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Released on May 31, 2019

About Moxa

Moxa is a leading provider of edge connectivity, industrial networking, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things. With over 30 years of industry experience, Moxa has connected more than 50 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industry with reliable networks and sincere service for industrial communications infrastructures. Information about Moxa's solutions is available at <u>www.moxa.com</u>.

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NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

1. Introduction

The NPort IA5000A-I/O and NPort IAW5000A-I/O serial device servers, which have built-in digital I/Os, provide maximum flexibility when you need to integrate serial equipment in the field with an Ethernet network or cloud platform. From Firmware Version 2.0 onwards, they support communications with IIoT applications, using generic MQTT or third-party cloud services, such as Azure and Alibaba Cloud.

This document demonstrates how to use the NPort IA5000A-I/O or NPort IAW5000A-I/O serial device when connecting to Microsoft Azure IOT. We also demonstrate how to send serial or I/O data messages and receive messages from Microsoft Azure.

2. System Topology

Figure 1 illustrates the system topology. PC1 runs PComm Lite to act as a serial device. It connects to Port 1 of the NPort IA5000A-I/O or NPort IAW5000A-I/O serial device. The NPort IA5000A-I/O or NPort IAW5000A-I/O serial device acts as an Azure IOT device and connects to Azure IOT Hub. PC2 runs **Device Explorer** to monitor the Azure IOT device in the IOT Hub.





NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

2.1 Creating an IoT Hub and IoT Device on Azure

- Use a Microsoft user account to log in to Azure Portal. Azure Portal website: <u>https://portal.azure.com</u>
- 2. Create a new IoT Hub: New → Internet of Things → IoT Hub



3. When a new IoT Hub has been created, click to create a new IoT Device: Explorers → IoT devices → Add.



NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

Fill in the device name on **Device ID**, and click **Save**, which will create an IoT device.



NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

After successfully creating the IoT device, you will see (as below) that its **Device ID** is "NPort".

Home > IoT Hub > MoxaHub1 - IoT devic	tes	
MoxaHub1 - IoT devices		\$ ×
	🕇 Add 👌 Refresh 🗴 Delete	
🔍 Pricing and scale		
<table-of-contents> IP Filter</table-of-contents>		
🔎 Certificates	You can use this tool to view, create, update, and delete devices on your IoT	Hub.
൙ Built-in endpoints	Field Operator Value	
Ξ Properties	+ X Select or enter your own V = V	
🔒 Locks	+ Add new clause	
🖳 Export template	Query devices	iery editor
Explorers		
Query explorer	DEVICE ID STATUS LAST ACTIVITY LAST STATUS AUTHENTICA C	LOUD TO DE
IoT devices	NPort Enabled Sas C	þ
Automatic Device Management		
🚔 IoT Edge		
🙎 IoT device configuration		

2.2 Set Up the NPort IA5000A-I/O and IAW5000A-I/O to Connect to Azure IoT Hub

 Log in to the NPort IA5000A-I/O or NPort IAW5000A-I/O's web console. Set the correct time setting on the **Basic Settings** page. Also, fill in **Time server** to correct the NPort's time-on period. You can find the NTP service at <u>https://www.pool.ntp.org/zone/@</u>

Time Settings		
Time zone	(GMT+08:00)Taipei	•
Local time (24-hour)	2019 / 05 / 17 22 : 23 : 49	
Time server	asia.pool.ntp.org	

Go to Main Menu → IoT Management → IoT Mode, to set IoT platform as "Azure IoT Hub".

• IoT Mode	
Basic Settings	
loT platform	Azure IoT Hub

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

The IoT Mode is running with Azure IoT Hub. It will show more settings about Azure IoT Hub as below:

Azure IoT Hub Settings	
Device connection string	e.g. HostName=xxx;DeviceId=xxx;SharedAccessKey=xxx

3. In **Device connection string**, fill in your IoT device connection string. Go back to Azure Portal, and click **NPort** to show the details of the device.

