## **APPLICATION EXAMPLES**



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## EXAMPLE 1:

## USING MODBUS POLL TO STRIDE MODBUS GATEWAY WITH BRX SLAVE

This example will illustrate how to use Modbus Poll, which is a PC-based Modbus master simulator tool, to connect through the *STRIDE*<sup>®</sup> Modbus Gateway to a BRX PLC via 2-wire RS-485. For simplicity in this example, the gateway will be configured in Transparent Mode.

#### ITEMS NEEDED FOR THIS EXAMPLE:

- STRIDE Modbus Gateway
- BRX PLC (any model)
- PC with Modbus Poll installed (free demo is available at www.modbustools.com)
- AutomationDirect ZL-DB9F-CBL-2P D-sub 9-pin pigtail cable, or small length of AutomationDirect L-19954 RS-485 cable or equivalent and D-sub 9-pin socket (female) connector
- Ethernet switch and cables to connect from the PC to STRIDE Modbus Gateway

#### STEP 1: CONNECT THE STRIDE MODBUS GATEWAY SERIAL PORT TO THE BRX MPU SERIAL PORT.

Using the ZL-DB9F-CBL-2P cable, or D-sub 9-pin connector and a short length of RS-485 cable, connect Serial Port 1 of the *STRIDE* Modbus Gateway to the BRX serial port as shown:

RS-485 2-wire Wiring Diagram



The Gateway contains a DIP switch selectable  $120\Omega$  Termination Resistor between TX+ and TX- for each serial port on RS485 2-wire, when the Gateway is wired at one end of the serial network

#### STEP 2: CONFIGURE THE BRX MPU SERIAL PORT.

Connect to the BRX MPU with BRX Do-more! Designer software using either the BRX serial or USB Pluggable Option Module.

<b>N A A A A A A A A A A</b>			
Do-more Designer 2.0.3 - Scratchpad - [Dashboard]			- U X
File Edit Search View Tools PLC Debug Windor	w Help		-#×
Open Save New Backup Dashboard Edit Mo	ode Accept Undo Cut Copy Paste Fin	d Find Next Browse Previous Next Output	Options On The Web Tip Help
Read PLC Write PLC New Online Do-more/Sim Data	Debug Trend Memory Status All Status No Statu	us Forces Value Mode Info Configure Devices	Check PID Overview PID View -
Project Browser	2 SMain 💽 Dashboard		4 Þ ×
Programs     Program     Pr	Documentation     Documentation     Documentation     Add PRC     modpy Version: 2.0     ory used: <1%     RX Orboard UO	On Decommentation Cyused: <1%	I/O     Etherner (I) Matter DISARED     I/O Salveter 0     I/O Salveter 0     I/O Salveter 0     I/O System Status: COOO     Interrupts Enabled: 0
4         5           5         6           6         7           7         PC is nNo           9         0           10         5           5         0           6         3           7         PC is nNo           9         0           0         2.3.3:           11         Sca Three IS	IBDDemo         Ch           D23-0 (00 E0 62 30 04-43)         Ch           DGRAM mode         Mode switch: TERM           S5 255, 255, 255, 255, 255, 255, 255, 25	1emory Terrer environ Terrer terrer Verw Ferent fun FC and dak Terrer terrer verw Ferent fun FC and dak Terrer terrer terrer forces active forces active forces active forces active	Devices Add/edit devices 3 devices present Device status: OK
rorriep, press ri	Run lerm Stop	P D Devs OK PLC OK Unline/Derault Oser/BKADemo	Flogram comprosisio by by the flocb25-b

Click on the built-in serial port on the image of the BRX MPU within the Do-more! Designer software. From the dialog box that pops up, select "Edit Protocol and Port Type"

System Configuration			×
System Configuration Configuration Entries CPU Configuration B I/O Configuration B I/O Configuration C Configuration D C C C C C C C C C C C C C C C C C C C	BX OM IE-x CPU Configuration         Serial Port Configuration         Protocol         C Do-more Protocol (For Programming, HMIs, etc) (For Programming, HMIs, etc)         C Kapeunen Server (Emulates DirectLogic PLCs)         Modus RTU Server (Slave)         Modus RTU Clent (Master)         Program Control         C Lues STREAMULYSTREAMOUT for ASCII and Custom Protocols)         C Anage @IntSerial Device Settings         Port Type         C RS232 (Pin1:0V, Pin2:0+, Pin3:D-)         F Enable 120 Ohm Termination         POM Configuration         Setup POM         Default Watchdog Timeout         Setu POM         Default Timeout:         Interval for some state state some state state some state state some state some state some state some state some some some state some some some some some some some som	Internal Ethernet Port Configuration         IP:       255.255.255         Configure         Net Madx:       255.255.255         CPUs with Ethernet can enable a second programming connection on a different UOP port number.         ID:       Enable Secondary Ethernet Connection         UDP Port Number:       5000       0x1388         TimeSync Configuration       Do-more CPUs equipped with Ethernet ports can automatically synchronize their internal docks.         Select:       Doable' to turn off this feature         Clent to liten for TimeSync messages 'Alternate' for a clent that reverts to server if server is offline.         For servers or alternates, you may specify the time in minutes between updates.         IP:       Disabled         Clent       Clent         Clent       Server' to goater Imaging means and the server if server is offline.	Ethernet I/O Master  OPLis with an internal Ethernet port can use that port to connect to compatible Ethernet I/O slave devices.  Imable Ethernet I/O Master  Modbus/TCP Server Configuration  Do-more CPUs equipped with Ethernet ports can provide a Modbus/TCP Server.  Server can support a maximum of 16 concurrent sessions to reduce scan time and improve scan consistency.  Imakimum Concurrent Sessions:  Imakimum Concurrent Sessions:  Collent Inactivity Timeout:  EtherNet/IP Explicit Message Server  CPUs with an Ethernet port can provide an EtherNet/IP Explicit Message Server  CPUs with an Ethernet port can provide an EtherNet/IP Settings  Imakimum Concurrent Sessions:  EtherNet/IP Settings
	ОК	Cancel Help	

