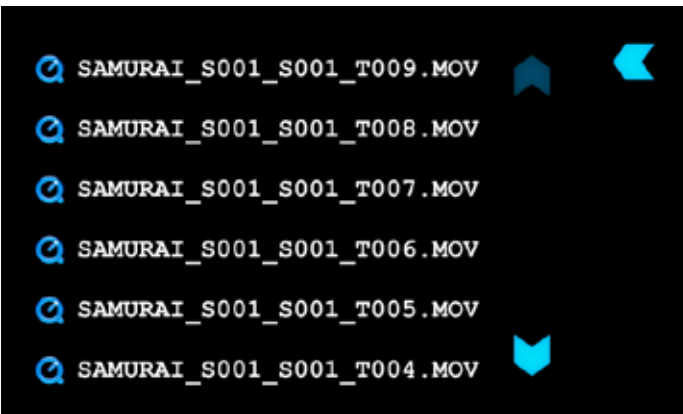
NO INPUT

Play

Touch this icon to play previously recorded clips. When you press the green Play button you will be taken to the navigation screen.



STANDBY



NAVIGATION

Samurai uses a unit name, scene, shot and take convention to name the clips. Select the clip you want to play by touching the file name and this will start to playback.

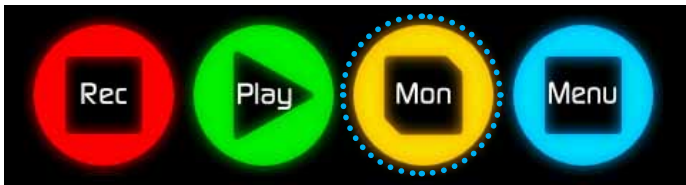


NO DISK

The **Play** button will be dimmed and disabled if there is no disk or the disk is not formatted. See page 14 - Formatting disks

Mon (Monitor)

Pressing this icon connects the incoming video signal to the screen, so that you can use the Samurai as a field monitor. More about monitoring in the next section, Monitoring and Recording.



STANDBY



NO INPUT

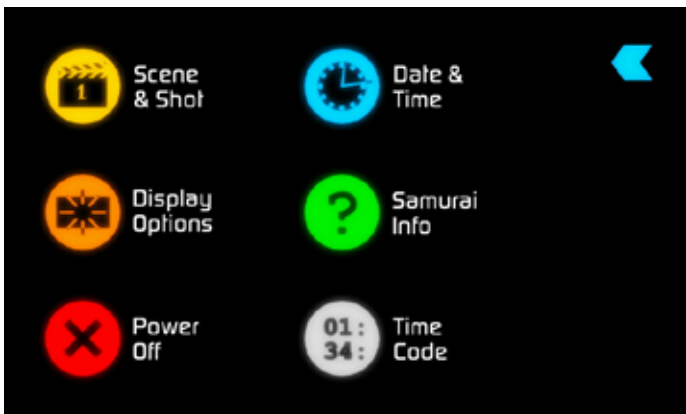
The **Mon** icon is dimmed and unselectable if there is no valid video input.

Menu

Pressing this takes you into a number of options which will be explained next.



STANDBY



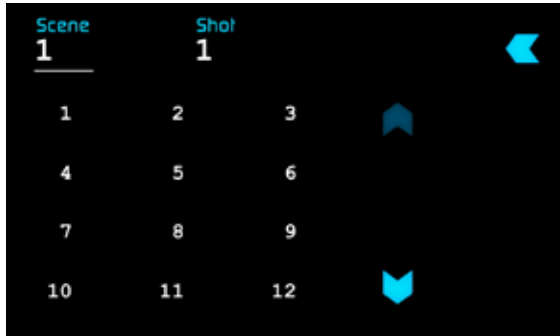
MENU

7. Using the Samurai



Scene & Shot

Allows you to select the scene and shot number that will be recorded next. To select press **scene** or **shot** at the top and the number you wish to use from the list below (up to 999). The number you choose will then be shown underneath the word Scene or Shot in a larger font and will be underlined. The take number is automatically increased with each take.



Date & Time

Allows you to adjust the date and time shown by the clock and calendar in the Samurai. Touching the Date & Time takes you into the Date and Time Screen. At the top of the screen is the date and the time of day. The month, day and year are selectable by touching them, at which point a scrollable list of dates, months or years will show below, depending on which option has been selected.



To enter a date, for example, begin by touching the month at the top of the screen, and then select the required month from the list below. Then touch the day, and then the year, selecting the required value from the list below.

Setting the time is done in exactly the same way.

Date formats (i.e. dd-mm-yyyy or mm-dd-yyyy) are selectable on the right of the screen. Just keep touching the **date format** icon until it shows the format you want to use.



Display Options / Screen Lock

Allows you to modify the brightness of the screen. You are presented with a horizontal slider. Touch it anywhere on its length to increase or decrease the brightness of the display or you can slide up and down the blue bar.

SCREEN LOCK

A new feature for the Samurai is the ability to Lock the screen so no changes can be made by mistakenly touching the screen. To Lock the screen press the start button located on the side of the Samurai once quickly.

You will see **Locked** will flash on the screen. Press again to Unlock.



When you access the Display Icons you can choose to disable your screen but only when the screen is locked. While Locked, Display is > On/off



Samurai Info

Shows the software (firmware) version and unique device ID (DID) of your Samurai device. This will be useful if you ever have to speak to Atomos technical support or a support agent from your reseller. You can also check on the Atomos website to ensure you are running the latest firmware: <http://www.atomos.com/samurai/firmware/>



Power Off

Turns the Samurai off. You need to press Power Off for four seconds. Alternatively, you can press the physical On/Off button on the right side of the Samurai for four seconds to force shutdown. Atomos recommends using the touchscreen Power Off function.



Timecode

Takes you to the dedicated timecode configuration page. **Refer to Part 7 of this manual for more information.**

 Remember that pressing a large blue arrowhead will always take you back to the previous menu you were in.

Smaller controls and indicators around the Home Screen

There are a number of smaller controls that double-up as indicators around the Home Screen.

Input



At the top left of the screen is not actually a control but will change to display information about the signal being input to the Samurai at the time. If there is no input, it will say No Input. When a valid signal source is connected, the display will change to (for example) 1080i50.

Video Compression Format



At the top middle of the screen shows which version of ProRes® you are using. You can change between versions (LT, HQ and 422) by repeatedly touching the indicator.

7. Using the Samurai

Battery Indicator



Shows whether you've got one or two batteries connected. If there is no battery connected a number will not be displayed in the appropriate slot. Touching the Battery Indicator takes you to the Batteries screen where you can closely monitor the status of the Batteries.

 When a battery is running low its icon will flash.

BATTERIES SCREEN

The Battery screen indicator is made up of two Battery icons, the active battery is shown in orange and the level of each battery is shaded in 1/4 increments with a voltage level shown on top.



In the picture above we see Battery 1 is full and active and Battery 2 is currently inactive and 1/4 depleted. If no battery is present it will show an X in the picture and will be Black in colour as pictured right.

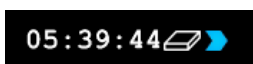


 **Warning:** If both of the batteries are fully depleted, the unit will turn itself off. The Samurai will switch to the battery screen for the last 5 seconds of available power before shutting down, alerting you that shutdown is about to occur.

AUTO SWITCHING/MANUAL SWITCHING

The Samurai will automatically switch to a new battery when the current battery is depleted. You may also switch between batteries at any time by pressing on that battery icon. The new active battery will then turn orange. You may need to use this if you have for example 3 hours recording but only 2.5 hours of battery in one battery, in which case you would change to a freshly charged one.

Storage Capacity Indicator



Located in the bottom right of the screen. When a disk is inserted, the Storage Capacity Indicator will show the recording capacity of the drive in hours minutes and seconds, based on the currently selected video compression, which of course, will determine the recording bitrate.

FORMATTING HDD/SSD

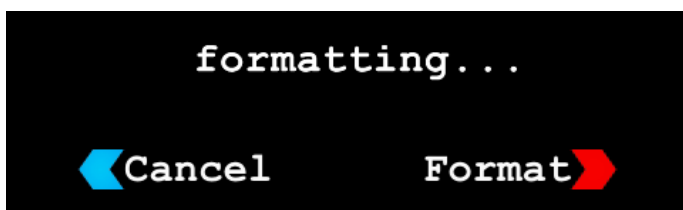
Touching the Storage Capacity Indicator on the home screen will take you to the Media Information and Format screen. Media Information indicates the drive you have present, in this case a Hitachi 500GB spinning disk.

Touching Format HDD/SSD will format the drive inside the Samurai. A confirmation screen will give you the choice to continue or cancel the process.

If you do not see your hard drive information, there may be a problem with your connection. Try ejecting the drive and trying again.

Also check the drive compatibility list: <http://atomos.activehosted.com/kb/article/what-drives-do-we-recommend>

 The Samurai file system is exFAT. We recommend that you format each disk with the Samurai and not your computer.



