

Technical Bulletin, Serial I/O Modules: Installation Options



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NOTE: User Manual Reference - This Technical Bulletin complements the information contained in Volume 1, and is applicable to all firmware revisions.

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Scope

All OMNI 6000/3000 Flow Computers have serial communications capabilities via proprietary Serial I/O Modules.

Abstract

OMNI Flow Computers can come equipped with Serial I/O Modules that communicate with RS-232-Compatible and/or RS-485 devices. OMNI manufactures four (4) models of serial modules:

- Dual Channel RS-232-C Serial I/O Module Model # **68-6005**
- RS-232-C/RS-485 Serial I/O Module Model # **68-6205-A**
- RS-232-C/RS-485 Serial I/O Module Model # **68-6205-B**
- RS-232-C/RS-485 Serial I/O Module Model # **68-6205-F**

Each serial module has two (2) ports. OMNI 6000 Flow Computers can have up to three (3) serial modules installed for a maximum of six (6) ports. OMNI 3000 Flow Computers typically use one (1) serial module providing two (2) ports. Each serial communication port is individually optically isolated for maximum common-mode and noise rejection. Jumpers are provided for selection of module address and serial port communication standards. Communication parameters such as protocol type, baud rate, stop bits and parity settings are software selectable.

Features and Specifications

Proprietary serial modules and Multi-bus Serial I/O Interface specifications are per Table 1 and Table 2.

Table 1. OMNI Serial I/O Modules

MODEL #	TYPE	BASIC COMMUNICATION FEATURES
68-6005	Dual Channel RS-232-Compatible	<ul style="list-style-type: none"> • Dual channel serial communications providing two (2) RS-232-compatible ports. • Communications protocol, baud rate, stop bits and parity settings are software selectable.
68-6205-A	RS-232-Compatible/RS-485 (Non-selectable Ports)	<ul style="list-style-type: none"> • Port #1 is factory-set as RS-232-compatible mode (jumper blocks are soldered in place). • Port #2 is factory set to RS-485 mode. • RS-485 communications are jumper-selectable as: <ul style="list-style-type: none"> ○ 2-wire terminated or non-terminated ○ 4-wire terminated or non terminated • Communications protocol, baud rate, stop bits and parity settings are software selectable.
68-6205-B & 68-6205-	FRS-232-Compatible/RS-485 (Selectable Ports)	<ul style="list-style-type: none"> • Both Port #1 and #2 are jumper-selectable as either RS-232-C or RS-485 modes. • RS-485 communications are jumper-selectable as: <ul style="list-style-type: none"> ○ 2-wire terminated or non-terminated ○ 4-wire terminated or non terminated • Communications protocol, baud rate, stop bits and parity settings are software selectable.

NOTE: Up to twelve (12) flow computers and/or other compatible serial devices can be multi-dropped using OMNI's proprietary RS-232-compatible serial port. Thirty-two (32) devices may be connected when using the RS-485 mode.

Typically, one (1) Serial I/O Module is used on the OMNI 3000, providing two (2) ports. A maximum of two (2) serial modules can be installed in the OMNI 6000, providing four (4) ports.

Table 2. OMNI Multi-bus Serial I/O Interface

	RS-232-COMPATIBLE	RS-485
DATA OUTPUT VOLTAGE	±7.5 VOLTS (TYPICAL)	5 VOLTS (DIFFERENTIAL DRIVER)
LOAD IMPEDANCE	1.5 K OHM	120 OHM
SHORT CIRCUIT CURRENT	10 mA (LIMITED)	20 mA
INPUT LOW THRESHOLD	-3.0 VOLTS	0.8 VOLTS (DIFFERENTIAL INPUT)
INPUT HIGH THRESHOLD	+3.0 VOLTS	5.0 VOLTS DIFFERENTIAL INPUT)
BAUD RATES	1.2, 2.4, 4.8, 9.6, 19.2, & 38.4 K BPS (SOFTWARE SELECTABLE)	
COMMON MODE VOLTAGE	±250 VOLTS TO CHASSIS GROUND	
LEDs	CHANNEL INPUTS/OUTPUTS & HANDSHAKING SIGNALS	

Dual Channel RS-232-C Serial I/O Module Model #68-6005

Dual channel serial communication modules can be installed providing two (2) RS-232-Compatible ports. Although providing RS-232-C signal levels, the tristate output design allows multiple flow computers to share one (1) RS-232 device. This serial module is the oldest model manufactured by OMNI.