In the Serial Port Configuration column, select "RS-485" under "Port Type" and select "Modbus RTU server (slave)" under "Protocol". Then click "Change @IntSerial Device Settings..."

Edit Serial Port Settings	$\times$
Device Name:  Continue Modbus Protocol Settings Unit ID 1 0 - 255	
Port Settings	
Baud Rate: 38400	•
Data Bits: 8	-
Stop Bits: 1	
Parity: Odd	
Transmit Control: Unconditional	
RTS Control: Follows Transmitter	-
OK Cancel	

Setup the port as shown for 38400 baud rate, Odd parity, 1 Stop bit and Unit ID 1. Match everything else as shown. Note the Unit ID configured in the PLC. Once this has been done, click "OK" to close this dialog then "OK" again to close the preceding dialog.

#### STEP 3: CONFIGURE THE STRIDE MODBUS GATEWAY

Open up a web browser, such as Internet Explorer, enter in the IP address of the *STRIDE* Modbus Gateway, and log into the *STRIDE* Modbus Gateway web console as described in the Initial Connection section of Chapter 3 to access the Device Information as shown:

		St	tride		Exit
Device Information	_		Device Information		Help
Network Settings     Operating Settings     Serial Settings     Import/Export     Upgrade Firmware     Change Password     Load Factory Default     System Reboot     Data Diagnostics	Device Name Model Type IP(E1) IP(E2)	SGW-MB1524-T MB-Gateway 192.168.0.249 192.168.1.249 Transparent Mode Agent Mode	SN Firmware Version MAC(E1) MAC(E2)	K10A0004A180100036 V3.5.019 00:1E:CD:1B:FA:15 00:1E:CD:1B:FA:16	

Set the gateway to Transparent Mode.

On the Operating Settings page, set Serial Port 1 to RTU Master mode as shown below and click Save.

$\leftarrow \ \rightarrow \ \heartsuit$	192.168.0	0.249/index_v3.5.html						l~	Ŕ	
			St	ride					Exit	
									Help	
Device Information				Operating	g Settings					
<ul> <li>Network Settings</li> <li>Operating Settings</li> </ul>		S1	S2		\$3	S	4			
Serial Settings     Agent Settings		Serial Port Mode	RTU Master 🗸							
Gateway Settings		Filter Enable								
Message List		Filter ID Start	1							
<ul> <li>Data in Gateway Men</li> <li>Import/Export</li> </ul>	nory	Filter ID End	247							
Upgrade Firmware		Protocol	TCP $\scriptstyle\checkmark$ (Note: In Agent me	ode, you can moo	lify the Modbus port on the 'Gateway S	ettings' page. )				
<ul> <li>Change Password</li> <li>Load Factory Default</li> </ul>		Gateway Modbus TCP Port	502	( Note: In Ager	t mode, you can modify the Modbus po	ort on the 'Gateway S	Settings' p	oage. )		
System Reboot										
Data Diagnostics				Sa	ve					

## Click "Serial Settings" from the navigation menu

$\leftrightarrow$ $\rightarrow$ O	192.168.0.	249/index_v3.5.html				★ ☆ ル	<u>è</u>
			Stric	e		E	xit
						He	elp
Device Information			Si	erial Settings			
Network Settings     Operating Settings			S1	S2	S3	S4	
Serial Settings		Alias	UART_1	UART_2	UART_3	UART_4	-
Import/Export     Ingrade Eirmware		Baudrate	38400 🗸	115200 ~	115200 ~	115200 ~	-
Change Password		Databits	8 ~	8 ~	7 ~	8 ~	-
Load Factory Default     Sustem Deheet		Stopbits	1 ~	1 ~	1 ~	1 ~	
Data Diagnostics		Parity	Odd 🗸	None 🗸	None ∨	None 🗸	
		RTS Control	Off ~	Off ~	Off ~	Off ~	
		Hardware Interface	RS-232 ~	RS-232 ~	RS-232 ~	RS-232 ~	
		Protocol(selected on Operating Settings page)	RTU Master $~ \lor$	RTU Slave $\sim$	Disabled $\checkmark$	RTU Master $~ \lor$	
				Save			

Set the serial port parameters to match the configuration of the BRX MPU, and set the hardware interface to RS-485 2-wire.

