# Roll Off Roof Card

**Ver. 1.0.0**

ABSTRACT

In this document you will find the most important information about ScopeDome Roll Off Roof card and dedicated software for it.

# What is the ScopeDome ROR RS485 card used for?

The ScopeDome ROR RS 485 card is used to control the motor that opens and closes the RollOfRoof observatory. It allows you to control three-phase 230VAC motors (the same ones used in ScopeDome domes). It is equipped with roof opening and closing sensors and an input for the telescope parking sensor.

The telescope parking sensor blocks the roof from closing. Its connection is not required for the correct operation of the software.

The roof can be controlled manually using the Open/Close buttons on the card or from a computer via the ScopeDome ROR driver.

Two engines with a maximum power of 120W or one with a power of up to 400W can be connected in parallel to one card.

The driver controlling the card simultaneously supports three ROR RS485 cards connected to it. This allows for the automation of observatories, which have three separate roof sections that need to be opened in a specific order.

## Technical parameters

- communication protocol: RS485
- Control: USB port
- Power supply: 230V AC
- power consumption: 400W (when the engine is turned on)
- power consumption in standby mode: 10W
- maximum engine power: 400W
- dimensions: 170 x 140 x 135 mm (without connectors and mounting plate)
- weight: 2 kg
- driver compatible: Windows 7, 8, 10 (32 and 64 bit) and ASCOM for Windows
- the maximum length of the cable connecting the card with the computer: 1500m (RS485 standard)

## Components supplied with the card

- RollOffRoof card in box
- converter USB to RS485
- 2x limit switch with cables
- all connectors and cables necessary to connect the card to the engine and PC

## Inputs and outputs

1. 230VAC power input
2. input for communication with a computer – RS485 protocol
3. input for the roof opening sensor and limiter
4. input for the roof closing sensor and movement limiter
5. ScopeAt Home sensor input
6. motor output 230V - 3 phase

