



IMP85

INSTRUMENT MULTI PORT

Introduction

- The Instrument Multiport enables the use of up to three instruments at the focal plane of a telescope.
- Two automated mirrors can be set to deflect the light either left, right or to let it pass through undeflected.
- The device can be controlled by a keypad or remotely via a webinterface.
- Power-over-Ethernet via the RJ45 ethernet port. In addition the device can also be powered by a standard 12V hollow plug.

Two individually adjustable 40x40mm mirrors can be electronically swiveled into the beam path with maximum repeatability to redirect the light to port 2 or port 3. These ports can be used for various optical instruments such as additional cameras, spectrographs or even a simple eyepiece. The IMP mirrors are made of quartz glass and coated with our best BBHS silver coating, which has a reflection of 98-99% from approx. 390 to 2000nm and is therefore suitable for a wide range of applications. Spectroscopy, photometry and also laser applications are possible!

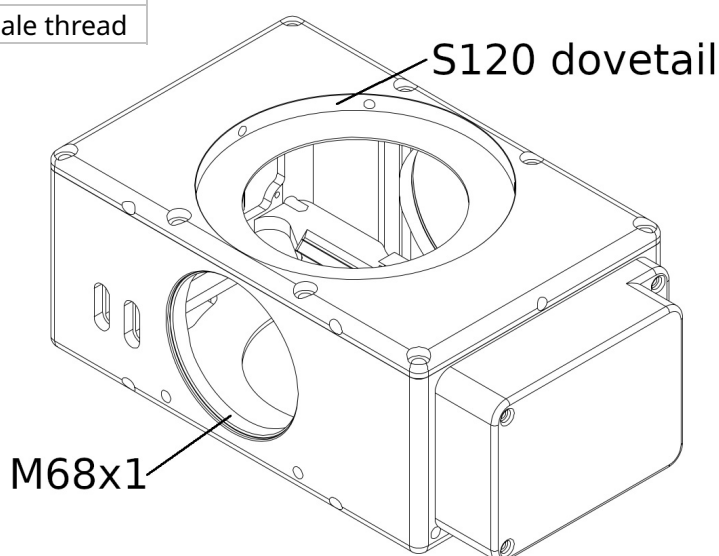
Specifications

Backfokus

Port	Backfocus	Clear Aperture	Interface
1	90 mm	85 mm	S120 Dovetail changer
2	110,5 mm	67 mm	M68x1 female thread
2	110,5 mm	67 mm	M68x1 female thread

Measures

- Weight: 2 kg
- Height: 90 mm
- Width: 230 mm
- Depth: 131 mm



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G
M
B
H

Available Adaptations

At the time of writing the following adaptaters for camera and telescope side S120mm changer are available.

- Planewave Instruments Hedrick focuser
- Planewave Instruments IR90 focuser
- 3.5" Feathertouch
- Alluna Optics M100 (male & female)
- M68x1 (and from this to almost anything using our wide range of adapters)

In addition custom adaptations can be made for the IMP's 120mm dovetail.

Setup

- Attach the appropraite adapter to your telescope.
- Attach the IMP to the adapter via the dovetail. This makes it easy to set the rotational position (keypad face up).
- Clamp the dovetail using the six M5 set screws.
- Attach the ethernet cable.
- (optionally power on the device via 12V hollow plug if not using Power-over-Ethernet)