Home > IoT Hub > MoxaHub1 - IoT devices	
MoxaHub1 - IoT devices	× %
🙂 Pricing and scale	
📲 IP Filter	
Certificates Question of the second secon	create, update, and delete devices on your IoT Hub.
Built-in endpoints	Or anter Make
E Properties	Value
Locks + Add new clause	
Export template	> Switch to query editor
Explorers	
Query explorer	T ACTIVITY LAST STATUS AUTHENTICA CLOUD TO DE
IoT devices NPort Enabled	Sas 0
Automatic Device Management	
🚔 IoT Edge	
R IoT device configuration	

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

On the **Device details** page, click the copy icon for **Connection string (primary key)** within Azure Portal as below.

Home > IoT Hub > MoxaHub1 - IoT dev	ices > Device details	
Device details		\$ ×
🕞 Save 🛛 Message to device 📣 🛛	Direct method 🗄 Device twin 🕂 Add module identity 🤇 Regenerate keys	•••• More
Device Id	NPort	Ē.
Primary key 🕦		0 (
Secondary key 🚯		0
Connection string (primary key) 🚯		
Connection string (secondary key) 🚯		• •
Connect this device to an IoT hub 🌒	Enable Disable	
Parent device 🕢	No parent device Set a parent device	
Module identities Configurations		
Module identities that are associat	ed with this device.	
MODULE IDENTITY NAME CONNE	CTION STATE CONNECTION STATE LAST UPDATED LAST ACTIVITY TIME	
No module identities listed.		

Go back to the NPort web console and paste (Ctrl + V) it in **Device connection string**, and click **Submit**.

•IoT Mode

Basic Settings	
IoT platform	Azure IoT Hub 🗸
Azure IoT Hub Settings	
Device connection string	HostName=MoxaHub1.azure-devices.net;DeviceId=NPort;Shar
Serial and I/O Message Format Settings	
Serial and I/O message definition	Serial JSON //O JSON
I/O publish trigger mode	Specific I/O change 👻 DI-00 👻
	Submit

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

 After clicking Submit, the NPort IA5000A-I/O or NPort IAW5000A-I/O will connect to Azure IoT Hub, and you can check if the Connection Status shows Connected under Azure IoT Connection Information as below:

Azure IoT Connection Information	
Target	MoxaHub1.azure-devices.net
Connection status	Connected
Diagnostics log	2019/05/16 20:45:29 Connecting 2019/05/16 20:45:31 Connected successfully!

You can also check **ConnectionState** under the **Management** tab on the **Device Explorer Twin** page. For more about the Device Explorer Twin, please refer to the "Device Explorer Twin" section.

evice E	xplorer Twin		-					
onfigur	ration Manag	gement Data N	lessages To Devic	e Call	Method on D	Device		
Action Cr Device Total: Filter:	s reate es 1	Refresh	Update		Delete	SAS Tol	ken Twin	Props.
	ld	PrimaryKey	SecondaryKey	Primar	Secondar	ConnectionStrin	ConnectionState	LastActiv
	NPort	UDwEurHOp	uKitaRCRLtktt			HostName=	Connected	

2.3 Device Explorer Twin

The Device Explorer Twin is a gadget released by Azure to monitor the Azure IoT Hub service. Device Explorer Twin manages devices that are connected to your IoT hub. It monitors messages from your devices and send messages to your devices. For more information, please reference https://github.com/Azure/azure-iot-sdk-csharp/tree/master/tools/DeviceExplorer.

It can be downloaded from https://github.com/Azure/azure-iot-sdk-csharp

Install the latest version of **SetupDeviceExplorer.msi** to launch it.

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

🖳 Device Explorer	Twin				
Configuration	Management Data	Messages To Device	Call Method on Device		
Connection I IoT Hub Cor	nformation				
I					
Protocol Ga	teway HostName:				
Upda	te				
Shared Acce	ess Signature				
Key Name	•				
Key value					
TTL (Days)	365		Generate	SAS	
L.					

