



DeviceMaster UP Modbus Router Shared Memory | Controller to Controller Communication



Today's Modbus installations are becoming increasingly complex. More and more installations are requiring the use of multiple Modbus controllers and the need to share information between the controllers is becoming increasingly important.

Sharing information between Modbus controllers can be relatively easy if one controller can communicate as a master (or client) and the other as a slave (or server). The master controller simply sends a message to the slave controller and the slave responds. However, what do you do when each controller can only be configured as a master?

The DeviceMaster UP, running with the Modbus Router firmware, provides master-to-master connectivity using a configurable Shared Memory sub-system. The Shared Memory sub-system features eight Holding Register blocks containing 200 registers each, and eight coil blocks containing 160 coils each. Write access for each Shared Memory block can be either enabled for all masters or restricted to a single master. Write messages that are addressed to restricted block(s) from unauthorized master(s) are rejected, logged, and displayed in the Write Violation Log web page.

Additional web pages provide configuration, diagnostics, and status information for the Shared Memory blocks.

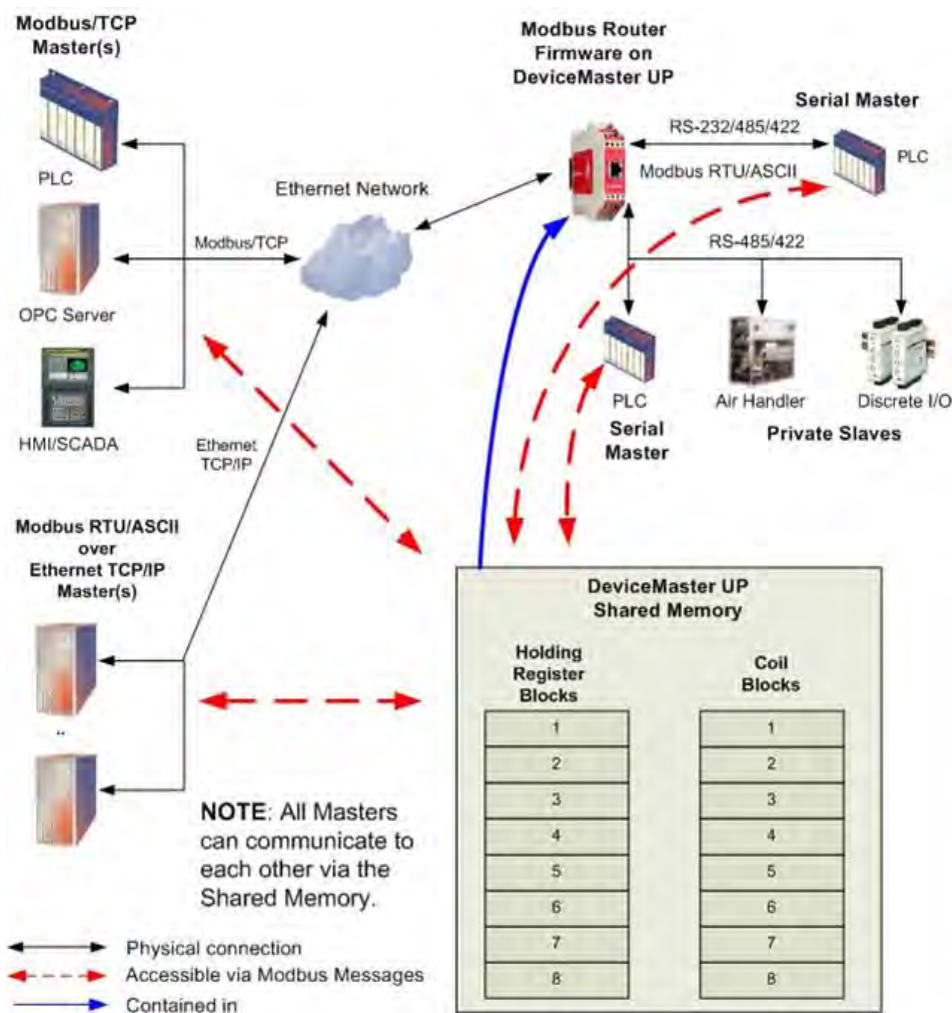
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1 Shared Memory Functionality

The Shared Memory functionality has been added to provide a simple and robust method for master-to-master communication.

