



**EZ Multiplexer  
Hardware Manual**  
*Manual Part Number EZ-MULTIDROP-M*



## WARNING!

Programmable control devices, such as Multiplexers, must not be used as stand-alone protection in any application. Unless proper safeguards are used, unwanted start-ups could result in equipment damage or personal injury. The operator must be made aware of this hazard and appropriate precautions must be taken.

In addition, consideration must be given to the use of an emergency stop function that is independent of the programmable controller.

The diagrams and examples in this user manual are included for illustrative purposes only. The manufacturer cannot assume responsibility or liability for actual use based on the diagrams and examples.

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Manual P/N EZ-MULTIDROP-M, Revision 1

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## Manual Revisions

**Manual Part Number:** EZ-MULTIDROP-M

**Manual Title:** EZ Multiplexer Hardware Manual

The following table provides you with update information. If you call technical support with a question about this manual, please be aware of the revision number.

Revision	Date	Effective Pages	Description of Changes
Original Release	09/2002	Cover Warning/Copyright i-ii 1-16	Original Release of Manual
Revision 1	02/2003	Pages i and 7	Revision 1 adds EMI Noise Filter Installation Instructions



## Introduction to the EZ Multiplexer

The EZ Multiplexer is a communication master unit and was designed to allow up to 5 EZText Panels to communicate with a single PLC. You may connect 5 of any combination of EZText Panels, including the EZ-SP Set Point Panel. You will program each panel separately in your EZText Programming Software, Version 2.0, Multi-Panel System project. After you select **Multi-Panel System** in the programming software, you will select an EZText Panel — connected to Port 1, Port 2, Port 3, Port 4, or Port 5 — and configure it individually. Each EZText Panel in a Multi-Panel System may have a unique configuration. **Only the PLC settings are common to all five panels.** When creating a Multi-Panel Project, you can import a panel configuration from an existing project file — or export it to another project file.

It is important to note that the EZ Multiplexer will only read and write to PLC registers that the panels are currently monitoring. This significantly increases the speed and performance of a Multi-Panel System.

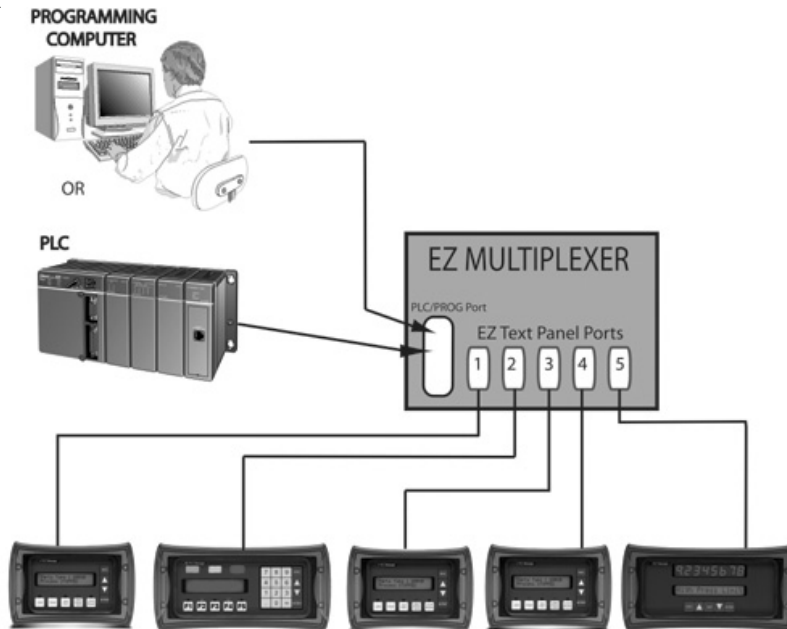
The same port (PLC/Programming Port) is used for connection to either the PLC or a programming computer. A **MODE** switch on the front of the unit (see figure on page 10) allows you to select **PROGRAM** (setup) Mode or **MULTIPLEXER** (run) Mode. You will use **PROGRAM** Mode (MODE switch is ON) when Programming (connected to a computer) and **MULTIPLEXER** Mode (MODE switch is OFF) when connected to a PLC. You will use cable P/N EZTEXT-PGMCBL to connect the Multiplexer to a programming computer. Above the PLC/PROG port are two LEDs that indicate communication between the Multiplexer and PLC or between the Multiplexer and a programming computer.

