

JNIOR Series 3

A Network I/O Resource
Utilizing the JAVA™ Platform

Serial Control Manual

Release 3.0

NOTE: JNIOR OS 3.1 or greater required

INTEG Process Group, Inc.
2919 East Hardies Rd, First Floor
Gibsonia, PA 15044

PH (724) 933-9350
FAX (724) 443-3553

www.integpg.com

JNIORsales@integpg.com

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1 What is the Serial Control Function?

The Serial Control function for the JNIO is a software application that runs on the JNIO and allows the user to interact with the JNIO I/O via the serial port. The user can control the relay outputs (on, off, pulse) and receive the status of the digital inputs (on, off) and counters via the serial port. Utilization of all other features of the JNIO must be implemented via the Ethernet port. Please note that you can interact with the JNIO I/O via both the serial port and the Ethernet port at the same time.

2 The Purpose of the Serial Control Function

The Serial Control function can be used in applications where the user's external device cannot communicate over the Ethernet, but can communicate via an RS232 port. The user's device must be able to utilize the command structure for the JNIO defined later in this manual. Utilization of the serial port can be used in conjunction with another application utilizing the Ethernet port. Both connections can control the outputs and receive notification of a change in input status.

3 Connecting the Serial Device

The default port for connecting the serial device is the Auxiliary Serial port located along the top edge of the JNIO. (Please see "Section 7 – Options" of this manual for using the "RS-232 only" serial port located along the lower edge of the JNIO.) There are two different physical connection types available for the Auxiliary Serial port. JNIO model number JNR-100-003A has a 5-pin connector and JNIO model number JNR-100-003B has a DB9 connector. For both models, the auxiliary serial port can communicate via RS232, RS422 or RS485. The mode is configured via jumpers internal to the JNIO.

The default jumper setting is RS232.

The following information is from the drawing titled – JNIO Model 310 Connections & Mounting – on the CD supplied with your JNIO. To modify the communication mode, you must remove the four screws on the JNIO and remove the lid. The jumpers are located in the upper right corner. Pin number 1 is closest to the outside of the box. The internal jumper settings are as follows:

Mode	J15	J16	J17
RS-485 2-Wire Half Duplex – Terminated	1 – 2	1 – 2	1 – 2
RS-485 2-Wire Half Duplex – Not Terminated	1 – 2	1 – 2	2 – 3
RS-422/RS-485 4-Wire Terminated	2 – 3	2 – 3	1 – 2
RS-422/RS-485 4-Wire Not Terminated	2 – 3	2 – 3	2 – 3
RS-232 (default setting since January 1, 2008)	2 – 3	2 – 3	2 – 3

Auxiliary Serial Port DB9 Connector

For JNIOR model number JNR-100-003B, the serial device is connected to the DB9 connector using a standard, **straight through serial cable**. The pin connections are as follows:

Pin 1 – No connection
Pin 2 – RS232 (TX) / RS485 (TX-)
Pin 3 – RS232 (RX) / RS485 (RX-)
Pin 4 – No connection
Pin 5 – Ground
Pin 6 – No connection
Pin 7 – RS232 (RTS) / RS485 (RX+)
Pin 8 – RS232 (CTS) / RS485 (TX+)
Pin 9 – No connection

Auxiliary Serial Port 5-Pin Connector

For JNIOR model number JNR-100-003A, the serial device is connected to the 5-pin connector as follows, where pin 1 is closest to the center of the JNIOR box:

Pin 1 – Ground
Pin 2 – RS232 (TX) / RS485 (TX-)
Pin 3 – RS232 (RTS) / RS485 (TX+)
Pin 4 – RS232 (RX) / RS485 (RX-)
Pin 5 – RS232 (CTS) / RS485 (RX+)

4 Installing the Serial Control Software

The Serial Control software is pre-installed on all JNIOs. A back-up copy is provided on the JNIO CD. To activate the software so that it runs on boot up, please launch the main JNIO web page, go to the Applications tab and check the Serial Control box. When finished, click the Save button and you will be asked if you want to reboot the JNIO now. Please click “Yes” (if you are ready) and the JNIO will reboot. After the reboot, the Serial Control software will be running.

