



# EZAutomation

Designed and built in USA by



The Most Sensible Automation Products  
Direct From the Factory

**EZMarquee**  
**Hardware User Manual**  
Manual Part Number EZM-MARQUEE-M  
Revision A

## **WARNING!**

Programmable visualization products such as EZAutomation's EZMarquee are not fail-safe devices and as such must not be used for stand-alone protection in any application. Any reliance on these devices for equipment or personnel safety is unwarranted.

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 EZM-EZMARQUEE-M**

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**EZM-EZMARQUEE-M**

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## Purpose of the Manual

This manual is presented with detailed and stepwise information on the installation, programming, troubleshooting, and maintenance of EZMarquees. It can also be used to understand how to connect the EZMarquee to other components in your control system.

This manual is a good reference guide for those who install EZMarquee, as well as those who program it. If you understand EZMarquee, or marquees in general, you can find all the information you need to start and maintain your system in this manual.

## Where You Should Start

If you are already familiar with basic Marquee concepts, you may choose to start with **Chapter 3, Installation and Wiring**. New customers may find it more useful to get acquainted with the wide features of EZMarquee first. The **Quick and EZ Start to Get Familiar with EZMarquee** part of this chapter is also a good starting point, for both experienced and new users.

## Where to get HELP - Technical Support

We make every effort to design our manuals around the feedback we receive from our customers. If you find it difficult to locate what you are looking for, check the following resources for the topic you are looking for:

- **Table of Contents** - A listing of contents per chapter, at the beginning of manual
- **Index** - At the end of the manual, Index is an alphabetical listing of all key words
- **Key Topics for Each Chapter** - At the beginning of each chapter

Although most of your questions will be answered from this manual, if you still need assistance, technical support is available at **1-877-774-EASY**. Our Technical Support Engineers are considered among the best in the industry and are available Monday through Friday 6 A.M. to 12 midnight CST. Emergency Tech Support is also available on the weekends at 1-563-650-8112.

You can also visit the EZAutomation website for online resources and our latest product-related information. Our web address is **[www.EZAutomation.net](http://www.EZAutomation.net)**.

### **EU Information**

EZMarquee is manufactured in compliance with European Union (EU) Directives and carries the CE mark. EZMarquee has been tested under CE Test Standard #EN55011, and is submitted for approval. The following information is provided to comply with EU documentation requirements.

Please NOTE: Products with CE marks perform their required functions safely and adhere to relevant standards as specified by EU directives provided they are used according to their intended purpose and that the instructions in this manual are adhered to. The protection provided by the equipment may be impaired if the equipment is not used in accordance with this manual. Only replacement parts supplied by EZAutomation, or its agents should be used.

### **Warranty**

EZAutomation products carry a 2 year warranty against defects in materials and workmanship. We will replace or repair the defective product at our discretion. The warranty will be null and void if the product is abused or used outside of the product specifications.

### **Out of Warranty Repairs**

If your EZMarquee is out of warranty, **contact EZAutomation's Customer Service Department for an evaluation of repair costs @ 1-877-774-EASY**. You can then decide whether it is more economical to proceed with factory repairs or to purchase a new EZMarquee.

### **Returns/30-Day Money Back Guarantee**

EZAutomation products are backed by a 30 day, unconditional, money-back guarantee. You may return the product for any reason for prompt exchange, credit, or refund (excluding shipping and handling charges).

Details of Warranty and Return procedures are detailed in the Introduction section of the EZAutomation Catalog.








# Chapter 1: Getting Started

- Manual Organization
- Product Overview
- Physical Characteristics
- Messages
- Where to Use EZMarquee Displays
- Quick & EZ Start to Get Familiar with EZMarquee

A red square containing a white number 1, positioned to the right of the chapter title.

### 1.1 Manual Organization

The table, below provides an overall description of the topics covered within this manual.

Chapter	Description
	<b>Getting Started:</b> Provides Manual Organization and lists what you need to get started to display messages. Gives you a Quick and EZ Start to get familiar with EZMarquee. Discusses how to get help with questions you might encounter and how to contact Technical Support.
	<b>Models, Features and Specifications:</b> Provides you with a table listing the various models, their part numbers and special features. Lists the important features and hardware specifications for different models.
	<b>Installation, Wiring and Connection Information:</b> Provides information about preparing the marquee for operation such as setting the DIP switches, connecting Power and how to interface EZMarquee for Serial communication. Shows the mounting and cutout dimensions for the different models. Explains the different ways to mount the marquee. Shows the setup screens displayed after initial power up of the display.
	<b>ASCII Instructions and Software:</b> Describes different ASCII commands to develop and maintain EZMarquee programs. Describes the EZMarquee String Generator software which can be used to preview messages and generate ASCII strings.
	<b>Connectivity to PLC's:</b> Shows how you can connect EZMarquee to different PLC's.
	<b>Connectivity to Control Network:</b> Shows how you can connect EZMarquee to Ethernet, DeviceNet, or Profibus.
	<b>APPENDIX A:</b> This part of the manual contains information about Valid ASCII Characters, International Character Set, and Error messages for EZMarquee.

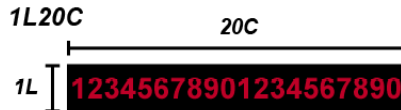


## 1.2 Product Overview

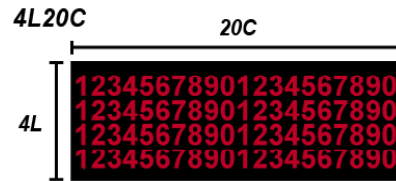
EZMarquees are the most sensible marquees for stand-alone and Plant-wide communication displays with large character sizes so that the messages are visible up to 400 feet. Character visibility can be enhanced by scrolling or blinking the message. EZMarquees are offered in 16 different models with Red and Tri-Color LEDs to suit every application. You can display messages in 2", 4", 6" and 8" characters. All EZMarquee models are capable of communicating over RS-232 and RS422 along with different models for Ethernet, DeviceNet and Profibus connectivity. EZMarquee can be interfaced with PLCs, PCs, and embedded controllers. All EZMarquees support ASCII protocol. You can take advantage of EZMarquee's International Character Set to display your messages in multiple international languages.



- 2" characters - readable from 100 feet
- 4" characters - readable from 200 feet
- 6" characters - readable from 300 feet
- 8" characters - readable from 400 feet
- 8" Narrow characters - readable from 400 feet



1L refers to one line or "row" that equals 20 characters (each 2" high). 20C refers to 20 characters, all of which are 2" high.



EZMarquees are available in several sizes. The smallest size is called the 1L10C. The other sizes are multiples of the smallest size, such as 1L20 C, and 4L20C (shown above), etc.

EZMarquees are "slave" marquees, that is they do not store any messages. They simply display the messages sent to them by a PLC, PC, or Embedded Controller. If you need a Master Marquee capable of string messages or Triggering messages based on external events, you can purchase an inexpensive EZPLC to perform these functions.

### 1.3 Physical Characteristics

EZMarquees are enclosed in a NEMA 12 extruded aluminum housing with NEMA ICS 2-230 level of electrical noise immunity. Two grommets are provided for routing wires through the back access plate. The connectors and set-up switches can be accessed by removing the back access plate.

EZMarquee can be mounted in three different ways. It can be mounted on a wall, ceiling or on top of the machine depending upon the application. Section 4 describes the various ways to mount and install the EZMarquee.

### 1.4 Messages

How messages look depends on the way they are sent. Messages have options that determine message output and visual appearance. A network of two groups of EZMarquees with 8 marquees in each group can be set up. When the message contains group and unit number information, the message can be displayed on one, some, or on all of the EZMarquees.

The EZMarquee also features International Character Sets. This option is switch-selectable to allow message display in U.S., English, French, Danish, Swedish, German, Cyrillic, or Japanese Kana.

### 1.5 Where to Use EZMarquee Displays

Using EZMarquees is an excellent way to keep workers in touch with the manufacturing process via the following:

- Monitor Productivity of each machine, line, or the whole plant
- Communicate Alarm and Safety Messages
- Provide Continuous Reports on Factory Conditions



### 3 Simple Steps to Get Familiar with EZMarquee

#### Step 1

Unpack the EZMarquee



#### Step 2

Connect the Cables



#### Step 3

Type and Send Message

## 1.6 Quick & EZ Start to Get Familiar with EZMarquee

This section is designed to take you through a quick start on how to use EZMarquee. It assumes that you are a first-time user of EZMarquee. By following the **3 Simple Steps**, you will be creating and displaying messages on your EZMarquee in no time. It is as **EZ as 1-2-3**.

### Step 1: Unpack the EZMarquee and Download Free Software

It is always recommended to make sure that you have all of the right parts to build your system. This is what you will need to get started:

- An EZMarquee Display (1L10C, 1L20C, 1L40C, 2L10C, 2L20C, 2L40C, 4L20C, or 4L40C)
- 110/220 VAC input power cord\* with stripped wires on one end
- An RS-232 Communication cable, with a 9-pin connector on one end to connect to the PC and 3 stripped wires on the other end to connect to the 3-pin terminal strip on the EZMarquee.

\*You may have to make the communication cable by cutting off the D connector from one end of a standard RS-232 PC cable.

You will also need a PC for sending messages to EZMarquee. It can be any IBM or Compatible PC with a mouse, a separate serial port, and a Windows operating system (Standard Windows 95/98/NT4.0/2000) installed on it.

### You will need EZMarquee Software:

EZMarquee string generator software is available **FREE** of cost and you can download it by performing the following simple steps:

1. Go to [www.EZAutomation.net](http://www.EZAutomation.net).
2. Click on **Downloads** on the top of the page.
3. Scroll Down to **EZMarquee**.
4. Right Click on **EZMarquee Software** and save it to your computer.
5. Install the EZMarquee Software onto your computer.



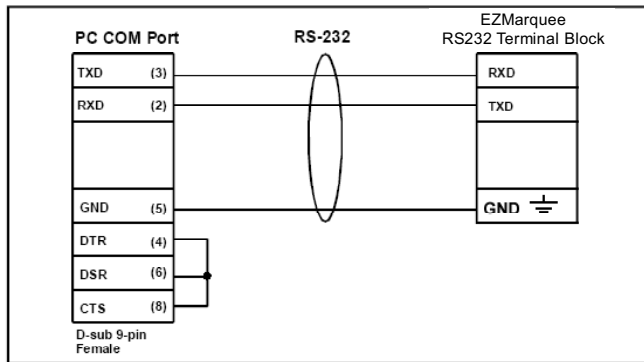
Remove the Access plate from the back of the marquee.

**Step 2: Connect the Cables**

Connect your PC's serial port to EZPLC's RS232 port using the programming cable.

1. Connect the 9-pin terminal of the RS-232 cable to the computer.
2. Wire the other three flying ends of the RS-232 cable to the EZMarquee as shown in the figure below.

**Wiring Diagram to connect to EZMarquee RS232 from PC COM Port**



3. Connect Power Cord to L1, L2, and Chassis.

Power Input Terminals	Pin	Description
	Chassis	GND (Ground)
	L2	Neutral
	L1	Live

After ensuring the connections are properly and safely connected, apply power to the system. You will see the following messages on the EZMarquee:

- ASCII
- Revision A (or whichever revision you're installing)
- Character Size 2"
- Group Number 01
- Unit Number 001
- Baud Rate 9600

### Step 3: Type and Send Message

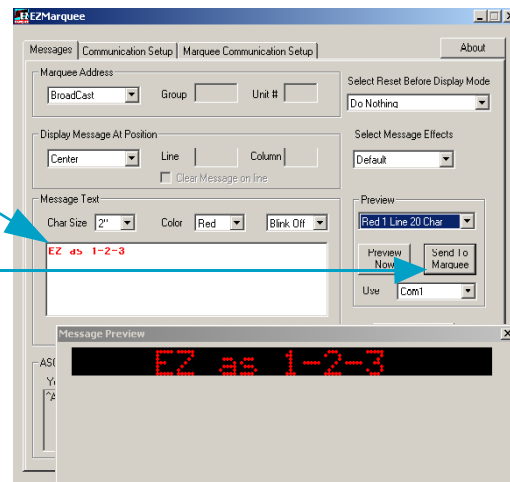
To Type and send a message, perform the following steps:

1. Double-click the EZMarquee icon to open the software.

2. Type in your message along with its attributes (character size, color, and effects like scrolling or blinking).

3. Click **Send to Marquee** button.

And that's it! Using the EZMarquee software is as easy as this!



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2

## **Chapter 2: Models, Features and Specifications**

- EZMarquee Models
  - Model Part Numbers
  - Descriptions
- Features
- Accessories
- EZMarquee Hardware Specifications

### 2.1 EZMarquee Models

EZMarquees are the most sensible marquees for stand-alone and plant-wide communication displays. EZMarquee messages can be made to appear stationary, scrolling, or blinking based on your preference. EZMarquees are offered in 16 different models in RED and TRI-Color LED's to suit applications for 1 Line 10 Characters all the way to 4 Line 40 Characters per line displays. All EZMarquees support ASCII protocol and have optional interface to Ethernet, DeviceNet or Profibus networks. Refer to the table below for part numbers, descriptions and options for all 16 EZMarquee models.

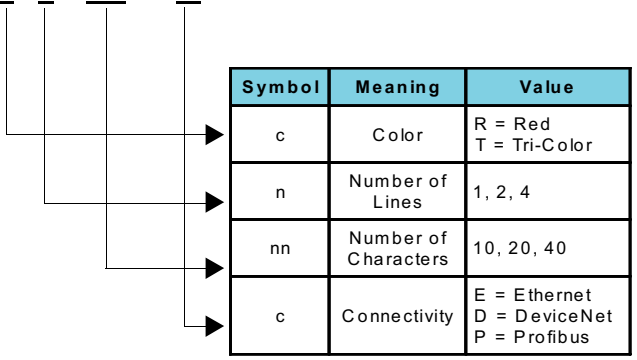
#### Part Numbers Convention

The table below describes the part number convention followed for various models of EZMarquee.

**E Z M c - n L n n C - \*c**



**NOTE:** Please see all available part numbers on the following pages. Some combinations or options may not be available.



