The content of this manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by 3M. 3M assumes no responsibility or liability for any errors or inaccuracies that may appear in this manual.

No part of this publication may be reproduced, or transmitted, in any form or by any means, electronic, mechanical, or otherwise, without prior written permission from 3M.
SAFETY NOTICE

As an institution, municipality, or private operator, it is important to be aware of the potential liabilities which may arise in normal parking operations. To ensure the safety of your personnel and your patrons, use the following checklist to make sure that all of the following “safety first” measures are implemented at your site:

- Use vibrant colors on parking equipment at entrance lanes and exit lanes.
- Use universally identifiable icons, or pictograms, in all entrance and exit lanes, roadways, posts and walls.
- Post “No Pedestrian,” “No Wheelchair,” “No Bicycle” and “No Motorcycle” pictograms on the roadway adjacent to the parking barrier gate.
- Always provide proper signs, both on the roadway and on other equipment.
- Maintain the manufacturer’s warning stickers on gate arms and on other equipment.
- Use safety devices such as mirrors, buzzers, and flashing lights, especially if there are sidewalks that cross the path of exit or entrance lanes.
- To prevent injury to pedestrians, maintenance personnel, and persons on bicycles or motorcycles, monitor all entrance and exit lanes to ensure barrier gates are not accidentally lowered or raised. Take special care when commanding any equipment from a centralized computer system, especially when the equipment is not in your line of vision.
- Institute the following equipment maintenance and inspection policies:
  - Ensure that maintenance is performed by the factory, a factory-trained technician, or an authorized distributor at least twice a year. Create a maintenance log to track maintenance history.
  - Ensure that the equipment is inspected frequently by a factory-trained technician to ensure that it is operating properly. Create an inspection log to track inspection history.

**SHOCK HAZARD**—to reduce the risk of severe personal injury or damage to equipment, turn off the power to the equipment before performing any maintenance or repairs. Failure to heed this warning could result in injury or even death of those who come in contact with the product.
PRODUCT USE STATEMENT

Product Use: Many factors beyond 3M’s control and uniquely within user’s knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user’s method of application.

Warranty, Limited Remedy, and Disclaimer: Unless a different warranty is specifically stated on the applicable 3M product packaging or product literature, terms of sale or software license agreement, 3M warrants that the 3M product will be free from substantial defects in material and workmanship under normal use and service, wear and tear excepted, for two (2) years from the original date of purchase, and (ii) for software products, for ninety (90) days from the original date of purchase, the software will materially perform the functions described in the accompanying documentation. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M’s option, to replace or repair any defective part or parts.

Limitation of Liability: Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.
TABLE OF CONTENTS

LIST OF FIGURES .......................................................................................................................... 15

CHAPTER 1 INTRODUCTION ...........................................................................................................17

Barrier Gate Overview .................................................................................................................. 17
Reviewing the Components .......................................................................................................... 17
Gate Housing .................................................................................................................................. 18
Gate Arm ........................................................................................................................................ 19
Barrier Gate Connection Panel ..................................................................................................... 19
Omega LCD Controller .................................................................................................................. 22
Configuration Module ................................................................................................................... 24
Detector Loops ............................................................................................................................... 25
Mechanical Components .............................................................................................................. 26
Working with the Menus ................................................................................................................. 28
Navigating the Omega LCD Controller Menus ........................................................................... 28

CHAPTER 2 LOOP INSTALLATION .................................................................................................31

Loop Overview ............................................................................................................................... 31
Loop Detector Operation ................................................................................................................. 31
Hardware Requirements ................................................................................................................. 31
Typical Loop Layout ........................................................................................................................ 32
Installing the Loops ....................................................................................................................... 32
Determine the Loop Size ................................................................................................................ 34
Set the Loop Lead Length .............................................................................................................. 36
Crosstalk and Loop Coil Frequency .............................................................................................. 37
View Current Loop Frequencies ................................................................................................... 38
Loop Sensitivity ............................................................................................................................ 41
Detecting Vehicles that Tailgate ................................................................................................... 42
Tuning Loops ............................................................................................................................... 43
Troubleshooting the Loop Detector .............................................................................................. 43
Loop Detector Malfunction .......................................................................................................... 43
Shorted Loops ............................................................................................................................... 44
Crosstalk ....................................................................................................................................... 44
Hidden Inductors .......................................................................................................................... 45
Using a Loop Locator ..................................................................................................................... 46

