PLC COMMUNICATIONS

CHAPTER 6

In This Chapter...

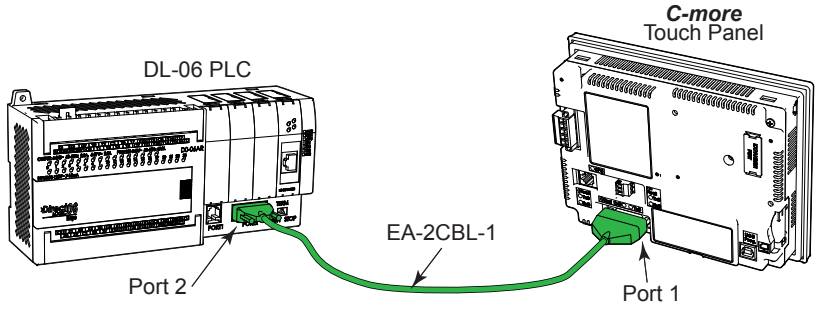
Introduction

The ***C-more*** family of touch panels is capable of communicating with a wide variety of Programmable Logic Controllers. ***C-more*** is capable of communicating over RS232, RS422 and RS485 serial networks as well as Ethernet networks. It communicates with all AutomationDirect PLC's utilizing various protocols. ***C-more*** also communicates with other brands of PLCs by their different protocols. The table on the next page lists all of the various PLCs and protocols that can be configured. The page after the protocol table lists the various serial communication cables that are available to purchase. The rest of this chapter is devoted to showing the pin to pin connections of all the available cables plus wiring diagrams that the user can refer to in order to construct their own cables, along with wiring diagrams of cables that are not available for purchase. To simplify RS422/RS485 wiring schemes, we have included wiring diagrams showing connections for available terminal connectors such as our ZIPLink Communication Adapter Module, p/n ZL-CMA15, used for example with our DL-06 and D2-260 PLCs.

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

*Direct*LOGIC PLCs Password Protection

NOTE: *Many* ***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 seven numeric characters (e.g. A1234567). Please refer to the specific PLC user manual for further details.*



PLC Protocols

PLC Protocol Table			
Model			**Protocols**
AutomationDirect	Productivity Series		Productivity Serial
			Productivity Ethernet
	Do-more (BRX)	all	Do-more Serial
			Do-more Ethernet
	CLICK	All	CLICK Serial
		C0-1x series	CLICK Ethernet
	CLICK PLUS	C2-01CPU-x, C2-03CPU-x, All with C2-DCM	CLICK Serial
		All	CLICK Ethernet
	DL05/DL06	all	K-Sequence
			DirectNET
			Modbus (Koyo addressing)
		H0-ECOM/H0-ECOM100	DirectLOGIC Ethernet
	DL105	all	K-Sequence
	DL205	D2-230	K-Sequence
		D2-240	K-Sequence
			DirectNET
		D2-250/D2-250-1/D2-260/D2-262	K-Sequence
			DirectNET
			Modbus (Koyo addressing)
		D2-240/D2-250-1/D2-260 Using DCM	DirectNET
			Modbus (Koyo addressing)
		H2-ECOM/H2-ECOM100	DirectLOGIC Ethernet
	DL305	D3-330/330P (Requires the use of a Data Communications Unit)	DirectNET
		D3-340	DirectNET
		D3-350	K-Sequence
			DirectNET
			Modbus (Koyo addressing)
		D3-350 DCM	DirectNET
			Modbus (Koyo addressing)
	DL405	D4-430	K-Sequence
			DirectNET
		D4-440	K-Sequence
			DirectNET
		D4-450/D4-454	K-Sequence
			DirectNET
			Modbus (Koyo addressing)
		All with DCM	DirectNET
			Modbus (Koyo addressing)
		H4-ECOM/H4-ECOM100	DirectLOGIC Ethernet
	H2-WinPLC (Think & Do) Live V5.2 or later and Studio any version		Think & Do Modbus RTU (serial port)
	H2-WinPLC (Think & Do) Live V5.5.1 or later and Studio V7.2.1 or later		Think & Do Modbus TCP/IP (Ethernet port)
	GS Drives		GS Drives Serial
			GS Drives TCP/IP (GS-EDRV)
	SOLO Temperature Controllers (models with serial communications)		SOLO Temperature Controller

PLC Protocols

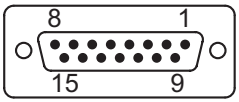
PLC Protocol Table (cont'd)		
Model		**Protocols**
Allen-Bradley	MicroLogix 1000, 1100, 1200, 1400, 1500, SLC 5-01/02/03	DH485/AIC/AIC+
	MicroLogix 1000, 1100, 1200, 1400 and 1500	DF1 Half Duplex; DF1 Full Duplex
	SLC 5-03/04/05	
	ControlLogix™, CompactLogix™, FlexLogix™	
	PLC-5	DF1 Full Duplex
	ControlLogix, CompactLogix, FlexLogix - Tag Based	DF1 Half Duplex; DF1 Full Duplex
	ControlLogix, CompactLogix, FlexLogix - Generic I/O Messaging	EtherNet/IP Server
	ControlLogix, CompactLogix, FlexLogix - Tag Based	EtherNet/IP Client
	MicroLogix 1100, 1400 and SLC 5/05, via native Ethernet port	
	MicroLogix 1000, 1100, 1200, 1400, 1500, SLC 5-03/04/05, all via ENI adapter	
	Micro 800 Series	Modbus RTU
		Modbus TCP
	Micro 800 Series - Tag Based	DF1 Full Duplex
		EtherNet/IP Client
Modbus RTU	Modbus RTU devices	Modbus RTU
Modbus TCP/IP	Modbus TCP/IP devices	Modbus TCP/IP
GE	90/30, 90/70, Micro 90, VersaMax Micro	SNPX
	90/30, Rx3i	SRTP Ethernet
Mitsubishi	FX Series	FX Direct
	Q02, Q02H, Q06H, Q12H, Q25H	Q CPU
	Q, QnA Serial	QnA Serial
	Q, QnA Ethernet	QnA Ethernet
Modicon	984 CPU, Quantum 113 CPU, AEG Modicon Micro Series 110 CPU: 311-xx, 411-xx, 512-xx, 612-xx	Modbus RTU
	Other devices using Modicon Modbus addressing	Modbus RTU
		TUModbus TCP/IP
Omron	C200 Adapter, C500	Host Link
	CJ1/CS1 Serial	FINS
	CJ1/CS1 Ethernet	
Siemens	S7-200 CPU, RS-485 Serial	PPI
	S7-200 CPU, S7-300 CPU, S7-400, S7-1200, S7-1500 CPU Ethernet	Ethernet ISO over TCP

PLC Communication Cables & Wiring Diagrams

Cable Description	Cable Part No.
Cables used with 15-pin RS-232/422/485 serial Port1	
AutomationDirect Productivity Series, Do-more, CLICK, ***Direct*** LOGIC PLC RJ-12 port, DL05, DL06, DL105, DL205, D3-350, D4-450 & 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 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)	**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, PLC5 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**

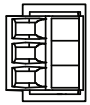
Cable Description	Cable Part No.
Cables used with RJ12 RS-232 serial Port3	
AutomationDirect Productivity Series, Do-more, CLICK, ***Direct*** LOGIC PLC RJ-12 port, DL05, DL06, DL105, DL205, D3-350, D4-450 & H2-WinPLC (RS-232C) 3.66m (12ft) cable length	**D0-CBL**
Direct LOGIC (VGA Style) 15-pin port, DL06, D2-250 (250-1), D2-260 (RS-232C). Use with D0-CBL cable.	**FA-15HD**
Direct LOGIC 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**

Port1



D-Sub 15-pin female on rear of touch panel

***Port2**

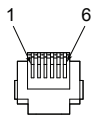


\+
–
Logic Ground

RS-485 Serial Communications

Port3

Pin	Signal
1	0V
2	N.C.
3	RXD
4	TXD
5	+5V
6	0V



RJ12 RS-232 Serial Communications

****NOTE:*** *All cables for connections at Port 2 are user constructed. Refer to the specifications of the connected device port to construct the cable properly. The connector for Port2, EA9-3TB , is included with your* ***C-more*** *panel.*

Cables from *AutomationDirect* (cont'd)

Part No. DO-CBL

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-MLOGIX-CBL

Part No. EA-SLC-232-CBL

Part No. EA-PLC5-232-CBL

Part No. EA-90-30-CBL

Part No. EA-MITSU-CBL

Part No. EA-MITSU-CBL-1

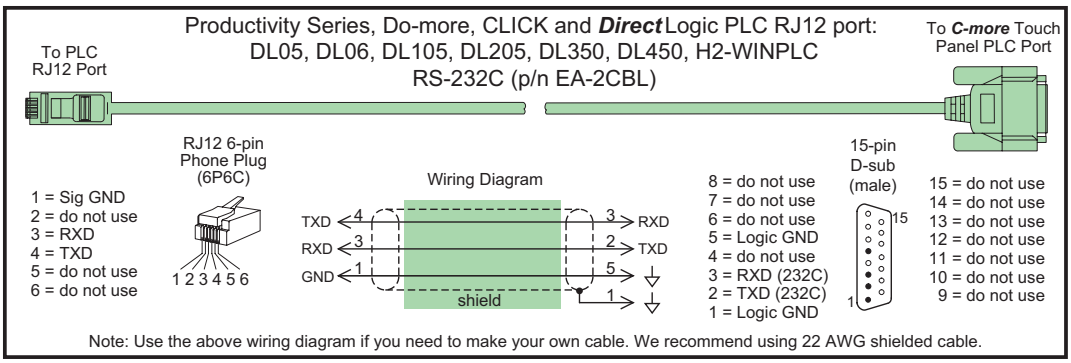
Part No. EA-OMRON-CBL

PLC Communication Cables & Wiring Diagrams (cont'd)

The following series of wiring diagrams show the connectors and wiring details for the communication cables that are used between the ***C-more*** touch panels and various PLC controllers. 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.