Click "Save" to store and apply the settings.

#### STEP 4: CONNECT TO THE STRIDE MODBUS GATEWAY USING THE MODBUS POLL SIMULATOR SOFTWARE.

Once the software has been obtained from www.modbustools.com and installed according to the directions provided from their website, open up the Modbus Poll software.

Click on the Setup pulldown menu and select Read/Write Definition as shown:

육립 Modbus Poll - Mb	poll1			
File Edit Connection	Setup Functions Display	View Window	Help	
D 🖻 🖬 🎒 🗙	Read/Write Definition	F8 22	23 101 🤋 🎀	
📅 Mbpoll1	✓ Read/Write Disabled	Shift+F6		
Tx = 0: Err = 0: ID	Excel Log	Alt+X BL	.ED)	
No Connection	Excel Logging Off	Alt+Q		
Alias	Log	Alt+L		
0	Logging Off	Alt+O		
1	Reset Counters	F12		
2	Use as Default			
3				
4				
5				
/				
0				
2				
Read/write definition			Port 1: 9600-8	B-E-1

Configure the Read/Write definition for a simple read of the register 400001, which equates to MHR1 (16 bit word, decimal data type) in the BRX MPUs.

Read/Write	e Definition 🛛 🔀
Slave ID:	1 ОК
Function:	03 Read Holding Registers (4x) 🗸 Cancel
Address:	1
Quantity:	1 Apply
Scan Rate:	1000 ms
Disable Read/ Disable	Write Disabled
Display:	20 50 100 ☐ Hide Alias Columns ☐ Address in Cell Signed ♥ PLC Addresses (Base 1)

Enter 1 for the Slave ID. This matches the Unit ID in the protocol that will determine which Modbus Serial slave will be targeted on the serial side of the STRIDE Modbus Gateway. Entering 1 here will match up to the Station Number configured above in Do-more! Designer for the BRX MPU.

Choosing Function 3 sets up the read for 4xxxxx registers. Checking the "PLC Addresses (Base 1)" in the lower right corner matches the addressing to the cross reference chart mentioned above. Once this windows has been configured as shown above, click on OK.

Now click on the Connection pulldown menu and select Connect:

월 Modb	us Poll - Mbpoll1		
File Edit	Connection Setup Fu	nctions Display View Window Help	
D 🗳	Connect F3 Disconnect F4	📋 .L 05 06 15 16 22 23 101 💡 隆	
<mark>) Mbpe</mark> Tx = 0:	Auto Connect   Quick Connect F5	): SR = 1000ms (DISABLED)	
No Con	nection	-	
	Alias 4×000	ס	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Connect		Port 1: 9	600-8-E-1

In the Connection Setup window, choose the Modbus TCP/IP connection type. Enter the IP address of your *STRIDE* Modbus Gateway module in the lower left hand corner. Match everything else as shown:

Connection Setup	X
Connection	ОК
Modbus TCP/IP	
Serial Settings	Lancel
Communications Port (COM1)	Mode
9600 Baud 👻	RTU O ASCII
8 Data bits 🕑	Response Timeout 1000 [ms]
Even Parity 💟	Delay Between Polls
1 Stop Bit 🐱 Advanced	10 [ms]
Remote Server	
IP Address Port Conn	ect Timeout
192.168.0.249 502 3000	[ms]

Click on OK to connect to the STRIDE Modbus Gateway.

If everything has been configured correctly, the counter next to "TX =" will increment rapidly and the counter next to "Err =" will not increment. If the Error counter is incrementing, go back and verify that all the steps prior to this one have been followed. If you get an error that says, "Modbus TCP connection failed", verify that the IP address of the PC and the IP address of the *STRIDE* Modbus Gateway are in compatible subnets and can communicate.

Nodbus Poll - Mbpoll1	
File Edit Connection Setup Functions Display View Window Help	
🗋 🖻 🖨 🖨 🗙 🔚 🗒 🔀 🗂 🗒	101 🦞 隆
👺 Mbpoll1	
Tx = 60: Err = 0: ID = 1: F = 03: SR = 100ms	
Alias 4x0000	
2	
3	
4	
5	
6	
7	
8	
9	
10	
For Help, press F1.	192.168.0.249: 502

Once Modbus Poll is communicating to the PLC, go into Do-more! Designer, open a Data View window and enter MHR1. Change the display type to "Decimal" to match the Modbus Poll

Change the value in data view for MHR1 to various values and watch the value change in Modbus Poll to match.

## EXAMPLE 2:

## USING MODBUS POLL TO STRIDE MB GATEWAY WITH CLICK SLAVE

This example will illustrate how to use Modbus Poll, which is a PC based Modbus master simulator tool, to connect through the *STRIDE* Modbus Gateway to a CLICK PLC via 2 wire RS-485.