There are 5 panel ports used to connect to any of the EZText Panel models. Above each EZText Panel port (COM1, COM2, COM3, COM4, and COM5) are two LEDs that indicate communication between the Multiplexer and the EZText Panels.

The PLC Attribute settings are the same for each Panel. The baud rate to each of the panels is fixed. The Multiplexer supports the same PLCs as the EZText Panel. All of the EZText Panels in a project are configured to use the same PLC driver to communicate with the Multiplexer, this is done automatically by EZText Programming Software, Version 2.0. Version 2.0 of the software will support downloading the PLC driver, retrieving information from the Multiplexer (revision and PLC attributes), and setting the PLC Attributes. For information about Multi-Panel configuration, see the *EZText Programming Software Getting Started Manual, Version 2.0* that ships with the software CD, P/N EZ-TEXTEDIT.

An EZText Panel will request (read) the values of the PLC Addresses stored in the EZ Multiplexer and will write new values to the EZ Multiplexer. The EZ Multiplexer will constantly monitor the PLCs for all of the active stored (programmed) addresses. By doing so, the EZ Multiplexer will always have updated information for an EZText Panel request. Please note that the more PLC register addresses that are active, the slower the update time will be.

## Multi-Panel System Diagram





## What you need to get started

### Hardware

- 1 EZ Multiplexer, P/N EZ-MULTIDROP, master communication unit
- 1–5 EZText Panels (choose from models EZ-220, EZ-220L, EZ-420, EZ-220P, EZ-SP)
- 24 Volt DC Power Supply (FA-24PS recommended)
- RS-232C Programming Cable (P/N EZTEXT-PGMCBL) and set MODE switch to ON to select Program (setup) Mode.
- RS-422A Multiplexer to EZText Panel Cable—Belden 9729 or equivalent, one per panel
- RS-232C or RS-422A/485A PLC Cable (see page 10 for part numbers)
- Programmable Logic Controller (PLC)
- PC requirements:
  - IBM or compatible PC (486 or better) with a mouse and separate serial port
  - VGA display with at least 800 x 600 resolution (1024 x 768 recommended)
  - Standard Windows 95/98 (Second Edition)/NT4.0/2000® requirements
  - CD ROM Drive

### Software

- EZText Programming Software (P/N EZ-TEXTEDIT, Version 2.0)

## Need HELP?



**PLEASE NOTE:** The section on **Troubleshooting** at the end of this manual should help you with most problems you might encounter.

### Onscreen HELP

One of the most important features of the EZText Panel Programming Software is the availability of context sensitive onscreen help. To access the Help windows, simply press the F1 function key while on the topic where you need help. For example, if you need help while working with panel configuration, hit the F1 function key when that dialog box is open and a pop-up HELP window will be displayed.

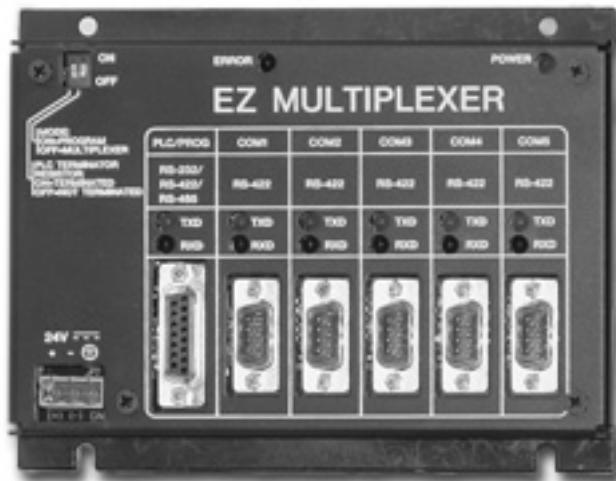
### PLC HELP

If you need help with the PLC to EZText Panel Interface, consult the EZText Panel Programming Software Help. Each PLC Driver has a Help Topic that lists the error messages and provides an explanation for each. Also provided are PLC to EZText Panel wiring diagrams.



