NPort® S9450I Series

4-port rugged device server with managed Ethernet switch

- 4-port RS-232/422/485 serial interface
- Supports up to 5 managed Ethernet switch ports (fiber available with some models)
- DNP3 and Modbus protocols supported
- IEC 61850-3, IEEE 1613 compliant (for power substations)
- Ethernet redundancy with Turbo Ring/Chain and RSTP/STP supported
- Real COM/TTY drivers for Windows and Linux
- Supports IEC 61850 MMS protocol
- Supports IEC 62443 Level 2
- -40 to 85°C wide operating temperature

Overview

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 wire Ethernet ports supported, the combination of device server plus 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 S9000 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 S9000 is suitable for a wide range of industrial environoments.

Another plus is the NPort S9000'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 modesl 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 S9000 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 S9000 even supports using MMS to monitor serial communications between the S9000 and the legacy devices.

Supports Modbus/DNP3 Protocol Gateway

The NPort S9000 series provides maximum flexibility for integrating industrial Modbus/DNP3 networks of all types and sizes. The NPort S9000 is designed to integrate Modbus TCP, ASCII, and RTU devices in almost any master/slave combination, including simultaneous serial and Ethernet masters. The NPort S9000 device servers also support protocol conversion between DNP3 serial and DNP3 IP. All models are ruggedly constructed and are DIN-rail mountable.

IEC 62443 Level 2 Supported for Cybersecurity

The NPort S9000 series supports IEC 62443 Level 2, and is designed for NERC CIP compliance system development to provide a high level of cybersecurity. Protecting mission-critical networks from cyber attacks is a high-priority for industrial automation applications, which can suffer large losses due to extended network downtime.

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 S9000 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 S9000 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.

General Specifications

Port Summary
Serial Ports: 4 RS-232/422/485 ports
Ethernet Switch Ports:
NPort S9450I all copper models: 5 RJ45 copper ports
NPort S9450I copper/fiber models: 3 RJ45 copper ports, 2 fiber ports
Magnetic Isolation Protection: 1.5 kV built in
Console Ports: 1 (10-pin RJ45 connector)

Physical Characteristics
Housing: Metal
Weight: 2.54 kg (5.60 lb)
Dimensions: 80 x 160 x 109 mm (3.15 x 6.30 x 4.29 in)

Environmental Limits
Operating Temperature: -40 to 85°C (-40 to 185°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Power Requirements
Input Voltage:
WV models: 24/48 VDC (18 to 72 VDC)
HV models: 110/220 VAC/VDC (88 to 300 VDC, 85 to 264 VAC)
Input Current:
520 mA @ 24 VDC
80 mA @ 110 VDC

Standards and Certifications
Safety: UL 508, UL 61010
EMC: EN 61000-6-2/61000-6-4
EMI: CISPR 22, FCC Part 15B Class A
EMS:
IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV
IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m
IEC 61000-4-4 EFT: Power: 4 kV; Signal: 4 kV
IEC 61000-4-5 Surge: Power 6 kV; Signal: 4 kV
IEC 61000-4-6 CS: 150 kHz to 80 MHz: 10 V/m; Signal: 10 V/m
IEC 61000-4-8 PFMF
IEC 61000-4-11 DIPs
Hazardous Location: UL/cUL Class I Division 2 Groups A/B/C/D

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

Device Server Specifications

Serial Interface
Number of Ports: 4
Serial Standards: RS-232/422/485
Connector: DB9 male
Serial Line Protection: 2 kV isolation protection
RS-485 Data Direction Control: ADDC® (Automatic Data Direction Control)
Console Port: Dedicated RS-232 console port (10-pin RJ45)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS and XON/XOFF
Baudrate: 50 bps to 921.6 Kbps

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
Digital Input: 2 inputs with the same ground, but electrically isolated from the electronics
- +13 to +30 V for state "1"
- -30 to +3 V for state "0"
- Max. input current: 8 mA