#### ITEMS NEEDED FOR THIS EXAMPLE:

- STRIDE Modbus Gateway
- CLICK PLC (any CO-01xx-x or CO-02xx-x PLC with 3 pin terminal RS-485 port)
- PC with Modbus Poll installed (free demo is available at www.modbustools.com)
- Small length of AutomationDirect L-19954 RS-485 cable or equivalent
- Ethernet switch and cables to connect from the PC to STRIDE Modbus Gateway

#### STEP 1: CONNECT THE STRIDE MODBUS GATEWAY SERIAL PORT TO PORT 3 OF THE CLICK PLC.

Using the short length of RS-485 cable, connect the STRIDE Modbus Gateway to CLICK's Port 3 as shown:



#### STEP 2: CONFIGURE THE CLICK SERIAL PORT.

Connect to the CLICK PLC with CLICK programming software. Go to the Setup pulldown and select Com Port Setup... as shown:

CLICK Programming Software - NewProject1.ckp - [Main Program]	>	×
🔄 File Edit View Setup Program Instruction PLC Monitor Window Help	- 8	×
🗋 📸 🗔   🍜 🛕 🦉 System Configuration 🥙 🍃 🛛 😵 🧠 🧠 🖉 🧏 🚳 🖗 👘 👘 🐜	🐀 🚯 🛯	
PLC Mode   PLC Error   Nicknames Address Comments	Rung Comments	à
Navigation O Scan Time C D E F AF	Instruction List	×
Program Function P 🔦 Watch Dog Timer	Instruction	•
- A Ladder Program O Password Setup Ctrl+Shift+P	Edge Contact	
The Main Program in Battery Backup Setup	Compare	
Subroutine	Coil	
Interrupt Pro Interrupt Sectors.     (NOP)	Hunni Out	
- Address Pic Salter IVO Setup	() mi Set	
Edit Rung C Software Setup	(ini) Reset	
Local Program and market and a rest of the second sec	Timer/Counter	
Orins Ories	Int Counter	
	Advanced	
Status Monitor	tath Math	
b-T Data View	Dium Drum	
- VIII DataView1 5	SR Shift Register	
Text View	Copy/Search	
Override View	Copy	
System Monitor	skoll Search	
	Program Control	
7 (NOP)	Even For	
	NAT Next	
	END End	~
→F		
Com Port S 🖪 Bit 🚺 Integer 🔟 Integer(2 words) 📳 Floating point 📔 Hex 🎹 Text 🛕 Ascii Offline 🛛 0000/8000 🛛 CO-02DD1-D	1:1:AF	:

Click the Port 3: Setup... button to configure Port 3 of the PLC.

COM Port Setup	×
COM Port Setup There are only 3 ports on C0-02DD1-D CPU Module 00-02D01-D CPU Module 00-02D01-D 01 x1 x2 x3 x4 RNN 02 CPU Module 00-02D01-D 01 x1 x2 x3 x4 CPU Module 00-02D01-D 01 02 00-02D01-D 01 02 02 02 02 02 02 02 02 02 02	Port 1: The setup of this port is fixed. It works as a network slave only. This port is used for programming and maintenance only. Learn More Setup Port 2: This port is used for general purpose communication that uses RS-232. This port can be a network master or slave. Learn More Setup Port 3:
PORT2 AD21 PORT3 RS-485 DATV TX3 + DATV DATV DATV	This port is used for general purpose communication that uses RS-485. This port can be a network master or slave.
R.3 LG DA21	OK Cancel Help

Configure the port for 38400 baud rate, Odd parity, 1 Stop Bit and Node Address 1. Leave the other settings as shown below. Note the Node Address number configured here. Once the settings are configured, Click on the Ok button.

t Setup Details				
Port3 v Protocol: Mo	dbus	$\sim$		
Configuration			Wiring Details	
Node Address (1-247):	1	<b></b>		
Baud Rate (bps):	38400	~	Port3 RS-485 (Non isolation)	
Parity:	Odd	$\sim$	3 pin Removable Terminal Block	
Stop Bit:	1	$\sim$	book	
Communication Data (bit):	в	$\sim$		
ced Configuration				
Time-out Setting:	500 ms	$\sim$		
aracter Time-out (2-1000ms):	2	▲ ▼		
RTS ON Delay (0-5000ms):	0	*		
RTS OFF Delay (0-5000ms):	0	*		
onse Delay Time (0-5000ms):	0	▲ ▼		
RTS OFF Delay (0-5000ms):	0	▼ ▼ OK	Cancel	Help

Next, transfer the project to the PLC for the Port 3 settings to take effect. Select the PLC pulldown menu and choose Write Project into PLC...