## Technical Support

Although most questions can be answered with EZText Programming Software Version 2.0 HELP or the manuals, if you are still having difficulty with a particular aspect of installation or system design, technical support is available at **1-770-844-4200**, Monday through Friday, 9 a.m. to 6 p.m. EST, or FAX us at **1-770-886-3199**. Visit our website at [www.Automationdirect.com](http://www.Automationdirect.com).

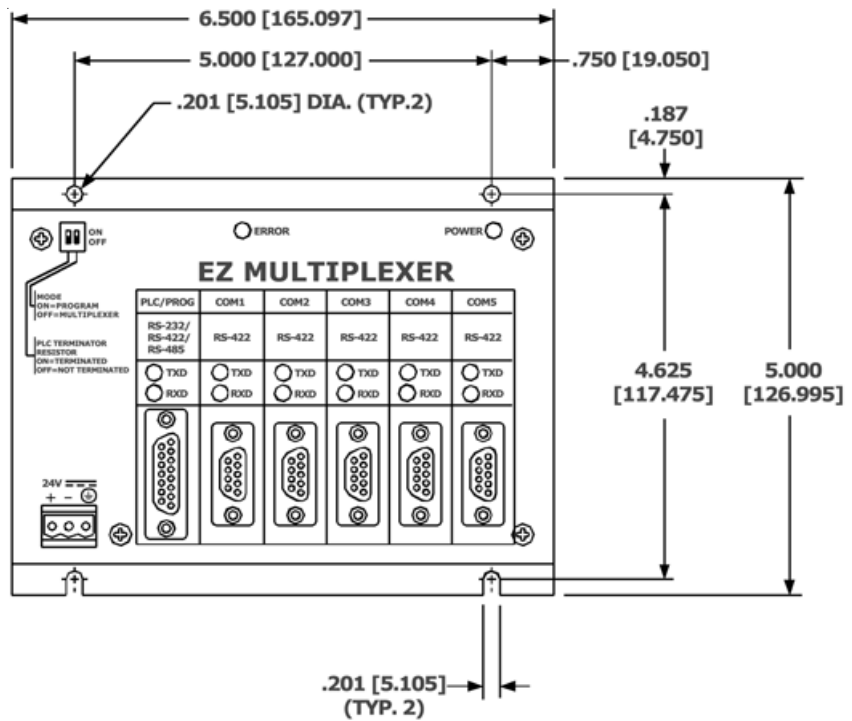




## Connections, Switches, LEDs and Outline Dimensions

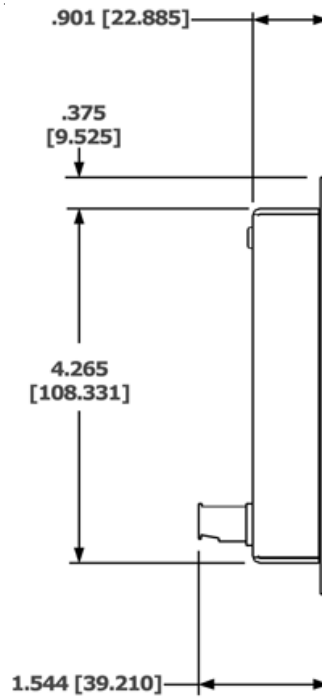
### Outline Dimensions — Front View

All dimensions are provided in inches and millimeters ( mm are in [ ] ). See the following page for side view and depth dimensions.



**Outline Dimensions — Side View**

All dimensions are provided in inches and millimeters (mm are in [ ]).

