# NPort S9450I Series

*4-port rugged device servers with managed Ethernet switch*

### Features and Benefits

- 4-port RS-232/422/485 serial interface
- Supports up to 5 managed Ethernet switch ports (fiber ports available with some models)
- Supports DNP3 and Modbus protocols
- IEC 61850-3, IEEE 1613-compliant (for power substations)
- Ethernet redundancy with Turbo Ring/Chain and RSTP/STP supported
- Real COM and TTY drivers for Windows, Linux, and macOS
- Supports IEC 61850 MMS protocol
- -40 to 85°C wide operating temperature

### Certifications

IEC 61850-3 IEEE 1613 c UL us LISTED CE FC

## Introduction

The NPort S9450I Series 4-port RS-232/422/485 device servers, which come with a built-in full-function managed Ethernet switch, are designed specifically for the harsh environmental conditions found in electrical substations. With both fiber and wired Ethernet ports supported, the combination of device server and Ethernet switch gives users the ability to easily install, manage, and maintain the NPort S9450I itself, as well as attached serial devices.

### Electromagnetic Compatibility for Harsh Substation Environments

The NPort S9450I Series supports a high level of surge protection to prevent damage from the types of power surges and EMI one finds in electrical substations and industrial automation applications. Combined with a -40 to 85°C operating temperature range and galvanized steel housing, the NPort S9450I is suitable for a wide range of industrial environments.

Another plus is the NPort S9450I's dual power supplies, which provide both redundancy, as well as a wide range of voltage inputs. The WV models accept a power 24/48 VDC power input (ranging from 18 to 72 VDC), and the HV models accept a power input of 88 to 300 VDC and 85 to 264 VAC.

### Power SCADA With IEC 61850 MMS for Easy Maintenance

The current trend in power SCADA applications is to control and monitor both IT devices (switches, routers, etc.) and IEDs (sensors, actuators, etc.) with the MMS protocol. Contrast this with the more traditional management approach of using SNMP for IT devices and MMS for IEDs. In fact, SIs may even need to manage a variety of legacy devices that use proprietary communications protocols.

The NPort S9450I device servers are the world's first device servers to integrate MMS into an IT-type device designed specifically for power SCADA applications. The NPort S9450I even supports using MMS to monitor serial communications between the S9450I and legacy devices.

### Supports Modbus/DNP3 Protocol Gateway

The NPort S9450I Series provides maximum flexibility for integrating industrial Modbus/DNP3 networks of all types and sizes. The NPort S9450I is designed to integrate Modbus TCP, ASCII, and RTU devices in almost any master/slave combination, including simultaneous serial and Ethernet masters.

The NPort S9450I device servers also support protocol conversion between DNP3 serial and DNP3 IP. All models are ruggedly constructed and are DIN-rail mountable.

### Ring Redundancy at the Device Level

Device-level communication networks for industrial automation are very critical since they are used to control and monitor device processes. The reliability of these communications depends on ring redundancy at the device level, which is designed to provide fast network fault detection and reconfiguration to support the most demanding control applications. The NPort S9450I Series integrates a full-function NPort device server with an industrial switch to carry serial and Ethernet devices at the same time.

In addition, the NPort S9450I can also achieve ring redundancy with standard STP/RSTP and Moxa's proprietary Turbo Ring or Turbo Chain 2 redundancy protocols. This all-in-one design can be used to optimize and simplify your device network and enhance reliability.