- The Shared Memory interface contains eight 200 Holding Register blocks and eight 160 Coil blocks.
- All Modbus masters, (Modbus/TCP, serial Modbus RTU/ASCII, and Modbus RTU/ASCII over Ethernet TCP/IP), can read the contents of the Shared Memory blocks.
- Write access can be controlled to each Holding Register and Coil block. Each block can be configured to provide all masters write access or be restricted to a port-specific serial master, a Modbus/TCP master, or an Ethernet TCP/IP master.
- The Shared Memory contents can be displayed and cleared via the embedded web pages.
- Diagnostics for each block include read, write, and blocked (rejected) write message counts.
- Blocked write messages are recorded in the write violation log.



Modbus Router Shared Memory Functionality

1.1 Web Pages

Embedded web pages provide configuration, diagnostics, and status of the Shared Memory blocks.

1.1.1 Shared Memory Configuration/Status Page

This page displays the current Shared Memory configuration and provides various links to edit the configuration and display the diagnostics and shared memory block contents.

Control Corporation - Device x

10.0.0.102/displaySharedRamConfig.asp?

CONTROL® DEV/CE-MASTER® UP

Shared Memory Configuration/Status

[Home](#) [Serial Interface Configuration](#) [Ethernet TCP/IP Interface Configuration](#)
[Communication Statistics](#) [Alias Modbus Device ID Config/Status](#) [Remote Modbus/TCP Device Configuration](#)
[Display Serial Logs](#) [Modbus/TCP Interface Diagnostics](#) [Display All Modbus Slave Devices](#)
[Shared Memory Config/Status](#)

[Edit Shared Memory Configuration](#)

Shared Memory Enable: Yes
Shared Memory Device ID: 25

Shared Holding Registers Configuration:

	<u>Block</u>	<u>Address Range</u>	<u>Write Mstr(s)</u>	<u>IP Address</u>	<u>Description</u>
Edit Display	1	400001-400200	Port-1		Hld reg 1 - 200 read write hold registers
Edit Display	2	400201-400400	Port-2		Hld reg 2 - 200 read write hold registers
Edit Display	3	400401-400600	Port-3		Hld reg 3 - 200 read write hold registers
Edit Display	4	400601-400800	Port-4		Hld reg 4 - 200 read write hold registers
Edit Display	5	400801-401000	Modbus/TCP	10.0.0.10	Hld reg 5 - 200 read write hold registers
Edit Display	6	401001-401200	Ethernet TCP/IP	10.0.0.11	Hld reg 6 - 200 read write hold registers
Edit Display	7	401201-401400	Modbus/TCP	10.0.0.101	Hld reg 7 - 200 read write hold registers
Edit Display	8	401401-401600	All		Hld reg 8 - 200 read write hold registers

Shared Coils Configuration:

	<u>Block</u>	<u>Address Range</u>	<u>Write Mstr(s)</u>	<u>IP Address</u>	<u>Description</u>
Edit Display	1	1-160	Port-1		coil reg 1 - 160 readwrite coils
Edit Display	2	161-320	Port-2		coil reg 2 - 160 readwrite coils
Edit Display	3	321-480	Port-3		coil reg 3 - 160 readwrite coils
Edit Display	4	481-640	Port-4		coil reg 4 - 160 readwrite coils
Edit Display	5	641-800	Modbus/TCP	10.0.0.10	coil reg 5 - 160 readwrite coils
Edit Display	6	801-960	Ethernet TCP/IP	10.0.0.11	coil reg 6 - 160 readwrite coils
Edit Display	7	961-1120	Modbus/TCP	10.0.0.101	coil reg 7 - 160 readwrite coils
Edit Display	8	1121-1280	All		coil reg 8 - 160 readwrite coils

1.1.2 Display Shared Memory Holding Register Block Page

This page displays the contents of a Shared Holding Register block.

Control Corporation - Device

10.0.0.102/displayShrAmHldRegBlk.asp?blkIndex=2

CONTROL® DEV/CE-MASTER® UP

Display Shared Holding Register Block 3

[Home](#) [Serial Interface Configuration](#) [Ethernet TCP/IP Interface Configuration](#)
[Communication Statistics](#) [Alias Modbus Device ID Config/Status](#) [Remote Modbus/TCP Device Configuration](#)
[Display Serial Logs](#) [Modbus/TCP Interface Diagnostics](#) [Display All Modbus Slave Devices](#)
[Shared Memory Config/Status](#) [Display Modbus Write Violation Log](#)

[Clear Holding Reg Block 3](#) [Clear Entire Shared Memory](#) << Previous Next >>