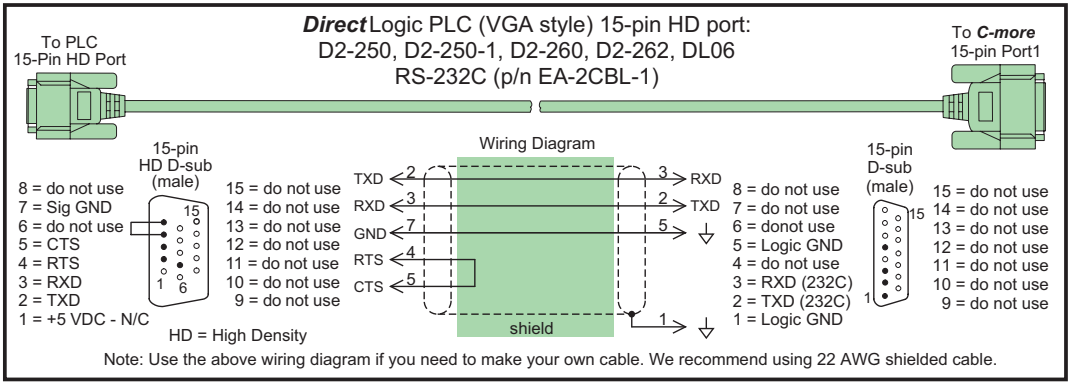
AutomationDirect PLCs RS-232C Serial

EA-2CBL



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

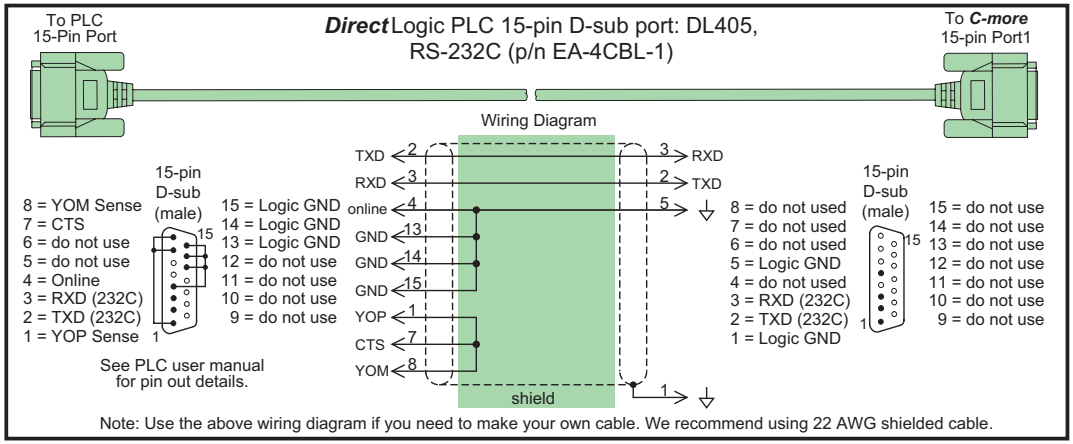
EA-2CBL-1



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

AutomationDirect PLCs RS-232C Serial (cont'd)

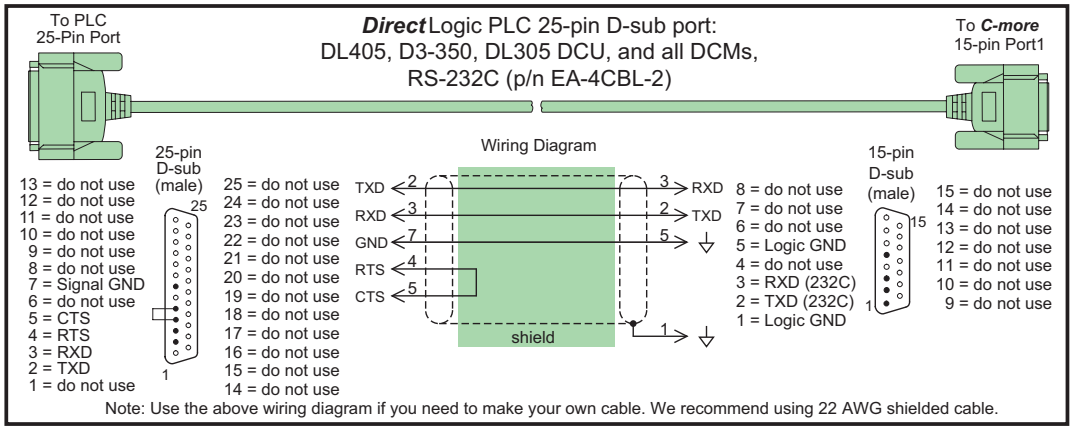
EA-4CBL-1



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

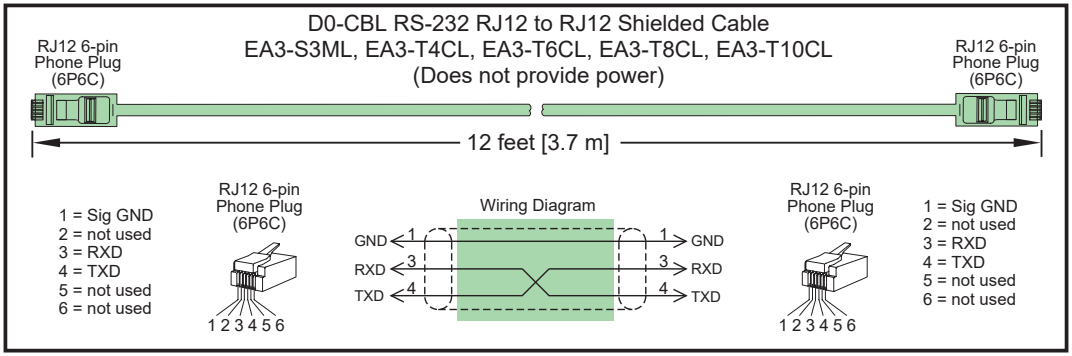
AutomationDirect PLCs RS-232C Serial (cont'd)

EA-4CBL-2

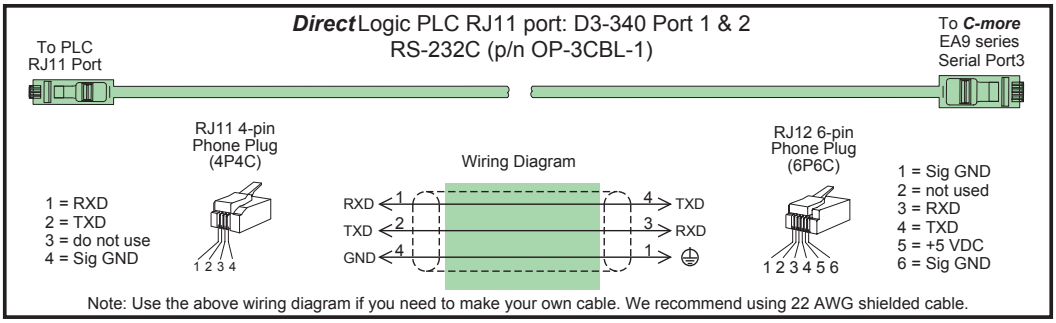


Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

D0-CBL



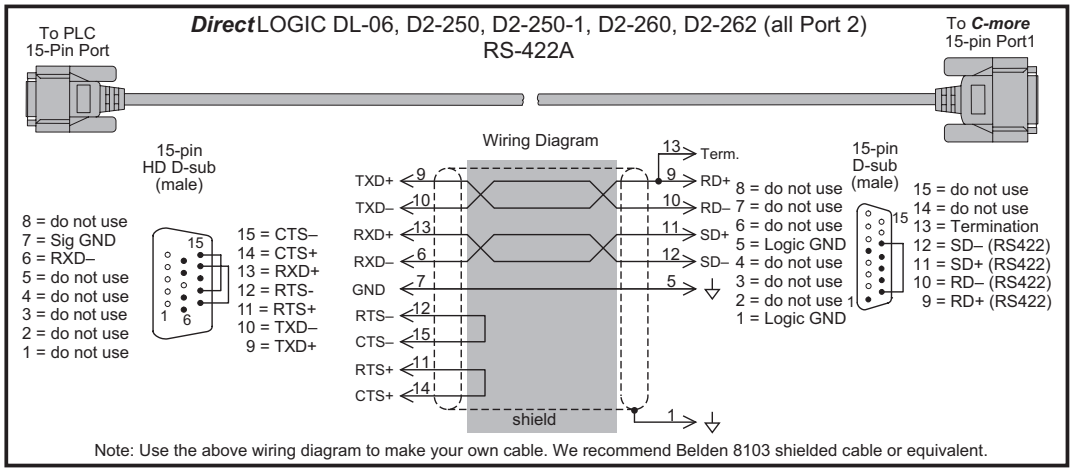
OP-3CBL-1



AutomationDirect PLCs RS-422A/RS-485A

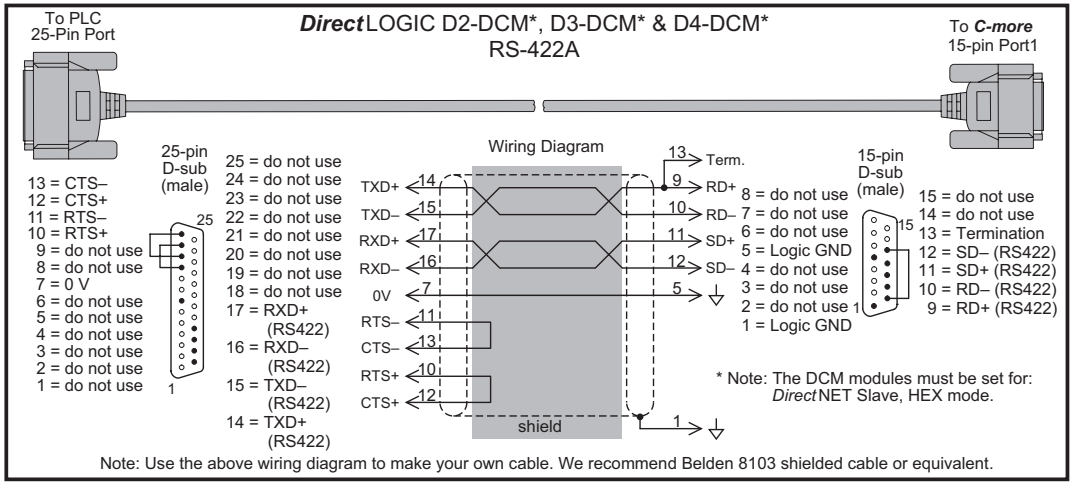
When using the RS-422A/RS-485A capabilities of the ***C-more*** 15-pin PLC communications Port1, the termination resistor is placed between the **RXD–** and **RXD+** terminals on the PLC side of the connection between the touch panel and PLC. The Termination Resistor value is based on the characteristic impedance of the cable being used. To enable the built-in 120 Ohm Termination Resistor, jumper pin **13** to pin **9 (RXD+)** on the ***C-more*** 15-pin PLC communications Port1.

User Constructed



Note: Use the above wiring diagram to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

User Constructed

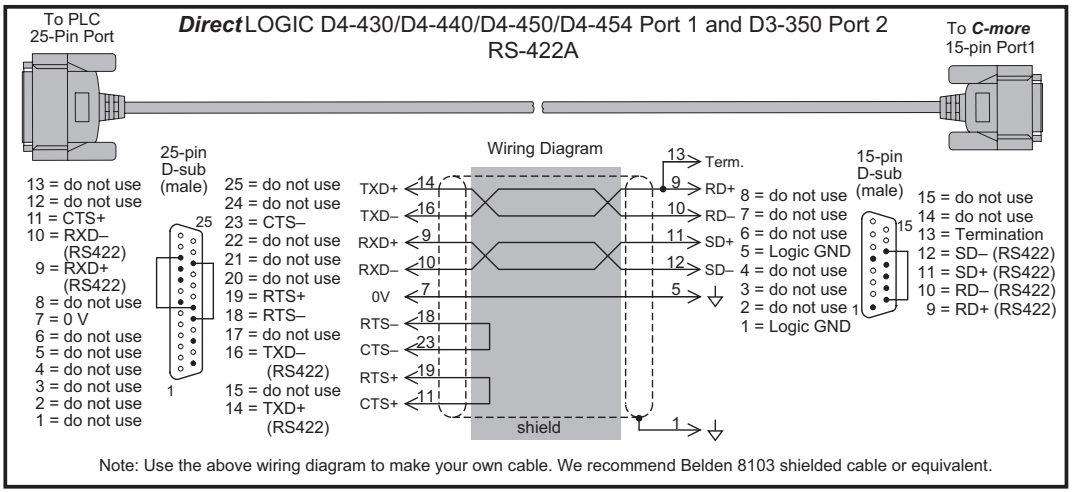


Note: Use the above wiring diagram to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

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 multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to a panel.*