CLICK Programming Software - NewProject1.ckp - [	Main Program]		– 🗆 X
🖼 File Edit View Setup Program Instruction	PLC Monitor Window Help		_ 8 ×
🗅 🧉 🖬 🏼 🖾 🔲 👘 👘	<mark>∲∳</mark> <u>C</u> onnect	📐 🥝 🕑 🚳 🛛 🚧 🐘 🕷	i 🛍 🚯 🖬   🏊 🐞
🔳 🔞 🛛 🥏 🖉 📃 📕	PJ Disco <u>n</u> nect	Nicknames Address Comment	s Rung Comments
CLICK Programming Software - NewProject1.ckp - [Main Program] File Edit View Setup Program Instruction File Edit View Setup Program Instruction PC Connect Discognect Navigation F AF Navigation F AF Navigation F AF Navigation F AF Instruction F AF Instruction		Instruction List	
Program Function PLC	Write Data into PLC		Instruction
Ladder Program 1	Read Project from PLC Ctrl+F9	(END)	🚯 Edge Contact 🔺
Main Program     Subroutine Program	Write Project into PLC Shift+F9		Compare
Interrupt Program	Ut Online Project Information		Cut Out
- Address Picker	PLC Modes     Ctrl+Shift+R	(Nor)	en Set
			Timer/Counter
- Vintax Check	Lerror History	(Nor)	THE Timer
Cross Reference View	Update Firmware		CNT Counter
Katus Monitor	Parat to Easton: Default		taransou taransou taransou
Data View	Reset to ractory berault		Drum Drum Shift Degister
TXT Text View		(1101)	Copy/Search
Override View			сору Сору
System Monitor		(1101)	Starch Program Control
7			tall Call
		(1101)	FOR For
		¥	
		>	. <u> </u>
-1 -         -1 - <t< td=""><td></td><td></td><td></td></t<>			
Write Projec 🖪 Bit 🚺 Integer 🔟 Integer(2 words) 📭 F	loating point 📔 Hex 頂 Text 🛕 Ascii Offline	0000/8000 C0-02DD1-D	1:1:AF

Choose Ok and follow the steps when prompted to transfer the project to the PLC.

Read/Write Program		
PC		PLC
Project Name: MBGATEWAY1		Project Name: MBGATEWAY1
Program Size (Total: 8,000 steps)		Program Size (Total: 8,000 steps)
Program Size: 3 steps (	0.03 %)	Program Size: 3 steps ( 0.03 %)
Free Area: 7,997 steps (	99.97 %)	Free Area: 7,997 steps ( 99.97 %)
0	8,000	8,000
Save Project to PLC Memory		Project File (Total: 256,000 bytes)
Recovery data is written with the project.		Project File Size 964 bytes ( 0.37 %)
The project cannot be read from the PLC		Free Area: 255,036 bytes ( 99.63 %)
without this option being selected.		
		0 256,000
Last Update: Mar 22,20	11, 15:15:37	Last Update: Mar 20,2011, 12:10:2
		OK Cancel Help

#### STEP 3: CONFIGURE THE STRIDE MODBUS GATEWAY

Open up a web browser, such as Internet Explorer, enter in the IP address of the *STRIDE* Modbus Gateway, and log into the *STRIDE* Modbus Gateway web console as described in the Initial Connection section of Chapter 2 to access the Device Information as shown:

		S	<b>Str</b> ide			Exit
Device Information			Device Informa	ation		Help
Network Settings     Operating Settings	Device Name	SGW-MB1524-T	SN		K10A0004A180100036	
Serial Settings	Model Type	MB-Gateway	Firm	ware Version	V3.5.019	
Import/Export     Import/Export	IP(E1)	192.168.0.249	MAC	C(E1)	00:1E:CD:1B:FA:15	
Change Password	IP(E2)	192.168.1.249	MAC	(E2)	00:1E:CD:1B:FA:16	
Load Factory Default     System Reboot     Data Diagnostics	(	Agent Mode				, ,

Set the gateway to Transparent Mode.

On the Operating Settings page, set Serial Port 1 to RTU Master mode as shown below and click Save.

$\leftrightarrow$ $\rightarrow$ O	192.168.	0.249/index_v3.5.html				□ ☆	∑≞	l~	È	
				Stride	).				Exit	
								ł	Help	
Device Information				Opera	ing Settings					
Network Settings     Operating Settings		S1		S2	\$3	S4	4			
Serial Settings     Import/Export		Serial Port Mode	RTU Master	$\checkmark$						
Upgrade Firmware		Filter Enable								
Change Password		Filter ID Start	1							
<ul> <li>Load Factory Default</li> <li>System Reboot</li> </ul>		Filter ID End	247							
Data Diagnostics		Protocol	TCP 🗸							
		Gateway Modbus TCP Port	502							
			•							
					Save					

## Click "Serial Settings" from the navigation menu

$\leftarrow$ $\rightarrow$ $\circlearrowright$ 192.	168.0.249/index_v3.5.html				★ 烽 ル	<i>è</i>
		<b>Str</b> ic	e			<mark>Exit</mark>
					F	lelp
Device Information		S	erial Settings			
Network Settings     Operating Settings		S1	S2	S3	S4	
Serial Settings	Alias	UART_1	UART_2	UART_3	UART_4	
Import/Export     Ingrade Eirmware	Baudrate	38400 ~	115200 ~	115200 ~	115200 ~	
Change Password	Databits	8 ~	8 ~	7 ~	8 ~	
Load Factory Default	Stopbits	1 ~	1 ~	1 ~	1 ~	
Data Diagnostics	Parity	Odd ~	None 🗸	None ∨	None 🗸	
	RTS Control	Off ~	Off ~	Off ~	Off ~	
	Hardware Interface	RS-232 ~	RS-232 ~	RS-232 ~	RS-232 ~	
	Protocol(selected on Operating Settings page)	RTU Master $~\sim~$	RTU Slave $\sim$	Disabled $\sim$	RTU Master $~ \lor ~$	
						_
			Save			

Set the serial port parameters to match the configuration of the CLICK PLC, and set the hardware interface to RS-485 2-wire.