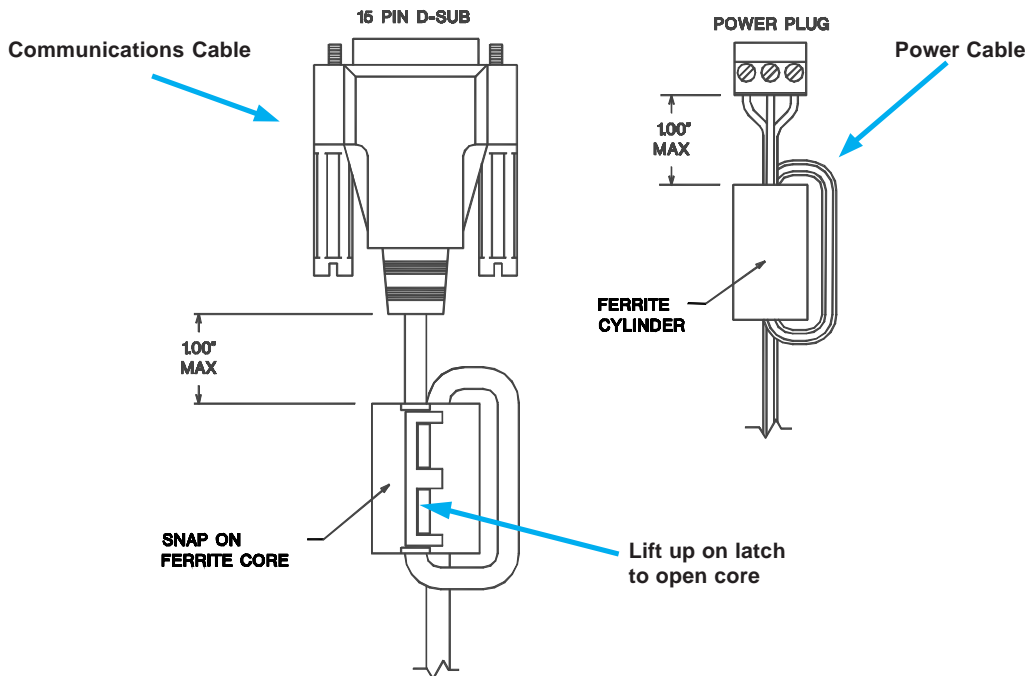


## EMI Noise Filter Installation

EZText Panels and the EZ Multiplexer are supplied with two ferrite cores that should be attached to the cables prior to installation of the EZText Panel. These cores are *required to suppress EMI emissions* that are conducted through the Power Cable and the Communications Cable. The figure, below, shows the ferrite cores properly installed. Attach the cores within one inch of the EZText connector. The cable should be snugly wrapped once around the core, providing two passes through the core.

The **Power Cable Core** is a solid ferrite cylinder. The Power Cable should pass once through the core, be looped around and pass through a second time. Pull the excess cable so that it rests snugly against the outside of the core.

The **Communications Cable Core** is a snap-together, split, ferrite core. This core can be installed on a finished cable. Lift the latch to open the core. Wrap the wire through the core center, snugly around the outside, and again through the center. Close the core until the latch snaps. Ensure that the cable jacket is not pinched between the two halves of the core. The finished cable should look similar to the drawing shown below.





## PLCs Supported by EZ Multiplexer

Below is a list of various PLCs and their protocols supported by the EZ Multiplexer and by EZText Panels. Please note that we continue to add new drivers to this list. If you don't see your PLC listed here, please contact [Automationdirect.com](http://Automationdirect.com) or visit our web site.

PLC Brand	Model	Protocols Supported	
Allen-Bradley	Micrologix 1000, 1200 and 1500 SLC5/03, /04, /05 (with DF1)	DF1 Half Duplex; DF1 Full Duplex	
	PLC5	DF1	
General Electric	90/30 and 90/70	SNPX	
Mitsubishi	FX Series (all)	Direct	
Modicon	984 CPU, Quantum 113 CPU AEG Modicon Micro Series 110 CPU: 311-xx, 411-xx, 512-xx, 612-xx	Modbus RTU	
Omron	C200, C500	Host Link	
DirectLogic	DL05, DL06	K-Sequence; DirectNet; ModBus (Koyo addressing)	
	DL105	K-Sequence	
	DL205	D2-230	K-Sequence
		D2-240	K-Sequence; DirectNet
		D2-250/D2-250-1/260	K-Sequence; DirectNet; ModBus (Koyo addressing)
		D2-240/250 DCM	DirectNet
	DL305	D3-330/330P	DirectNet
		D3-340	DirectNet
		D3-350	K-Sequence; DirectNet; ModBus (Koyo addressing)
		D3-350 DCM	DirectNet
	DL405	D4-430	K-Sequence; DirectNet
		D4-440	K-Sequence; DirectNet
		D4-450	K-Sequence; DirectNet; ModBus (Koyo addressing)
		All with DCM	DirectNet
	Siemens	Siemens 7 MPI Adapter	3964R
	Other	H2- WinPLC (Think-N-Do V5.2, check for version compatability)	Modbus RTU (serial port)