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

Under **IoT Hub Connection String**, fill in "Connection string—primary key". This string is used for API calls and uses the primary key. Go back to Azure Portal and click **Shared access policies > iothubbowner** to show "Shared access keys". Click the copy icon for **Connection string—primary key** as below.

oolicies			iothubowner	
MoxaHub1 - Shared acc	cess policies		MoxaHub1	•••• More
	Add			
🕺 Overview	IoT Hub uses permissions to grant access to	each IoT hub endpoint. Permiss		
 Activity log Access control (IAM) 	functionality.		Permissions	
🗬 Tags	Search to filter items		🗹 Registry write 🚯	
🗲 Events 🛛	POLICY	PERMISSIONS	🗹 Service connect 🚯	
Settings	iothubowner	registry wri	✓ Device connect ⑤	
📍 Shared access policies	service	service conn		
O Pricing and scale	device	device conne		
∃+ IP Filter	registryRead	registry read	Shared access keys Primary key 🚯	
Certificates	registryReadWrite	registry writ∉		**** 👁 🌓
			Secondary key 🚯	**** 👁 <u></u>
Locks			Connection string—primary ke	y O
💻 Export template				***** @
Explorers			Connection string—secondary	key 👩 **** 👁 <u>ြ</u>
🔎 Query explorer				
IoT devices				
Automatic Device Management				
🐴 IoT Edge	•			

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

Go back to **Device Explorer Twin**, and paste (Ctrl + V) it in **IoT Hub Connection String**, and click **Update**.

🖶 Device Explorer T	Twin	
Configuration	Management Data Messages To Device Call Method on Device	
Connection In	formation	
IoT Hub Conr	nection String:	1
devices.netS	loxaHub1.azure- haredAccessKeyName=iothubowner,SharedAccessKey+	
		J
Protocol Gate	away HostName:	
Update	9	
- Shared Acces	ss Signature	
Key Name		
Key Value		
Target		
TTL (Days)	365 Generate SAS	

3. Upload/Download Serial Pattern and I/O Status With

Cloud

In this section, we will instruct you on how the NPort IA5000A-I/O and NPort IAW5000A-I/O (in sections below, referred to as NPort or NPorts) send and receive serial pattern to and from the cloud. If a DI is triggered, the NPorts will publish I/O status to the cloud, and publish a message from the cloud to the NPorts to change I/O status. Azure IoT Hub only supports MQTT data message format. Under **I/O publish trigger mode,** select **Specific I/O change** along with **DI-00**.

-IoT Mode

loT platform	Azure IoT Hub 👻
Azure IoT Hub Settings	
Device connection string	HostName=MoxaHub1.azure-devices.net;DeviceId=NPort;Sha
Serial and I/O Message Format Settings	1
Serial and I/O message definition	Serial JSON I/O JSON
	One site life shares DL 00

Submit

For the purpose of this demonstration, we will show you the text content of the data we upload to the cloud platform. Click the **Serial JSON** button to uncheck the **enable Base64 Encode/Decode for serial data** checkbox. JSON format does not support special characters. If needed, set **Encode/Decode for serial data**. For more about JSON format rules, please reference http://json.org/

-Serial JSON Message Definition

Publish JSON Me	essage		
{			
"msgVer"	:	"1.0",	
"gwID"	:	"NPortIAW5250A-12I/O_2647",	
"devID"	:	"SerialPort1",	port 1
"dateTime"	:	"2018-08-27T15:43:14+08:00",	enable
"msgNumber"	:	0-65535,	enable
"msgType"	:	"Data",	
"msgFrame"	1	"Raw data from serial port"	🔲 enable Base64 Encode/Decode for serial data
}			

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

Note: You must fill in serial alias name, which is an identifiable ID for serial data on the Serial Parameter page.

	:• Serial Parameter									
* Modifyi	ng "Serial Parameter" settin	gs will cause the	serial ports to restart connectio	ns.						
Port	Alias	Alias code	Baud rate	Parity	Data bit	Stop bit	Flow control	FIFO	Interface	
1	SerialPort1	p1	115200 ▼	None 🔻	8 🔻	1 🔻	RTS/CTS V	Enable 🔻	RS-232	Ŧ
2	SerialPort2	p2	115200 🔻	None •	8 🔻	1 🔻	RTS/CTS V	Enable •	RS-232	¥
			Submit							

In this demonstration, we use the NPorts' DO-00 to trigger DI-00 (connect DO-00 to DI-00 by wire).



NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

3.1 Sending Serial Patterns From the Device to the Cloud

In this section, we will instruct you how to send serial data to the cloud. We use Device Explorer Twin to monitor whether the PC has sent a pattern through the NPort's Serial Port 1 to the cloud.

 Log in to the NPort's web console and change Serial Port 1's **Operation mode** to IoT and set **Force transmit** at 500. The NPorts support several types of data packing combinations. For the purposes of this demonstration, we use **Force transmit**. If needed, set the correct **Data Packing** method.

Port Settings	
Port	1
Operation mode	IoT 🗸
Sniffer mode	Enable (Subscribed messages will be dropped)
Data Packing	
Packet length	0 (0 - 2880)
Delimiter 1	00 (HEX) 🔲 Enable
Delimiter 2	00 (HEX) Enable
Delimiter process	Do Nothing - (Processed only when the packet length is 0)
Force transmit	500 (0 - 65535 ms)
Apply the above settings to all serial ports	

• Operation Mode

Click **Submit** to activate the new settings.

:• Operation Mode

	Port	Operating mode	Packet length	Delimiter 1	Delimiter 2	Delimiter process	Force transmit
	1	IoT	0	00 (Disable)	00 (Disable)	Do Nothing	500
ſ		_	0	00 (Disable)	00 (Disable)	Do Nothing	0
	2	Real COM	Max connection:	1			



2. On the **Device Explorer Twin page**, click the **Data** tab.

💀 Device Explorer Twin	
Configuration Management Data Messages To Device Call Method on Device	
Connection Information IoT Hub Connection String:	
HostName=MoxaHub1.azure- devices.net.SharedAccessKeyName=iothubowner,SharedAccessKey	
Protocol Gateway HostName:	
Update	

Select **NPort** in the drop-down menu under **Device ID** and click **Monitor** to begin monitoring the NPort's IoT messages.

🖳 Device Explorer Twin	x
Configuration Management Data Messages To Device Call Method on Device	
Monitoring	
Event Hub: MoxaHub1	
Device ID: NPort	
Start Time: 05/16/2019 20:57:54	
Consumer Group: SDefault	
Monitor Cancel Clear Show system properties	
Event Hub Data	



Under the Event Hub Data status box, the message will read "Receiving events".

🖶 Device Explorer Twin	
Configuration Management Data Messages To Device Call Method on Device	
~ Monitoring	
Event Hub: MoxaHub1	
Device ID: NPort	*
Start Time: 05/16/2019 21:54:33	
Consumer Group: \$Default	
Monitor Cancel Clear	Show system properties
Event Hub Data Receiving events	

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

- 3. Launch PComm Terminal Emulator on PC 1 and open COM Port with the NPort's serial default settings as below:
 - Port number: PC 1's native COM port connecting to the NPort's Port 1
 - Baud rate: 115200
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: RTS/CTS

Property					X	
Communication Parameter Terminal File Transfer Capturing						
Pr Serial Parame	rotoc eters	ol: Serial		•		
COM1	•	Baud rate:	115200		•	
COM101 COM102 COM103		Data bita:	Use	r defined		
COM104 COM105		Parity:	None		- -	
COM106 COM107	Ξ	Stop bits:	1		•	
COM108 COM109		Flow control:		/CTS		
COM110 COM111 COM112				I/XOFF		
COM113 COM114	-	RTS state:	© ON	C OFF		
LCOM115		DTR state:	• 0N	U OFF		
Default		[ОК		Cancel	

 Click the Send Pattern button, or on the toolbar, select Port Manager → Send Pattern to send a serial pattern.