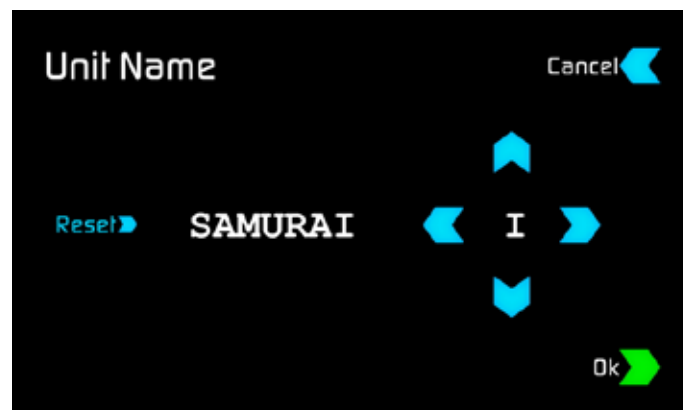
Unit Name



The unit name serves two main purposes:

- **HDD Naming:** Naming the unit names the drive if the drive is formatted after the unit name has been set
- **File Naming:** File name is the current unit name as the start of the recorded clip name; SAMURAI_S001_S002_T003

To access the unit name screen simply touch the blue arrow to the right of the unit name. Creating your own unit name is simple. Pressing OK will allocate the new unit name and return you to the menu screen.

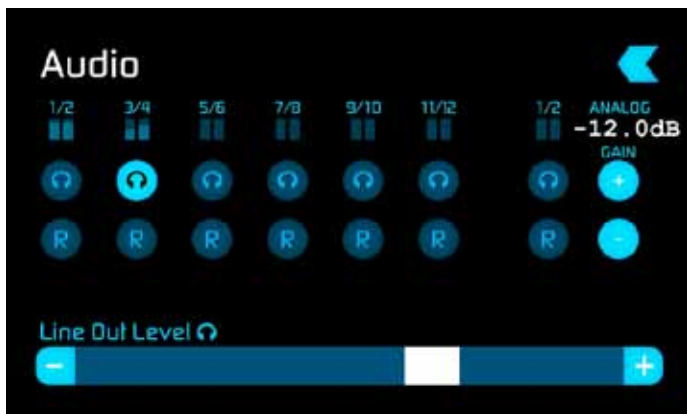


7. Using the Samurai

Audio In



Located in the bottom left corner of the main screen you can see the Audio Monitoring Levels, with access to Audio in.

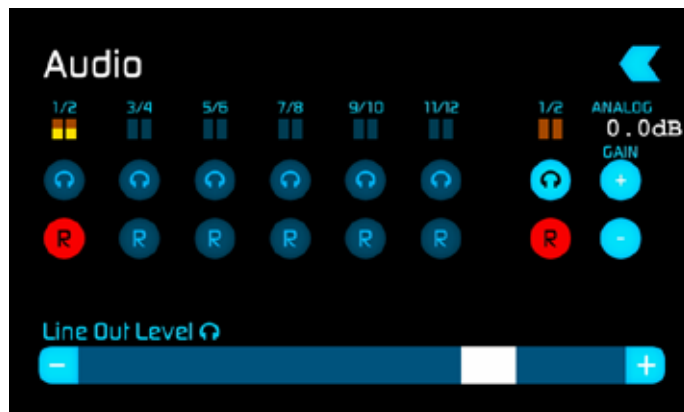


You can see 12 digital channels (via SDI input) and 2 analogue audio channels (via the Stereo Line in). Each channel has a small rectangle assigned to it; when there is active sound coming in you will see the level indicator moving.

Any rectangle shown in orange is set to be recorded. To change the record settings, adjust the gain of Analogue audio in or headphone output levels and monitor selection access the menu

When you touch the Audio in access icon you are taken to the Audio In Page, where you can choose to record from any or all of the digital (SDI) and analogue inputs. Underneath each pair of audio channels you can see the R record button, when this is shown in red it is set to record, simply select all you want to record.

You can adjust the analogue audio gain by pressing the + and - buttons next to the channel pair. There is also a slider to control the line out level. Press any point along the line or slide your finger to the left or right to adjust.



 It is not possible to vary the gain if the signal input is from the SDI connection because this is digital and is embedded in the signal. You can usually adjust this from the camera, please see your camera manual for operational details.

AUDIO DURING PLAYBACK MODE

When you enter into Playback mode on the Samurai it will only output channels 1/2 on the headphones, please bear this in mind when you select the audio channels for recording.

8. Monitoring and Recording

Connect to input

As soon as you connect a supported input to the Samurai's SDI input:

- Rec and Mon icons will go solid and colourful
- The input format will be shown in the top left corner
- Audio inputs will show levels in bottom left corner



READY-TO-RECORD



NO INPUT / NO DISK



NO INPUT / DISK PRESENT



INPUT PRESENT / NO DISK

 The Samurai has a high-quality screen that adjusts to the scan frequency of the incoming signal, for a smooth, accurate display.

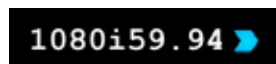
Before recording

- Check there is a valid signal by looking at the main screen, ensuring it looks like the 'ready-to-record' screen
- Check the input signal is set to what you would like:
 - Progressive with 2:2 or 3:2 pulldown or
 - Interlaced
- If you see No Input for any reason please check your camera settings match a supported format for Samurai. See technical specifications on page 33.
- Connect headphones and monitor the Audio channels to make sure the sound
- Check you have your audio in record set as you require.
- Connect any additional Analogue audio inputs and adjust gain accordingly.
- Enter monitor mode to ensure the video is coming in as expected.
- Check you have the correct Scene & Shot number selected. (see page 21 – Organising Material on disk)
- Check your drive is inserted and has been formatted
- Check your timecode settings are as you need
- Choose how you will start/stop your recording
- Check for clean input:

By touching the screen in Monitor mode, you can remove the Atomos overlays to give you a clean screen. If any overlay graphics remain, these will be coming from your camera. Please check the settings on your camera to switch these off.

Choosing your recording format

You can select the recording format by touching the top middle of the touch screen where the format is indicated.



 **IMPORTANT:** You need to match the format you are recording internally on the camera with the format recorded on the Samurai. If you are recording 24p internally on the camera you need to record 24p on the Samurai so the recordings match. To adjust the recording format simply touch the format icon repeatedly and the Samurai will cycle through the options available. The basic rule is match the format of the internal recording on the camera (not the external output of the camera). For more explanation on choosing the correct format on the Samurai and the relationship to camera internal format and output format refer to Section 10 – Pulldown.

8. Monitoring and Recording

SmartControl

SmartControl is a versatile set of functions used to control the starting and stopping of recording by automatic or external means. This section outlines the different methods to start and stop recording. More advanced external control using the Samurai serial port (marked LANC) allows control from other devices such as serial control ports, using computer applications, or API code-generating products. Atomos has a document guide in its KnowledgeBase on how to use industry-adopted protocols and the serial port for external control.

Samurai Start and Stop record control can be triggered by the following methods:

1. Home Page Touch Screen
2. Monitor Page
3. HD-SDI Rolling Timecode trigger
4. HD-SDI Camera trigger
5. Via LANC for Sony and Canon Cameras
6. Via LANC serial port

1. Home page Touch Screen

By pressing Rec (Record)



2. From the Monitor Page

By pressing Rec (Record)



3. HD-SDI Rolling Time Code Trigger record



OFF



DISABLED



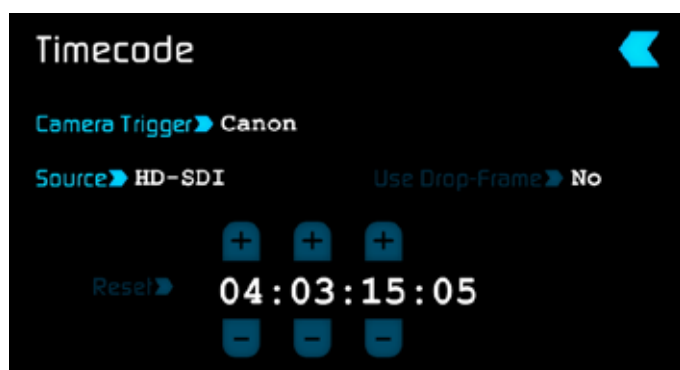
ENABLED

If HD-SDI timecode is selected and the camera is in Record run mode, the user has the choice to start and stop recording remotely from the moving HD-SDI timecode. To enable this simply arm the TC icon (see above). When enabled the camera and the Samurai will start and stop record simultaneously.

NOTE: Rolling timecode trigger is for use when the camera is in REC RUN timecode mode only. Auto SDI flag triggers should be used for Free Run timecode. Please be that aware not all cameras have Start/Stop flags for triggering record, especially older cameras. In such cases rolling trigger in REC RUN will need to be used to trigger recording automatically at the same time as the camera starts recording.

4. HD-SDI Camera trigger record

The HD-SDI Camera trigger is manufacturer-specific, you will need to select the appropriate manufacturer for your camera. There is a flag within the SDI signal that lets the Samurai know the start/stop record has been pressed on the camera; in turn this will trigger the Samurai to start/stop recording at the same time as the camera.



You can use this mode with either Free-Run or Record-Run timecode

To enable this set Timecode to HD-SDI then set the camera manufacture in the timecode menu

⚠ If both the Camera Trigger and Rolling Timecode Trigger are enabled this can create multiple files, please ensure only one HD-SDI trigger is used.