Click "Save" to store and apply the settings.

#### STEP 4: CONNECT TO THE STRIDE MODBUS GATEWAY USING THE MODBUS POLL SIMULATOR SOFTWARE.

Once the software has been obtained from *www.modbustools.com* and installed according to the directions provided from their website, open up the Modbus Poll software.

Click on the Setup pulldown menu and select Read/Write Definition as shown:

원 <mark>을</mark> Modbus Poll - Mi	opoll1		
File Edit Connection	Setup Functions Display	View Window He	łp
🗅 🖻 🖥 🎒 🗙	Read/Write Definition Read/Write Once	F8 22 23	i 101 🤋 🎀
🔛 Mbpoll1	✓ Read/Write Disabled	Shift+F6	
T× = 0: Err = 0: ID No Connection	Excel Log Excel Logging Off	Alt+X BLED	]
Alias 0	Log Logging Off	Alt+L Alt+O	
1 2	Reset Counters Use as Default	F12	
3 4			
5			
7			
8			
9			
Read/write definition			Port 1: 9600-8-E-1

Configure the Read/Write definition for a simple read of the register 400001, which equates to DS1 in the CLICK PLC as shown.

CLICK Programming Softw	are - NewProject1.ckp - [Main Program]	– 🗆 X
🖼 File Edit View Setup	Program Instruction PLC Monitor Window Help	_ & ×
🗅 🧉 🔙 🎯 🞑	🙀 Add New Subroutine Program Ctrl+U 🛛 🔍 🖉 🝈 🐁 🥥 报 🙀 👘 📲 🦉 👔	in 🐂 🚯 💵   🏊 🐀
🔳 🖬 🛛 🖉 🏓 🔈	Add New Interrupt Program Ctrl+1	ts Rung Comments
Navigation		Instruction List ×
Program Function PLC	Pedit Runa Comments Ctrl+K	Instruction +
🖃 🧀 Ladder Program	Local Program Information     END	Edge Contact 🔥
🔛 Main Program		🛒 Compare
- Wei Subroutine Program		Coil
- P Address Picker	Cross Reference View (NOP )	ing Out
- Edit Rung Comment:	IS	(m) Reset
	mation 3 (NOP)	Timer/Counter
Cross Reference Vie	ew	CNT Counter
🖻 🖾 Monitor	4 (NOP)	Advanced
Status Monitor		<u>a</u> t Math nam Drum
DataView1	5(NOP)	SR Shift Register
Text View		Copy/Search
System Monitor	6 (NOP)	Copy Search
Und Oystein Montor		Program Control
	7 (NOP)	Call
		FOR FOR
	· · · · · · · · · · · · · · · · · · ·	END End 🗸
		<u>.</u>
F2 F3 F2 F3 5	<b>1TF 14F 1=F 1≠F 1≥F 1≤F 5</b> ₩F2 <b>5</b> ₩F2 <b>5</b> ₩F2 <b>= ! &gt; ≤</b>	
Address Pic 🖪 Bit I Integer 🛽	😰 Integer(2 words) 📘 Floating point 📙 Hex 頂 Text 🛕 Ascii Offline 🛛 0003/8000 🛛 CO-02DD1-D	1:1:AF

<i>@</i> /	Address Pie	cker : Edit Mode							$\times$
	Fill Down (	(Nickname) Find:	∠ ✓ ⊻ Exact	Match Find					_
All	Address	Data Type	MODBUS Address (Function code)	Nickname	Used	Initial Value	Retentive	Address Comment	<u>^</u> ا
	DS1		400001 (03,06,16)		No	Disable	Yes		- 1
X	DS2		400002 (03,06,16)		No	Disable	Yes		-
Y	053		400003 (03,06,16)		NO	Disable	res		-
c	054		400004 (03,06,16)		NO	Disable	res		-
т	DSS		400005 (03,06,16)		NO	Disable	res		-
CT I	DS6		400006 (03,06,16)		No	Disable	res		-
	DS7		400007 (03,06,16)		No	Disable	res		-
SC	DS8		400008 (03,06,16)		No	Disable	res		-
De	DS9		400009 (03,06,16)		No	Disable	Yes		-
03 no 1	DS10		400010 (03,06,16)		No	Disable	Yes		-
טט	DS11		400011 (03,06,16)		No	Disable	Yes		-
DH	DS12		400012 (03,06,16)		No	Disable	Yes		-
DF	DS13		400013 (03,06,16)		No	Disable	Yes		-
	DS14	RW	400014 (03,06,16)		No	Disable	Yes		-
XD	DS15	RW	400015 (03,06,16)		No	Disable	Yes		-
YD	DS16	RW	400016 (03,06,16)		No	Disable	Yes		-
TD	DS17	RW	400017 (03,06,16)		No	Disable	Yes		-
CTD	DS18	RW	400018 (03,06,16)		No	Disable	Yes		-
SD	DS19	RW	400019 (03,06,16)		No	Disable	Yes		-
TVT	DS20	RW	400020 (03,06,16)		No	Disable	Yes		-
	DS21	RW	400021 (03,06,16)		No	Disable	Yes		~
	Data Typ Displ	pe Filter lay All Data Types integer 12 Intr IEX FOR Sit T Tes	eger (2Words) ating Point ct	ress sed and unused sed nused	Display MC MODBUS	DBUS Address 984 Addressin HEX Addressin Export	g		
						OK	Cance	el Help	