PComm Terminal Emulator - COM102,115200,None,8,1,RTS/CTS,Dumb Terminal	Contraction - 1	
Profile Edit Port Manager Window Help		
COM102,115200,None,8,1,RTS/CTS,Dumb Terminal		- • •
		Â
RTS		
State:OPEN CTS DSR RI DCD Ready TX:4	RX:0	li.

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

In the **Send Pattern** window, select **ASCII** and fill in "MOXA"; then, select **Repeat count** and enter "**1**". Click **Start Send** to send the pattern.

Send Pattern	
Data Pattern © ASCII H 0 X A C HEX 4D4F5841 C Range (Hex) Start: To:	Start Send Cancel
Count C Send until user break	
<pre>(• Repeat count: 1 Interval time: 1000 (100ms ~ 60000ms)</pre>	
Set all ports to send pattern simultaneously	

5. On the **Device Explorer Twin** page, you will receive an IoT message from the cloud that was sent from the NPort.

Configuration M	^{vin} Ianagem	ent Data	Messages To	Device	Call Method on Device		
Monitoring							
Event Hub:	MoxaH	ub1					
Device ID:	NPort						-
Start Time:	05/1	6/2019 21:54	:33				
Consumer G	iroup: \$	Default			Enable		
Monito	r		Cancel		Clear	Show:	system properties
Event Hub Data	3						
Receiving eve 2019-05-16 21: 2647","msgTyp	nts 55:52> De pe":"Data	evice: [NPo a","devID":"\$	t], Data:[{"msgV SerialPort1","msg	'er":"1.0",' gFrame":'	'gwlD":"NPortlAW5250A "MOXA"}]	-121/0_	

The serial data pattern will be filled in the msgFrame.

Event Hub Data
Receiving events 2019-05-16 21:55:52> Device: [NPort], Data:[{"msgVer":"1.0","gwlD":"NPortlAW5250A-12I/O_ 2647","msgType":"Data","devID":"SerialPort1","msgFrame":"MOXA"}]

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

3.2 Sending Serial Data From the Cloud to the Device

In this section, we will instruct you on how to send serial data to PC 1 from the cloud. We use **Device Explorer Twin** to send an IoT message to the NPort's Serial Port 1.

1. Click **Serial JSON**.

-IoT Mode

oT platform	Azure IoT Hub 🗸		
Azure IoT Hub Settings			
Device connection string	HostName=MoxaHub1.azure-devices.net;DeviceId=NPort;Sha		
Serial and I/O Message Format Settings			
Serial and I/O message definition	Serial JSON I/O JSON		
/O publish triager mode	Specific I/O change 👻 DI-00 👻		

Copy Subscribe JSON Message:

Publish JSON Me	ssage		
{			
"msgVer"	:	"1.0",	
"gwID"	:	"NPortIAW5250A-12I/O_2647",	
"devID"	:	"SerialPort1",	
"dateTime"	:	"2018-08-27T15:43:14+08:00",	
"msgNumber"	:	0-65535,	
"msgType"	:	"Data",	
"msgFrame"	:	"Raw data from serial port"	
}			
Subscribe JSON	Message		
{			
"msgVer"	:	"1.0",	
"gwID"	:	"NPortIAW5250A-12I/O_2647",	
"devID"	:	"SerialPort1",	
"msgType"	:	"Data",	
"msgFrame"	:	"Raw data to serial port"	
}			

Serial JSON Message Definition

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

 The copied message has a lot of space and line feed. We can use a tool to compact it. Below is a free online tool:

https://jsonformatter.org/json-minify

Paste the message in the column on the left and change the msgFrame stating"Raw data to serial port" to read"Hi MOXA NPort"; then, click **Minify JSON**. It will show a compact JSON format message in the column on the right. Click **Copy to Clipboard**.