## Specifications

<b>Power Supply:</b>	20–30 VDC <2.5 Watts
<b>Operating Temperature:</b>	0 to 60 °C
<b>Storage Temperature:</b>	–20 to +70 °C
<b>Humidity:</b>	0–95% R.H, noncondensing
<b>LED Indicators:</b>	<p><b>1 Green Power LED:</b> Illuminates when power is applied to unit</p> <p><b>1 Red Error LED:</b> Illuminates when there is an error with PLC when in Multiplexer (Run) Mode, or illuminates in Program (Setup) Mode when there is an error with the internal EXEC firmware.</p> <p><b>6 Green Transmit Data:</b> Illuminates when port is transmitting data</p> <p><b>6 Red Receive Data:</b> Illuminates when port is receiving data</p>
<b>Ports:</b>	<p><b>1 PLC/Programming Port:</b> 15-position female D-sub connector to PLC or Programming Computer. Operates in RS-232C, RS-422A, or RS-485A modes. Communicates at a fixed Baud.</p> <p><b>5 EZText Panel Ports:</b> 9-position male D-sub connector to any model EZText Panel. Operates in RS-422A mode. Communicates at a fixed Baud.</p>
<b>Switches:</b>	<p><b>1 Mode Switch:</b> Used to switch panel between Program (Setup) Mode and Multiplexer (Run) Mode.</p> <p><b>1 PLC Terminator Resistor:</b> Should be turned ON if the Multiplexer is the first or last node on the network. Set to ON, the RS-422/RS-485 signal is terminated.</p>
<b>External Dimensions:</b>	6.5" x 5.0" x 0.901" (165.097 x 126.995 x 22.885 mm); Depth including connector 1.544" (39.210 mm)
<b>Weight:</b>	0.9 lbs.

## Front Panel Features

### PLC TERMINATOR

**RESISTOR Switch**  
Set to ON when unit is first or last node on network — the RS-422/RS-485 signal is terminated. See page 13.

### MODE Switch

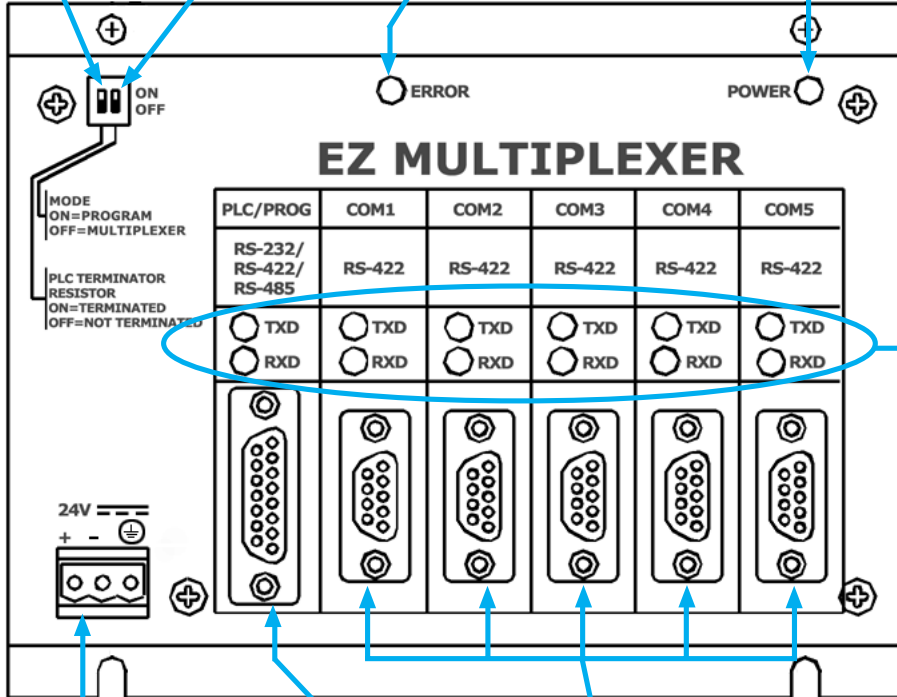
Set to ON when programming, and set to OFF when connected to a PLC. See page 13.

