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/TTY drivers for Windows and Linux
- Supports IEC 61850 MMS protocol
- Security features based on IEC 62443/NERC CIP
- -40 to 85°C wide operating temperature

Certifications

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.

Cybersecurity Features Based on IEC 62443/NERC CIP

The NPort S9450I Series has security features based on IEC 62443/NERC CIP to provide a high level of cybersecurity. Protecting mission-critical networks from cyberattacks 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 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, Resistive load: 1 A @ 24 VDC
Digital Input Channels	2
Digital Inputs	+13 to +30 V for state 1 -30 to +1 V for state 0 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 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 IEEE 802.1p for Class of Service IEEE 802.1Q for VLAN Tagging IEEE 802.1w for Rapid Spanning Tree Protocol IEEE 802.1X for authentication IEEE 802.3 for 10BaseT IEEE 802.3ad for Port Trunk with LACP 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	Command Line Interface (CLI) through Serial/Telnet/SSH, Web Console (HTTP/HTTPS), Windows Utility
Management	DHCP Client, DHCP Option 82, HTTP, IEC 61850 MMS, IPv4, LLDP, Port Mirror, RARP, RMON, SMTP, SNMPv1/v2c/v3, Syslog, Telnet, TFTP, Web Console
Filter	GMRP, GVRP, IGMP v1/v2
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 R2/2016/2019 (x64), Windows Embedded CE 5.0/6.0, Windows XP Embedded
Linux Real TTY Drivers	Kernel versions: 2.4.x, 2.6.x, 3.x, 4.x, and 5.x
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
Android API	Android 3.1.x and later
Industrial Protocols	Modbus TCP Server (Slave), DNP3 TCP Outstation
Time Management	NTP Server/Client, SNTP
MIB	Bridge MIB, Device Settings MIB, Ethernet-like MIB, MIB-II, P-BRIDGE MIB, Q-BRIDGE MIB, RFC1213, RFC1317, RMON MIB Groups 1, 2, 3, 9, RSTP MIB
Redundancy Protocols	RSTP, Turbo Chain, Turbo Ring v1, Turbo Ring v2
Security	HTTPS/SSL, Local Account Accessibility, TACACS+, RADIUS, SSH

Serial Interface

Connector	DB9 male
No. of Ports	4
Serial Standards	RS-232, RS-422, RS-485
Operation Modes	Real COM mode, RFC2217 mode, TCP Client mode, TCP Server mode, UDP mode, Modbus mode, DNP3 mode, DNP3 Raw Socket mode, 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, RTS/CTS, XON/XOFF
Isolation	2 kV
Surge	4 kV
RS-485 Data Direction Control	ADDC® (automatic data direction control)
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 RJ45 (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, Master, Coupler, 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

No. of Power Inputs	2
Power Connector	1 removable 5-contact terminal block(s)
Reverse Polarity Protection	Supported
Input Current	NPort S9450I-WV-T Series: 520 mA @ 24 VDC NPort S9450I-HV-T Series: 80 mA @ 110 VDC
Input Voltage	NPort S9450I-WV-T Series: 24/48 VDC (18 to 72 VDC) NPort S9450I-HV-T Series: 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, 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 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
Environmental Testing	IEC 60068-2-2 IEC 60068-2-14
Power Substation	IEC 61850-3, IEEE 1613
Hazardous Locations	UL/cUL Class I Division 2 Groups A/B/C/D
Safety	EN 61010-2-201, UL 61010-2-201
Shock	IEC 60068-2-27
Vibration	IEC 60068-2-6, IEC 60068-2-64