## Specifications

### Input/Output Interface

| | |
|---|---|
| Alarm Contact Channels | 2<br>Resistive load: 1 A @ 24 VDC |
| Digital Input Channels | 2 |
| Digital Inputs | +13 to +30 V for state 1<br>-30 to +1 V for state 0<br>Max. input current: 8 mA |

### Ethernet Interface

| | |
|---|---|
| 10/100BaseT(X) Ports (RJ45 connector) | NPort S9450I: 5 RJ45 ports |
| 100BaseFX Ports (multi-mode SC connector) | NPort S9450I-2M-SC: 3 RJ45 ports, 2 multi-mode SC ports |
| 100BaseFX Ports (multi-mode ST connector) | NPort S9450I-2M-ST: 3 RJ45 ports, 2 multi-mode ST ports |
| 100BaseFX Ports (single-mode SC connector) | NPort S9450I-2S-SC: 3 RJ45 ports, 2 single-mode SC ports |
| 100BaseFX Ports (single-mode ST connector) | NPort S9450I-2S-ST: 3 RJ45 ports, 2 single-mode ST ports |
| Magnetic Isolation Protection | 1.5 kV (built-in) |

Optical Fiber

| | | 100BaseFX | | |
|---|---|---|---|---|
| | | Multi-Mode | | Single-Mode |
| Fiber Cable Type | | OM1 | 50/125 µm<br>800 MHz x km | G.652 |
| Typical Distance | | 4 km | 5 km | 40 km |
| Wavelength | Typical (nm) | 1300 | | 1310 |
| | TX Range (nm) | 1260 to 1360 | | 1280 to 1340 |
| | RX Range (nm) | 1100 to 1600 | | 1100 to 1600 |
| Optical Power | TX Range (dBm) | -10 to -20 | | 0 to -5 |
| | RX Range (dBm) | -3 to -32 | | -3 to -34 |
| | Link Budget (dB) | 12 | | 29 |
| | Dispersion Penalty (dB) | 3 | | 1 |

Note: When connecting a single-mode fiber transceiver, we recommend using an attenuator to prevent damage caused by excessive optical power.
Note: Compute the “typical distance” of a specific fiber transceiver as follows: Link budget (dB) > dispersion penalty (dB) + total link loss (dB).

| | |
|---|---|
| Standards | IEEE 802.1D-2004 for Spanning Tree Protocol<br>IEEE 802.1p for Class of Service<br>IEEE 802.1Q for VLAN Tagging<br>IEEE 802.1w for Rapid Spanning Tree Protocol<br>IEEE 802.1X for authentication<br>IEEE 802.3 for 10BaseT<br>IEEE 802.3ad for Port Trunk with LACP<br>IEEE 802.3u for 100BaseT(X) and 100BaseFX |

### Switch Properties

| | |
|---|---|
| IGMP Groups | 256 |
| Max. No. of VLANs | 64 |

| | |
|---|---|
| Priority Queues | 4 |
| VLAN ID Range | VID 1 to 4094 |

### Ethernet Software Features

| | |
|---|---|
| Configuration Options | Web Console (HTTP/HTTPS)<br>Windows Utility<br>Device Search Utility (DSU)<br>MCC Tool<br>Command Line Interface (CLI) through Serial/Telnet/SSH |
| Management | DHCP Client<br>DHCP Option 82<br>HTTP<br>IEC 61850 MMS<br>IPv4<br>LLDP<br>Port Mirroring<br>RARP<br>RMON<br>SMTP<br>SNMPv1/v2c/v3 Trap/Inform<br>Syslog<br>Telnet<br>TFTP<br>Web Console |
| Filter | GMRP<br>GVRP<br>IGMP v1/v2 |
| Windows Real COM Drivers | Windows 11, 10, 8.1, 8, 7, Vista, XP, ME, 98 and 95<br>Windows Server 2022, 2019, 2016, 2012 R2, 2012, 2008 R2, 2008, 2003, 2000 and NT<br>Windows Embedded CE 5.0 and 6.0, Windows XP Embedded |
| Linux Real TTY Drivers | Kernel versions: 6.x, 5.x, 4.x, 3.x, 2.6.x and 2.4.x |
| Fixed TTY Drivers | macOS versions: 14, 13, 12, 11 and 10.1x<br>SCO UNIX, SCO OpenServer, UnixWare 7, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i, Mac OS X |
| Virtual Machine | VMWare ESXi (Windows 11 / 10)<br>VMware Fusion (Windows on macOS 14, 13, 12, 11 and 10.1x)<br>Parallels Desktop (Windows on macOS 14, 13, 12, 11 and 10.1x) |
| Arm®-based Platform Support | Windows 11<br>Linux Kernel 6.x, 5.x and 4.x<br>macOS 14, 13, 12 and 11 |
| Android API | Android 3.1.x and later |
| Industrial Protocols | Modbus TCP Server (Slave)<br>DNP3 TCP Outstation |
| Time Management | NTP Server/Client<br>SNTP |
| MIB | Bridge-MIB<br>Device Settings MIB<br>Ethernet-like-MIB<br>MIB-II<br>P-BRIDGE MIB<br>Q-BRIDGE-MIB<br>RFC1213, RFC1317<br>RMON MIB Groups 1, 2, 3, 9<br>RSTP MIB |