The screenshot shows a web-based configuration interface for JNIO. At the top, there are six tabs: 'I/O Control', 'Configuration', 'Registry Editor', 'Command Line', 'Applications' (which is selected), and 'About'. The 'Applications' tab contains three checkboxes with descriptive text:

- ☒ **Serial Control**
The Serial Control software application provides the user with a way to monitor and control the internal JNIO I/O and external 4 Relay Out expansion modules through an RS-232 connection using the Auxiliary Serial port or the RS-232 port. The AUX serial port is the default port. Please consult the Serial Control Manual on how to change to the RS-232 port.
- ☐ **Serial to Ethernet Converter**
The Serial to Ethernet Converter software application provides the user with the ability to use the JNIO as a bridge connecting serial devices to the Ethernet via the Auxiliary Serial port or the RS-232 port. The AUX serial port is the default port. Please consult the Serial To Ethernet Manual on how to change to the RS-232 port.
- ☐ **Task Manager**
The Task Manager software application provides the user with the ability to configure tasks on the JNIO for output control, data logging, resetting data and/or sending emails. These tasks can be defined as recurring based on time or interrupt driven.

Below the checkboxes are two buttons: 'Save' and 'Cancel'.

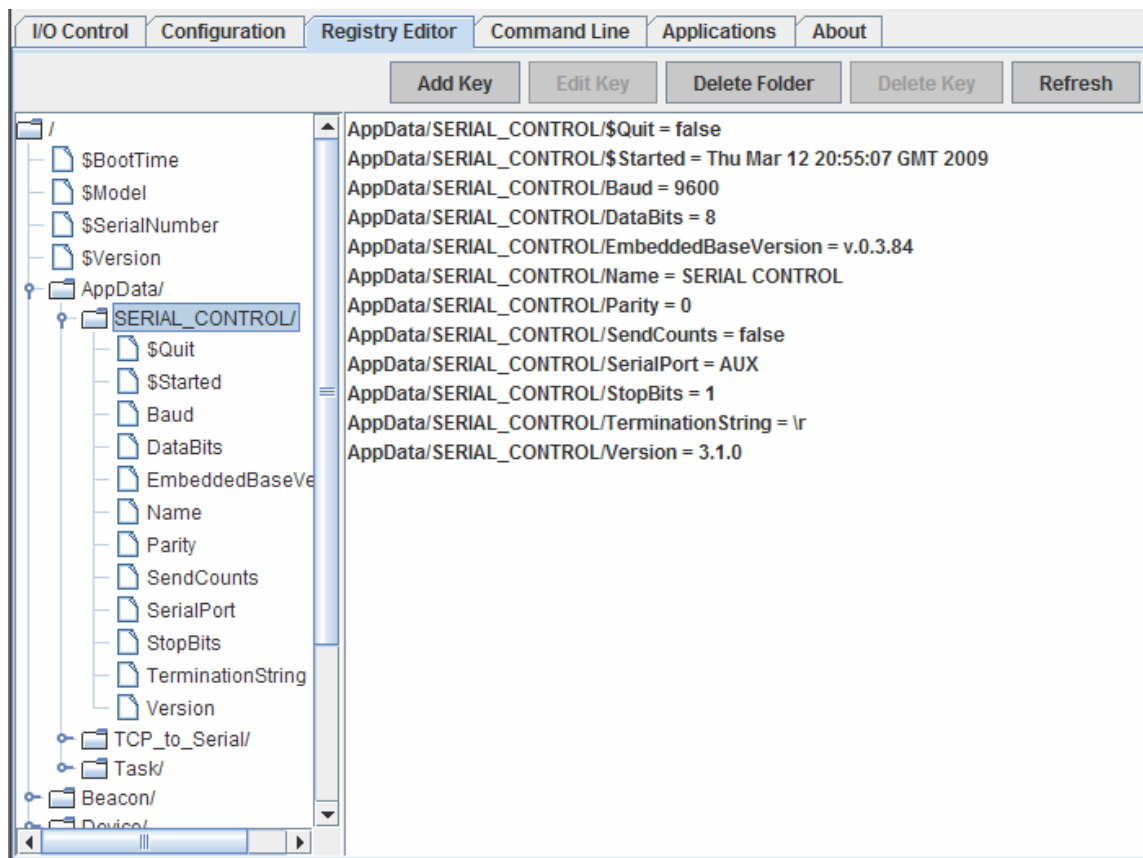
NOTES:

1. In order to run the Serial Control and Serial to Ethernet Converter applications at the same time you must make the necessary configuration changes to use different serial ports and start the programs one at a time via the Command Line tab or a telnet session.
2. Please see the manuals for each application on the JNIO CD for more details.

5 Configuring the Serial Control Software

Once the Serial Control program is running, it will be ready to accept clients on the auxiliary serial port. The default setting for the serial port is 9600 baud, 8 data bits, 1 stop bit, no parity and flow control set to none. What this means is that the serial device connected to the JNIOR serial port must work with the above serial settings otherwise you will have to change the settings on either the JNIOR or your device.

The Registry Editor tab on the JNIOR Main Web page can be used to change any settings for the Serial Control software program. After you enable the Serial Control program and it is running after a reboot, the default settings are displayed in the Registry Editor and are as shown below:



The Registry Keys with their full name and default settings that you can edit are as follows (please ignore any other registry keys as they are for system operation):

AppData/Serial_Control/Baud = 9600
AppData/Serial_Control/DataBits = 8
AppData/Serial_Control/Parity = 0
AppData/Serial_Control/SendCounts = false
AppData/Serial_Control/SerialPort = AUX
AppData/Serial_Control/StopBits = 1
AppData/Serial_Control/TerminationString = \r

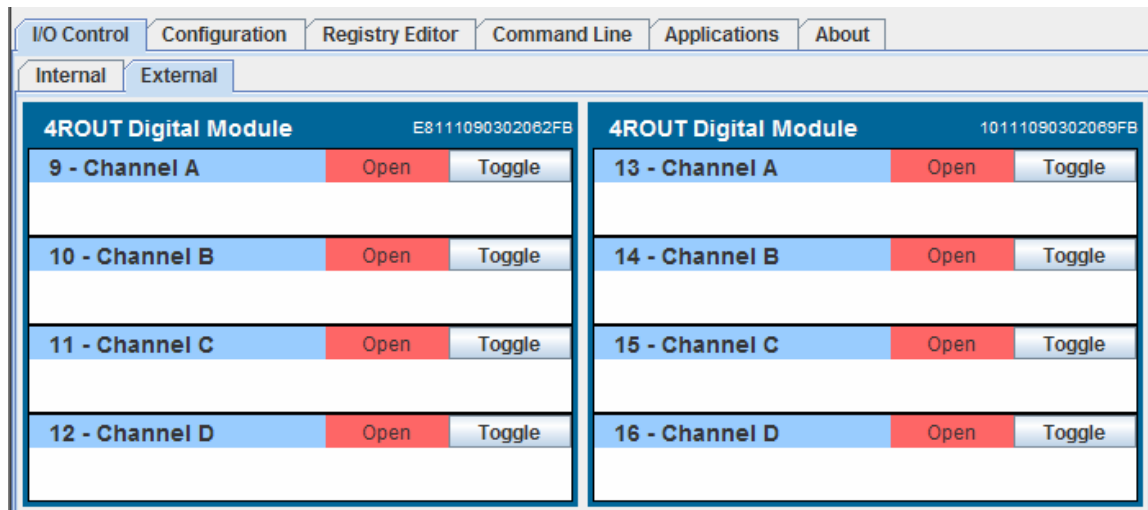
To modify any of the above keys, click on the appropriate key and then the Edit Key button. Make any changes and click the Save button. Your change will be saved.