**\*Part numbers for standard models** (those without Ethernet, DeviceNet, or Profibus option) won't have a letter in this space to indicate the marquee's connectivity to a network. For example:

The part number "EZMR-2L40C would be a **RED, 2 Line 40 Character Marquee.**

The part number "EZMT-2L40C-E" would be a **Tri-Colored, 2 Line 40 Character Marquee with Ethernet connectivity.**



## 2.2 EZMarquee Model Part Numbers and Description

Part Number	Description
EZMR-1L10C	1 Line, 10 Char, Red LED
EZMR-1L10C-E	1 Line, 10 Char, Red LED, Ethernet
EZMR-1L10C-D	1 Line, 10 Char, Red LED, DeviceNet
EZMR-1L10C-P	1 Line, 10 Char, Red LED, Profibus
EZMT-1L10C	1 Line 10 Char, Tri-color LED
EZMT-1L10C-E	1 Line 10 Char, Tri-color LED, Ethernet
EZMT-1L10C-D	1 Line 10 Char, Tri-color LED, DeviceNet
EZMT-1L10C-P	1 Line 10 Char, Tri-color LED, Profibus
EZMR-2L-10C	2 Line, 10 Car, Red LED
EZMR-2L-10C-E	2 Line, 10 Car, Red LED, Ethernet
EZMR-2L-10C-D	2 Line, 10 Car, Red LED, DeviceNet
EZMR-2L-10C-P	2 Line, 10 Car, Red LED, Profibus
EZMT-2L10C	2 Line, 10 Char, Tri-color LED
EZMT-2L10C-E	2 Line, 10 Char, Tri-color LED, Ethernet
EZMT-2L10C-D	2 Line, 10 Char, Tri-color LED, DeviceNet
EZMT-2L10C-P	2 Line, 10 Char, Tri-color LED, Profibus
EZMR-1L20C	1 Line, 20 Char, Red LED
EZMR-1L20C-E	1 Line, 20 Char, Red LED, Ethernet
EZMR-1L20C-D	1 Line, 20 Char, Red LED, DeviceNet
EZMR-1L20C-P	1 Line, 20 Char, Red LED, Profibus
EZMT-1L20C	1 Line, 20 Char, Tri-color LED
EZMT-1L20C-E	1 Line, 20 Char, Tri-color LED, Ethernet
EZMT-1L20C-D	1 Line, 20 Char, Tri-color LED, DeviceNet
EZMT-1L20C-P	1 Line, 20 Char, Tri-color LED, Profibus
EZMR-1L40C	1 Line, 40 Char, Red LED
EZMR-1L40C-E	1 Line, 40 Char, Red LED, Ethernet
EZMR-1L40C-D	1 Line, 40 Char, Red LED, DeviceNet
EZMR-1L40C-P	1 Line, 40 Char, Red LED, Profibus
EZMT-1L40C	1 Line, 40 Char, Tri-color LED
EZMT-1L40C-E	1 Line, 40 Char, Tri-color LED, Ethernet
EZMT-1L40C-D	1 Line, 40 Char, Tri-color LED, DeviceNet
EZMT-1L40C-P	1 Line, 40 Char, Tri-color LED, Profibus

**EZMarquee Model Part Numbers and Description (Continued)**

Part Number	Description
EZMR-2L20C	2 Line, 20 Char, Red LED
EZMR-2L20C-E	2 Line, 20 Char, Red LED, Ethernet
EZMR-2L20C-D	2 Line, 20 Char, Red LED, DeviceNet
EZMR-2L20C-P	2 Line, 20 Char, Red LED, Profibus
EZMT-2L20C	2 Line, 20 Char, Tri-color LED
EZMT-2L20C-E	2 Line, 20 Char, Tri-color LED-Ethernet
EZMT-2L20C-D	2 Line, 20 Char, Tri-color LED-DeviceNet
EZMT-2L20C-P	2 Line, 20 Char, Tri-color LED-Profibus
EZMR-2L40C	2 Line, 40 Char, Red LED
EZMR-2L40C-E	2 Line, 40 Char, Red LED, Ethernet
EZMR-2L40C-D	2 Line, 40 Char, Red LED, DeviceNet
EZMR-2L40C-P	2 Line, 40 Char, Red LED, Profibus
EZMT-2L40C	2 Line, 40 Char, Tri-color LED
EZMT-2L40C-E	2 Line, 40 Char, Tri-color LED, Ethernet
EZMT-2L40C-D	2 Line, 40 Char, Tri-color LED, DeviceNet
EZMT-2L40C-P	2 Line, 40 Char, Tri-color LED, Profibus
EZMR-4L20C	4 Line, 20 Char, Red LED
EZMR-4L20C-E	4 Line, 20 Char, Red LED, Ethernet
EZMR-4L20C-D	4 Line, 20 Char, Red LED, DeviceNet
EZMR-4L20C-P	4 Line, 20 Char, Red LED, Profibus
EZMT-4L20C	4 Line, 20 Char, Tri-color LED
EZMT-4L20C-E	4 Line, 20 Char, Tri-color LED, Ethernet
EZMT-4L20C-D	4 Line, 20 Char, Tri-color LED, DeviceNet
EZMT-4L20C-P	4 Line, 20 Char, Tri-color LED, Profibus
EZMR-4L40C	4 Line, 40 Char, Red LED
EZMR-4L40C-E	4 Line, 40 Char, Red LED, Ethernet
EZMR-4L40C-D	4 Line, 40 Char, Red LED, DeviceNet
EZMR-4L40C-P	4 Line, 40 Char, Red LED, Profibus
EZMT-4L40C	4 Line, 40 Char, Tri-color LED
EZMT-4L40C-E	4 Line, 40 Char, Tri-color LED, Ethernet
EZMT-4L40C-D	4 Line, 40 Char, Tri-color LED, DeviceNet
EZMT-4L40C-P	4 Line, 40 Char, Tri-color LED, Profibus

## 2.3 Features

- 2" to 8" Red or Tri-Color characters
- International Character Set
- 16 Available Models starting from 1 line 10 Character per line display to 4 Line 40 Character per line display
- Ethernet, DeviceNet and Profibus Interface models
- Free ASCII String Generator Software
- NEMA 12 Industrial enclosure
- Pre-Matched LEDs
- 24 hour Burn-in tested
- 100,000 Hours rated life
- 110/220 VAC Power Input voltage
- UL, CUL, CE, CSA Approval (pending)
- Stationary, Scrolling and Blinking Messages
- Mixed Character sizes on one Line

## 2.4 Accessories

There are replacement parts and other accessories available to fit your application. The table below provides you with the list of accessories available for EZMarquees:

Part Number	Description
EZM-GRMT	Grommets for EZMarquee back Plate
EZM-BKPLT	Back Plate with Gasket for EZMarquee
EZM-TERM5	5-point Phoenix plug-in Terminal Block
EZM-MNTBRK1	Mounting Brackets for EZMarquees-1L10C and 1L20C models Only(package of 2)
EZM-MNTBRK2	Mounting Brackets for EZMarquees-2L10C and 2L20C models Only(package of 2)
EZIO-SCDRV	2-5mm Screwdrivers

To order from this list, phone EZAutomation at **1-877-774-EASY**

### 2.5 EZMarquee Hardware Specifications

EZMarquee Model Specifications				
Part Number	EZMR-1L10C EZMR-1L10C-E EZMR-1L10C-D EZMR-1L10C-P	EZMT-1L10C EZMT-1L10C-E EZMT-1L10C-D EZMT-1L10C-P	EZMR-2L10C EZMR-2L10C-E EZMR-2L10C-D EZMR-2L10C-P	EZMT-2L10C EZMT-2L10C-E EZMT-2L10C-D EZMT-2L10C-P
Display Type	RED LED	TRI-Color LED	RED LED	TRI-Color LED
Specification	1 Line of 10 Char (2") max.		2 Lines of 10 Char (2") max.	
Max. Viewable Distance	100 Feet with 2" Characters		200 Feet with 4" Characters	
Power Consumption	8 watts	14 watts	15 watts	28 watts
Agency Approvals	UL, CUL, CE, pending			
Enclosure	NEMA 12			
Operating Temperature	0° to 60° C Ambient			
Storage Temperature	-40° to 95° C Ambient			
Humidity	10% to 95% RH, Non-Condensing			
Input Power	110/220 VAC, 47-63Hz			
Electrical Interference	NEMA ICS 2-230 Showering Arc Test			
Electrical Tolerance	ANSI C37.90a-1974 (SWC) Surge With-Stand Capability Test			
Vibration	5 - 55 Hz 2G for 2 hours in the X, Y, and Z axis			
Shock	10G for under 12ms in the X, Y, and Z axis			
Serial Communications	Port 1 RS232; Port 2 RS422/485			
External Dimensions	18.9" x 4.8" x 2.8" (479.25 x 121.43 x 69.85mm)		18.9" x 6.2" x 2.8" (479.25 x 156.13 x 69.85mm)	
Weight	2.8 lbs.	3 lbs.	5 lbs.	5.2 lbs.

*\*Units with the suffix "E" have the Ethernet Communication option.  
Units with the suffix "D" have the DeviNet option.  
Units with the suffix "P" have the Profibus option.*

## EZMarquee Hardware Specifications (Continued)

EZMarquee Model Specifications				
Part Number	EZMR-1L20C EZMR-1L20C-E EZMR-1L20C-D EZMR-1L20C-P	EZMT-1L20C EZMT-1L20C-E EZMT-1L20C-D EZMT-1L20C-P	EZMR-1L40C EZMR-1L40C-E EZMR-1L40C-D EZMR-1L40C-P	EZMT-1L40C EZMT-1L40C-E EZMT-1L40C-D EZMT-1L40C-P
Display Type	RED LED	TRI-Color LED	RED LED	TRI-Color LED
Specification	1 Line of 20 Char (2") max.		1 Line of 40 Char (2") max.	
Max. Viewable Distance	100 Feet with 2" Characters			
Power Consumption	15 watts	28 watts	30 watts	60 watts
Agency Approvals	UL, CUL, CE, pending			
Enclosure	NEMA 12			
Operating Temperature	0° to 60° C Ambient			
Storage Temperature	-40° to 95° C Ambient			
Humidity	10% to 95% RH, Non-Condensing			
Input Power	110/220 VAC, 47-63Hz			
Electrical Interference	NEMA ICS 2-230 Showering Arc Test			
Electrical Tolerance	ANSI C37.90a-1974 (SWC) Surge With-Stand Capability Test			
Vibration	5 - 55 Hz 2G for 2 hours in the X, Y, and Z axis			
Shock	10G for under 12ms in the X, Y, and Z axis			
Serial Communications	Port 1 RS232; Port 2 RS422/485			
External Dimensions	36.9" x 4.8" x 2.8" (936.44 x 121.43 x 69.85mm)		72.1" x 5.4" x 2.8" (1831.31 x 106.35 x 69.85mm)	
Weight	4.5 lbs	4.8 lbs	8 lbs	8.5 lbs

*\*Units with the suffix "E" have the Ethernet Communication option.*

*Units with the suffix "D" have the DeviNet option.*

*Units with the suffix "P" have the Profibus option.*

**EZMarquee Hardware Specifications (Continued)**

EZMarquee Model Specifications				
Part Number	EZMR-2L20C EZMR-2L20C-E EZMR-2L20C-D EZMR-2L20C-P	EZMT-2L20C EZMT-2L20C-E EZMT-2L20C-D EZMT-2L20C-P	EZMR-2L40C EZMR-2L40C-E EZMR-2L40C-D EZMR-2L40C-P	EZMT-2L40C EZMT-2L40C EZMT-2L40C EZMT-2L40C
Display Type	RED LED	TRI-Color LED	RED LED	TRI-Color LED
Specification	2 Lines of 20 Char (2") max.		2 Lines of 40 Char (2") max.	
Max. Viewable Distance	200 Feet with 2" Characters			
Power Consumption	30 watts	55 watts	54 watts	100 watts
Agency Approvals	UL, CUL, CE, pending			
Enclosure	NEMA 12			
Operating Temperature	0° to 60° C Ambient			
Storage Temperature	-40° to 95° C Ambient			
Humidity	10% to 95% RH, Non-Condensing			
Input Power	110/220 VAC, 47-63Hz			
Electrical Interference	NEMA ICS 2-230 Showering Arc Test			
Electrical Tolerance	ANSI C37.90a-1974 (SWC) Surge With-Stand Capability Test			
Vibration	5 - 55 Hz 2G for 2 hours in the X, Y, and Z axis			
Shock	10G for under 12ms in the X, Y, and Z axis			
Serial Communications	Port 1 RS232; Port 2 RS422/485			
External Dimensions	36.1" x 11.7" x 2.7" (936.44 x 156.13 x 69.85mm)		72.1" x 11.7" x 2.8" (1831.31 x 144.02 x 69.85mm)	
Weight	8 lbs	8.5 lbs	15 lbs	16 lbs

*\*Units with the suffix "E" have the Ethernet Communication option.  
Units with the suffix "D" have the DeviNet option.  
Units with the suffix "P" have the Profibus option.*

## EZMarquee Hardware Specifications (Continued)

EZMarquee Model Specifications				
Part Number	EZMR-4L20C EZMR-4L20C-E EZMR-4L20C-D EZMR-4L20C-P	EZMT-4L20C EZMT-4L20C-E EZMT-4L20C-D EZMT-4L20C-P	EZMR-4L40C EZMR-4L40C-E EZMR-4L40C-D EZMR-4L40C-P	EZMT-4L40C EZMT-4L40C-E EZMT-4L40C-D EZMT-4L40C-P
Display Type	RED LED	TRI-Color LED	RED LED	TRI-Color LED
Specification	4 Lines of 20 Char (2") max.		4 Lines of 40 Char (2") max.	
Max. Viewable Distance	400 Feet with 2" Characters			
Power Consumption	55 watts	100 watts	100 watts	180 watts
Agency Approvals	UL, CUL, CE, pending			
Enclosure	NEMA 12			
Operating Temperature	0° to 60° C Ambient			
Storage Temperature	-40° to 95° C Ambient			
Humidity	10% to 95% RH, Non-Condensing			
Input Power	110/220 VAC, 47-63Hz			
Electrical Interference	NEMA ICS 2-230 Showering Arc Test			
Electrical Tolerance	ANSI C37.90a-1974 (SWC) Surge With-Stand Capability Test			
Vibration	5 - 55 Hz 2G for 2 hours in the X, Y, and Z axis			
Shock	10G for under 12ms in the X, Y, and Z axis			
Serial Communications	Port 1 RS232; Port 2 RS422/485			
External Dimensions	36.577" x 11.720" x 2.750" (929.06 x 297.69 x 69.85mm)		72.450" x 11.720" x 2.750" (1840.24 x 297.69 x 69.85mm)	
Weight	15 lbs	16 lbs	30 lbs	32 lbs

*\*Units with the suffix "E" have the Ethernet Communication option.*

*Units with the suffix "D" have the DeviNet option.*

*Units with the suffix "P" have the Profibus option.*

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# 3

## **Chapter 3: Installation, Wiring, and Connection Information**

- Installation Considerations
  - General Environmental Installation Considerations
  - Environmental Specifications
  - AC Line Noise
  - Dealing with AC Line and Other Electrical Noise
- Wiring and Connections
- Accessing Connectors and Switches
- Setting Up DIP Switches
- Serial Communication Ports
- Connecting EZMarquee to PLCs
- Power Input Terminals
- Verification Setup
- Mounting Precautions
- Mounting
- Dimensions for Various EZMarquee Models

### 3.1 Installation Considerations

EZAutomation products have been designed and tested for operation in the most demanding industrial environments. Modern solid-state industrial controls are complex electronic equipment that operates at low levels of voltage and current, coexisting with components that operate at much higher levels of power. The difference in operating power characteristics between the high and low power control devices creates the possibility of unwanted signals being generated causing interference. The interference, which is a by-product of electrical noise, is not present at all times. However, it appears at random and during brief periods of time can cause disruptions and errors in the operation of a control system.

Enhancement of a system's noise level immunity, and its tolerance to other environmental hazards can be accomplished by following proper system installation guidelines. The recommendations are of a general nature and constitute good, solid state industrial installation practice.

#### 3.1.1 General Environmental Installation Considerations

Avoid installing EZMarquee in areas where the following conditions may exist:

- Environmental temperatures above or below those specified by the system being installed
- Prolonged exposure to humidity and liquids which may be sprayed or splashed on the equipment
- Dusty environments where airborne particles may accumulate on equipment causing reduction of heat dissipation, and reduction in effective electrical spacing between components
- Areas of excessive vibration
- Areas of high-radiated electrical noise, such as near fields of transmitting antennas and areas in close proximity of arc welding stations

### 3.1.2 Environmental Specifications

The following table lists the environmental specifications that generally apply to the EZMarquee. However I/O module operation may fluctuate depending upon the ambient temperature and your application. Please refer to appropriate specifications in the EZMarquee User Manual.

Parameter	Ratings
Operating Temperature	-10 to 60 °C
Storage Temperature	-40 to 95 °C
Humidity	10 to 95% Relative Humidity, Non-condensing
Vibration Resistance	5 to 55 Hz, 2G for 2 hours in X, Y, and Z axis
Shock Resistance	10G for under 12 ms in X, Y, and Z axis
Electrical Noise	ANSI C370.90a-1974 (SWC) Surge withstand capability test

### 3.1.3 AC Line Noise

The AC power available in house outlets and at sub-stations powering industrial and commercial applications is generally generated at a power station miles away from the point of usage.

The power is “noise” free at the time it is being generated, and meets all specifications for amplitude, frequency, harmonic distortion and others. However, the same specifications cannot be guaranteed at the point of usage, due to the disruptive factors associated with the transmission from generator to consumer.