Enter 1 for the Slave ID. This matches the Unit ID in the protocol that will determine which Modbus Serial slave will be targeted on the serial side of the **Stride** Modbus Gateway. Entering 1 here will match up to the Station Number configured above in the CLICK software.



Choosing Function 3 sets up the read for 4xxxxx registers. Checking the "PLC Addresses (Base 1)" in the lower right corner matches the addressing to the cross reference chart mentioned above. Once this window has been configured as shown above, click on OK.

Now click on the Connection pulldown menu and select Connect:

21 N	lodbi	us Poll -	Mbpoll1												-	
File	Edit	Connectio	on Setup	o Fun	ctions	Display	/ Viev	v Win	ndow	Help						
D	<b>2</b>	Conne Discon	nect 😽	F3 F4	<u>i</u>	Π. 05	06 1	5 16	22	23	101	ę	₩?			
Tx	Mbpd = 0:	Auto C Quick (	Connect Connect	F5	): SR	= 100	Oms	(DIS	ABL	ED)						
NU	COIII	lecuoli														
	J	Alias	4	×0000												
1				0												
2																
3																
4																
5																
6																
7																
8																
9																
10																
Conne	ect											Port	1:96	00-8	-E-1	

In the Connection Setup window, choose the Modbus TCP/IP connection type. Enter the IP address of your *STRIDE* Modbus Gateway module in the lower left hand corner. Match everything else as shown:

Connection Setup	×
Connection	ОК
Modbus TCP/IP	
Serial Settings	Cancel
Communications Port (COM1)	Mode
9600 Baud 💌	RTU OASCII
8 Data bits 💽	Response Timeout 1000 [ms]
Even Parity 👻	Delay Between Polls
1 Stop Bit 💉 Advanced	10 [ms]
Remote Server	
IP Address Port Conne	ct Timeout
192.168.0.249 502 3000	[ms]
	)

Click on OK to connect to the *STRIDE* MB Gateway.

If everything has been configured correctly, the counter next to "TX =" will increment rapidly and the counter next to "Err =" will not increment. If the Error counter is incrementing, go back and verify that all the steps prior to this one have been followed. If you get an error that says, "Modbus TCP connection failed", verify that the IP address of the PC and the IP address of the *STRIDE* Modbus Gateway are in compatible subnets and can communicate.



Once Modbus Poll is communicating to the PLC, go into the CLICK programming software, open up a Data View window and enter in DS1 as shown.

👬 Data View -[DataView1]							
Ed	lit Fill [	own	谢 <u>W</u> rite A	ll New Values		View Override	VR OFF
No.	Address	Nickname	Current Value	New Value	Write	Viewing Format	~
001	DS1	400001	0			Integer	
002							
003							
004							
005							
006							
007							
008							~
	xport					Close	Help

Change the value in data view for DS1 to various values and watch the value change in Modbus Poll to match.

## EXAMPLE 3:

## USING P3000 AS MASTER (CLIENT) TO STRIDE MODBUS GATEWAY WITH CLICK SLAVE.

STEP 1: CONNECT CLICK TO THE STRIDE MODBUS GATEWAY AS SHOWN IN EXAMPLE 2.

# STEP 2: CONNECT P3000 CPU (P3-550) TO STRIDE MODBUS GATEWAY VIA ETHERNET SWITCH AND TWO ETHERNET CABLES.

Configure the IP address of the P3000 or P3-550 CPU and the *STRIDE* Modbus Gateway to be compatible subnets. Steps to configure the IP address of the P3-550 CPU areas follows:

Click on Setup on the top menu bar and choose "Hardware Configuration".

Productivity Suite Programming Software, Version 3.1.0 (11) [No Name] -					
File Edit Setup CPU Tools Window Help					
🗋 🕼 🛃 🔐 Hardware Config 🚬 🔹 📲 🦉 🥒 Offine 🖉 Online 🧟 Choose CPU 🍓 Run 🔞 Stop 👘 🦉 🍪 🗢 📲 🍓 🖄 🎕 🖓 🎕 🕷					
Application 1 4/0 Overview Hardware Config					
Setu Comm Adapter Config > 7 🗟 🔄 🛶 🛶 Run Every Scan 🗸 🗞 Monitor 👻 🛙 Favorites					
H S Set CPU Time/Date 2 3 4 5 6 7 8 9 10 11					
Data Logger					
S Security Accounts					
Set CPU Time/Date					
- Tag Database					
1/0 Overview (END ) 1/0 Overview 1/0 Overview1/0 Overview1/0 Overview1/0 Overview1/0 Overview1/0 Overview1/0 Overview1/0 Overview1/0 Overview					
Rung Comments					
Compare Project 4 – Coils					
Problem Report					
- CENU ) (ENU ) (ENU ) (ENU ) (ENU )					
< > 6 (END ) (Will No Operation					
Task Management					
Tasks					
END ) [BUILDE Store Coll					
Run Every Second					
Run When Called     In Ca					
Application Functi					
User No Security Task New Task Rung 1 Column 1 CPU Offline Project File Status Saved CPU Project Status Run Time Transfer					

Double click on the image of the P3-550 in the center of the hardware configuration.



