

# Micro Control Systems

APPLICATION NOTE

APP-004

## RS485 Network Installation

### Revision History

Date	Author	Description
05/27/97	Brian Walterick	Created Application Note
10/16/98	Brian Walterick	Modified MCS-485-GATEWAY Network Connection section
11/10/08	Ron Andersen	Updated Application Note

This Application Note describes the installation of the RS485 network on a MCS-8 micro-controller.

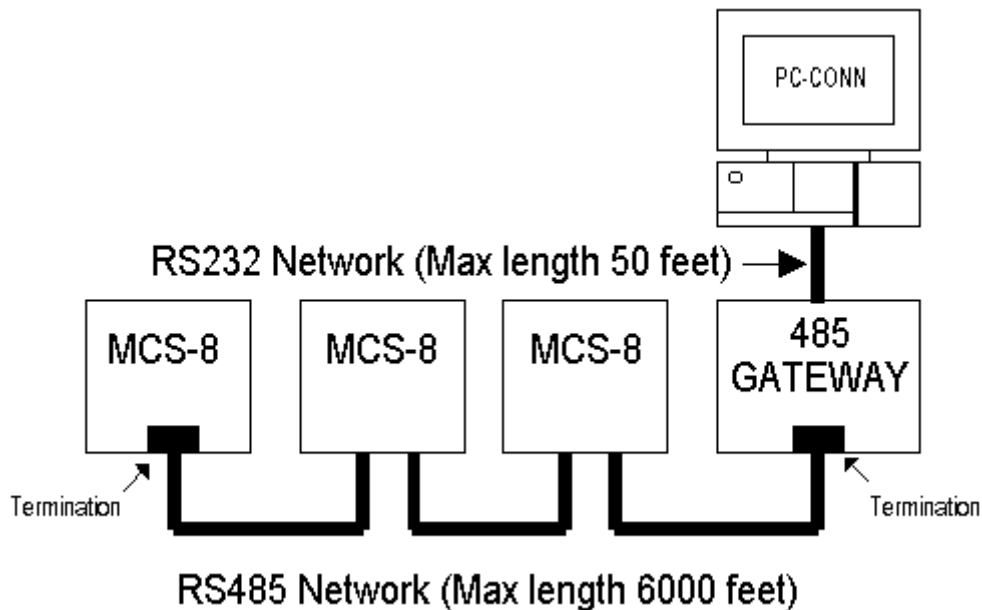
## Theory

Each MCS-8 has a RS485 communication port for a network interface. Using this RS485 port you can connect up to 20 MCS-8's to one PC through a MCS-485-GATEWAY. The MCS-485-GATEWAY converts the RS485 network to a RS232 network to provide a connection to the PC's COM port.

The RS485 network uses a shielded pair of wires to connected multiple MCS-8's together to provide a high speed local area network. The network operates at 19.2k baud and supports a total cable length of 6000 feet.

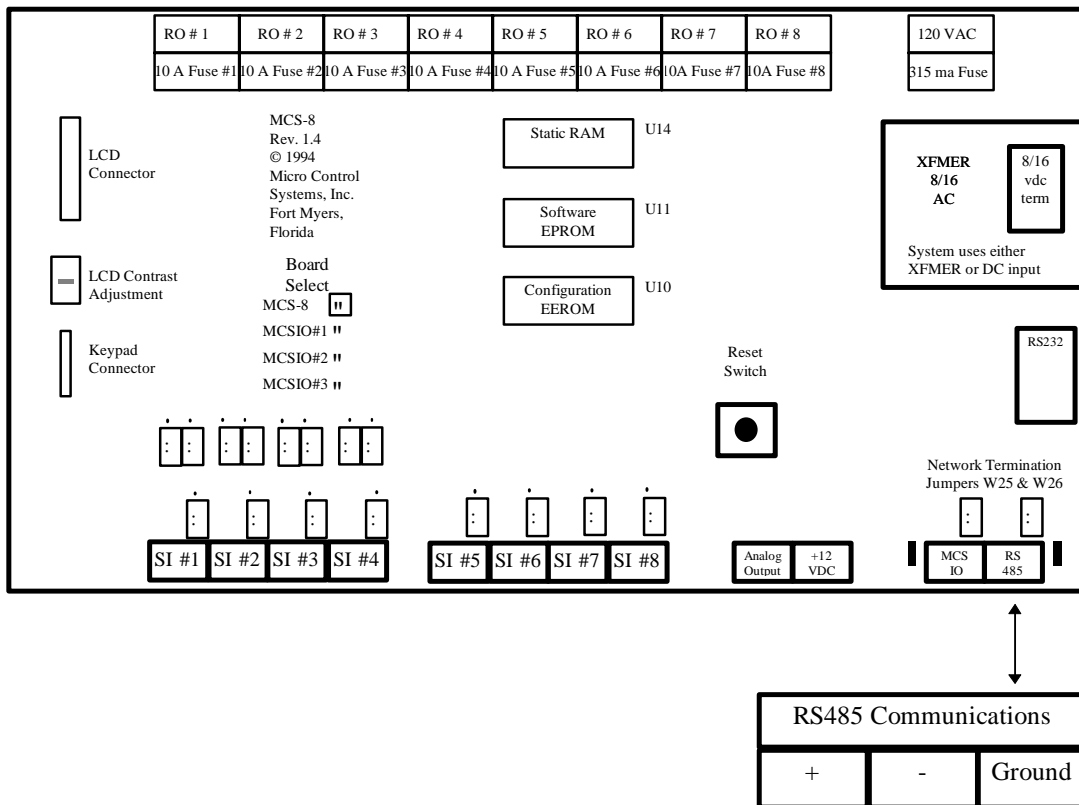
The nature of the RS485 network allows for a Master-Slave configuration. In this type of network, the master (PC) will poll the slaves (MCS-8's) through the shielded pair of wires and request information from one slave at a time. The master identifies which slave it is accessing by a network address. Each device on the RS485 network must have a unique network address.

