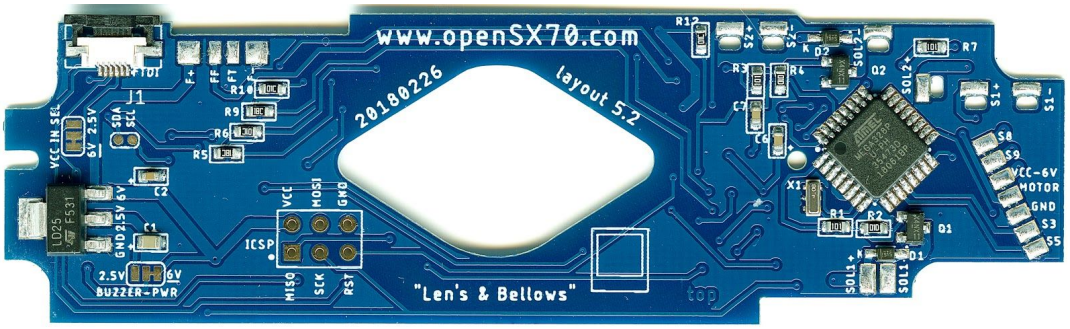
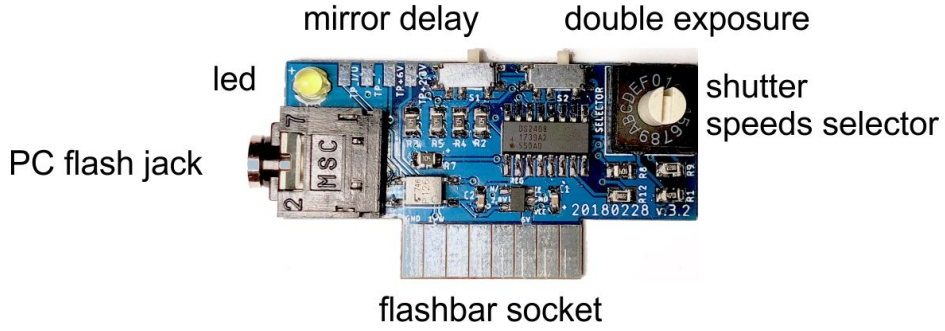
openSX70 operating instructions

v 1.3 sketch: 20180513

This document assumes that you have a properly converted camera with the Arduino sketch corresponding for the timing on the sheet below. For instructions on converting your camera to an openSX70 camera there is a different document. Please note that at this moment we have only tested the system on SX70 alpha cameras.



You need the openSX70 dongle to operate the camera. This can be the uDongle or any other later version of the Dongle. (NOTE: the uDongle by itself on a “normal” SX70 camera **DOES NOT WORK** and can damage your camera).



You can have OR NOT some sort of means to upload sketches or no. This can range from a FPC (very thin flat cable) adapter to a full FTDI USB board. You can only have the FPC cable or you can have nothing installed.


optional FTDI-USB and FPC.

Once the firmware or Arduino sketch is stable there won't be a need to reprogram the camera and thus all this will not be necessary.

The uDongle connects to the flashbar socket on the camera. If there is no Dongle or flash or flashbar connected the camera will not operate at all and will only do darkslide ejection if that corresponds.

If you connect a flashbar INSTEAD of the Dongle the camera will shoot triggering the flash as a normal SX70. The darker/lighter wheel in this case does nothing.

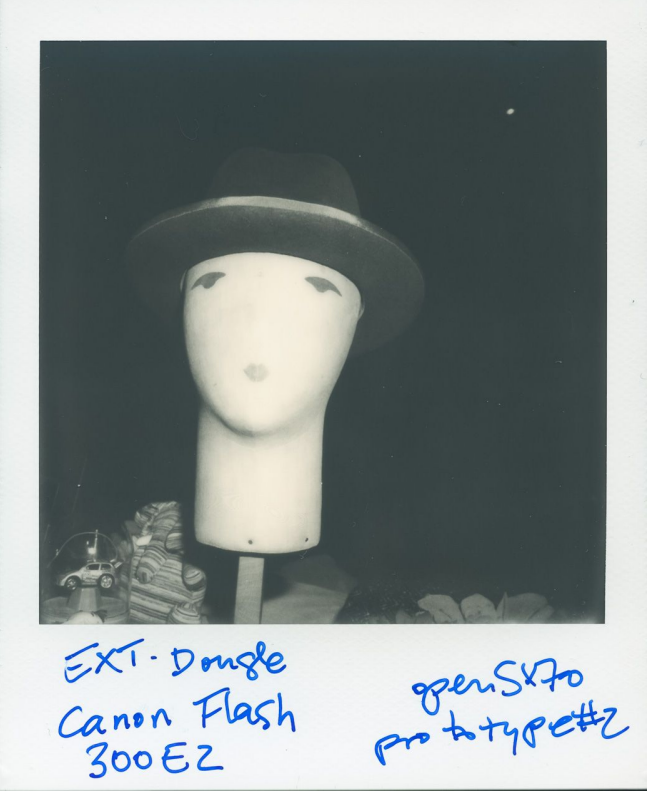
These are the uDongle parts:

Selector:
SHUTTER SPEEDS:
The selector has 16 positions or slots, marked 0 to F(15). Positions 1-A correspond to different shutter speeds:

openSX70 uDongle cheat 20180512					
dongle	EV	f.8 equiv.	aperture	actual ms	raw t ms
0	**17**	1/2000	11	1	11
1	**16**	1/1000	10	2	12
2	**15**	1/500	9	3	13
3	**14**	1/260	8	4	14
4	**13**	1/130	8	8	18
5	**12**	1/60	8	15	25
6	**11,5**	1/45	8	22	32
7	**11**	1/30	8	35	45
8	**10,5**	1/23	8	43	53
9	**10**	1/20	8	80	90
A	**9**	1/10	8	140	150
B	**8**	1/4	8	290	300
C	uDONGLE FLASH			S1 exposure	S2 mirror
D	uDONGLE FLASH f.8				
E	POSITION "T"			normal--> <--multiple	normal--> <--delay
F	POSITION "B"				

Please bear in mind that this values are my estimation based on (non very scientific) tests. Your mileage may vary. This is still a work in progress. First column is the selector position, second is the EV value or corresponding option. Next is the exposure time (theoretical) for f.8 aperture. Next is the (again theoretical) actual aperture. Then is the actual shutter speed. The last column is the "raw" ms that I use in the software (with delays of the mechanical movement).
The faster shutter speeds do not allow due to mechanical limitations of the shutter mechanism to fully open and thus have to be taken into account. That make expressing the exposure in EV or "exposure value" more accurate and truth.

FLASH:
Slot C is for what I call “normal” flash: that means that the Solenoid#2 engages, and closes the aperture depending on the distance based on the position of the focus ring. This is how you normally want to operate.



(external flash picture)

Slot D is for full open or f.8 aperture flash no matter what distance or where the focus ring is.
This will yield to overexposed pictures unless you can control the flash power. This is accomplished by software because I do not engage the Solenoid#2.

(burnt flash picture at full f.8)

LONG EXPOSURE MODES:
Slot E: is for T-mode. The shutter opens when you press the first time and closes when you press again a second time. I guess this is for really really long exposures.

Slot F: is B-mode, the shutter remains open while you keep the red button pressed.
EXPERIMENTAL: If Switch S2 (mirror delay) in ON in this mode:
-aperture will be as in flash mode (solenoid#2 engaged, don't know if it will hold)
-when you release the button flash will fire (dongle flash of course)

Self-Timer:
The openSX70 camera implements a 10 seconds self-timer function. If you keep the red button pressed (in any of the "normal" shutter speeds) for more than a second then the camera delays the picture-taking for 10 seconds. The LED on the uDongle will blink at an increasingly faster pace until the picture is taken.

The LED acts also as a sort of counter:
-when you insert the pack and ejects the darkslide it will remain solid on.
-while the pack is in use, when you open (power-up) the camera it will blink the remaining number of pictures (on an 8-picture pack basis).
-once the camera thinks the pack is empty the LED will remain solid on, this is on 8-picture per pack basis. The camera will keep shooting until the actual counter says "0". This is because the "internal" counter sometimes goes wrong.
(of course this can be altered in the software for ten picture pack).

SWITCHES: (S1 on the left S2 on the right)

-S1 switch if in OFF position it will shoot and eject in a normal fashion. If in ON position (on the left looking from the front) it will engage multiple exposures mode. It will keep the shutter closed after the

first shot allowing for multiple exposures until the switch is back in the normal position and the red button is pressed.
NOTES:

- after the first shot the mirror remains up, impeding thus the reflex viewfinder operation.
- as a safety measure the LED will lit after 60 seconds, and the camera will eject after 5 minutes from the first shot. Maybe it is too much, but hey, I need time for my shot. This is to avoid potential damage to the Solenoid#1 operating the shutter. This limitation could be removed in software, but you do that on your own, I do not want to (potentially) wreck your SX70.
- I guess another use of this feature is wait to eject in a darker environment. I end up doing that a lot.

double exposure shot.

-S2 switch when ON will increase the “Y” delay (when the mirror goes up to take the picture) to a longer time to limit vibrations. At this time I have set it to 200ms (normal “Y” delay is 40ms).

External flash 3.5mm jack. This is for use with an external flash or studio lights. For the flash to trigger you have to be on “C” or “D” position in the selector.

openSX70 prototype#2 camera with optional magnetic I1 viewfinder for double exposures.

FINAL NOTES:

-the boards are defective due to a manufacturing error by SeeedStudio, and thus there is no light meter chip and no auto modes. (Even if the sensor was a bit off-center, I was planning on using something to somehow fix the error, that is a “date lens” to amplify the light, and an enhancement on the resolution provided by the current library)

-the uDongle is, to put it mildly very fragile. Be very careful when handling while inserted.

-if you are going to need to upgrade the firmware sketch in the camera, it probably better just to stick with a piece of tape the FPC cable.

-the FPC cable is very whimsical, be very careful not to twist or break it. I am now experimenting with cheap cables from eBay, 6cm long.

-There is no light sensor operative in this generation of openSX70 cameras. Without the uDongle or a flash inserted the red button will do nothing. This is by design.