JSON Minify		
ב די א Sample ⊷ שים אים אים א זי (Load Data	
<pre>2 "msgVer":1.0", 3 "gwID":"NortIAN5250A-12I/O_2647", 4 "devID":"SerialPort1", 5 "msgTvpe":"Data".</pre>	Minify JSON	:"SerialPortl","msgType":"Data","msgFrame":"Hi MOXA mpet"} Copy to Clipboard
6 "msgFrame": "Hi MOXA NPort" 7) Pacto it	Format JSON	
	Download	

3. On the **Device Explorer Twin** page, click the **Message To Device** tab.

Configuration	lanagement	Data	Messages To Devi	ice Call Method on Device	
Monitoring					
Event Hub:	MoxaHub1				
Device ID:	NPort				V
Start Time:	05/16/20	19 21:54	:33		
Consumer Group: SDefault Enable					
Monitor Cancel Clear Show system properties					
Event Hub Data					
Receiving events 2019-05-16 21:55:52> Device: [NPort]. Data:[{"msgVer":"1.0","gwlD":"NPort/AW5250A-12I/O_ 26/3" "#msgTuse:"Data" "dou/D":"SerialPat1" "#ssErame":"MOVA"]]					
2047 , hisy rype . Data , devid . Senairoitt , hisyrtaine . MOAA }]					

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

4. To send a message to the NPort's Serial Port 1, click the **Message To Device** tab, paste the clipboard message in text area of **Message** and click **Send**.

P Device Explorer Twin					
Configuration Management Data Messages To Device Call Method on Device					
Send Message to Device:					
loT Hub: MoxaHub1					
Device ID: NPort	•				
Message: D":"NPortIAW5250A-12I/0_2647","devID":"SerialPort1","msgType":"Data","msgFrame":"Hi MOXA NF	Port"}				
Add Time Stamp Monitor Feedback Endpoint					
Properties System Properties					
Key Value					
•	_				
Send Clear					
Output					

On the **PComm Terminal Emulator** page, you will receive an IoT message from the cloud, sent from Device Explorer Twin.

🔁 PComm Terminal Emulator - COM102,115200,None,8,1,RTS/CTS,Dumb Terminal	
Profile Edit Port Manager Window Help	
COM102,115200,None,8,1,RTS/CTS,Dumb Terminal	- • •
Hi MOXA NPort	A
DTR	
RTS	
	-
	P.
State:OPEN CTS DSR RI DCD Ready TX:12 RX:13	li.

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

3.3 Sending the NPort's DI and DO Status to the Cloud

In this section, we will instruct you on how to trigger the DI status to the cloud. First, we use the Device Explorer Twin tool to monitor the NPort's I/O status; then, trigger the DI status to change; lastly, you will receive an IoT message regarding the NPort's DI and DO status.

1. On the Device Explorer Twin page, click **Data**.

🖳 Device Explorer Twin	
Configuration Management Data Messages To Device Call Method on Device	
Connection Information IoT Hub Connection String:	
HostName=MoxaHub1.azure- devices.net.SharedAccessKeyName=iothubowner,SharedAccessKey*	
Protocol Gateway HostName:	
Update	

Select **NPort** in the drop-down menu under **Device ID**, and click **Monitor** to start monitoring the NPort's IoT messages.

Device Explorer Twin	
Configuration Management Data Messages To Device Call Method on Device	
Monitoring	
Event Hub: MoxaHub1	
Device ID: NPort	•
Start Time: 05/16/2019 20:57:54	
Consumer Group: \$Default	
Monitor Cancel Clear Show system pr	operties
Event Hub Data	



In the Event Hub Data message box, a message should read "Receiving events..."

🖶 Device Explorer Twin	
Configuration Management Data Messages To Device Call Method on Device	
Monitoring	
Event Hub: MoxaHub1	
Device ID: NPort	Ŧ
Start Time: 05/16/2019 21:54:33	
Consumer Group: SDefault Enable	
Monitor Cancel Clear	Show system properties
⊂ Event Hub Data	
Receiving events	

 Log in to the NPort's web console and change DI assess interface to "IoT+Web+Modbus address mapping" on the Remote I/O Access Interface page.