The RS485 network provides a linear bus topology. Devices are connected to a cable point to point and terminated at both ends. A typical layout is shown below.



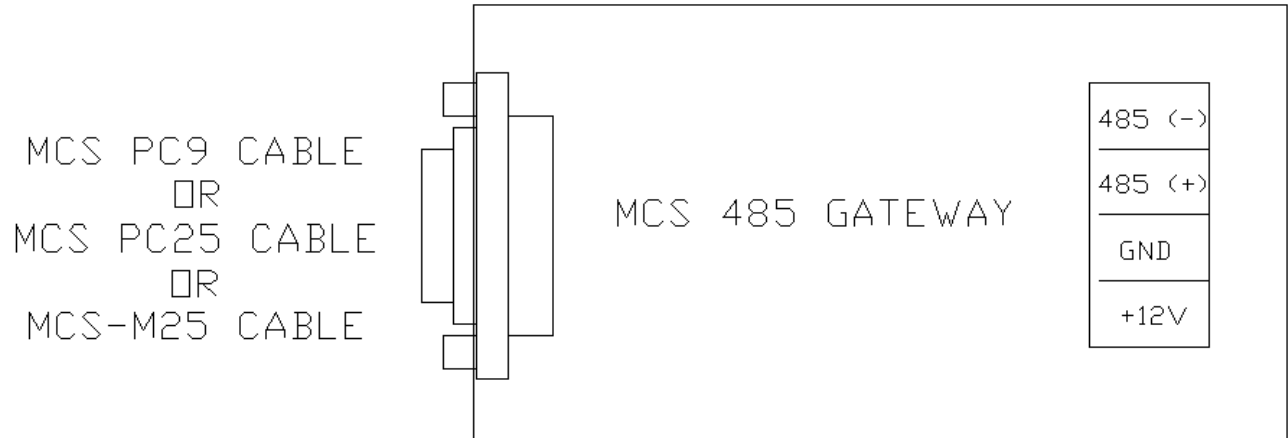
## MCS-8 Network Connection

Each MCS-8 provides a terminal block for its RS485 communication port. The terminal block is location on the bottom right side and has 3 positions, PLUS, MINUS and GROUND. See diagram below. Each MCS-8 also provide a termination jumper labeled “W26 TERMINATION”. When the jumper is installed a 220Ω resistor is placed across the PLUS and MINUS terminals. This resistor provides termination for the network bus. The jumper should only be installed at the two ends of the network bus.