### ERROR LED

Illuminates in PROGRAM mode when there is an error with the internal firmware (EXEC). Illuminates in MULTIPLEXER (run) Mode when there is a PLC error. See page 12.

### POWER LED

Illuminates when power is applied to the EZ Multiplexer. See page 13.



### Power Terminals

Connect (+) on the unit to the (+) lead of your power source. Connect (-) on the unit to the (-) lead, and chassis GND (on the unit) is connected to the chassis ground of the cabinet. See page 11.

### PLC/PROG Port

15-position Male D-Sub Connector. Connect programming PC to this port using cable P/N EZTEXT-PGMCBL or connect to PLC using the PLC cable appropriate for your type PLC. See PLC Cable table, page 11.

### COM1, COM2, COM3, COM4, and COM5 Ports

Five 9-position Male D-Sub connectors. Connect up to 5 (any model) EZText Panels using cable as shown on page 12.

### TXD and RXD LEDs

Twelve LEDs that illuminate to show transmit and receive data activity for the port directly below. See page 12.

### Power Terminal

It is recommended you use a regulated power source isolated from relays, valves, etc. Connect (+) on the unit to the (+) lead of your power source. Connect (-) on the unit to the (-) lead, and chassis GND (on the unit) is connected to the chassis ground of the cabinet.

*Power Connector  
(P4, Phoenix 3-pin Header, 0.2 cuntr)*

Pin #	Connection	
1	+V	24VDC (20–30 VDC)
2	-V	
3	Chassis Ground	

### PLC or Programming (Computer) Port: PLC/PROG

There is one 15-position female D-Sub Connector, operating in RS-232C, RS-422A, or RS-485A modes, at a fixed Baud Rate. This port (PLC/Programming) is used for connection to either a PLC or a programming computer. A switch on the front of the unit (see MODE Switch, below) allows you to select Program (setup) Mode or Multiplexer (run) Mode. You will use Program Mode when programming (connected to a computer) and Multiplexer Mode when connected to a PLC. You will use one of the PLC cables listed in the table below to connect to your type PLC. For programming, use cable P/N EZTEXT-PGMCBL.

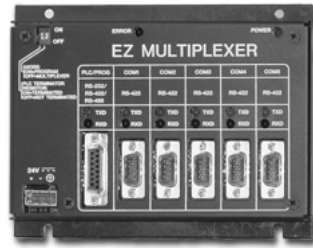
### PLC/PROG Port LEDs: TXD and RXD

#### PLC Cable Part Numbers



Part Number	Cable Description
EZ-2CBL	<i>Direct</i> Logic PLC RJ12 port, DL05, DL105, DL205, DL350 & DL450 (RS-232C)
EZ-2CBL-1	<i>Direct</i> Logic (VGA Style) 15-pin port, DL250 (RS-232C)
EZ-3CBL	<i>Direct</i> Logic PLC RJ11 port, DL340 (RS-232C)
EZ-4CBL-1	<i>Direct</i> Logic PLC 15-Pin Dsub port, DL405 (RS-232C)
EZ-4CBL-2	<i>Direct</i> Logic PLC 25-Pin Dsub port, DL405, DL350, DL305 DCU, and all DCM's (RS-232C)
EZ-90-30-CBL	GE 90/30 and 90/70 15-pin Dsub port (RS-422A)
EZ-SLC-232-CBL	AB SLC 5/03/04/05 DF1 port (RS-232C)
EZPLC5-232-CBL	AB PLC5 DF1 port (RS-232C)
EZ-DH485-CBL	AB SLC DH485 port (RS-485A)
EZ-MLOGIX-CBL	AB MicroLogix 1000, 1200 & 1500 (RS-232C)
EZ-MITSU-CBL	Mitsubishi FX Series 25-pin port (RS-422A)
EZ-MITSU-CBL-1	Mitsubishi FX Series 25-pin MINI-DIN (RS-422A)
EZ-OMRON-CBL	Omron C200, C500 (RS-232C)
EZ-S7MPI-CBL	Siemens 7 MPI Adapter (RS-232C)