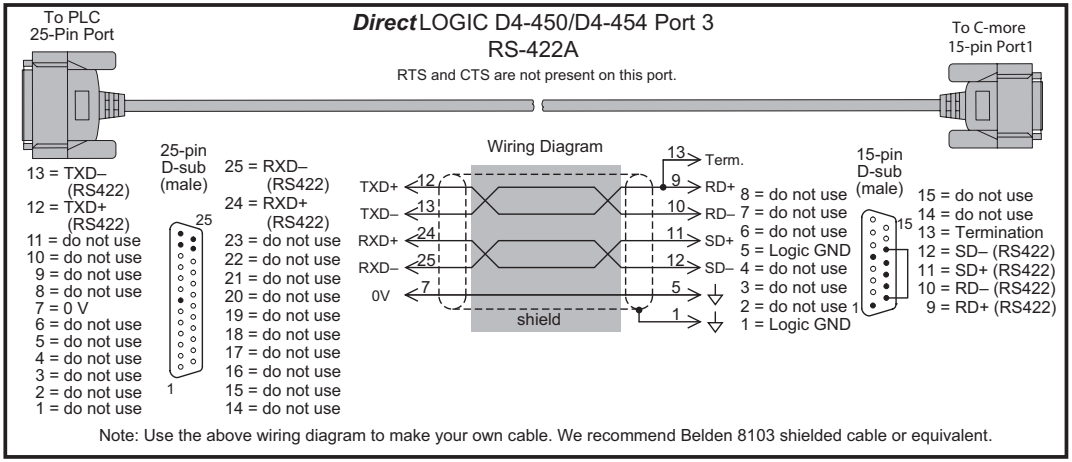
AutomationDirect PLCs RS-422A/RS-485A (cont'd)

User Constructed



Note: Use the above wiring diagram to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

User Constructed

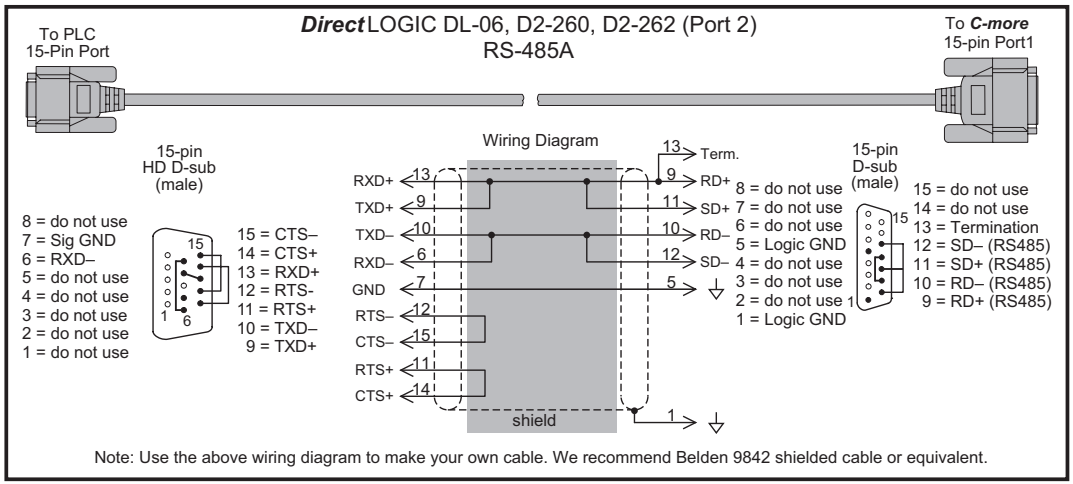


Note: Use the above wiring diagram to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

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 multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to a panel.*

AutomationDirect PLCs RS-422A/RS-485A (cont'd)

User Constructed



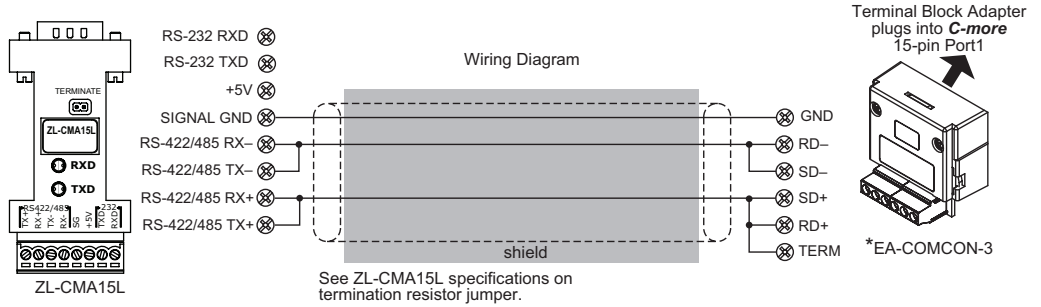
Note: Use the above wiring diagram to make your own cable. We recommend Belden 9842 shielded cable or equivalent.

NOTE: *The RS-485 wiring diagram shown above is not for multi-drop networks involving connecting more than one PLC to a panel. Refer to the multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to a panel.*

AutomationDirect PLCs RS-422A/RS-485A (cont'd)

User Constructed

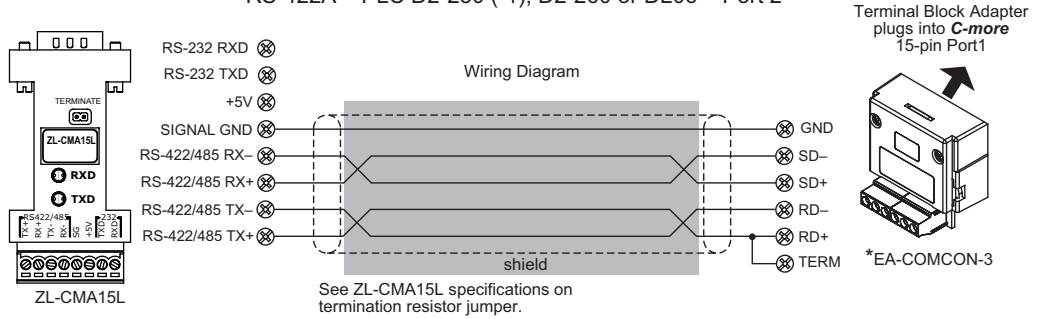
***Direct*LOGIC ZIPLink ZL-CMA15L Adapter Module to EA-COMCON-3 Terminal Block Adapter**
RS-485A – PLC D2-260 or DL06 only – Port 2



Note: Use the above wiring diagram to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

User Constructed

***Direct*LOGIC ZIPLink ZL-CMA15L Adapter Module to EA-COMCON-3 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 Belden 9842 shielded cable or equivalent.

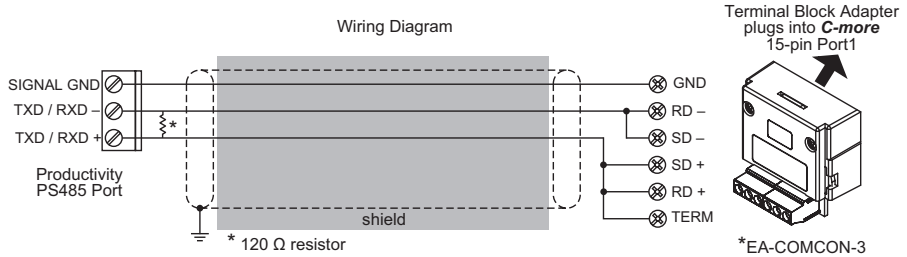
***NOTE:** The RS-422 and RS-485 wiring diagrams shown above are not for multi-drop networks involving connecting more than one PLC to a panel. Refer to the multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to a panel.*

*** NOTE:** EA-COMCON-3 will install only on EA9-T6CL, EA9-T6CL-R, EA9-T7CL and EA9-T7CL-R panels*

AutomationDirect PLCs RS-422A/RS-485A (cont'd)

User Constructed

Productivity PLC RS485 Port to EA-COMCON-3 Terminal Block Adapter



Note: Use the above wiring diagram to make your own cable. We recommend Belden 9842 shielded cable or equivalent.

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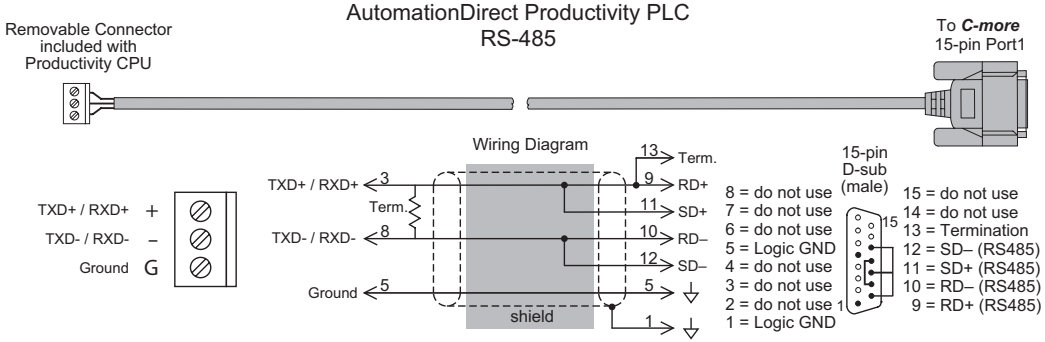
User Constructed

AutomationDirect Productivity PLC RS-485



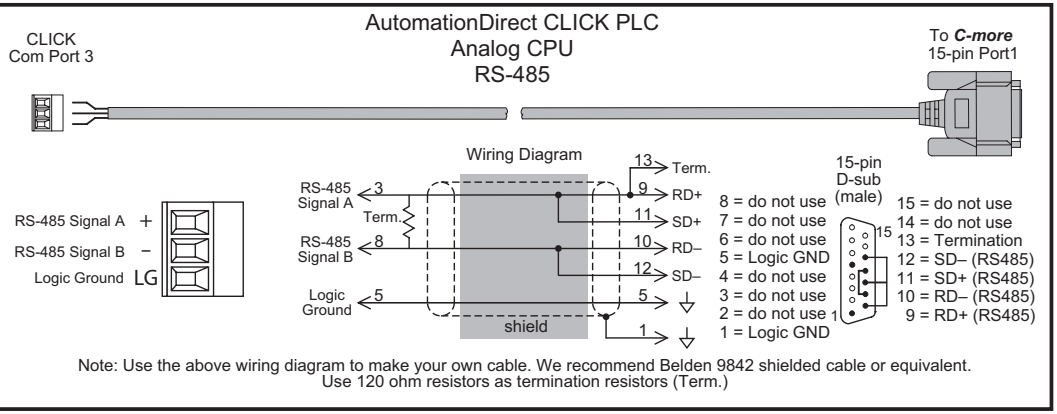
Note: Use the above wiring diagram to make your own cable. We recommend Belden 9842 shielded cable or equivalent.
Use 120 ohm resistors as termination resistors (Term.)