NOTE: Up to twelve (12) flow computers and/or other compatible serial devices can be multi-dropped using OMNI's proprietary RS-232-C serial port.

Typically, one (1) Serial I/O Module is used on the OMNI 3000, providing two (2) ports. A maximum of two (2) serial modules can be installed in the OMNI 6000, providing four (4) ports.

Jumper Settings – For information on setting the jumpers of Serial I/O Modules refer to “Serial Communication Modules” in Volume 1, Chapter 1 of the User Manual (Section 1.6.3).

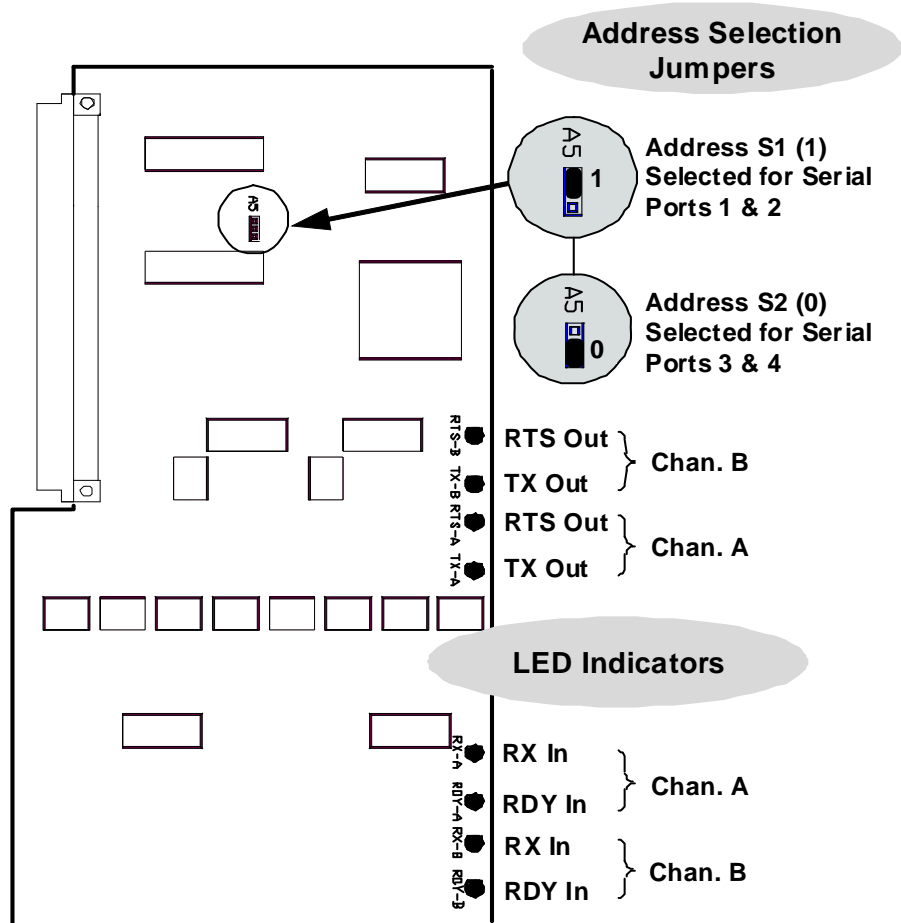


Figure 1. Dual RS-232 Serial I/O Module Model Showing Selection jumper and Indicator LEDs

RS-232-C / RS-485 Serial I/O Module Model #68-6205-A

NOTE: Up to twelve (12) flow computers and/or other compatible serial devices can be multi-dropped using OMNI's proprietary RS-232-C serial port. Up to thirty-two (32) devices may be connected when using the RS-485 mode. Refer to Technical Bulletin 980401 (52-0001-0001) "Peer-to-Peer Basics" for more information.

