PLC COMMUNICATIONS

In this Chapter...

Introduction

The ***C-more*®** Micro panels are capable of communicating with AutomationDirect Productivity Series, Do-more, BRX, CLICK, SOLO, GS Drives and the entire ***Direct***LOGIC family of PLCs. The panel is capable of communicating using RS232 on the RJ12 Port1 and RS232, RS422 or RS485 on Port2. The EA3-S3ML and EA3-4TCL have a built-in Ethernet RJ45 port capable of communicating with all AutomationDirect PLC's and Modbus slave devices. Adding the optional EA-ECOM module to the EA3 series 6, 8 and 10-inch models also allows communications via an Ethernet connection with a Cat5e cable.

Cable Description	Cable Part No.
Cables used with RJ12 RS-232 serial Port1	
AutomationDirect Productivity Series, Do-more / BRX*, CLICK, ***Direct***LOGIC PLC RJ-12 port, DL05, DL06, DL105, DL205, D3-350, D4-450, D4-454 & H2-WinPLC (RS-232C). 3.66m (12ft) cable length	**DV-1000CBL**
DirectLOGIC (VGA Style) 15-pin port, DL06, D2-250 (250-1), D2-260 (RS-232C). Use with D0-CBL cable.	**FA-15HD**
DirectLOGIC PLC 15-pin D-sub port, DL405 (RS-232C). Use with D0-CBL cable.	**FA-CABKIT**
Direct LOGIC PLC RJ-11 port, D3-340 (RS-232C) 2m (6.56 ft) cable length	**OP-3CBL-1**
**** BX-P-SER2-RJ12 is required***	

Cable Description	Cable Part No.
Cables used with 15-pin RS-232/422/485 serial Port2	
AutomationDirect Productivity Series, Do-more / BRX*, CLICK, ***Direct*** LOGIC PLC RJ-12 port, DL05, DL06, DL105, DL205, D3-350, D4-450, D4-454 & H2-WinPLC (RS-232C) 3m (9.8 ft) cable length	**EA-2CBL**
Direct LOGIC (VGA Style) 15-pin port, DL06, D2-250 (250-1), D2-260 (RS-232C) 3m (9.8 ft) cable length	**EA-2CBL-1**
Direct LOGIC PLC RJ-11 port, D3-340 (RS-232C) 3m (9.8 ft) cable length	**EA-3CBL**
Direct LOGIC DL405 PLC 15-pin D-sub port, DL405 (RS-232C) 3m (9.8 ft) cable length	**EA-4CBL-1**
Direct LOGIC PLC 25-pin D-sub port, DL405, D3-350, DL305 DCU and all DCM's (RS-232C) 3m (9.8 ft) cable length	**EA-4CBL-2**
Allen-Bradley MicroLogix 1000, 1100, 1200, 1400 & 1500 (RS-232C) 3m (9.8 ft) cable length	**EA-MLOGIX-CBL**
Allen-Bradley SLC 5-03/04/05, ControlLogix, CompactLogix, FlexLogix DF1 port (RS-232C) 3m (9.8 ft) cable length	**EA-SLC-232-CBL**
Allen-Bradley PLC-5 DF1 port (RS-232C) 3m (9.8 ft) cable length	**EA-PLC5-232-CBL**
Allen-Bradley SLC 5-01/02/03 DH485 port 3m (9.8 ft) cable length	**EA-DH485-CBL**
GE 90/30, 90/70, Micro 90, Versamax Micro (Port2) 15-pin D-sub port (RS-422A) 3m (9.8 ft) cable length	**EA-90-30-CBL**
MITSUBISHI FX Series 25-pin port (RS-422A) 3m (9.8 ft) cable length	**EA-MITSU-CBL**
MITSUBISHI FX Series 8-pin mini-DIN (RS-422A) 3m (9.8 ft) cable length	**EA-MITSU-CBL-1**
OMRON Host Link (C200 Adapter, C500) (RS-232C) 3m (9.8 ft) cable length	**EA-OMRON-CBL**
**** BX-P-SER2-RJ12 is required***	

Introduction (cont'd)

Available PLC Protocols

PLC Drivers		
Serial - port1 or port2	**Serial - port2 only**	**Ethernet***
AutomationDirect Productivity Series	Allen-Bradley DF1 Half Duplex	AutomationDirect Productivity Series Ethernet
	Allen-Bradley DF1 Full Duplex	
AutomationDirect Do-more / BRX**	Allen-Bradley PLC5 DF1	AutomationDirect Do-more / BRX Ethernet
AutomationDirect CLICK	Allen-Bradley DH485	AutomationDirect CLICK Ethernet
AutomationDirect K-sequence	GE SNPX (90/30, 90/70, Micro 90, VersaMax Micro)	AutomationDirect ECOM Ethernet
AutomationDirect DirectNET	Mitsubishi FX	Modbus TCP/IP
AutomationDirect Modbus (master only)	Mitsubishi Q & QnA	Allen-Bradley EtherNet / IP Client (MicroLogix 1100/1400)
Modicon Modbus RTU (master only)	Omron Host Link (C200 Adapter, C500)	
Entivity Modbus RTU (master only)	Omron FINS Serial (CJ1, CS1)	Allen-Bradley EtherNet / IP Client (SLC5 / 05 / ENI Adapter)
	Siemens PPI (S7-200 CPU)	
	AutomationDirect SOLO Temperature Controller	
	AutomationDirect GS Drives	

** Ethernet port is built in on EA3-S3ML and EA3-T4CL. Add an Ethernet port to EA3-T6CL, EA3-T8CL and EA3-T10CL with an optional EA-ECOM module. Ethernet communications require external power supply.*

*** BX-P-SER2-RJ12 is required*

The panel can also be connected to more than one PLC by using RS-422, RS-485 or Ethernet connected in a multi-drop configuration. See the example wiring diagrams at the end of this chapter for details.

If you have difficulty determining whether the particular PLC and/or protocol you are using will work with ***C-more*** Micro panels, please contact our technical support group at 770-844-4200.

Introduction (cont'd)

Maximum Connected PLC Nodes

NOTE: *The maximum number of protocols that can be used on the* ***C-more*** *Micro is four but depends on the connection; serial or Ethernet.*

Serial

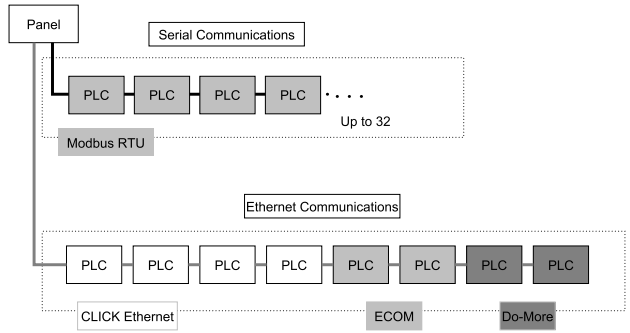
If connected serially, only one PLC protocol can be used. Up to 32 PLC's can be connected

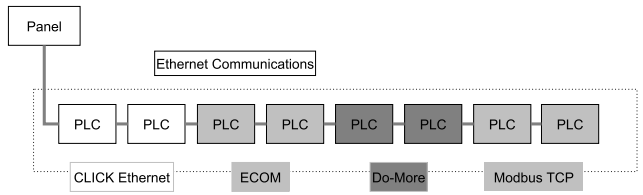
Ethernet

If connected over Ethernet, 4 PLC Protocols can be used. Up to 8 PLC's can be connected to the Ethernet network.

Maximum PLC Connections		
Connection Type	**Protocols**	**PLC Nodes**
Serial	1	32
with EA-ECOM	4	32 serial 8 Ethernet

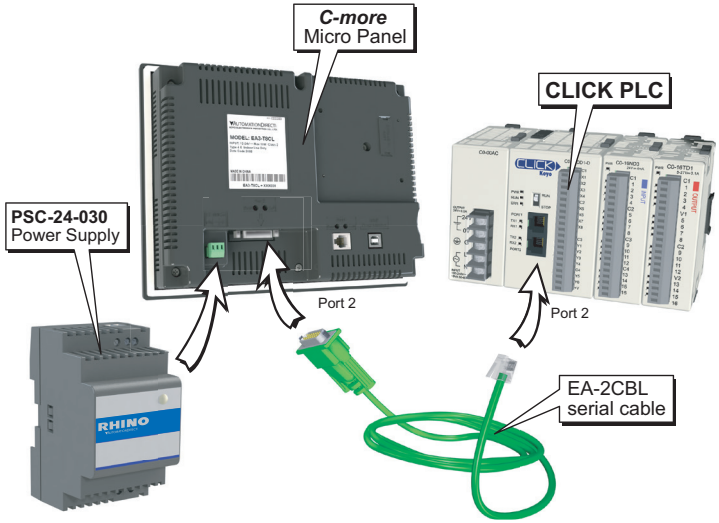
Examples:



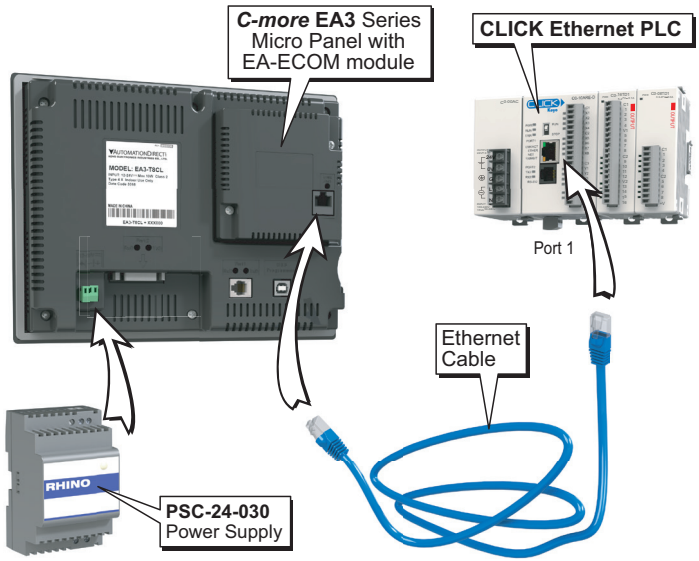


C-more Micro Communication Ports

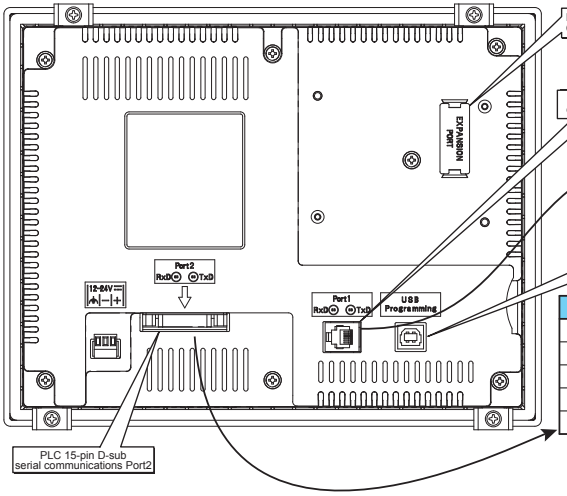
Serial connection to a CLICK PLC example



Ethernet connection to a CLICK PLC example



C-more Micro Communication Ports (cont'd)