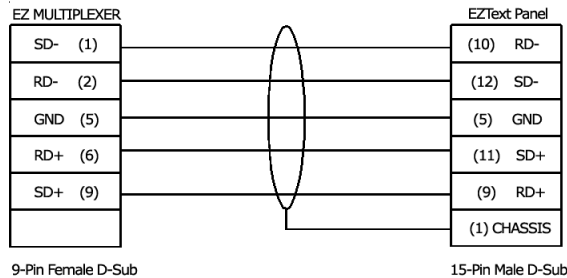
Above the PLC/PROG port are two LEDs that indicate communication between the Multiplexer and PLC or between the Multiplexer and a programming computer.



- 1 TXD (Transmit) Green LED - when illuminated indicates that the port is sending data
- 1 RXD (Receive) Red LED - when illuminated indicates that the port is receiving data

### EZText Panel Ports: COM1, COM2, COM3, COM4, and COM5

There are five 9-position male D-Sub Connectors, operating in RS-422A mode, at a fixed Baud Rate. These ports are used for connection for up to five of any EZText Panel including the Set Point Panel (EZ-220, EZ-220L, EZ-420, EZ-220P, EZ-SP). Use Belden 9729 or equivalent (one per panel) to connect panels to COM ports. A wiring diagram for the cable is shown below.



### COM1, COM2, COM3, COM4 and COM5 Port LEDs: TXD and RXD

Above each EZText Panel port (COM1, COM2, COM3, COM4, and COM5) are two LEDs that indicate communication between the PLC and the EZText Panels:

- 5 TXD (Transmit) Green LED - when illuminated indicates that the port is sending data
- 5 RXD (Receive) Red LED - when illuminated indicates that the port is receiving data

### ERROR LED

The ERROR LED indicates an error with the PLC when in Multiplexer (run) Mode, or it indicates an error with the Multiplexer's internal firmware (EXEC) when in Program (setup) Mode. It also flashes when switching between modes.

- When the EZ Multiplexer enters the Multiplexer Mode the ERROR LED will blink on for 100 Msec and off for 100 Msec 5 times.





- When the EZ Multiplexer enters the Program Mode the ERROR LED will blink on for 400 Msec and off for 100 Msec 2 times.
- While the EZ Multiplexer is in Multiplexer Mode (Run Mode) the red ERROR LED will illuminate to indicate an error with the PLC. The ERROR LED will illuminate for 2 seconds and then turn off while the PLC driver tries to communicate with the PLC again. If there was an error with the PLC, the PLC message will be displayed on all of the EZText Panels that are connected and communicating with the EZ Multiplexer.
- When the Multiplexer Panel is in Program Mode —either because the EZText Programming Software is sending new firmware, or because on power up the Boot found that there is an invalid EXEC— the ERROR LED will blink on for 1 second and off for 200 Msec continuously. YOU MUST reload the firmware, ensuring you have the correct firmware.hex file.

### **POWER LED**

The Power LED illuminates when power is applied to the unit.

### **Mode Switch**

This switch allows you to switch the EZ Multiplexer between Programming (setup) Mode and Multiplexer (run) Mode.

### **PLC Terminator Resistor Switch**

Used to switch the RS-422/RS-485 termination resistor, ON or OFF. If the EZ Multiplexer is the first or last node on the network, set the switch to ON to prevent signal distortion. Set to ON, the RS-422/RS-485 signal is terminated.



## Maintenance

### Fuse Reset

The EZ Multiplexer features an AUTO-RESET fuse (0.65 Amp polyfuse). It is reset by removing power for 5 minutes and then reapplying power to the unit.