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 multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to a panel.*

*** NOTE:** EA-COMCON-3 will install only on EA9-T6CL, EA9-T6CL-R, EA9-T7CL and EA9-T7CL-R panels*

AutomationDirect PLCs RS-422A/RS-485A (cont'd)

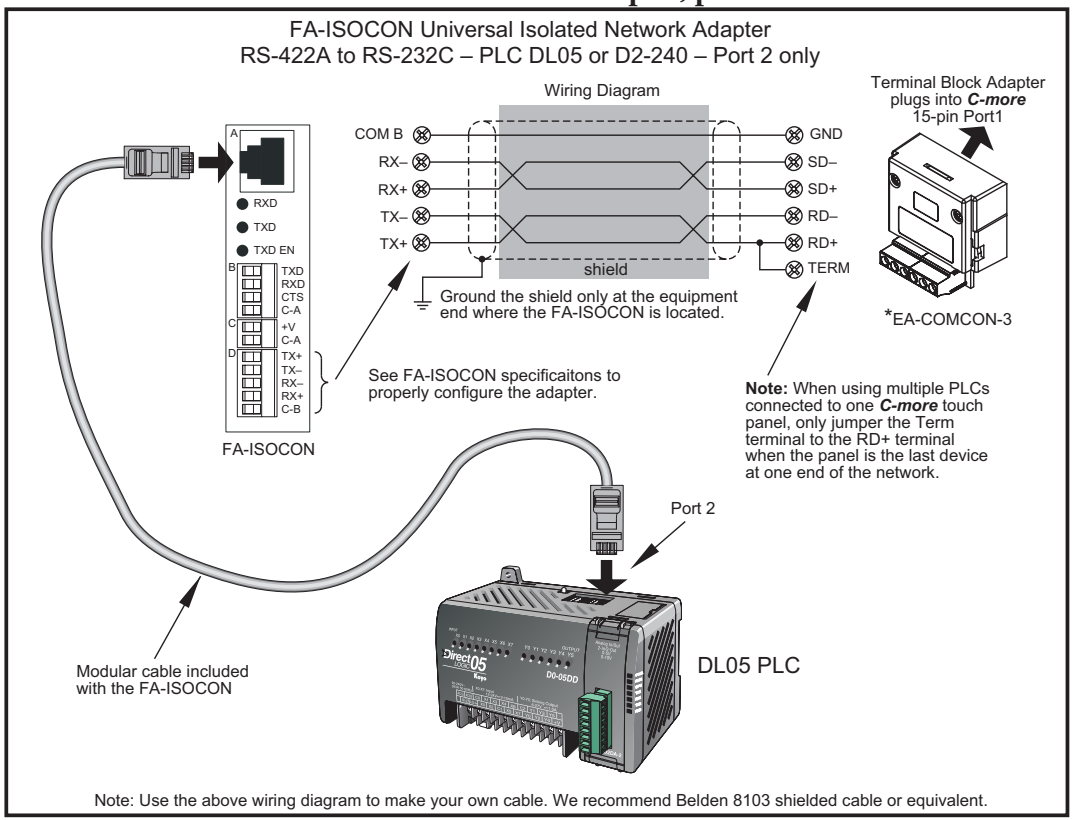
User Constructed



Note: Use the above wiring diagram to make your own cable. We recommend Belden 9842 shielded cable or equivalent.
Use 120 ohm resistors as termination resistors (Term.)

NOTE: *The RS-485 wiring diagram shown above is not for multi-drop networks involving connecting more than one PLC to a panel. Refer to the multi-drop wiring diagram examples later in this chapter if more than one PLC will be connected to a panel.*

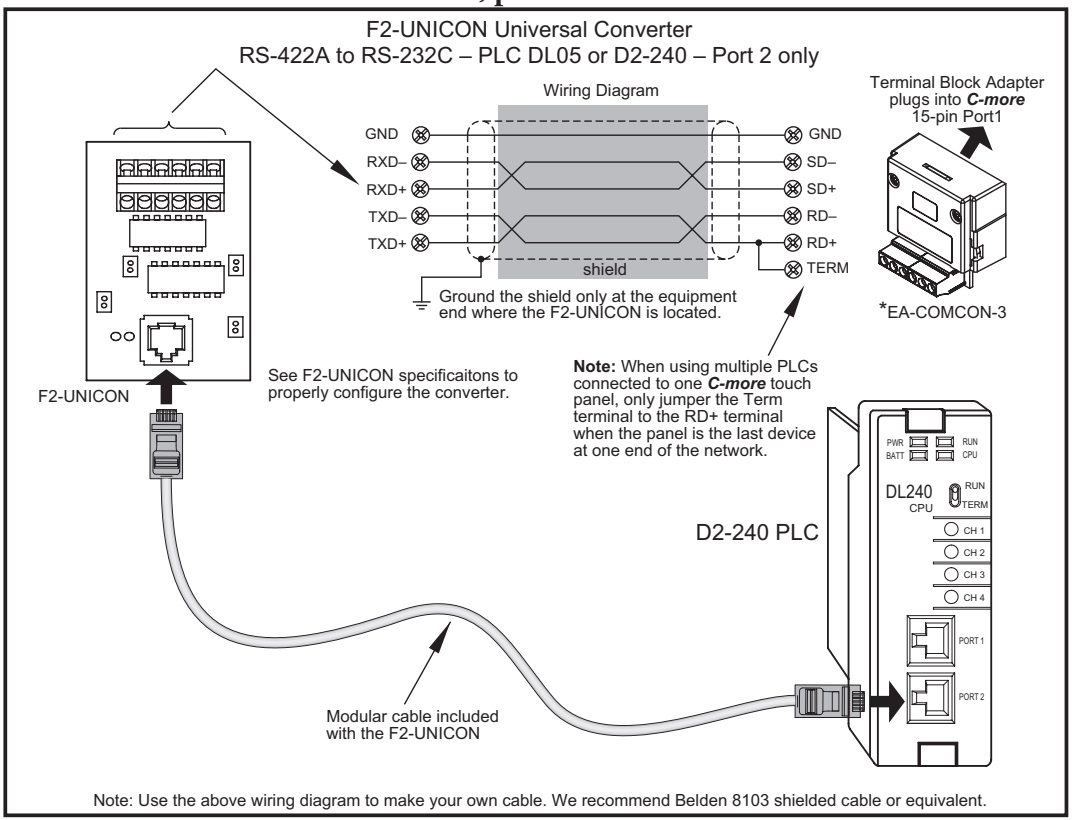
*Direct*LOGIC Universal Isolated Network Adapter, p/n FA-ISOCON:



Note: Use the above wiring diagram to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

*** NOTE:** *EA-COMCON-3 will install only on EA9-T6CL, EA9-T6CL-R, EA9-T7CL and EA9-T7CL-R panels*

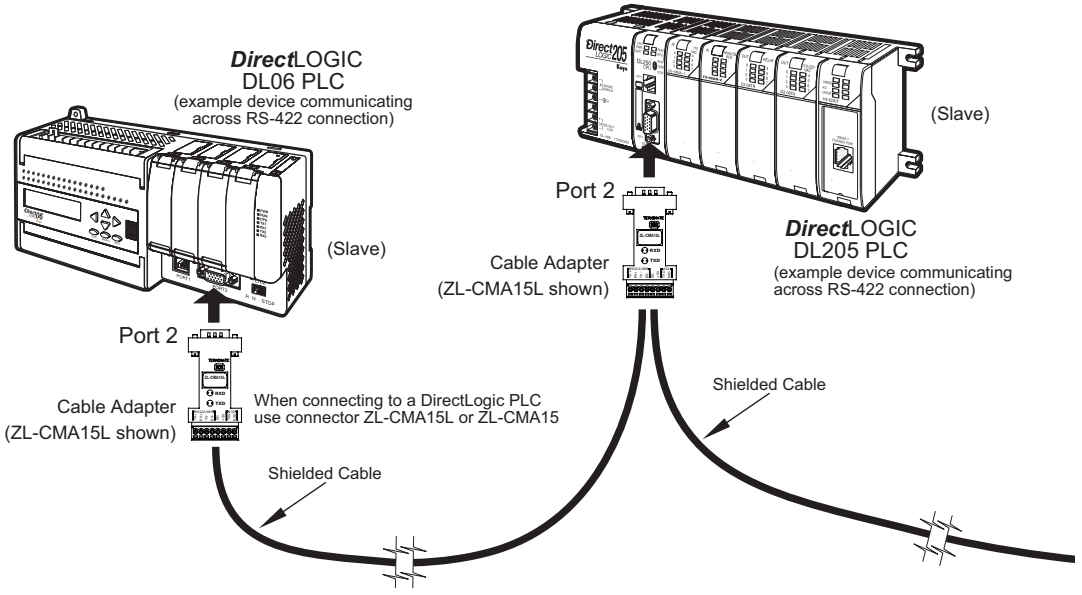
*Direct*LOGIC Universal Converter, p/n F2-UNICON:



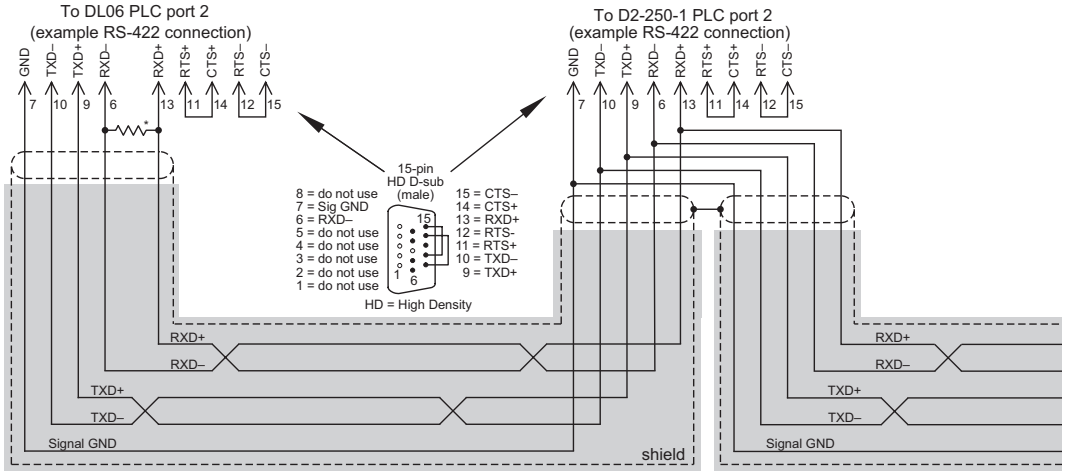
** **NOTE:** EA-COMCON-3 will install only on EA9-T6CL, EA9-T6CL-R, EA9-T7CL and EA9-T7CL-R panels*

RS-422A/RS-485A Multi-Drop Wiring Diagram Examples

DL06 and DL205 used for illustration purposes



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

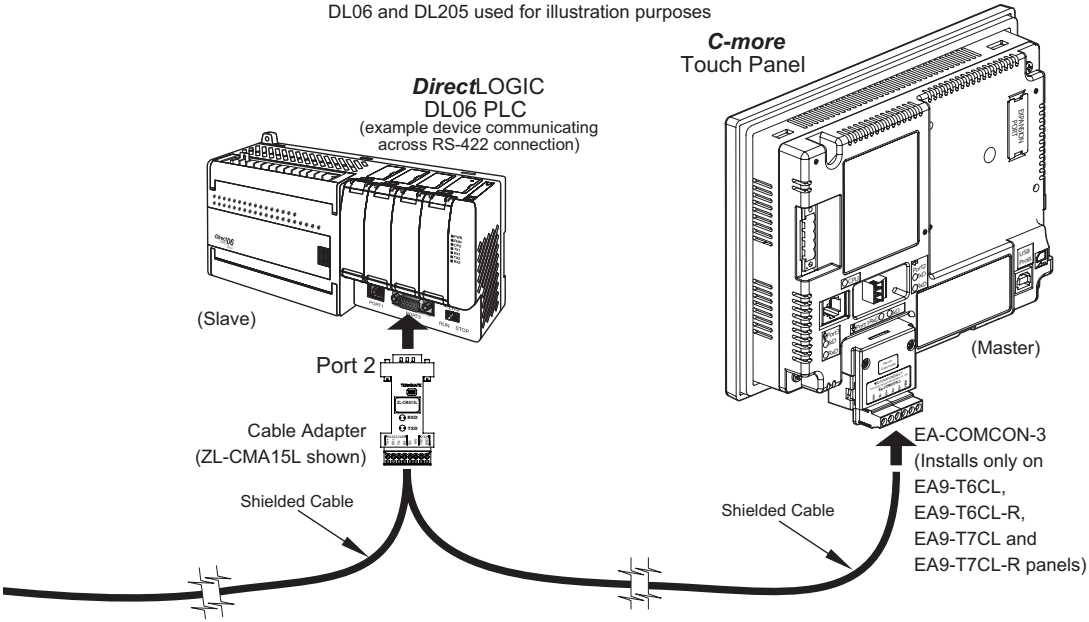


* Termination resistors required at both ends of the network receive data signals to match the impedance of the cable (between 100 and 500 ohms).