| | |
|---|---|
| Redundancy Protocols | RSTP<br>Turbo Chain<br>Turbo Ring v1<br>Turbo Ring v2 |
| Security | HTTPS/SSL<br>Local Account Accessibility<br>TACACS+<br>RADIUS<br>SSH |

### Serial Interface

| | |
|---|---|
| Connector | DB9 male |
| No. of Ports | 4 |
| Serial Standards | RS-232<br>RS-422<br>RS-485 |
| Operation Modes | Real COM mode<br>RFC2217 mode<br>TCP Client mode<br>TCP Server mode<br>UDP mode<br>Modbus mode<br>DNP3 mode<br>DNP3 Raw Socket mode<br>Disabled |
| Baudrate | 50 bps to 921.6 kbps (supports non-standard baudrates) |
| Data Bits | 5, 6, 7, 8 |
| Stop Bits | 1, 1.5, 2 |
| Parity | None, Even, Odd, Space, Mark |
| Flow Control | None<br>RTS/CTS<br>XON/XOFF |
| Isolation | 2 kV |
| Surge | 4 kV |
| RS-485 Data Direction Control | Automatic Data Direction Control (ADDC) |
| Pull High/Low Resistor for RS-485 | 1 kilo-ohm, 150 kilo-ohms |
| Terminator for RS-485 | 120 ohms |
| Console Port | RS-232 (TxD, RxD, GND), 10-pin RJ50 (19200, n, 8, 1) |

### Serial Signals

| | |
|---|---|
| RS-232 | TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND |
| RS-422 | Tx+, Tx-, Rx+, Rx-, GND |
| RS-485-4w | Tx+, Tx-, Rx+, Rx-, GND |
| RS-485-2w | Data+, Data-, GND |

### DIP Switch Configuration

| | |
|---|---|
| Ethernet Interface | Turbo Ring<br>Master<br>Coupler<br>Reserved |

### Modbus TCP

| | |
|---|---|
| Max. No. of Client Connections | 32 |
| Max. No. of Server Connections | 16 |

### DNP3 (Transparent)

| | |
|---|---|
| Max. No. of Master Connections | 16 |
| Max. No. of Outstation Connections | 32 |

### Power Parameters

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|---|---|
| No. of Power Inputs | 2 |
| Power Connector | 1 removable 5-contact terminal block(s) |
| Reverse Polarity Protection | Supported |
| Input Current | NPort S9450I-WV-T Models: 520 mA @ 24 VDC<br>NPort S9450I-HV-T Models: 80 mA @ 110 VDC |
| Input Voltage | NPort S9450I-WV-T Models: 24/48 VDC (18 to 72 VDC)<br>NPort S9450I-HV-T Models: 110/220 VAC/VDC (110 to 220 VAC, 110 to 220 VDC) |

### Physical Characteristics

| | |
|---|---|
| Housing | Metal |
| Dimensions | 80 x 160 x 109 mm (3.15 x 6.30 x 4.29 in) |
| Weight | Product Only: 2.54 kg (5.60 lb) |
| Installation | DIN-rail mounting<br>Wall mounting (with optional kit) |