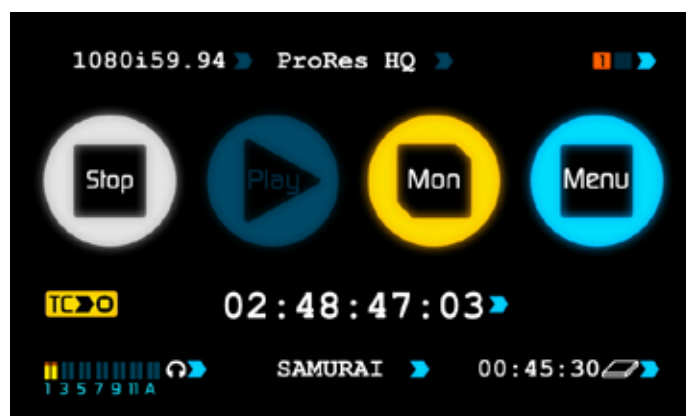
5. via LANC for Sony and Canon Cameras

6. via the LANC serial port

Controlled by a third party computer or controller. For system and OEM integration, contact support@atomos.com

Once you are recording you will see:

- The Rec button has now changed to Stop on the main screen

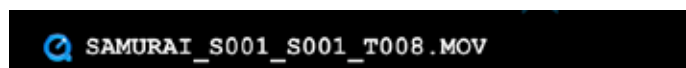


- Play button has been disabled
- The Record icon has changed to a stop icon on the monitor screen



- REC is in the top right corner of the monitor screen

Your files will be recorded to your drive with the `unitname, scene`



and shot you have setup.

To stop, press the stop button on the Samurai monitor or Trigger.

8. Monitoring and Recording

Using the Samurai as a field monitor and viewfinder

With its 5" high-resolution color TFT 800x480pixel screen, the Samurai makes a great field monitor. So good, in fact, that you don't need any separate monitoring equipment. You could even say that the Samurai is a "Recording Monitor".

SmartMonitor

To make the Samurai's screen even more useful, we have added new "assist" features in the AtomOS 3 firmware, which we refer to collectively as **SmartMonitor**.



To access these tools, go into Monitor and select the Camcorder icon. A new set of icons will appear



On the right hand side are the icons for each SmartMonitor tool.

To enable the tools you simply press the icon for the tool you would like, the border will change to white.



You can apply all filters to your monitor at the same time but set up individually for your needs



Zebra

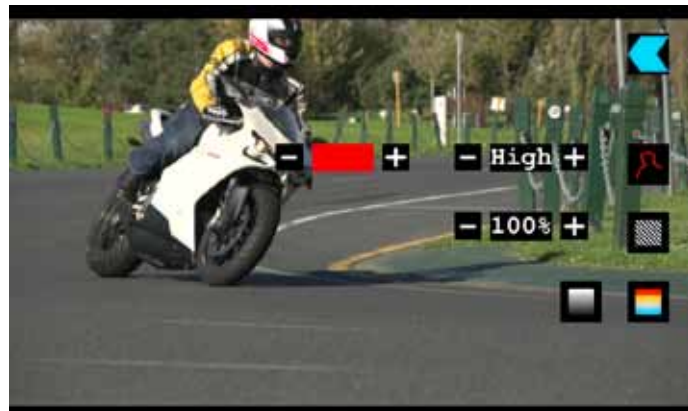


Zebra lines show the parts of the image that are over exposed relevant to the % level set. 95% is usually used for objects, windows and surfaces. 75% is used for checking over exposure of human faces this will indicate reflective or shiny areas on the face.



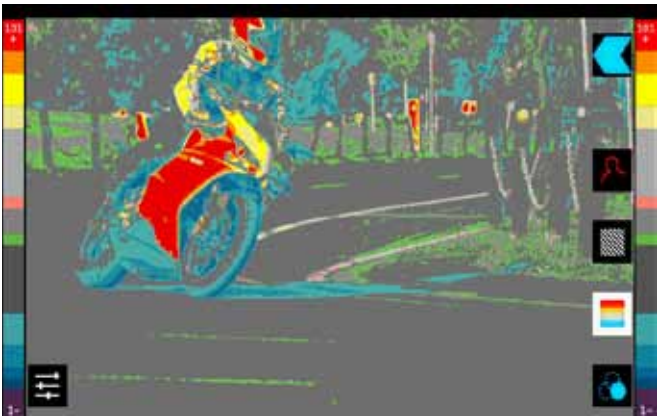
Focus Peaking

Focus peaking allows the user to ensure their recordings are always in focus. The parts of the image in focus are indicated by the selected colour. By default the Samurai uses red, but you can change the colour in the settings and have a Low, Med and High indicator depending on the look you want to achieve. The width of the lines indicating focus can be adjusted for finer focus line representation. This tool is very accurate.



8. Monitoring and Recording

False Colour



False Colour assigns different colors to areas of different exposure in the image. Instead of just showing what parts of the image are overexposed, it gives a more complete picture of what is going on in the image by using a range of exposure values. Generally speaking, overexposed elements will display as red, and underexposed elements will display as blue.

The gradient between colour levels can be adjusted to have a gradient or not. If gradient is not selected, the colour levels will change instantly to the next colour level.

	110%		100 to 109 IRE
	100%		93 to 100 IRE
	90%		84 to 93 IRE
	80%		77 to 84 IRE
	70%		58 to 77 IRE
	60%		54 to 58 IRE
	50%		47 to 54 IRE
	40%		43 to 47 IRE
	30%		24 to 43 IRE
	20%		15 to 24 IRE
	10%		8 to 15 IRE
	0%		2 to 8 IRE
	-10%		-7 to 2 IRE

False Colour Scale:

To help you determine the exposure range with more accuracy, please use the scale below:

You can apply all filters to your monitor at the same time but set up individually for your needs

The colour indicating the section of the image in focus can be adjusted by pressing the +/- keys next to the coloured square representing the current colour. The default colour is Red. The following additional colours are available (White Square, Red Square, Green, Blue, Yellow, Light Blue and Purple).

Blue for Exposure

Displays a black-and-white image that is based on the blue channel of the input signal. Used to observe the noise content of a video image and the judge the overall exposure quality.

Settings

On the bottom left side is the icon to amend the settings of the tools. Current settings are for Focus Paking, Zebra and False Colour.

SmartLog

SmartLog gives you the ability to tag your clips during recording (or playback, more on this later).

By the pressing the Favourite and Reject icons you can assign a “good clip” or “bad clip”. This information can then be exported to non-linear editing system to speed up the edit process, as you can easily see which parts of your recording you have marked to keep or reject.

SmartLog currently only works with Apple FCP X.

How to use

To access the tags, enter the Monitor screen, then press the Flag



SmartLog: MONITOR MODE

You can now see your monitor in the background and the Favourite and Reject icons



8. Monitoring and Recording

You will use these icons as an in and out point on the file, pressing once to set the in point then again to set the output.

When you have selected Favourite, the icon colours will invert (Green background with black text) and the Reject Icon will disappear. When Reject is selected the icon colours will invert (red background with black text) and favourite will disappear.



SmartLog: PLAYBACK MODE

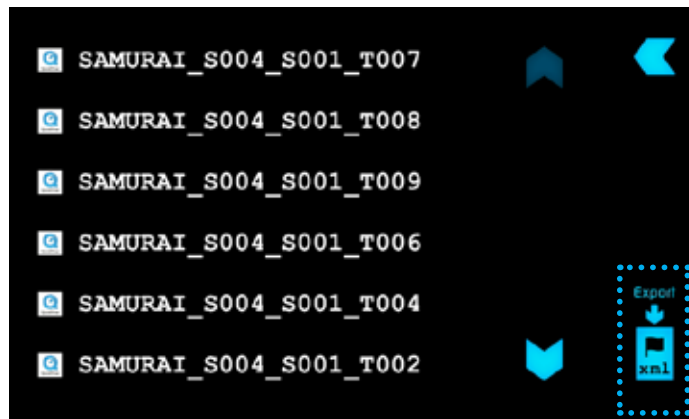


Once recording has finished you will see the green or red in/out points shown on the timeline of the clip once selected.



Your final stage is to Export the XML flag:

- Enter Play or Media Information
- On the bottom right hand side there is an icon Export XML



- Press this once
- You will be shown a please wait screen (the length of time will vary depending on your recording time and amount of flags applied)
- Then it will return you to the previous screen



You can carry on recording but please remember before you eject the drive to export your XML files.

8. Monitoring and Recording

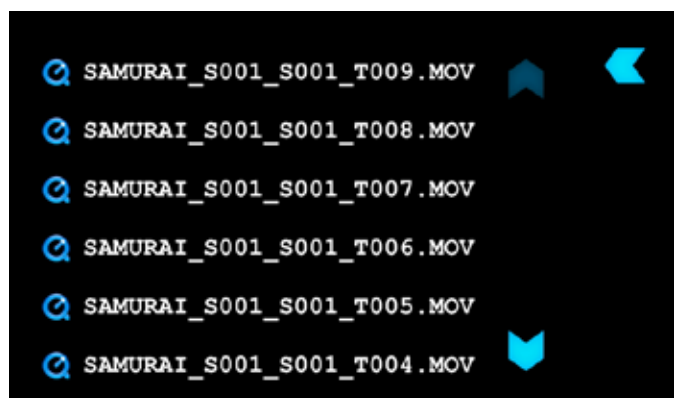
Organising material on the disk

Samurai uses a `unitname`, `scene`, `shot` and `take` naming convention:

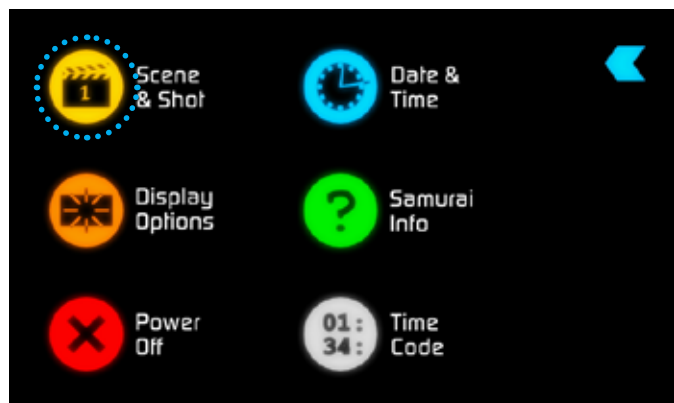
`SAMMI_S001_S001_T001`

This was recorded on a Samurai unit called SAMMI, the `scene` selected was 1, the `shot` selected was 1 and it was `take` 1.