Write Enabled Mstr(s): Port-3

Description: Hld reg 3 - 200 read write hold registers

Statistics: [Write Msgs](#) [Read Msgs](#) [Blocked Wr Msgs](#) [Reset Statistics](#) Data Format: Hex 20-per-row [Update Format](#)

27950	231157	2
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Address	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12	+13	+14	+15	+16	+17	+18	+19
400401	1212	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
400421	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
400441	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
400461	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
400481	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
400501	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
400521	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
400541	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	1234	9876	5663	6781	3211	8888	9999	AAAA	BBBB	CCCC
400561	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
400581	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000

redhat ecos goahead WEB SERVER

Where:

- This individual holding register block or the entire Shared Memory can be cleared.
- Write, read, and blocked (rejected) write message counters are displayed.
- A Reset Statistics button is provided to clear the counters.
- The Data Format can be displayed in hex, decimal and ASCII character formats.

1.1.3 Display Shared Memory Coil Block Page

This page displays the contents of a Shared Memory Coil block.

Control Corporation - Device

10.0.0.102/displayShRamCoilBlk.asp?blkIndex=3

CONTROL DEV/CE-MASTER[®] UP

Display Shared Coil Block 4

[Home](#) [Serial Interface Configuration](#) [Ethernet TCP/IP Interface Configuration](#)
[Communication Statistics](#) [Alias Modbus Device ID Config/Status](#) [Remote Modbus/TCP Device Configuration](#)
[Display Serial Logs](#) [Modbus/TCP Interface Diagnostics](#) [Display All Modbus Slave Devices](#)
[Shared Memory Config/Status](#) [Display Modbus Write Violation Log](#)

[Clear Coil Block 4](#) [Clear Entire Shared Memory](#) << Previous Next >>

Write Enabled Mstr(s): Port-4

Description: coil reg 4 - 160 readwrite coils

Statistics: [Write Msgs](#) [Read Msgs](#) [Blocked Wr Msgs](#) [Reset Statistics](#)

Address	+15	+14	+13	+12	+11	+10	+9	+8	+7	+6	+5	+4	+3	+2	+1	+0	Total
481	0	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	1882h
497	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000h
513	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000h
529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000h
545	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000h
561	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000h
577	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000h
593	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000h
609	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000h
625	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000h

redhat ecos goahead WEB SERVER

Where:

- This individual coil block or the entire Shared Memory can be cleared.
- Write, read, and blocked (rejected) write message counters are displayed.
- A Reset Statistics button is provided to clear the counters.

1.1.4 Display Write Violation Log Page

This page displays Write Violation attempts to Shared Memory blocks and Ready-Only serial ports.

The screenshot shows a web browser window with the address bar displaying `10.0.0.102/displayWriteViolationLog.asp`. The page header includes the **CONTROL** logo and the text **DEV/CE-MASTER UP**. The main heading is **Modbus Write Violation Log**. Below this, there are several navigation links: [Home](#), [Serial Interface Configuration](#), [Ethernet TCP/IP Interface Configuration](#), [Communication Statistics](#), [Alias Modbus Device ID Config/Status](#), [Remote Modbus/TCP Device Configuration](#), [Display Serial Logs](#), [Modbus/TCP Interface Diagnostics](#), [Display All Modbus Slave Devices](#), [Shared Memory Config/Status](#), and [Display Modbus Write Violation Log](#). The log title is **Write Violation Log (Attempted Writes to Devices on Read Only Serial Ports or Write Protected Shared Memory)**. A button labeled **Reset Violation Log** is present. Below the button, it states **Maximum of 64 entries; Time Format: ddd hh:mm:ss:mss**. The log table has the following columns: **Entry**, **Time Since startup**, **Source**, **Protocol**, **DeviceId**, **Function Code**, **Address (Base 1)**, **Count**, and **Data**. The table contains 9 entries. At the bottom of the page, there are logos for **redhat**, **ecos**, and **goahead WEB SERVER**.