## Troubleshooting

In this section we will explain how to isolate potential problems. If you cannot isolate and remedy the problem using the procedures we have outlined below, call technical support. For a list of EZText Panel, EZText Programming Software, and PLC Driver Error Messages, see Appendix C in your EZText Panel User Manual.

### **Problem: Multiplexer doesn't have power.**

1. Check the green Power LED on the front of the panel. It will illuminate when power is applied to the unit. If it is not illuminated, check to make sure power is applied to the unit.
2. Check power supply or replace.
3. Ensure that the power terminal connections on the front panel of the multiplexer are wired correctly.

### **Problem: Multiplexer is not communicating with programming computer.**

1. Ensure that the MODE Switch on the front panel of the multiplexer is set to PROGRAM (ON).
2. Check cable, ensure that it is the correct cable and that it is properly connected at both ends.
3. Check multiplexer for power.
4. Check to ensure the correct PC COM port is selected in the EZText Programming Software and that it is available in the PC.
5. Check to ensure that EZText Panels are in SETUP Mode. Press the UP Arrow Pushbutton and hold while simultaneously pressing the DOWN Arrow Pushbutton. The panels MUST be in setup mode to communicate with the programming computer through the Multiplexer.
6. Check the COM1 setting in Setup Mode on the EZText Panel.

### **Problem: Multiplexer is not communicating with PLC.**

1. Ensure that the MODE switch on the front panel of the multiplexer is set to MULTIPLEXER (OFF).
2. Check to ensure cable from PLC to Multiplexer is the right cable, and connected properly.
3. If Multiplexer is the first or last node on a network, check to make sure that the PLC TERMINATOR RESISTOR switch on the front panel of the multiplexer is set to TERMINATED (ON).
4. Check PLC settings:
  - a. Is PLC system powered?
  - b. Is PLC COM Port properly configured?
  - c. If there is a RUN switch on PLC, is it in the term/remote mode?



**Problem: Multiplexer is not communicating with one or more EZText Panels.**

1. Check to ensure that cable from Multiplexer to EZText Panel is the correct cable (see page 11) and connected properly.
2. Check to ensure that the MODE switch is set properly. To program the panels the MODE switch must be ON — in the PROGRAM Mode. To run the panels the MODE switch must be OFF — in the MULTIPLEXER Mode.

**Problem: ERROR LED is illuminated.**

The ERROR LED indicates an error with the PLC when in Multiplexer (run) Mode, or it indicates an error with the Multiplexer's internal firmware (EXEC) when in Program (setup) Mode. It also flashes when switching between modes.

- When the EZ Multiplexer enters the Multiplexer Mode the ERROR LED will blink on for 100 Msec and off for 100 Msec 5 times. This is normal.
- When the EZ Multiplexer enters the Program Mode the ERROR LED will blink on for 400 Msec and off for 100 Msec 2 times. This is normal.
- While the EZ Multiplexer is in Multiplexer Mode (Run Mode) the red ERROR LED will illuminate to indicate an error with the PLC. The ERROR LED will illuminate for 2 seconds and then turn off while the PLC driver tries to communicate with the PLC again. If there was an error with the PLC, the PLC message will be displayed on all of the EZText Panels that are connected and communicating with the EZ Multiplexer. See **Problem: Multiplexer is not communicating with PLC.**
- When the Multiplexer Panel is in Program Mode— either because the EZText Programming Software is sending new firmware, or because on power up the Boot found that there is an invalid EXEC — the ERROR LED will blink on for 1 second and off for 200 Msec continuously. YOU MUST reload the firmware, ensuring you have the correct firmware.hex file. See section on installation of new firmware, this manual.



### Still need Help?

Check the EZText Panel User Manuals and/or EZText Programming Software Manual/Help Topics for additional troubleshooting information. You also have two additional sources for more information other than this manual.

#### **Visit our web site at [www.automationdirect.com](http://www.automationdirect.com)**

Our web site contains all of this information, any new feature releases, technical support, plus much more...

Call our **Technical Support Group** Monday–Friday at **1-770-844-4200** or FAX us at **1-770-886-3199**.

If you have any questions that you can't find an answer to, give us a call from 9 a.m. to 6 p.m. EST at the number above and we will be glad to assist you.



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