

SCNDR
*Handheld Barcode Scanning
for your Allen-Bradley PLC
ScanDr. Package User Guide*
Package Revision 1.02

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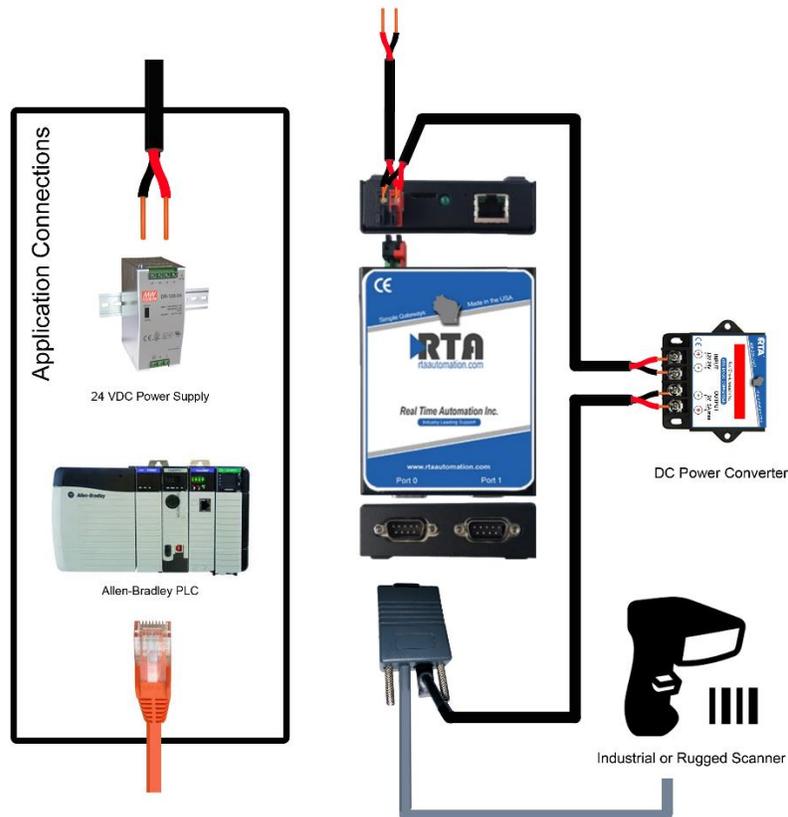
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Overview

The *ScanDr.* package includes everything you need to add handheld barcode scanner(s) to an Allen-Bradley PLC. This package creates a one source solution for Allen-Bradley PLC applications requiring handheld barcode scanners. It also simplifies the field integration issues by creating a single voltage power requirement and single Ethernet connection the Allen-Bradley PLC.



Packages Available

Part #	Description
SCNDR-SI1	ScanDr. - Handheld Industrial Corded Barcode Scanner for A-B PLC
SCNDR-SI2	ScanDr. - 2 Handheld Industrial Corded Barcode Scanners for A-B PLC
SCNDR-SWI1	ScanDr. - Handheld Industrial Cordless Barcode Scanner for A-B PLC
SCNDR-SWI2	ScanDr. - 2 Handheld Industrial Cordless Barcode Scanners for A-B PLC
SCNDR-SR1	ScanDr. - Handheld Rugged Corded Barcode Scanner for A-B PLC
SCNDR-SR2	ScanDr. - 2 Handheld Rugged Corded Barcode Scanners for A-B PLC
SCNDR-SWR1	ScanDr. - Handheld Rugged Cordless Barcode Scanner for A-B PLC
SCNDR-SWR2	ScanDr. - 2 Handheld Rugged Cordless Barcode Scanners for A-B PLC

Materials for commissioning:

All the software tools and reference files needed to commission a *ScanDr.* package are included on the provided CD and available online: <https://www.rtautomation.com/scandr-support/>

SUPPORT

If at any time you need further assistance do not hesitate to call Real Time Automation support.

Support hours are Monday-Friday 8am-5pm CST

Toll free: 800-249-1612

Email: support@rtautomation.com



Hardware Installation

Included in Your ScanDr. Package

1. Selected Zebra barcode scanner(s)

INDUSTRIAL CORDED	INDUSTRIAL CORDLESS	RUGGED CORDED	RUGGED CORDLESS
 <p data-bbox="203 730 474 751">Model: DS2208-SR7U2100AZW</p>	 <p data-bbox="519 730 790 751">Model: DS2278-SR7U2100PRW</p>	 <p data-bbox="828 730 1099 751">Model: DS3608-SR3U4600VZW</p>	 <p data-bbox="1136 730 1408 751">Model: DS3678-SR3U42A0SFW</p>

2. RS232 cable: CBA-R01-S07PAR (Industrial) or CBA-RF1-C09ZAR (Rugged)



3. Power convertor & cabling: 24vdc → 5vdc convertor with (Industrial 3.5mm jack) or 24vdc → 12vdc convertor with (Rugged 5.5mm jack)