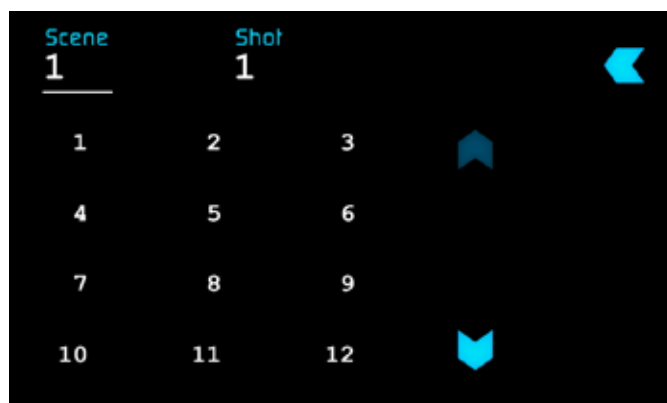
Below is an example of your playback browser window showing file names.



To organise your clips you need to access the Scene & Shot. To navigate press **Menu** on the main screen and then press **Scene & Shot** on the menu screen.



You can see along the top you have `scene` and `Shot` with a large underlined number, this is the current selection.



To change them press `scene` or `shot` (depending on the one you wish to change) then the number you wish it to set as. In each selection this goes up to 999.

Once selected you will see the underlined number at the top will have changed. You can now go back to the Main screen and start your record.

 *If you do not set this up Samurai will start recording from Scene 1 and Shot 1 automatically.*

 *The Samurai uses the exFAT file system. This is recognised natively by both PCs and Macs, without any need to install driver software. It is a 64-bit file system that will let you record to the full capacity of your storage medium without any need to "segment" the files. The maximum file size is so large that you do never need to worry about exceeding it.*

 *For Windows XP, service pack 3 and a special exFAT patch are required. Both are available on the Microsoft® website.*

8. Monitoring and Recording

Atomos Anti-Shock Technology

Spinning disks are very reliable in a controlled environment where movement and vibration are minimal and within the capabilities of the devices. They are ideal for low-cost recording, but will suffer reduced performance if they are jolted or receive a sudden impact.

Should one of these events occur, the Samurai will sense the hard disk slowdown. If there is a break in the recording it will detect the number of frames involved and will then continue to record when it is safe to do so.

This means that even if you suffer a momentary break in your recording, the video capture will continue without any intervention from you, the user.

It is obviously important for you to know that you have suffered from an interrupted recording and the user interface will display a warning (in the form of a Kangaroo sign) clearly above the disk-capacity display on the main screen.

If you find you are working on a very active project where you are seeing a lot of “Skippys” then you probably need to switch to SSDs, and only use spinning disks for gentler environments.

 To remove “Skippy” warning, simply touch the icon and it will disappear.



“Skippy”
warning



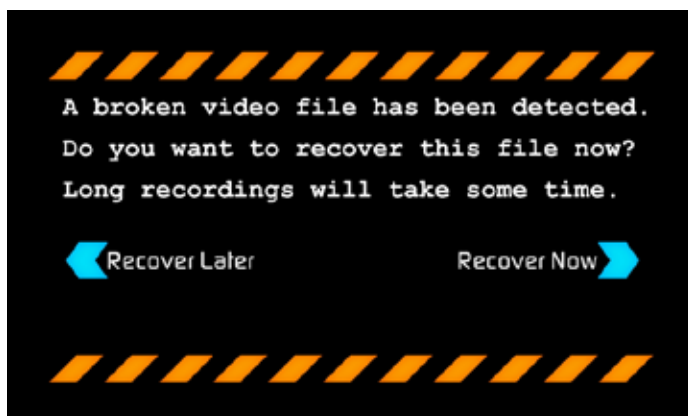
File Recovery

From AtomOS 3.0 onwards, a file recovery feature is included, in the event of a disk being removed, or a battery running out, while recording.

The Samurai saves the file every 8 seconds while in recording mode, so if the recording is stopped suddenly, without closing the file properly, you will only ever lose 8 seconds of material.

In the event of an interrupted recording, when you restart the Samurai, or replace the disk, you will be presented with a menu that gives you the option to recover immediately, or recover it later.

If you recover later, every time you put the disk in, or start up the Samurai, the same menu will appear to prompt you to recover the file that did not close properly.

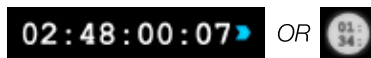


 If the drive is broken, or has become corrupted, then we will not be able to recover the file and we recommend that you try third-party hard disk recovery software.

9. Timecode

Using Timecode

Touching the timecode display on the Samurai's home screen, just below the four main coloured controls, will take you to the Timecode setup screen (this is also accessible by touching Menu and then Timecode)

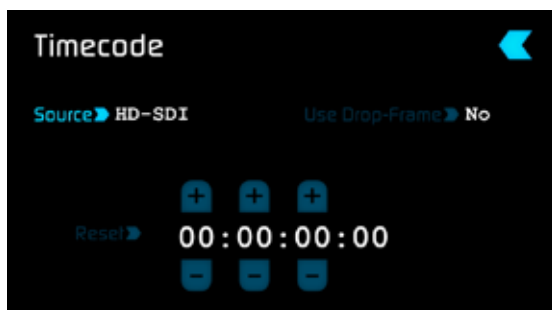


Occupying the lower-centre part of the screen is the timecode display with controls to set the start-time of the timecode.

The four timecode modes supported are:

- HD-SDI
- Time of Day
- Record Run
- Auto Restart

Cycle through these modes by touching the timecode Source Selector.



HD-SDI embedded timecode

With this setting, the SDI input will set the timecode (as long as the source SDI device supports this). The controls to adjust the timecode value are disabled in this setting because the embedded timecode in the SDI signal sets the Timecode value of the recording. If you want to adjust this please, refer to the manual of your SDI input device.

Trigger from HD-SDI time code

If HD-SDI timecode is selected and the camera is in Record Run mode, the user has the choice to start and stop recording remotely from the Source Camera HD-SDI timecode.

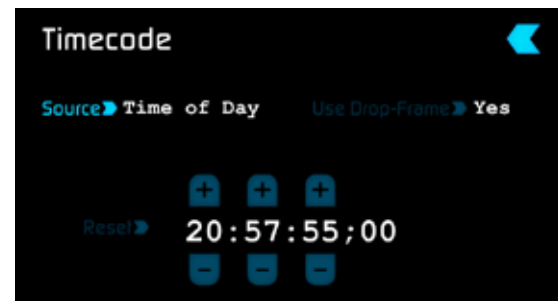
To enable rolling Timecode Start/Stop functions, simply press the TC Icon shown here. When enabled, pressing the camera Record Stop/Start button will make the Samurai start and stop record simultaneously as the timecode starts and stops.



When using the camera in Free Run timecode, the rolling timecode trigger might not work as expected. However, depending on the camera, you can trigger record function by the embedded flag/trigger in the HD-SDI signal. Most higher end cameras have this functionality; if unsure contact us at support@atomos.com

Time of Day

With this selected, each new clip that is created will contain embedded timecode accurately showing the time of day that it was recorded, based on the internal Samurai Time of Day clock. This can be set in Menu > Date & Time

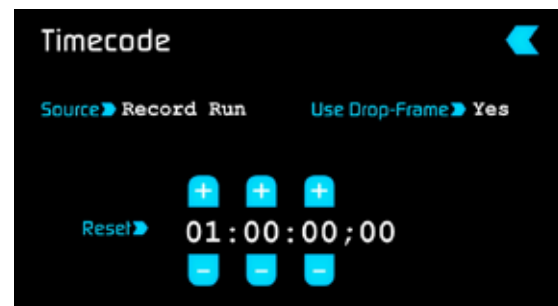


If recording is stopped and then restarted while in this mode, there will be a time gap between the last clip and the next one, equal to the length of time the Samurai has been out of record. The start timecode of each clip will be the exact time of day when recording started.

Time of Day timecode is useful as a reminder of the time that clips were recorded. It can also help with syncing-up of multiple cameras, but remember that the accuracy of the correlation of Time of Day timecode between Samurais will depend on how closely their internal clocks are synchronised.