Key Name	Default	Valid Settings	Comments
Baud	9600	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	No reboot required
DataBits	8	7 or 8	No reboot required
Parity	0	0, 1, or 2 where: 0 = no parity 1 = odd parity 2 = even parity	No reboot required Supports: 8 databits, 1 stop bit 7 databits, 2 stop, no parity 7 databits, 1 stop, with parity
SendCounts	false	false or true	Reboot required Setting this key to true will cause the count value to be sent each time the input status message is sent (for example, IN2=1,32)
Serial Port	AUX	AUX or RS232	Reboot required – defines the serial port on the JNIO that the serial device is connected to. (Please see Section 7 of this manual for important information.)
StopBits	1	1 or 2	No reboot required
Termination String	\r	\r = carriage return \n = line feed \r\n = carriage and line feed Any character recognized by the user's program	Reboot required

6 Serial Control Software Commands

After the Serial Control software is properly configured and running, you can now start to interact with the JNIOR via the serial port. The JNIOR Model 310 has 8 digital inputs, 8 relay outputs and the capability to add one or two 4 Relay Output Expansion Modules. Adding the expansion modules provides the user with a total of 12 or 16 relay outputs. The expansion module relay outputs can be controlled and monitored via the Serial Control program.

The 4 Relay Output Expansion Modules are connected to the JNIOR via the Sensor Port. After the expansion modules are connected and you reboot the JNIOR, the JNIOR will assign the external relay outputs as numbers 9 through 16. The number assigned by the JNIOR will be displayed on the Main JNIOR Web page as shown below. This is the order with which you will access the external outputs via the Serial Control application. Outputs 9 through 16 will be controlled using commands +1 through +8 respectively.



Controlling the Outputs

The following commands are available to control the relay outputs:

- cX **Close the output** (relay is “on” closing the contact)
 where x = 1 through 8 for the internal relay outputs on the JNIOR 310
 and x = +1 through +8 for the external relay outputs on the 4 Relay Output Expansion Modules

- oX **Open the output** (relay is “off” opening the contact)
 where x = 1 through 8 for the internal relay outputs on the JNIOR 310
 and x = +1 through +8 for the external relay outputs on the 4 Relay Output Expansion Modules

p=yyy **Pulse duration** (milliseconds) and is used in conjunction with the ‘close’ or ‘open’ command

Examples:

c2p=1000 close output 2 for 1 second and then open again
 c+2p=1000 close output 10 for 1 second and then open again
 o3p=10000 open output 3 for 10 seconds and then close again

c* Close all outputs at the same time (includes internal and external)

o* Open all outputs at the same time (includes internal and external)

These commands can be abbreviated and used in combination, such as:

c1 close relay output 1
 c+1 close relay output 9 (first output on first expansion module)
 c+5 close relay output 13 (first output on second expansion module)
 c1+1+5 combination of the above all in one command
 c1234 close relay outputs 1 through 4
 c1368 close relay outputs 1, 3, 6, 8
 o125 open relay outputs 1, 2, 5
 c1+1p=1000 close relay outputs 1, 9 and pulse each for 1 second simultaneously

Monitoring the Inputs, Outputs and Counters

Whenever an input (or output) changes status (low-to-high or high-to-low), the following is sent out by the JNIO:

INx=1 Input x (1 – 8) has gone high (on)
 OUTx=1 Output x (1 – 16) has gone high (on)
 INx=0 Input x (1 – 8) has gone low (off)
 OUTx=1 Output x (1 – 16) has gone low (off)