# Card connection diagram

## Diagram for a typical ROR observatory with one roof section

If you connect the USB/RS485 converter by yourself, pay attention to connecting the A+ and B- wires. Wire B- is brown. You should also configure the serial port speed correctly and adapt it to the transmission speed programmed in the inverter.
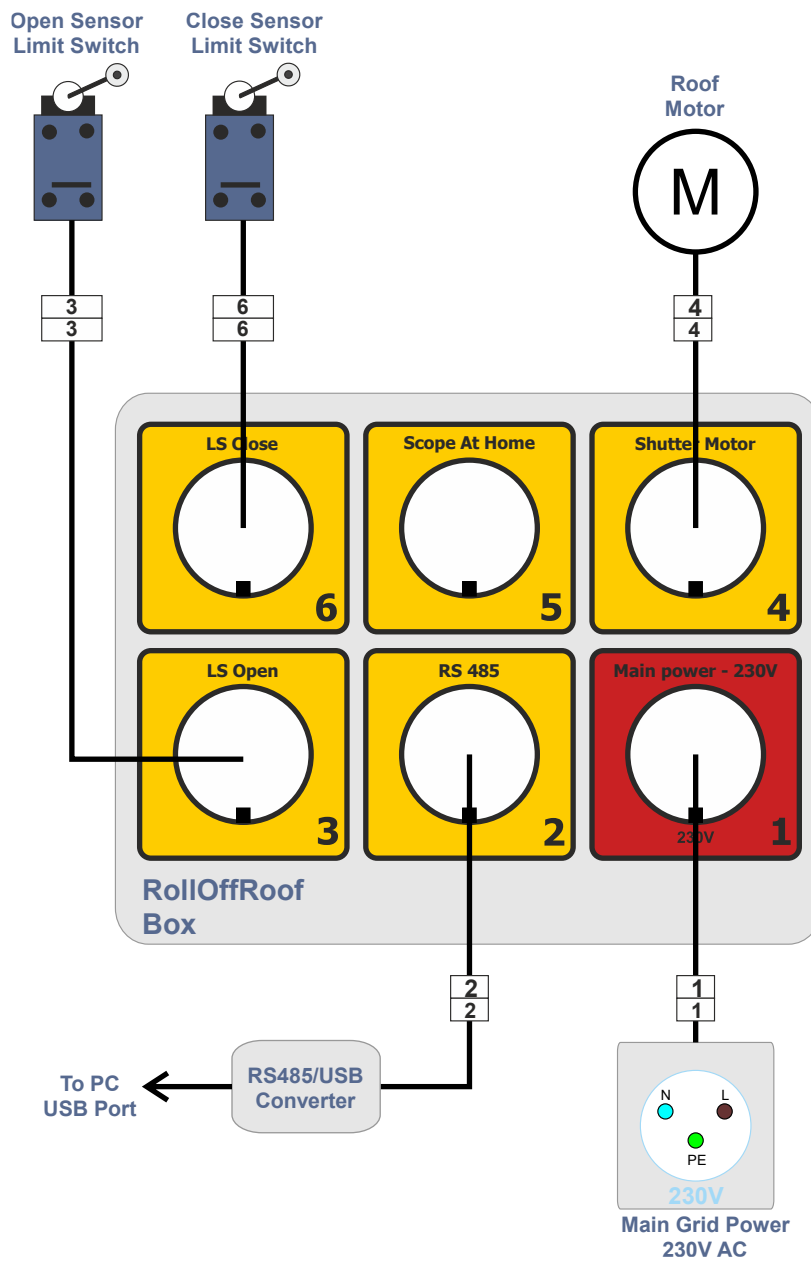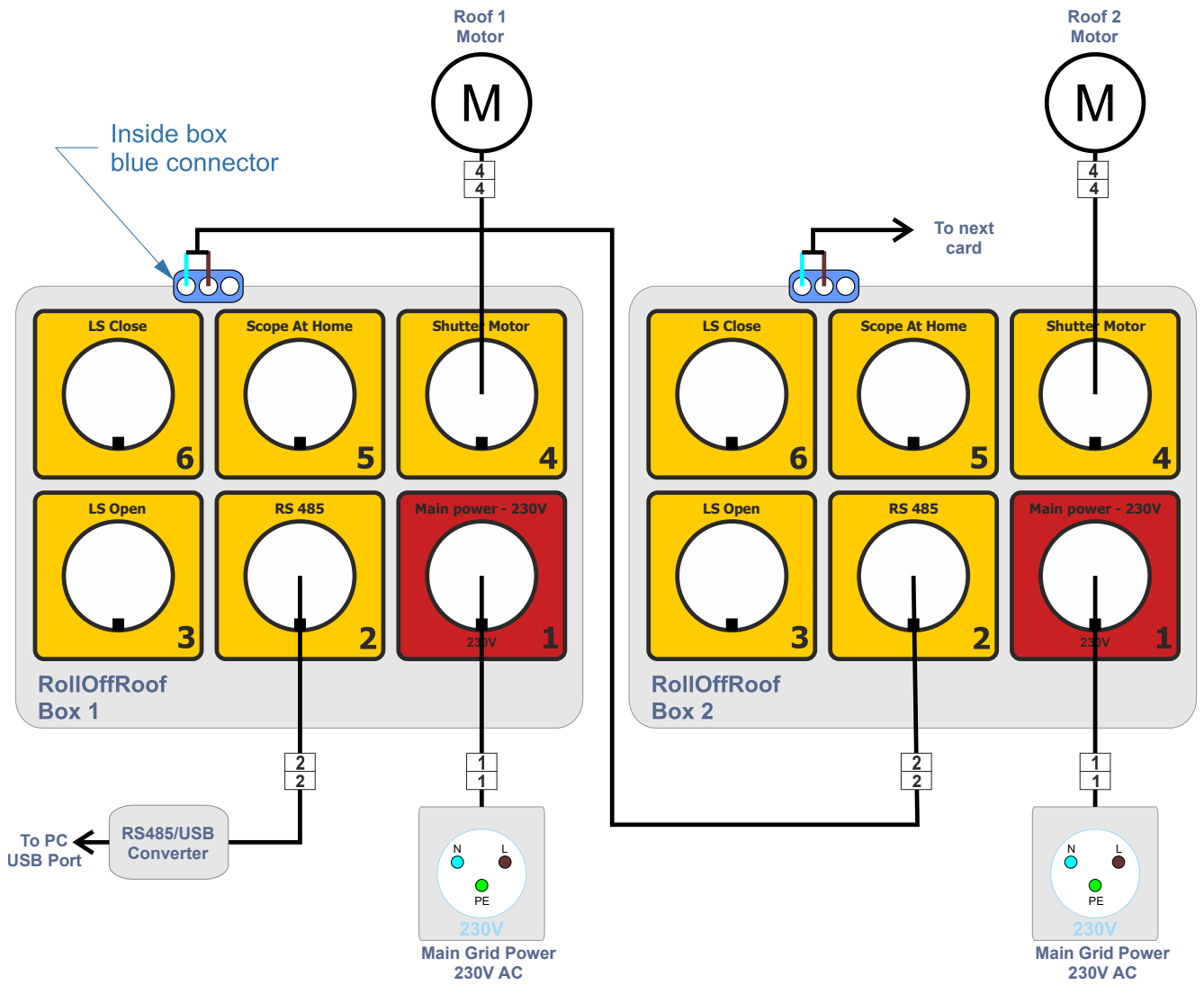
## Diagram for two or more roof sections