While the generated power output starts its journey “clean,” and free of noise, it is “polluted” by radio and TV frequencies, spikes from reactive kickbacks due to switching heavy inductive and capacitive loads in transmission lines, and from other interference.

As a result, critical and sophisticated electronic controls may malfunction; false triggering, user program loss and/or modification may occur and even catastrophic failure.

In view of the problems associated with AC power, it is strongly recommended the source, transmission and final end use be given stringent consideration before any commitment to supply the system is given. Some typical problems in power line usage are:

- **Blackouts:** This is the total loss of power. Generally, they are easy to detect and if a situation arises where they cannot be tolerated then an un-interrupted power supply (UPS) should be used.

- **Brownouts:** This occurs when there is a reduction in line voltage amplitude. If this reduction falls within operating limits, no adverse effects will be experienced. However, if they are frequent and severe, a UPS system should be considered.
  
- **Voltage Fluctuations:** These are amplitude variations (rapid or slow) and can occur above or below the specified limits. Over-voltage conditions may damage equipment if the duration of the voltage condition is lengthy. It may cause disruptions, data loss, and production down-time.
  
- **Noise Spikes:** Noise spikes and other unwanted signals superimposed on the AC line voltage waveform are the most common problems associated with the distribution of the power from its grid system. The amplitude of these signals can be from several hundred to a few thousand volts and the pulse width from about one to 200 microseconds. Because of their short duration and random occurrences, these harmful signals are difficult to detect.

### 3.1.3 Dealing with AC Line and Other Electrical Noise

The best option to effectively eliminate or greatly reduce voltage fluctuations, spikes and line noise is through the use of isolation, constant voltage or power line conditioner transformer.

Isolation transformers are passive devices that do not have DC paths between the circuits they isolate. The transformer provides attenuation to spikes and common mode noise, but has virtually no effect on transverse mode noise and does not provide protection for voltage fluctuations.

Constant voltage transformers are static Ferro-resonant transformers that can accept fluctuating AC voltage input (within a specified range) and maintain a constant voltage output. The transformers provide good attenuation to transverse mode type noise, however, are ineffective for attenuation of common mode type signals.

Power line conditioning transformers provide good line regulation and are effective in providing attenuation to both common and transverse mode types of noise.

All of the mentioned transformer types are available by various manufacturers and they come in different varieties of operating voltages, power ratings, and frequencies.

Make sure that the 110-220VAC Power Source for the EZMarquee is a clean noise-free power source used for low voltage control systems as described above. It should be isolated from heavy inductive or RF loads such as motors, motor starters, and welding and other RF equipment. EZMarquee's power source should be either the same as your PLC or same quality.

The power cable and unshielded communication cable must be run in a separate conduit or wiring harness. The shield at both ends should be connected to the Earth Ground Terminals to minimize extraneous electrical noise pick-up.



**CAUTION!** Make sure you connect the Earth Ground wire to the Earth Ground Terminal on EZMarquee to avoid possible shock.

### 3.2 Wiring and Connections

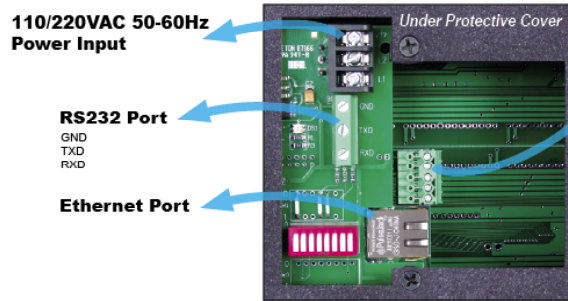
This section of the manual provides information about preparing the marquee for operation, such as setting the DIP Switches, connecting power and preparing to interface the EZMarquee for serial communication.

### 3.3 Accessing Connectors and Switches

EZMarquee has an Access/Cover plate on its backside. This is a gasketed cover plate with two sealed grommets for power and communication cables. The gasket and the grommet seal must be intact to retain NEMA 12 rating. Once you remove the cover plate by removing the four access screws on the plate, you have access to wiring terminals and an 8-position DIP switch for marquee parameter selection.



**CAUTION!**  
Please don't touch the 5-position DIP switch above the 8-position DIP switch, that is for factory use only!



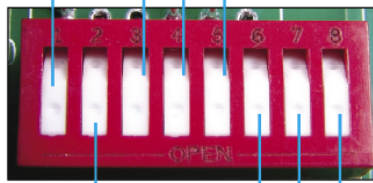
**Baud Rate**

Switch 1	Baud
0 =	9600
1 =	38.4K

**Default Settings**  
Baud Rate: 9600  
Group Selector: 1  
Unit Selector: 1  
Character Set: U.S.

**Group Selector**

Switch 2	Group #
0 =	1
1 =	2



**Unit Selector**

Switches	Unit Number
5 4 3	
0 0 0	1
0 0 1	2
0 1 0	3
0 1 1	4
1 0 0	5
1 0 1	6
1 1 0	7
1 1 1	8

**Character Set**

Switches	Char. Set
8 7 6	
0 0 0	U.S.
0 0 1	Cyrillic
0 1 0	French
0 1 1	German
1 0 0	English
1 0 1	Danish
1 1 0	Swedish
1 1 1	Kana

### 3.4 Setting up DIP Switches



**Note:** The Unit Number and Group Number selection is applicable only if you use either the RS422/485 port of the marquee or EZMarquee with Ethernet, DeviceNet, or Profibus options.

**Group and Unit Number:** Each EZ Marquee is assigned a unit address. A unit address is programmed into each message to specify which unit or units should display that message. The unit address of an EZ Marquee is defined by the setting of the Dip Switch located inside the back panel under the access plate. This can be changed at any time to alter the address of the unit. Each unit address consists of two identifiers—a Group and a Unit Number. The unit addresses are divided into Group and Unit Numbers to allow the message controller address selected subsets of all the Marquee displays connected to it.

#### Group Selector

Switch 2	Group #
0 =	1
1 =	2

When Switch #2 is “OFF” it sets EZMarquee’s Group Number as 1, whereas when it’s set to “ON” it sets it to Group Number 2.



**Note:** Changes to DIP switches are only acknowledged at power-up.

#### Baud Rate

Switch 1	Baud
0 =	9600
1 =	38.4K

**Baud Rate:** The Baud Rate of the EZ Marquee determines how fast serial data will be communicated to the display. **The Baud Rate of the EZMarquee should match with the device that will be sending serial data to the display.**

#### Default Settings

Group Selector: 1

Baud Rate: 9600

Unit Selector: 1

#### Unit Selector

Switches			Unit Number
5	4	3	
0	0	0	1
0	0	1	2
0	1	0	3
0	1	1	4
1	0	0	5
1	0	1	6
1	1	0	7
1	1	1	8

Switches 5, 4, and 3 set Unit Numbers as show in the table to the left.



**Note:** If your PLC does not have an RS422/485 port and you need only point-to-point communication, you can connect the RS232 port of the PLC to the RS232 terminals of the EZMarquee.

### 3.5 Serial Communication Ports

All EZMarquees have two-built-in communication ports; one for RS232 and one for RS422/485. Either of the ports can be used to send messages to an EZMarquee.

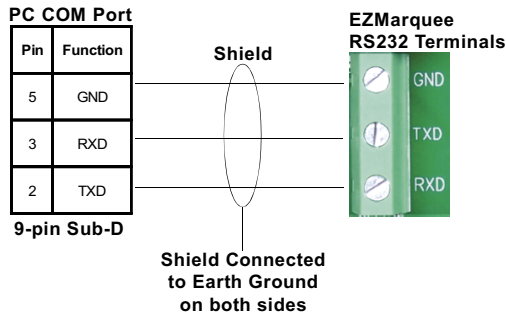
#### 3.5.1 Communication Using RS-232

RS-232 is normally used for distances of under 50 feet and for Point-to-point communication.

**RS-232 Connector:** The RS-232 port is a three-position terminal block on the EZMarquee. Refer to the terminal block table below for the positions.



**CAUTION!** Please be sure to connect the shield of the RS232 cable to Earth Ground on the EZMarquee as well as chassis GND of enclosure that houses the Message Controller.



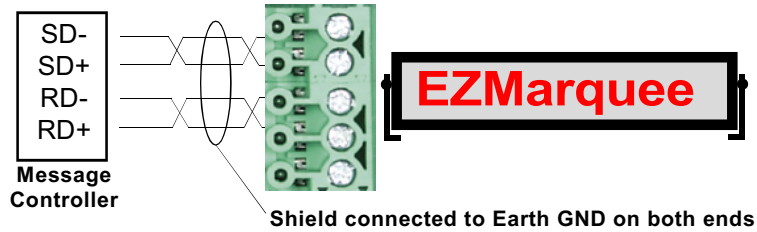
#### 3.5.2 Wiring RS-422 to the Marquee

EZMarquee's RS422 port can be used to network up to 16 marquees on a single RS422 network. In order to use RS422 port for communicating with a PC, use an appropriate RS232 to RS422 Converter on PC side.

The following diagram illustrates the required connections for linking multiple or single displays.



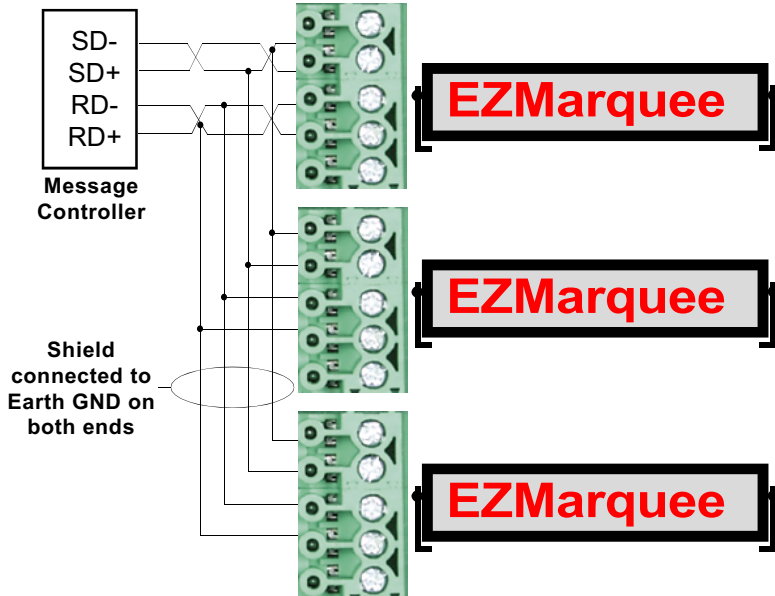
**Note:** For connecting multiple marquees to a computer's COM port, you need an RS232 to RS422/485 convertor.







**Note:** Message Controller could be a PLC, PC, or an Embedded Controller.



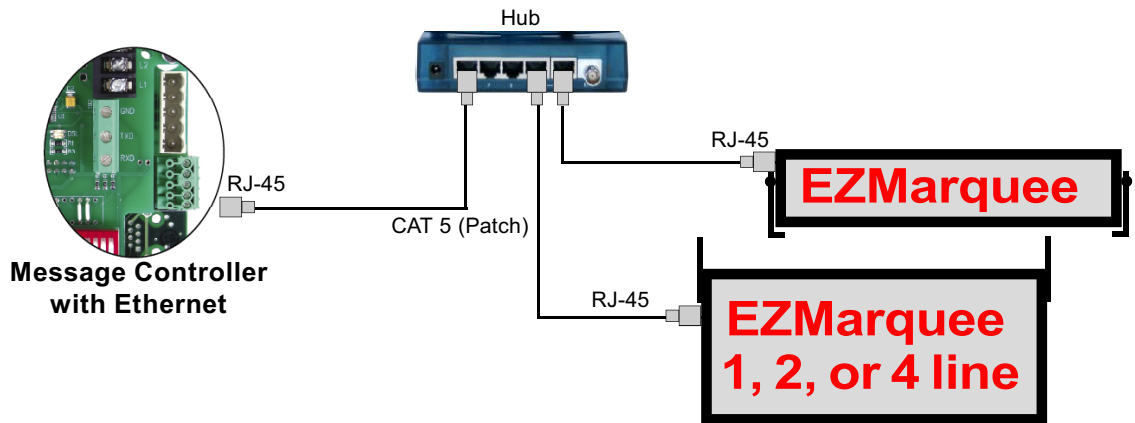
**CAUTION!** Don't connect the GND terminal of the EZMarquee RS422 Port to any GND. Also, please be sure to connect the shield of the RS422 cable to Earth Ground on the EZMarquee as well as chassis GND of enclosure that houses the Message Controller.

### 3.5.3 Connecting EZMarquee over Ethernet

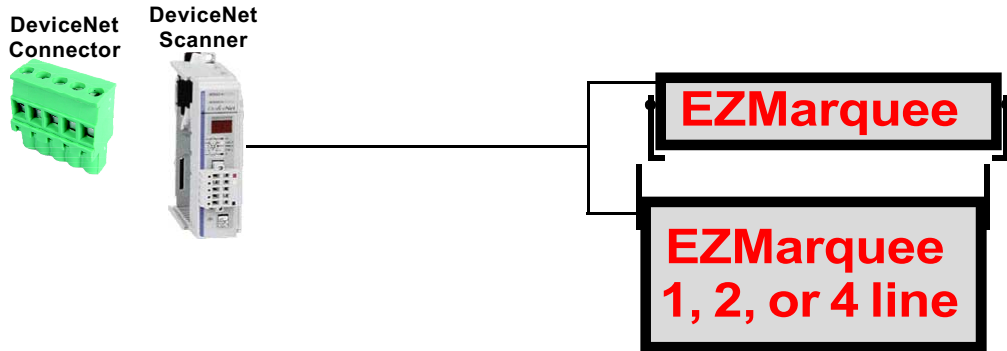
EZMarquee's Ethernet-enabled models are rated to handle 10/100 Base-T speed with single drops that can be up to 100 meters. The maximum number of EZMarquees connected on Ethernet is network dependent as every EZMarquee will have its independent IP Address along with group and unit number.

#### Wiring EZ Marquee to Ethernet Port (RJ-45 port)

The figure below illustrates the required connections for communication between EZMarquee and a PC over RJ-45.

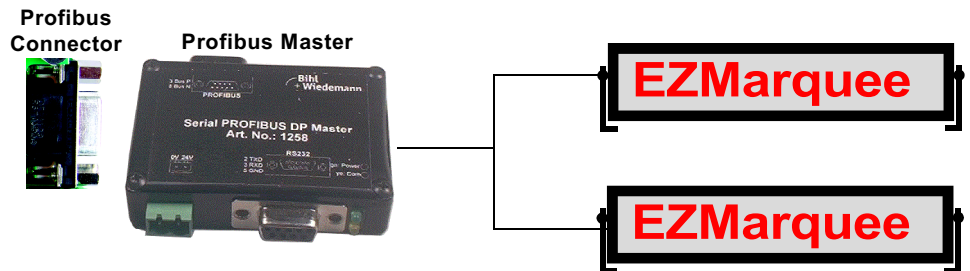


### 3.5.4 DeviceNet Connections



**CAUTION!** When connecting to the DeviceNet connection inside the EZMarquee, you will need to provide a DeviceNet mating connector inside the cover plate. In order to maintain NEMA 12 rating, you will need to crimp on this DeviceNet connector after you pull the cable through the grommet.

### 3.5.5 Profibus Connections

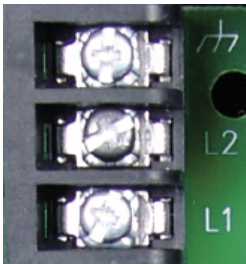


### 3.6 Connecting EZMarquee to PLC

Messages can be sent to EZMarquee from any PLC such as Allen Bradley's MicroLogic, SLC500, Compact Logic, ADC's DL06, Siemens S7, and GE Versamax.

### 3.7 Power Input Terminals

EZMarquee's power input is 110-220VAC @ 50-60Hz. Three terminals are provided for connecting operating power to the unit. These terminals are located on the Control Board (see the figure below). Power Input terminals are labeled L1, L2, and chassis ground ( $\perp$ ). Always connect the ground terminal to the safety ground.

