Serial ports - X500

1. Introduction

Serial port is computer port, which transfers data in string of bits.NPE X500 platform has 4 serial ports - 2x RS-232(3-pin) and 2x RS-485(2-pin). But simultaneously can operate only two of them: **COM1** or **COM4** and **COM2** or **COM3**.

- COM1 - RS-232
- COM2 - RS-232
- COM3 - RS-485
- COM4 - RS-485

2. Technical parameters

- 2xRS-232 / 2xRS-485
- 3pin / 2pin
- overvoltage protection transil bidirectional 24V DC
- Peak 600W

3. Port mapping in Linux operating system

```
COM1/COM4 <=> /dev/ttyAMA0
COM2/COM3 <=> /dev/ttySC0
```

4. Operating mode

ttySC0 and **ttyAMA0** ports can work in 2 modes - **RS-485** or **RS-232**. By default **ttyAMA0**(COM1 - RS232) port works as a service port. Before the first connecting an external device to the serial ports, you must set the operating mode (RS-232/RS-485).

4.1 ttyAMA0 as service port

In order to check if **ttyAMA0** port works as a service port, run following command:

```
/root/scripts/service_port_ctrl status
```

If so, you can disable it with command

```
/root/scripts/service_port_ctrl off
```

To enable it as a service port, use command:

```
/root/scripts/service_port_ctrl on
```

4.2 Changing operating mode

To change operating mode of port (RS-232/RS-485) use **comctrl** command:

```
comctrl 1 RS-232 2 RS-232 - both ports work as a RS-232
comctrl 1 RS-485 2 RS-485 - both ports work as a RS-485
```

To effectively change the operating mode of ports, a restart is required.

5. Cooperation with iMod application

At the bottom of this page you will find sample configurations, which can be used to ckeck if the serial ports are running properly. First step should be uploading a configuration to the device. Next perform a loop - connect Następnie wykonać pętle, connect to each other corresponding ports (bellow you will find connection scheme). This test allows checking status of connection.

Check if **ttySC0** port is running as a service port

```
/root/scripts/service_port_ctrl status
```

If so, it should be disabled with following command

```
/root/scripts/service_port_ctrl off
```

1. Connect corresponding ports with each other (perform a loop).

```
COM1 <--> COM2 (232)
COM3 <--> COM4 (485)
```

To change operating more of port (RS-232/RS-485) use **comctrl** command:

```
comctrl 1 RS-232 2 RS-232
comctrl 1 RS-485 2 RS-485
```

2. Test

Use **modmas** command to perform a test:

```
modmas write:parameter_id:value
np. modmas write:101:12
```

or

```
modmas -p baudrate,8N1 -a RTU:/dev/ttyXX write:parameter_id:value
np. modmas -p 115200,8N1 -a RTU:/dev/ttySC0 write:1:1
```

3. Configuration.

For the purpose of the test there were prepared 2 configurations, but there are 4 cases (COM1 and COM2 for RS-232 or RS-485). Therefore, to test all cases, during the operation of configuration, change the ports' operating mode.

1. Configuration where COM1/COM4 (/dev/ttyAMA0) is Source Channel, and COM2/COM3 (/dev/ttySC0) is Access Channel.
2. Configuration where COM2/COM3 (/dev/ttySC0) is Source Channel, and COM1/COM4 (/dev/ttyAMA0) is Access Channel.

1. rs_x500_sc_ttyama0_ac_ttysc0.xml
2. rs_x500_sc_ttysc0_ac_ttyama0.xml

1.

```
<imod version="1.2.45">
    <group name="Definitions 1">
        <access-channel name="ttySC0">
            <protocol name="MODBUS">
                <property name="type" value="RTU"/>
            </protocol>
            <port>"/dev/ttySC0-115200-8N1"</port>
            <property name="device-id" value="1"/>
            <property name="varspace" value="INPUT"/>
        </access-channel>
        <source-channel name="ttyAMA0">
            <protocol name="MODBUS">
                <property name="type" value="RTU"/>
            </protocol>
            <port>"/dev/ttyAMA0-115200-8N1"</port>
            <cycle>"2s"</cycle>
        </source-channel>
        <access-channel name="MODBUS_TCP_Access_1">
            <protocol name="MODBUS">
```

```
                <property name="type" value="TCP"/>
            </protocol>
            <port>"ET-502-TCP"</port>
            <property name="device-id" value="1"/>
            <property name="varspace" value="INPUT"/>
        </access-channel>
        <parameter type="int16">
            <id>"101_ttySC0_AC"</id>
            <access-channel channel-name="ttySC0" parameter-id="101"/>
            <init-value>"1"</init-value>
            <access-channel channel-name="MODBUS_TCP_Access_1"
parameter-id="101"/>
        </parameter>
        <parameter type="int16">
            <id>"100_ttyAMA0_SC"</id>
            <source-channel channel-name="ttyAMA0" parameter-id="101"/>
            <access-channel channel-name="MODBUS_TCP_Access_1"
parameter-id="100"/>
        </parameter>
    </group>
</imod>
```

2.

```
<imod version="1.2.45">
    <group name="Definitions 1">
        <access-channel name="ttyAMA0">
            <protocol name="MODBUS">
                <property name="type" value="RTU"/>
            </protocol>
            <port>"/dev/ttyAMA0-115200-8N1"</port>
            <property name="device-id" value="1"/>
            <property name="varspace" value="INPUT"/>
        </access-channel>
        <source-channel name="ttySC0">
            <protocol name="MODBUS">
                <property name="type" value="RTU"/>
            </protocol>
            <port>"/dev/ttySC0-115200-8N1"</port>
            <cycle>"2s"</cycle>
        </source-channel>
        <access-channel name="MODBUS_TCP_Access_1">
            <protocol name="MODBUS">
                <property name="type" value="TCP"/>
            </protocol>
            <port>"ET-502-TCP"</port>
            <property name="device-id" value="1"/>
            <property name="varspace" value="INPUT"/>
        </access-channel>
```

```
        <parameter type="int16">
            <id>"101_ttyAMA0_AC"</id>
            <access-channel channel-name="ttyAMA0" parameter-id="101"/>
            <init-value>"1"</init-value>
            <access-channel channel-name="MODBUS_TCP_Access_1"
parameter-id="101"/>
        </parameter>
        <parameter type="int16">
            <id>"100_ttySC0_SC"</id>
            <source-channel channel-name="ttySC0" parameter-id="101"/>
            <access-channel channel-name="MODBUS_TCP_Access_1"
parameter-id="100"/>
        </parameter>
    </group>
</imod>
```