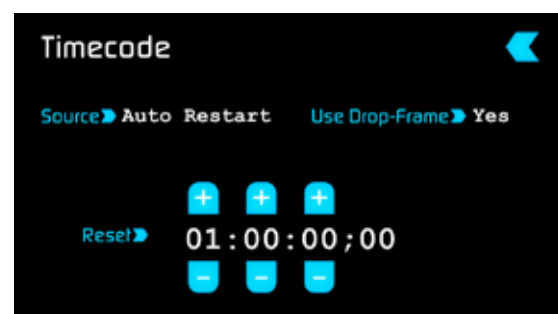
In Time Of Day mode, the controls on the Timecode Setup Screen for adjusting the start-point of the Samurai timecode are not available, as the timecode is set by the Samurai's internal clock.

Record Run



With this setting you set the start timecode of the first clip and the following clip will start at the frame immediately after the out point of the preceding clip. This will continue for all clips that follow. This is often referred to as continuous timecode.

Auto Restart



With this setting, the timecode will be reset to the timecode you define here whenever you press record. All your clips will start at this timecode.

To adjust the timecode use the "+" and "-" above and below the hour:minute:seconds sections

10. Pulldown

What is Pulldown?

3:2 Many professional and consumer cameras available today do not send true 1080p24, 1080p23.98, 1080p25, 1080p29.97 or 1080p30 signals down their SDI or HDMI outputs.

2:2

Instead they send 1080i59.94 in NTSC regions (eg USA, Japan), and 1080i50 in PAL regions (eg Europe)

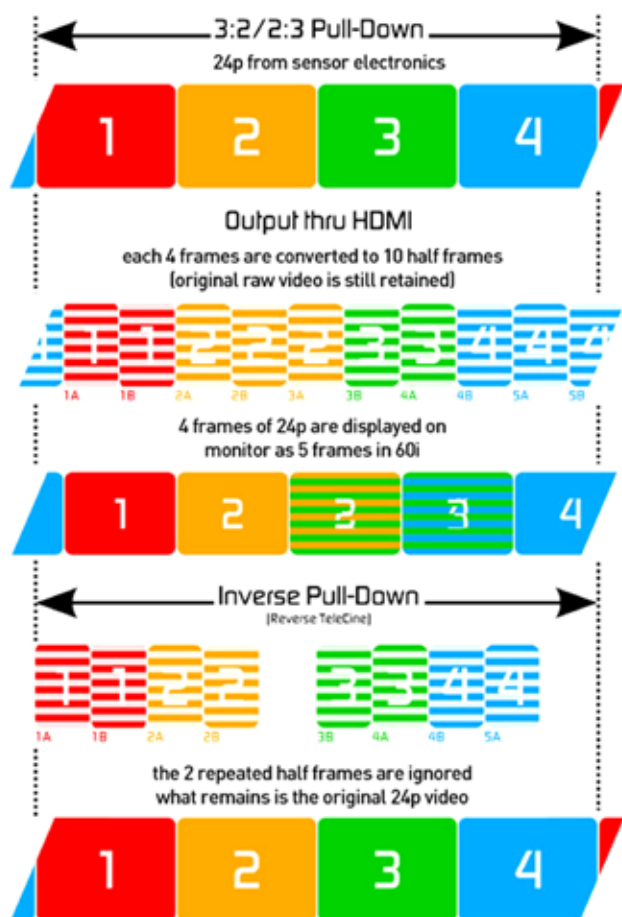
In order to convert the signal from the internal recording format to 1080i5994 or 1080i50, they use a process called 3:2 or 2:2 pulldown.

Camera Setting	Pulldown	Samurai Receives
1080p23.98	3:2	1080i59.94
1080p24	3:2	1080i60
1080p25	2:2	1080i50
1080p29.97	2:2	1080i59.94
1080p30	2:2	1080i60

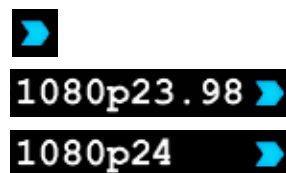
You will, of course, want the Samurai to record eg 1080p24, not 1080i60 to the disk. In many cases, it is not easy for the Samurai to detect the pulldown operation in the video, so you will have to set the correct mode in the Samurai as well as setting it on your camera.

With some cameras, the Samurai can detect and remove the pulldown, in which case the mode you expect (eg 1080p23.98) will display on the Samurai and you will not have to do anything further.

Atomos is adding auto-detection support for more cameras, please check for firmware updates regularly at www.atomos.com



1080p23.98 or 1080p24



If you have set 1080p23.98 or 1080p24 in your camera and your samurai displays 1080i59.94 or 1080i60, then you can easily remove the pulldown by following these steps:

- Press the **blue arrow** next to the **video format** repeatedly until you see 1080p23.98 (or 1080p24) displayed. You will see that the **Mon** button is dimmed. Your samurai needs to analyse the video for about 1 second, in order to detect the pulldown sequence and remove it.
- If it is not automatically detected after 1 second, wave your hand from side to side in front of the lens, or wave the camera from side to side for a few seconds. The Samurai will detect the pulldown in the movement, the input video format will show 1080p24 and the Mon/Rec button will highlight.

3:2 pulldown detection is difficult, if not impossible to detect on completely still video. This is why you should wave your hand in front of the lens.

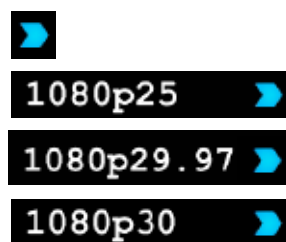
If you lose the input detection – for example you unplug the SDI cable or go to Playback mode, you will need to wave your hand or the camera again, when the signal is restored to the Samurai.

Some cameras use a variant of pulldown removal, for example Panasonic Advanced pulldown. The Samurai does NOT support this format, and it will not be detected.

Standard Panasonic pulldown is supported, ensure in the Panasonic camera settings that pulldown is not set to Advanced.

1080p25, 1080p29.97 or 1080p30

For these modes, simply press the **blue arrow** repeatedly until your 1080p desired format is displayed. There is no need to wave your hand or the camera, as 2:2 pulldown removal does not require moving video.



Your Samurai always remembers whether you wanted 3:2 or 2:2 pulldown removal. If you change the format on your camera eg from 1080p24 to 1080i60, you will need set to the Samurai input to match your camera setting again.

11. Playback & Playout

Using the Playback and Playout features

The Samurai has a powerful playback function that allows you to playback pristine Apple ProRes or (optionally) DNxHD recordings in real-time with controls to navigate quickly to any part of a clip, the ability to play recorded content faster than normal playback speed or step through the clip frame-by-frame to check your footage very accurately.

Playback makes the Samurai a fully-functional portable HD Deck with quality visually identical to uncompressed!

Whenever a clip plays on the Samurai's screen, it will also be presented as an HD-SDI signal through the Samurai's HD-SDI output. You can view this on an HD-SDI monitor, or, using an optional Atomos S2H Connect Converter, on an HDMI monitor.



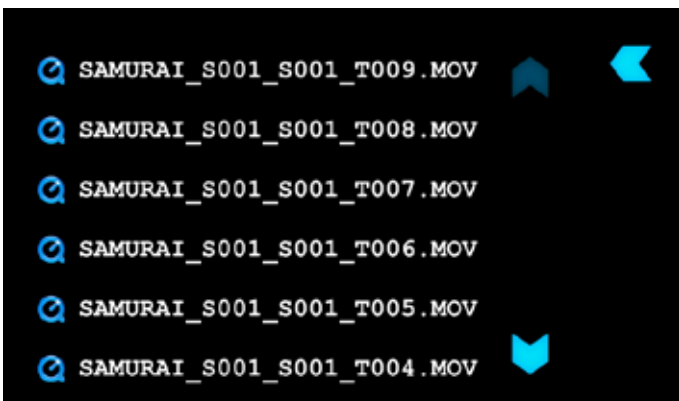
To play back a clip, first touch the green Play control on the home screen. There will be a short pause while clips are made available for playback. You will then be taken to the Play Navigation screen.

exFAT Disks

If the disk has been formatted on Samurai it will use the ExFat file system. The Play navigation screen will display a list of files that have been recorded. The naming convention used includes the unit's name, Scene number, shot number and take number, e.g.

`SAMURAI_S001_S001_T001.mov`

This list is ordered in the same order it was recorded in. To navigate the list use the up and down arrows to scroll through.



To play the item touch the file you want to play and this will start the playback.

FAT32 Disks

If the disk has been formatted on Ninja it will use the FAT32 file system.

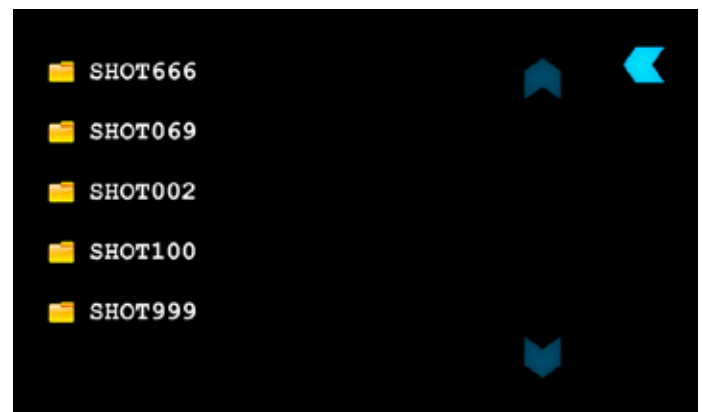
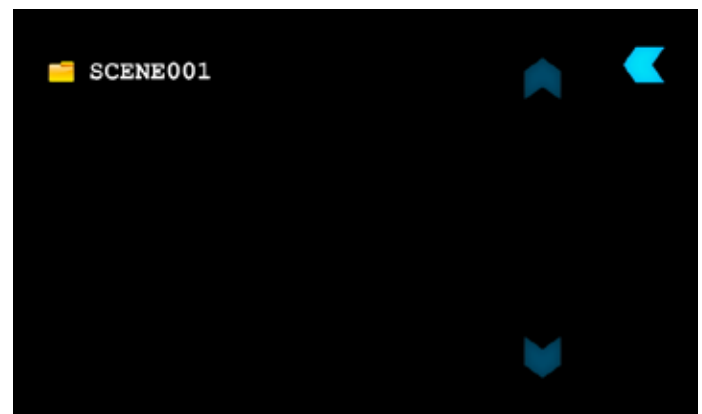
The Play navigation screen will display the Scene and Shot folder structure.