Pin	Signal
1	Logic GND
2	not used
3	RXD (232C)
4	TXD (232C)
5	Supplies +5VDC
6	Logic GND

RS-232

Pin	Signal	Pin	Signal	Pin	Signal
1	Frame GND	6	LE	11	TXD+ (422/485)
2	TXD (232C)	7	CTS (232C)	12	TXD– (422/485)
3	RXD (232C)	8	RTS (232C)	13	Term. Resistor
4	do not use	9	RXD+ (422/485)	14	do not use
5	Logic GND	10	RXD– (422/485)	15	do not use

RS-232/422/485

*Direct*LOGIC PLCs Password Protection

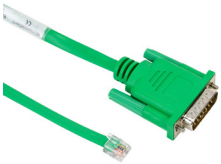
NOTE: Direct*LOGIC PLCs support multi-level password protection of the ladder program. This allows password protection while not locking the communication port to an operator interface. The multilevel password can be invoked by creating a password with an upper case "A" followed by any variation of seven numeric characters (e.g. A1234567). Please refer to the specific PLC user manual for further details.*

Cables from *AutomationDirect*

Part No. DV-1000CBL

Part No. OP-3CBL-1

Part No. FA-15HD



Part No. EA-2CBL

Part No. EA-2CBL-1

Part No. FA-CABKIT

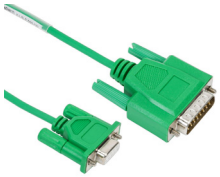
Part No. EA-4CBL-1

Part No. EA-4CBL-2

Part No. EA-3CBL

Cables from *AutomationDirect* (cont'd)

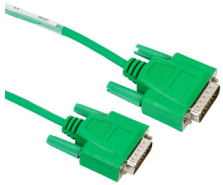
Part No. EA-MLOGIX-CBL



Part No. EA-SLC-232-CBL

Part No. EA-PLC5-232-CBL

Part No. EA-DH485-CBL



Part No. EA-90-30-CBL

Part No. EA-MITSU-CBL

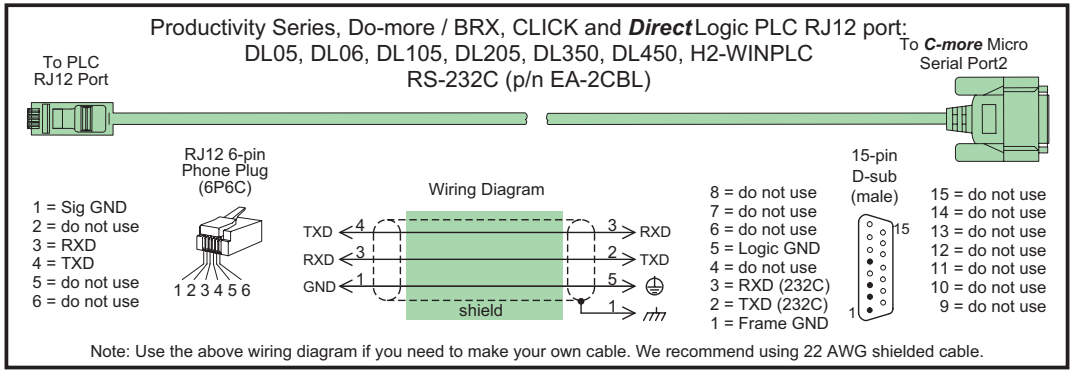
Part No. EA-MITSU-CBL-1

Part No. EA-OMRON-CBL

Cables from *AutomationDirect* – Wiring Diagrams

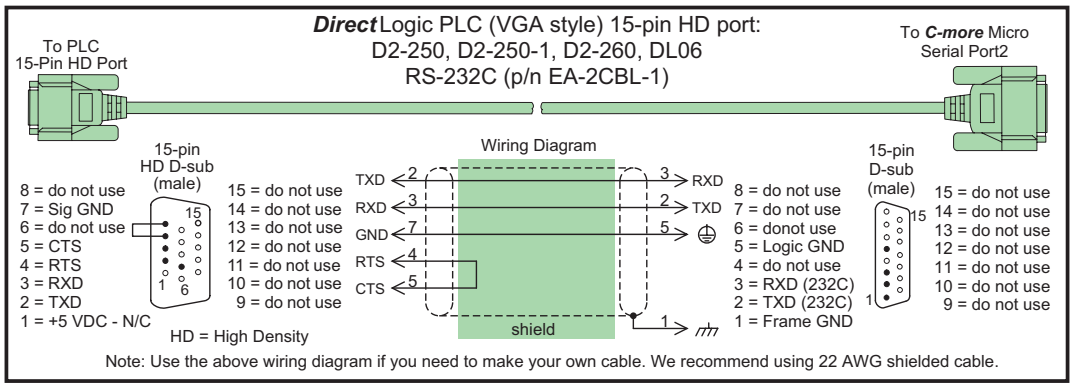
The following series of wiring diagrams show the connectors and wiring details for the communication cables that are used between the ***C-more*** Micro panels and various PLCs. Part numbers are included with the pre-made cables that can be purchased from ***AutomationDirect***. The information presented will allow the user to construct their own cables if so desired.

CLICK and *Direct*LOGIC: *EA-2CBL*



Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

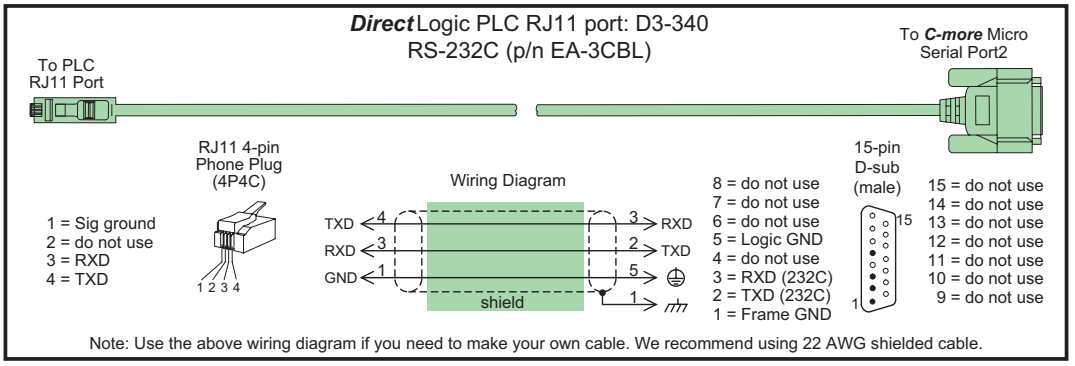
*Direct*LOGIC: *EA-2CBL-1*



Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

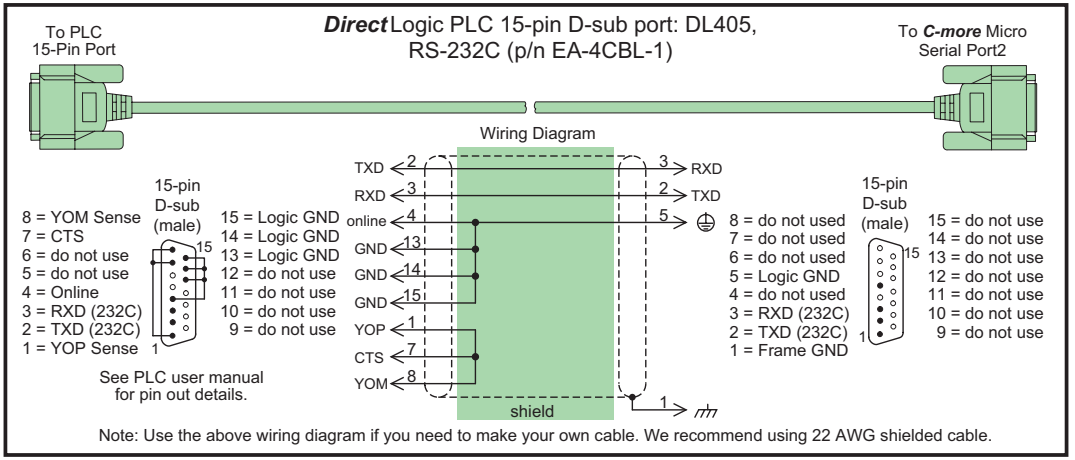
Cables from *AutomationDirect* – Wiring Diagrams (cont'd)

DirectLOGIC: **EA-3CBL**



Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

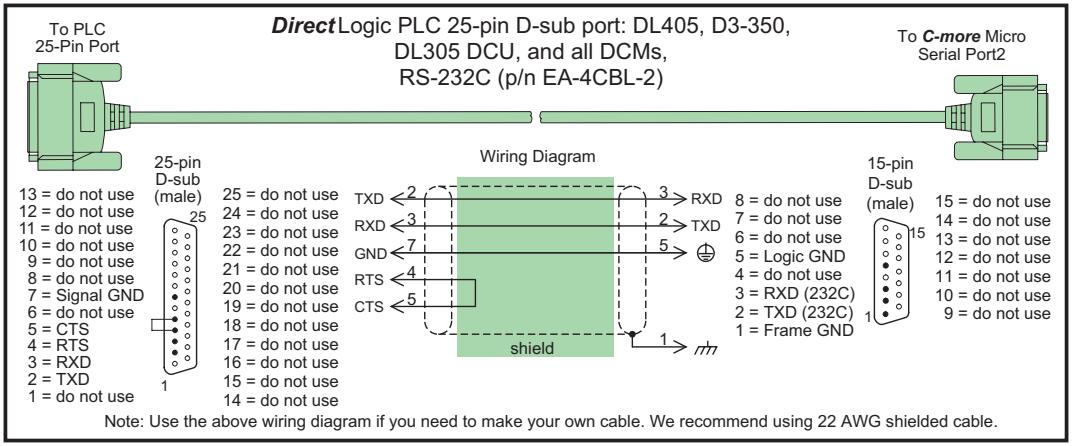
DirectLOGIC: **EA-4CBL-1**



Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

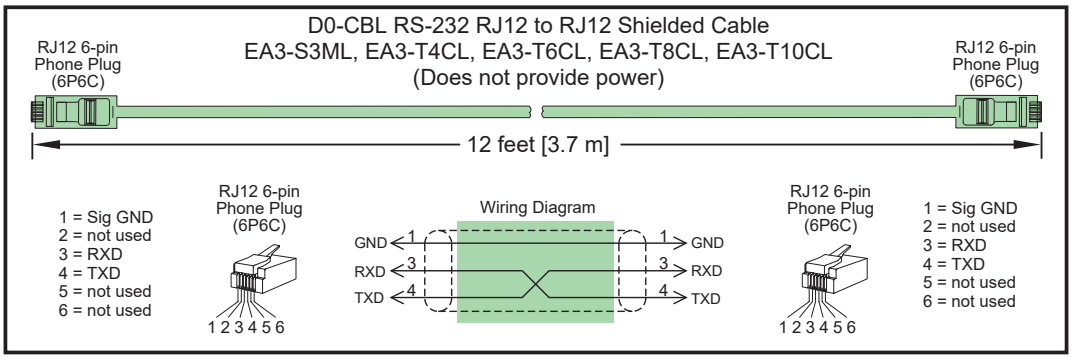
Cables from *AutomationDirect* – Wiring Diagrams (cont'd)

