



BREATHING LIFE INTO MACHINES

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Doc No.: TN20-34  
Version: 1.1  
Date: 11<sup>th</sup> April 2001  
Subject: RS485 Communications with Motion Coordinator

## Application Note

Summary: The RS485 adapter converts TTL level serial data to RS485 or RS422 level communication signals. This application note covers the main points to note when setting up the RS485 adapter for use with the Trio range of Motion Coordinators. It also includes the use of Modbus via the RS485 link.

MC216 and Euro205:

- a) Software. The RS485 serial port is allocated to channel number 2 so to output a string to the port use: **PRINT #2,"Hello"** and to input characters from the port use **GET #2,in\_char**.
- b) Connection. There are two 8-way mini din connectors on the front panel. The upper mini-din socket is referred to as socket A and the lower one as socket B. To use the RS485 port an adapter, part number P348, must be connected to socket A and the "pass through" connections used to connect Port 0 to the PC running Motion Perfect. (See "P348 Connector Pin-out")

MC202:

- a) Software. The RS485 serial port is allocated to channel number 1 so to output a string to the port use: **PRINT #1,"Hello"** and to input characters from the port use **GET #1,in\_char**.
- b) Connection. There is one 8-way mini din connector on the front panel. To use the RS485 port an adapter, part number P348, must be connected to the socket and the "pass through" connections used to connect Port 0 to the PC running Motion Perfect. (See "P348 Connector Pin-out")
- c) Special requirements.  
The cable supplied with each P348 adapter module is configured for use with the MC216 / Euro205. Before connecting the mini din plug to the MC202 the wiring of the 9-way D type socket must be changed.

Mini Din	9-way D Type	Wire Colour
6	7	Blue
8	8	Brown
7	9	Green

Modified wiring for MC202 – P348 [Note: wire colours may change]

MC204:

- a) Software. The RS485 serial port is allocated to channel number 2 so to output a string to the port use: `PRINT #2,"Hello"` and to input characters from the port use `GET #2,in_char`.
- b) Connection. There are two 8-way mini din connectors on the front panel. The upper mini-din socket is referred to as socket A and the lower one as socket B. The MC204 has a built-in RS485 port which is routed to 5 pins of socket B.

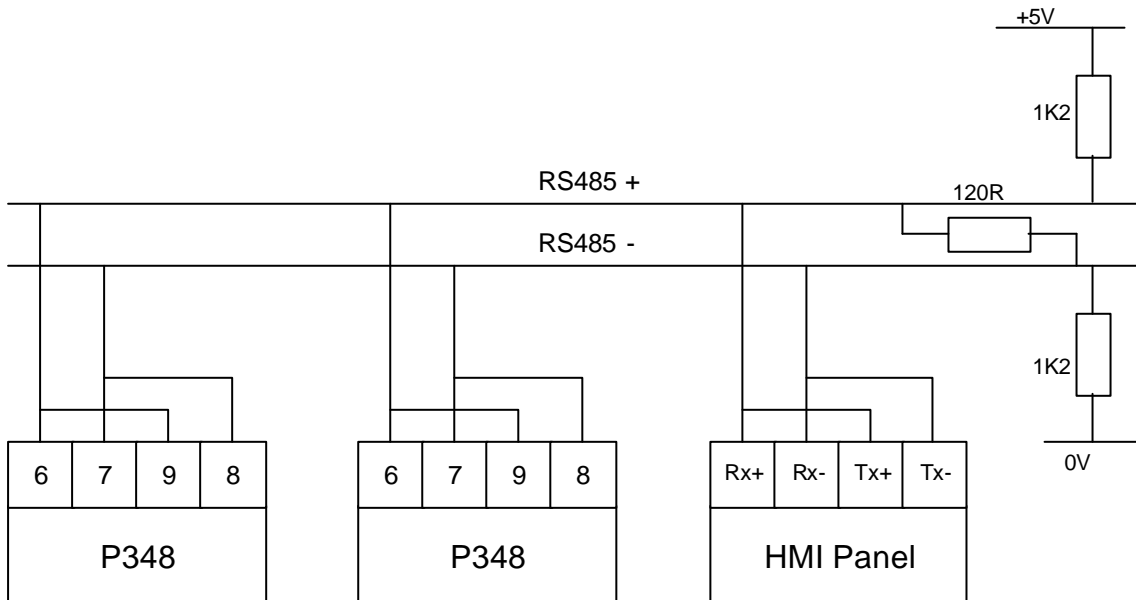
Pin 1	Rx+
Pin 2	Rx-
Pin 4	Ground
Pin 7	Tx-
Pin 8	Tx+

Note: On early versions of the MC204 the RS485 port was a factory fitted option – if you are not sure whether your Motion Coordinator has RS485, please contact Trio Motion Technology.