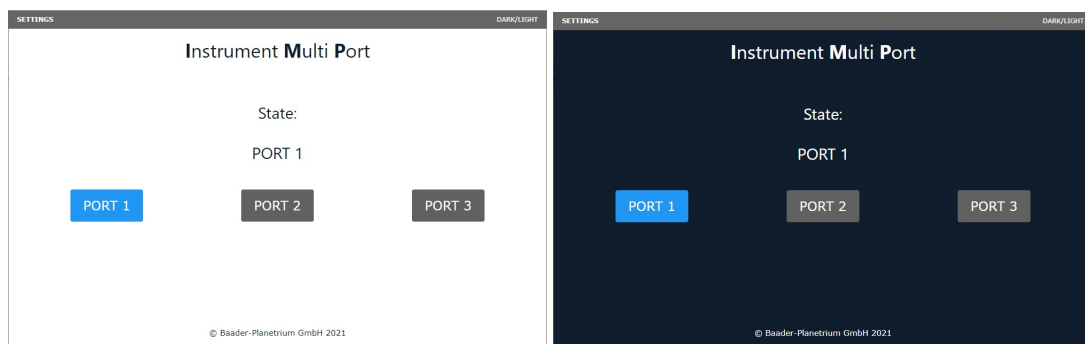
Keypad

- Keypad numbers 1-3 set the corresponing port.
- With the keypad facing you, port 2 is to the left side and port 3 is to the right side.
- If keypad nb. 4 is held down for at least 5sec during power up, the device is set to factory defaults (eg. if you misconfigured the network by mistake).

WebGUI

Open your browser and enter address <http://192.168.1.85> (the default status Ip address)

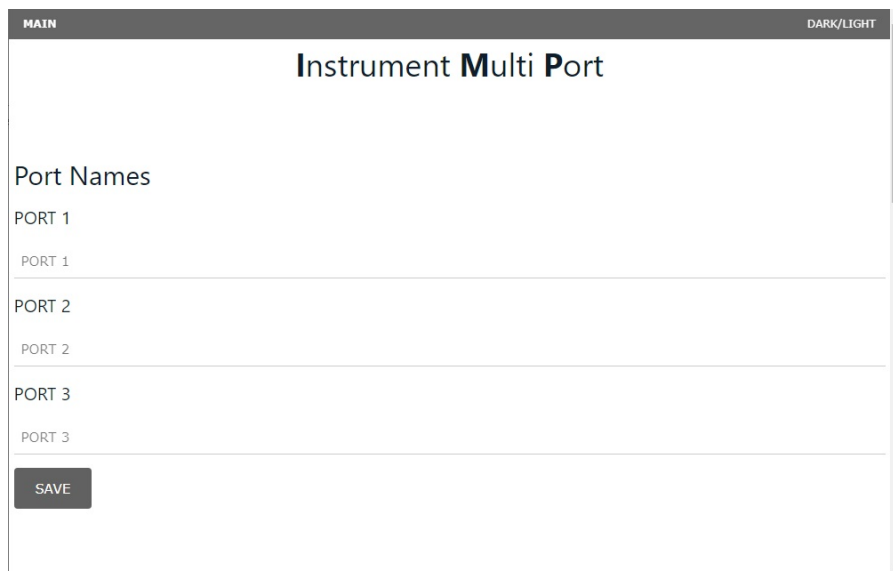
- The main page shows the three port buttons with the currently selected port highlightes in blue (button names can be changed).
- The port state is shown in letters ([PORT 1-2, MOVING, ERROR]).
- Use the *DARK/LIGHT* button on the top right to switch themes for eye relief at night.



Settings

Port names

You can change the port names, eg. to the appropriate instrument (max. 20 characters).



Network configuration

- By default, the IP address is configured to be static 192.168.1.85.
- You can change that as appropriate for your local network configuration. But beware, incorrect settings might end up with the device being unreachable over network. If you are doing this remotely, be sure to know exactly what you are doing! If you set it to DHCP, you can check for the device IP address in your router's GUI.



Offsets

This is useful if you should have realigned the mirrors for some reason inside, which should not be necessary. The endstop offset is the number of final steps the device does after decelerating on a complete movement. Then the motors are unpowered (in order to prevent heat dissipation)

and the mirror levers are held magnetically. If set to high, the mirror moves hard into the endstop. If set too low, the mirror can fling. It can be set between 0 and 100. Default is 50 steps.

MAIN

DARK/LIGHT

Endstop Offsets

Mirror A

50

Mirror B

50

SAVE

Software Version

Current Version: 0.3

Latest Version: 0.3

UPDATE

Reboot Device

REBOOT

Software Version

The device checks on boot if a new software version is available, if no connection can be established, the latest version will read 'v0.0'. If you click 'Update', make sure to not poweroff or disconnect the device from the network. The Update process takes approx. 1min. The device will reboot afterwards. Your current settings are persistent.