*Direct*LOGIC: EA-4CBL-2

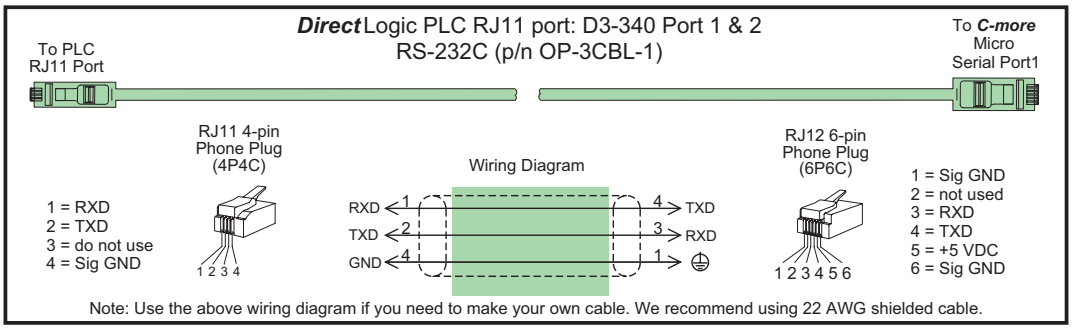


Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

AutomationDirect Controllers D0-CBL



*Direct*LOGIC: OP-3CBL-1



Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

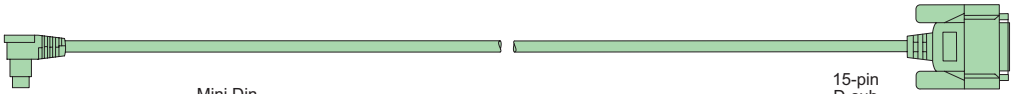
Cables from *AutomationDirect* – Wiring Diagrams (cont'd)

AllenBradley: *EA-MLOGIX-CBL*

Allen-Bradley MicroLogix™ 1000/1100/1200/1400/1500 RS-232C (p/n EA-MLOGIX-CBL)

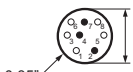
To AB MicroLogix RS-232 communication channel

To ***C-more*** Micro Serial Port2

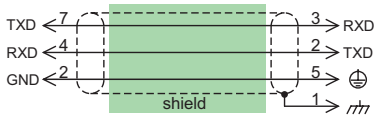


1 = do not use
2 = Sig GND
3 = do not use
4 = RXD
5 = do not use
6 = do not use
7 = TXD
8 = do not use

Mini Din 8-pin Male

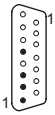


Wiring Diagram



8 = do not use
7 = do not use
6 = do not use
5 = Logic GND
4 = do not use
3 = RXD (232C)
2 = TXD (232C)
1 = Frame GND

15-pin D-sub (male)



15 = do not use
14 = do not use
13 = do not use
12 = do not use
11 = do not use
10 = do not use
9 = do not use

Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

AllenBradley: *EA-SLC-232-CBL*

Allen-Bradley SLC 5-03/04/05, ControlLogix, CompactLogix, FlexLogix, DF1, RS-232C (p/n EA-SLC-232-CBL)

To PLC 9-Pin Port

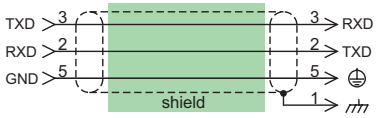
To ***C-more*** Micro Serial Port2

9-pin D-sub (female)

1 = do not use
2 = RXD
3 = TXD
4 = do not use
5 = Signal GND

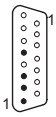
6 = do not use
7 = do not use
8 = do not use
9 = do not use

Wiring Diagram



8 = do not use
7 = do not use
6 = do not use
5 = Logic GND
4 = do not use
3 = RXD (232C)
2 = TXD (232C)
1 = Frame GND

15-pin D-sub (male)



15 = do not use
14 = do not use
13 = do not use
12 = do not use
11 = do not use
10 = do not use
9 = do not use

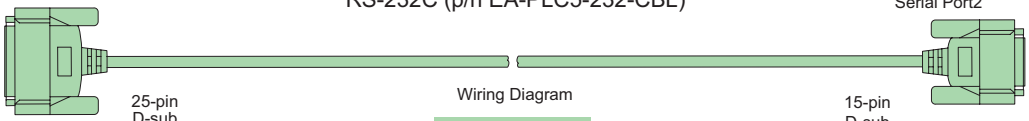
Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

AllenBradley: *EA-PLC5-232-CBL*

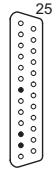
Allen-Bradley PLC5, DF1, RS-232C (p/n EA-PLC5-232-CBL)

To PLC 25-Pin Port

To ***C-more*** Micro Serial Port2



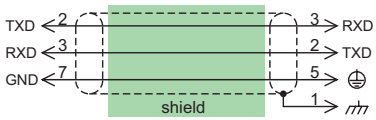
25-pin D-sub (male)



13 = do not use
12 = do not use
11 = do not use
10 = do not use
9 = do not use
8 = do not use
7 = Signal GND
6 = do not use
5 = do not use
4 = do not use
3 = RXD
2 = TXD
1 = do not use

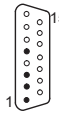
25 = do not use
24 = do not use
23 = do not use
22 = do not use
21 = do not use
20 = do not use
19 = do not use
18 = do not use
17 = do not use
16 = do not use
15 = do not use
14 = do not use

Wiring Diagram



8 = do not use
7 = do not use
6 = do not use
5 = Logic GND
4 = do not use
3 = RXD (232C)
2 = TXD (232C)
1 = Frame GND

15-pin D-sub (male)

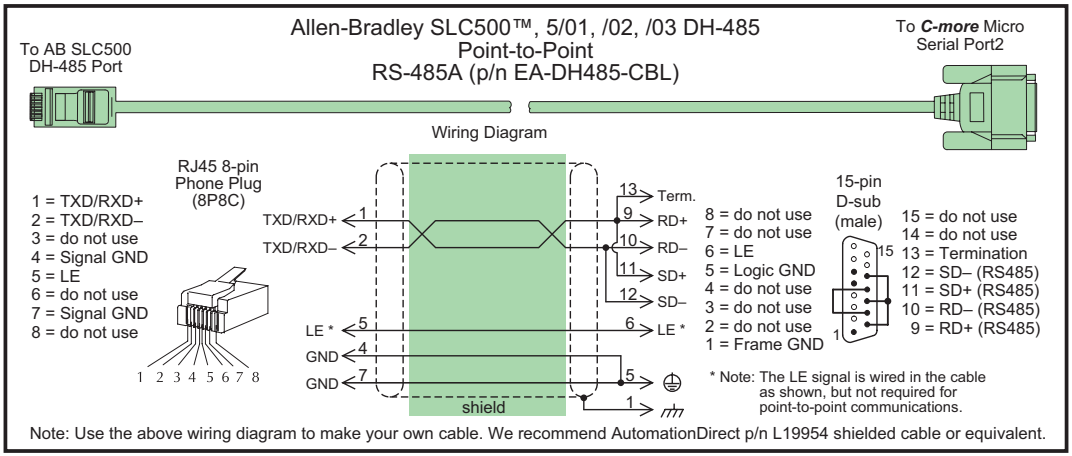


15 = do not use
14 = do not use
13 = do not use
12 = do not use
11 = do not use
10 = do not use
9 = do not use

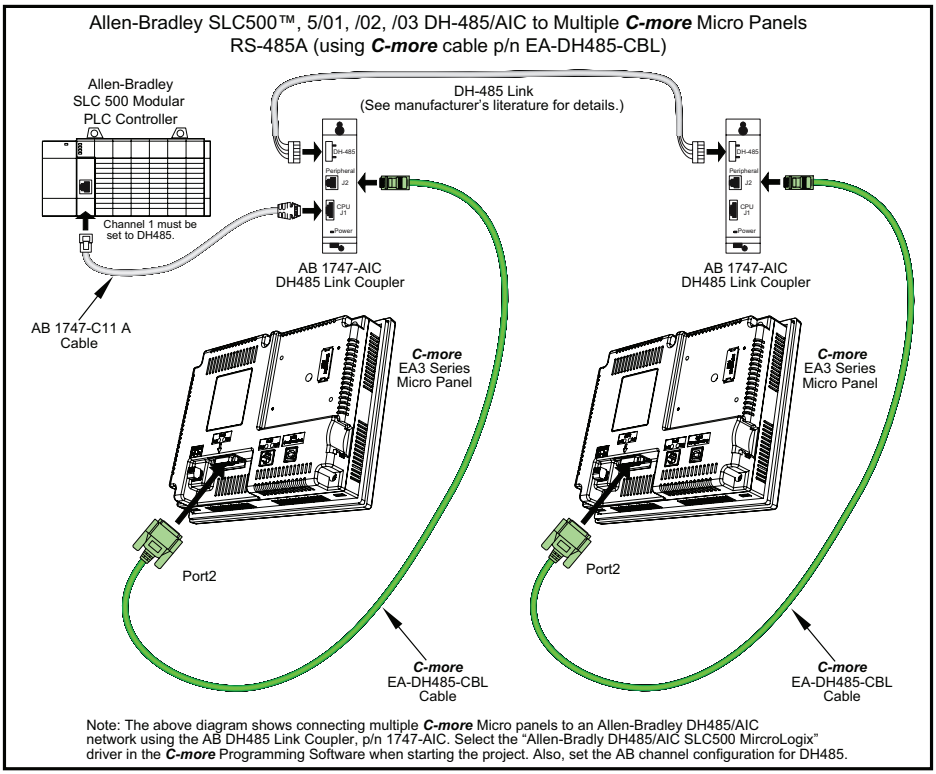
Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

Cables from *AutomationDirect* – Wiring Diagrams (cont'd)

Allen-Bradley: *EA-DH485-CBL*



Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19954 shielded cable or equivalent.

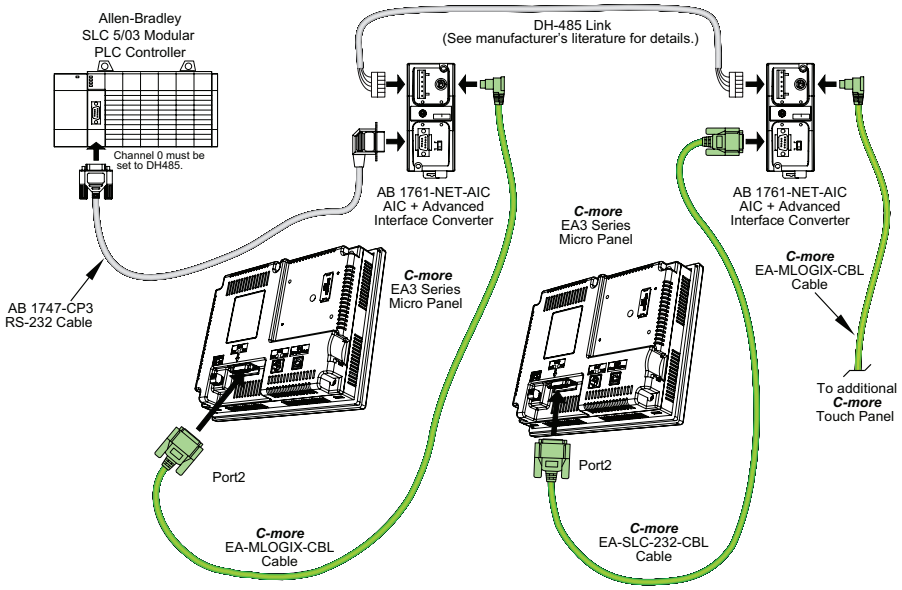


Note: The above diagram shows connecting multiple ***C-more*** Micro panels to an Allen-Bradley DH485/AIC network using the AB DH485 Link Coupler, p/n 1747-AIC. Select the "Allen-Bradly DH485/AIC SLC500 MircroLogix" driver in the ***C-more*** Programming Software when starting the project. Also, set the AB channel configuration for DH485.