4. 435NBX-N700 ASCII to PLC gateway



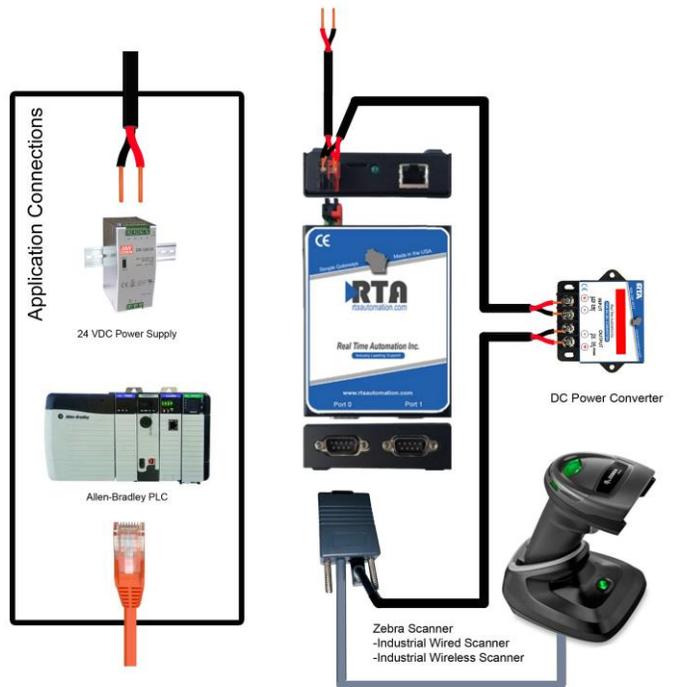
Assembling Your ScanDr. Package

- 1) Connect the DB9 of the serial cable to the male DB9 connection on the 435NBX-N700. Attach the mating end into the base station or base of the scanner.
 - a. For single scanner applications use port 0
 - b. In 2 scanner applications the scanners can be assigned to either port

- 2) Connect the barrel connector(s) on the power wire harness to the mating connector on the scanner or scanner base station.

- 3) Connect the pluggable red & black power connector from the power wire harness into the 435NBX-N700

- 4) Connect the red and black flying leads from the power wire harness into a 24VDC power supply.



Power Requirements

All *ScanDr.* packages require 24VDC

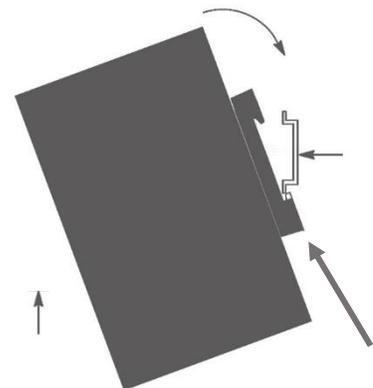
Package #	Power Draw
SCNDR-SI1	110mA
SCNDR-SI2	175 mA
SCNDR-SWI1	284 mA
SCNDR-SWI2	522 mA
SCNDR-SR1	225 mA
SCNDR-SR2	405 mA
SCNDR-SWR1	1045 mA
SCNDR-SWR2	2045 mA

Spring Loaded Clip
on bottom

DIN Rail Installation

Follow these steps to install your unit.

- 1) Hook the bottom mounting flange under the DIN Rail.
- 2) While pressing the 435NBX against the rail, press up to engage the spring-loaded lower clip and rotate the unit parallel to the DIN Rail.
- 3) Release upward pressure.



Follow these steps to remove your unit.

- 1) Press up on the unit to engage the spring-loaded lower clip.
- 2) Swing top of the unit away from the DIN rail.

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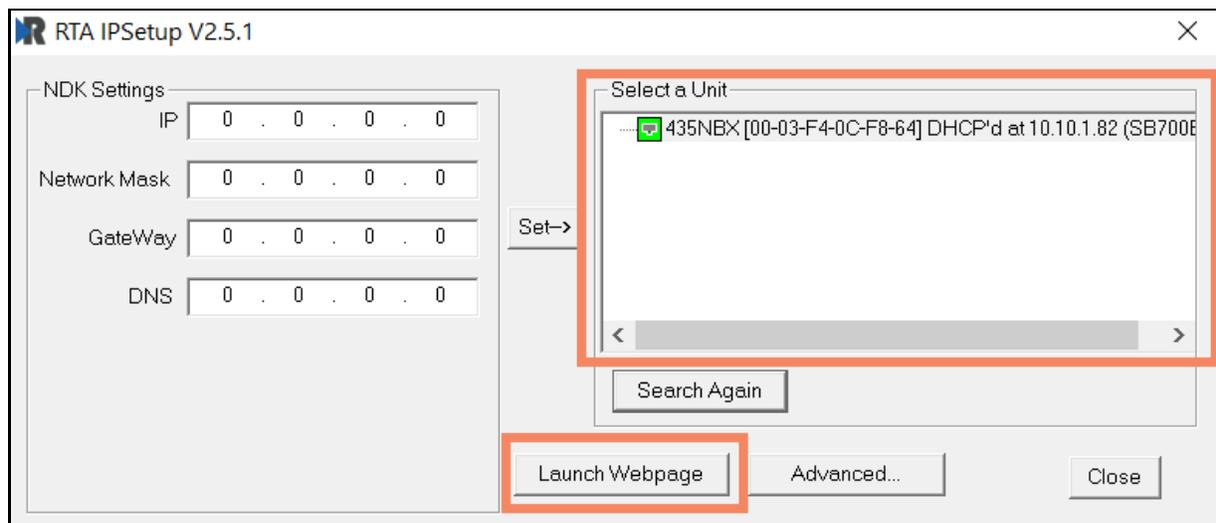


Gateway Configuration

Accessing the Gateways Configuration Pages

Access the browser-based configuration of the 435NBX. By default, DHCP is enabled. If the 435NBX fails to obtain an IP address over DHCP it will Auto IP with 169.254.X.Y.

- Connect an 8-24 VDC power source to the gateway, Red Wire = (+) Black Wire = (-).
- Using the supplied crossover cable, connect the gateway to the PC.
- Insert the provided CD-ROM into a computer also on the network. Refer to the Accessing_Browser_Configuration doc to setup DHCP on your PC. This guide is also found on https://www.rtautomation.com/wp-content/uploads/Accessing_Browser_Configuration.pdf