The first screen will show you all the Scene folders. In the picture below we can see Scene001) within the Scene Folder are any Shot folders. In the picture below you will see the 5 different shot folders. Within each Shot folder will be the list of takes.

Fat 32 has a file size limitation of approx 4GB, when you recorded on the Ninja it would generate a new take each time the recording exceeded this limit.

You will notice the take has a different icon, this indicates the file can be played back.

You can navigate the files and folders using the blue up and down arrows. Once you see the take you would like to playback, touch the take icon you want to play and this will start the playback.



11. Playback & Playout

Scrub Bar



This is the thick blue line along the bottom of the playback screen. A vertical white “now” line shows the current playback position. You can think of the scrub bar as representing the length of the clip. If you touch the scrub bar, playback will start from that position.

Simply by running your finger along the scrub bar, you can move forwards or backwards through any clip - even if it is eight hours long - at any speed.

Play/Pause



This is the master playback start/stop control and is found to the right of the scrub bar. It toggles between play and stop.

The remaining play controls have two modes depending on whether the Samurai is in Play or Pause.

Play mode



PLAY MODE

Fast Forward/Fast Reverse



Plays the clip at 8x normal speed

Fast Fast Forward/Fast Fast Reverse



Plays the clip at 64x normal speed

Pause mode



PAUSE MODE

Frame Forward/ Frame Reverse



Moves the clip forward/backward by a single frame

Go to start/Go to end



Goes directly to the beginning/end of the current clip

Note that you can jump between any of the controls while in playback: you do not have to press Stop first.

11. Playback & Playout

Loop Mode



LOOP MODE

The Samurai has the ability to play back a single clip in loop mode via the SDI output. This can be performed with captured clips at full broadcast quality or the final edited clips from your hard drive.

To do this:

- Go into Playback mode
- Pick the clip you want to loop

 *Note that when you first select a clip for playback, longer clips will take slightly more time before they start playing. All subsequent navigation within clips of any size will be instantaneous.*

- Use the scrub bar to locate the point you wish to start from (In point) and select the **In point** icon on the top left hand side of the playback screen. This will turn red to confirm that it is active.



- Repeat this for the desired Out point by selecting the **Out point** icon on the top right hand side. Again this will change to red.



- Now select the **Loop** icon in the top middle of the screen - that will also turn red to indicate that it is active.



- Press the **Play** button. The segment of the clip you have selected will now loop until you press the **Stop** button.

To change the In and Out points, just stop playback and adjust the start and stop points. Press **Loop/Play** again.

 *You can only play any one clip at any given time, and only one area from that clip.*



REMOVE OVERLAY

 *At any time, you can hide all the visible controls by simply touching the screen (away from any controls) once. Touch it again to bring back the controls.*

Headphone volume



Allows you to adjust the headphone volume while in the playback page

Timecode

12:16:34;19

This shows the timecode of the 'Now' line

Interlaced playback

Samurai playback shows a frame at a time. If the video footage is interlaced (ie with two fields, each separated by 1/50th or 1/60th of a second) it will play back perfectly well, but when playback is stopped, the frame showing on the screen will flicker between the two fields.

This is a useful and accurate method to determine whether your originally captured footage is progressive (even if it is delivered via an interlaced signal) or genuinely interlaced.

12. Connecting and Editing

Connect

To access and edit your recorded material, connect the Master Caddy Docking Station to a Mac® or Windows® editing workstation via USB 2.0, USB 3.0 or FireWire® 800 port.

Eject the Master Caddy from your Samurai and insert it into the Docking Station. After a short wait, the recorded video will be accessible to the target computer via a standard disk (exFAT) file system.

NLE supported

We have chosen the Apple Pro-Res codec as it is not only visually lossless but is an edit-ready format. All major NLE support Apple ProRes®.

- **Final Cut Pro (version 7)**
- **Final Cut X**
- **Adobe CS5 (with 5.51 update)**
- **EDIUS 6**
- **Sony Vegas 10**
- **Lightworks**
- **AVID Media Composer 6**

Avid DNxHD® support is available as an optional download.

ExFAT compatibility

The Samurai formats your disk as exFAT. We have chosen this file system to overcome the 4GB file limitation of FAT32 and keep compatibility on both Windows and MAC OS.

The Operating Systems that support exFAT are:

- **Windows XP - install the following update :**
<http://www.microsoft.com/download/en/details.aspx?id=19364>
- **Windows Vista - install SP1 or higher**
- **Windows 7 (32/64bit)**
- **Snow Leopard 10.6.5 or higher**
- **Lion 10.7**

 *The Master Caddy Docking Station is a sophisticated device supporting three different data interfaces: Firewire 800, USB 2 and USB 3. Note that when using the Master Caddy Docking Station you may need to connect an additional USB cable to the 5v power input. This is because when it has to power a disk drive and its interface electronics, the Docking Station may consume more power than is available from a single USB port. We supply you with a USB to 5v Power Supply socket for this purpose.*

 *Do not connect the USB power cable if you are using Firewire® 800. You may find that your docking station does not work with the Apple Lion operating system if you use Firewire® 800. This is a temporary situation and will be remedied with a firmware update as soon as possible. Meanwhile, please use a USB connection for accessing your Samurai files.*

Transferring Files

Now your docking station is connected and your disk is recognised by your operating system, you can edit directly from the drive or copy the files to your own storage.

Windows

Open the disk in My Computer > Select all the files or just the ones you wish to transfer, copy and paste them to your desired location. (command+c copy, command+v paste).

Mac OS

Your Samurai disk will show in Finder. Select the files you wish to transfer, drag the files to your desired location or use the copy and paste commands.(⌘+c copy, ⌘+v paste).

 *If you have used a FAT32 formatted disk in the Samurai this will have a folder structure Scene, Shot, Take. This will mean you either transfer all the folders or utilise the Windows Search or MACs automate program to transfer just the .mov files. There are instructions on this in our knowledge base; visit www.atomos.com/support for more info.*

 *Optional power input.*
May be required when using USB.



Firewire®

USB



Insert
Master
Caddy

12. Connecting and Editing

Importing

Final Cut Pro (version 7), Final Cut X, Adobe CS5 (with 5.51 update), EDIUS 6, Sony Vegas 10, Lightworks and AVID Media Composer 6 support imported files from your Samurai disk.

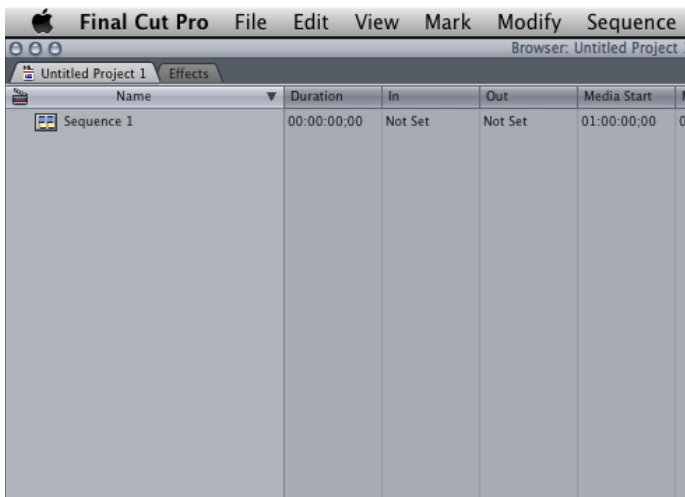
Importing Samurai footage into Final Cut Pro

You can import Samurai footage into Final Cut Pro (FCP) in just a few simple steps.

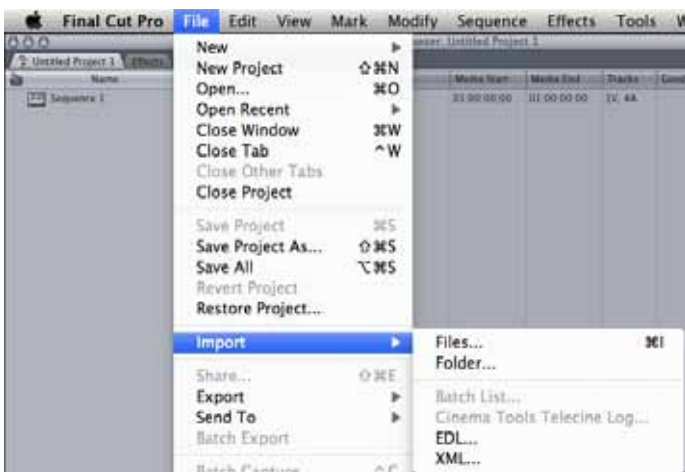
First, connect the Samurai Docking Station to your Apple Mac using the Firewire 800 port (USB 2.0 will also work). Insert the Samurai Master Caddy containing the disk with your footage into the Docking Station and you will see the drive appear in your Finder window.