Power Input Terminals	Pin	Description
	Chassis	GND (Ground)
	L2	Neutral
	L1	Live

### 3.8 Verification of Setup

After the EZMarquee has been installed according to the Wiring and Mounting Instructions, it can be powered up. On power-up, EZMarquee displays its current settings which can be changed through DIP switches. The following information is displayed on power-up of an EZMarquee.

- Communication Protocol (ASCII)
- Revision A (or whichever revision you're currently installing)
- Character Size (2" Default)
- Group and Unit Number (01 and 001)
- Baud Rate (9600)

### 3.9 Mounting Precautions

**Caution!**

EZMarquee displays are for indoor use only and should not be continuously exposed to direct sunlight. For the integrity of the enclosure, do not drill holes or modify the enclosure.

Before mounting and servicing EZMarquee please remove power from the display!

EZMarquee is housed in a NEMA 12 enclosure. When properly mounted with the right gaskets, mounting plates, and grommets. These marquees have an efficient power management system and thus can be mounted practically anywhere as long as the surrounding temperature is below 60 °C. EZMarquee is also extremely light-weight as compared to other marquees. Please check the weight in the specifications.

**Caution!**

When mounting onto a metal structure, make sure that the mounting plate and the aluminum extrusion of the EZMarquee have a solid connection to Earth Ground. You may have to scrape off the paint from connecting metal surfaces to ensure a good metallic connection. We recommend that you check this connection with an Ohm meter to maximize the electrical noise immunity of EZMarquee.

### 3.10 Mounting

The EZMarquee is shipped to you with two different styles of mounting brackets:

1. Up to 2 Line EZMarquees have a Rotatable Mounting bracket that allows it to be mounting on top of a machine or on a wall or hung from a ceiling.

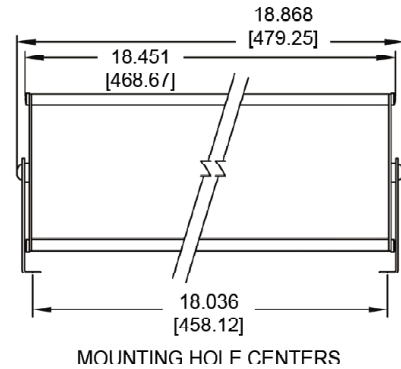
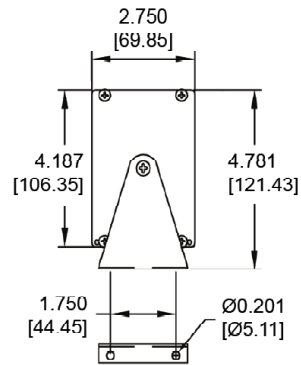


2. Bigger 4 Line marquees come only with mounting brackets that allow it to be hung from a ceiling. You can add your own brackets if you want to mount these on top of a machine or on a wall.

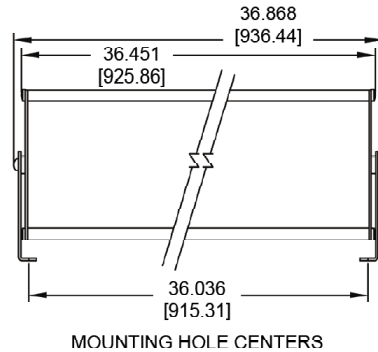
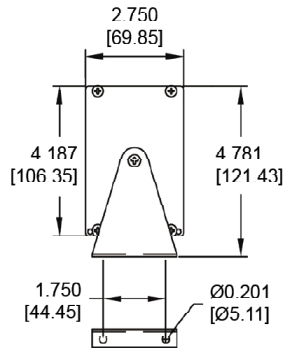


### 3.11 Dimensions for Various EZMarquee Models

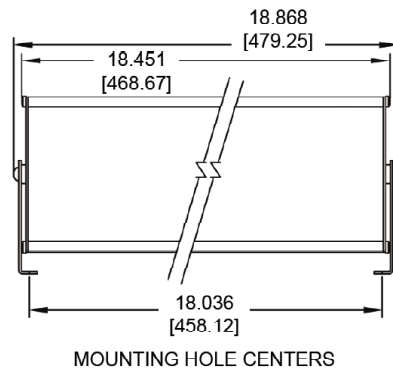
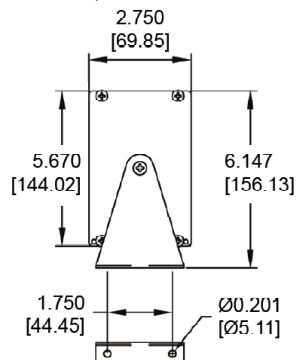
#### 1Line 10 Characters



#### 1 Line 20 Characters

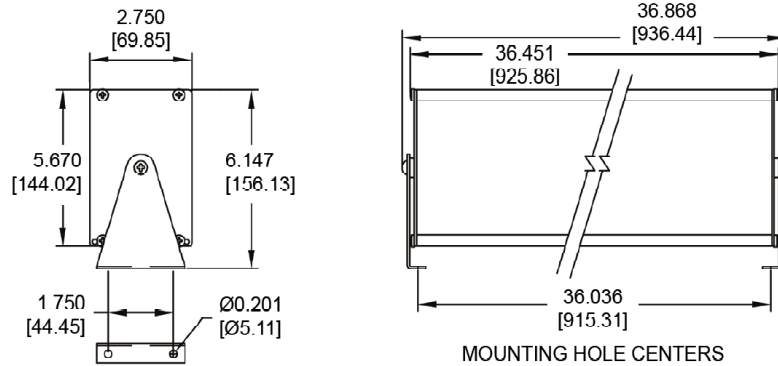


#### 2 Lines, 10 Characters

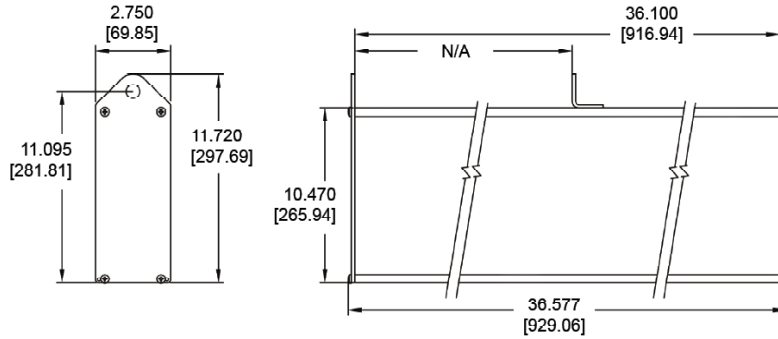


**EZMarquee Models Dimensions (Continued)**

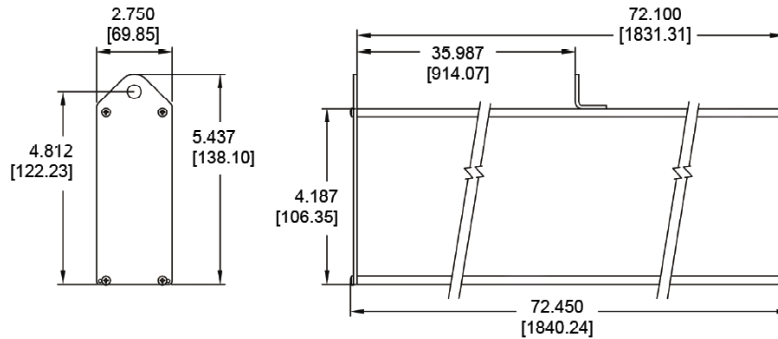
**2 Lines 20 Characters**



**4 Lines 20 Characters**



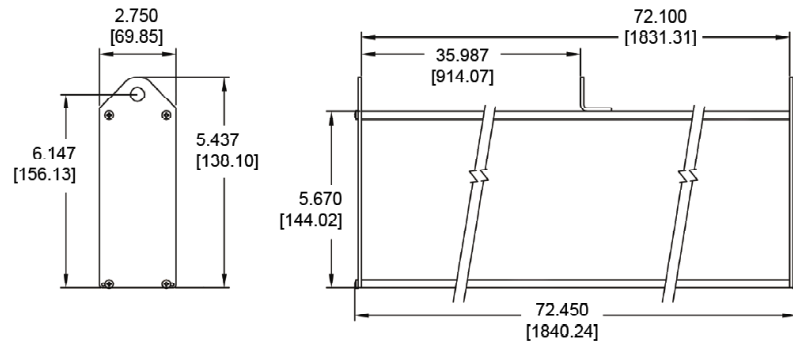
**1 Line 40 Characters**



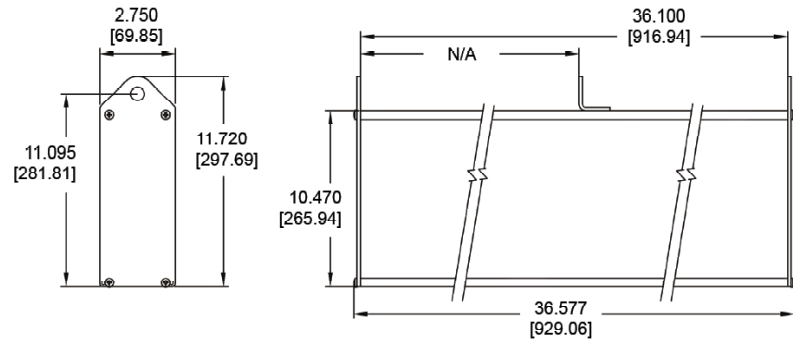


**EZMarquee Models Dimensions (Continued)**

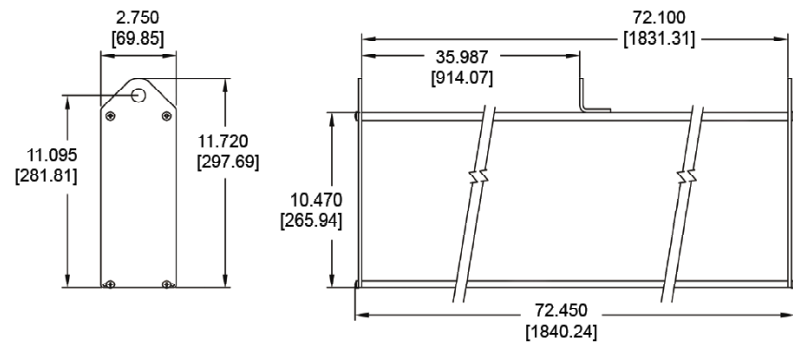
**2 Lines 40 Characters**



**4 Lines 20 Characters**



**4 Lines 40 Characters**



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# 4

## **Chapter 4: ASCII Instructions and Software**

- Introduction to ASCII Protocol
- EZMarquee Software
- Cursor Positioning For Messages
- Valid ASCII Commands Accepted By EZMarquee
- ASCII Command Interpretation
- Examples

### 4.1 Introduction to ASCII Protocol

EZMarquee's ASCII protocol transmits information using ASCII characters only and uses ASCII control codes. Using this ASCII protocol, an intelligent device like a computer, a controller, or a PLC can formulate messages and their appearance (scrolling, blinking, character size, color, etc.) to display on an EZMarquee.

When a message comprising of ASCII commands is sent to an EZMarquee, it is displayed only if interpreted properly. If the message sent does not comply with EZMarquee's ASCII protocol, EZMarquee might not react properly. Also, ASCII commands sent to EZMarquee are **case sensitive**. There is no handshaking with a master device. Therefore, it is recommended that you take advantage of our Free EZMarquee Software for creating ASCII strings with proper ASCII commands (see the following page). Once you are done creating ASCII strings through the String Generator software, you can paste the created ASCII strings in PLC instructions or any other intelligent device that you might be using for sending messages to the EZMarquee.

All EZMarquees have two built-in communication ports (RS232 and RS422/485) both of which can be used to receive ASCII command strings. EZMarquees can **ONLY** interpret messages sent in ASCII format. Therefore, it is important to understand how EZMarquee interprets ASCII strings. This chapter will describe in detail how to formulate messages using ASCII protocol that can be sent to an EZMarquee.

## 4.2 EZMarquee Software

EZMarquee Software for EZMarquee is an available tool which can be utilized to generate messages in ASCII protocol along with all the necessary commands. The software is easy to use and will allow you to create messages (along with the information needed for scrolling, blinking etc) without knowing anything specific about ASCII protocol. If you are not familiar with EZMarquee ASCII protocol, we recommend that you take advantage of this tool. The EZMarquee software is available as a **FREE** download from EZAutomation's website [www.ezautomation.net](http://www.ezautomation.net).

The EZMarquee software can be used to configure an EZMarquee, preview messages, and generate ASCII strings. These strings can be simply copied and pasted in any PLC's ladder logic or any other intelligent device being used to send messages to your EZMarquee. Once you've downloaded the free EZMarquee Software, perform the following **Three Simple Steps** to configure your EZMarquee:

### 3 Simple Steps to Configure Your EZMarquee

#### Step 1

Set up  
Communication  
Parameters

#### Step 2

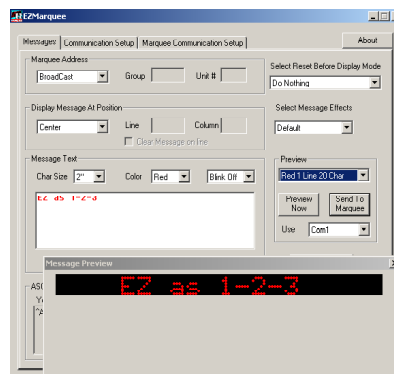
Type in  
Your Message

#### Step 3

Preview the  
Message

1. Configure EZMarquee to **Set Up Communication Parameters** along with Group and Unit Number if a network of marquees is present.
2. **Type in Your Message** along with its attributes (character size, color, and effects like scrolling or blinking).
3. **Preview the Message** to make sure it appears as you want it to and then just copy the generated ASCII string using the Windows® copy feature and paste the string into your desired controller's logic.

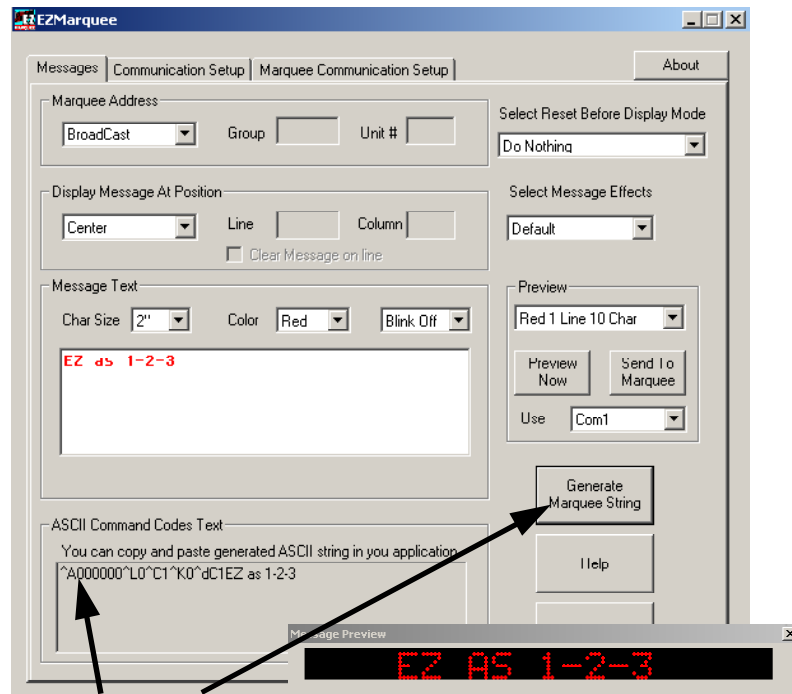
The EZMarquee software can also be used for testing EZMarquees. Just simply connect an EZMarquee to your computer's serial port (see Chapter 3 for wiring details) and you will be directly connected to the EZMarquee for sending messages.