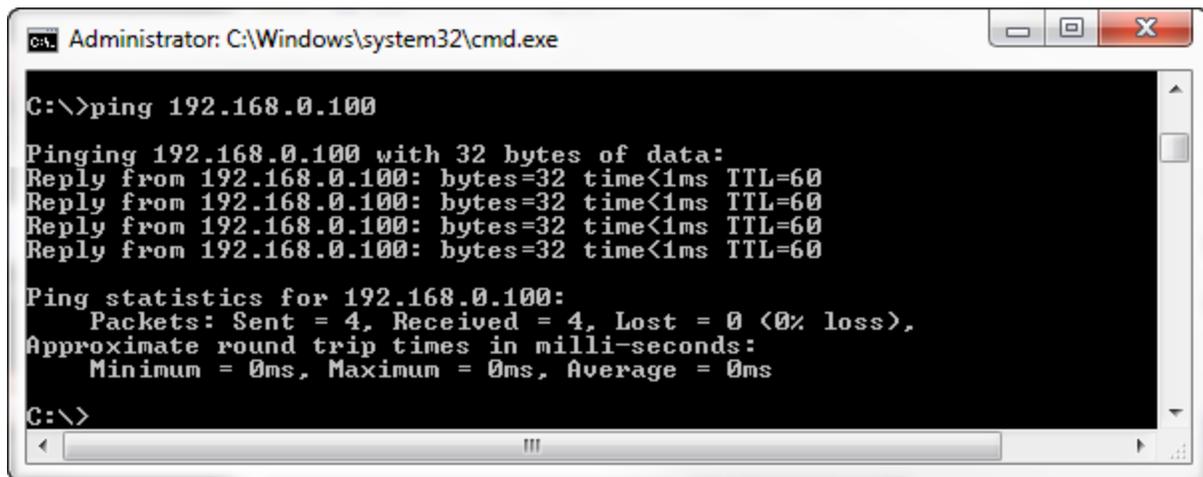
- Run the IPSetup.exe program from the CD-ROM.
- Find unit under “Select a Unit”.
 - a. To change the IP Address to match that of your PC if DHCP has failed, enter the desired static IP settings on the left-hand side and click **Set->**.
 - i. You will know DHCP has failed if the gateway’s IP address is AutoIP at 169.254.X.Y.
 - ii. If successful it will say DHCP’d at ex: 192.168.0.100 or however your DCHP Client is setup.
- Click **Launch Webpage**. The Main Page should appear.

Error: Main Page Does Not Launch

If the Main Page does not launch, please verify the following:

1. Check that the PC is set for a valid IP Address
 - a. Open a MS-DOS Command Prompt
 - b. Type "ipconfig" and press enter
 - c. Note the PC's IP Address, Subnet, and Default Gateway
2. The gateway must be on the same Network/Subnet as the PC whether it's set up for DHCP/Static.

