### Internet of Things (IoT) – JNIOR MQTT Topic Format

### For Use with the JNIOR Series 4

### Last updated: December 16, 2020

The following information describes the MQTT Topic format for use with the JNIOR Series 4 and its MQTT communication protocol application.

If you have any questions or want to use the JNIOR and MQTT protocol with additional information available in the JNIOR or with custom information or with a specific broker, please contact INTEG via e-mail at <a href="mailto:support@integpg.com">support@integpg.com</a> or via phone at 724-933-9350. INTEG can adapt the MQTT application running on the JNIOR to meet your specific needs.

### Overview

The INTEG JNIOR automation controller is capable of being an edge device for the Internet of Things (IoT) applications using the MQTT protocol. The JNIOR can both publish and subscribe to topics using an MQTT broker.

The JNIOR implements the complete MQTT protocol including CONNECT, CONNACK, PUBLISH, PUBACK, SUBSCRIBE, SUBACK and UNSUBSCRIBE. The JNIOR can also provide all three Quality of Service levels.

The JNIOR topics are structured as follows for subscriptions and publications.

### Configuration

The MQTT application is loaded on to your JNIOR using an update project provided by INTEG. Please save the update project to your PC and then go to the Update tab in the JNIOR Support Tool and click on Open Project and navigate to where you saved the update project. After the update project is open, click on Publish and then select your JNIOR. The MQTT application will be operational after the update project is completed.

The MQTT application has a web page for some minor configuration items. The web page can be launched by going to the main JNIOR web page and then the Configuration tab and the Applications web page. You will see the MQTT application listed and to the right is an icon. Clicking on the icon will launch the MQTT configuration web page. The JNIOR web page is shown below.

Or you can go to the web page directly by typing your JNIOR IP address/MQTT in your browser. An example is as follows.

#### http://10.0.0.210/Mqtt



Below is the MQTT web page. The minimum information you need to enter is the MQTT Broker Host. The default MQTT port of 1883 will be used. Click on Save Changes when done. Make sure you have the MQTT application running on your jnior to create a connection. The MQTT application will automatically connect to the MQTT broker and provide feedback that it is connected. It may take a few seconds for the connection to be completed.

NOTE: Depending on which broker you're using, you might be able to create or are provided a username and password to interact with it. Make sure to enter this into the Username and Password fields in order to connect to that broker.

NOTE: The Device Groups field is for allowing multiple jniors to be called on the same topic name. You simply type a device group you wish to create and then when making a publish or subscription, you type the device group instead of the serial number.

NOTE: The Relay Output Groups is for addressing multiple outputs at once by creating a group fro them. You give the group a name, and then you give it a mask to represent the outputs you wish to trigger when that topic name is in the publish statement.

MQTT Tools -				Save Changes Cancel Changes
	Device Groups           Image:	MQTT Broker Host broker hivemq.com User Name Password	MQTT Broker Port Encrypted	
	Relay Output Groups           The Output Groups enable multiple outputs to respond to a single named output group.           Outputs must be specified as a binary mask. If you wish to specify the mask in hexadecimal format beginning with 'Dx'. Relay Output Group Names WILL be used as lower case!           Ox?         Remove           Add Output Group         Ox?	Will Topic [niorfinal A default will and testament will be used if nor Status: Connection lost from broker hiveme local port: 50411 @ 01/16/2020 14: Connect	I.com/18.194.67.1:1883 using	

Below is a screen picture indicating the JNIOR has connected to the MQTT Host Broker.

MQTT Tools -								Save Changes	Cancel Changes
Devi	vice Groups		MQTT Broker Host			MQTT Broker Port	Encrypted		
			broker.hivemq.com			1883			
resp	Device Groups are the names that, when present, cause this device to pond to subscribed topics. There can be one or more Device Groups assigned ach JNIOR. Device Group Names WILL be used as lower case!		User Name	Password					
Reia	ay Output Groups		Will Topic	,	Will Me	essage			
Outp	Output Groups enable multiple outputs to respond to a single named output g puts must be specified as a binary mask. If you wish to specify the mask in adecimal format beginning with '0x'. Relay Output Group Names WILL be us are case!		jnior/final A default will and testament w	ill be used if not de	good efined				
	dd Output Group	ן (	Status: Connected to broker.hiv 56083 @ 01/16/2020 1 Disconnect	vemq.com/18. 4:38:17	194.6	7.1:1883 using local	port:		

## **SUBSCRIPTIONS**

NOTES:

- *Serial\_number* is replaced with the JNIOR serial number. This makes the data unique per JNIOR.
- The number of digital inputs and outputs is a function of the JNIOR Model being used and any relay output expansion modules attached to the JNIOR.