CHAPTER 3 BARRIER GATE ELECTRONICS INSTALLATION ......................................................49

Gate Configuration Overview ....................................................................................................... 49
Field Connections on the Connection Panel ................................................................................ 49
Installing the Configuration Module ................................................................. 53
Removing the Configuration Module ................................................................. 54
Installing the Omega LCD Controller ................................................................. 55
Removing the Omega LCD Controller ................................................................. 57
Setting the DIP Switches on the Connection Panel .............................................. 57
  Set the DIP Switches for Base Mode/Sub Mode .................................................... 58
  Set the DIP Switches for Device Number .............................................................. 59
  Set the DIP Switches for Rebound Features .......................................................... 60
  Set the DIP Switches for Loop Sensitivity ............................................................. 61
  Set the DIP Switches for Tailgate Detection and Sensitivity ............................... 62
Starting the Barrier Gate ...................................................................................... 63
  Cold Starting the Gate ............................................................................................ 63
  Warm Starting the Gate .......................................................................................... 65
Setting the Time and Date on the Omega LCD Controller ............................... 65
Operating the Gate without a Configuration Module ......................................... 68
  Set DIP Switches for Lane Operation Modes in No Config Mode ....................... 69
  Set Loop Sensitivity for No Config Mode ............................................................. 71

CHAPTER 4  MECHANICAL INSTALLATION .............................................................. 73
Mechanical Installation Overview ........................................................................ 73
Installing the Barrier Gate Cabinet ..................................................................... 73
Installing the Barrier Gate Arm .......................................................................... 77
  Install a Standard Barrier Gate Arm ................................................................. 78
  Install a Folding Barrier Gate Arm ................................................................. 79
Adjusting the Cam for Barrier Gate Arm Travel .................................................. 80
Setting the Barrier Gate for Automatic Operation .............................................. 82
  Opening the Gate During Power Failure ............................................................. 83
  Opening the Barrier Gate in an Emergency ......................................................... 83

CHAPTER 5  PROGRAMMING THE BARRIER GATE .................................................. 85
Programming Overview ..................................................................................... 85
Setting Gate Sensitivity ....................................................................................... 85
Programming Timer Features ............................................................................ 89
Resetting Counters ............................................................................................. 92
Defining Function Time Zones ........................................................................... 93
Programming Differential Counters (Optional Feature) .................................... 97
Programming an Alarm Message ...................................................................... 99
CHAPTER 6  MONITORING .................................................................101
  Monitoring Overview ................................................................. 101
  Viewing the Diagnostic Information .............................................. 101
    DIP Switch Hexadecimal Representation .................................. 102
    View the Diagnostic Information on the Miscellaneous Menu ... 103
  Viewing the Software and Hardware Configuration Menus ........... 105
  Reviewing Lane Transaction Information ..................................... 110
  Accessing Report Messages .......................................................... 114
  Viewing Count Information ......................................................... 116
  Viewing Lane Status Functions ..................................................... 121

CHAPTER 7  BARRIER GATE COMMANDS ..............................................125
  Commands Overview ................................................................. 125
    Commands Menu .................................................................. 125
  Accessing the Commands Menu .................................................. 127
    Tune Loops .................................................................. 127
    Raise/Lower the Gate Arm .................................................. 128
    Override Gate .................................................................. 128
    Turn on/off a Full Sign ....................................................... 129
    Enable/Disable the Gate ....................................................... 129
    Remote Vend the Gate ......................................................... 130

CHAPTER 8  UPDATING THE FIRMWARE ..............................................131
  Updating Overview ................................................................. 131
  Before You Start ................................................................. 131
  Installing the FlashProgrammer Program ................................... 131
  Connecting the Computer to the Omega LCD Controller ........... 133
  Loading Firmware to the Omega LCD Controller ......................... 134