Software
Configuration Options: Command Line Interface (CLI) through Serial/Telnet/SSH, Web Console (HTTP/HTTPS), Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7/8/8.1/10 (x86/x64), Windows 2008 R2/2012/2012 R2 (x64), Windows Embedded CE 5.0/6.0, Windows XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i, Mac OS X
Linux Real TTY Drivers: Linux 2.4.x, 2.6.x, 3.x
Operation Modes: Real COM, TCP Server, TCP Client, UDP, RFC2217, Modbus, DNP3, DNP3 Raw Socket
Management: SNMP MIB-II, IEC 61850 MMS

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

MTBF (mean time between failures)
Time: 347,436 hrs
Standard: Telcordia (Bellcore) Standard TR/SR

Ethernet Switch Specifications

Ethernet Interface

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1x for Authentication
IEEE 802.3ad for Port Trunk with LACP
Network Protocols: ICMP, IPv4, TCP, UDP, ARP, Telnet, DNS, HTTP, SMTP, SNTP, IGMPv1/v2, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 82, BootP, TFTP, SNTP, SMTP, RARP, GMRP, LACP, RMON
MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control interface

Switch Properties

Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
Cybersecurity: Ready for NERC CIP compliance system development
• Supports IEC 62443 Level 2
• Supports port access control list: MAC, 802.1x authentication
• Supports RADIUS, TACACS+
• Supports Syslog for system/event

Optical Fiber Interface

		100BaseFX		
		Multi-Mode		Single-Mode
Fiber Cable Type		OM1	50/125 µm 800 MHz*km	G.652
Typical Distance		4 km	5 km	40 km
Wave-length	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

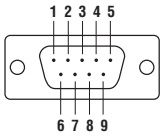
Note: When connecting a single-mode fiber transceiver, we recommend using an attenuator to prevent damage caused by excessive optical power.
Note: Compute the "typical distance" of a specific fiber transceiver as follows: Link budget (dB) > dispersion penalty (dB) + total link loss (dB).

Switch Interface

RJ45 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Alarm Contact: 2 relay outputs with current carrying capacity of 1A @ 24 VDC