					DATA
jnior/ <i>serial_number/</i> status	/hostname				Hostname for JNIOR
jnior/ serial_number/ status	/digital	/inputs	/1		Any input number 1 - 12
				/state /counter /usagemeter	-true or false -increments each time input goes OFF to ON -number of hours input has been ON
jnior/ serial_number/ status	/digital	/outputs	/1		Any output number 1 - 16
				/state /usagemeter	-true or false -number of hours input has been ON
jnior/ serial_number/ status	/fourtwenty	/inputs	/1		Any input number 1 - 8
				/raw /scaled	-raw 0 – 65,535 -scaled value
	/fourtwenty	/outputs	/1		Any output number 1 - 4
				/raw /scaled	-raw 0 – 65,535 -scaled value
jnior/ serial_number/ status	/tenvolt	/inputs	/1		Any input number 1 - 8
				/raw /scaled	-raw 0 – 65,535 -scaled value
	/tenvolt	/outputs	/1		Any output number 1 - 4
				/raw /scaled	-raw 0 – 65,535 -scaled value
jnior/ serial_number/ status		/tempprobe	/1		Any number 1 - 10
				/fahernheit /celsius	-degrees Fahrenheit -degrees Celsius
jnior/ serial_number/ status		/humidity	/1		Any number 1 - 4
				/percent	-percent humidity
jnior/ serial number/		/environ	/1		

status			
		/humidity /fahernheit /celsius	-percent humidity -degrees Fahrenheit -degrees Celsius

# **PUBLICATIONS**

### DIGITAL INPUTS

You cannot currently publish to the JNIOR digital inputs, but if needed, functionality can be added to:

- turn the digital input 'logically' ON or OFF by setting the inversion key for an input
- change the value of the usage meter
- change the value of the counter

					DATA
jnior/serial_number	/digital	/outputs	/1		Any output number 1 - 16
				/set-state	true or false -Turns output ON or OFF true_duration -Pulses output ON for
					duration false_duration -Pulses output OFF for duration
jnior/serial_number	/4-20	/outputs	/1		Any output number 1 - 4
				/set-value	-0-100.00%
jnior/serial_number	/tenvolt	/outputs	/1		Any output number 1 - 4
				/set-value	-0-100.00%

A free application to download called mqtt spy is available to publish and subscribe to topics from a broker. The download is <u>here</u>.

9.97 Hours

19.96 Hours

19.96 Hours

0.00 Hours

0.00 Hours

5 - Digital Input 5

6 - Digital Input 6

7 - Digital Input 7

8 - Digital Input 8

integ

Tue, 25 Sep 2018 14:19:42 EDT

7,099 Counts

1 Counts

1 Counts

0 Counts

1 Counts

OFF

OFF

OFF

OFF

You can create a connection to free online brokers to view messages sent and recieved. A list of available ones to find are <u>here</u>.

Below are pictures of the mqtt-spy client showing that you can 'publish' the topic to turn JNIOR relay number 2 ON and also 'subscribe' to the topic for the status of relay number 2. When you publish to turn relay 2 ON, the relay will turn ON in the JNIOR web page.

Registry Sy	vslog Peers Ab	logout 'jnior	mqtt-spy	on Connections Window H	eln			-	o x
			-	me_MOT-Mqtt					
1 - Relay Outpu		Toggle	<ul> <li>Publish message</li> </ul>	me_wor-wdtt					0
0.25 Hou									
2 - Relay Outpu		Toggle		10208/digital/outputs/2/set-state				😼	Publish 🔻
2.11 Hou			true						
3 - Relay Outpu	ut 3 OFF	Toggle	<ul> <li>Scripted publication</li> </ul>	ions					0
0.00 Hou	irs		<ul> <li>Subscriptions and</li> </ul>	d received messages					0
4 - Relay Outpu	ut 4 OFF	Toggle	P New All	jnior/614110208/# jnior/614110	208/digital/inputs/	inior/6141102	08/digital/outputs/2/state		
0.00 Hou	irs		Message 1 / 2	jiloiyolariozooy jiloiyolario	2007 digital/inputs/	Jillol/0141102	Show latest 🔯 💠 🐳	Search 🔀	Tools 💌
5 - Relay Outpu	ut 5 OFF	Toggle	Message 1 / 2					M search	, 100is +
0.00 Hou	irs		Topic jnior/614110	208/digital/outputs/2/state				Time 2018/09/26 16:51:	39:178
6 - Relay Outpu	ut 6 OFF	Toggle	Data true						
0.00 Hou	irs								
7 - Relay Outpu	ut 7 OFF	Toggle							
0.00 Hou	irs		<ul> <li>Received messa</li> </ul>	ges summary [search topics:			) (1	1 topic, 2 messages, load:	0.0/0.0/0.0)
8 - Relay Outpu	ut 8 OFF	Toggle		Торіс			Content	Browse	Messages
0.00 Hou	irs		jnior/614110208/d	igital/outputs/2/state	true				2
		)	<						>
	VebSite_Demo			a	10 (S/N 6141102	208) 14NOS v1 7			
U INTEG_W	vebsite_Demo				10 (5/11 01 11102	logout 'jnior'			
Input/Outp	Configuration	Console	Folders Re	egistry Syslog Pe	ers About				
	1 - Digital Input 1	OFF		1 - Relay Output 1	OFF	Toggle			
Internal External	0.00 Hours		0 Counts	0.01 Hours					
	2 - Digital Input 2	OFF		2 - Relay Output 2	ON	Toggle			
	19.96 Hours		1 Counts	1.62 Hours					
	3 - Digital Input 3	OFF		3 - Relay Output 3	OFF	Toggle			
	9.97 Hours		098 Counts	0.00 Hours					
	4 - Digital Input 4	OFF		4 - Relay Output 4	OFF	elapoT			