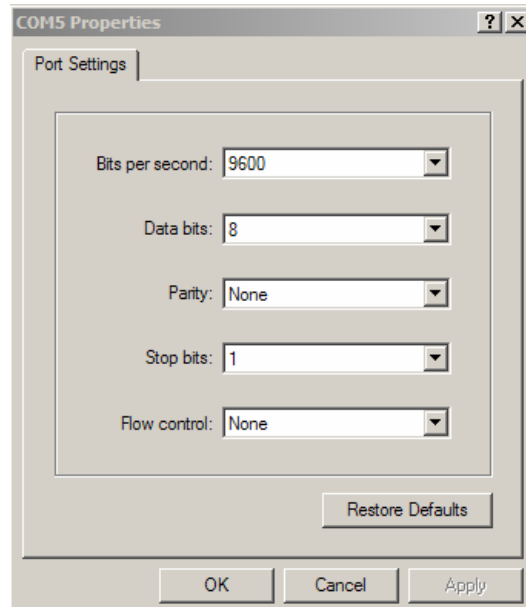
The default setting for the Registry Key **AppData/Serial_Control/SendCounts** is false. If you change this key to true and reboot, with each message stating the input status, a count value will also be included. Whenever an input changes status (low-to-high or high-to-low), the following is sent out by the JNIO:

INx=1,yyy Input x (1 – 8) has gone high (on), counter value = yyy
 INx=0,yyy Input x (1 – 8) has gone low (off), counter value = yyy

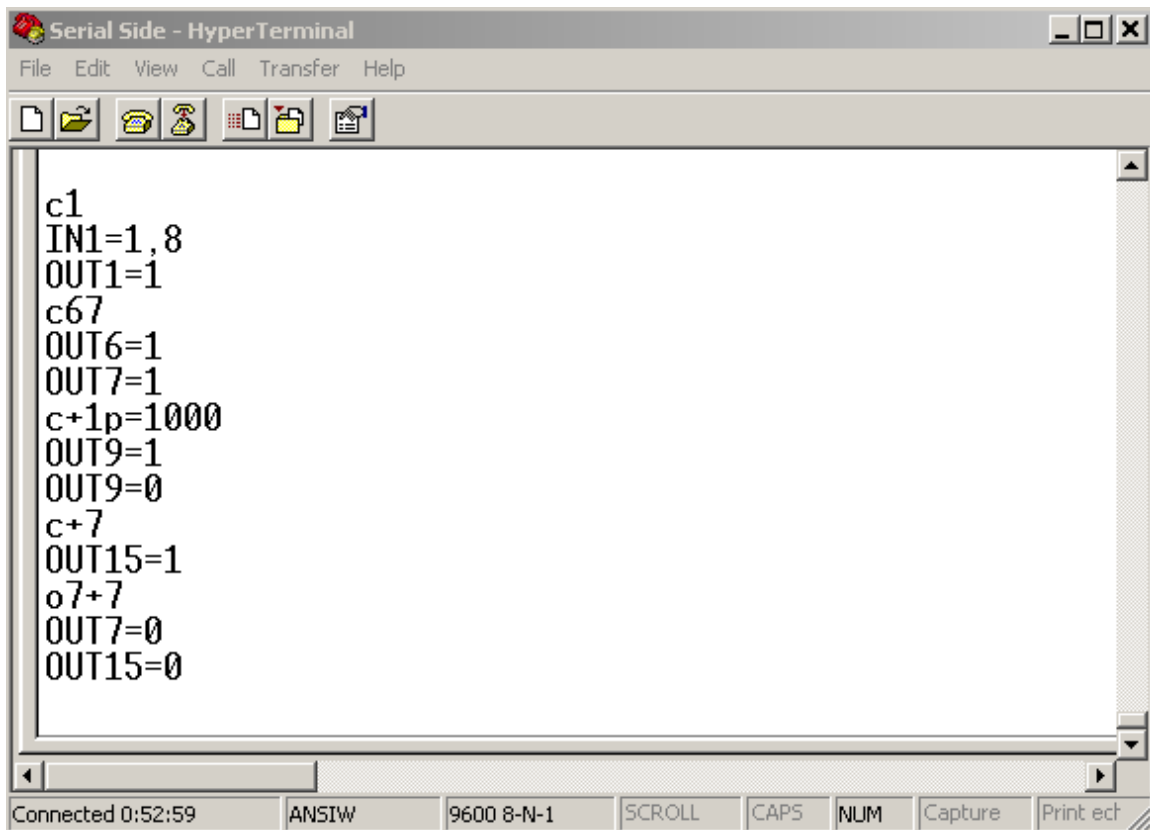
Note that these monitoring messages are sent out individually over the serial port. The JNIO does not report the status of more than one input/counter in the same message.