CHAPTER 9  DIAGNOSTICS AND TROUBLESHOOTING ......................139
  Diagnostics and Troubleshooting Overview .............................. 139
  Diagnostics ................................................................. 139
    Run-Time Diagnostics .......................................................... 140
    Run Diagnostics Manually .................................................... 140
      Communication Diagnostics ............................................... 142
      LCD Display Diagnostics ............................................... 143
      Keypad Diagnostics ......................................................... 143
      Input/Output Diagnostics ................................................. 144
      Exception Event Report .................................................. 145
  Troubleshooting ................................................................. 146
Contents

Barrier Gate Does Not Operate .................................................................................................. 146
Barrier Gate Arm Raises and Lowers Without Stopping ............................................................ 147
Detector Operates Incorrectly and Adjacent Loop’s Vehicles Detected ..................................... 147
Barrier Gate Arm Does Not Travel Far Enough .......................................................................... 147
No Text On Omega LCD Display ............................................................................................. 148
Black Dust Inside Cabinet ........................................................................................................... 148

CHAPTER 10 PREVENTIVE MAINTENANCE ............................................................................. 151
Maintenance Overview .............................................................................................................. 151

APPENDIX A ORDER AND REPAIR PROCEDURES ................................................................ 153
Placing an Order ....................................................................................................................... 153
Requesting a Repair .................................................................................................................. 154

APPENDIX B PRODUCT SUPPORT ............................................................................................. 155
Getting Help ............................................................................................................................. 155

APPENDIX C CONFIGURATION OPTIONS ........................................................................... 157
Configuration Options Overview .................................................................................................. 157
Single Differential Counter ......................................................................................................... 157
Dual Differential Counter ............................................................................................................. 158
Dual Direction Operation ............................................................................................................. 158
Communication Options ............................................................................................................ 158
Directional Arming ...................................................................................................................... 158
Third Loop Detector (Loop C) ..................................................................................................... 158
Automatic Time Zone Control Options ....................................................................................... 159
Inputs .......................................................................................................................................... 159
Outputs ....................................................................................................................................... 161
Internal Resettable and Non-Resettable Counters .................................................................... 166
Hourly Count Reports ................................................................................................................ 168