### Using EZMarquee Software to Configure EZMarquee

To configure your EZMarquee using the Free EZMarquee Software, perform the following **3 Simple Steps**:

1. Configure EZMarquee to set up communication parameters and addresses if in a network of marquees.
2. Type in your message along with its attributes like character size, color, and effects like scrolling or blinking. Preview the message to edit any changes.
3. Copy the ASCII string and paste to the appropriate line in your ladder logic.



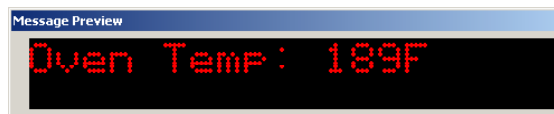
We make it EZ to generate ASCII Strings

The Message Preview window shows you what your message will look like instantly.

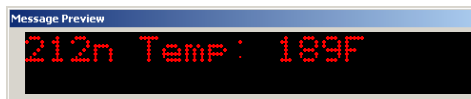
### 4.3 Cursor Positioning For Messages

Before we introduce the EZMarquee's ASCII command set, it is important to understand how the positioning of messages works. Understanding this properly will allow proper operation and positioning of messages on an EZMarquee.

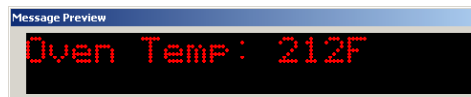
Let's take the example of a 2 Line, 20 characters per line EZMarquee (model# EZMR-2L20C). This EZMarquee is capable of displaying 20 2-inch (2") characters per line max and has 2 lines total. If we send a message "Oven Temp: 189F" to this marquee, in its default mode after power-up, it will show as follows:



Now if we send another message "212" without specifying cursor position (ASCII Command: ^Mrrcc; will be described in detail later in this section), it will be displayed as follows:



Now if we take a step back and send the message with cursor positioning command; we can display the message "212" as follows:



Or we can display another message "Temp Over Shoot" on next line using 'Select New Line' (ASCII Command: ^In) as follows:



Whenever a character is sent to EZMarquee it is written to the current "cursor position", which is the very next character space on an EZMarquee after a message is displayed, unless specified by an ASCII command to do otherwise. Once a new character is sent to EZMarquee, the current "cursor position" is advanced. All subsequent characters are written on the right side after each other unless specified otherwise via an ASCII command.

There are many ASCII commands to position the cursor properly, which will be described in next section in detail, including "Reset Display, Position Cursor, Select New Line, Select Wrap, Select Number of sticks per line, and Position Cursor without Clearing the Line".

#### 4.4 Valid ASCII Commands Accepted by EZMarquee

The table below provides a list of all the valid ASCII commands accepted by EZMarquee.

Valid ASCII Commands	
^Agguuuu	Selecting Unit and Group Number
^En	Resetting Display
^Hrrcc	Cursor Positioning With Line Clearing
^Mrrcc	Cursor Positioning Without Line Clearing
^In	Cursor Positioning at Carriage Return
^Jn	Selecting Text Wrap
^Cn	Selecting Center Mode
^dCc	Selecting Character Color
^Ln	Selecting Number of Sticks per Line
^Kn	Selecting Character Size
^Bn	Selecting Blink Mode
^Xn	Selecting Blink Delimiters On/Off
^Gbbcc	Selecting Blink On/Off Rate
^Dn<message text>^N	Displaying Scrolling Text
<i>All ASCII Commands listed above are Case Sensitive.</i>	



**\*Note: Selecting Number of Sticks per Line Command**

*This ASCII command is used to select the number of physical lines (sticks) on an EZMarquee to be utilized as one display line. This allows you to allocate multiple lines (sticks) to be used as a single line when using 4", 6", 8", and 8" narrow font sizes.*



## 4.5 ASCII Command Interpretation

As mentioned earlier, EZMarquees only accept ASCII protocol for receiving messages. ASCII protocol consists of ASCII characters only along with ASCII commands which always start with a “^” (circumflex) symbol followed by the command to perform a special function on subsequent messages to be displayed on the EZMarquee.

Let’s take the example of the “Select Unit” ASCII command which has the following syntax:

**^Agguuuu**



**Note:** Current EZMarquee models have only two groups and 8 unit numbers per group. Two digit group numbers and four-digit unit numbers for future expansion.

If using multiple EZMarquees, this ASCII command selects an EZMarquee based on its assigned Group and Unit Number. In order to get familiarized with ASCII commands it is important to know how these commands are formulated.

**^** Lets EZMarquee look for an ASCII command right after this symbol  
**A** ASCII command to perform necessary function  
**gg** User Specified Parameter  
**uuuu** User Specified Parameter

Thus, when the ASCII String “**^A010001HELLO**” is sent, the only message that will be displayed by an EZMarquee with pre-assigned Group Number of “01” and Unit Number of “0001” will be “**HELLO**”. Also note that that the character “A” and the digits “010001” are not displayed because they are part of the ASCII command syntax. For proper formulation of messages to be displayed on an EZMarquee, it is important to pay attention to the syntax of every ASCII command.

## 4.6 Examples

In this section we will provide some examples to get you familiarized with EZMarquee's ASCII protocol. As mentioned earlier, you can take advantage of our FREE String Generator software available at EZAutomation's website [www.ezautomation.net](http://www.ezautomation.net).

For simplicity, let's take a 2 Line 10 characters per line EZMarquee. We'll further assume that this EZMarquee is connected to an intelligent device e.g. a computer from where these ASCII strings are being sent from. In the case of a computer, the String Generator Software or Hyper Terminal can be used to send messages. All of the following examples will be based on this size.

### 1. ^E1Test 123

On power-up all EZMarquees assume to be the only EZMarquee present and automatically process any commands sent to them unless a message is sent with Group and Unit Numbers. When a message with Group and Unit Numbers is sent, EZMarquee will only respond to messages which are specifically addressed as per its assigned Group and Unit Number. In this example, "**^E1**" clears the display, homes the cursor, and resets all parameters modified by ASCII protocol.

Once the display is cleared, it will show "Test 123" on the first line of the display.



### 2. ^E1^M0200Test 123

**^E1** will clear the whole display, home the cursor, and reset all the parameters modified by ASCII protocol; and **^M0200** will position the cursor on Line 2 Column 0.

"**Test123**" will appear on the very first column of Line 2.



### 3. ^A000000^E0^I1^C1This is^NTest Msg

**^A000000** Selects all the units in every Group (broadcast); **^E0** clears the whole display and homes the cursor; **^I1** sets the cursor to advance to the next line when **^N** (carriage return) is entered; and **^C1** turns the centering mode on for all of the following messages.

“**This is**” will be centered on line 1 and “**Test Msg**” will be centered on Line 2 of all the EZMarquees connected on the network.



### 4. ^A020007^E0Oven: 01^NTemp: 199

**^A020007** Selects an EZMarquee with Group #02 and Unit #07; **^E0** clears the display and homes the cursor; and **^N** is carriage return.

“**Oven: 01**” will be displayed on line 1 and “**Temp: 199**” will be displayed on Line 2.



**Note:** Messages that require constant updating of certain segments of an EZMarquee display can be sent independently by utilizing different ASCII commands as follows:

**^Mrrcc:** Cursor positioning without line clearing

This command when used can be used to update/overwrite only a certain segment of the display instead of resending the same message over and over again. e.g. if you want to update just the temp as displayed in example 4 you could send the following ASCII message:

**^M0208200**

When the above message is sent, it will overwrite 199 with 200 (present on line=02 and column=08).

*This page intentionally left blank.*

5

## **Chapter 5: Connectivity to PLCs and Control Network**

- Connecting EZMarquee to Different PLCs
- Integrating EZMarquee with EZPLC
- Sending Messages to EZMarquee from EZPLC
- Communication Parameters
- Connecting EZMarquee to DL06
- Connecting EZMarquee to MicroLogix
- Connecting EZMarquee to SLC 5/03, 5/04, or 5/05
- Connecting EZMarquee to Mitsubishi FX
- Connecting EZMarquee to Siemens S7

### 5.1 Connecting EZMarquee to Different PLCs

Most PLCs have a serial communication port. Based on the type of PLC, it either allows RS232 or RS422/485 type of communication interface. PLCs which have any one of these serial ports and is capable of sending ASCII type messages can be easily used to connect to an EZMarquee.

EZMarquees come equipped with two serial communication ports, RS232 port and RS422/485 port. The RS232 port can be used to establish a point-to-point communication interface with a PLC. On the other hand, the RS422/485 port of an EZMarquee can be used to integrate multiple EZMarquees on a single network.

The following chapter will describe in detail how to connect an EZMarquee to EZPLC along with major PLCs like Allen-Bradley, Siemens, Mitsubishi, and Direct Logic. For connectivity to Ethernet, DeviceNet and Profibus networks, refer to chapter 7 which describes in detail the steps necessary to connect an EZMarquee to any of these networks.

### 5.2 Integrating EZMarquee with EZPLC

As mentioned earlier, an EZMarquee can be connected to any PLC capable of sending messages over a serial port. However, when using a PLC other than EZPLC, you can use our EZMarquee software to generate ASCII strings which can be pasted in a PLC's ladder logic. Using this method is fairly simple to implement, but EZPLC has a special "Marquee Instruction" which makes EZMarquee implementation a lot simpler and faster than any other PLC.

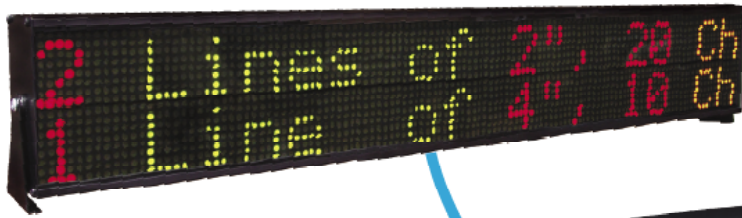
EZPLC's "Marquee Instruction" allows you to create a message database especially for EZMarquees. When populating this database, you can specify all the necessary information along with message attributes such as color, character height, flashing, scrolling, etc. without ever having to worry about generating ASCII strings and copying and pasting them in a PLC's ladder logic.

Every EZPLC has an RS422/485 port which can be used to plug-n-play with an EZMarquee using the extremely simple to use Marquee Instruction. EZPLCs Ethernet-enabled models can also be used to send messages to an EZMarquee over the corresponding Ethernet port of an EZMarquee.

Just following the **3 simple steps** on the following page to connect an EZMarquee with an EZPLC.

### 5.3 Sending Messages to EZMarquee from EZPLC

To configure and send messages to the EZMarquee from EZPLC, perform the following 3 Simple Steps:

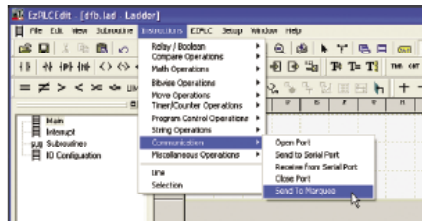


EZPLC has an RS422/485 port and an Ethernet port that can be connected to the corresponding port on the EZMarquee.

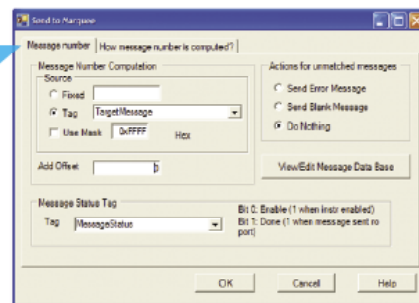
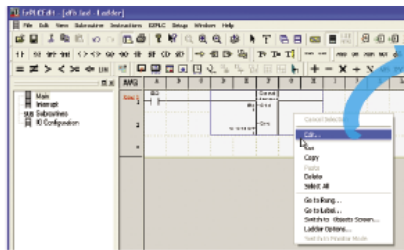
In addition, message programming and storage is much EZier as EZPLC has been designed from ground up to easily communicate with marquees.



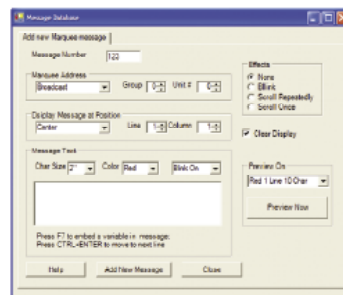
- 1 Use EZPLC's "Send to Marquee" instruction to initiate communication with EZMarquee.



- 2 Configure your message's source tag and status tag.



- 3 Control your message attributes without ever having to worry about ASCII format



Type in your message along with its attributes like character size, color, and effects like scrolling or blinking. Preview the message to edit any changes.

### 5.4 Communication Parameters

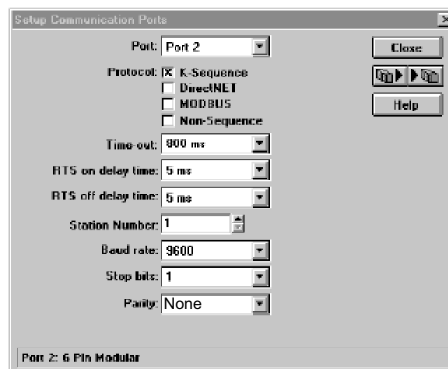
For communication between any PLC and EZMarquee, make sure that the communication parameters of the EZMarquee **match** with the PLC (or any other device) that will be sending serial data to EZMarquee. EZMarquee supports:

DIP Switch Selectable: 9600 (Default) or 38.4K  
 Data Bit: 8 bits  
 Parity: None (8, N, 1)  
 Stop Bit: 1

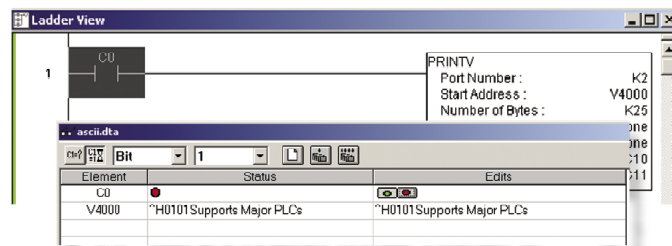
### 5.5 Connecting EZMarquee to DL06

To connect EZMarquee to DL06 for Serial Communication perform the following steps in DirectSoft Programming Software:

1. Set up the controller properties for serial communication.



2. Set up ladder logic and PLC tags. Use the **PRINTV** function to initiate ASCII command to trigger relevant messages. The example below illustrates this.

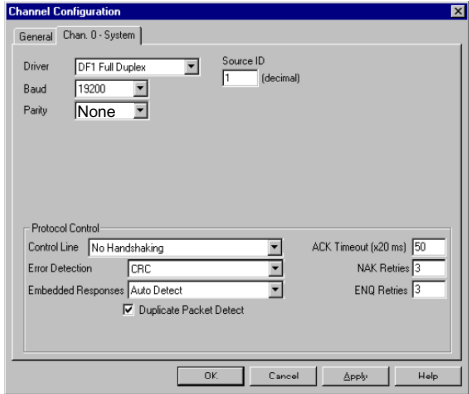




### 5.6 Connecting EZMarquee to MicroLogix

To connect EZMarquee to a MicroLogix PLC, perform the following steps in RSLogix Programming Software:

- 1. Set up the PLC properties for serial communication as shown below:



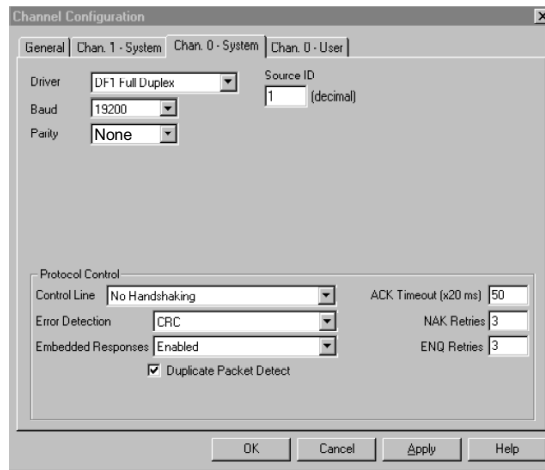
- 2. Create a string (ST) type file to insert ASCII/Hex Commands.
- 3. Set up ladder logic and PLC tags. Use the **AWT ASCII Write** function to initiate the ASCII command to trigger relevant messages. The example below illustrates this.