**Roof 1 Motor**

(M)

| 4 |
|---|
| 4 |

**Roof 2 Motor**

(M)

| 4 |
|---|
| 4 |

Inside box blue connector

To next card

**RollOffRoof Box 1**

| LS Close **6** | Scope At Home **5** | Shutter Motor **4** |
|---|---|---|
| LS Open **3** | RS 485 **2** | Main power – 230V 230V **1** |

**RollOffRoof Box 2**

| LS Close **6** | Scope At Home **5** | Shutter Motor **4** |
|---|---|---|
| LS Open **3** | RS 485 **2** | Main power – 230V 230V **1** |

| 2 |
|---|
| 2 |

**RS485/USB Converter**

**To PC USB Port**

| 1 |
|---|
| 1 |

N     L

PE

**230V**

**Main Grid Power 230V AC**

| 2 |
|---|
| 2 |

| 1 |
|---|
| 1 |

N     L

PE

**230V**

**Main Grid Power 230V AC**

## Diagram for the telescope Park sensor

**Scope At Home**

NO     NO

**5**

**Scope At Home Sensor**

Normal Open Contacts

# Card pin diagram

**Roof Motor**

PE
○ Green
L1 L2 L3
Yellow White Brown

Shield

| 4 |
|---|
| 4 |

**Close Sensor Limit Switch**

| 6 |
|---|
| 6 |

**Open Sensor Limit Switch**

| 3 |
|---|
| 3 |

**LS Close**

NO NC
NO NC

6

**Scope At Home**

NO NO

5

**Shutter Motor**

V U
W PE

4

**LS Open**

NO NC
NO NC

3

**RS 485**

GND
B- A+

2

**Main power - 230V**

PE
N L
230V

1
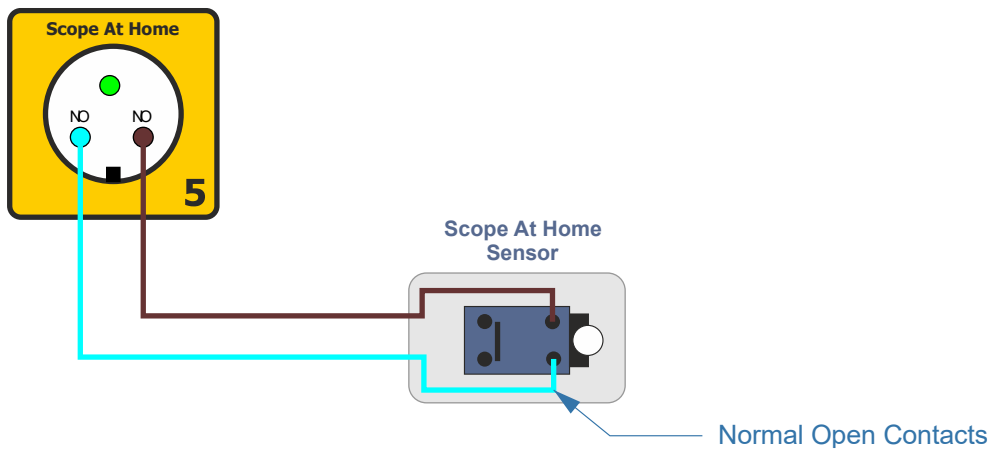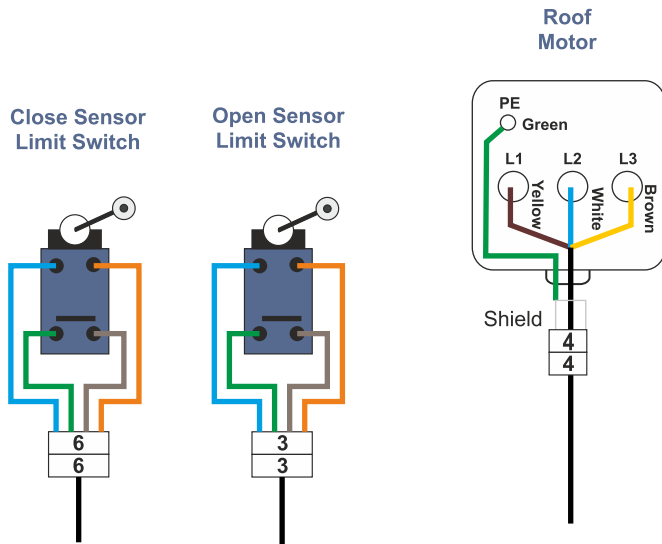
# Driver ScopeDome ROR RS485

The software can be downloaded from our website - the link to the driver is available in the Download menu.