APPENDIX D LANE OPERATION .............................................................................................. 169
Lane Operation Overview ............................................................................................................ 169
Understanding Gate Logic .......................................................................................................... 169
Mode Logic ................................................................................................................................. 169
Directional Logic ......................................................................................................................... 170
Setting Base Modes and Sub Modes .......................................................................................... 170
Setting Vends ............................................................................................................................ 171
Set Vend B Enable Output to Pulse ............................................................................................ 171
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1.1</td>
<td>Gate Warning Label</td>
<td>18</td>
</tr>
<tr>
<td>Figure 1.2</td>
<td>Gate Arm Warning Label</td>
<td>19</td>
</tr>
<tr>
<td>Figure 1.3</td>
<td>Barrier Gate Connection Panel</td>
<td>22</td>
</tr>
<tr>
<td>Figure 1.4</td>
<td>Omega LCD Controller</td>
<td>23</td>
</tr>
<tr>
<td>Figure 1.5</td>
<td>Omega LCD Controller Keypad</td>
<td>24</td>
</tr>
<tr>
<td>Figure 1.6</td>
<td>Configuration Module</td>
<td>25</td>
</tr>
<tr>
<td>Figure 1.7</td>
<td>Barrier Gate Internal View</td>
<td>27</td>
</tr>
<tr>
<td>Figure 1.8</td>
<td>Omega LCD Controller Menu</td>
<td>28</td>
</tr>
<tr>
<td>Figure 2.1</td>
<td>Typical Loop Layout</td>
<td>32</td>
</tr>
<tr>
<td>Figure 2.2</td>
<td>Loop Installation in Concrete</td>
<td>33</td>
</tr>
<tr>
<td>Figure 2.3</td>
<td>Electrical Field</td>
<td>36</td>
</tr>
<tr>
<td>Figure 2.4</td>
<td>Loop with Shorted Inductor Nearby</td>
<td>46</td>
</tr>
<tr>
<td>Figure 3.1</td>
<td>Barrier Gate Connection Panel with Standard Configuration Module</td>
<td>51</td>
</tr>
<tr>
<td>Figure 3.2</td>
<td>Barrier Gate Connection Panel without Standard Configuration Module</td>
<td>52</td>
</tr>
<tr>
<td>Figure 3.3</td>
<td>Configuration Module and Power Switch Locations</td>
<td>54</td>
</tr>
<tr>
<td>Figure 3.4</td>
<td>Omega LCD Controller and Open DIP Switches</td>
<td>55</td>
</tr>
<tr>
<td>Figure 3.5</td>
<td>Location of DIP Switch Banks on the Connection Panel</td>
<td>58</td>
</tr>
<tr>
<td>Figure 3.6</td>
<td>Control Power Switch on the Connection Panel</td>
<td>64</td>
</tr>
<tr>
<td>Figure 3.7</td>
<td>Omega LCD Controller and Programming Keys</td>
<td>64</td>
</tr>
<tr>
<td>Figure 3.8</td>
<td>Time and Date Menu</td>
<td>66</td>
</tr>
<tr>
<td>Figure 4.1</td>
<td>Center Cabinet Alignment</td>
<td>74</td>
</tr>
<tr>
<td>Figure 4.2</td>
<td>Gate Orientation Chart</td>
<td>75</td>
</tr>
<tr>
<td>Figure 4.3</td>
<td>Mounting Barrier Gate in Sloping Lane</td>
<td>76</td>
</tr>
<tr>
<td>Figure 4.4</td>
<td>Anchor Bolt Installation</td>
<td>77</td>
</tr>
<tr>
<td>Figure 4.5</td>
<td>Standard Barrier Gate Arm Assembly</td>
<td>79</td>
</tr>
<tr>
<td>Figure 4.6</td>
<td>Folding Barrier Gate Arm Assembly</td>
<td>80</td>
</tr>
<tr>
<td>Figure 4.7</td>
<td>Adjusting the Cam</td>
<td>81</td>
</tr>
<tr>
<td>Figure 4.8</td>
<td>Gate Switches</td>
<td>83</td>
</tr>
<tr>
<td>Figure 4.9</td>
<td>Omega LCD Controller Sensitivity Programming Menu</td>
<td>86</td>
</tr>
<tr>
<td>Figure 4.10</td>
<td>Omega LCD Controller MISCELLANEOUS Menu</td>
<td>90</td>
</tr>
<tr>
<td>Figure 4.11</td>
<td>Omega LCD Controller NON-RESET Menu</td>
<td>92</td>
</tr>
<tr>
<td>Figure 4.12</td>
<td>Omega LCD Controller TIME ZONES Menu</td>
<td>94</td>
</tr>
<tr>
<td>Figure 4.13</td>
<td>Omega LCD Controller DIFF COUNTER Menu</td>
<td>97</td>
</tr>
<tr>
<td>Figure 5.1</td>
<td>Omega LCD Controller NON-RESET Menu, Cont</td>
<td>99</td>
</tr>
<tr>
<td>Figure 6.1</td>
<td>Understanding SW 1-3</td>
<td>102</td>
</tr>
<tr>
<td>Figure 6.2</td>
<td>Omega LCD Controller MISCELLANEOUS Menu</td>
<td>104</td>
</tr>
<tr>
<td>Figure 6.3</td>
<td>Omega LCD Controller SETTINGS Menu</td>
<td>106</td>
</tr>
<tr>
<td>Figure 6.4</td>
<td>Omega LCD Controller OPTIONS Menu</td>
<td>107</td>
</tr>
<tr>
<td>Figure 6.5</td>
<td>Omega LCD Controller INPUTS Menu</td>
<td>108</td>
</tr>
<tr>
<td>Figure 6.6</td>
<td>Omega LCD Controller INPUTS Menu</td>
<td>109</td>
</tr>
<tr>
<td>Figure 6.7</td>
<td>Omega LCD controller REPORTS Menu</td>
<td>115</td>
</tr>
<tr>
<td>Figure 6.8</td>
<td>Omega LCD Controller Non-Resettable/Resettable COUNTS Menu</td>
<td>117</td>
</tr>
<tr>
<td>Figure 6.9</td>
<td>Omega LCD Controller Non-Resettable/Resettable COUNTS Menu, Cont.</td>
<td>118</td>
</tr>
<tr>
<td>Figure 6.10</td>
<td>Omega LCD Controller Differential COUNTS Menu</td>
<td>119</td>
</tr>
</tbody>
</table>
CHAPTER 1

Introduction

Barrier Gate Overview

The Universal PS has been designed to provide modern, reliable barrier gates for your parking system. The gate includes field programmable features in the gate controller, an internal motor current sensing system (also known as a safety edge), input LEDs, power supply LEDs, built-in diagnostics, a seven-day Supercap memory backup, an event history report, and a built-in, back-out timer. Some additional features include a third internal loop detector, internal totalizing and differential counters, true directional arming, statistical reporting at the gate itself, and programmable time zone control of basic gate functions such as override, raise/lower, and device enable/disable.