Start FCP and open your project (or start a new one).

The screen will look like this:

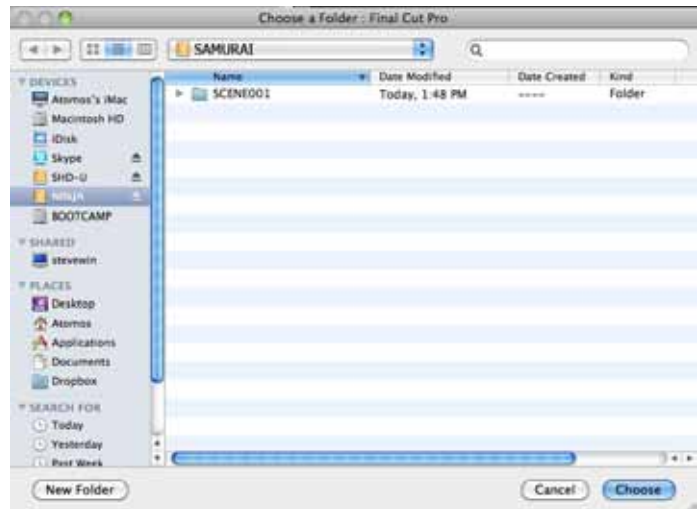


Go to the File menu and select Import > folder:

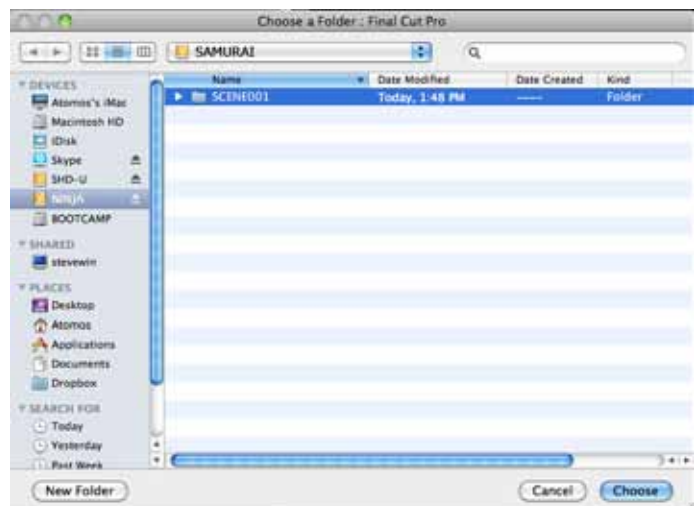


FCP will show you a “browse” window. Look for the Samurai drive, and click on it.

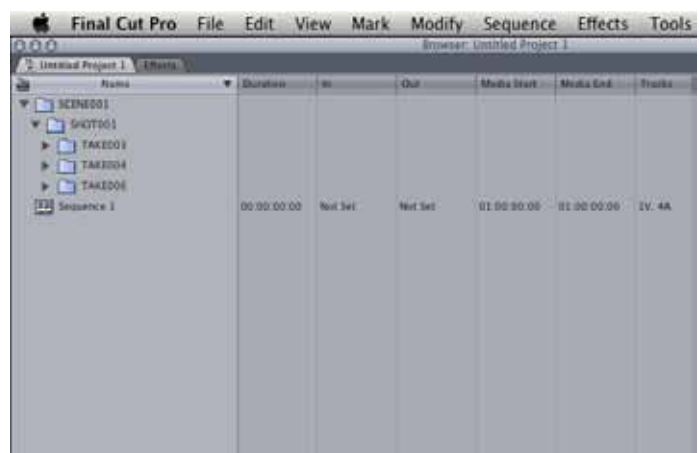
You’ll see the folders in the Samurai drive. **Select the folder containing the footage you want to import:**



Click on **Choose** and go back to your FCP project window:



Your Scene, Shot and Take folders now appear in the project window, ready for use in your FCP project.



12. Connecting and Editing

SmartLog with FCP X

Prior to importing the XML files into FCP X, ensure that:

- You have exported XML whilst the drive is in your Samurai
- You have connected your Master Caddy Docking Station and inserted your Master Caddy into the Dock
- You are using an operating system that supports ExFAT
- Your QuickTime version is up to date
- FCP X is the latest version

There are 2 ways to import the XML file:

1. Directly from the docked hard drive
2. Manually into FCP X

1. Automatic Import

- Open Finder
- Select the drive (in this example it is EXCVIDEO)
- Double-click the unitname.FCPXML file
- This will open FCP X and import the .xml file

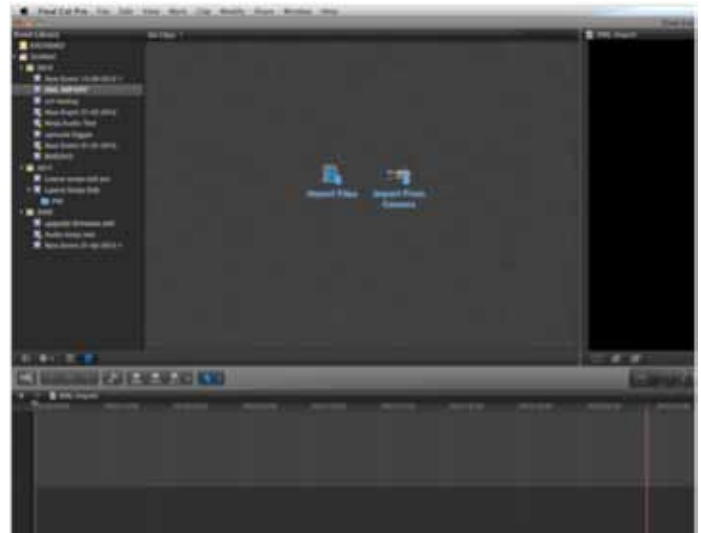
FCP X will make a event of the disk name and reference all the footage in that event.

You will notice that on the clips you have added Smart Tags too, with Green and Red indicating Favorite and Reject.

You can sort these by using the pull-down menu to show favorites. This will show all the individual favorites as separate clips in the Event Viewer.

2. Manual

- Open FCP X
- Create a New Project (or you can use an existing project); in this example it is called XML Import
- Select File, Import, XML

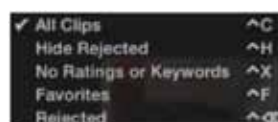
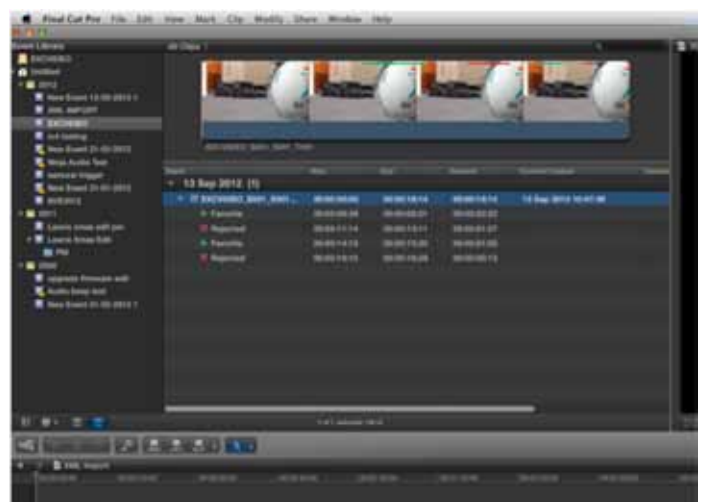


- Select the Samurai drive under Devices (in this example it is called EXCVIDEO)
- Choose the unitname.FCPXML, select Import

The XML will import



Once imported you can expand the clip and you will see the Favourite and Reject tags. You can also filter the view to only see Favourite, etc.



13. Using Samurai with external power supplies

D-Tap Connector

This adaptor allows you to take the power supply from any source that has a D-Tap connection such as V-Lock

The D-Tap also connects to the battery slot of the Samurai, please ensure it is in slot 1. There will be a D-Tap to D-Tap cable. Voltages up to 20.0V.

AC Adaptor (not included)

Available from your reseller as an optional accessory, this connects on the battery slot on the back of the Samurai. Please ensure it is connected to slot 1. The end of the adaptor will connect to a mains plug.

Alternatively you can use any NP-Compatible Charger or power supply, as long as they use a “Dummy Battery”.



14. Using Samurai with Atomos Connect Converters

You can think of Atomos Connect Converters as stand-alone devices or as specially designed modules to give the Samurai additional capabilities. With them you can:

- Add an HDMI input to the Samurai for connection to non-HD SDI devices
- Add an HDMI output to the Samurai for playout to HDMI monitors

There is nothing to set up when you use a Connect Converter. Just secure the device in a battery slot (in Slot 1 if you only have a single battery) and place the battery that previously occupied that slot in the battery slot on the converter.

If you are using a Connect H2S to bring an HDMI input to the Samurai, connect the HDMI cable to the HDMI input of the Converter, and take a short HD-SDI cable from the Converter to the BNC>Mini BNC adaptor cable connected to the Samurai.

As far as the Samurai is concerned, it is receiving a conventional HD SDI signal, even though your source is HDMI.