The operation of the driver is very simple. It only allows you to open, close or stop the roof. Thanks to cyclic card status readings, we know the status of the roof and engine opening and closing sensors.
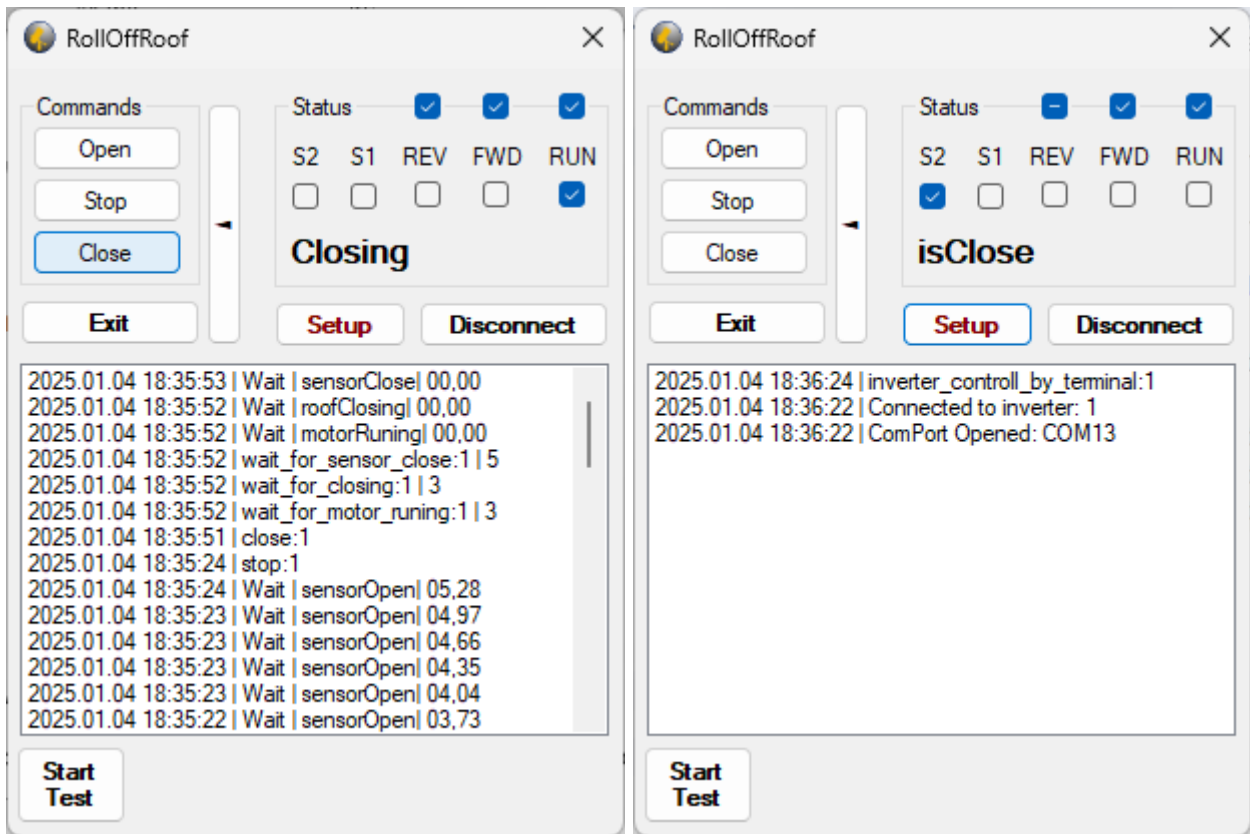
The "Start Test" button starts the procedure of cyclic opening and closing of the roof - useful when testing engines.
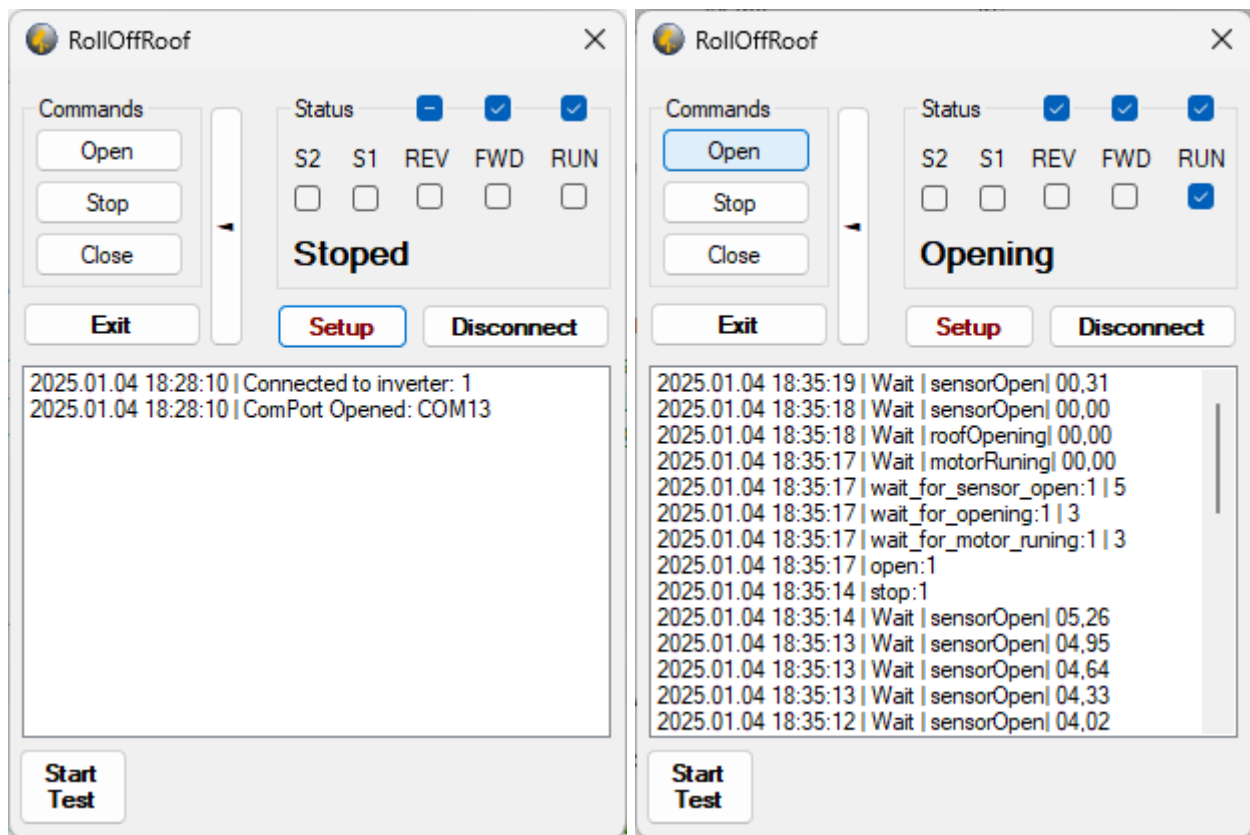