Entry	Time Since startup	Source	Protocol	DeviceId	Function Code	Address (Base 1)	Count	Data
1	001 02:08:19.010	SP=4	Modbus/RTU	25(Rx=1)	5 (Wr Single Coil)	450 (Shared memory)	1	(FFh)
2	001 02:08:23.480	SP=4	Modbus/RTU	25(Rx=1)	5 (Wr Single Coil)	451 (Shared memory)	1	(FFh)
3	001 02:10:33.420	10.0.0.10	Modbus/TCP	25(Rx=1)	5 (Wr Single Coil)	501 (Shared memory)	1	(FFh)
4	001 02:10:46.780	10.0.0.10	Modbus/TCP	25(Rx=1)	5 (Wr Single Coil)	505 (Shared memory)	1	(FFh)
5	001 02:15:57.440	SP=4	Modbus/RTU	25(Rx=3)	6 (Wr Single Register)	403 (Shared memory)	1	(6712h)
6	001 02:16:18.560	SP=4	Modbus/RTU	25(Rx=3)	6 (Wr Single Register)	436 (Shared memory)	1	(1234h)
7	001 02:24:19.680	10.0.0.10	Modbus/TCP	25(Rx=1)	5 (Wr Single Coil)	506 (Shared memory)	1	(00h)
8	001 02:31:29.710	SP=1	Modbus/ASCII	12	16 (Wr Holding Registers)	16	1	(6781h)
9	001 02:31:55.550	SP=1	Modbus/ASCII	13	16 (Wr Holding Registers)	26	1	(9910h)

2 Modbus Master-to-Master Connectivity

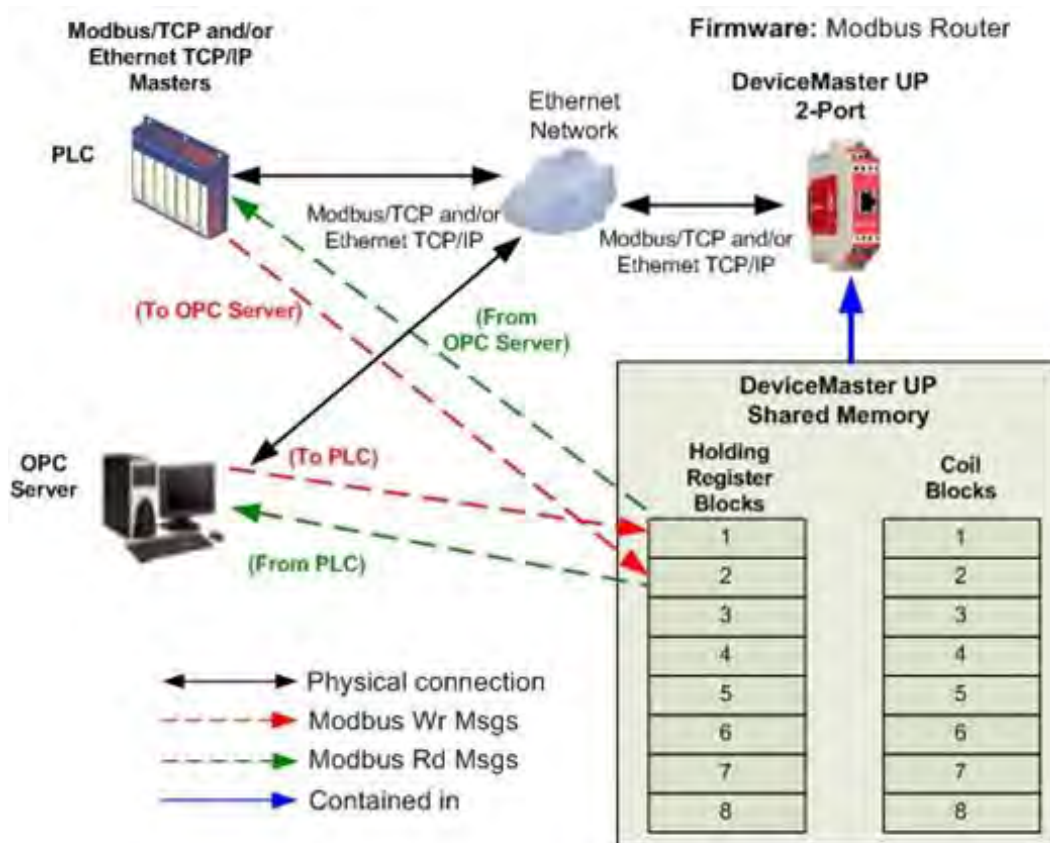
Multiple Modbus masters can communicate to each other through the DeviceMaster UP Shared Memory. Possible communication options include:

- Two Modbus masters communicating directly to each other through two separate Shared Memory blocks.
- One Modbus master writing data to be read by one or more Modbus masters.
- Modbus/TCP, Modbus over Ethernet TCP/IP, and serial Modbus master communication.
- Communication from master(s) to a serial master with slave(s) on the same serial bus.