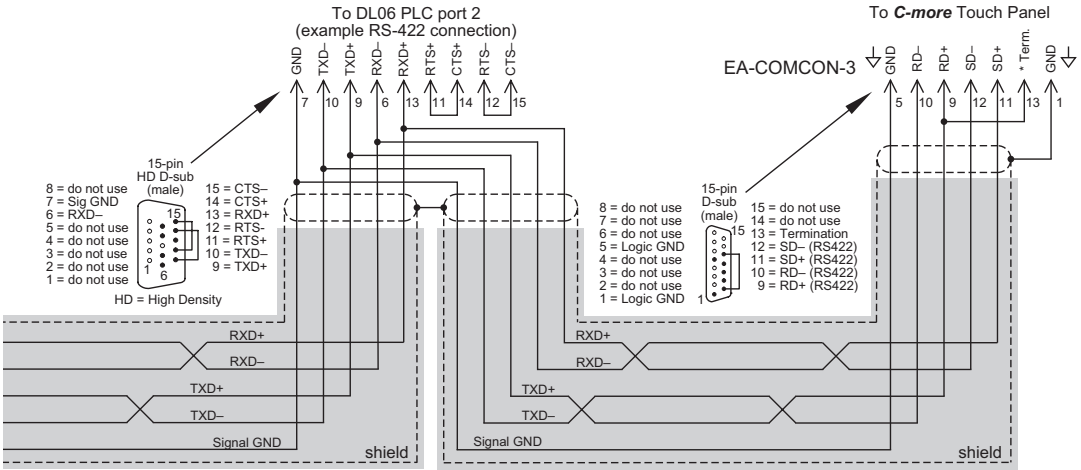
Typical RS-422 Multi-Drop Wiring Diagram

using DirectLogic pin numbers to illustrate

RS-422A/RS-485A Multi-Drop Wiring Diagram Examples (cont'd)



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



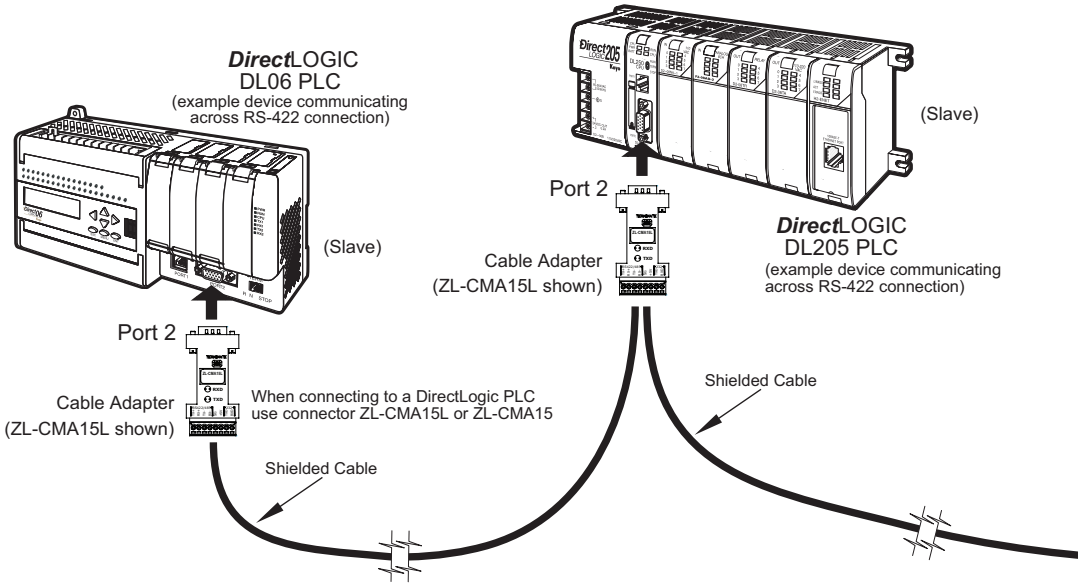
Typical RS-422 Multi-Drop Wiring Diagram (cont-d)

using DirectLogic pin numbers to illustrate

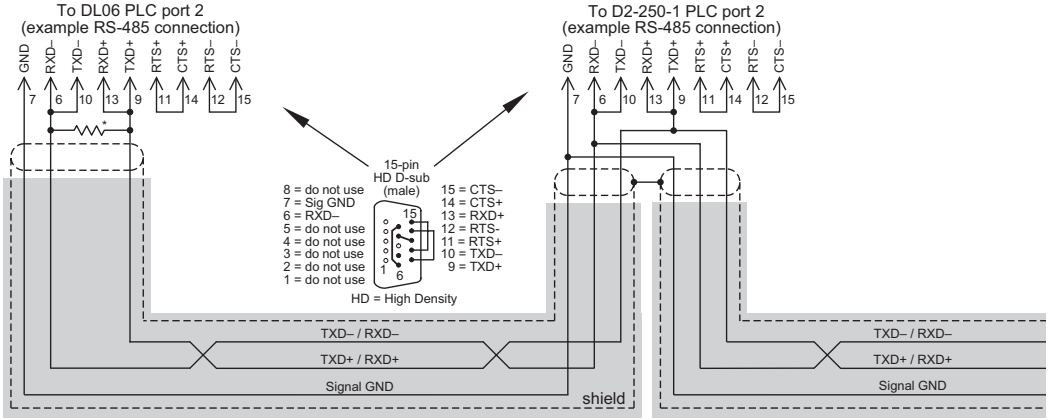
* Termination resistors required at both ends of the network receive data signals to match the impedance of the cable (between 100 and 500 ohms). Jumper pin 13 to 9 on the ***C-more*** Touch Panel 15-pin connector to place the 120Ω internal resistor into the network. If the cable impedance is different,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

RS-422A/RS-485A Multi-Drop Wiring Diagram Examples (cont'd)

DL06 and DL205 used for illustration purposes



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



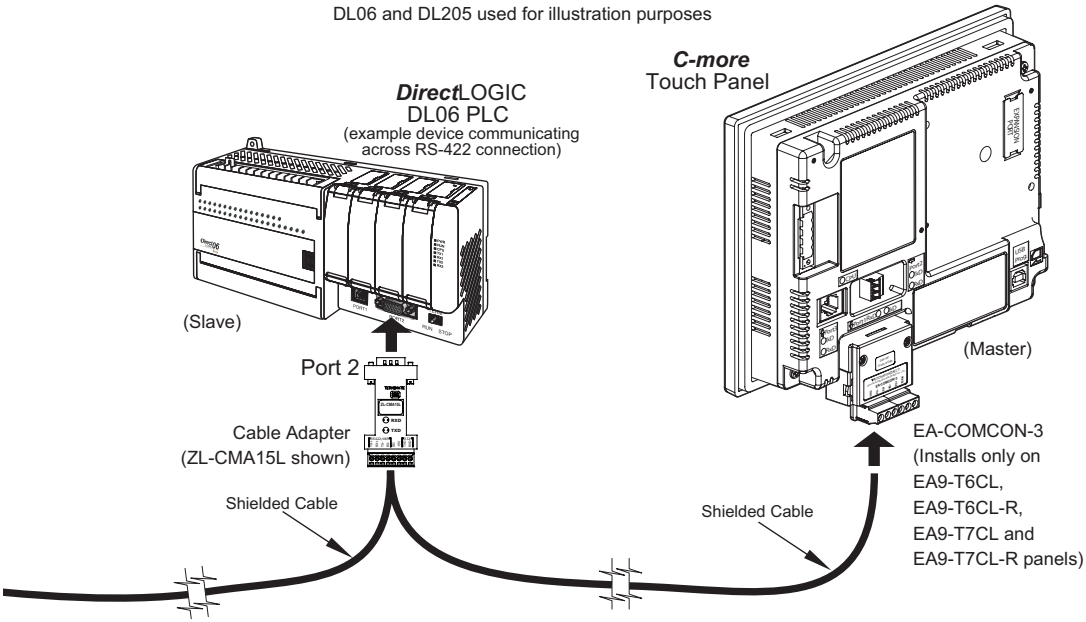
* Termination resistors required at both ends of the network to match the impedance of the cable (between 100 and 500 ohms).

Typical RS-485 Multi-Drop Wiring Diagram

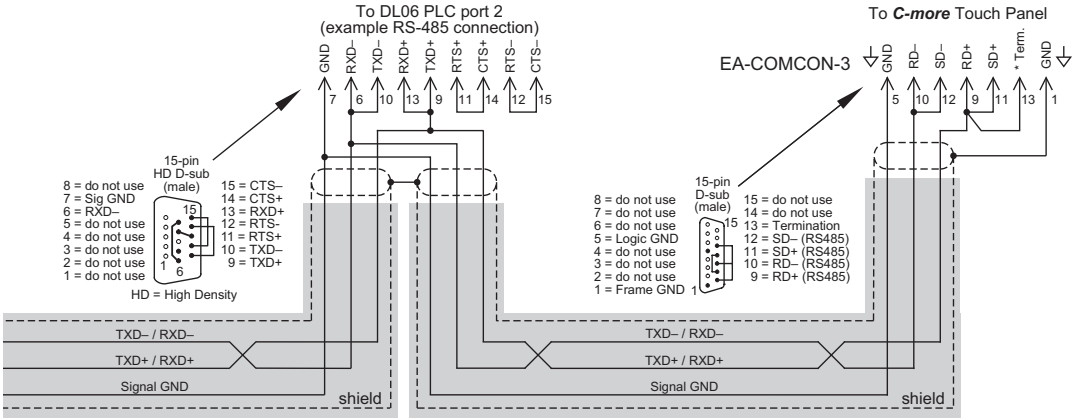
using DirectLogic pin numbers to illustrate

RS-422A/RS-485A Multi-Drop Wiring Diagram Examples (cont'd)

DL06 and DL205 used for illustration purposes



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



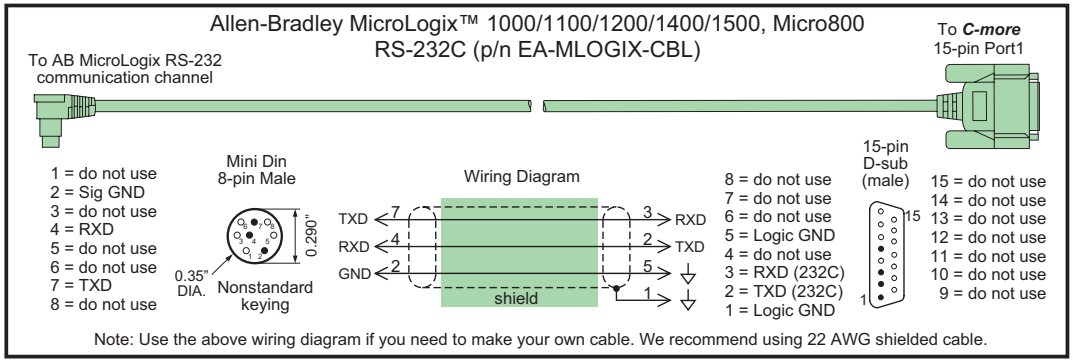
Typical RS-485 Multi-Drop Wiring Diagram (cont-d)

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*** touch panel 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.