Declaration

Green Product	RoHS, CRoHS, WEEE

MTBF

Time	347,436 hrs
Standards	Telcordia SR332

Warranty

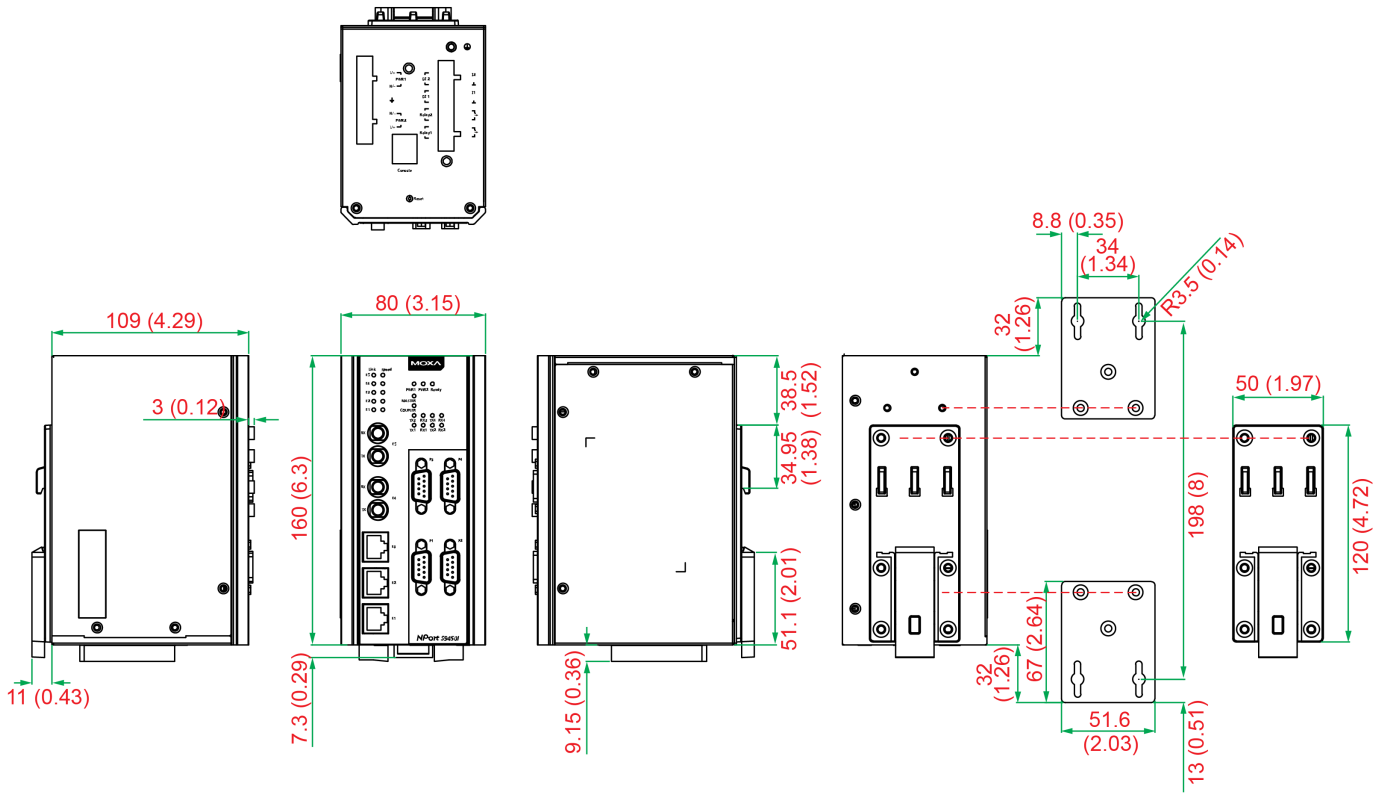
Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

Device	1 x NPort S9450I Series device server
Installation Kit	1 x DIN-rail kit
Cable	1 x DB9 female to RJ45 10-pin
Documentation	1 x quick installation guide 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

CBL-F9M9-150	DB9 female to DB9 male serial cable, 1.5 m
CBL-F9M9-20	DB9 female to DB9 male serial cable, 20 cm
CN20070	10-pin RJ45 to DB9 female serial cable

Connectors

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

Wall-Mounting Kits

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