Typically, one (1) Serial I/O Module is used on the OMNI 3000, providing two (2) ports. A maximum of three (3) serial modules can be installed in the OMNI 6000, providing six (6) ports.

Jumper Settings – For information on setting the jumpers of Serial I/O Modules refer to "Serial Communication Modules" in Volume 1, Chapter 1 of the User Manual (Section 1.6.3). For serial port jumper setting see Figure 6.

Serial I/O Module # 68-6205-A (manufactured 1997) has two (2) communication ports. The first serial port (Ports #1 and #3 if two (2) 68-6205 modules are installed) is factory set in the RS-232-C mode (jumpers are soldered into place and cannot be moved). The second serial port (Ports #2 and #4) is configured for RS-485 communications only. Although the first serial port provides RS-232-C signal levels, the tristate output design allows multiple flow computers to share one (1) serial link

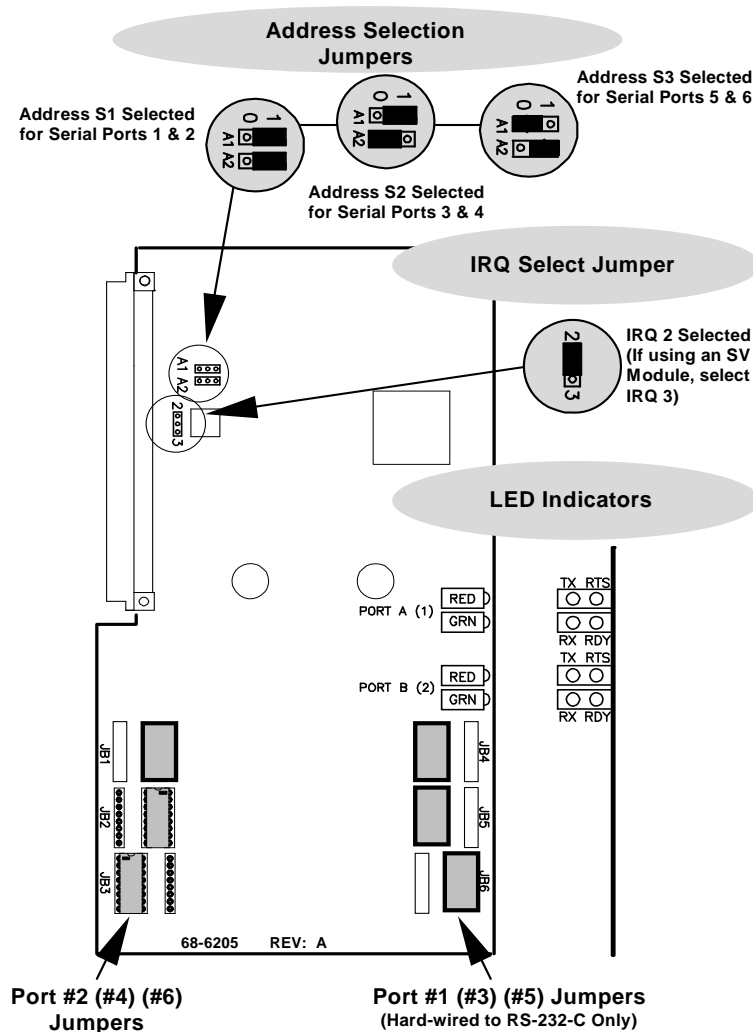


Figure 2. RS-232/485 Module #68-6205-A Showing Selection Jumpers and Indicator LEDs

The first serial port jumpers are factory hard-wired for RS-232-C mode. This port is non-selectable and cannot be changed by the user. The second serial port jumpers are factory preset in the RS-485 two-wire, terminated positions. This port is user-selectable for RS-485 two-wire/four-wire terminated/non-terminated jumper positions (Figure 6). Back panel wiring is shown in Figure 3.

NOTE: Micro Motion™ RFT 9739 Devices – Users of Micro Motion™ RFT 9739 devices connected to the peer-to-peer port (Port #2) of the OMNI, please note that the resistor networks should be positioned for 2-wire RS-485 and that Terminal A from the RFT 9739 should be wired to OMNI Terminal B (7), and B from the RFT must be wired to OMNI Terminal A (11). Refer to Technical Bulletin 980401 “Peer-to-Peer” for more information.