### 5.7 Connecting EZMarquee to SLC 5/03,5/04 or 5/05

To connect EZMarquee to a SLC 5/03, 5/04, or 5/05 PLC, perform the following steps in the Rockwell Programming Software:

1. Set up the PLC properties for serial communication.



3. Create a string (ST) type file to insert ASCII/Hex Commands.
4. Set up ladder logic and controller tags. Use the **AWT ASCII Write** function to initiate the ASCII command to trigger relevant messages. The example below illustrates this.



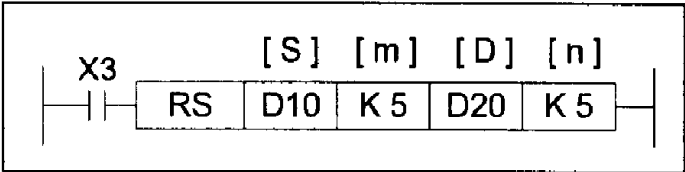
### 5.8 Connecting EZMarquee to Mitsubishi FX

To connect EZMarquee to a Mitsubishi FX PLC, perform the following steps in the Mitsubishi Programming Software:

- 1. Set up the PLC properties for serial communication.



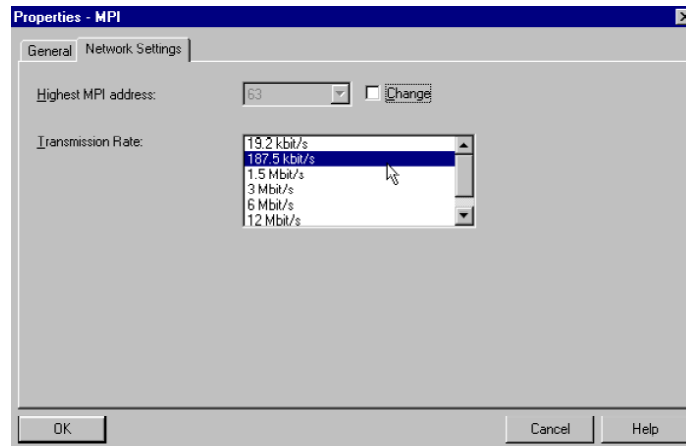
- 2. Set up ladder logic and controller tags. Use the **RS(FNC 80)** instruction to initiate the ASCII command to trigger relevant messages. The example below illustrates this.



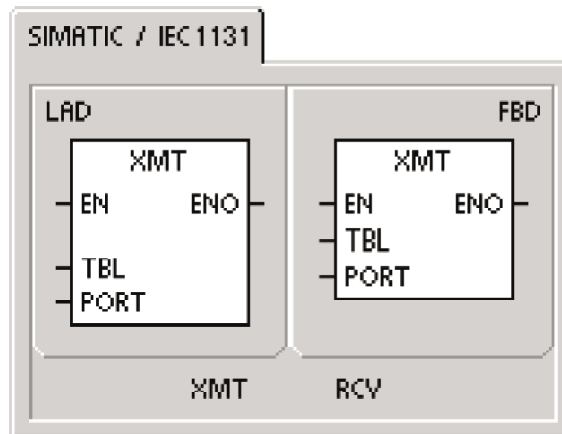
### 5.9 Connecting EZMarquee to Siemens S7

To connect EZMarquee to a Siemens S7 PLC, perform the following steps in the relevant Siemens Programming Software:

1. Set up the PLC properties for serial communication.



2. Set up ladder logic and controller tags. Use the **XMT** instruction to initiate the ASCII command to trigger relevant messages. The example below illustrates this.



# 6

## Chapter 6: Connectivity to Control Network

- Ethernet/DeviceNet/Profibus Connectivity
- Ethernet
  - Configuring EZMarquee for Ethernet Network
  - Sending Messages to EZMarquee over Ethernet
- DeviceNet/Profibus
  - Configuring EZMarquee for DeviceNet/Profibus Network
  - Sending Messages to EZMarquee over DeviceNet/Profibus
  - Input Area
  - Output Area
  - Operation Using DeviceNet/Profibus

## 6.1 Ethernet/DeviceNet/Profibus Connectivity

EZMarquees are available with Ethernet, DeviceNet, and Profibus communication interfaces. These network interface options can be used to connect to a single EZMarquee or network multiple EZMarquees on a control network. All these interfaces must be configured before EZMarquee can be utilized on any of the mentioned control networks.

In order to setup an EZMarquee for operation on Ethernet, DeviceNet, or Profibus, the user is required to setup parameters like the IP Address for Ethernet, MAC ID for DeviceNet, and Node Address for Profibus. These parameters can be setup either by using our easy to use EZMarquee software (available as a FREE download on our website [www.EZAutomation.net](http://www.EZAutomation.net)) or by sending ASCII strings through a utility like HyperTerminal.

All of the settings for a control network operation can only be setup using the serial RS232 or RS422/485 ports and cannot be setup by connecting an EZMarquee to a control network itself. All of the setup parameters are stored in the non-volatile flash memory of an EZMarquee and are retained through power cycles and do not require to be re-programmed unless changed you.

## 6.2 Ethernet

The following section will describe in detail steps necessary for sending messages to an EZMarquee over Ethernet.

### 6.2.1 Configuring EZMarquee for Ethernet Network

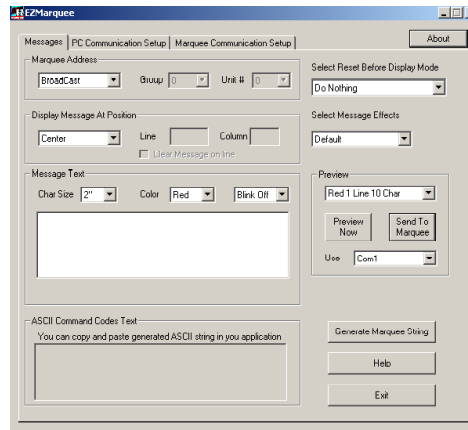
When connecting an EZMarquee to a control network over Ethernet, user is required to setup the following parameters:

- IP Address
- Subnet Mask
- Gateway

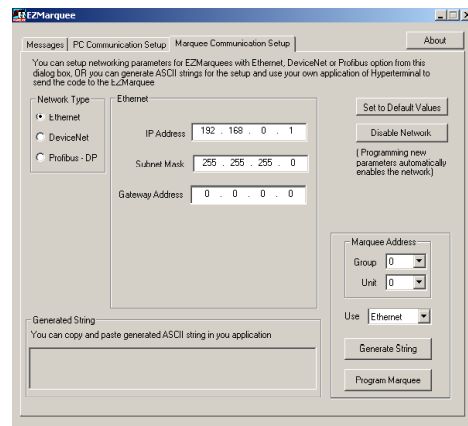
The most convenient way of setting up these parameters for EZMarquee is to utilize our EZMarquee software. Connect an EZMarquee to your computer using the COM port (refer to section 3.5.1 for wiring diagrams) and perform the steps on the following page.

**EZMarquee Software:**

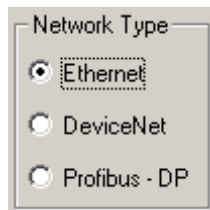
1. Install EZMarquee software (available FREE at our website [www.EZAutomation.net](http://www.EZAutomation.net)).



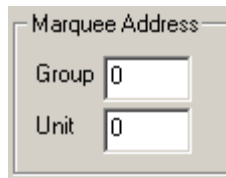
2. Click onto the **Marquee Communication Setup** Tab.



3. Select **Ethernet** in Network Type.



4. Assign an appropriate group and unit number in Marquee Address. This is the address of the marquee being programmed.



A dialog box titled "Marquee Address" with two input fields. The "Group" field contains the number "0" and the "Unit" field also contains the number "0".

5. Assign proper values to IP Address, Subnet Mask, and Gateway Address.
6. Click onto the **Program Marquee** button and you're done!



7. You can Disable the network interface by clicking on the "Disable Network" button should you need to do so. Programming new parameters automatically enables the network.



### Hyper Terminal

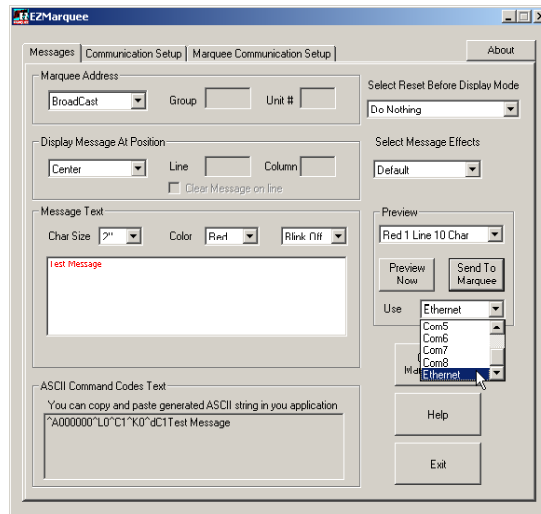
EZMarquee's Ethernet communication parameters can also be setup by sending ASCII strings through a utility like HyperTerminal. When utilizing Hyper Terminal, ASCII strings must be sent out in the following format:

S. No.	Parameters	Command	Example	Default values (for ^PIL instr)
1	IP Address	^P1Addd.ddd.ddd.ddd	^P1A192.168.000.001	192.168.000.001
2	Subnet Mask	^P1Mddd.ddd.ddd.ddd	^P1M255.255.255.000	255.255.255.000
3	Gateway	^P1Gddd.ddd.ddd.ddd	^P1G192.168.000.100	000.000.000.000
4	Load default	^P1L	Load default parameters (shown in default column)	
5	Disable Network	^P1Z	Disable Ethernet Interface. Programming new parameters would automatically enable the Ethernet interface	

*Use the number of digits shown in the command even if the parameter requires a fewer number of digits. Pad the parameter with leading zeros if necessary.*

### 6.2.2 Sending Messages to EZMarquee over Ethernet

Once Ethernet parameters are configured, you can use EZMarquee software to send messages through Ethernet. You can also use an intelligent device like PLC to send appropriate ASCII messages to the specified IP address of EZMarquee configured for use on Ethernet.



### 6.3 DeviceNet/Profibus

The following section will describe in detail the steps necessary for sending messages to EZMarquee over DeviceNet.

#### 6.3.1 Configuring EZMarquee for DeviceNet/Profibus Network

When connecting an EZMarquee to a control network over DeviceNet/Profibus, you are required to setup the following parameters:

DeviceNet

- MAC ID
- Produced Bytes (Send Bytes)
- Consumed Bytes (Received Bytes)
- Baud Rate
- Byte Order Control

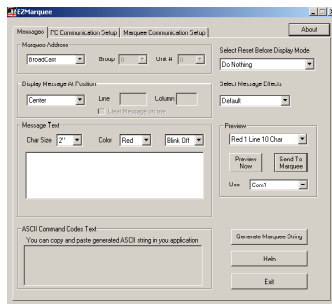
Profibus

- Node Address
- Output Bytes
- Input Bytes
- Baud Rate
- Byte Order Control

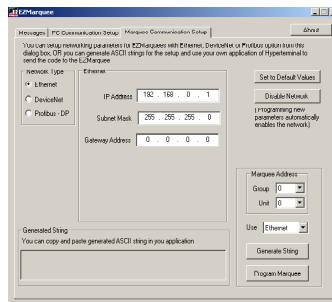
The most convenient way of setting up these parameters for EZMarquee is to utilize our EZMarquee software. Connect an EZMarquee to your computer using the appropriate wiring (refer to section 3.5.1 for wiring diagrams) and perform the following steps:

*EZMarquee Software:*

1. Install EZMarquee software (available FREE at our website [www.EZAutomation.net](http://www.EZAutomation.net)).



2. Click onto the **Marquee Communication Setup** Tab.



3. Select **DeviceNet/Profibus** in Network Type.

Two screenshots of the 'Network Type' dialog box. The left screenshot shows the 'DeviceNet' radio button selected. The right screenshot shows the 'Profibus - DP' radio button selected.

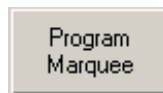
4. Assign an appropriate group and unit number in Marquee Address. This is the address of the marquee being programmed.

A screenshot of the 'Marquee Address' dialog box. It contains two input fields: 'Group' and 'Unit', both of which have the value '0' entered.

5. Select appropriate parameters for DeviceNet/Profibus.

Two screenshots of parameter configuration dialog boxes. The left screenshot is for 'DeviceNet' and the right is for 'Profibus'. Both dialogs show the following settings: MAC ID (1-63) / Node Address: 20; Data Timeout (0-255): 30 x 10 Seconds; Poll Time (0-255): 0 x 10 Seconds; Consumed Bytes: 32; Produced Bytes: 2; Output Bytes: 2; Baud Rate: 125 kb/s; Message Byte Order: LSB-MSB; Count and Status Byte Order: LSB-MSB.

6. Click the **Program Marquee** button and you're done!



7. You can disable the network interface by clicking on the "Disable Network" button should you need to do so. Programming a new parameter automatically enables the network.

**Hyper Terminal**

EZMarquee's DeviceNet/Profibus communication parameters can also be setup by sending ASCII strings through a utility like HyperTerminal. When utilizing Hyper Terminal, ASCII strings must be sent out in the following format:

*DeviceNet*

S. No.	Parameters	Command	Example	Default values (for ^P2L)
1	MAC ID	^P2Addd ddd = 000 to 063	^P2A020	020
2	Baud Rate	^P2Bddd ddd = 125, 250, or 500 (in KB)	^P2B125	125KB
3	Max Consumed Bytes (Receive Bytes)	^P2Rddd	^P2R032	32
4	Load Default	^P2L	Load default parameters (shown in default column)	
5	Disable Network	^P2Z	Disable DeviceNet Interface Programming new parameters would automatically enable the interface	
6	Byte Order Control (See Input area)	^P2W!N=0,1,2 or 3	^P2W0	0

*Profibus*

S. No.	Parameters	Command	Example	Default values (for ^P3L)
1	Node Address	^P3Addd ddd = 000 - 125	^P3A020	20
2	Baud Rate	^P3B???	^P3B???	12MB
3	Max Input Bytes (Receive Bytes)	^P3Rddd	^P3R032	32
4	Load Default	^P3L	Load default parameters (shown in default column)	
5	Disable Network	^P3Z	Disable Profibus Network interface Programming new parameters would automatically enable the interface	
6	Byte Order Control (See input area)	^P3W!N=0,1,2 or 3	^P3W0	0

## 6.4 Sending Messages to EZMarquee over DeviceNet/Profibus

Once DeviceNet/Profibus parameters are configured, you can start sending messages to EZMarquee by following the instructions described in this section. EZMarquees are configured to accept up to 120 Bytes from DeviceNet or Profibus networks, and write back 2 bytes to the network.

### 6.4.1 The Input Area

Input area (or consumed bytes in DeviceNet) is mapped as follows.

The number of bytes in this area is defined by the user by ASCII command ^P2Rnnn (DeviceNet) or ^P3Rnnn (Profibus), where nnn is the number of bytes. Table below assumes that 2N bytes have been allocated for the input area.

Word Offset	Description	
	MS Byte	LS Byte
0	Not used	Count Byte
1	Message-Char 1	Message-Char 2
2	Message-Char 3	Message-Char 4
3	Message-Char 5	Message-Char 6
.		
N-1	Message-char (2N-2)	Message-char (2N-1)
N	Not used	Controller Status Byte

*Example:*

If you want to display String "ABCD", and you have defined 8 bytes for the input area, the input area would look like the table below:

Word Offset	Description	
	MS Byte	LS Byte
0	Not used	4
1	A	B
2	C	D
3	Not used	Controller Status Byte

## 6.5 Byte Order Control

EZMarquee offers a “Byte Order Control” to work with controllers that may not have the message information arranged as shown in the above table. The command to control the Byte Order is ^P2Wn for DeviceNet and ^P3Wn for Profibus, where n can be 0 (default), 1, 2, or 3. **For most users the default value should work.**

The table below describes byte orders expected for different values of n. The examples after each row show how a count of 2 and message “AB” would be in the bytes.