Cables from *AutomationDirect* – Wiring Diagrams (cont'd)

Allen-Bradley:

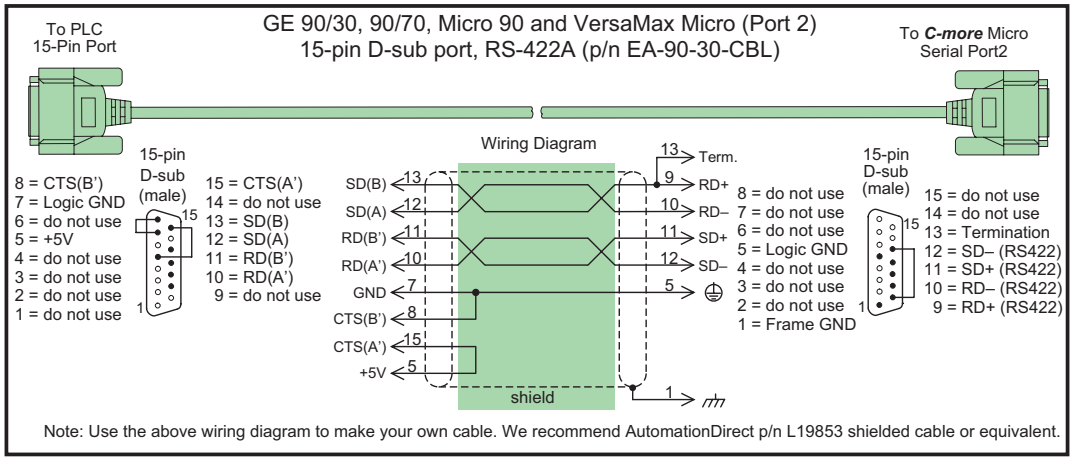
Allen-Bradley SLC500™ 5/03 DH-485/AIC to Multiple ***C-more*** Micro Panels
(using ***C-more*** cables p/n EA-MLOGIX-CBL, EA-SLC-232-CBL)



Note: The above diagram shows connecting multiple ***C-more*** Micro panels to an Allen-Bradley DH485/AIC network using the AB AIC+ Advanced Interface Converter, p/n 1761-NET-AIC. Select the "Allen-Bradly DH485/AIC SLC500 MircroLogix" driver in the ***C-more*** Micro Programming Software when starting the project. Also, set the AB channel configuration for DH485.

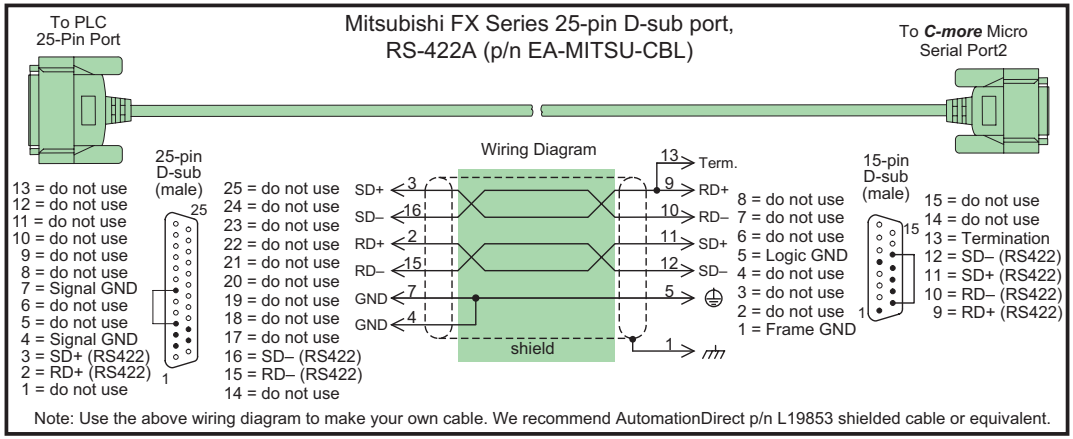
Cables from *AutomationDirect* – Wiring Diagrams (cont'd)

GE: *EA-90-30-CBL*



Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19853 shielded cable or equivalent.

Mitsubishi *EA-MITSU-CBL*

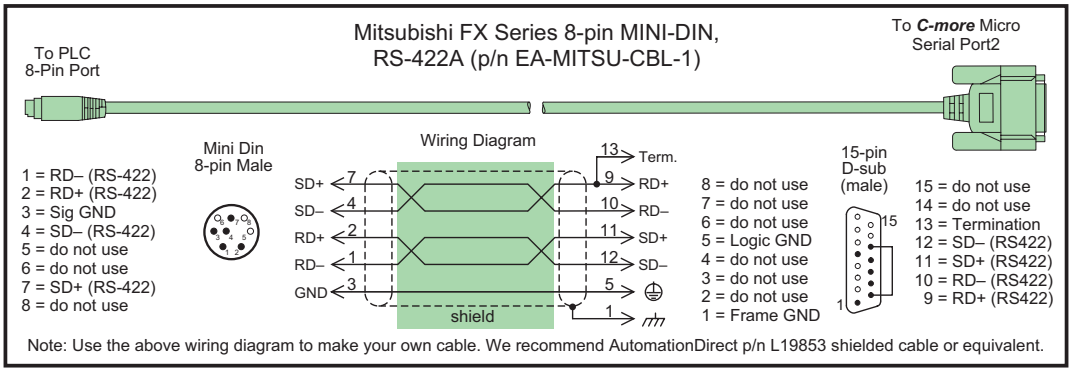


Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19853 shielded cable or equivalent.

Cables from *AutomationDirect* – Wiring Diagrams (cont'd)

Mitsubishi

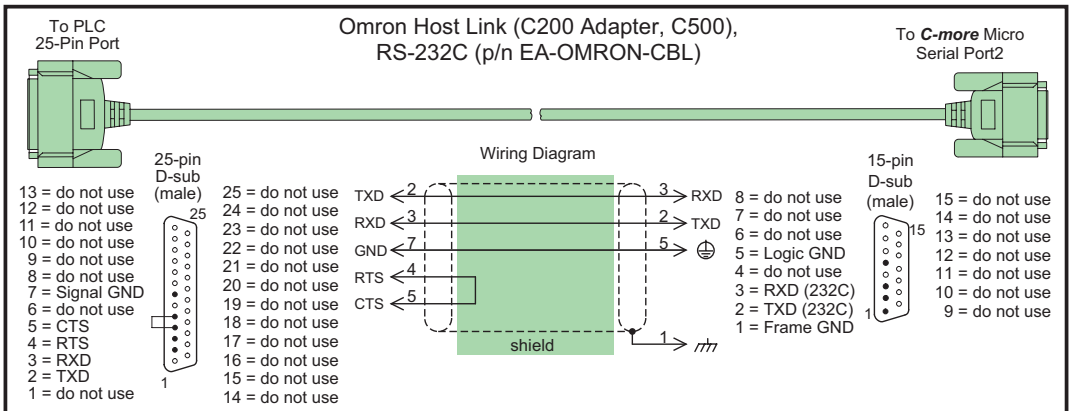
EA-MITSU-CBL-1



Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19853 shielded cable or equivalent.

Omron

EA-OMRON-CBL



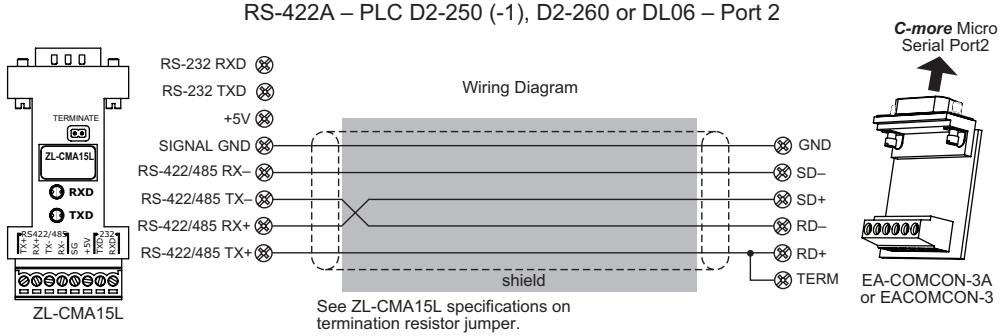
Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

User Constructed Cables – Wiring Diagrams

Diagram 1

User Constructed

***Direct*LOGIC ZIPLink ZL-CMA15L Adapter Module to EA-COMCON-3A Terminal Block Adapter**
RS-422A – PLC D2-250 (-1), D2-260 or DL06 – Port 2

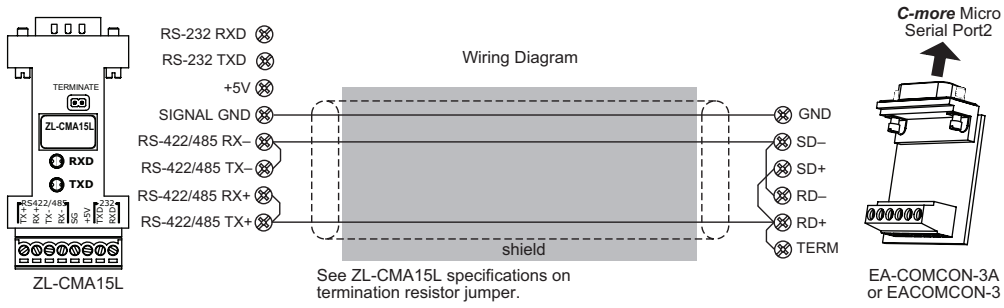


Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19954 shielded cable or equivalent.

Diagram 2

User Constructed

***Direct*LOGIC ZIPLink ZL-CMA15L Adapter Module to EA-COMCON-3 Terminal Block Adapter**
RS-485A – PLC D2-260 or DL06 – Port 2



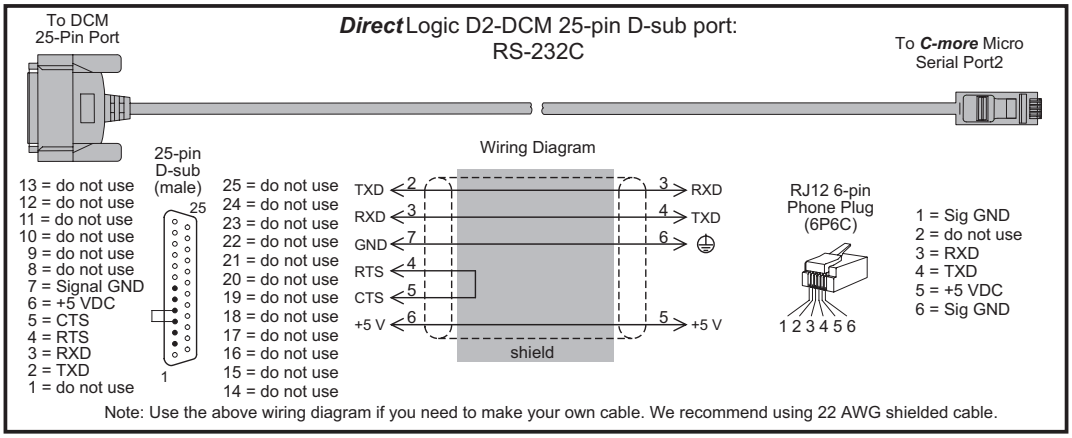
Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19853 shielded cable or equivalent.