Once you have both devices on the same network, you should be able to ping the gateway using a MS-DOS Command Prompt.



```
Administrator: C:\Windows\system32\cmd.exe

C:\>ping 192.168.0.100

Pinging 192.168.0.100 with 32 bytes of data:
Reply from 192.168.0.100: bytes=32 time<1ms TTL=60

Ping statistics for 192.168.0.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

The screenshot above shows a gateway that is currently set to a static IP Address of 192.168.0.100.

If you can successfully ping your gateway, open a browser and try to view the main page of the gateway by entering the IP Address of the gateway as the URL.



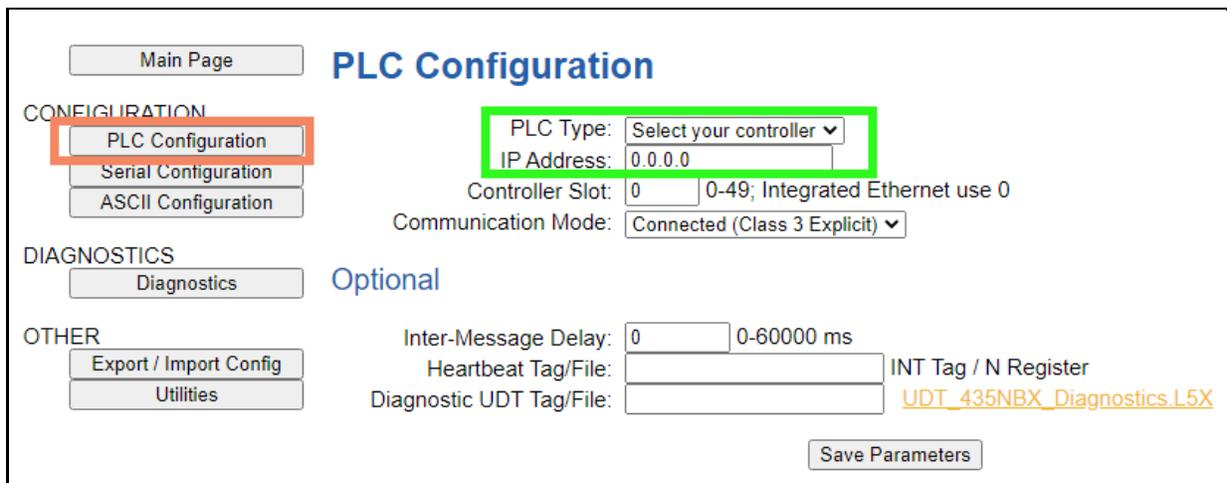
Default setting is set to DHCP. If DHCP fails, default IP Address is 169.254.x.y

435NBX Setup

Once you have access to the 435NBX you will have the ability to alter the configuration of the RTA gateway. **Please note:** Most settings in the 435NBX are pre-configured for the *ScanDr.* package. Only the elements noted below will need to be altered.

Connecting CompactLogix, ControlLogix, Flex I/O

1. Navigate to the PLC Configuration page (orange box).
2. Select your PLC type and enter the IP Address of your Allen-Bradley PLC (green box).
3. Controller Slot is defaulted at 0.
4. Communication Mode is defaulted at Connected Messaging (Class 3 Explicit). Connected Messaging ensures data is moving as reliably as possible.



PLC Configuration

CONFIGURATION
 (highlighted)

DIAGNOSTICS

OTHER

Optional
 PLC Type: (highlighted)
 IP Address: (highlighted)
 Controller Slot: 0-49; Integrated Ethernet use 0
 Communication Mode:

Inter-Message Delay: 0-60000 ms
 Heartbeat Tag/File: INT Tag / N Register
 Diagnostic UDT Tag/File:

Serial Configuration

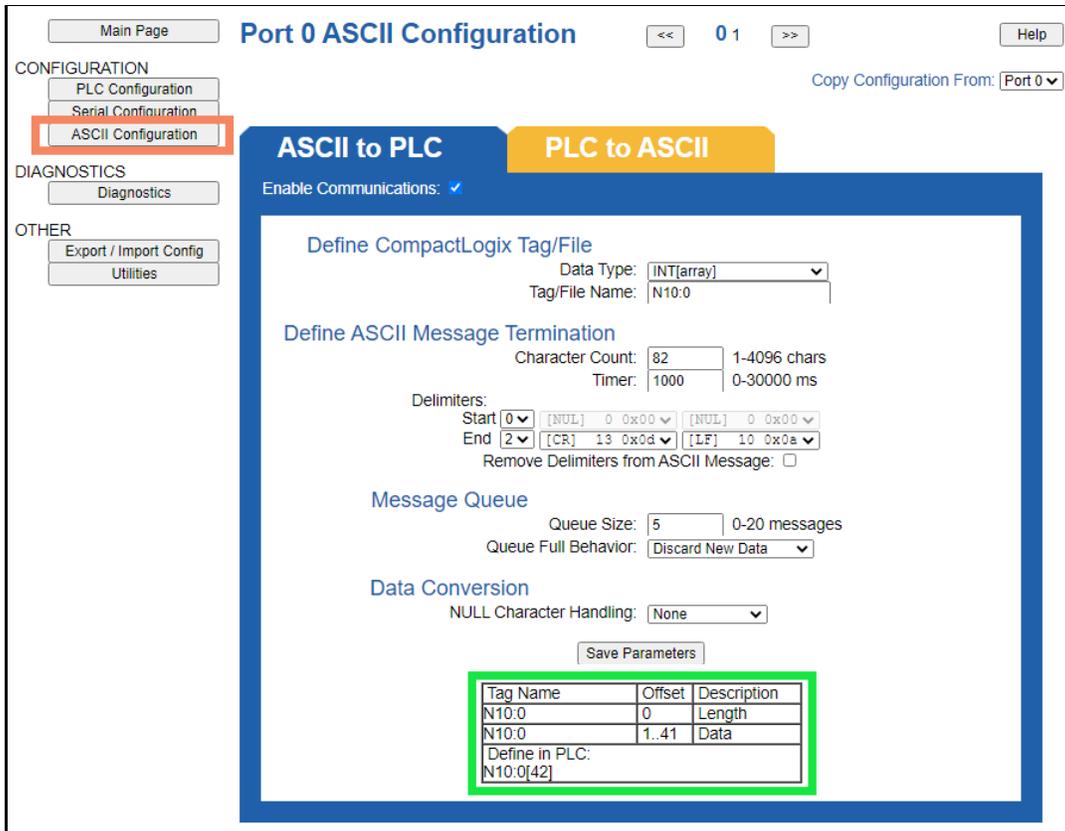
NO ASCII CONFIGURATION IS REQUIRED The gateway is shipped ready to communicate with the barcode scanner(s).

ASCII Configuration

NO ASCII CONFIGURATION IS REQUIRED if using a CompactLogix, ControlLogix, or FlexLogix PLC.

Connecting MicroLogix, SLC, or PLC5E

1. PLC Configuration:
 - a. If using a PLC5E, then it must be: Series C, Revision N.1 or later; Series D, Revision E.1 or later; or Series E, Revision D.1 or later.
 - b. If using a SLC5/05, then it must be: Series A, Version OS501; or FRN5 Series B and Series C or later.
2. Navigate to the ASCII Configuration (orange box).
3. Select the Data Type that you defined in the PLC.
4. Enter the File Name that you want to move the ASCII data to.
 - a. The File must be defined in the PLC and match exactly.
5. Change the Character Count from 4096 to one of the following depending on the Data Type selected.
 - a. If using a STRING, set this to be 82
 - b. If using an INT, the acceptable range is 1 to 200. When using an INT data type, this is the Character count divided by 2 +1 of the File name. Ex: Character count is 82, in RSLoigx500 it will be defined as N10:0 with a length of 41. N10:0 will be reserved for the Length and N10:1...N10:41 will include the data. Clicking the **Save Parameters** button will generate an example at the bottom for how to define the PLC (green box).



Port 0 ASCII Configuration