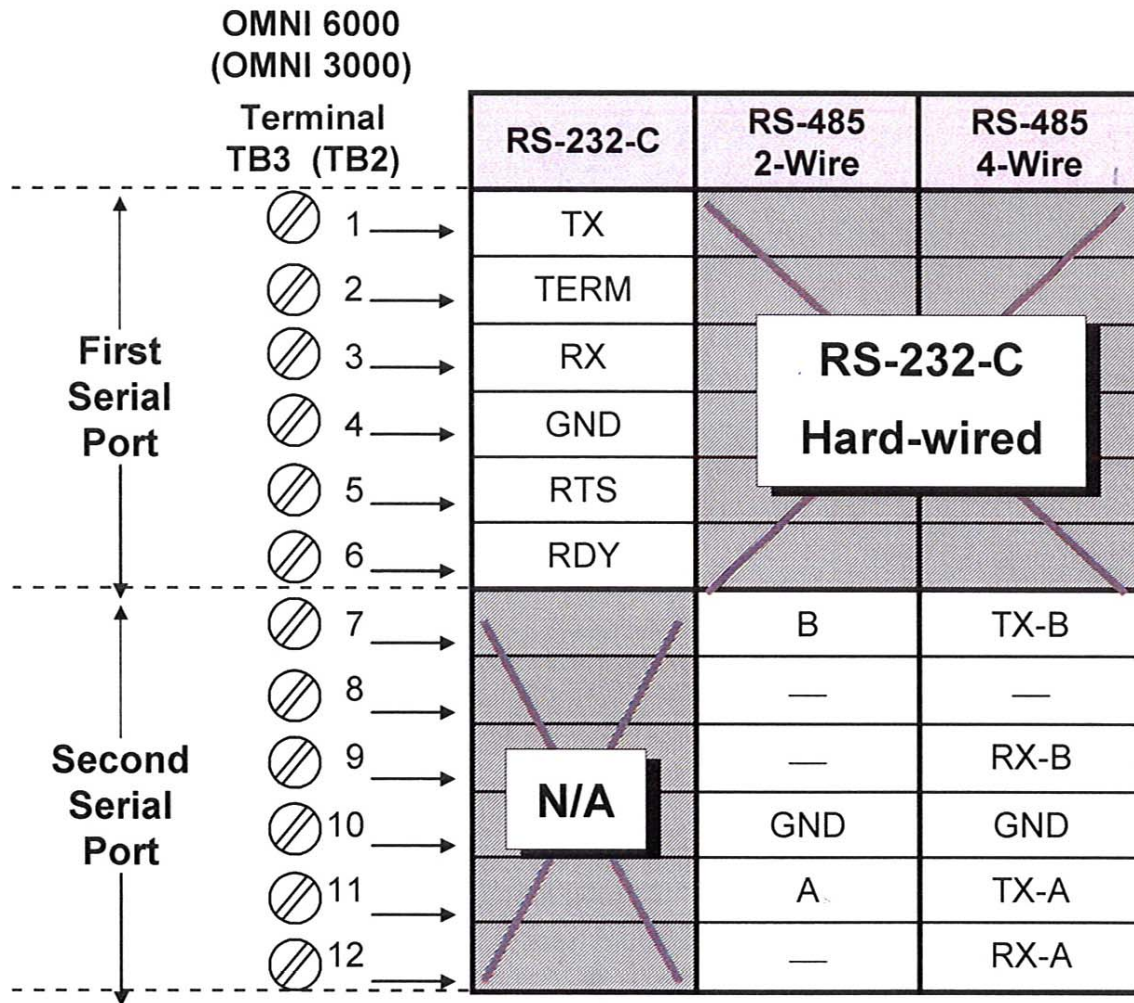


Figure 3. Back Panel Wiring of the RS-232-C/RS-485 Module #68-6205-A

RS-232-C / RS-485 Serial I/O Module Model #68-6205-B

Serial I/O Module # 68-6205-B was first manufactured by OMNI in 1998. It is capable of handling two (2) communication ports. Each serial port is jumper-selectable for either RS-232-Compatible or RS-485 communications. Although providing RS-232-C signal levels when in this mode, the tristate output design allows multiple flow computers to share one (1) serial link. In addition to the RS-232 mode, jumper selections have been provided on each port to allow selection of RS-485 format. With this option, a total of two (2) RS-485 ports are available on this model.