*(Please note that majority of users would not change this from it's default values. Please try the default values before changing byte order).*

n	Numbers (Count & Status)		Characters (Message Bytes)	
	MS Byte	LS Byte	MS Byte	LS Byte
0 Example	High Order Byte 0	Low Order Byte 2	Char 1 A	Char 2 B
1 Example	Low Order Byte 2	High Order Byte 0	Char 1 A	Char 2 B
2 Example	High Order Byte 0	Low Order Byte 2	Char 2 B	Char 1 A
3 Example	Low Order Byte 2	High Order Byte 0	Char 2 B	Char 1 A

### Controller Status Byte:

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Not used	Not used	Not used	Not used	Not used	Not used	<b>OK to Read</b>	<b>Message Ready</b>

Bit0 and Bit1 of the byte are used for handshaking between the Network and the EZMarquee, so that the message is reliably sent to the EZMarquee.

### Message-Ready:

This bit is set by controller after the controller has written Count and message bytes. Controller can write these bytes only if the **Busy** and **ACK** bits in output status byte (see below) are cleared.

### OK-to-Read:

This bit is set when controller has its **Message-Ready** bit set AND the EZMarquee's **ACK** bit set to 1.

### Count Byte:

This byte contains the number of bytes used message area, i.e. number of characters that the current message has. For example if the current message in the message area is ^A010001Hello then the count byte will have a value of 13.

## 6.6 Output Area

The **Output area** bytes (Produced bytes in Device Net) are defined as follows:

Word Offset	Status Information	
	MS Byte (Byte 1)	LS Byte (Byte 0)
0	Do not use	EZMarquee Status Byte

The Byte Order control command controls byte order in input as well as output area. The mapping above is the default mapping and should work for majority of users. For those users, who need to change this order, please refer to table below which describes the byte order for possible values of n in command ^P2Wn or ^P3Wn:

n	Status	
	MS Byte (Byte 1)	LS Byte (Byte 0)
0 Example	High Order Byte 0	Low Order Byte Status
1 Example	Low Order Byte Status	High Order Byte 0
2 Example	High Order Byte 0	Low Order Byte Status
3 Example	Low Order Byte Status	High Order Byte 0

### EZMarquee Message Status Byte:

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Not used	Not used	Not used	Not used	Not used	Not used	<b>Busy</b>	<b>ACKnowledge</b>

#### Busy:

This bit is set to 1 by the EZMarquee when it is reading message byte from the Input area. EZMarquee reads the message (and sets this bit) only after it finds **OK-to-Read** bit set. Controller must not change the input area when this bit is set to 1. The bit is cleared when the Marquee has finished reading the message.

#### ACKnowledge:

EZMarquee sets **ACK** bit to 1 after it detects that the **Message-Ready** bit is set. The bit is cleared when EZMarquee detects that **OK-to-Read** bit is set.

## 6.7 Operation Using DeviceNet/Profibus

The bits in two status bytes are used for handshaking between the controller and EZMarquee. **Busy** and **ACK** bits in the Output (Produced area) are

controlled by EZMarquee and monitored by controller to determine its action. **OK-to-read** and **Message-Ready** bits are controlled by the controller, and monitored by the Marquee to determine its next action. Following table shows the status of EZMarquee bits and Controller required action for proper handshaking.

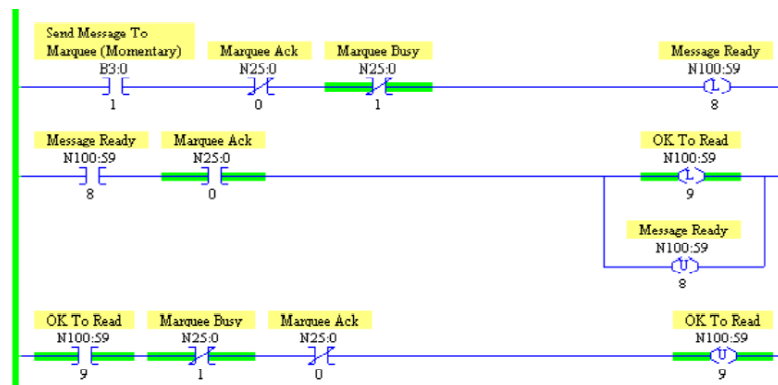
Step	Monitor Bits		Controller Action Description	Set/Clear bits	
	Busy	ACK		Monitor Busy and ACK bits from EZMarquee.	Message-Ready
1	0	0	- Monitor Busy and ACK bits from EZMarquee - When both are 0, write Count and Message Bytes, and then, set <i>Message-Ready</i> Bit to 1 - Wait for EZMarquee to set <i>ACK</i> bit to 1	0	1
2	0	1	- When <i>ACK</i> bit is set, Set <i>OK-To-Read</i> Bit to 1 - Wait for EZMarquee to set <i>Busy</i> Bit to 1 and <i>ACK</i> bit to 0	1	1
3	1	0	- When <i>Busy</i> Bit is 1 and <i>ACK</i> bit is 0, clear <i>Message-Ready</i> Bit to 0 - Wait for EZMarquee to clear <i>Busy</i> Bit	1	0
4	0	0	- When <i>Busy</i> bit is 0, clear <i>OK-To-Read</i> bit - Go to Step 1	0	0

### 6.8 Example of Ladder Logic for Handshaking

#### Allen-Bradley Processors

Following example shows ladder logic to implement handshake between an AB Processor and the EZMarquee.

After setting all the message bytes and message length, set *Send-to-Marquee* bit on for one scan. The ladder logic will set status byte bits to ensure that all the message bytes are delivered without loss.



For other processors, please implement logic equivalent to the logic above.





## Appendix A:

- ASCII Command Interpretation
- ASCII Command Syntax and Description
  - Selecting Unit and Group Number
- Resetting Display
- Cursor Positioning with Line Clearing
- Cursor Positioning without Line Clearing
- Cursor Positioning at Carriage Return
- Select Text Wrap
- Selecting Center Mode
- Selecting Character Color
- Selecting Number of Sticks Per Line
- Selecting Character Size
- Selecting Blink Mode
- Selecting Blink Delimiters On/Off
- Selecting Blink On/Off
- Displaying Scrolling Text
- International Character Set

## A.1 ASCII Command Interpretation

As mentioned earlier, EZMarquees only accept ASCII protocol for receiving messages. ASCII protocol consists of ASCII characters only along with ASCII commands which always start with a “^” (circumflex) symbol followed by the command to perform a special function on subsequent message to be displayed on an EZMarquee.

Let’s use the example of the **Select Unit** ASCII command which has the following syntax:

**^Agguuuu**

If using multiple EZMarquees, this ASCII command selects an EZMarquee based on its assigned Group and Unit Number. In order to get familiarized with ASCII commands, it is important to know how these commands are formulated.

- ^** Instruction to let EZMarquee look for an ASCII command right after this symbol
- A** ASCII command to perform the necessary function
- gg** User Specified Parameter
- uuuu** User Specified Parameter

Thus when the “**^A010001HELLO**” ASCII string is sent, the only message that will be displayed by an EZMarquee with the pre-assigned Group Number of “01” and Unit Number of “0001” will be “**HELLO**”. Also note that the character “A” and the digits “010001” are not displayed because they are part of the ASCII command syntax. For proper formulation of messages to be displayed on an EZMarquee, it is important to pay attention to the syntax of every ASCII command.

## A.2 ASCII Command Syntax and Description

### 5.2.1 Selecting Unit and Group Number

Function	Command Syntax	Example
Select Unit	^Agguuu	^A000000 (would select all units) ^A040004 (would select unit 4) ^A040000 (Would select all the units in group 4)

This ASCII command is used for selecting unit(s) which will process the subsequent ASCII commands sent. It allows multiple EZMarquees to be connected and addressed on the same network. They can be addressed as a whole, as a subset, or as individuals. Only units that have been selected by this command process the rest of the ASCII string following the “^A” command. The commands “**gg**” and “**uuuu**” are user selectable as follows:

**gg**      2-digit Group Number  
**uuuu**    4-digit Unit Number

For width, pad the number with zeroes (i.e., for unit 45, the number would be 0045). All units always process all ^A commands to see if they have been selected or deselected. There are three basic ways of selecting units”

1. Group x and Unit x selects only the unit with matching numbers
2. Group x and Unit 0 selects all units in group x (Broadcast Message)
3. Group 0 and Unit 0 selects all units (Broadcast Message)

Broadcast messages are very useful when the same information is to be displayed on all the marquees in one or all of the groups.

#### Valid Range:

Group Number      “**gg**” 01, 02  
Unit Number        “**uuuu**” 0001 - 0008

#### Default Value:

EZMarquee’s Group and Unit numbers are assigned by Dip Switches, which can be accessed by removing the back plate. The default factory set values:

Group Number      “**gg**” 01  
Unit Number        “**uuuu**” 0001

**Retention:**

This command is retentive.

**Compatibility:**

This command can be used with any ASCII command as a prefix to select a unit to receive that particular command.



**NOTE:** When an EZMarquee powers up, it assumes that it is the only EZMarquee present on a network. It will display messages sent without Group Number and Unit Number as long as no message is sent by the controller specifying the Group Number and Unit Number in a message. Whenever an EZMarquee detects a message starting with Group Number and Unit Number information, it will start identifying messages to see if they match Group and Unit Numbers as specified by the DIP switches.

### A.3 Resetting Display

Function	Command Syntax	Example
Reset Display	^En n=0 n=1 n=2 n=3	^E0 (Clears the display and homes the cursor) ^E1 (Clears the display, homes the cursor, and resets all parameters modified by ASCII protocol) ^E2 (Clears the display and leaves the cursor at its current position) ^E3 (Clears the line and sets the cursor to the beginning of the line)

This ASCII command is used to perform 'Clearing' and/or 'Resetting' of line(s) on an EZMarquee. It can be used in several ways to either clear a single line or the whole display along with options for positioning the cursor after clearing/resetting. The command "n" is user specified as follows:

- n = 0      Clears the display and homes the cursor
- n = 1      Clears the display, homes the cursor, and reset all parameters modified by ASCII protocol
- n = 2      Clears the display and leaves the cursor at its current position
- n = 3      Clears the line and sets the cursor to the beginning of the line originally present at

When using "n=0, 1 or 2" the whole message display is cleared, whereas "n=3" only clears the current line where cursor resides. Let's use the example of a 4 Line 20 Character per line display. If the last message was written on Line 4 and the cursor positioned was not changed, then **^E3** would clear Line 4 only and would not clear the whole display. **^E1, ^E2, and ^E3** would clear the whole display regardless of the cursor position at that time.

**Valid Range:**

"n" 0,1,2,3

**Default Value:**

Not applicable

**Retention:**

This command is NOT retentive. This only applies when used.

**Compatibility:**

This command can be used in any sequence in an ASCII string except in scrolling messages.

### A.4 Cursor Positioning with Line Clearing

Function	Command Syntax	Example
Cursor Positioning with Line Clearing	^Hrrcc rr=01-04 cc=01-40	^H01-04 (specifies the Row where cursor is to be positioned) ^H01-40 (specifies the column where cursor is to be positioned)

**^Hrrcc**

This ASCII command is used to position the cursor anywhere on an EZMarquee *after clearing the entire row that the cursor is being positioned on*. It clears the existing text on the whole line where the cursor is to be positioned. The parameters for this command are only applicable when used correctly with the right model information. The commands “**rr**” and “**cc**” are user selectable as follows:

- rr** 01 - 04 \*Specifies the Row where cursor is to be positioned
- cc** 01 - 40 \*Specifies the column where cursor is to be positioned  
\*Dependent on size of display

The valid values for “**rr**” and “**cc**” are relative to 2-inch characters where they would be positioned. If the value for either variable is less than 10, it must be padded with leading zeros.

**Valid Range:**

- “**rr**” Dependent on the number of ROWS available on an EZMarquee (e.g. in a 1 Line X Character EZMarquee the valid range is 01, in a 2 Line X Character EZMarquee the valid range is 01 – 02, and in a 4 Line X Character EZMarquee the valid range is 01 – 04)
- “**cc**” Dependent on the number of COLUMNS available on an EZMarquee, for example:
  - X Line 10 Char marquee the valid range is 01 – 10
  - X Line 20 Char marquee the valid range is 01 – 20
  - X Line 40 Char marquee the valid range is 01 – 40

**Default Value:**

Not applicable

**Retention:**

This command is NOT retentive. It only applies when used.

**Compatibility:**

This command can be used in any sequence in an ASCII string except in scrolling messages.

## A.5 Cursor Positioning without Line Clearing

Function	Command Syntax	Example
Cursor Positioning without Line Clearing	^Mrrcc rr=01-04 (valid range number of lines for the model) cc=01-40 (valid range number of characters for model)	^M0101 (Cursor positions on line 1 character 1)

This ASCII command is used to position the cursor anywhere on an EZMarquee *without clearing the entire row*. This command allows the you to over write any existing text if present and does NOT clear any characters if not overwritten. The parameters for this command are only applicable when used correctly with the right model information. The commands “**rr**” and “**cc**” are user selectable as follows:

- rr** 01 – 04 \*Selects the ROW of EZMarquee where cursor is to be positioned
- cc** 01 – 40 \*Selects the COLUMN of EZMarquee where cursor is to be positioned  
\*Dependent on the size of display

The valid values for “**rr**” and “**cc**” are relative to two-inch characters and where they would be positioned on EZMarquee. If the value for either variable is less than 10, it must be padded with leading zeros. Characters received after this command will overwrite pre-existing characters on the display. By using this command, you are also able to overwrite characters of different sizes, where the overwriting character size does not have to match that of the overwritten character.

### Valid Range:

- “**rr**” Dependent on the number of ROWS available on an EZMarquee (e.g. in a 1 Line X Character EZMarquee the valid range is 012, in a 2 Line X Character EZMarquee the valid range is 01 – 02, in a 4 Line X Character EZMarquee the valid range is 01 – 04)
- “**cc**” Dependent on the number of COLUMNS available on an EZMarquee (e.g. in an X Line 10 Character EZMarquee the valid range is 01 – 10, in an X Line 20 Character EZMarquee the valid range is 01 – 20, in an X Line 40 Character EZMarquee the valid range is 01 – 40)

**Default Value:** Not applicable

**Retention:** This command is NOT retentive. It only applies when used.

**Compatibility:** This command can be used in any sequence in an ASCII string except in scrolling messages.

## A.6 Cursor Positioning at Carriage Return

Function	Command Syntax	Example
Cursor positioning at carriage return	^In n=0 n=1	^I0 (The new line is OFF. This advances the cursor to the beginning of the SAME line it was located on when the carriage return command "^N" is used) ^I1 (The new line is ON. This advances the cursor to the beginning of a NEW line--e.g. advances to line 2 if originally located on line 1, when the carriage return command "^N" is used)

### ^In

This ASCII command is used to control the cursor position when a carriage return command "**^N**" is sent to EZMarquee. By using this command, you can position the cursor either to the beginning of a new line (one below) or the same line itself based on the parameter chosen. The command "**n**" is user selectable as follows:

- n=0** The New Line is OFF. This advances the cursor to the beginning of the SAME line it was present on when the carriage return command "**^N**" is used
- n=1** The New Line is ON. This advances the cursor to the beginning of a NEW line (e.g. advances to line 2 if originally present on line 1, when the carriage return command "**^N**" is used.)

### Valid Range:

"n" 0, 1

### Default Value:

At power up the default value of "**n**" is "**1**".

### Retention:

This command is RETENTIVE. Once the value is changed, it retains unless changed by this command itself or by the Reset Display Command "**^En**".

### Compatibility:

This command can be used in any sequence in an ASCII string except in scrolling messages.