NOTE: *The RS-422 and RS-485 wiring diagrams shown above are not for multi-drop networks involving connecting more than one PLC to a panel. Refer to the wiring diagram examples starting on page 6-40 if more than one PLC will be connected to a panel.*

User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 3

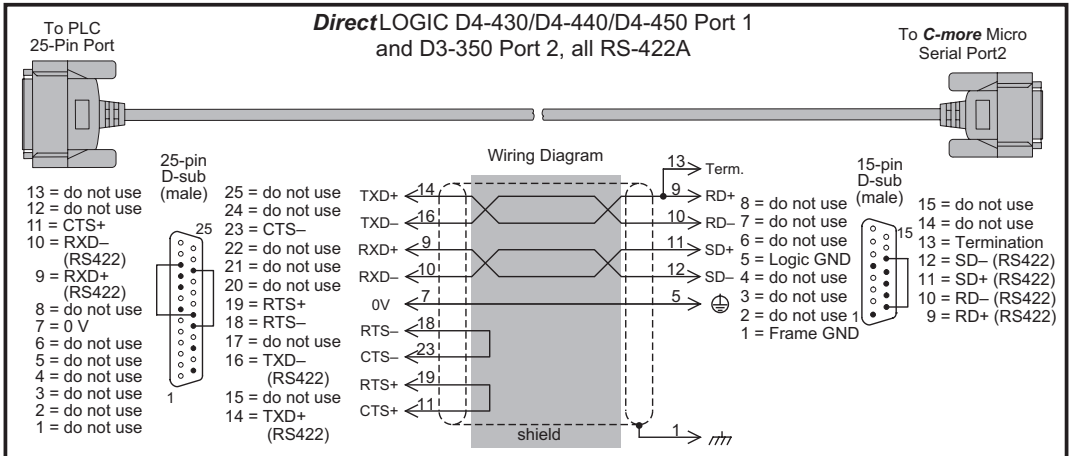
User Constructed



Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

Diagram 4

User Constructed



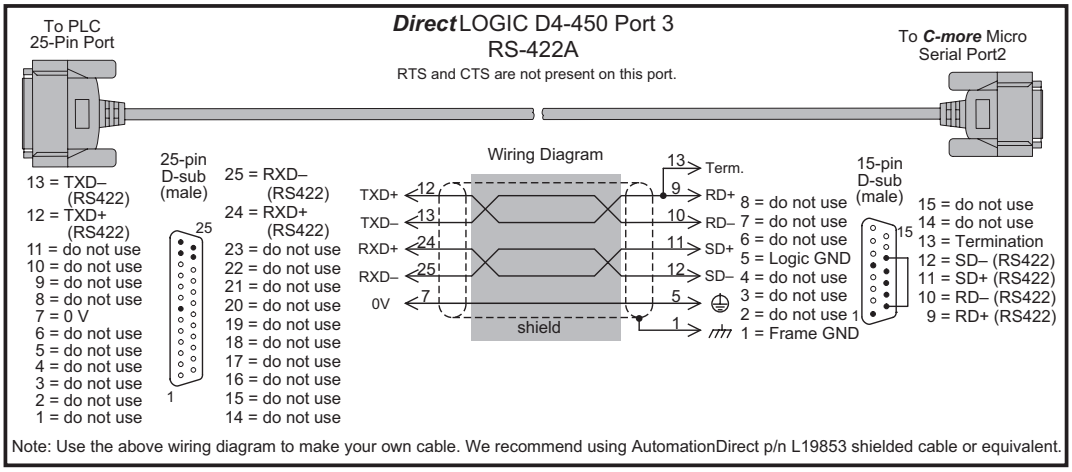
Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19853 shielded cable or equivalent.

NOTE: *The RS-422 wiring diagram shown above is not for multi-drop networks involving connecting more than one PLC to a panel. Refer to the wiring diagram examples starting on page 6-40 if more than one PLC will be connected to a panel.*

User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 5

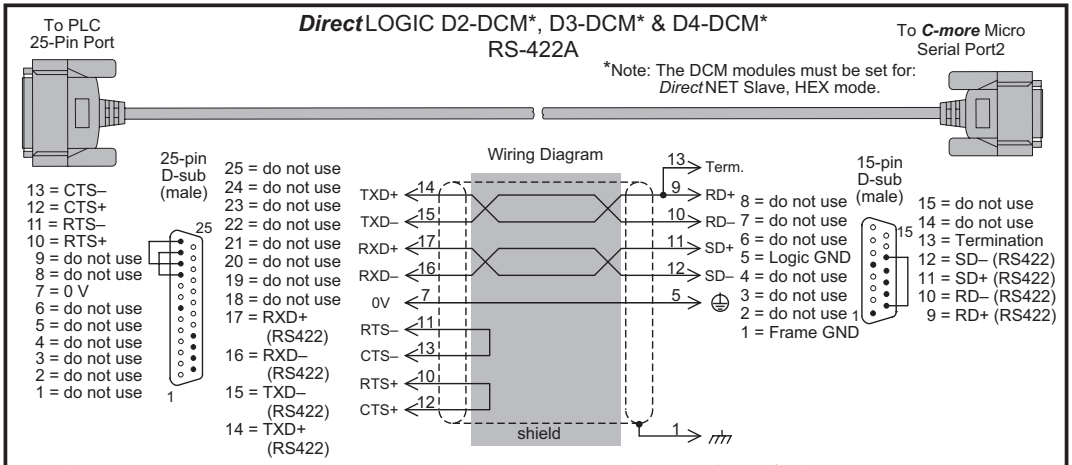
User Constructed



Note: Use the above wiring diagram to make your own cable. We recommend using AutomationDirect p/n L19853 shielded cable or equivalent.

Diagram 6

User Constructed



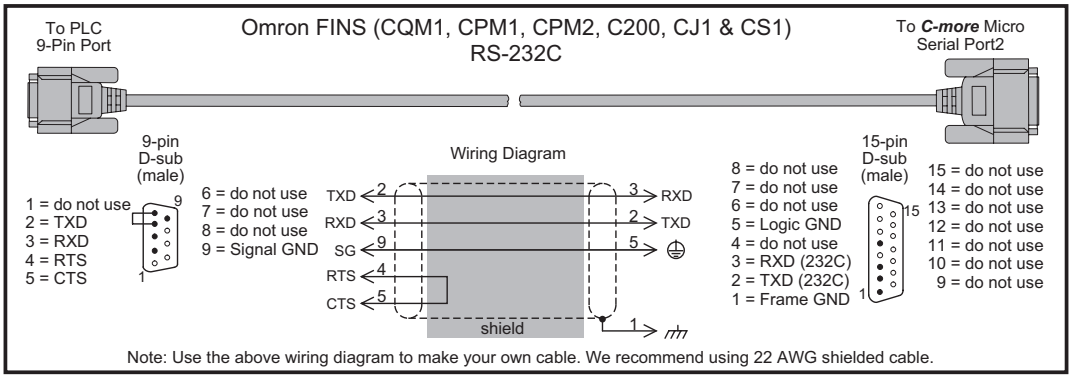
Note: Use the above wiring diagram to make your own cable. We recommend using AutomationDirect p/n L19853 shielded cable or equivalent.

NOTE: *The RS-422 wiring diagrams shown above are not for multi-drop networks involving connecting more than one PLC to a panel. Refer to the wiring diagram examples starting on page 6-40 if more than one PLC will be connected to a panel.*

User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 7

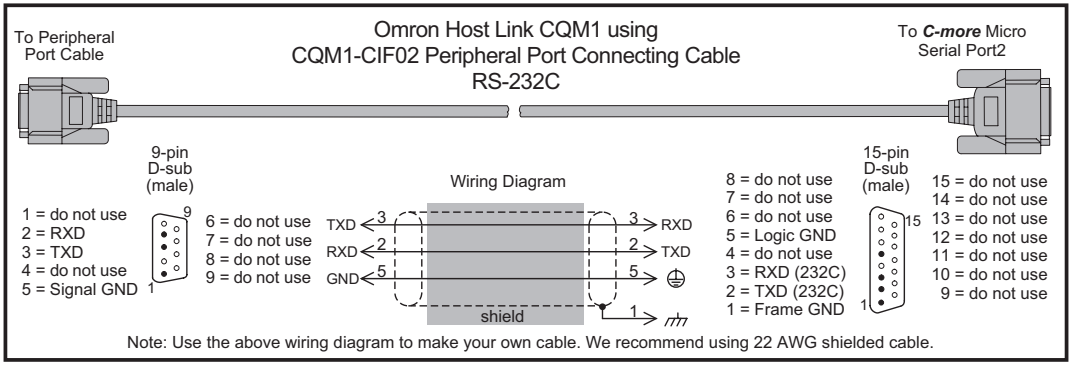
User Constructed



Note: Use the above wiring diagram to make your own cable. We recommend using 22 AWG shielded cable.

Diagram 8

User Constructed

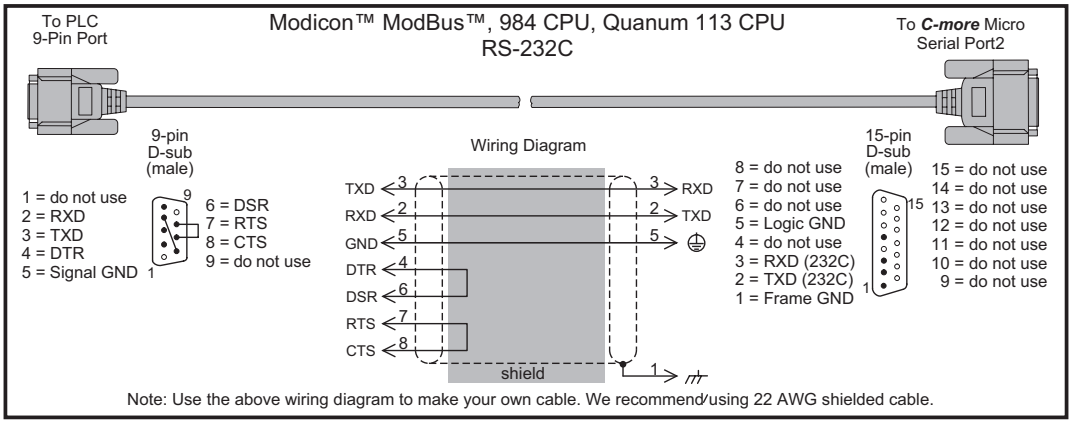


Note: Use the above wiring diagram to make your own cable. We recommend using 22 AWG shielded cable.