***** Remote I/O Access Interface

DI Channels	
DI access interface	IoT + Web + Modbus address mapping 💌
DO Channels	
DO access interface	IoT + Web + Modbus address mapping



3. Change **DO Status** to "ON" in the D**O Channel 0 Settings** page.

:•DO Channel 0 Settings

Mode	DO Status	ON Width*	OFF Width*	Pulse Count	Pulse Start
1. Current Setting	_				
DO 👻	ON 👻				
2. Power On Setting					
	OFF 👻				
3. Safe Status Setting					
	OFF 👻				
Apply to all					
Apply to all DO channe	ls				
4. Alias Name					
Alias name of channel					
DO-00					
Alias name of "OFF" statu	s				
OFF					
Alias name of "ON" status	5				
ON					

4. On the **Device Explorer Twin** page, you should receive a message from the cloud that which was sent from the NPort.

onfiguration	Vanagement	Data	Messages To D	evice Call Method on	Device	
Monitoring						
Event Hub:	MoxaHub1					
Device ID:	NPort					v
Start Time:	05/16/20)19 22:14	:16			
Consumer	Group: \$De	fault		Enab	le	
Monit	or		Cancel	Clear		Show system properties
Event Hub Da	ta					
Receiving ev	ents					
2019-05-16 22	:14:46> Devic	e: [NPor	t], Data:[{"msgVe	r":"1.0","gwlD":"NPortlA falaa "DI03":falaa "DI04	W5250A-12I/0)_ falso "DIQ6":falso "DIQ7":falso "

NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

The DI and DO status will appear in JSON message format. The DI00 and DO00 status will read as "true".

Event Hub Data Receiving events... 2019-05-16 22:14:46> Device: [NPort], Data:[{"msgVer":"1.0","gwlD":"NPortIAW5250A-12I/O_ 2647","msgType":"IO","DI00":true,"DI01":false,"DI02":false,"DI03":false,"DI04":false,"DI05":false,"DI06": false,"DI07":false,"D000":true,"D001":false,"D002":false,"D003":false}]

3.4 Control the NPort's DO Status Through the Cloud

In this section, we instruct you on how to change an NPort's DO status via the cloud. First, we use the Device Explorer Twin tool to send an IoT message to the NPort's I/O topic; then, the NPort will receive an IoT message from the cloud to change the DO status; lastly, we will set the NPort's DO status on the web console.

1. Click I/O JSON.

-IoT Mode

Azure IoT Hub 👻
HostName=MoxaHub1.azure-devices.net;DeviceId=NPort;Shar
Serial JSON I/O JSON
Specific I/O change 👻 DI-00 👻

Submit

Copy Subscribe JSON Message:

Subscribe JSON Message					
The following DI and DO key-values are all optional					
{					
"msgVer"	:	"1.0",			
"gwID"	:	"NPortIAW5250A-12I/O_2647",			
"msgType"	:	"10",			
"DO00"	:	true/false,			
"DO01"	:	true/false,			
"DO02"	:	true/false,			
"DO03"	:	true/false			
}					

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NPort IA5000A-I/O or NPort IAW5000A-I/O to Azure

2. The copied message has a lot of space and line feed. We can use a tool to compact it. Below is a free online tool:

https://jsonformatter.org/json-minify

Paste the message in the column on the left side and change all the DO statuses to false.



Click **Minify JSON**. It will show a compact JSON format message in the column on the right. Click **Copy to Clipboard**.

JS	JSON Minify									
∃ = 1,	루 🌶 Sample 🗠 🖻 🗸 🖨 🗙 🖄 🐰	Load Data	[= = ≁ Code + ★ ★ ⊉ 22 ¥ 1 {"msgVer":"1.0","gwID":"NPortIAN5250A-121/0_2647","ms_vpe"							
2 3 4	"msgVer":"1.0", "gwID":"NPortIAW5250A-12I/0_2647", "msgType":"IO",	Minify JSON	:"IO", "D000":false, "D001":false, "D002":false, "D002 :false)							
6 7	"D000":false, "D002":false, "D002":false,	Format JSON	Сору то Сприоага							
9	}	Developed								
	Paste it	Download								



