SMARTMOTOR Troubleshooting

**30.04.2020**

Issue: The SMARTMOTOR control (turning the filter wheel and opening and closing the shutter) through uioCam v 2.0 does not work.

Checked:

* The camera, Remote and uioCAM v 2.0 appears to be in working order. It’s possible to make photos through uioCam when the shutter is manually open.
* The cable is checked and working
* The COM1 connection with the cable at the laptop docking station has some issues sometimes if the docking station isn’t correctly attached. Attaching the laptop to the docking station properly solves the problem.
* The uioCAM v 2.0 is signalling that all is well, that the RS232 is open, shutter is open etc. It’s still possible that some issues aren’t covered by the application exceptions and the software may not be correctly sending the signals to the smartmotor (but nothing changed in the software since it was working in 2018)
* The ATHENA thermal controller is working and showing the temperature
* The power seems to be on in smart motor (the red diode next to the circuit is on)
* The white-red cable connecting the shutter and photosensor to the rest of the circuit is working

Possible issues:

* Two transistors weren’t screwed to a cooling, steel plate – it’s possible that they overheated and were damaged when we tried to find the issue and the smartmotor was connected to power
  + Screwing them back didn’t help, but if they’re fried it wouldn’t change anything
* There is a loose four-pin plug coming out of the connector between the shutter/photosensor cable and the circuit board, but there isn’t any place where it could connect
* The software doesn’t mind running (no errors) when the cable isn’t connected at all – it’s either working correctly and just doesn’t handle this exception, or it’s not sending the commands at all
* Basically unknown

Questions:

* What and how was changed when the whole system make trip to Oslo and back?
* Was it working in Oslo?
* Was it working once it was installed back?
* Could it just be damaged/set loose during the transport?
  + Considering the metal box full of cardboard and foams it’s not likely
* Is the software actually sending any commands to RS232? How to check that?

**04.05.2020**

Tim answers:

Here are some quick answers to your questions:

-       There is a loose four-pin plug coming out of the connector between the shutter/photosensor cable and the circuit board, but there isn’t any place where it could connect

**Could you send me a photo of the way you connected the cables at the underside of the optical axis including this loose four-pin plug?**

-       What and how was changed when the whole system make trip to Oslo and back?

**I basically had to unmount the camera and the top part of the all-sky system including the filter wheel from the long optical-axis frame in order to be able to transport it to Germany for calibration. For this, I needed to unmount the chip as well, disconnected all cables etc. The camera survived the trip to Germany well and I was able to remotely control all necessary features including the shutter and the filter wheel from the program. I also did not make any adjustments to the controls of the smartmotor.**

-       Was it working in Oslo?

**I only checked it in Germany during calibration, so it was working one week before being transported back to Andenes via Oslo. I did exactly the same steps to dismount the camera system to transport it back to Andenes from Germany as compared to what I did on the way towards Germany. But of course, it could be that some contacts got damaged during the second trip.**

-       Was it working once it was installed back?

**Do you mean installed back at Andenes? We just brought it up to Alomar but didn't test the operation when we arrived as we wanted to do that together with Michael right before the campaign before our plans got cancelled unfortunately.**

-       Could it just be damaged/set loose during the transport?

o   Considering the metal box full of cardboard and foams it’s not likely

**Within the metal box I also don't think so, but I used the metal box only for transport between Oslo and Andenes. From Germany to Oslo I had to use a large suitcase and a backpack. It survived the first trip very well, and reassembling it in Oslo for the trip back to Andenes showed no visible sign of damaging. But I didn't check the operation in Oslo.**

The photos were sent to Tim and further check were made:

* The Intensifier/Shutter board was unscrewed to check the back – everything seemed fine
* The P3 plug was plugged into the identical P2 plug on DIO-116 board – nothing changed
* The P1 plug in power was checked – it has around 26 V
* Lowering the heater set value didn’t help
* The sensor at the end of the light sensor is broken off – we tried short cuting it, it didn’t change anything

Checking connection with Termite:

Termite is a simple program for RS-232 protocol. To make sure that the problem doesn’t lie with uioCam software we used it to check the connection.

COM3 doesn’t respond at all.

COM1 is the one connected to the All-Sky system. We tried different commands found in the manual from the KEO Consultants and in the uioCam software and that’s the results:

|  |  |
| --- | --- |
| Command sent | Response from RS-232 |
| d=0 | No response |
| d=1 | No response |
| d=-1 | No response |
| GOSUB0 | +- |
| GOSUB1 | +- |
| GOSUB2 | +- |
| … |  |
| GOSUB5 | +- |
| GOSUB140 | . or .. or +- |
| GOSUB150 | .. or +- |
| 129 | No response |
| 130 | No response |

GOSUB from 0 to 5 are subroutines programmed by KEO Consultants to control the Shutter, Filter Wheel and other elements. GOSUB above 5 don’t exist and gave responses that varied between “.”, “..” and “+-“, but usually it gave “.” or “..” after the first time the command was used and “+-“ afterwards. We tried 129 and 130 as a way to initialize the connection, and tried different order of commands, alongside resetting the All-Sky couple of times.

This check confirmed that the All-Sky system is correctly connected to the laptop, powered up and that it does give back some responses, although not the ones we expected (it should response back with SHTR:Open for successfully opened shutter for example). None of those commands actually opened the shutter or turned the filter wheel.

Possible problems:

- The light sensor is broken, possibly the lack of signal is influencing the shutter – not probable, as all the parts including the light sensor were deleted from the software in 2018, and the filter wheel isn’t working as well. But you never know, and there may be a shortcut there.

- Possibly an electrostatic charged during transport, disassembling and assembling again the circuit boards could damage them

- There were missing screws here and there on the circuit board

- Jumper J6 is missing, not sure if it’s important – IMPORTANT : the manual from KEO Consultants says that J6 shouldn’t be connected and that J5 and J6 should NEVER be connected at the same time

**Arild recommendation is to find someone in the ASC knowing more about the electronics to check the board for damage.**