To use a S2H converter to connect the Samurai to an HDMI monitor, secure the device in a battery slot (in Slot 1 if you only have a single battery) and place the battery that previously occupied that slot in the battery slot on the converter. Connect the Samurai's HD SDI Output (via the Mini BNC>BNC adaptor cable) to the HD SDI input on the S2H converter.



CONNECT

15. Software updates

Updating AtomOS (Firmware)

From time to time we will issue software updates for your Samurai. To update the firmware (that's the software that runs inside your Samurai), there is a simple procedure you have to follow.

- Go to **www.atomos.com/samurai/firmware**
 - Locate and download the firmware upgrade
1. Extract the file **ATOMSAM.FW** from the firmware zip file.
 2. Copy ATOMSAM.FW onto a drive in a Master Caddy.
 - a. Atomos recommends you use a freshly formatted known good disk.
 - b. Always format your drives in the Samurai. The Samurai formats the drive for optimal performance for Video.
 3. Put 2 freshly charged batteries on your Samurai.
 - a. It is very important that your Samurai does not lose power during a firmware upgrade.
 - b. This is a necessary precaution to make doubly sure that power is not lost.
 4. Power down your Samurai.
 5. Insert the Master Caddy with the ATOMSAM.FW file.
 6. Power up your Samurai with a short press of the Power Button.
 7. Watch the screen. Do not remove the Master Caddy until after the upgrade is complete.
 8. The Atomos Logo will appear, and after a few seconds the firmware upgrade will start.
 9. While the firmware upgrade is happening, there will be flashing coloured lines above and below the Atomos Logo.
 10. The firmware upgrade will take up to a few minutes.
 11. When the firmware upgrade is finished, the Samurai will:
 - a. delete ATOMSAM.FW from the drive. This is a necessary precaution for the upgrade procedure.
 - b. Power itself down.
 12. Wait until the Samurai has powered itself down.
 13. Turn on your Samurai again with a short press of the Power Button.
 14. When the Samurai has booted, Press "MENU" and then "Samurai Info" and check that the version number is the version expected.

 Please ensure your batteries have plenty of charge and that you do not interrupt your Samurai while its firmware is upgrading. You will see a randomised colour-bar display on the screen top and bottom of the screen while updating is taking place. When it is finished, the Samurai will restart and you will be able to use the device as normal.

Problems when installing AtomOS

Very occasionally, the firmware update process can go wrong. This might be because of an incomplete or corrupted download.

In the unlikely event of your Samurai becoming unresponsive, there is a built-in recovery mechanism.

All you have to do is press and **hold the on/off button for 10 seconds**. If you do this your Samurai will revert to its factory condition, and you will be able to retry the firmware update later (taking due precautions to identify and remove possible reasons for the failure of the previous attempt).

16. Samurai Technical Specifications

Samurai Main Unit				
Lightweight	390g (without batteries & HDD) 690g (with batteries & HDD)			
Dimensions (without batteries)	140mm (W) x 87mm (H) x 41mm (D)			
Construction	Aircraft-grade aluminium for durability + portability. Fanless for silent operation.			
Operating Power	3.3W (Monitoring Only) / 6.8W (Rec, Mon & Play)			
Batteries 7.2V-14.4V Battery System Compatible NP Series D-Tap and supporting accessories	All 7.4v 1. 2600mAh - Up to 4hrs 2. 5200mAh - Up to 8hrs 3. 7800mAh - Up to 12hrs 4. AC Power via adaptor plate (option) 5. D-Tap Adaptor (cables sold separately)			
Continuous Power* *Patent Pending	Primary-Secondary battery system. Change batteries without losing power. Loop batteries continuously.			
Touchscreen	Size: 5" diagonal. Resolution: 800x480 Aspect Ratio: 16:9 native /4:3 Letterbox. SMPTE Colour Specification Native Frame Rate Playback (48-60Hz)			
Video Input Uncompressed 10/8-bit 4:2:2 Simultaneously displayed on internal 5" Samurai screen Mini BNC to BNC cables provided	HD/SD-SDI x 1 HDMI x 1 (with optional H2S Connect HDMI -> SDI converter)	DI SMPTE 259/292/296 Mini BNC (with BNC Adaptor cables) HDMI v1.4		
Video Output Uncompressed 10-bit 4:2:2 Simultaneously displayed on internal 5" Samurai screen Mini BNC to BNC cables provided	HD/SD-SDI x 1 HDMI x 1 (with optional S2H Connect SDI -> HDMI converter)	DI SMPTE 259/292/296 Mini BNC (with BNC Adaptor cables) HDMI v1.4		
Supported Formats (In/Out)	HD 1080i60, 1080i59.94, 1080i50, 1080p30, 1080p25, 1080p24, 1080p23.98, 1080pSF23.98, 1080pSF24, 1080pSF25, 1080pSF30, 720p60, 720p59.94, 720p50, SD 480i, 486i, 576i			
Realtime Hardware Encoding 1920x1080 8/10-bit 4:2:2 to:	→ Apple ProRes®	HQ - 220Mbps 422 - 150Mbps LT - 100Mbps		
	→ Avid DNxHD®	Avid DNxHD-220/220x - 220Mbps (8/10-bit) Avid DNxHD-185/185x - 185Mbps (8/10-bit) Avid DNxHD-145 - 145 Mbps (8-bit)		
	(Optional download)			
Onboard Processing Auto detect and remove or insert pulldown	25pSF (50i) → 25p 30pSF (60i) → 30p 24p (3.2-60i) → 24p 23.98p (3.2-59.94i) → 23.98p			
Audio input 48kHz PCM audio	SDI 12 channels + 2 analogue channels with gain controls			
Audio output 48kHz PCM audio	SDI 12 channels + headphone for onboard review. (Select any pair of channels)			
Remote Start and Stop	Via SDI trigger / Via SD timecode / Via LANC controller			
Customisable Remote Controls (control all Samurai functions)	System integrator custom controls available on request			
Genlock sync for broadcast and 3D infrastructure	Any incoming genlock signal is looped out of the SDI-out of the Samurai. SDI payout is genlockable from any external genlocked SDI fed into the SDI input. For 3D, two Samurais will genlock together if fed signals from a genlocked camera pair.			
Recording Time	Edit Formats (I-Frame Only, 4:2:2, 8/10-bit)	HDD or SSD		
HDD & SSDs are hot-swappable on the fly in the field		250GB	500GB	1 TB
	ProRes® HQ (10-bit, 220Mbps)	2.5 hrs	5hrs	10hrs
	Avid DNxHD® 220x (10-bit, 220Mbps)	2.5 hrs	5hrs	10hrs
	ProRes® 422 (10-bit, 150Mbps)	4 hrs	8hrs	16hrs
	Avid DNxHD® 145 (8-bit, 145Mbps)	4 hrs	8hrs	16hrs
	ProRes® LT (10-bit, 100Mbps)	5.5 hrs	11hrs	22hrs
Master Caddy Case for HDD or SSD	75mm x 105mm x 12mm			
2.5" SSD or HDD minimum 5400rpm to 10,000rpm standard 9.5mm height	For recommended drives visit: www.atomos.com Available in packs of 5 for: USD 29.95 / £19.95 / €9.95 / AUD 34.95			
Master Caddy Dock	2.5" internal drive SATA to FireWire® 800, USB 2.0 / 3.0			
Supported Applications	FCPX/FCP7+ / Media Composer 5.0+ / Premiere 5.5+ EDIUS 6.0+ / Vegas Pro 10+ / Lightworks			
Accessories included	• Universal Battery Charger 110-240V • Docking station and leads • 2 x Master Caddy Cases • 2 x Atomos 2600mAh batteries • Rugged Carry Case • BNC Adaptor cables • D-Tap Adaptor			
Optional Extras	• 5 x Master Caddy Cases • Atomos AC Adapter • Docking station and leads • Connect H2S converter • Connect S2H converter			

Construction note:

Your Samurai is designed to operate in ambient temperatures up to 40°C/105°F. It features a fanless design which dissipates internal heat through the aluminium chassis.

If you wish to extend the temperature of operation in high temperature conditions, you can choose an SSD drive, and set the TFT brightness to a minimum.

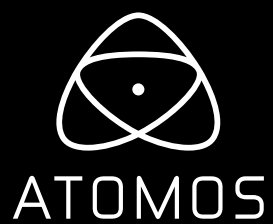
The top and bottom aluminium surfaces next to the tripod screws are the heat sinks. Under warm or extended operating conditions, these surfaces may get hot to the touch. This is normal part of the design, and shows that your Samurai is dissipating heat successfully.



 Do not be alarmed if the top and bottom surfaces seem hot to touch. This is normal part of the design, and shows that your Samurai is dissipating heat successfully.

SSD/HDD usage:

With spinning drives, you need to be careful in handling when recording. The drives will generally stand light/medium occasional bumps without problems, and the Samurai has an anti-shock buffer. However, spinning drives are not suitable for use in high vibration or movement environments, for example if the Samurai is strapped to the side of a motor bike. With spinning hard drives, use a new drive, or one that has very little usage. Do not use old drives. Do not use drives that have been dropped. On all drives, when handling, keep fingers away from the SATA connector at all times, as static electricity can damage the electronics inside.



Sales & Technical Support

Website: www.atomos.com | Sales: sales@atomos.com | Support: support@atomos.com