RS485 Modes:

- a) 2-Wire. For 2 wire connection, the same pair of wires are used for communication traffic in both directions:

2-Wire Rs485 with Termination network

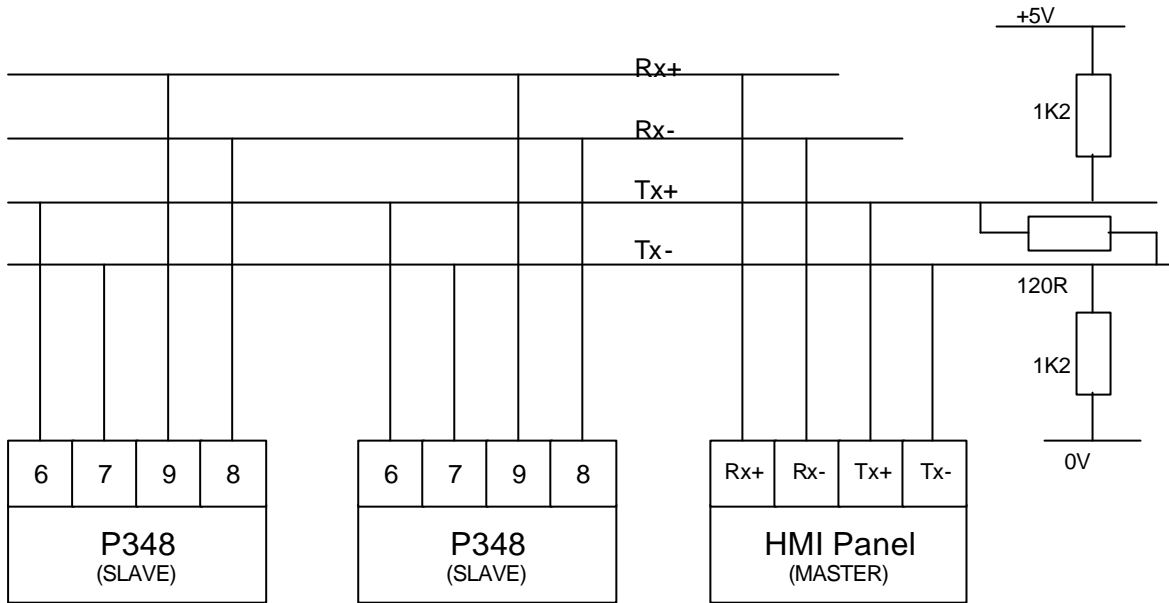


Note 1: For best noise immunity use screened twisted pair with characteristic impedance of 120 ohms.

Note 2: Where the cable run exceeds 1 meter, place a terminating network at both ends of the cable.

- b) 4-Wire. 4 wire connection, sometimes known as RS422 is used for single master multiple slave applications. One pair of wires is connected to the master Tx+/Tx- and the second pair to the master Rx+/Rx- terminals.