## MCS-485-GATEWAY Network Connection

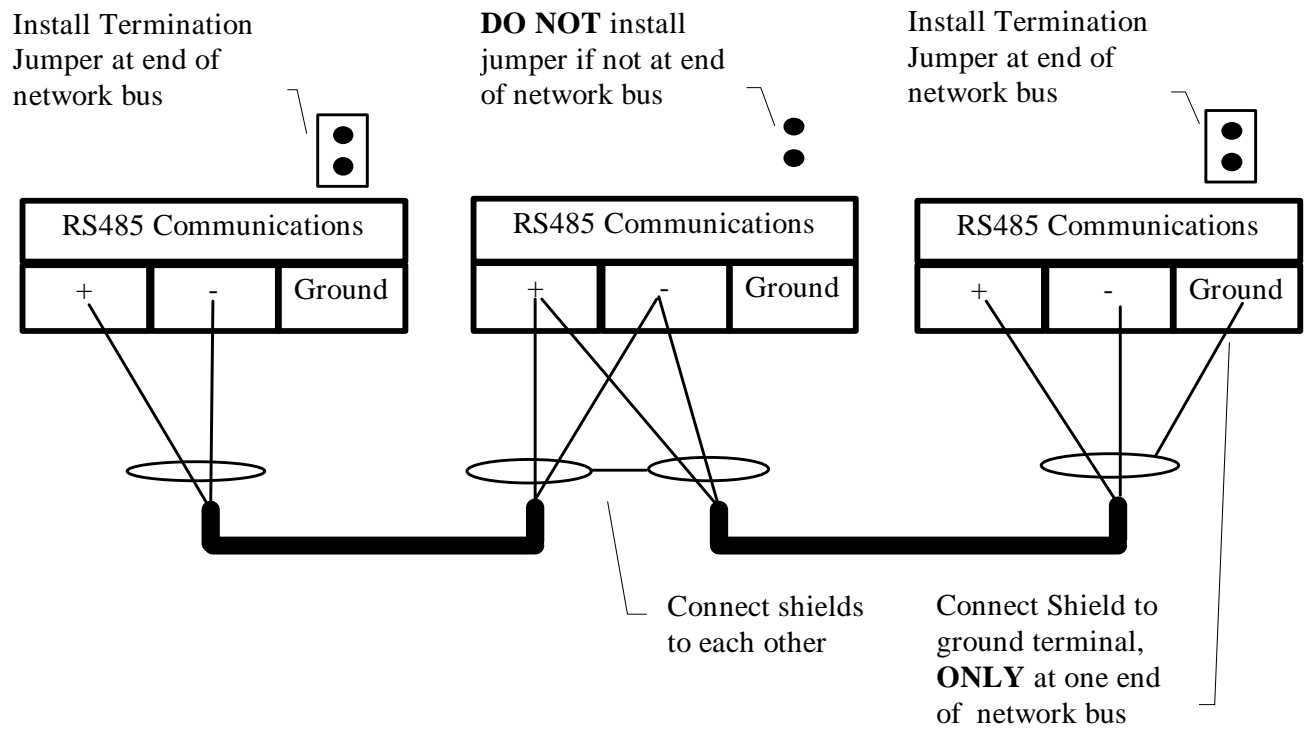
The MCS-485-GATEWAY also provide a terminal block for its RS485 communication port as well as a plug for its RS232 communication port and power. The RS485 terminal block is location on the right side and has 4 positions, one RS485 (-), one RS485 (+), one +12 and one GROUND. See diagram below.



## RS485 WIRING

Use two-conductor 24 gauge shielded wire for the RS485 network bus. Connect all the PLUS terminals to each other. And connect all the minus terminals to each other. Loop all the shields to each other, but only connect the shield at one end to the ground terminal. Install termination jumpers at the two ends of the bus and remove all termination jumpers. See diagram below.

The cable must be run from device to device so there are only to **TWO ENDS** of the bus. Total length of the cable must not exceed 6000 feet.



## RS232 Wiring

Using the cable provide with the MCS-485-GATEWAY connect the RS232 port on the MCS-485-GATEWAY to the COM port on your PC. Total length of the RS232 cable must not exceed 50 feet.

## Network Address

The MCS-8's network address can be set up directly from the MCS-8's keypad as shown below. Remember, each MCS-8 must have its own unique network address number. If more than one MCS-8 has the same network address, a conflict will occur and you will not be able to communicate with it.

First, after logging into the MCS-8 with your authorization code, press the <b>SERVICE DIAGNOSTICS</b> key until the following screen appears:	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> UNIT INFORMATION  ENTER CHG/OPTION </div>
Next, press the <b>ENTER</b> key. You will see which version of software the MCS-8 is currently running and the configurator type. For example:	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> SOFTWARE           CFG  CHL S08.23-B       6 </div>
Now press the <b>INCREASE (+)</b> or <b>DECREASE(-)</b> key until the NETWORK ADDRESS screen appears. Here you will see what the network address of the MCS-8 currently is. For example:	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> NETWORK ADDRESS  MCS-8 ADDRESS   1 </div>
Press the <b>ENTER</b> key to go into the change mode:	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> NETWORK ADDRESS  + - CHNG/ENTER   1 </div>
Press the <b>INCREASE (+)</b> or <b>DECREASE (-)</b> key to cycle through addresses. Stop when you reach the one you want.	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> NETWORK ADDRESS  + - CHNG/ENTER   2 </div>
Finally, press the ENTER key to make the change. For example, as shown here the MCS-8 network address has been changed from 1 to 2:	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> NETWORK ADDRESS  CHANGE MADE       2 </div>