### Environmental Limits

| | |
|---|---|
| Operating Temperature | -40 to 85°C (-40 to 185°F) |
| Storage Temperature (package included) | -40 to 85°C (-40 to 185°F) |
| Ambient Relative Humidity | 5 to 95% (non-condensing) |

### Standards and Certifications

| | |
|---|---|
| EMC | EN 61000-6-2/-6-4 |
| EMI | CISPR 32, FCC Part 15B Class A |
| EMS | IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV<br>IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m<br>IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV<br>IEC 61000-4-5 Surge: Power: 6 kV; Signal: 4 kV<br>IEC 61000-4-6 CS: 150 kHz to 80 MHz: 10 V/m; Signal: 10 V/m<br>IEC 61000-4-8 PFMF<br>IEC 61000-4-11 |
| Environmental Testing | IEC 60068-2-2<br>IEC 60068-2-14 |
| Power Substation | IEC 61850-3<br>IEEE 1613 |

| | |
|---|---|
| Hazardous Locations | UL/cUL Class I Division 2 Groups A/B/C/D |
| Safety | EN 61010-2-201<br>UL 61010-2-201 |
| Shock | IEC 60068-2-27 |
| Vibration | IEC 60068-2-6<br>IEC 60068-2-64 |

### Declaration

| | |
|---|---|
| Green Product | RoHS, CRoHS, WEEE |

### MTBF

| | |
|---|---|
| Time | 347,436 hrs |
| Standards | Telcordia Standard SR-332 |

### Warranty

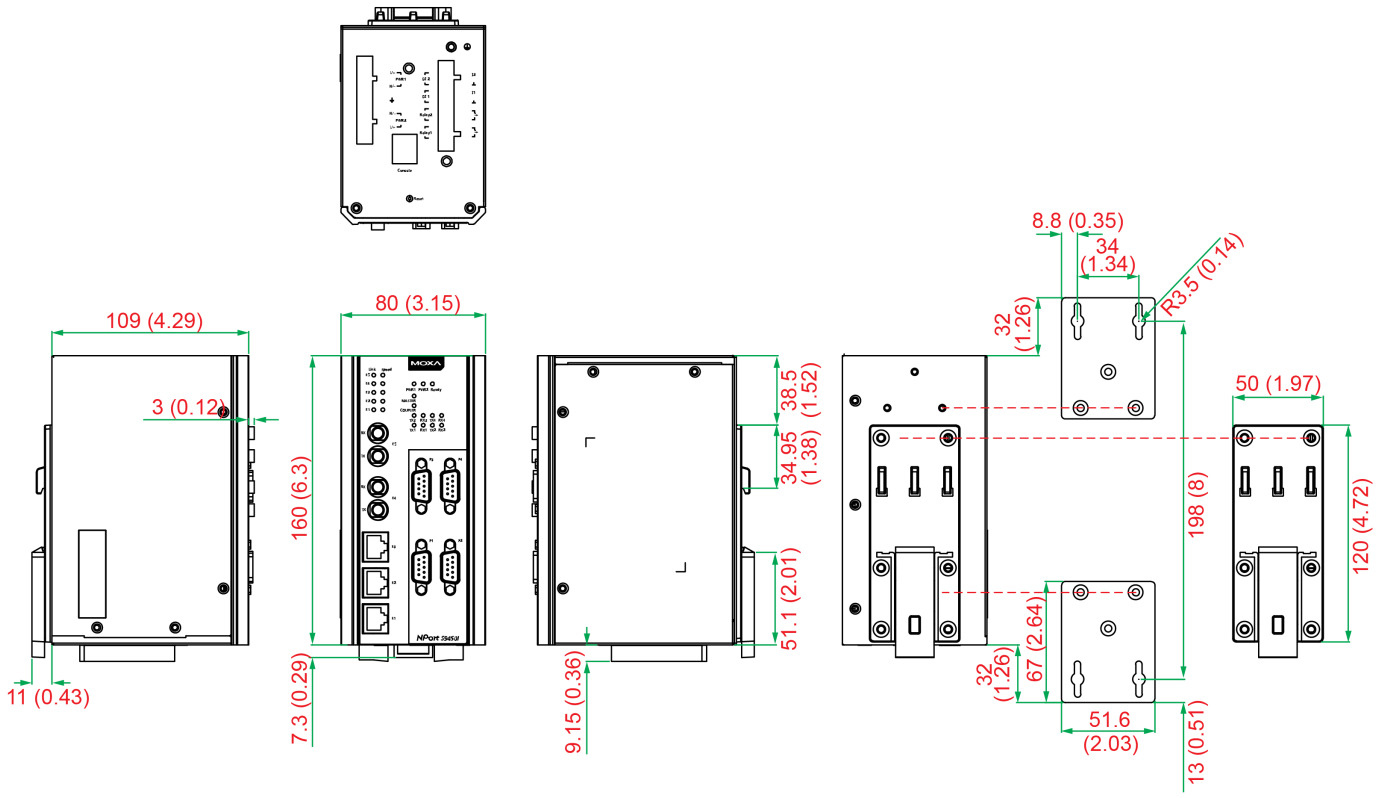
| | |
|---|---|
| Warranty Period | 5 years |
| Details | See www.moxa.com/warranty |