**Attention:**

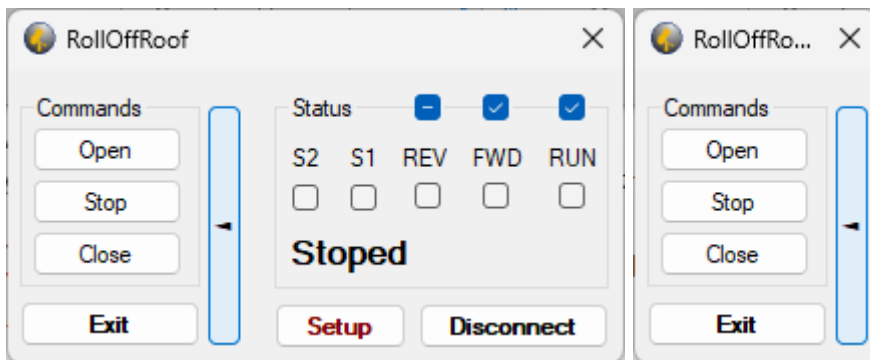**ASCOM driver works from platform version 7.0.2 and above.**

**You cannot simultaneously run the ROR driver under ASCOM platform and the EXE version directly on Windows. This will cause a conflict at the level of referencing both programs to the same COM port on the computer.**