NOTE: Up to twelve (12) flow computers and/or other compatible serial devices can be multi-dropped using OMNI’s proprietary RS-232-C serial port. Up to thirty-two (32) devices may be connected when using the RS-485 mode. Refer to Technical Bulletin 980401 (52-0001-0001) “Peer-to-Peer Basics” for more information.

Typically, once Serial I/O Module is used on the OMNI 3000, providing two (2) ports. A maximum of two (2) serial modules can be installed in the OMNI 6000, providing four (4) ports.

Jumper Settings – For information on setting the jumper of Serial I/O Modules refer to “Serial Communication Modules” in Volume 1, Chapter 1 of the User Manual (Section 1.6.3). For serial port jumper settings see Figure 6.

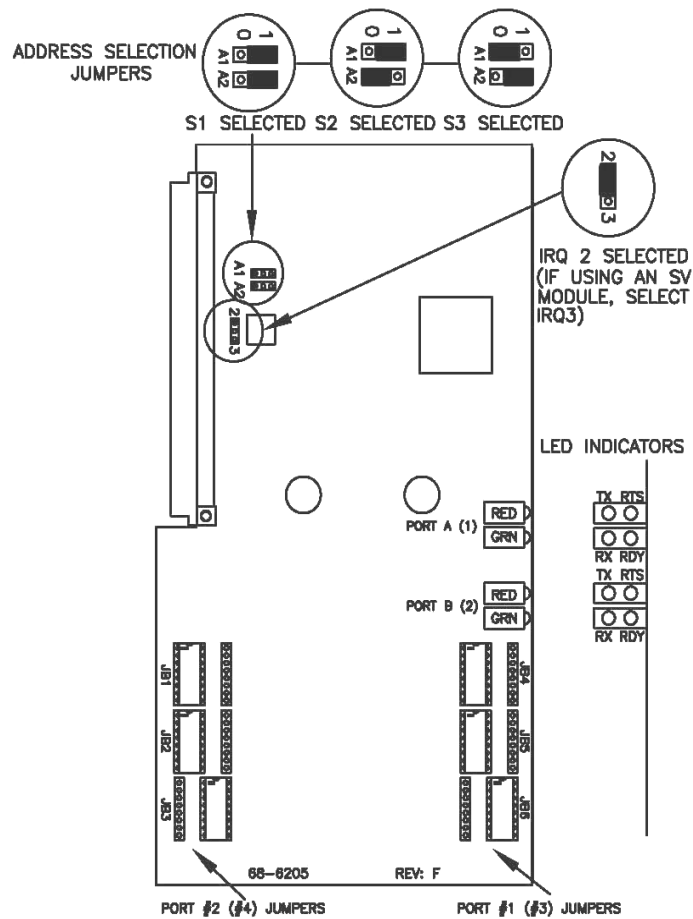


Figure 4. RS-232-C/RS-485 Module #68-6205-B Showing Selection Jumpers and Indicator LEDs

RS-232-C / RS-485 Serial I/O Module Model #68-6205-F

Serial I/O Module # 68-6205-F is the latest serial module manufactured by OMNI (2000). It is capable of handling two (2) communication ports. Each serial port is jumper-selectable for either RS-232-Compatible or RS-485 communications. Although providing RS-232-C signal levels when in this mode, the tristate output design allows multiple flow computers to share one (1) serial link. In addition to the RS-232 mode, jumper selections have been provided on each port to allow selection of RS-485 format. With this option, a maximum of two (2) RS-485 ports are available on this model.