CONFIGURATION

- PLC Configuration
- Serial Configuration
- ASCII Configuration

DIAGNOSTICS

- Diagnostics

OTHER

- Export / Import Config
- Utilities

Define CompactLogix Tag/File

Data Type: INT[array]

Tag/File Name: N10:0

Define ASCII Message Termination

Character Count: 82 (1-4096 chars)

Timer: 1000 (0-30000 ms)

Delimiters:

Start: [NUL] 0 0x00 [NUL] 0 0x00

End: [CR] 13 0x0d [LF] 10 0x0a

Remove Delimiters from ASCII Message:

Message Queue

Queue Size: 5 (0-20 messages)

Queue Full Behavior: Discard New Data

Data Conversion

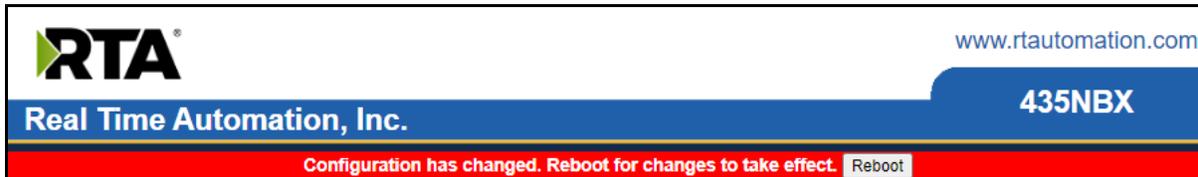
NULL Character Handling: None

Save Parameters

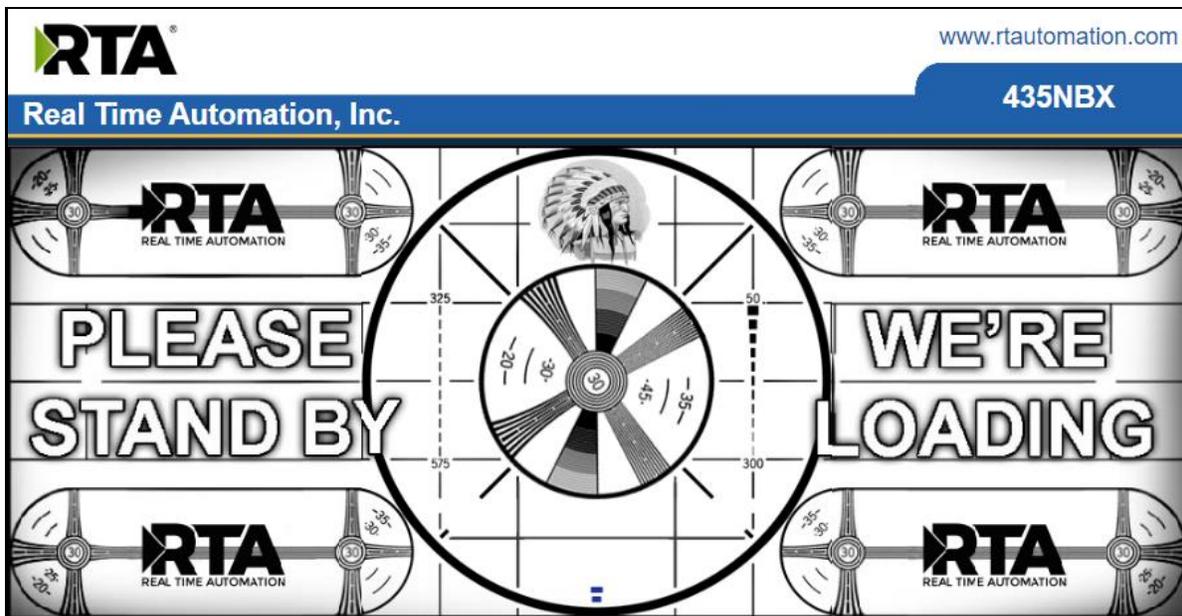
Tag Name	Offset	Description
N10:0	0	Length
N10:0	1..41	Data
Define in PLC:		
N10:0[42]		

Saving Changes to the Settings

- Any changes made to the IP Address or DHCP settings will take effect immediately.
- All other changes made to the settings of the gateway will not take effect until the gateway is restarted. Changes will not be stored if the gateway’s power is removed prior to a reboot.
- The gateway detects changes and will prompt you with a red notice box to restart the gateway after change.



- **NOTE:** The gateway does not need to be restarted after every change. Multiple changes can be made before a restart, but they will not be committed until the gateway is restarted.
- When all desired changes have been made, press the **Reboot** button.
- The webpage will redirect to the rebooting page shown below:



- The reboot can take up to 20 seconds. You will know the save was successful if the red box is no longer present.
 - If the IP Address has not been modified, the gateway will automatically redirect to the main page.
 - If the IP Address was modified, a message will appear at the top of the page to instruct the user to manually open a new webpage at that new IP.

Fun Fact:

The load screen pays homage to the RCA Television test pattern used from 1939-1970. The Native American head was used to check brightness and contrast, the corner circles check beam focus on the edges of the screen, the bars for low frequency response and the large circle to test height.

Optional Functionality

The RTA gateway supports a heartbeat feature. It can be used to ensure that you still have an active connection to the gateway. This is often used in applications that only execute occasional scans. If the value continues to increment you can be assured of a connection to the PLC.

Implement a Heartbeat Using a CompactLogix, ControlLogix, and FlexLogix

Optionally, if you want to use a heartbeat tag, use “RTA_SCNDR_Tags.Heartbeat” as your tag name to utilize the RTA_SCNDR_Heartbeat_AOI. The heartbeat tag cyclically updates an INT file in the PLC to let the PLC know that the 435NBX is successfully communicating.

Implement a Heartbeat Using a MicroLogix, SLC or PLC5

By default, there is no heartbeat file configured. Optionally, if you want to add a heartbeat file, you will need to create an INT file in the PLC and enter that file name in the 435NBX. The heartbeat file cyclically updates an INT file in the PLC to let the PLC know that the 435NBX is successfully communicating.