User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 9

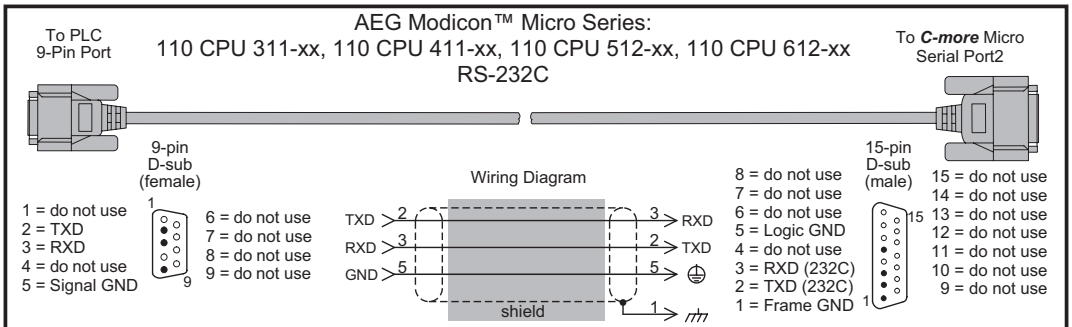
User Constructed



Note: Use the above wiring diagram to make your own cable. We recommend using 22 AWG shielded cable.

Diagram 10

User Constructed

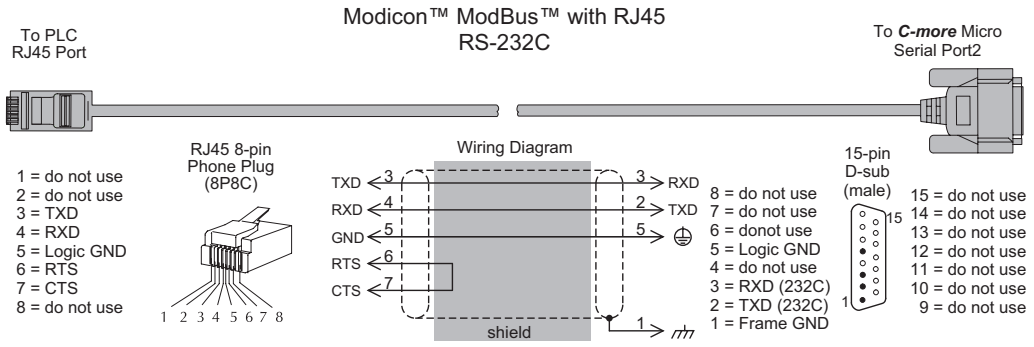


Note: Use the above wiring diagram to make your own cable. We recommend using 22 AWG shielded cable.

User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 11

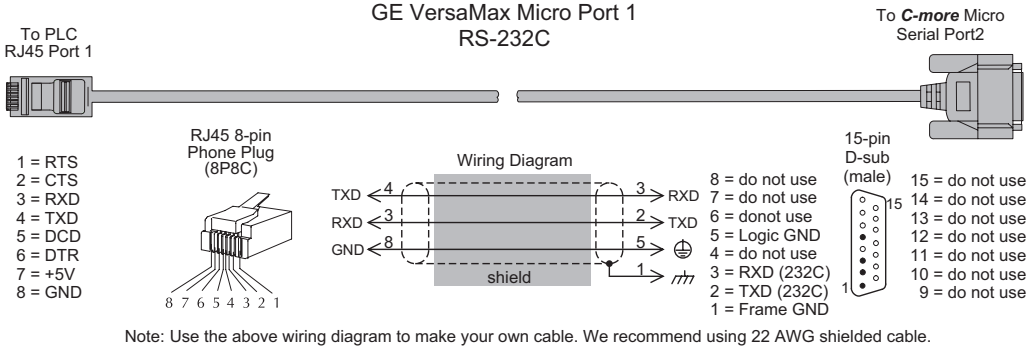
User Constructed



Note: Use the above wiring diagram to make your own cable. We recommend using 22 AWG shielded cable.

Diagram 12

User Constructed

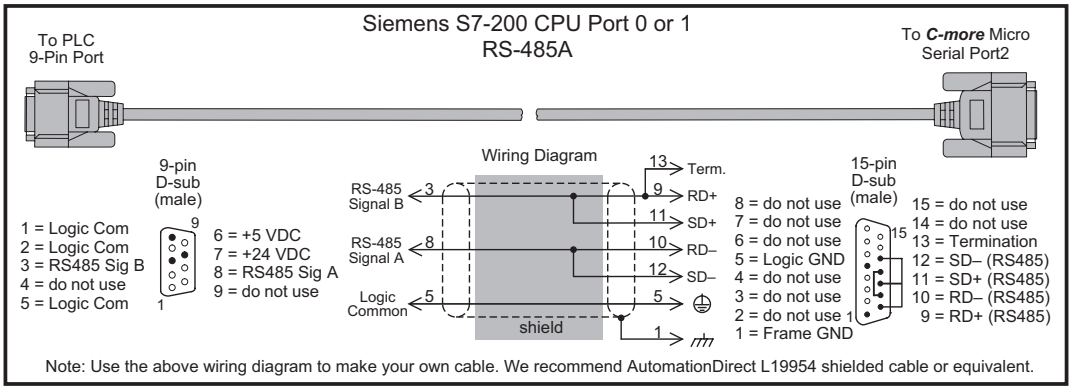


Note: Use the above wiring diagram to make your own cable. We recommend using 22 AWG shielded cable.

User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 13

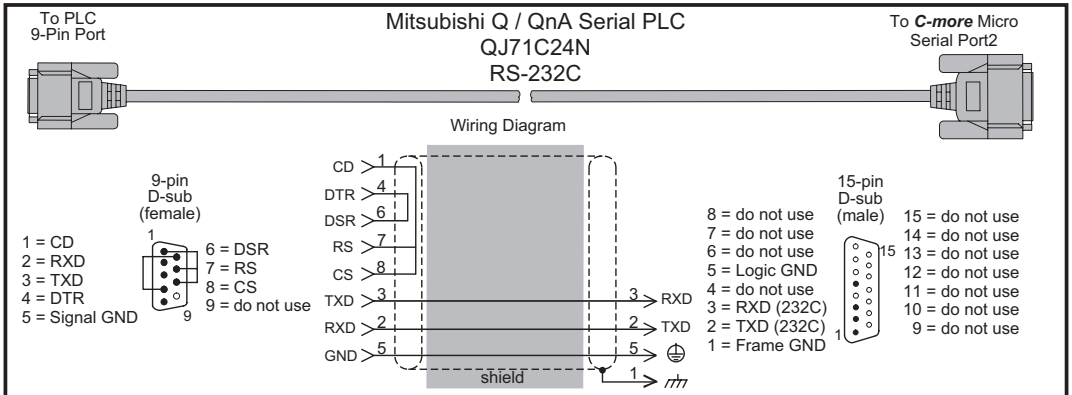
User Constructed



Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect L19954 shielded cable or equivalent.

Diagram 14

User Constructed



Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 15

User Constructed

Mitsubishi Q02 / Q02H / Q06H / Q12H / Q25H Serial Driver and QnA Serial Driver with Direct Connection to the Serial Port on Q00 and Q01 CPU's RS-232C

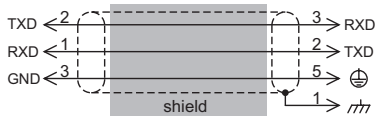
To PLC 6-Pin Port

To ***C-more*** Micro Serial Port2

1 = RXD (232C)
2 = TXD (232C)
3 = Logic GND
4 = do not use
5 = do not use
6 = do not use

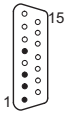
Mini Din 6-pin Male

Wiring Diagram



8 = do not use
7 = do not use
6 = donot use
5 = Logic GND
4 = do not use
3 = RXD (232C)
2 = TXD (232C)
1 = Frame GND

15-pin D-sub (male)



15 = do not use
14 = do not use
13 = do not use
12 = do not use
11 = do not use
10 = do not use
9 = do not use

Note: Use the above wiring diagram to make your own cable. We recommend using 22 AWG shielded cable.

Diagram 16

User Constructed

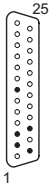
Allen Bradley PLC5 DF1 RS-422

To PLC 25-Pin Port

To ***C-more*** Micro Serial Port2

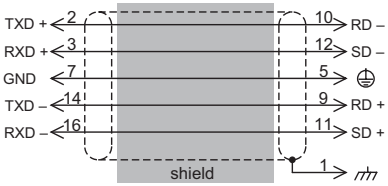
13 = do not use
12 = do not use
11 = do not use
10 = do not use
9 = do not use
8 = do not use
7 = Signal GND
6 = do not use
5 = do not use
4 = do not use
3 = RXD +
2 = TXD +
1 = do not use

25-pin D-sub (male)



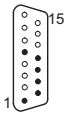
25 = do not use
24 = do not use
23 = do not use
22 = do not use
21 = do not use
20 = do not use
19 = do not use
18 = do not use
17 = do not use
16 = RXD –
15 = do not use
14 = TXD –

Wiring Diagram



8 = do not use
7 = do not use
6 = do not use
5 = Logic GND
4 = do not use
3 = do not use
2 = do not use
1 = Frame GND

15-pin D-sub (male)

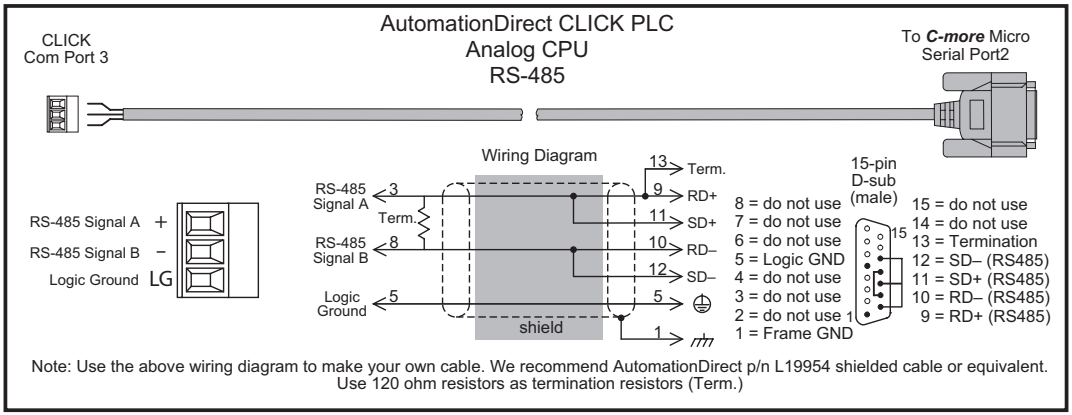


15 = do not use
14 = do not use
13 = do not use
12 = SD –
11 = SD +
10 = RD –
9 = RD +

Notes:
1. Polarities must be swapped.
2. Handshaking is turned off
3. Use the above wiring diagram to make your own cable. We recommend using AutomationDirect p/n L19853 shielded cable or equivalent.
4. Refer to the PLC-5 Programmable Controllers User Manual Switch Setting Reference for details on switch settings to define the controller's serial port electrical interface.