NOTE: Up to twelve (12) flow computers and/or other compatible serial devices can be multi-dropped using OMNI’s proprietary RS-232-C serial port. Up to thirty-two (32) devices may be connected when using the RS-485 mode. Refer to Technical Bulletin 980401(52-0001-0001) “Peer-to-Peer Basics” for more information.

Typically, once Serial I/O Module is used on the OMNI 3000, providing two (2) ports. A maximum of two (2) serial modules can be installed in the OMNI 6000, providing four (4) ports.

Jumper Settings – For information on setting the jumper of Serial I/O Modules refer to “Serial Communication Modules” in Volume 1, Chapter 1 of the User Manual (Section 1.6.3). For serial port jumper settings see Figure 6.

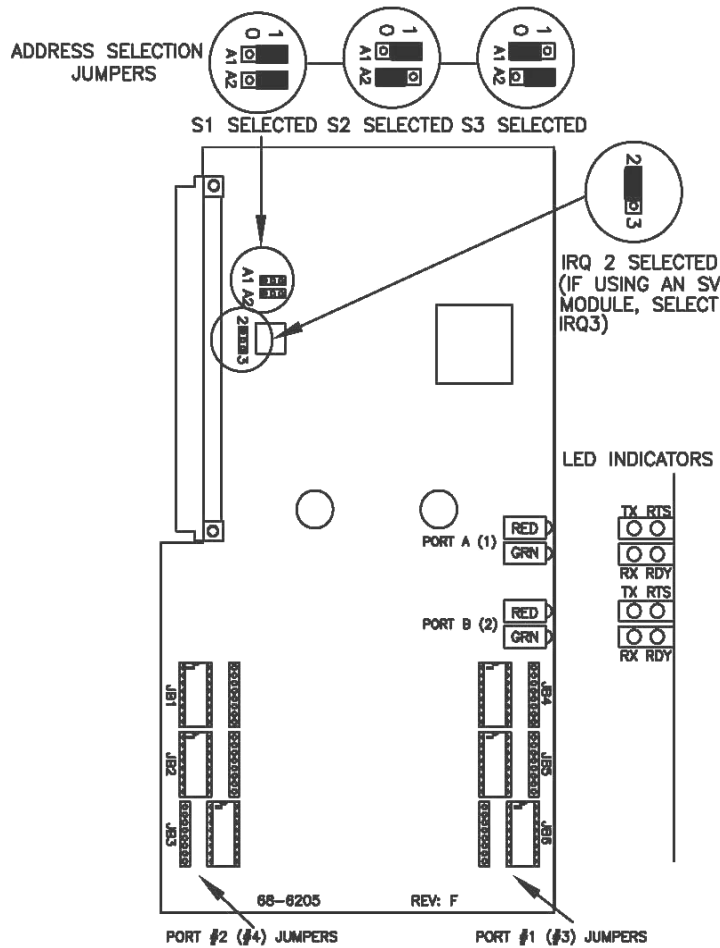


Figure 5. RS-232-C/RS-485 Module #68-6205-F Showing Selection Jumpers and Indicator LEDs

Jumpers for both serial ports are user-selectable to RS-232-C or RS-485 formats (Figure 6). The RS-485 options are either 2-wire or 4-wire mode; each mode can be set as terminated or non-terminated connections. Back panel wiring is shown in Figure 6.

NOTE: Micro Motion™ RFT 9739 Devices – Users of Micro Motion™ RFT 9739 devices connected to the peer-to-peer port (Port #2) of the OMNI, note that the resistor networks should be positioned for 2-wire RS-485 and the Terminal A from the RFT 9739 should be wired to OMNI Terminal B (7), and B from the RFT must be wired to OMNI Terminal A (11). Refer to Technical Bulletin 980401 (52-0001-0001) “Peer-to-Peer Basics” for more information.