3. On the **Device Explorer Twin** page, click the **Message To Device** tab.

Device Explorer Tw	vin 🔄 🖬 🖬 👘 🖬 💼 🗖 🔤 🔤 💌
Configuration N	lanagement Data Messages To Device Call Method on Device
Monitoring	
Event Hub:	MoxaHub1
Device ID:	NPort *
Start Time:	05/16/2019 21:54:33
Consumer G	iroup: \$Default Enable
Monito	r Cancel Clear Show system properties
Event Hub Dat	a
Receiving eve 2019-05-16 21: 2647","msgTyp	nts 55:52> Device: [NPort], Data:[{"msgVer":"1.0","gwlD":"NPortIAW5250A-12I/O_ pe":"Data","devID":"SerialPort1","msgFrame":"MOXA"}]

4. To send a message to the NPort, click the **Message To Device** tab, paste the clipboard message in the text area of **Message**, and click **Send**.

- Devi	ice Explor	er Twi	n	- 110				AL	
Con	figuratior	n Ma	nagement	Data	Messages To	Device	Call	Method on Device	
Se	end Mes	sage	to Device:						
l	oT Hub:	N	MoxaHub1						
	Device IE	D: 1	NPort						•
N	Message	e: D	A-12I/O_264	7","msg	Type":"IO","DO	00":false	."DO	01":false,"D002":false,"l	D003":false}
		E	Add Time	Stamp	Mo	nitor Fee	dbad	ck Endpoint	
[Properti	ies S	System Prop	erties					
		Key						Value	
	•								
		Send			Clear				
ΓΟι	utput								
Se 26 cd	ent to De 647","msg Ic665d9-3	vice II gType 25df-4	D: [NPort], M 9":"IO","DO0 Id2c-809f-20	lessage 0":false, 8732d1:	e:"{"msgVer":"1. "D001":false,"E 3b8c	0","gwlD)002":fal	":"NP se,"D	PortlAW5250A-12I/O_ 0003":false}", message	ld:



On the NPort's web console set DO-00 status as OFF.

:•DO Channel Settings

DO Channel	Mode	Status	ON Width	OFF Width
DO-00	DO	OFF		
DO-01	DO	OFF		
DO-02	DO	OFF		
DO-03	DO	OFF		

Also you can find a new message under the **Data** tab on the **Device Explorer Twin** page, because we connect DO-00 to DI-00.

- Device Explorer T	win		-	_		
Configuration N	Management	Data	Messages To [Device	Call Method on Device	
Monitoring						
Event Hub:	MoxaHub1					
Device ID:	NPort					~
Start Time:	05/16/20	19 22:14	4:16			
Consumer	Group: \$Def	ault			Enable	
Monito	or		Cancel		Clear	Show:
Event Hub Da	ta					
Receiving events 2019-05-16 22 2647","msgTy false "DI07" fa	ents ::14:46> Devic /pe":"IO","DI0(alse "D000":tri	e: [NPo)":true,"[ue "DO0	rt], Data:[{"msgVe DI01":false,"DI02")1":false "D002":fi	er":"1.0" :false," alse "D	,"gwlD":"NPortlAW5250A DI03":false,"DI04":false,"D 003":false}1	-12I/O_)105":false,"D106":
2019-05-16 22 2647","msgTy ":false,"DI07":*	:29:30> Devic /pe":"IO","DI0(false,"DO00":i	e: [NPo)":false, alse,"D	rt], Data:[{"msgVe "Dl01":false,"Dl02 0001":false,"D002	er":"1.0" 2":false, 2":false,	."gwID":"NPortIAW5250A "DI03":false,"DI04":false," "D003":false}]	·12I/O_ DI05":false,"DI06

That new message shows both DI-00 and DO-00 statuses as false.

2019-05-16 22:29:30> Device: [NPort], Data:[{"msgVer":"1.0","gwlD":"NPortIAW5250A-12I/O_ 2647","msgType":"IO","DI00":false,"DI01":false,"DI02":false,"DI03":false,"DI04":false,"DI05":false,"DI06 ":false,"DI07":false,"D000":false,"D0011":false,"D002":false,"D003":false,]]