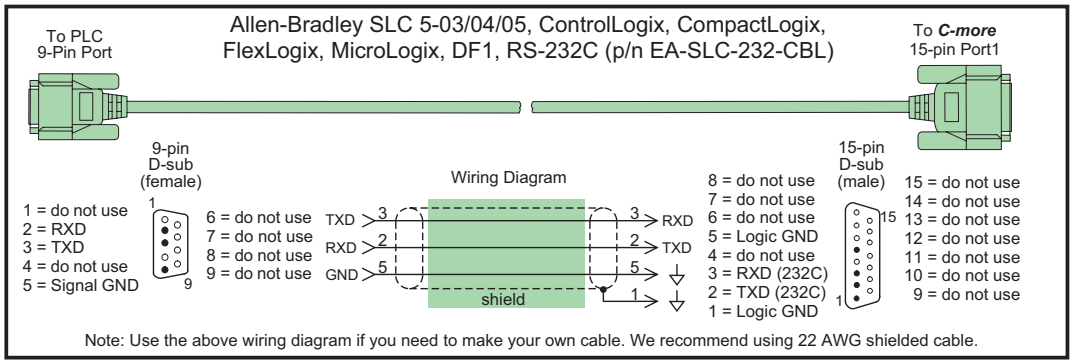
Allen-Bradley

EA-MLOGIX-CBL



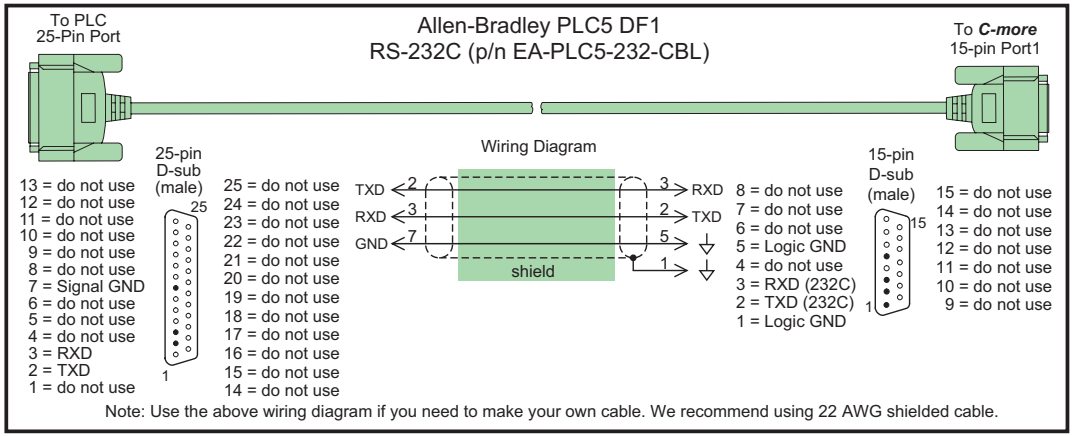
Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

EA-SLC-232-CBL



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

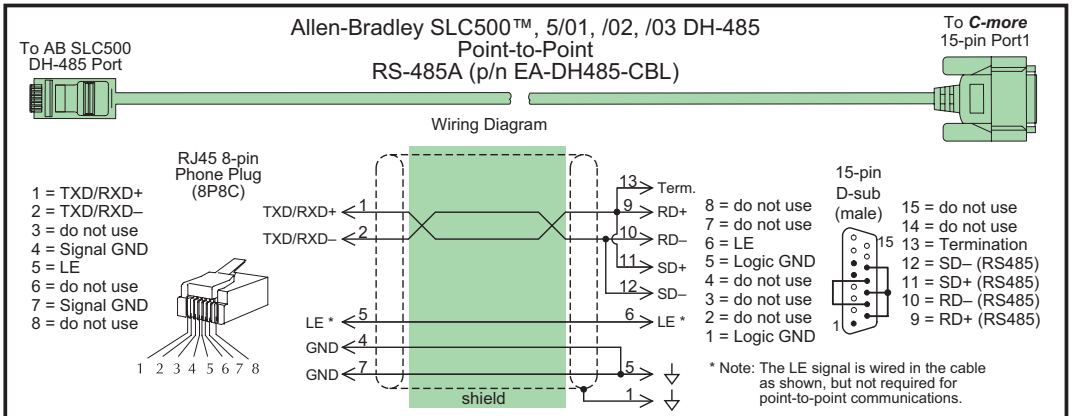
EA-PLC5-232-CBL



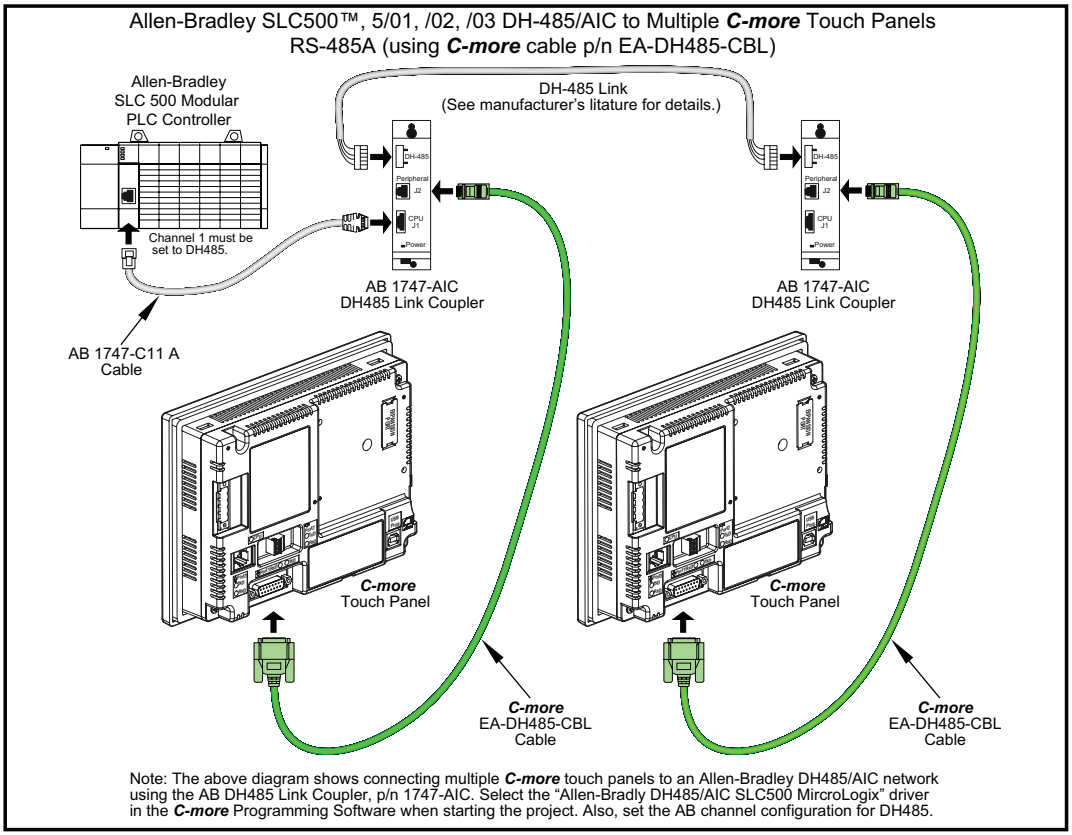
Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

Allen-Bradley (cont'd)

EA-DH485-CBL



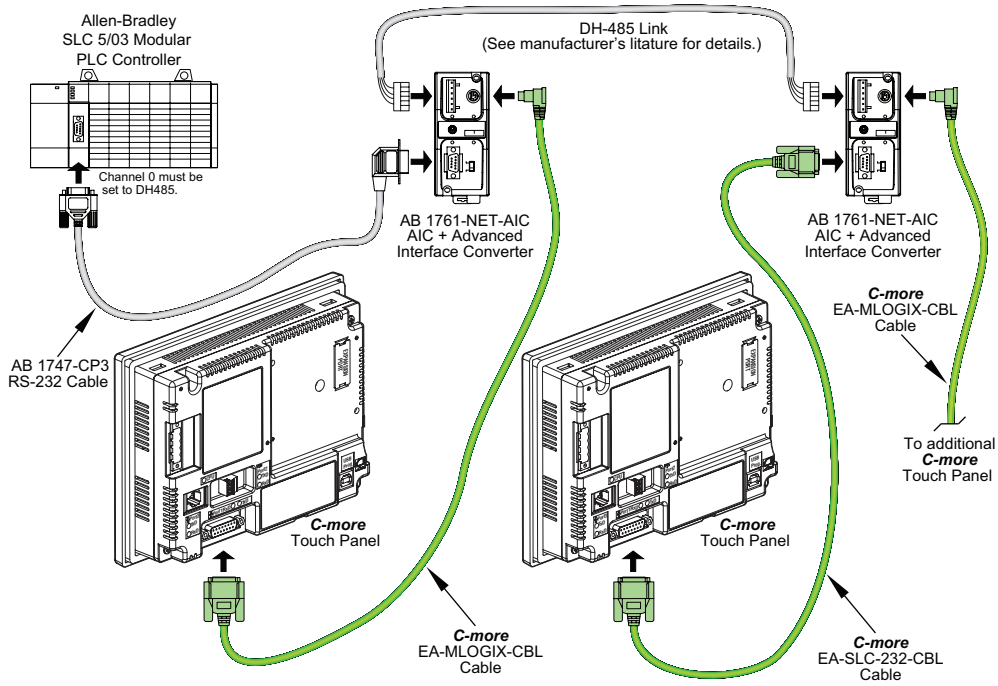
Note: Use the above wiring diagram if you need to make your own cable. We recommend Belden 9842 shielded cable or equivalent.



Note: The above diagram shows connecting multiple ***C-more*** touch 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.

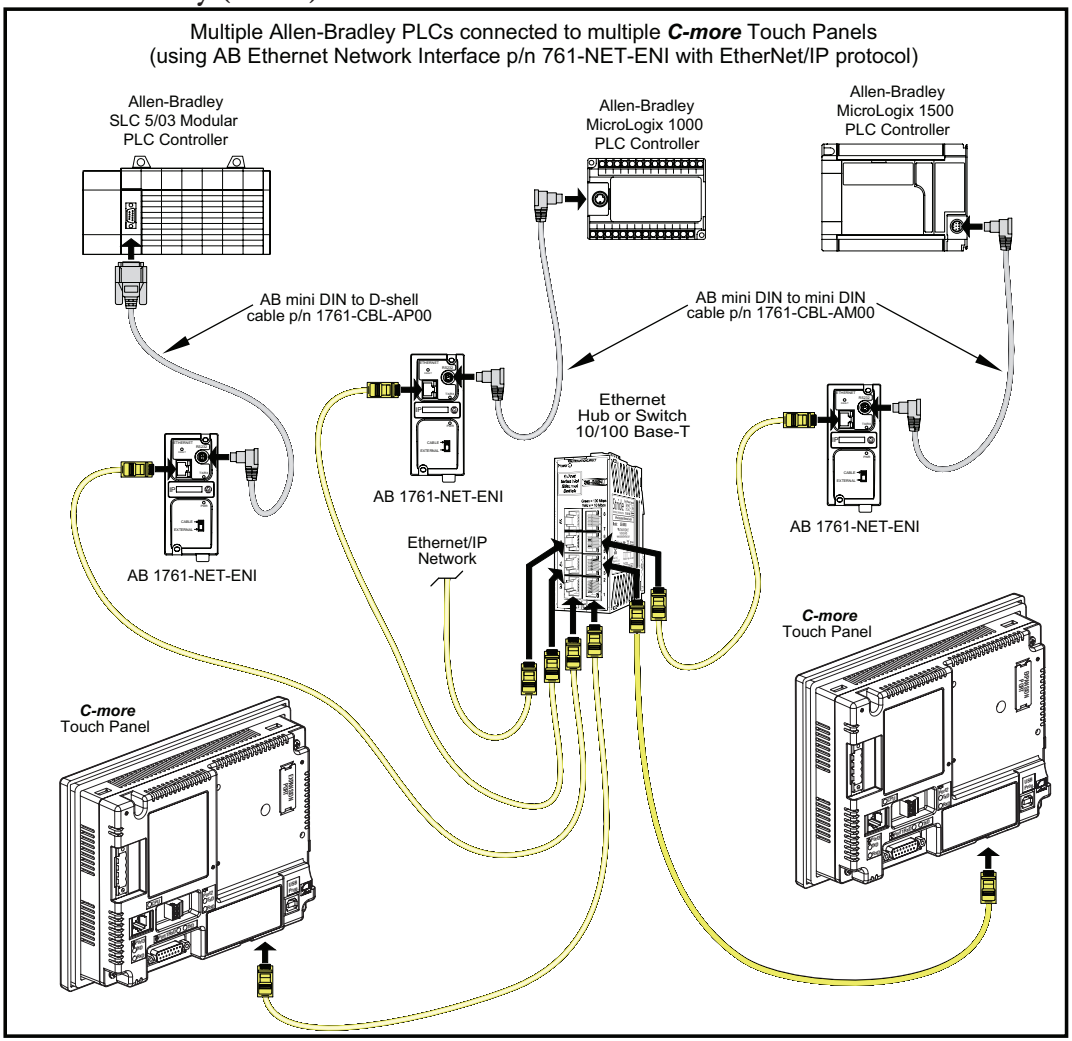
Allen-Bradley (cont'd)