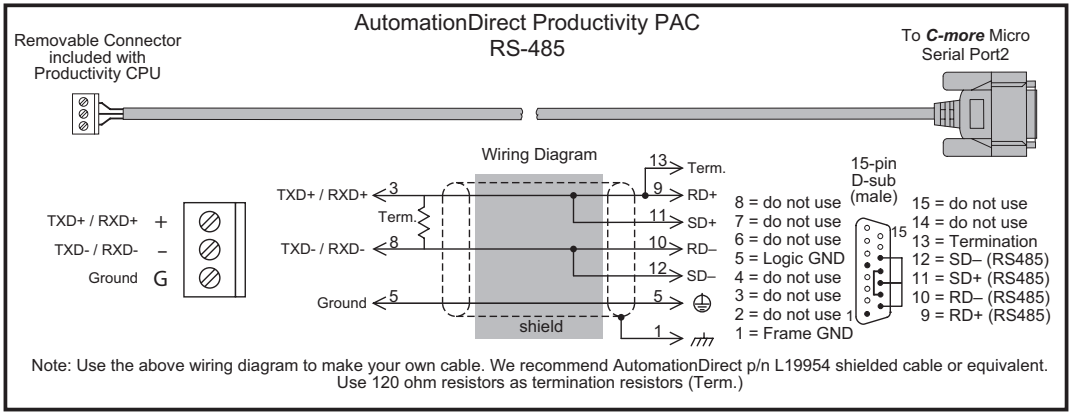
User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 17 ***User Constructed***



Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19954 shielded cable or equivalent. Use 120 ohm resistors as termination resistors (Term.)

Diagram 18 ***User Constructed***



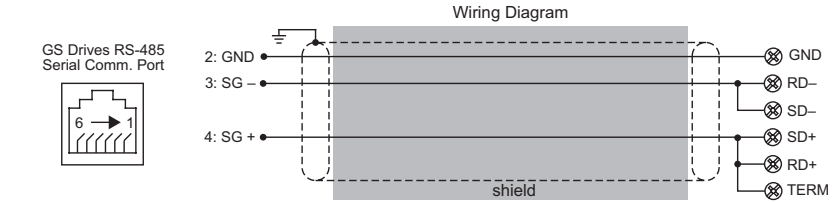
Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19954 shielded cable or equivalent. Use 120 ohm resistors as termination resistors (Term.)

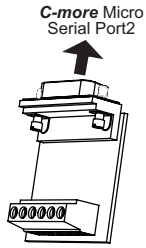
User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 19

User Constructed

GS Serial Drive Connection via RS-485



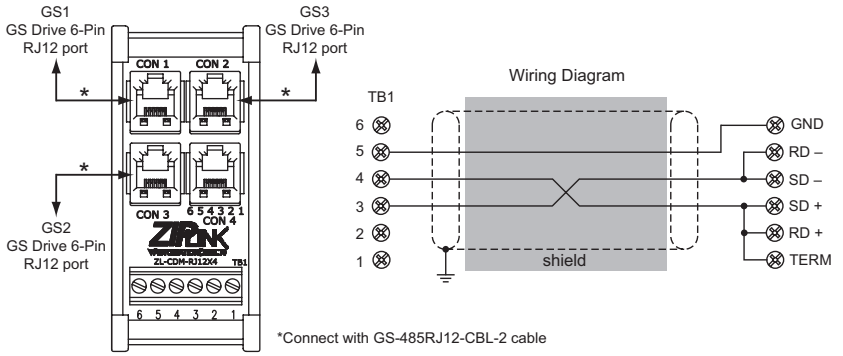


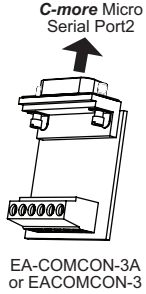
Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19772 shielded cable or equivalent.

Diagram 20

User Constructed

Multiple GS Drives Connected to One ***C-more*** Micro panel (RS-485)





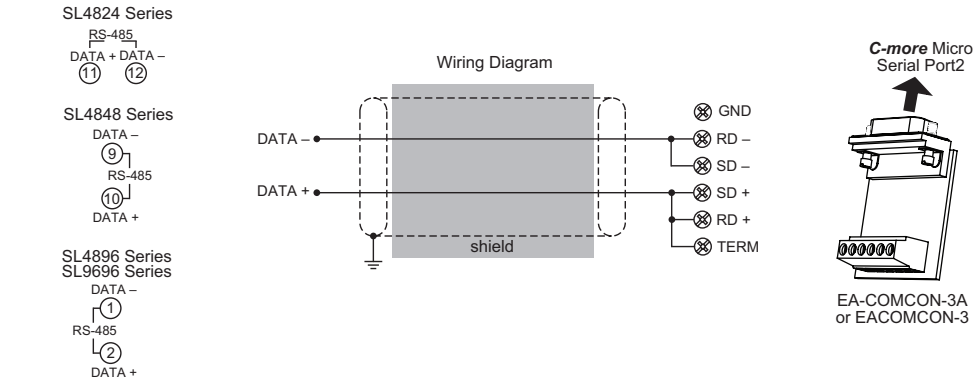
*Connect with GS-485RJ12-CBL-2 cable

Notes: 1. The terminal connections at the ZL-CDM-RJ12X4 are different for multi-drop networks than for the direct drive to panel connection.
2. Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L19954 shielded cable or equivalent.

User Constructed Cables – Wiring Diagrams (cont'd)

Diagram 21 ***User Constructed***

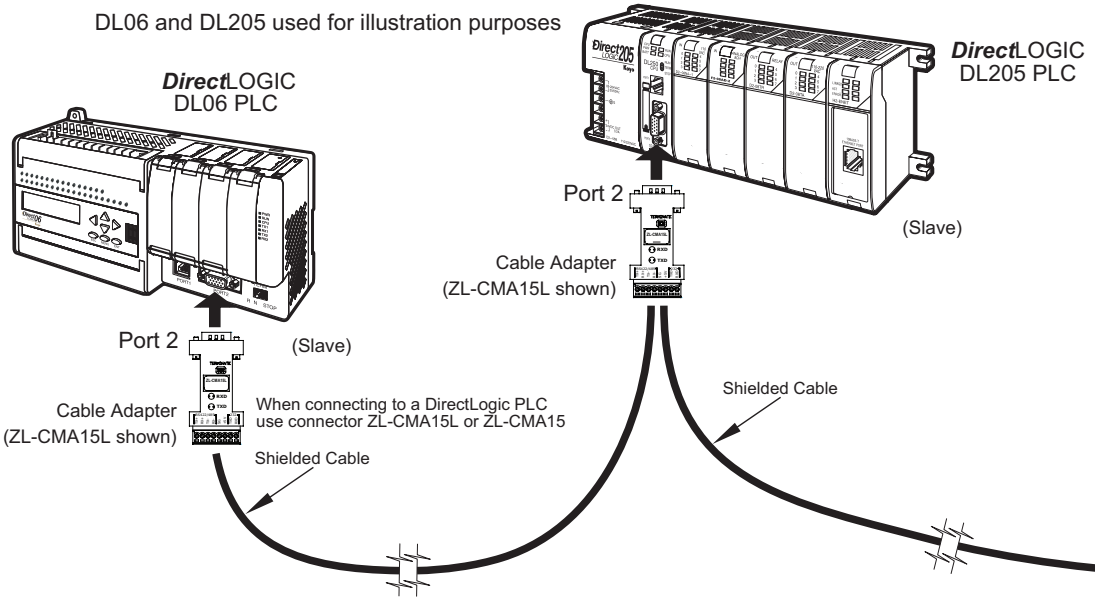
SOLO Temperature Controller to ***C-more*** Micro Panel (RS-485)



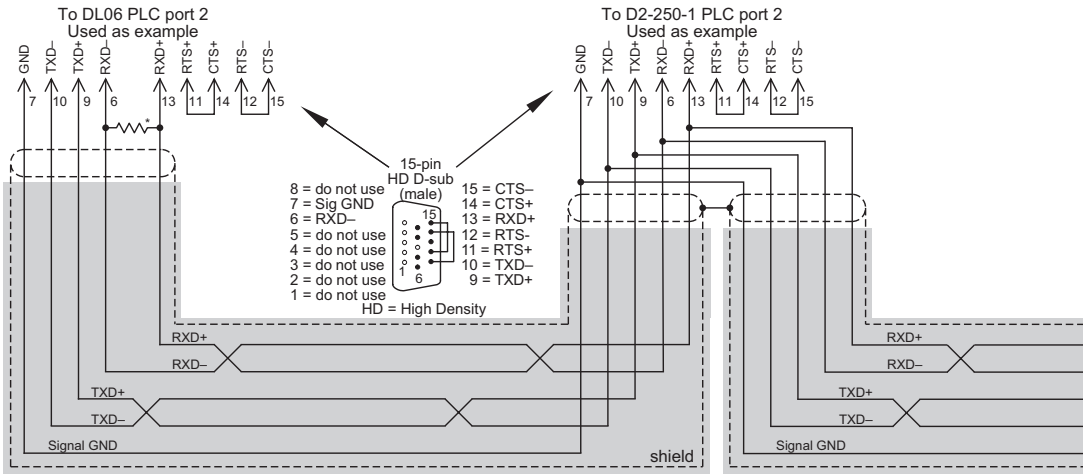
Note: Use the above wiring diagram to make your own cable. We recommend AutomationDirect p/n L199772 shielded cable or equivalent.

6

RS-422A Multi-Drop Wiring Diagram Example



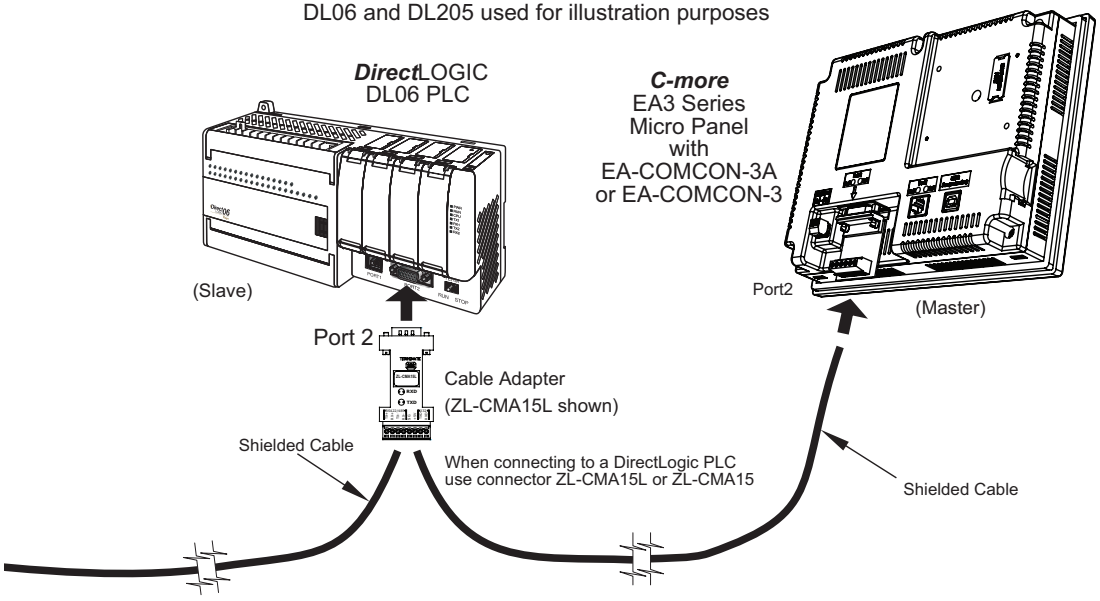
Notes: 1. We recommend Belden 8103 shielded cable or equivalent.
2. Wiring Diagram for this example, ZL-CMA15(L)