### Package Contents

| | |
|---|---|
| Device | 1 x NPort S9450I Series device server |
| Installation Kit | 1 x DIN-rail kit |
| Cable | 1 x DB9 female to RJ50 10-pin |
| Documentation | 1 x quick installation guide<br>1 x warranty card |

## Dimensions

Unit: mm (inch)




Panel-Mounting Kit

## Ordering Information

| Model Name | 10/100BaseT(X) Ports, RJ45 Connector | 100BaseFX Ports, Multi-Mode SC Connector | 100BaseFX Ports, Multi-Mode ST Connector | 100BaseFX Ports, Single-Mode SC Connector | 100BaseFX Ports, Single-Mode ST Connector | Input Voltage |
|---|---|---|---|---|---|---|
| NPort S9450I-WV-T | 5 | – | – | – | – | 24/48 VDC |
| NPort S9450I-HV-T | 5 | – | – | – | – | 110/220 VAC/VDC |
| NPort S9450I-2S-ST-WV-T | 3 | – | – | – | 2 | 24/48 VDC |
| NPort S9450I-2S-SC-WV-T | 3 | – | – | 2 | – | 24/48 VDC |
| NPort S9450I-2S-ST-HV-T | 3 | – | – | – | 2 | 110/220 VAC/VDC |
| NPort S9450I-2S-SC-HV-T | 3 | – | – | 2 | – | 110/220 VAC/VDC |
| NPort S9450I-2M-ST-WV-T | 3 | – | 2 | – | – | 24/48 VDC |
| NPort S9450I-2M-SC-WV-T | 3 | 2 | – | – | – | 24/48 VDC |
| NPort S9450I-2M-ST-HV-T | 3 | – | 2 | – | – | 110/220 VAC/VDC |
| NPort S9450I-2M-SC-HV-T | 3 | 2 | – | – | – | 110/220 VAC/VDC |

## Accessories (sold separately)

### Cables

| | |
|---|---|
| CN20070 | 10-pin RJ50 to DB9 female serial cable |
| CBL-F9M9-20 | DB9 female to DB9 male serial cable, 20 cm |
| CBL-F9M9-150 | DB9 female to DB9 male serial cable, 1.5 m |

### Connectors

| | |
|---|---|
| Mini DB9F-to-TB | DB9 female to terminal block connector |
| ADP-RJ458P-DB9F | DB9 female to RJ45 connector |

### Wall-Mounting Kits

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|---|---|
| WK-51-01 | Wall mounting kit with 2 plates (51.6 x 67 x 2 mm) and 6 screws |