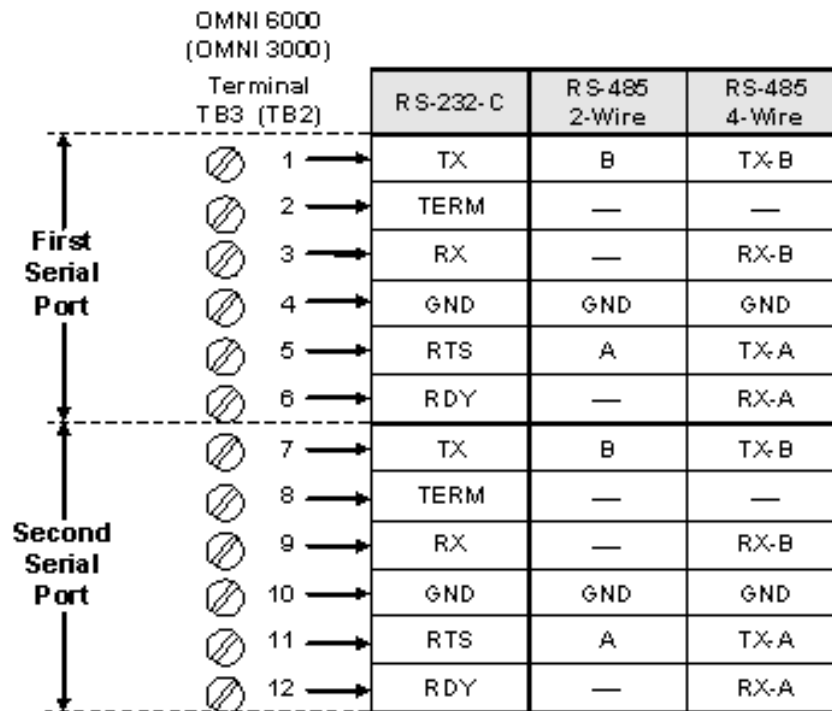


Figure 6. Back Panel Wiring of the RS-232-C/RS-485 Module #68-6205-F

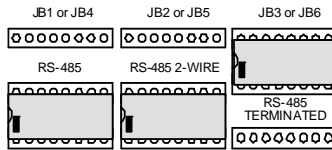
RS-232-C / RS-485 Serial Port Jumper Options

The RS-232-C/RS-485 serial port has been designed so that RS-232-C or RS-485 communications standards can be selected by placement of 16-pin resistor networks into the correct blocks. Figure 7 diagrams show the locations of blocks JB4, JB5, JB6 for the first serial port (Model #68-6205-B only), and JB1, JB2, JB3 for the second serial port (Models #68-6205-A and #68-6205-B) for each format. Serial I/O Module #68-6205-A only has the RS-485 options available for the second serial port, and the first port is hard-wired to the RS-232-C position and cannot be changed by the user.

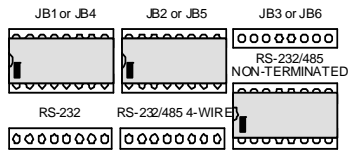
NOTE: Serial Port I/O Software Settings - Each serial port is configurable via OMNICOM[®] software or the OMNI front panel. Detailed information on how to configure these and other flow computer settings is available in Volume 3, Chapter 2 of the User Manual and in OMNICOM Help.

Terminated/Non-terminated RS-485 – The RS-485 devices located at each extreme end of an RS-485 run should be terminated. Note that the device located at the extreme end may or may not be an OMNI Flow Computer

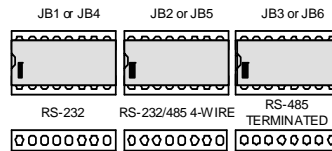
RS-232



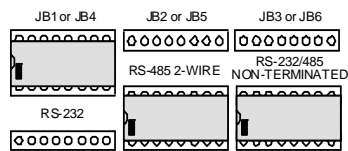
RS-485 2-WIRE TERMINATED



RS-485 2-WIRE NON-TERMINATED



RS-485 4-WIRE TERMINATED



RS-485 4-WIRE NON-TERMINATED

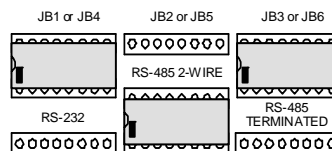


Figure 7. Layout of Jumper Blocks Showing RS-232/485 Formats

DOCUMENT REVISION HISTORY

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<u>REVISION</u>	<u>DATE</u>	<u>PURPOSE / CHANGE REQUEST</u>
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