## A.7 Selecting Text Wrap

Function	Command Syntax	Example
Selecting Text Wrap	^Jn n=0 n=1	^J0 (The Wrap is OFF. The cursor will advance to the beginning of the line that the cursor is located on). ^J1 (The Wrap is ON. The cursor advances to the beginning of the next line).

### **^Jn**

This ASCII command is used to control the advancement of the cursor past the end of a display line. Based on the settings on this command, the cursor will either advance to the beginning of the next line (one below) or at the beginning of the line that the cursor is currently on.

**n=0** The Wrap is OFF. The cursor will advance to the beginning of the line that the cursor is presently on.

**n=1** The Wrap is ON. The cursor advances to the beginning of the next line.

#### **Valid Range:**

'n' : 0, 1

#### **Default Value:**

At power up the default value of 'n' is '1'

#### **Retention:**

This command is RETENTIVE. Once the value is changed, it retains unless changed by this command itself or by the Reset Display Command "**^En**".

#### **Compatibility:**

This command can be used in any sequence in an ASCII string except in scrolling messages.

### A.8 Selecting Center Mode

Function	Command Syntax	Example
Selecting Center Mode	^Cn n=0=Turn Centering OFF n=1=Turn Centering ON	^C0 (Centering OFF) ^C1 (Centering ON)

This ASCII command is used to “center position” the entire message on an EZMarquee line when embedded in an ASCII string. It applies to the whole message and cannot be applied to segments of a message. The “n” command is user selectable as follows:

- n=0** Turn Centering OFF
- n=1** Turn Centering ON

**Valid Range:**

“n” 0, 1

**Default Value:**

At power up the default value of “n” is “0”.

**Retention:**

This command is RETENTIVE. Once the value is changed, it retains unless changed by this command itself or by the Reset Display Command “^En”.

**Compatibility:**

This command can be used in any sequence in an ASCII string except in scrolling messages.

## A.9 Selecting Character Color

Function	Command Syntax	Example
Selecting Character Color	<code>^d C c</code> <code>c=1=Red</code> <code>c=2=Green</code> <code>c=3=Yellow</code>	<code>^d C 1</code> (Red color character) <code>^d C 2</code> (Green color character) <code>^d C 3</code> (Yellow color character)

This ASCII command is used to select the color of the entire message or a segment when embedded in an ASCII string. Based on the positioning of this command, the color of the whole message or a segment can be changed to RED, GREEN, or YELLOW. This command can only be utilized with TRI-Color LED EZMarquees and is ignored when sent to a RED-Color LED EZMarquee. The “c” command is user selectable as follows:

- c=1** For Assigning RED Color
- c=2** For Assigning GREEN Color
- c=3** For Assigning YELLOW Color

The Color Code ASCII command can be used anywhere in an ASCII string to control the color of specific characters instead of the whole message. Characters sent prior to this command will always be treated as RED, unless otherwise selected for another color. If the “Select Color Command” is used in a scrolling message, it will determine the starting color for the next scrolling message or static text send, unless another “Select Color Command” is sent to change to the desired color.

### Valid Range:

“n” 1,2,3,4

### Default Value:

At power up the default value of “n” is “1”.

### Retention:

This command is RETENTIVE. Once the value is changed, it retains unless changed by this command itself or by the Reset Display Command “^En”.

### Compatibility:

This command can be used in any sequence in an ASCII string including scrolling messages.

### A.10 Selecting Number of Sticks Per Line

Function	Command Syntax	Example
Selecting Number of Sticks Per Line	$\wedge L n$ n=0=1 Stick per line n=1=2 Sticks per line n=2=3 Sticks per line n=3=4 Sticks per line	$\wedge L 3$ (would select 4 sticks per line)

This ASCII command is used to select the number of physical lines (sticks) on an EZMarquee to be utilized as one display line. When this command is used, it allows you to select either 1 line or multiple lines (sticks) to be used as a single display line. This allows you to allocate multiple lines (sticks) to be used as a single line when using 4", 6", 8", and 8" Narrow font sizes. The command "n" is user selectable as follows:

- n=0** Assigns one physical line as one display line; default for 2" char.
- n=1** Assigns two physical lines as one display line; 4" char.
- n=2** Assigns three physical lines as one display line; 6" char.
- n=3** Assigns four physical lines as one display line; 8" and 8" charc.

This command takes effect only when the cursor position is such that there are enough lines above it to form the display line and there are no characters on the current line. If characters exist on the current line, this command takes effect when a new line is formed. The line which the cursor occupies at the time that this command is used becomes the bottom of the display line when formed. This command also takes effect when it is the first command after power up or immediately after a Clear/Home/Reset,  $\wedge E 1$ , command.

**Valid Range:**

"n" 0,1,2,3

**Default Value:**

At power up the default value of "n" is "0".

**Retention:**

This command is RETENTIVE. Once the value is changed, it retains unless changed by this command itself or by the Reset Display Command " $\wedge E n$ ".

**Compatibility:**

This command can be used in any sequence in an ASCII string including scrolling messages. It's used in conjunction with the "select character size" command " $\wedge K n$ " to designate the proper number of physical lines for different character sizes.

## A.11 Selecting Character Size

Function	Command Syntax	Example
Selecting Character Size	$\wedge K n$ n=0=2" Characters n=1=4" Characters n=2=6" Characters n=3=8" Characters	$\wedge K 1$ (4" Characters)

This ASCII command is used to select the character size of messages displayed on an EZMarquee. When this command is used, it can be applied to either a whole message or segments of a message. The "n" command is user selectable as follows:

- n=0** two-inch characters
- n=1** four-inch characters
- n=2** six-inch characters
- n=3** eight-inch characters
- n=4** eight-inch compressed characters (4"x8")

If there are not enough lines in a display, the character size is adjusted by an EZMarquee to accommodate the maximum size character it can display. This command can be used within a scrolling message. The last character size change command within a scroll command sequence specifies the default character size for future static messages.

### Valid Range:

"n" 0,1,2,3,4

### Default Value:

At power up the default value of "n" is "0".

### Retention:

This command is RETENTIVE. Once the value is changed, it retains unless changed by this command itself or by the Reset Display Command " $\wedge En$ ".

### Compatibility:

This command can be used in any sequence in an ASCII string including scrolling messages. It's used in conjunction with the "Select Number of Sticks Per Line" command ( $\wedge Ln$ ).  $\wedge Ln$  is used as a prefix to designate the proper number of physical lines for different character sizes.

### A.12 Selecting Blink Mode

Function	Command Syntax	Example
Selecting Blink Mode	^B n n=0=Turn Blink OFF n=1=Turn Blink ON	^B 0 (Turns Blink OFF) ^B 1 (Turns Blink ON)

This ASCII command is used to turn Blinking mode “On” or “Off” for the entire message when embedded in an ASCII string. ‘n’ is user selectable as follows:

- n=0** Turn Blink Off
- n=1** Turn Blink On

**Valid Range:**

“n” 0,1

**Default Value:**

At power up the default value of ‘n’ is ‘0’

**Retention:**

This command is RETENTIVE. Once the value is changed, it retains unless changed by this command itself or by the Reset Display Command “^En”.

**Compatibility:**

This command can be used in any sequence in an ASCII string except in scrolling messages. Scrolling messages cannot have blinking/ flashing characteristics

### A.13 Selecting Blink Delimiters On/Off

Function	Command Syntax	Example
Selecting Blink Delimiters On/Off	^Xn n=0=Blink OFF n=1=Blink ON	^X0 (Blink OFF certain character) ^X1 (Blink ON certain character)

This ASCII command is used to turn blinking “On” or “Off” at your discretion. When this command is used, it can be applied to a whole message or certain segments based on where the command is embedded in an ASCII string. The “n” command is user selectable as follows:

**n=0** Turns Blinking ON for subsequent characters following after this command

**n=1** Turns Blinking OFF for characters following after this command

**^X1** and **^X0** can also be replaced with “[” and “]” respectively for US character set only (e.g. if you want to make “HELLO” blink in a message, you can either control this by **^X1HELLO^X0** or **[HELLO]**).

**Valid Range:**

“n” 0,1

**Default Value:**

At power up the default value of “n” is “0”.

**Retention:**

This command is RETENTIVE. Once the value is changed, it retains unless changed by this command itself or by the Reset Display Command “^En”.

**Compatibility:**

Can be used in any sequence in an ASCII string except in scrolling messages. Scrolling messages cannot have blinking/flashing characteristics.



**\*NOTE:** “[” and “]” can be used with the US Character Set only and does not apply to the rest of the International Character Set. “^Xn” can be utilized with all of the character sets.

### A.14 Selecting Blink On/Off Rate

Function	Command Syntax	Example
Select Blink ON/OFF Rate	^Gbbcc bb=01-99 cc=01-99	^G01-99 (Blink ON interval (the time for which a message stays ON when in blinking mode) ^G01-99 (Blink OFF interval (the time for which a message stays OFF when in blinking mode)

**^Gbbcc**

This ASCII command is used to select the rate at which messages blink/flash "On" or "Off". The "bb" and "cc" commands are user selectable as follows:

- bb=01-99** Blink ON interval (the time for which a message stays ON when in blinking mode).
- cc=01-99** Blink OFF interval (the time for which a message stays OFF when in blinking mode).

**01-99 corresponding time scale:**

- 01=.1** second
- 99=9.9** seconds

**Valid Range:**

"n" 0,1

**Default Value:**

At power up the default value of 'n' is '0'

**Retention:**

This command is RETENTIVE. Once the value is changed, it retains unless changed by this command itself or by the Reset Display Command "**^En**".

**Compatibility:**

This command can be used in any sequence in an ASCII string except in scrolling messages. This command is used to control the blinking rate for Select Blink Mode (**^Bn**) and Blink Delimiters On/Off (**^Xn**) commands. Scrolling messages cannot have blinking/flashing characteristics.



## A.15 Displaying Scrolling Text

Function	Command Syntax	Example
Displaying Scrolling Text	<code>^Dn&lt;Message Text&gt;&lt;CR&gt;</code> Display Scrolling Text n=0=No Repeat n=1=Repeat <CR>=ASCII Carriage Return (0D HEX, 13 DEC)	<code>^D0&lt;Hello&gt;&lt;CR&gt;</code> (would scroll "Hello" without repeat) <code>^D1&lt;Hello&gt;&lt;CR&gt;</code> (would scroll "Hello" with repeat)

This ASCII command is used to scroll data from right to left on an EZMarquee line when embedded in an ASCII string. When this command is used, it applies to the whole line where the cursor is located at that time. Also, before the message starts scrolling on a line, the line is cleared of all the data that might be located on it. The “n” and “<Message Text>” commands are user selectable as follows:

<b>&lt;Message Text&gt;</b>	ASCII type user specified message; Maximum length of 255 characters
<b>n=0</b>	Message is Scrolled Only Once
<b>n=1</b>	Message is Scrolled Repeatedly
<b>^N</b>	Specifies the end of scrolling message

The **<message text>** portion can also include “^Kn” ASCII command to change character size within a scrolling message. Every time Select Character Size the “^Kn” ASCII command is used in the **<Message Text>**, it takes away two (2) characters from the total available 255 characters.

Once the text begins to scroll, the cursor is positioned on the scrolling line as if the cursor had been advanced there from another line. When “n=1” and message is set to repeat, a space is added at the end of the message to separate the **<Message Text>** being repeated.

When using the “Display Scrolling Message” command, **<Message Text>** cannot be blinked as a whole or a segment. The ASCII commands used for blinking text (^Bn for “Select Blink Mode” and ^Xn for “Blink Delimiters” are ignored if present in **<Message Text>**). Also, when a character is written to a line which is being scrolled, the line with scrolling text is cleared.

**Valid Range:**

“n” 0,1

**Default Value:**

Not Applicable

**Retention:**

This command is NOT retentive. It only applies when used.

**Compatibility:**

This command can be used in any sequence in an ASCII string except with Blinking/Flashing messages. Scrolling messages cannot have any commands for Blinking/Flashing as they will be ignored. Scrolling messages can contain "Select Character Size" (^Kn) and "Select Number of Sticks Per Line" ^Ln commands.

## A.16 International Character Set

EZMarquees are capable of displaying messages in 7 international languages in addition to U.S. character set. At any given time, it can be only set to a specific character set by setting up the DIP switches (refer to chapter X.X for details on how to set DIP Switches). The default factory setting for DIP switches is set to U.S. character set. In order for you to display messages in a language other than U.S. character set, perform the following steps:

1. Set the appropriate DIP Switches to the desired language (e.g. KANA).
2. Once the DIP Switch is selected for KANA, every time an ASCII character is sent to “#” character to EZMarquee to display when DIP switches are set for “KANA”, the character that will appear on EZMarquee will be “X”.
3. If the corresponding character in the selected language is not available, then EZMarquee will display U.S. Character set for that particular character only. e.g. if the DIP switch is set to “French” and you send the “#” character to EZMarquee, it will be displayed as “#” because there is no corresponding character for “#” in “French”.

The following pages will show all the corresponding characters in 7 international characters corresponding to U.S. character set that can be used with EZMarquees.

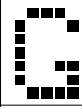

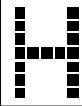

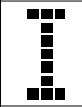

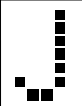

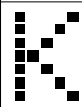



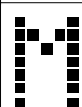

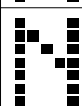

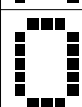

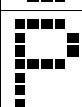

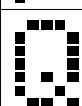

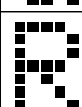



**Note:** Messages can only be sent to EZMarquee in ASCII character type (U.S. Character set). Based on the DIP Switch settings, EZMarquee will display the corresponding character in international language if present. If the corresponding character is not available, it will display the U.S. character only.

**A.16.1 International Character Sets**

The EZMarquee displays messages in 7 international character sets in addition to the U.S. character set. It is set to display a character set . To program messages (into a master display or the computer) in a non-U.S. character set, refer to the ASCII conversion chart. Enter the ASCII character or code equivalent to the non-U.S. character desired. Blank areas on the chart indicate no change from the American set. If no character is shown for the character set in use, the American character is displayed. For example, when using the English character set, enter the “#” character (Program Mode) or HEX 23 (Computer Interface Mode) to program and display the “£” character. All international character sets use the standard ASCII codes. The programming terminal always shows only the American character set. To check your messages; use the View command of the Program Mode.

	AMERICA	CYRILLIC	GERMANY	ENGLAND	DENMARK	SWEDEN	FRANCE	KANA
# 23								
\$ 36								
@ 64								<SPACE>
A 65								
B 66								
C 67								
D 68								
E 69								
F 70								

	AMERICA	CYRILLIC	GERMANY	ENGLAND	DENMARK	SWEDEN	FRANCE	KANA
G 71								
H 72								
I 73								
J 74								
K 75								
L 76								
M 77								
N 78								
O 79								
P 80								
Q 81								
R 82								

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	AMERICA	CYRILLIC	GERMANY	ENGLAND	DENMARK	SWEDEN	FRANCE	KANA
S 83								
T 84								
U 85								
V 86								
W 87								
X 88								
Y 89								
Z 90								
[ 91								
\ 92								
] 93								
^ 94								

	AMERICA	CYRILLIC	GERMANY	ENGLAND	DENMARK	SWEDEN	FRANCE	KANA
—								
95								
•								
96								
a								
97								
b								
98								
c								
99								
d								
100								
e								
101								
f								
102								
g								
103								
h								
104								
i								
105								
j								
106								

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	AMERICA	CYRILLIC	GERMANY	ENGLAND	DENMARK	SWEDEN	FRANCE	KANA
k 107								
l 108								
m 109								
n 110								
o 111								
p 112								
q 113								
r 114								
s 115								
t 116								
u 117								
v 118								



	AMERICA	CYRILLIC	GERMANY	ENGLAND	DENMARK	SWEDEN	FRANCE	KANA
w 119								
x 120								
y 121								
z 122								
{ 123								
 124								
} 125								
~ 126								

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