4-Wire Rs485 with Termination network

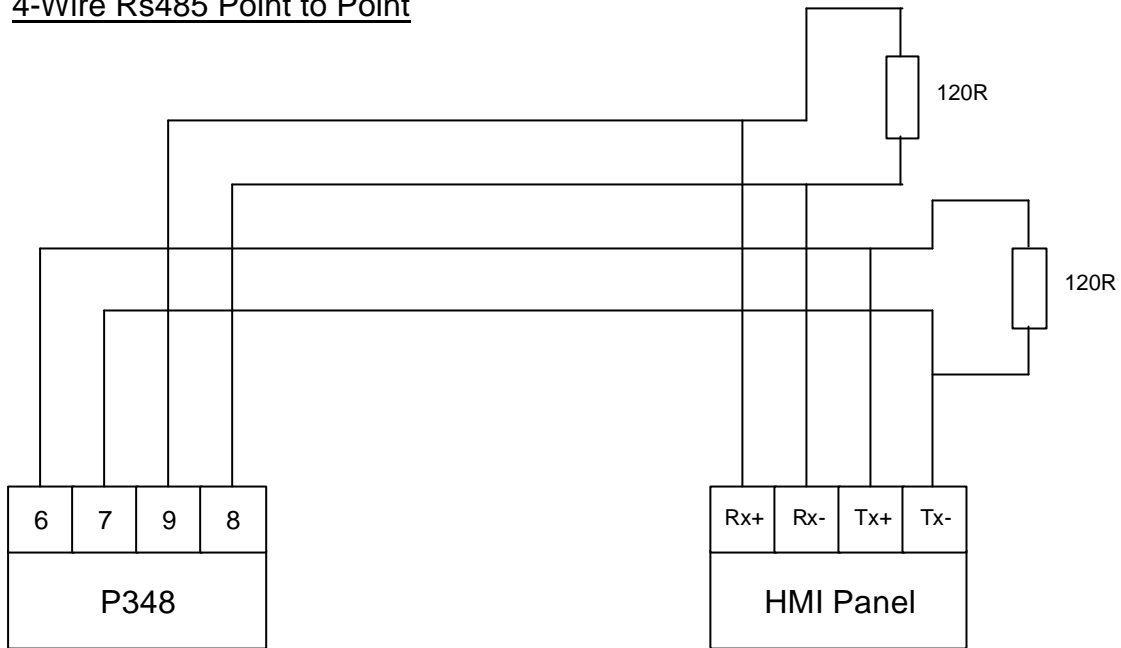


Note 1: For best noise immunity use screened twisted pairs with characteristic impedance of 120 ohms. Tx+ and Tx- make one pair, Rx+ and Rx- are the second pair.

Note 2: Where the cable run exceeds 1 meter, place a terminating network at both ends of the cable. Terminating network(s) may also be required for Rx lines.

- c) Single drop. Where only 2 nodes are communicating (non multidrop) a 4 wire connection is usually employed as shown below.

### 4-Wire Rs485 Point to Point



Note 1: For best noise immunity use screened twisted pairs with characteristic impedance of 120 ohms. Tx+ and Tx- make one pair, Rx+ and Rx- are the second pair.

Note 2: Where the cable run exceeds 1 meter, place a terminating network at both ends of the cable.

Programming: The serial port must be initialised at the start of the user's application program, depending on what the port is intended to be used for. There are three options at present:

- 1) Trio RS485 multi-drop protocol:  
`ADDRESS=node_address`                      `node\_address is 1 to 32  
`SETCOM(baudrate,8,1,parity,2)` `not available on port 1 (MC202)
- 2) User Written RS485 protocol:  
`ADDRESS=255`                                `turns off the addressing function  
`SETCOM(baudrate,8,1,parity,port)`  
  ` set the data, stop bits and parity as required
- 3) Modbus protocol:  
`ADDRESS=node_address`                      `node\_address is 1 to 32  
`SETCOM(baudrate,8,1,2,port)`  
  ` Note: some Modbus systems use no parity.

P348 Connector Pin-out:

9-Way Dtype

1	+5v power
2	RS232 Receive pass-through
3	RS232 Transmit pass-through
4	Logic 0V
5	RS232 Pass-through 0v
6	no connection
7	Transmit enable input
8	Logic level receive
9	Logic level transmit

25-Way Dtype

5	RS485 Gnd
6	RS485 Rx+
7	RS485 Rx-
8	RS485 Tx-
9	RS485 Tx+
11	Port #0 Rx
12	Port #0 Tx
13	Port #0 RS232 Gnd

Port Allocation Summary:

MC202	Port #1	RS485 adapter connected to the one socket.
MC204	Port #2	RS485 built in – use socket B without adapter.
MC216	Port #2	RS485 adapter connected to socket A.
Euro205	Port #2	RS485 adapter connected to socket A.