If you elect to subscribe to all of the JNIOR topics and the I/O is changing, then you can see all the data that is changing.

0.00 Hours

0.00 Hours

0.00 Hours

0.00 Hours

0.00 Hours

5 - Relay Output 5

6 - Relay Output 6

7 - Relay Output 7

8 - Relay Output 8

OFF

OFF

OFF

OFF

Dynamic Configuration Pages (DCP) v2.2

Toggle

Toggle

Toggle

Toggle

spy mqtt-spy				- 🗆 ×
File Configuration Connections Window	Help			
Control panel Spime_MOT-Mqtt				
<ul> <li>Publish message</li> </ul>				0
Topic jnior/614110208/digital/outputs/2/set-stat	e			🔹 🔽 Publish 👻
Data true	Subscribe to all topics	5		
<ul> <li>Scripted publications</li> </ul>				0
Subscriptions and received messages				0
P New All jnior/614110208/# inior/614	110208/digital/inputs/# jnior/614110208/digital/outputs/#	2/state		
Message 1 7 5000	Show latest		♦	🖌 Search 🔀 Tools 🔹
Topic jnior/614110208/digital/inputs/4/counter			Tir	me 2018/09/26 16:54:17:950
Data 16511				
				v
<ul> <li>Received messages summary [search topics:</li> </ul>		1	(12 topics E	
		,	(15 topics, 5	000 messages, load: 1.2/1.0/1.0)
Торіс	Content 💌	Browse	Messages	000 messages, load: 1.2/1.0/1.0) Last received
Topic jnior/614110208/digital/outputs/2/set-state	Content v	-		
		Browse	Messages	Last received
jnior/614110208/digital/outputs/2/set-state	true	Browse	Messages 6	Last received 2018/09/26 16:51:38:529
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state	true true	Browse	Messages 6 3	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/hostname	true true mqtt-test2	Browse	Messages 6 3 4	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:18:58:067
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/hostname jnior/614110208/digital/inputs/4/state	true true mqtt-test2 true	Browse	Messages 6 3 4 995	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:18:58:067 2018/09/26 16:54:17:593
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/hostname jnior/614110208/digital/inputs/4/state jnior/614110208/digital/inputs/3/state	true true mqtt-test2 true true	Browse	Messages 6 3 4 995 994	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:54:17:593 2018/09/26 16:54:17:593 2018/09/26 16:54:17:060
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/hostname jnior/614110208/digital/inputs/4/state jnior/614110208/digital/inputs/3/state jnior/614110208/digital/outputs/1/set-state	true       true       mqtt-test2       true       true       false	Browse V V V V V V	Messages 6 3 4 995 994 5	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:18:58:067 2018/09/26 16:54:17:593 2018/09/26 16:54:17:060 2018/09/26 16:48:58:601
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/hostname jnior/614110208/digital/inputs/4/state jnior/614110208/digital/inputs/3/state jnior/614110208/digital/outputs/1/set-state jnior/614110208/digital/outputs/1/state	true       true       mqtt-test2       true       false       false	Browse V V V V V V V	Messages 6 3 4 995 994 5 3	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:18:58:067 2018/09/26 16:54:17:593 2018/09/26 16:54:17:060 2018/09/26 16:48:58:601 2018/09/26 16:48:59:184
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/digital/inputs/4/state jnior/614110208/digital/inputs/3/state jnior/614110208/digital/outputs/1/set-state jnior/614110208/digital/outputs/1/state jnior/614110208/digital/inputs/3/usagemeter jnior/614110208/digital/inputs/4/usagemeter	true         true         mqtt-test2         true         false         false         23.212576	Browse V V V V V V V V V	Messages 6 3 4 995 994 5 3 3 994	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:18:58:067 2018/09/26 16:54:17:593 2018/09/26 16:54:17:060 2018/09/26 16:48:58:601 2018/09/26 16:48:59:184 2018/09/26 16:54:17:166
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/digital/inputs/4/state jnior/614110208/digital/inputs/3/state jnior/614110208/digital/outputs/1/set-state jnior/614110208/digital/outputs/1/state jnior/614110208/digital/inputs/3/usagemeter	truetruemqtt-test2truetruefalsefalse23.21257623.211832	Browse V V V V V V V V V V V	Messages 6 3 4 995 994 5 3 994 995	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:54:39:178 2018/09/26 16:54:17:593 2018/09/26 16:54:17:060 2018/09/26 16:48:58:601 2018/09/26 16:54:17:166 2018/09/26 16:54:17:739