2.1 Using Shared Memory to Communicate Between Two Modbus Masters

2.1.1 Two Modbus/TCP and/or Ethernet TCP/IP Masters

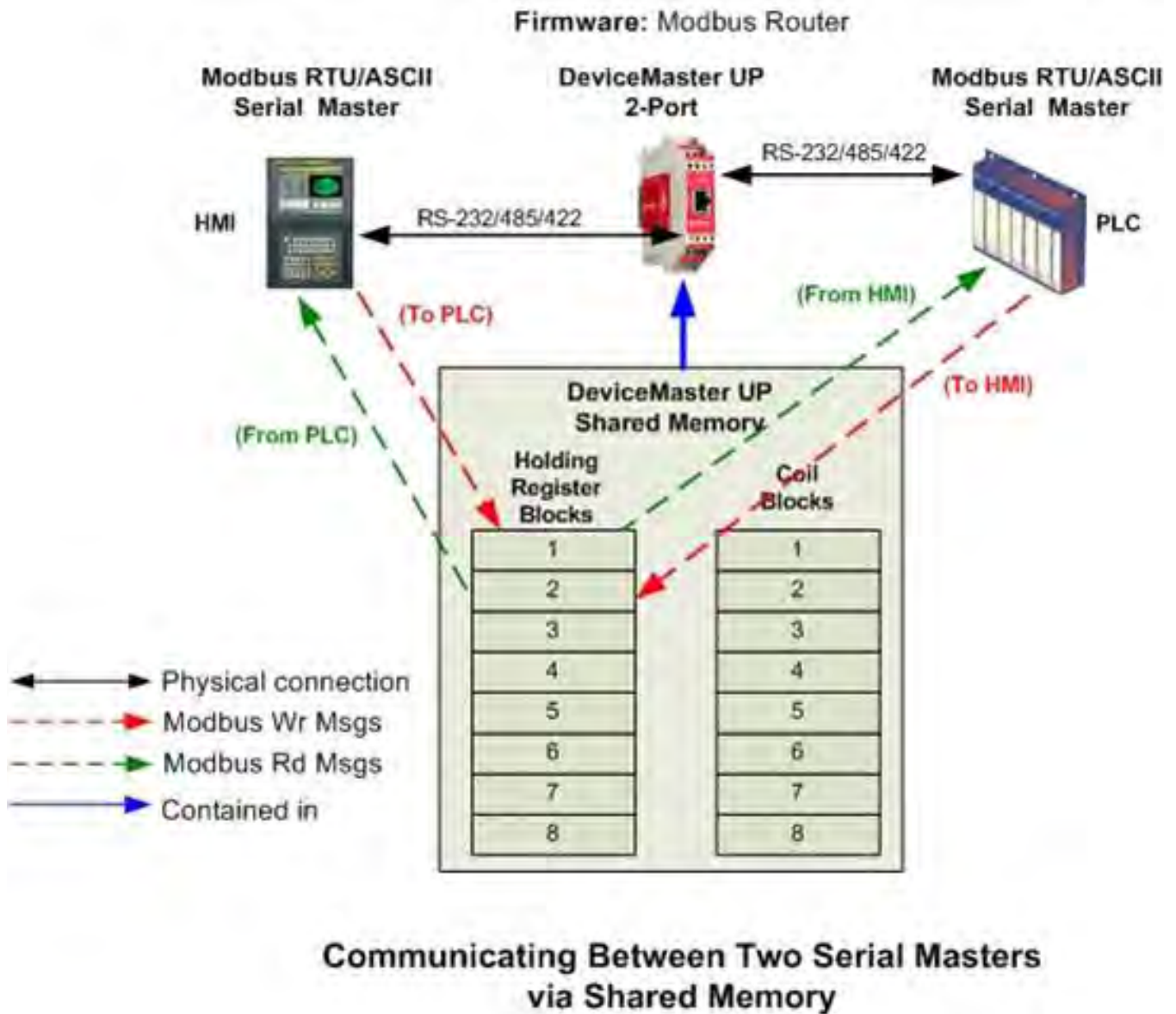
As shown in the following diagram, two Modbus/TCP and/or Ethernet TCP/IP masters can communicate to each other using the Shared Memory blocks.