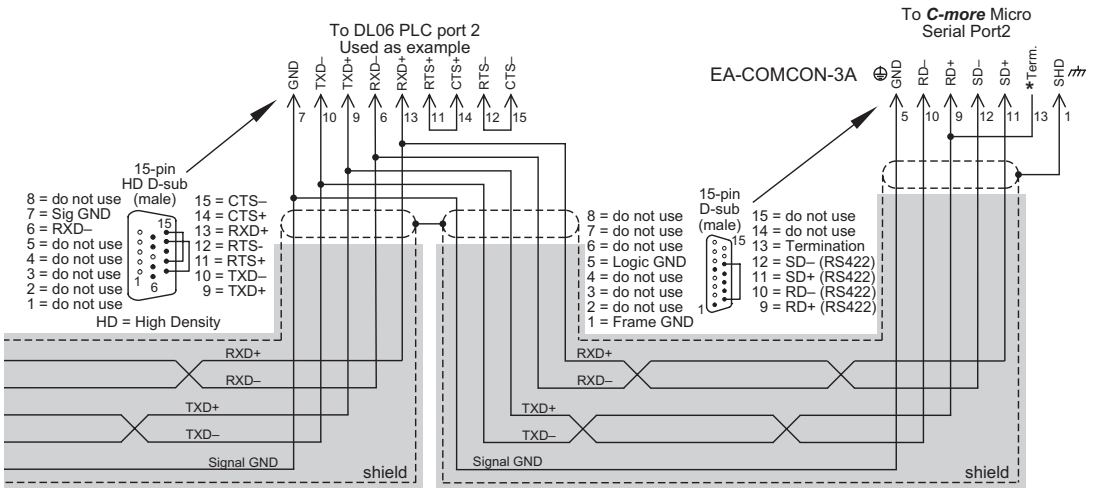
* Termination resistors required at both ends of the network receive data signals to match the impedance of the cable (between 100 and 500 ohms).

Typical RS-422 Multi-Drop Wiring Diagram
using DirectLogic pin numbers to illustrate

RS-422A Multi-Drop Wiring Diagram Example (cont'd)



Notes: 1. We recommend Belden 8103 shielded cable or equivalent.
2. Wiring Diagram for this example, ZL-CMA15(L)

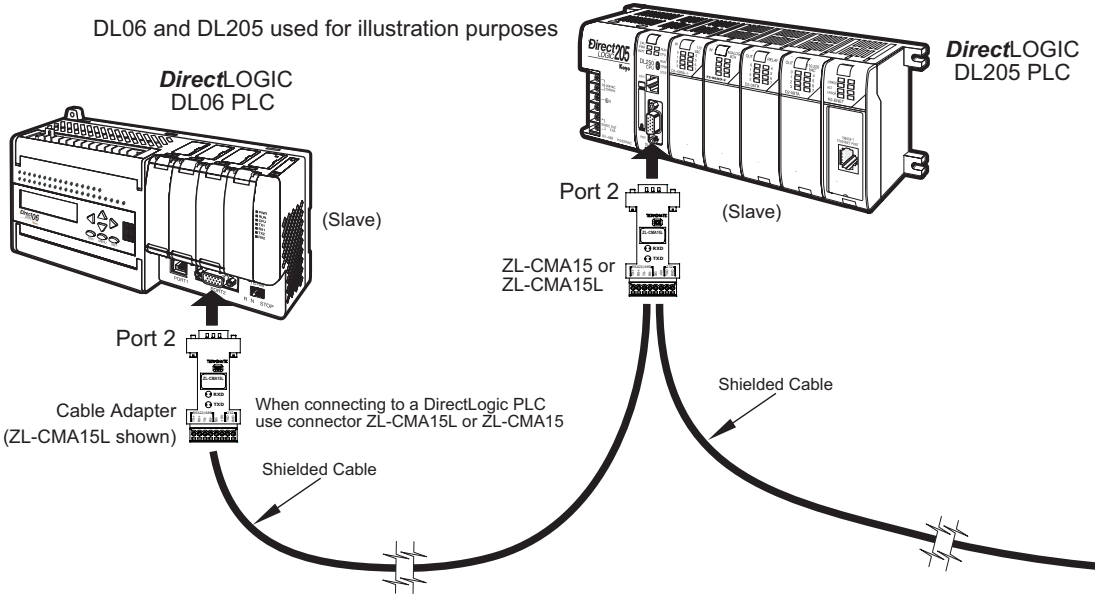


Typical RS-422 Multi-Drop Wiring Diagram (cont'd)

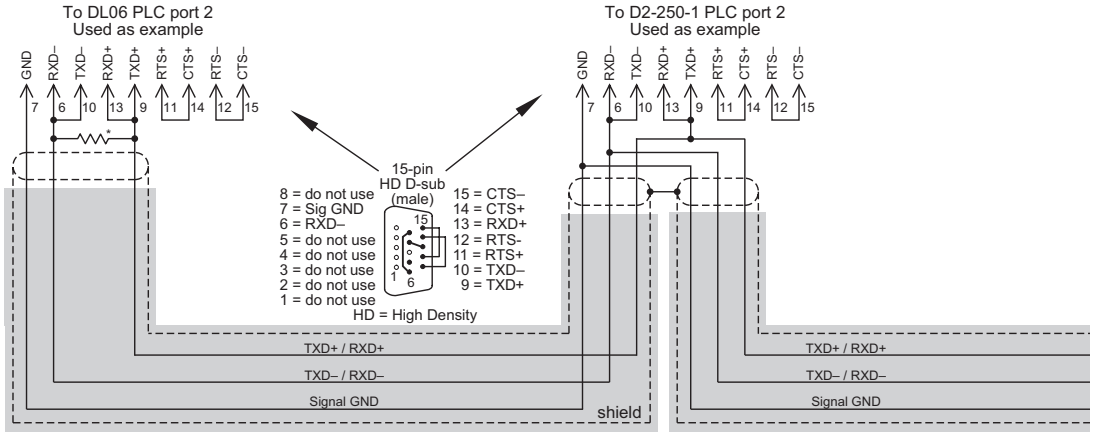
using DirectLogic pin numbers to illustrate

* Termination resistors required at both ends of the network receive data signals to match the impedance of the cable (between 100 and 500 ohms). Jumper pin 13 to 9 on the ***C-more*** Micro Serial Port2 15-pin connector to place the 120Ω internal resistor into the network. If the cable impedance is different, then use an external resistor matched to the cable impedance.

RS-485A Multi-Drop Wiring Diagram Example



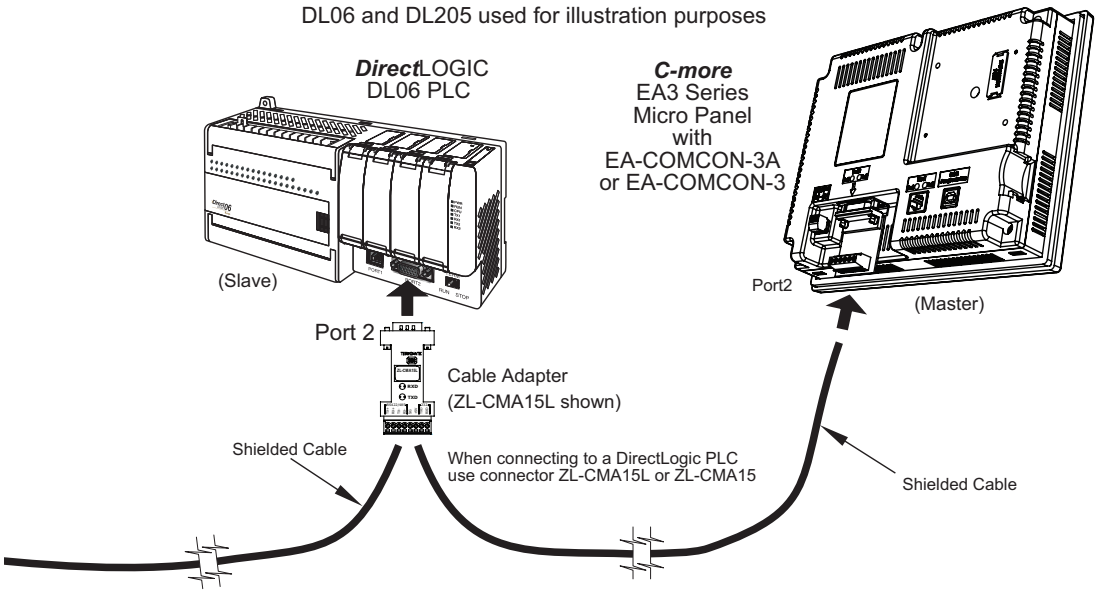
Notes: 1. We recommend Belden 9842 shielded cable or equivalent.
2. Wiring Diagram for this example, ZL-CMA15(L)



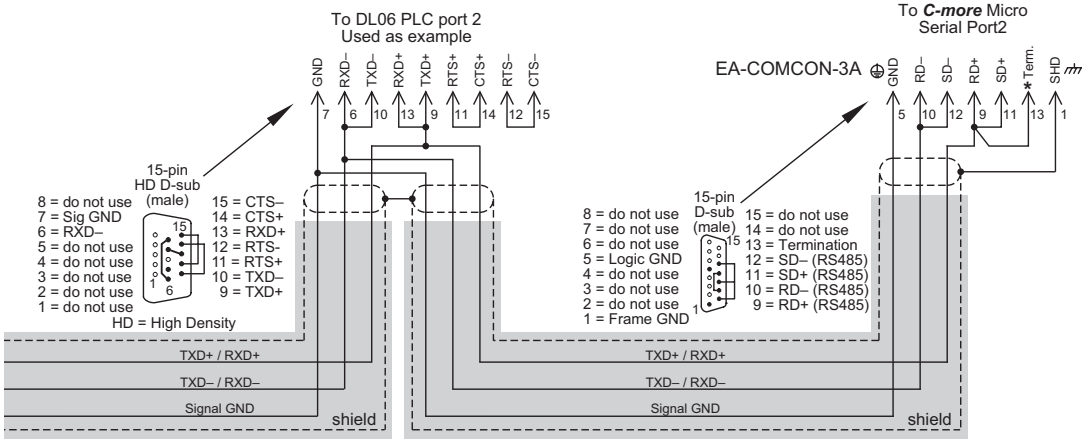
* Termination resistors required at both ends of the network to match the impedance of the cable (between 100 and 500 ohms).

Typical RS-485 Multi-Drop Wiring Diagram
using DirectLogic pin numbers to illustrate

RS-485A Multi-Drop Wiring Diagram Example (cont'd)



Notes: 1. We recommend Belden 9842 shielded cable or equivalent.
2. Wiring Diagram for this example, ZL-CMA15(L)



Typical RS-485 Multi-Drop Wiring Diagram (cont'd)

using DirectLogic pin numbers to illustrate

*Termination resistors required at both ends of the network receive data signals to match the impedance of the cable (between 100 and 500 ohms). Jumper pin 13 to 9 on the ***C-more*** Micro Serial Port2 15-pin connector to place the 120Ω internal resistor into the network. If the cable impedance is different, then use an external resistor matched to the cable impedance.