PLC Programming

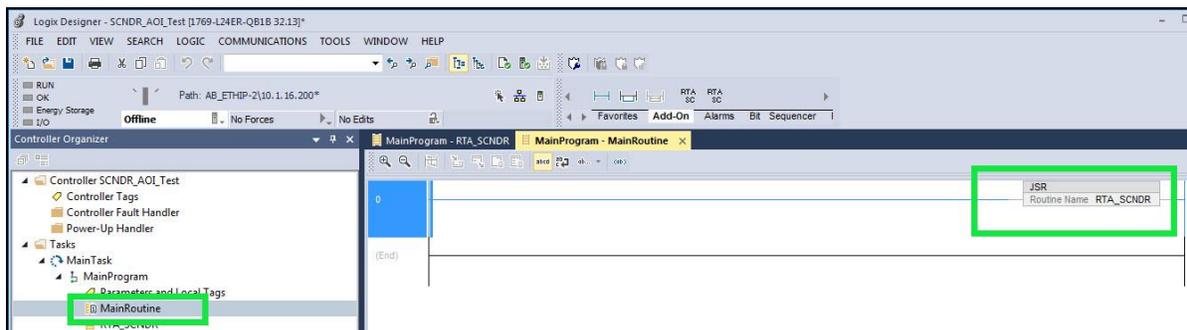
AOI Implementation in Studio5000 & RSLogix5000 Programming

The *ScanDr.* package includes UDTs and AOIs to simplify the integration into RSLogix5000 / Studio5000. The UDTs and AOIs can be found on the provided CD or can be downloaded <https://www.rtautomation.com/scandr-support/>.

Please Note: AOIs and UDTs **cannot** be used in RSLogix500 or Flex IO.

The instructions below cover the Single and Dual Scanner files.

1. Scanner .zip files will contain both an optional and required folder.
 - a. The optional folder will include:
 - i. Heartbeat AOI, if you choose to monitor the 435NBX
 - ii. SCNDR Sub Routine, this will include all AOIs and UDTs
 - b. The required folder will include:
 - i. Port 0 (Single) or Port 0/Port1 (Dual) to PLC AOI
 - ii. New string data type of 4096 characters
 - iii. UDT for Single or Dual Scanner
 - iv. Single or Dual controller tags CSV
2. Launch RSLogix5000 / Studio5000
3. Open the Program that will be used for communication to the Real Time Automation 435NBX SCNDR package.
4. Import the Sub Routine
 - a. Use this if you want all the files (AOIs and UDTs) loaded listed in 1.a and 1.b.
 - i. Under the “Controller Organizer” (left hand side), right click MainProgram
 - ii. Click **Add** and select the “Import Routine...” option.
 - iii. Select the “RTA_SCNDR_Single_Sub_Routine.L5X” file. If use using Dual SCNDR, then use the “RTA_SCNDR_Dual_Sub_Routine.L5X.”
 - iv. When the Import screen pops up, select **OK**
 - v. Create a JSR (Jump to Sub Routine) instruction in the Main Routine that will call the “RTA_SCNDR_Single_Sub_Routine.L5X”. If using Dual SCNDR then use the “RTA_SCNDR_Dual_Sub_Routine.L5X”.



If you don't wish to use the Sub Routine, follow the instructions below to import the individual AOIs and UDTs.

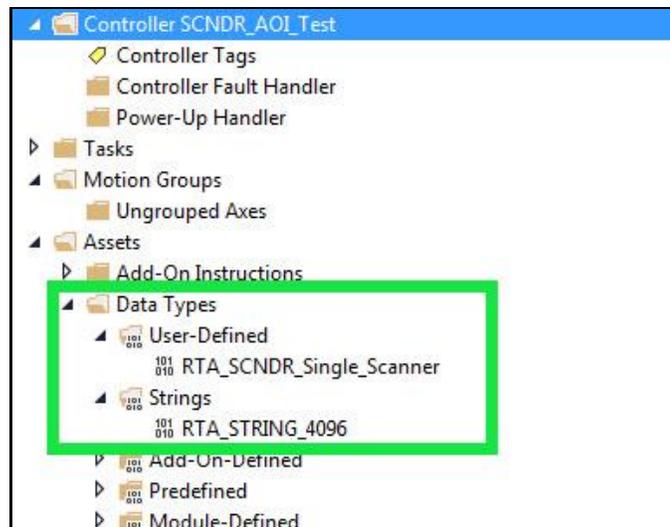
5. Import the data types

a. Strings

- i. Under the "Controller Organizer" (left hand side), expand the "Data Types" folder
- ii. Right click the "Strings" folder and select "Import String Type..."
- iii. Select the "RTA_STRING_4096.L5X" file
- iv. Click **Import**
- v. When the import screen pops up, select **OK**

b. User-Defined

- i. Under the "Controller Organizer" (left hand side), expand the "Data Types" folder
- ii. Right click the "User-Defined" folder and select "Import Data Type..."
- iii. Select the "RTA_SCNDR_Single_Scanner_UDT.L5X" file, if you have a dual SCNDR package, then load the "RTA_SCNDR_Dual_Scanner_UDT.L5X"
- iv. Click **Import**
- v. When the import screen pops up, select **OK**



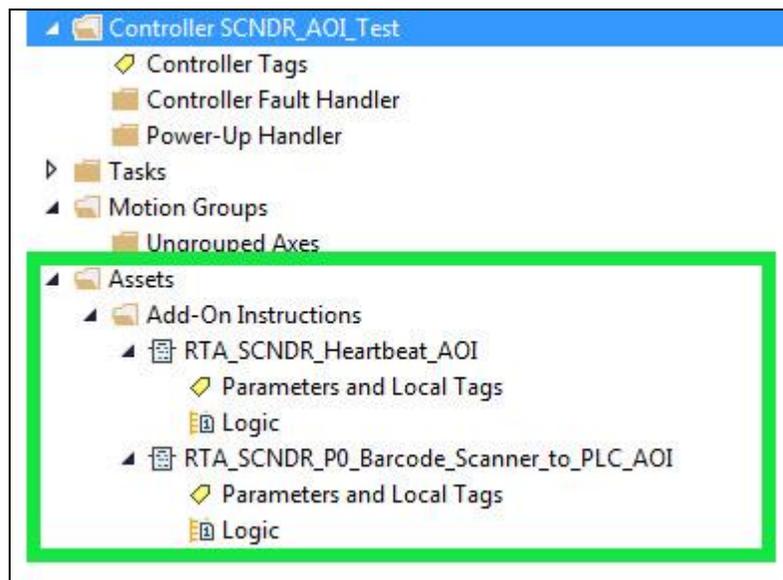
6. Import the Add-On Instructions

a. AOI Port 0 Scanner to PLC

- i. Under the "Controller Organizer" (left hand side), right click the "Add-On Instructions" folder and select "Import Add-On Instruction..."
- ii. Select the "RTA_SCNDR_PO_Barcode_Scanner_to_PLC_AOI.L5X"
- iii. Click **Import**
- iv. When the import screen pops up, select **OK**

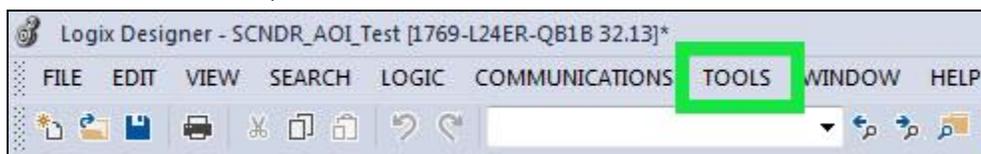
- b. AOI Port 1 Scanner to PLC (**use only if you have a dual scanner package**)