Reboot

Just in case of unpredicted problems, a reboot could be helpful.

GET/POST commands

- Send a html GET or POST request (the device will only evaluate the requested filepath). The simplest method is typing the following commands into your browser address field:
 - "http://DEVICE_IP/set_port1"
 - "http://DEVICE_IP/set_port2"
 - "http://DEVICE_IP/set_port3" to set a port.
 - "http://DEVICE_IP/reboot" to reboot the device.
 - "http://DEVICE_IP/status" to receive a full device status in form of a json string (firefox does an automatic pretty print for you):

```

state:          "S_INIT"
descr:          "Instrument Multi Port"
port:           "INITIALIZING"
info:           "Moving mirrors out until endstop sensors are hit."
name:           "IMP85"
▼ config:
  ▼ portnames:
    0:           "PORT1"
    1:           "PORT2"
    2:           "PORT3"
  version:       "1.2_cbf5fc4 (29.3.2023)"
  ▼ net:
    ip:          "172.17.7.85"
    mask:        "255.255.255.0"
    mode:        "static"
    dns:         "8.8.8.8"
    gw:          "172.17.7.254"
  ▼ offsets:
    A:           50
    B:           50

```

TCP commands

- The device listens on port 12358 for TCP connections.
- The first 4 bytes of messages are reserved for the message length in big endian integer notation.
- Follow with a json containing one of the following commands:
 - {"cmd": "set_port1"}
 - {"cmd": "set_port2"}
 - {"cmd": "set_port3"}

to set a port. Device answers: "\x00\x00\x00\x0e{"rep": "ACK"}"

- {"cmd": "reboot"} to reboot the device. No answer since the device will reboot immediately.
- {"cmd": "status"} to get a full device status (same as via 'http://DEVICE_IP/status');

```

'b'\x00\x00\x01\x93{"status":
  {"state": "S_INIT",
   "descr": "Instrument Multi Port",
   "port": "PORT 1",
   "info": "PORT 1 (both mirrors in parking position)",
   "name": "IMP85",
   "config": {"portnames": ["PORT1", "PORT2", "PORT3"],
    "version": "1.2_cbf5fc4 (29.3.2023)",
    "net": {"ip": "192.168.1.85",
     "mask": "255.255.255.0",
     "mode": "static",
     "dns": "8.8.8.8",
     "gw": "192.168.1.1"},
    "offsets": {"A": 50,
     "B": 50}}}}'

```

- In Python you would pack the request dictionary `req_dict={"cmd": "set_port1"}` with:

```
data = json.dumps(req_dict).encode('utf-8')
msg = struct.pack('!I', len(data)) + data
```

- And unpack the reply with:

```
reply_dict = json.loads(msg[4:])
```

Python Example Library

Use the exemplary library `bp_imp85.py` to control the device: Open a Python3 console in same folder where "`bp_imp85.py`" is:

```
>>> from bp_imp85 import Imp85

>>> myImp = Imp85("192.168.1.85")
>>> myImp.show_status()
{'config': {'net': {'dns': '8.8.8.8',
                    'gw': '192.168.1.1',
                    'ip': '192.168.1.85',
                    'mask': '255.255.255.0',
                    'mode': 'dhcp'},
            'offsets': {'A': 50, 'B': 50},
            'portnames': ['PORT1', 'PORT2', 'PORT3']},
 'descr': 'Instrument Multi Port',
 'info': 'PORT 1 (both mirrors in parking position)',
 'name': 'IMP85',
 'port': 'PORT 1',
 'state': 'S_AOUT_BOUT'}
```

```
>>> myImp.set_port(1)

>>> myImp.set_port(2)
True
>>> myImp.set_port(3)
True
>>>
```

Support

If you are facing any problems with this device, please contact us at

support@baader-planetarium.de