Pin Assignment

DB9 male connector

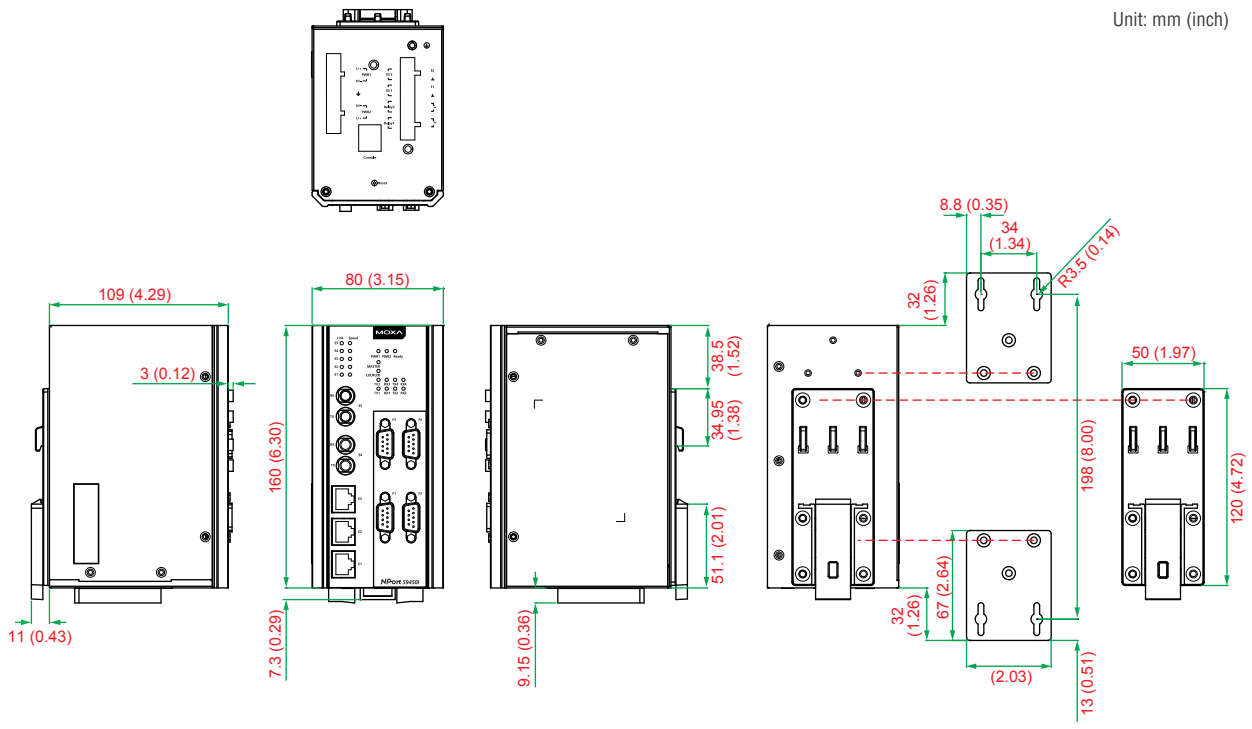


Serial Port (DB9 male connector)

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

Dimensions

Unit: mm (inch)



Panel-Mounting Kit

Ordering Information

Available Models

NPort S9450I-WV-T: 4-port RS-232/422/485 rugged device server, 5 10/100M Ethernet ports, 24/48 VDC, -40 to 85°C operating temperature
NPort S9450I-HV-T: 4-port RS-232/422/485 rugged device server, 5 10/100M Ethernet ports, 88-300 VDC or 85-264 VAC, -40 to 85°C operating temperature
NPort S9450I-2M-SC-WV-T: 4-port RS-232/422/485 rugged device server, 3 10/100M Ethernet ports, 2 100M multi-mode fiber ports with SC connectors, 24/48 VDC, -40 to 85°C operating temperature
NPort S9450I-2M-SC-HV-T: 4-port RS-232/422/485 rugged device server, 3 10/100M Ethernet ports, 2 100M multi-mode fiber ports with SC connectors, 88-300 VDC or 85-264 VAC, -40 to 85°C operating temperature
NPort S9450I-2M-ST-WV-T: 4-port RS-232/422/485 rugged device server, 3 10/100M Ethernet ports, 2 100M multi-mode fiber ports with ST connectors, 24/48 VDC, -40 to 85°C operating temperature
NPort S9450I-2M-ST-HV-T: 4-port RS-232/422/485 rugged device server, 3 10/100M Ethernet ports, 2 100M multi-mode fiber ports with ST connectors, 88-300 VDC or 85-264 VAC, -40 to 85°C operating temperature
NPort S9450I-2S-SC-WV-T: 4-port RS-232/422/485 rugged device server, 3 10/100M Ethernet ports, 2 100M single-mode fiber ports with SC connectors, 24/48 VDC, -40 to 85°C operating temperature
NPort S9450I-2S-SC-HV-T: 4-port RS-232/422/485 rugged device server, 3 10/100M Ethernet ports, 2 100M single-mode fiber ports with SC connectors, 88-300 VDC or 85-264 VAC, -40 to 85°C operating temperature
NPort S9450I-2S-ST-WV-T: 4-port RS-232/422/485 rugged device server, 3 10/100M Ethernet ports, 2 100M single-mode fiber ports with ST connectors, 24/48 VDC, -40 to 85°C operating temperature
NPort S9450I-2S-ST-HV-T: 4-port RS-232/422/485 rugged device server, 3 10/100M Ethernet ports, 2 100M single-mode fiber ports with ST connectors, 88-300 VDC or 85-264 VAC, -40 to 85°C operating temperature

Package Checklist

- 1 NPort S9450I device server
- 1 CN20070 connection CBL, RJ45/10P/F9, 150 cm
- 1 DK/DC 50 x 131 mm DIN-rail kit
- Documentation and software CD
- Quick installation guide (printed)
- Warranty card