Communicating Between Two Modbus/TCP and/or Ethernet TCP/IP Masters via Shared Memory

2.1.2 Two Serial Modbus Masters

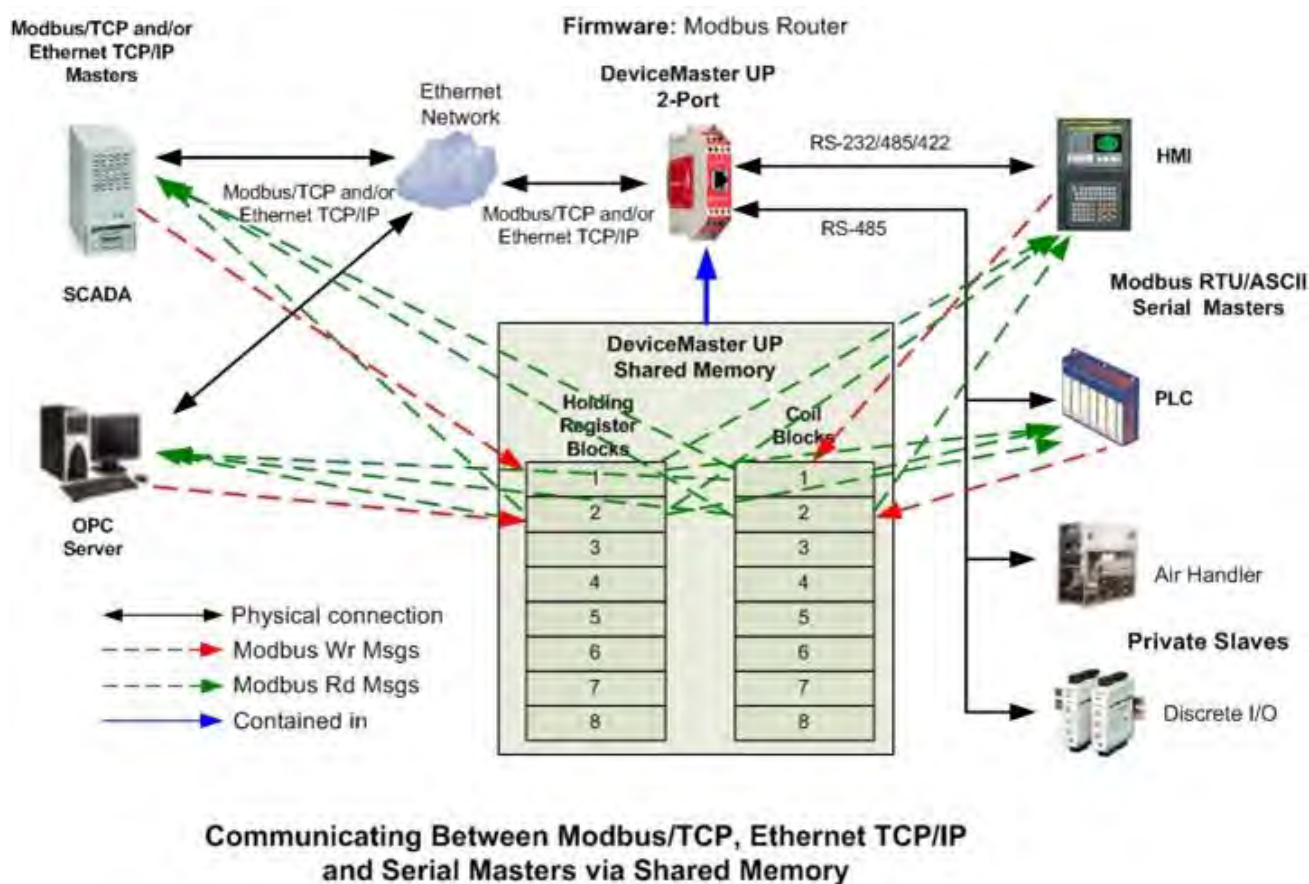
As shown in the following diagram, two serial Modbus masters can communicate to each other using the Shared Memory blocks.



Note: A serial connection can also be made with a 1-Port or 4-Port DeviceMaster UP.

2.1.3 Modbus/TCP, Ethernet TCP/IP, and Serial Modbus Masters

As shown in the following diagram, multiple Modbus/TCP, Ethernet TCP/IP and serial Modbus masters can communicate to each other using the Shared Memory Blocks. Please note that a serial bus connecting both a Modbus master and Modbus slaves can also be connected to a DeviceMaster UP.



Note: Serial connections can also be made with a 4-Port DeviceMaster UP.



Warranty Information
Control offers a 30-day satisfaction guarantee and 5-year limited warranty.

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