

# Niobrara Research & Development Corporation

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**MSTD-002** Momentum<sup>®</sup> Serial Tophat Effective: 22 March, 2004

## Introduction

The Momentum<sup>®</sup> Serial Tophat (MST) provides a serial communications adapter for Modicon Momentum I/O bases. The MSTD-002 allows I/O to be easily added to existing multidrop or point-to-point Modbus networks.

The MSTD-002 communicates Modbus RTU protocol at 9600 baud with 8 data bits and even or no parity.

The MSTD-002 is powered by the Momentum base. LED indicators show the state of POWER, Serial TX and RX. The green POWER LED should be on if the MSTD-002 is properly powered by the base. The POWER light will flash slowly if the unit is set to slave address 0. The yellow TX light is on while the MSTD-002 is transmitting data while the RX light indicates data arriving at the MSTD-002.

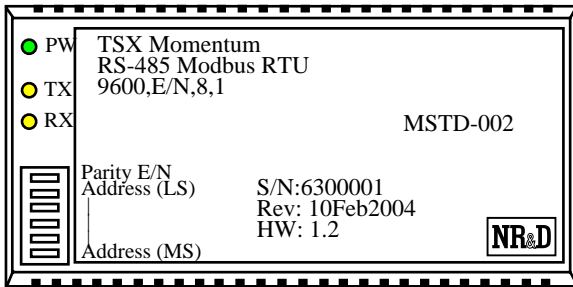


Figure 1 MSTD-002 Layout

## MSTD-002 Configuration

The MSTD-002 is configured through a 6 position DIP switch on its front. Switches 1, 2, 3, 4, and 5 control Slave Address while switch 6 sets the parity and data bits.

**NOTE:** The MSTD-002 only reads the DIP switches on power-up. Power must be cycled after changing the Parity or Slave Address.

1 = ON (left), 0 = OFF (right)

Figure 2 displays the DIP switch settings for a MSTD-002 set for Slave Address 13 and EVEN parity. From 1 to 6, the settings are 011011.

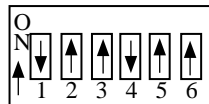


Figure 2 Example for Slave Address = 13, EVEN parity

1 = ON (up), 0 = OFF (down)

Table 1 Slave Address Switch Settings

Slave	SW1	SW2	SW3	SW4	SW5
N/A	0	0	0	0	0
1	0	0	0	0	1
2	0	0	0	1	0
3	0	0	0	1	1
4	0	0	1	0	0
5	0	0	1	0	1
6	0	0	1	1	0
7	0	0	1	1	1
8	0	1	0	0	0
9	0	1	0	0	1
10	0	1	0	1	0
11	0	1	0	1	1
12	0	1	1	0	0
13	0	1	1	0	1
14	0	1	1	1	0
15	0	1	1	1	1
16	1	0	0	0	0
17	1	0	0	0	1
18	1	0	0	1	0
19	1	0	0	1	1
20	1	0	1	0	0
21	1	0	1	0	1
22	1	0	1	1	0
23	1	0	1	1	1
24	1	1	0	0	0
25	1	1	0	0	1
26	1	1	0	1	0
27	1	1	0	1	1
28	1	1	1	0	0
29	1	1	1	0	1
30	1	1	1	1	0
31	1	1	1	1	1

**NOTE:** Power must be cycled after changing the Parity or Slave Address for the change to take effect.



## Network Connection

The MSTD-002 has a 5-position screw terminal 4-wire connection. The pinout is shown in Figure 3.

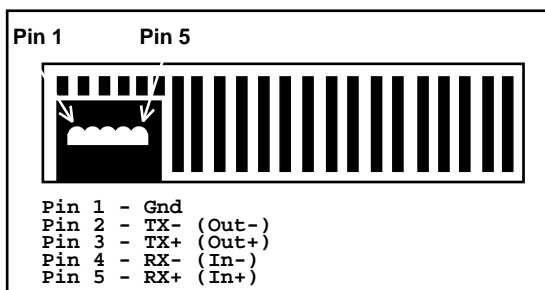


Figure 3 5-Pin RS-485 Port

## Register List

The Modbus models mimic the standard Modicon Ethernet Communication Adapter with some additional register support. The Output registers are zeroed on power-up and when the watchdog expires between write messages. The Watchdog register value is written to EEPROM for permanent setting. Setting the slave address to 0 returns the watchdog to factory default.

Table 2 MSTD-002Register List

Register	Description
4x00001 - 4x00032	Read - Base Inputs Write - Base Outputs
4x00101 - 4x00132	Read - Base Outputs Write - Base Outputs
4x00200 and 4x61441	Base Output Watchdog (0.01 second) Default = 3000 (30 seconds) The MSTD-002 must receive a write within the timeout or the outputs will zero.
4x00201 and 4x63489	Size of Status Block (const = 12)
4x00202 and 4x63490	Number of Input Words
4x00203 and 4x63491	Number of Output Words
4x00204 and 4x63492	Module Base ID code
4x00205 and 4x63493	Module Revision Number
4x00206 - 4x00209 and 4x63494 - 4x63497	N/A
4x00210 and 4x63498	Module Health (8000 is good Health)
4x00211 and 4x63499	Last I/O module error #
4x00212 and 4x63500	Count of I/O module errors
8009	RNIM Network ID (limited to 0-47)
8174	Write xC5C5 to save parameters to EEPROM