 - i. Under the “Controller Organizer” (left hand side), right click the “Add-On Instructions” folder and select “Import Add-On Instruction...”
 - ii. Select the “RTA_SCNDR_P1_Barcode_Scanner_to_PLC_AOI.L5X”
 - iii. Click **Import**
 - iv. When the import screen pops up, select **OK**

- c. AOI Heartbeat (Optional)
 - i. Under the “Controller Organizer” (left hand side, Right Click the “Add-On Instructions” folder and select “Import Add-On Instruction...”
 - ii. Select the “RTA_SCNDR_Heartbeat_AOI.L5X”
 - iii. Click **Import**
 - iv. When the import screen pops pp, select **OK**



7. Import Controller Scope Tags

- a. In the tool bar, Select “Tools”

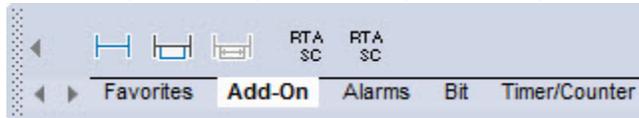


- b. Select “Import”
- c. Select “Tags and Logic Comments...”
- d. Select “RTA_SCNDR_Single-Controller-Tags.CSV” or “RTA_SCNDR_Dual-Controller-Tags.CSV”

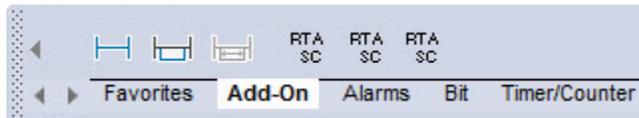
RTA_SCNDR_Heartbeat_AOI	{...}	RTA_SCNDR_Heartbeat_AOI
RTA_SCNDR_Heartbeat_AOI.EnableIn	Decimal	BOOL
RTA_SCNDR_Heartbeat_AOI.EnableOut	Decimal	BOOL
RTA_SCNDR_P0_AOI	{...}	RTA_SCNDR_P0_Barcode_Scanner_to_PLC_AOI
RTA_SCNDR_P0_AOI.EnableIn	Decimal	BOOL
RTA_SCNDR_P0_AOI.EnableOut	Decimal	BOOL
RTA_SCNDR_Tags	{...}	RTA_SCNDR_Single_Scanner
RTA_SCNDR_Tags.Heartbeat	Decimal	INT
RTA_SCNDR_Tags.Active	Decimal	BOOL
RTA_SCNDR_Tags.P0_Received_Garbage_Data	Decimal	BOOL
RTA_SCNDR_Tags.P0_ASCII_Data	{...}	RTA_STRING_4096
RTA_SCNDR_Tags.P0_ASCII_Data.LEN	Decimal	DINT
RTA_SCNDR_Tags.P0_ASCII_Data.DATA	{...} ASCII	SINT[4096]
RTA_SCNDR_Tags.P0_Barcode_Data	{...}	RTA_STRING_4096
RTA_SCNDR_Tags.P0_Barcode_Data.LEN	Decimal	DINT
RTA_SCNDR_Tags.P0_Barcode_Data.DATA	{...} ASCII	SINT[4096]

8. Calling an Add-On Instruction

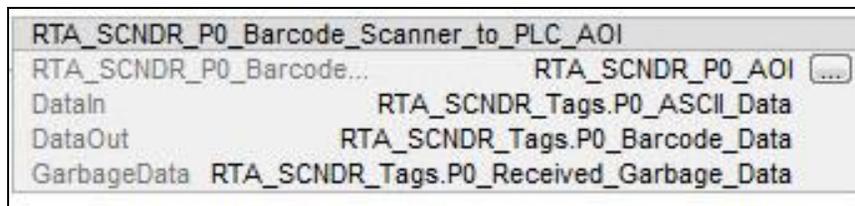
- a. The AOI for a single barcode scanner package will display as below:
 - i. Heartbeat AOI (1st Add-on) and Port 0 (2nd Add-on) will look like this:



- b. The AOI for a dual barcode scanner package will display as below:
 - i. Heartbeat AOI (1st Add-on), Port 0 (2nd Add-on) and Port 1 (3rd Add-on) and should look like this:



- 9. Under your Main Program within the Main Routine, you will need to call the AOIs using its instruction. Below is the breakdown of the arguments.
- 10. If you have Imported the Controller Scope Tags, above 7.a, then the AOI Tags are already set up for you.
- 11. In the Ladder Logic that you want to call the AOI from, create an instruction (or new rung) with the following Add-on.
- 12. Instruction Name to select:
 - a. RTA_SCNDR_P0_Barcode_Scanner_to_PLC_AOI: **Used for only Port 0**



b. RTA_SCNDR_P1_Barcode_Scanner_to_PLC_AOI: **Used for only Port 1**

RTA_SCNDR_P1_Barcode_Scanner_to_PLC_AOI	
RTA_SCNDR_P1_Barcode...	RTA_SCNDR_P1_AOI ...
DataIn	RTA_SCNDR_Tags.P1_ASCII_Data
DataOut	RTA_SCNDR_Tags.P1_Barcode_Data
GarbageData	RTA_SCNDR_Tags.P1_Received_Garbage_Data

c. RTA_SCNDR_Heartbeat_AOI: **Optional**

RTA_SCNDR_Heartbeat_AOI	
RTA_SCNDR_Heartbeat...	RTA_SCNDR_Heartbeat_AOI ...
DataIn	RTA_SCNDR_Tags.Heartbeat
DataOut	RTA_SCNDR_Tags.Active

13. Below is the explanation for all the arguments within an instruction.