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/digital/inputs/4/state jnior/614110208/digital/inputs/3/state jnior/614110208/digital/outputs/1/set-state jnior/614110208/digital/inputs/3/usagemeter jnior/614110208/digital/inputs/4/usagemeter jnior/614110208/digital/outputs/2/usagemeter jnior/614110208/digital/inputs/4/usagemeter	true           true           mqtt-test2           true           false           false           23.212576           23.211832           2.103344           16511	Browse V V V V V V V V V V V V V	Messages           6           3           4           995           994           5           3           994           3           995           3           994           995           3           994           995           3           995           3           497	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:51:39:178 2018/09/26 16:54:17:593 2018/09/26 16:54:17:060 2018/09/26 16:48:58:184 2018/09/26 16:54:17:166 2018/09/26 16:54:17:739 2018/09/26 16:51:39:290 2018/09/26 16:54:17:950
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/digital/inputs/4/state jnior/614110208/digital/inputs/3/state jnior/614110208/digital/outputs/1/set-state jnior/614110208/digital/outputs/1/state jnior/614110208/digital/inputs/3/usagemeter jnior/614110208/digital/inputs/2/usagemeter jnior/614110208/digital/inputs/4/counter jnior/614110208/digital/inputs/4/counter	true           true           mqtt-test2           true           true           false           false           23.212576           23.211832           2.103344           16511           16510	Browse	Messages           6           3           4           995           994           5           3           994           995           3           994           995           3           994           995           3           497           498	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:18:58:067 2018/09/26 16:54:17:593 2018/09/26 16:54:17:060 2018/09/26 16:48:59:184 2018/09/26 16:54:17:166 2018/09/26 16:54:17:739 2018/09/26 16:54:17:395 2018/09/26 16:54:17:386
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/digital/inputs/4/state jnior/614110208/digital/inputs/3/state jnior/614110208/digital/outputs/1/set-state jnior/614110208/digital/inputs/3/usagemeter jnior/614110208/digital/inputs/4/usagemeter jnior/614110208/digital/outputs/2/usagemeter jnior/614110208/digital/inputs/4/usagemeter	true           true           mqtt-test2           true           false           false           23.212576           23.211832           2.103344           16511	Browse V V V V V V V V V V V V V	Messages           6           3           4           995           994           5           3           994           3           995           3           994           995           3           994           995           3           995           3           497	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:51:39:178 2018/09/26 16:54:17:593 2018/09/26 16:54:17:060 2018/09/26 16:48:58:184 2018/09/26 16:54:17:166 2018/09/26 16:54:17:739 2018/09/26 16:51:39:290 2018/09/26 16:54:17:950
jnior/614110208/digital/outputs/2/set-state jnior/614110208/digital/outputs/2/state jnior/614110208/digital/inputs/4/state jnior/614110208/digital/inputs/3/state jnior/614110208/digital/outputs/1/set-state jnior/614110208/digital/outputs/1/state jnior/614110208/digital/inputs/3/usagemeter jnior/614110208/digital/inputs/4/usagemeter jnior/614110208/digital/inputs/4/usagemeter jnior/614110208/digital/inputs/4/counter jnior/614110208/digital/inputs/4/counter	true           true           mqtt-test2           true           true           false           false           23.212576           23.211832           2.103344           16511           16510	Browse	Messages           6           3           4           995           994           5           3           994           995           3           994           995           3           994           995           3           497           498	Last received 2018/09/26 16:51:38:529 2018/09/26 16:51:39:178 2018/09/26 16:18:58:067 2018/09/26 16:54:17:593 2018/09/26 16:54:17:060 2018/09/26 16:48:59:184 2018/09/26 16:54:17:166 2018/09/26 16:54:17:739 2018/09/26 16:54:17:395 2018/09/26 16:54:17:386