Click on the "Ethernet Ports" tab and configure the IP address in the "Use the Following:" IP address field. Once the correct IP address and Subnet Mask is entered, click on the OK button and close the hardware configuration window.

P3-550 ×
P3-330       CPU Module         Options       Ethernet Ports       Remote Access       Serial Ports         Image: CPU The second secon
Module Info OK Cancel Help

Transfer the project to the PLC in order to have the new settings take effect. To do this, select File from the pulldown menu and then Transfer Project >To PLC...

File       Edit       Setup       CPU       Tools       Window       Help         New Project       Image: Choose CPU       Run       Stop       Image: Choose CPU       Run       Image: Choose CPU       Run       Image: Choose CPU	•				
New Project       Image: Choose CPU image: C	• •				
Open Project       ew Task         Close Project       E I I I I I I I I I I I I I I I I I I I	^				
Close Project					
Save Project Ctrl+S 1 2 3 4 5 6 7 8 9 10 11 M ASCII In					
Save Project As					
🗞 Import >	er				
Export > END ) USE Custom Protocol Eth END )	rnet				
Compile Project F8					
Transfer Project > To CPU Shift+F9 (END ) (CPU Custom Protocol Out					
Page Setup 🐼 From CPU Ctrl+F9					
🕒 Print Ctrl+P 🏂 To Removable Media (END )	e				
Project Properties Trom Removable Media (END )					
Sorres write     Sorres write     Sorres					
6 (END) (With SWite					
Task Management					
Larker - Lar					
e- Run Every Scan					
New Task     Sond     Data Handling					
Run When Called					
Ling Disable Task	~				
Licer No Servity Tack New Tack Dung 1 Column 1 COLI Offine Project File Statue Not Saved COLI Project Statue Dung Transfer					

### STEP 3: CONFIGURE THE MRX INSTRUCTION TO READ DATA FROM THE STRIDE MODBUS GATEWAY.

Double click on the instruction MRX Read to configure the MRX instruction as shown.

Modbus Read (MRX)		×			
	Use Structure	· · · · · · · · · · · · · · · · · · ·			
● Ethernet Port CPU-ETH-Ext ∨	In Progress	Click1_Read1_InProg ~			
IP Address 192.168.0.249	Complete	Click1_Read1_Comp ~			
TCP Port Number 502	Success	Click1_Read1_Success $\lor$			
Slave Node Number 1 (Defa	ault=255) Error	Click1_Read1_Err v			
○ Serial Port CPU-232 ∨	Timeout	Click1_Read1_TimeOut ~			
Slave Node Number 1 (Defa	ault=1) Exception Response String	Click1_Read1_ExResp ~			
Addressing and Polling Options					
Automatic Polling every	100 msec poll of	fset 0 msec			
Skip execution if buffer is greater than 75 % full					
Word Swap     Slave Modbus Starting Address     1     + 400000       Map 16 bit data to 32 bit <ul> <li>Modbus Decimal Addressing</li> <li>Zero Based Modbus Addressing</li> </ul>					
Modbus Function Code 3: Pead Holding Pe	agisters				
Non-Array					
Number of Tags 1	Tag CLICK DS1				
O Array Array Name	<ul> <li>Starting I</li> </ul>	ndex 1 End Index 1			
O String String Name	<ul> <li>Number a</li> </ul>	f Characters 2			
Byte Swap	(Even Nu	mber Only)			
Show Instruction Comment					
Monitor	0	K Cancel Help			

**IP Address:** address of the *STRIDE* Modbus Gateway.

TCP Port Number: Leave at default 502.

- **Slave Node Number:** This should match the Node address of Port 3 of the CLICK PLC. Leave at 1 in this case.
- **Slave Modbus Starting Address:** Set to 1 to read address DS1 in the CLICK PLC.

**Tag Name Mapping:** Create a Tag called CLICK\_DS1 as an Signed Int 16 Tag to read in DS1 from the CLICK PLC.

Use the status bits and Exception Response String to verify whether communications were successful or not. If the Error bit comes on, look at the Exception Response String to see which error occurred. If the Timeout Bit comes on, check the IP address settings of the P3-550 and the *STRIDE* Modbus Gateway and make sure that they are in compatible subnets.

If the Successful Status bit comes on, add the CLICK\_DS1 tag to the Data View at the bottom of the Productivity Suite Programming Software and check the values. Change the values in the CLICK data view for DS1 and verify that the CLICK\_DS1 tag matches.