- a. The first argument is the AOI you set up in 6.a (specific based on the AOI being used)
- b. The second argument is the Input Tag (defined as DataIn)
 - i. For the RTA_SCNDR_PO_Barcode_Scanner_to_PLC_AOI, this is the Controller Scope Tag that the 435NBX is updating (this is the "RTA_SCNDR_Tags.PO_ASCII_Data" tag defined in the ASCII to PLC direction of the 435NBX).
 - ii. For the RTA_SCNDR_P1_Barcode_Scanner_to_PLC_AOI, this is the Controller Scope Tag that the 435NBX is updating (this is the "RTA_SCNDR_Tags.P1_ASCII_Data" tag defined in the ASCII to PLC direction of the 435NBX).
 - iii. For the RTA_SCNDR_Heartbeat_AOI, this is "RTA_SCNDR_Tags.Heartbeat".

14. The third argument is the Output Tag (defined as DataOut)

- a. For the RTA_SCNDR_PO_Barcode_Scanner_to_PLC_AOI, this is the Controller Scope Tag that the AOI is updating for the PLC to process the data (this is "RTA_SCNDR_Tags.PO_Barcode_Data")
- b. For the RTA_SCNDR_P1_Barcode_Scanner_to_PLC_AOI, this is the Controller Scope Tag that the AOI is updating for the PLC to process the data (this is "RTA_SCNDR_Tags.P1_Barcode_Data")
- c. For the RTA_SCNDR_Heartbeat_AOI, this is "RTA_SCNDR_Tags.Active".

15. The fourth argument is the Garbage Data. This is the received data that was not from a scan of the barcode.

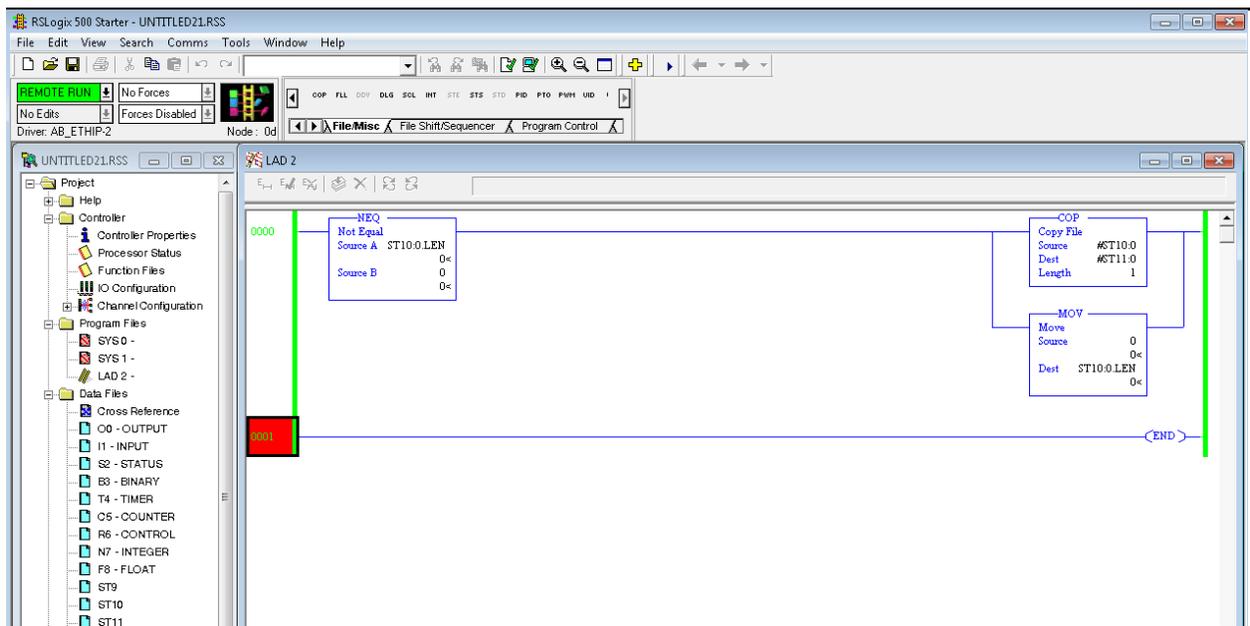
- a. For the RTA_SCNDR_PO_Barcode_Scanner_to_PLC_AOI, this is the Controller Scope Tag that the AOI is updating for the PLC to know if it received data that was not valid, and it discarded the data (this is "RTA_SCNDR_Tags.PO_Received_Garbage_Data")
- b. For the RTA_SCNDR_P1_Barcode_Scanner_to_PLC_AOI, this is the Controller Scope Tag that the AOI is updating for the PLC to know if it received data that was not valid, and it discarded the data. (this is "RTA_SCNDR_Tags.P1_Received_Garbage_Data")

RSLogix500 Setup

The *ScanDr.* package **does not** include UDTs or AOIs for RSLogix500 as it does not support these files.

1. Setting up RSLogix Data Types and Ladder Logic

- a. Open RSLogix500
- b. Open the Data Files folder and create the file(s) defined in the 435NBX. The file and data type must match what is set up in the 435NBX.
- c. In the Ladder Logic, within a single rung, follow these steps to work with the 435NBX (Example will reference ST10:0 which is defined in the 435NBX)
 - a. Not Equal To (NEQ) instruction to check if there is ASCII data to process
 - i. Source A: ST10:0.LEN
 - ii. Source B: 0
 - b. Copy File (COP) instruction to move the ASCII data that the 435NBX is updating to another file for additional processing
 - i. Source: ST10:0
 - ii. Dest: ST11:0 (note: this is a different file for additional processing)
 - iii. Length: 1
 - c. Move (MOV) instruction to allow the next ASCII message to be sent from the 435NBX to the PLC
 - i. Source: 0
 - ii. Dest: ST10:0.LEN



Setup Is Complete!

Your *ScanDr.* package is now ready for years of reliable service.

SUPPORT

If at any time you need further assistance do not hesitate to call Real Time Automation support.

Support hours are Monday-Friday 8am-5pm CST

Toll free: 800-249-1612

Email: support@rtautomation.com