## RollOffRoof

**Commands**
- Open
- Stop
- Close
- Exit

**Status**
| S2 | S1 | REV | FWD | RUN |
|----|----|-----|-----|-----|

**Closing**

Setup  Disconnect

```
2025.01.04 18:35:53 | Wait | sensorClose| 00,00
2025.01.04 18:35:52 | Wait | roofClosing| 00,00
2025.01.04 18:35:52 | Wait | motorRuning| 00,00
2025.01.04 18:35:52 | wait_for_sensor_close:1 | 5
2025.01.04 18:35:52 | wait_for_closing:1 | 3
2025.01.04 18:35:52 | wait_for_motor_runing:1 | 3
2025.01.04 18:35:51 | close:1
2025.01.04 18:35:24 | stop:1
2025.01.04 18:35:24 | Wait | sensorOpen| 05,28
2025.01.04 18:35:23 | Wait | sensorOpen| 04,97
2025.01.04 18:35:23 | Wait | sensorOpen| 04,66
2025.01.04 18:35:23 | Wait | sensorOpen| 04,35
2025.01.04 18:35:23 | Wait | sensorOpen| 04,04
2025.01.04 18:35:22 | Wait | sensorOpen| 03,73
```

Start Test

## RollOffRoof

**Commands**
- Open
- Stop
- Close
- Exit

**Status**
| S2 | S1 | REV | FWD | RUN |
|----|----|-----|-----|-----|

**isClose**

Setup  Disconnect

```
2025.01.04 18:36:24 | inverter_controll_by_terminal:1
2025.01.04 18:36:22 | Connected to inverter: 1
2025.01.04 18:36:22 | ComPort Opened: COM13
```

Start Test

The driver window can be reduced:



## RollOffRoof

**Commands**
- Open
- Stop
- Close
- Exit

**Status**
| S2 | S1 | REV | FWD | RUN |
|----|----|-----|-----|-----|

**Stoped**

Setup  Disconnect

## RollOffRo...

**Commands**
- Open
- Stop
- Close
- Exit

# Configuration of the driver

Select the appropriate COM port number to which the ScopeDome ROR card is connected. Then select the appropriate transmission speed for the COM port and the inverter inside the card. By default it will be 9600 or 38400 - the higher the baud rate, the shorter the cable connecting the card to the computer must be. Please remember that changing the transmission speed requires reprogramming the inverter inside the card. If you intend to use more than one ScopeDome ROR card, set their ModBas addresses to 1, 2 or 3, respectively.
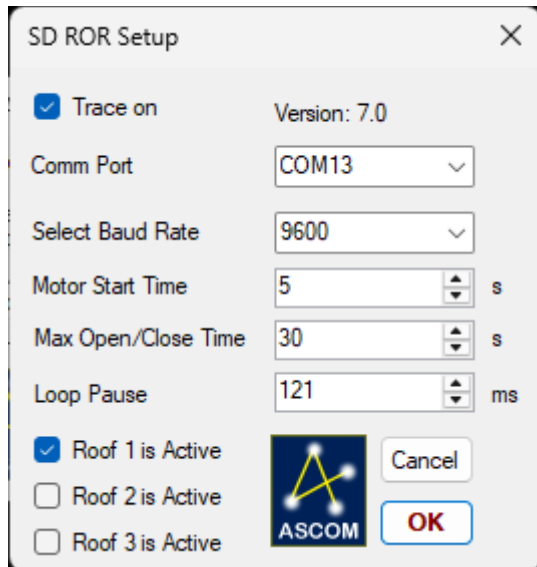


Motor Start Time parameter – used to stop the motor after a selected time if the software does not detect that the motor has started to rotate.

The Open/Close Time parameter determines the maximum time for opening or closing the roof - after this time the engine will be stopped - unless it is stopped earlier based on the status of the limit switches.

Loop Pause parameter – defines the interval at which the status of the inverter controlling the engine is read.

Switches (CheckBox): "Roof 1 is Active", "Roof 2 is Active", "Roof 3 is Active" – determine how many cards the program should control.

Each Open or Close operation will open and close the roofs in the following order:
- for Open Roof: 1, 2, 3
- for Close Roof: 3, 2, 1

# ScopeDome ROR driver configuration for ASCOM 7.0.2 platform

1. launch the ASCOM Device Hub program.
2. select Tools>Setup from the menu.
3. go to the Dome Setup tab
4. press Dome Device > Chose - the dome driver selection window will open
5. select "ScopeDome ROR" from the selection list.
6. press Properties button - the driver configuration window will open
7. select COM port number and baud rate
8. Confirm the changes in all windows.