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



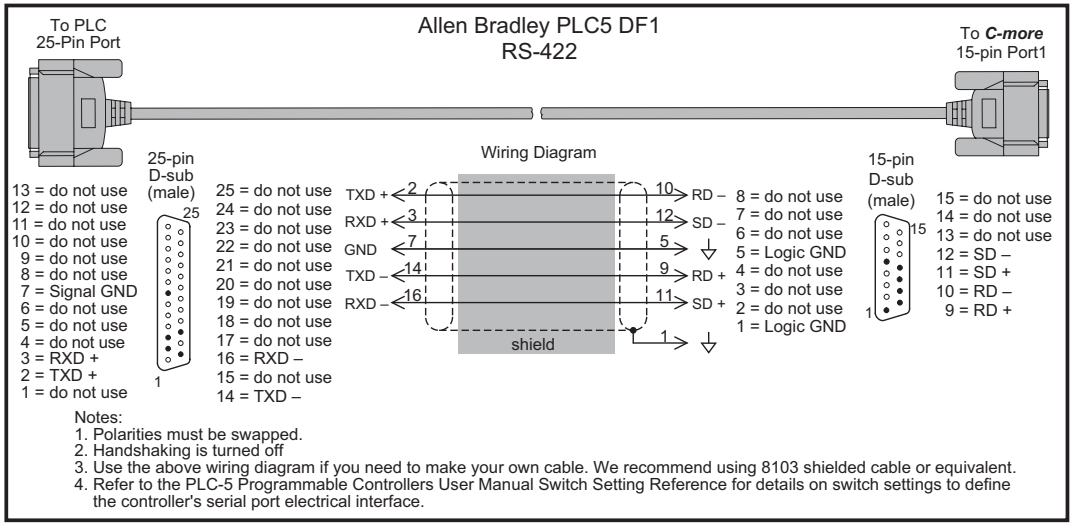
Note: The above diagram shows connecting multiple ***C-more*** touch panels to an Allen-Bradley DH485/AIC network using the AB AIC+ Advanced Interface Converter, p/n 1761-NET-AIC. Select the "Allen-Bradly DH485/AIC SLC500 MircroLogix" driver in the ***C-more*** Programming Software when starting the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

Allen-Bradley (cont'd)



Allen-Bradley (cont'd)

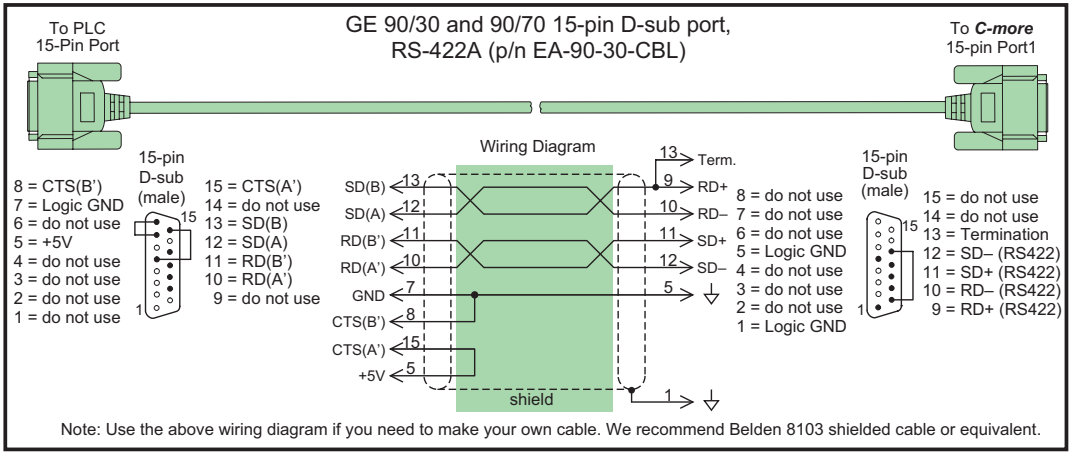
User Constructed



Notes:
1. Polarities must be swapped.
2. Handshaking is turned off
3. Use the above wiring diagram if you need to make your own cable. We recommend using 8103 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.

GE

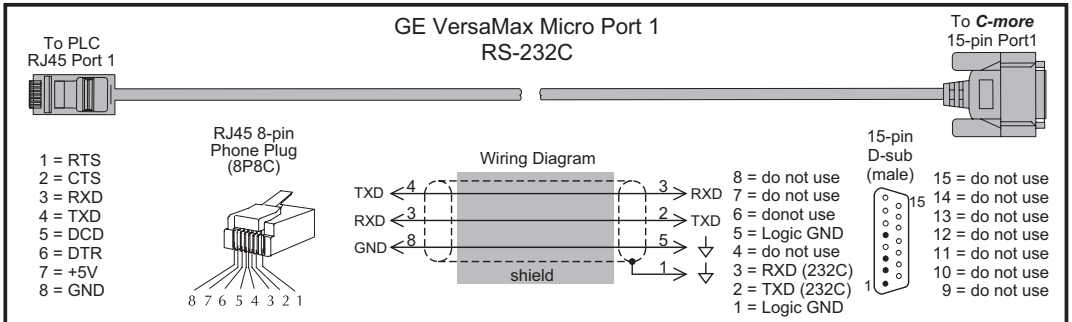
EA-90-30-CBL



Note: Use the above wiring diagram if you need to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

GE VersaMax Micro

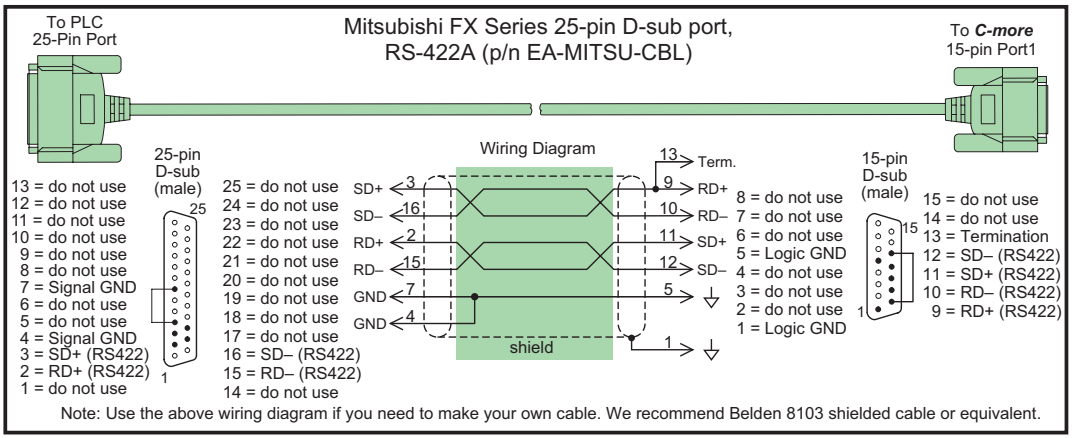
User Constructed



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

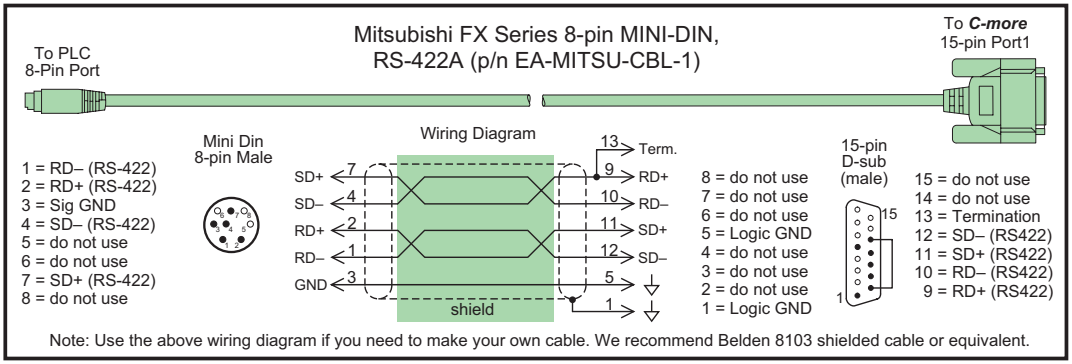
Mitsubishi

EA-MITSU-CBL



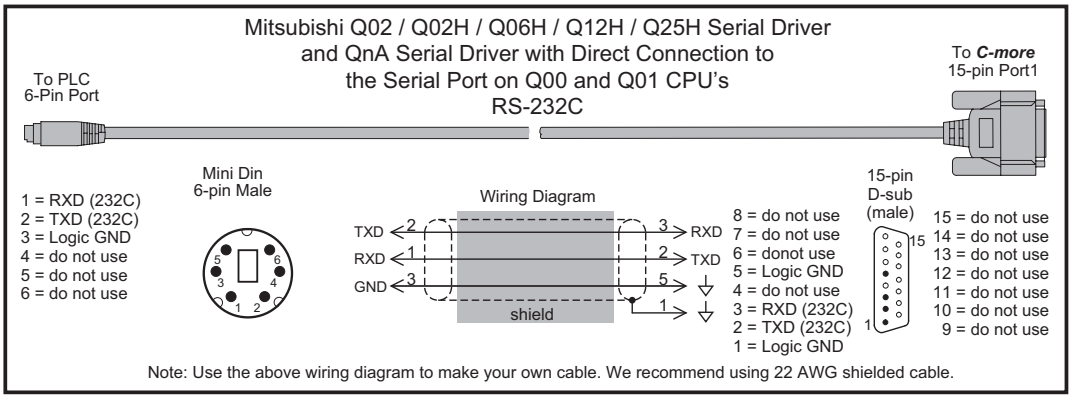
Note: Use the above wiring diagram if you need to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

EA-MITSU-CBL-1



Note: Use the above wiring diagram if you need to make your own cable. We recommend Belden 8103 shielded cable or equivalent.

