

SS-One Autoguider Element and ZWO Image Capture

Two Raspberry Pi Open-Source Projects






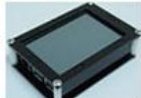
14 Feb. 2017 -- D. Kodama
(updated 8 Mar. 2017)

About SS-One



- A Japanese Company
- SS-One = “*Smart, Simple, All-in-One*”
- Now represented and supported by Hutech
- Owner-Designer: Koichi Nakazawa
- Products:
 - Portable Mounts and Mount Controllers
 - Electronic Polar Alignment System
 - Autoguider/Imaging System
- Products are for **PORTABLE** Imaging

Announced Products (via Hutech)

SS-one Project				
	AG Element	AG Complete	SS-one Controller	ZWO Image Capture
				
Autoguider	Y	Y	Y	N
Polar Alignment	Y	Y	Y	N
DSLR Focus	N	Y	Y	N
Finder	N	Y	Y	N
GOTO	N	Y	Y	N
Image capture	N	N	Y	Y
RS232C	OPTION	Y	N	N
WiFi	OPTION	OPTION	OPTION	OPTION
Mount control	N	N	Y	N
Focuser control	N	N	Y	N
DSLR shutter	N	Y/2CH	Y/2CH	N
Dithered imaging	N	Y	Y	N
Clock	N	Y	Y	N
LCD	320X240	480X320 TOUCHPANEL	480X320 TOUCHPANEL	480X320 TOUCHPANEL
Voltage	5V	5V	12V/5V	5V
Max current	450mA	250mA	TBA	450mA

Two SS-One Products Targeted for Open-Source

- **AG Element** - self-contained (No laptop required) autoguiding solution with optional polar alignment functionality
- **ZWO Image Capture** - self-contained astronomical imaging functionality with DSLR-type simplicity

Open-Source App Underlying Foundation

- Computer Platform: Raspberry Pi
- OS: Linux variant for Raspberry Pi
- SS-One software built using Qt ("Cute") GUI/IDE platform (C++ programming language)
- Software and OS are provided as a bootable .IMG file which needs to be written to a micro-SD card.

Open-Source App with Additional Linux Benefits

- Pre-programmed App user interfaces insulates operator from OS for non-Linux users.
- VNC (Virtual Network Computing) is enabled. With an optional Wi-Fi USB adapter, remote access to the via smartphone/tablet/laptop is available.
- OS access to the Linux GUI desktop is available to experienced users via VNC (Wi-Fi or direct ethernet).

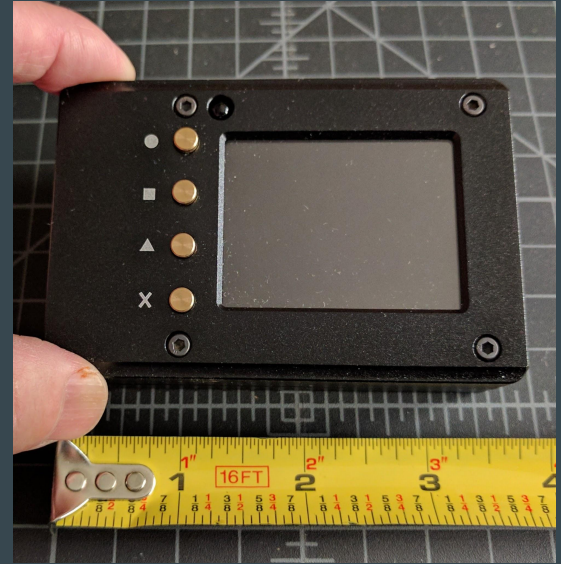


Open-Source App with Additional Linux Benefits

- SSH (Secure Shell) access to the Linux command line is available via Wi-Fi or direct ethernet (100 mb/sec).
- 4 USB 2.0 ports for mass storage (USB flash drive, HDD, etc.) or other peripherals
- Custom programs via standard programming languages: Linux shell, C, C++, Python, etc.

Packaging

- AG Element
 - 2.2" 320x240LCD (non-touch) includes metal case with 4 front-panel push buttons and 2 right-side panel pushbuttons
- ZWO Image Capture
 - Acrylic laser-cut case sold by Hutech accommodates 3.5" 480x320 touch screen
 - At least one 3D design on Thingiverse.com can be printed on a home 3D printer



Plug-and-Play assembled units with software installed will be available from Hutech for convenience.

AG Element

- Primary Function: autoguiding (for portable use)
 - Uses ZWO ASI cameras (commonly ASI120MM)
 - Camera's ST-4 output is used for mount connection
 - SS-One will be selling guide camera with internal ASI120MM camera boards, which will also include optics, a fan and small heater for dew control
 - Sub-pixel star position calculation to allow use of short focal length guider optics
 - Control over camera gain, exposure, image averaging, correction aggressiveness

AG Element

- Optional function: Polar alignment
 - SS-One polar axis camera for Takahashi mounts available
 - Discussion to support QHY Polar cameras in progress
 - Uses USB GPS receiver (3rd party model compatibility list will be released)



ZWO Image Capture*

- Astronomical long-exposure features in a self-contained DSLR-like interface
- Capture images to external USB device - flash memory stick or hard disk drive
- Cooled camera support
- Filter wheel control support
- Optional internal dark-frame subtraction
- Optional flat-frame processing
- Live-view for framing
- Focusing assist functions
- Intervalometer-type sequencing

* *Program is still in early development*

Compatibility

- Software currently requires Raspberry Pi 2B, version 1.1
- Compatibility with Raspberry Pi 2B, version 1.2 and Raspberry Pi 3 -- in progress*
- Note: Raspberry Pi 2 may be more desirable due to lower power consumption.

** The Raspberry Pi CPU was significantly changed between versions 1.1 and 1.2 of the model 2.*

Status

- Software being updated for compatibility with latest Raspberry Pi versions
- Interfaces being “tweaked” for proper English messages
- English operation manuals in progress

- AG Element has been in use in Japan by public users.

- ZWO Image Capture program is in development and has been in the hands of beta testers in Japan since January.

Status

- Open-source licensing (beyond personal use) is still being examined.
- Open-source code repository will be established on github
- Forum for discussions (user and developers) has been established on Google+. Please sign up now if you are interested.

<https://plus.google.com/communities/105781303979566788217>

Additional Operational Notes

- Raspberry Pi is powered by a micro USB connection. A power supply of adequate current capacity must be provided (2A recommended for Raspberry Pi). Consider the camera and other peripherals plugged into the Raspberry Pi when choosing a power supply.
- The underlying Linux OS must be properly shut down before turning power off to avoid possible corruption of the micro USB OS card.

Links

- https://en.wikipedia.org/wiki/Raspberry_Pi
- <https://www.raspberrypi.org/>
- <http://ss-one.net/>
- <http://www.sciencecenter.net/hutech/ss-one/index.htm>
- <https://plus.google.com/communities/105781303979566788217>