You can test the JNIOR Serial Control program by using a program such as HyperTerminal. This will test the wiring to your inputs and outputs and replaces the functionality of your serial device. You can manually control the outputs.

To connect to the Serial Control program using HyperTerminal, set up HyperTerminal to use one of your COM ports on your PC and set the properties to the default settings for the JNIOR serial port.



After connecting a cable from your COM port to the JNIOR Auxiliary Serial Port and opening HyperTerminal, you can issue control commands and also receive status messages. An example is as follows:



7 Options

The default setting for the Serial Control software is to utilize the Auxiliary Serial port located along the top edge of the JNIOR. However, it is possible to change this setting to utilize the RS-232 serial port located along the bottom edge of the JNIOR. It is important to understand that the primary purpose of the RS-232 port is to act as the command console for the JNIOR. The command console allows the user to connect to the JNIOR via a program such as HyperTerminal for configuration purposes. And although they are not visible to the user unless connected, the JNIOR will write certain system messages to this port.

If you desire to use this port for your serial device, then you must start the Serial Control software as described above so that the Registry Keys are displayed. Using the main JNIOR web page, edit the SerialPort key and change the value to RS232. You must reboot the JNIOR (a soft reboot via the About tab or a Telnet window is preferred) and when it finishes, the Serial Control software will now use the RS-232 port.

IMPORTANT: Every time the JNIOR reboots, it waits 1 minute before taking over the RS-232 port for the Serial Control application. This would allow you some time to connect to the JNIOR via HyperTerminal for an emergency where you no longer knew the JNIOR IP address and had no other way to connect to the JNIOR. You would have 1 minute to log in and type 'ps' at the prompt to list all the running processes and then type 'kill X' where X is the process number for the serialcontrol.jnior program.

The program will stop immediately and you will have time to change your ipconfig or go to the Command Line registry editor and delete the Run key for the Serial Control software program. When the Run key is deleted, the program will no longer automatically run after boot.

NOTE: You can have both Serial Control and Serial-to-Ethernet (see the Serial-to-Ethernet Manual) programs running on the same JNIOR at the same time as long as they are using different serial ports. You must start the program first that will be using the RS232 port and change its default setting from AUX to RS232. Then you can start the other program because it will now be able to run and use the Auxiliary Serial port. Having both programs running at the same time with both of them configured for the Auxiliary Serial port could cause unexpected operation of your JNIOR.

Summary

Thank you for purchasing the **JNIOR**. Hopefully this manual made the getting-to-know process of your new **JNIOR** very quick and easy. The **JNIOR** has many more wonderful tools and features available, and are explained in detail in the supplied documents.

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Please do not hesitate to contact our **JNIOR** team at **INTEG Process Group, Inc.** We can be reached via phone, fax or e-mail as follows:

INTEG Process Group, Inc.
2919 E. Hardies Road
1st Floor
Gibsonia, PA 15044

www.integpg.com

JNIORsales@integpg.com

PH (724) 933-9350 extension 20
FAX (724) 443-3553