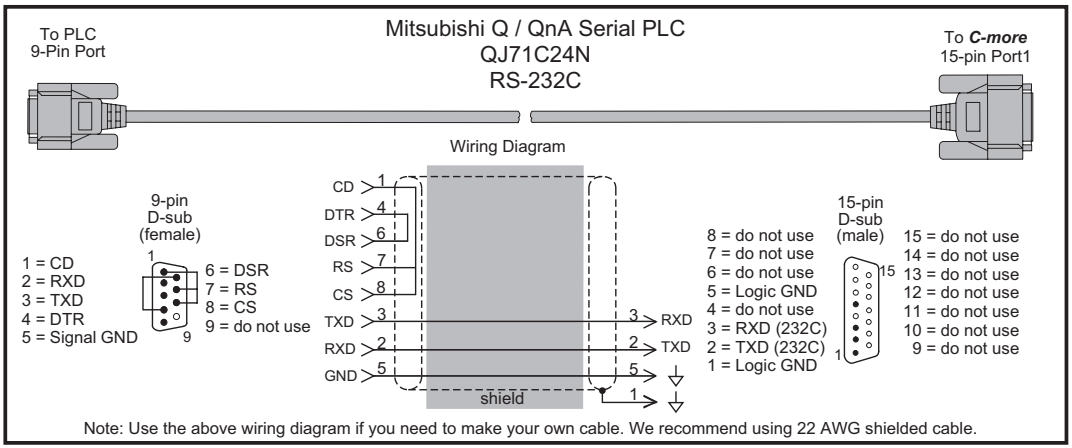
User Constructed



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

Mitsubishi (cont'd)

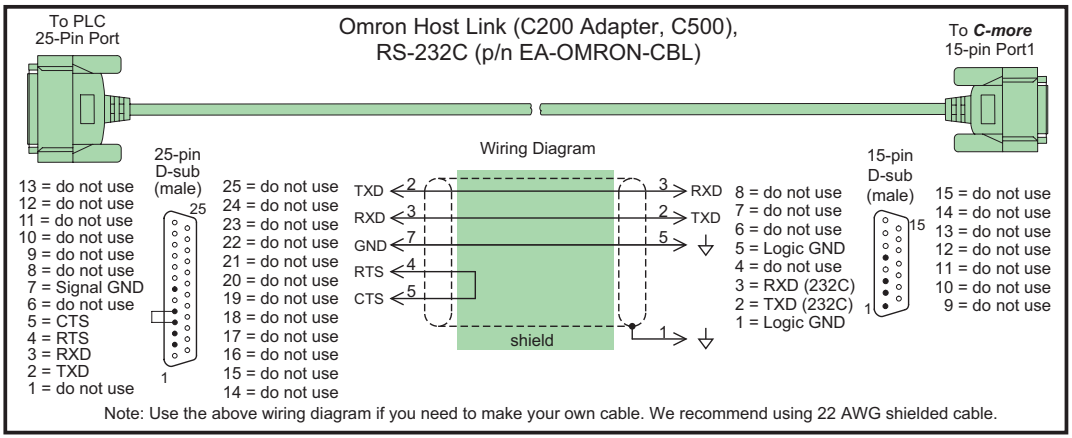
User Constructed



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

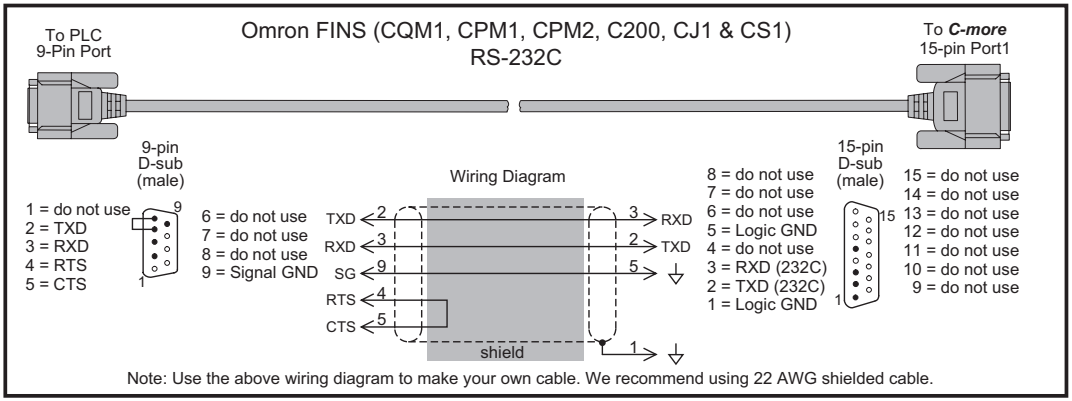
Omron

EA-OMRON-CBL



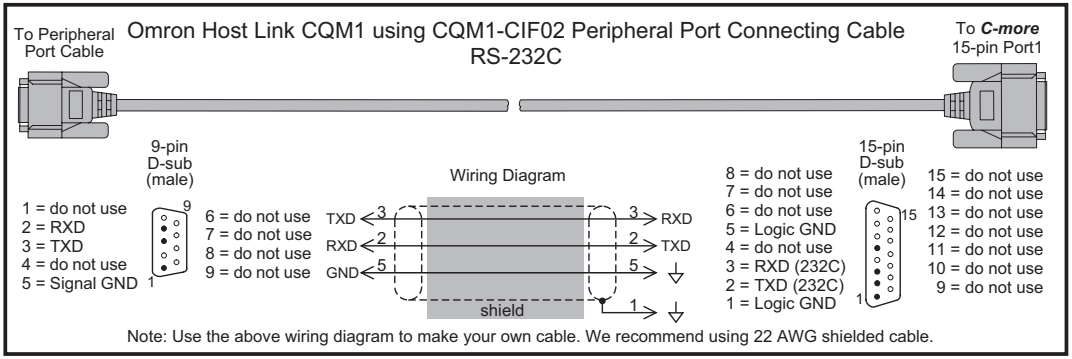
Note: Use the above wiring diagram if you need to make your own cable. We recommend using 22 AWG shielded cable.

User Constructed



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

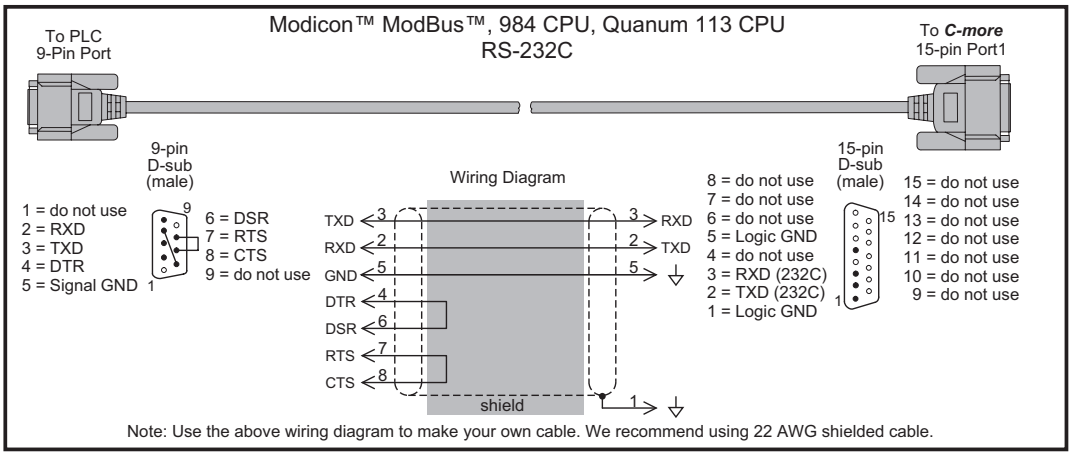
User Constructed



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

Modicon Modbus RS-232

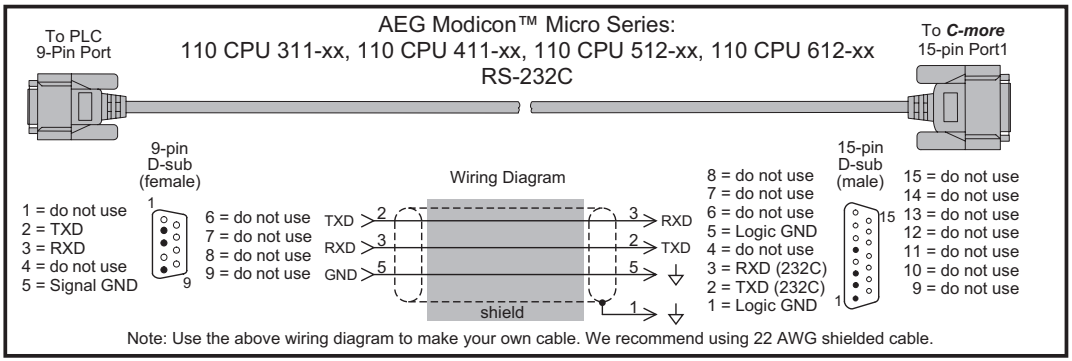
User Constructed



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

Modicon Micro Series

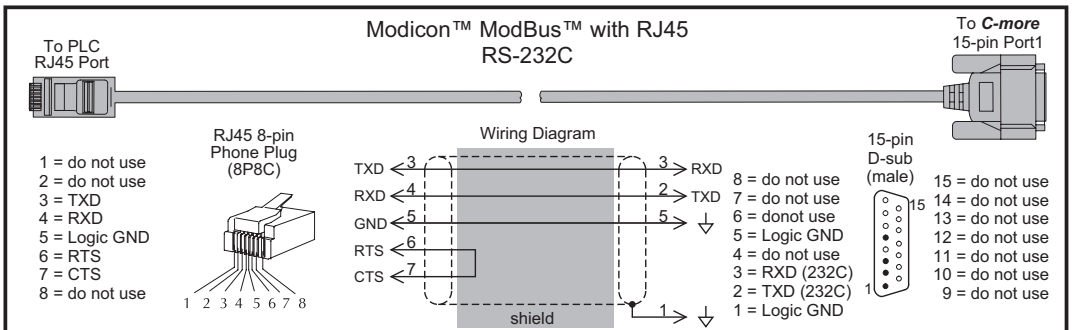
User Constructed



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

Modicon Modbus with RJ45

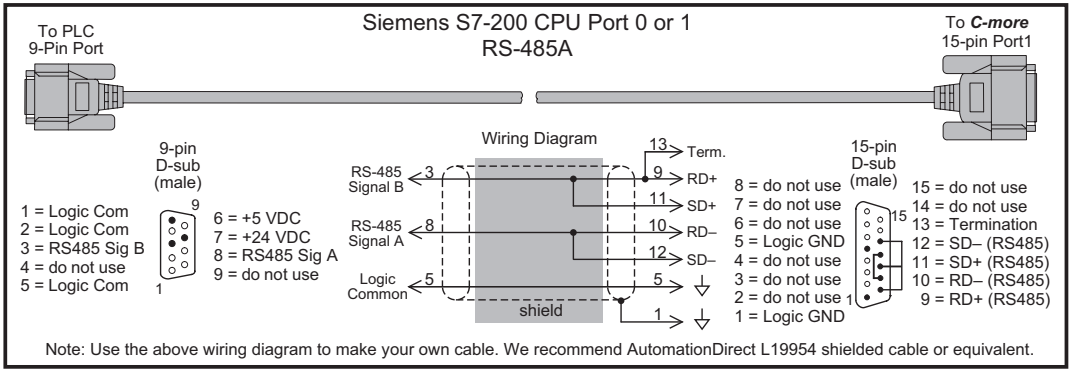
User Constructed



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

Siemens

User Constructed



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