The Barrier Gate retrofits to legacy G-90 and G-90 LCD Gates. You may upgrade your legacy gate by ordering the appropriate upgrade package. Refer to “Parts for Upgrading Legacy Gates,” on page 199 for more information about these part numbers.

This chapter describes the various components of the Barrier Gate, as well as the parking configuration in which it is used. This chapter contains the following:

- “Reviewing the Components” on page 17
- “Working with the Menus” on page 28
- “Navigating the Omega LCD Controller Menus” on page 28

Note: This manual may reference legacy part numbers and product names. Please refer to the 3M Parking Price Book for current product names or contact your customer service representative with questions.

Reviewing the Components

The Barrier Gate includes structural, mechanical and software components. This topic details the major gate components.
Gate component topics include:

- “Gate Housing” on page 18
- “Gate Arm” on page 19
- “Barrier Gate Connection Panel” on page 19
- “Omega LCD Controller” on page 22
- “Configuration Module” on page 24
- “Detector Loops” on page 25
- “Mechanical Components” on page 26

Gate Housing

The Barrier Gate housing is constructed of heavy duty aluminum with a weatherproof, gasketed door. The door is equipped with a flush-mounted T-handle lock and one key. The enclosure and gate are painted with a heavy duty powder coating.

*Note:* A yellow caution sticker stating “AUTOS ONLY NO MOTORCYCLES, BICYCLES OR PEDESTRIANS” is required on both sides of the gate cabinet. Figure 1.1 illustrates the gate warning label in English (other languages are available).

**Figure 1.1** Gate Warning Label
Reviewing the Components

Gate Arm

The standard gate arm is 10’ (3.05 m) in length and is constructed of clear white pine. It is finished in diagonal stripes of black and white enamel.

Note: A bright orange warning label is required to be affixed to both sides of the gate arm. Figure 1.2 illustrates a gate arm warning label in English (other languages are available).

Figure 1.2 Gate Arm Warning Label

 Barrier Gate Connection Panel

The Barrier Gate Connection Panel is a single unit, plug-in assembly that supports the device’s field connections (the terminal blocks are removable for easy field connection installation), and is also used to mount the Omega LCD Controller (refer to “Omega LCD Controller,” on page 22). Figure 1.3 on page 22 illustrates a Barrier Gate Connection Panel.

Table 1.1 Connection Panel Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration Module</td>
<td>Defines the software options in the Barrier Gate. Refer to “Configuration Module,” on page 24.</td>
</tr>
<tr>
<td>DIP Switch Banks 1 - 3</td>
<td>Determine the lane operation. Refer to “Setting the DIP Switches on the Connection Panel,” on page 57.</td>
</tr>
<tr>
<td>Motor Rebound Jumper</td>
<td>110/220 resistor for the motor.</td>
</tr>
<tr>
<td>Power Relay</td>
<td>Controls the gate logic.</td>
</tr>
<tr>
<td>Heater Connector</td>
<td>Provides power for the heater.</td>
</tr>
<tr>
<td>Motor Connector</td>
<td>Provides power for the motor.</td>
</tr>
<tr>
<td>SST Connector</td>
<td>N/A</td>
</tr>
</tbody>
</table>
## Table 1.1 Connection Panel Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Switch</td>
<td><strong>ON</strong> — heater will run continuously</td>
</tr>
<tr>
<td></td>
<td><strong>OFF</strong> — heater is off</td>
</tr>
<tr>
<td></td>
<td><strong>AUTO</strong> — heater is controlled through the preset thermostat setting</td>
</tr>
<tr>
<td>Gate Switch</td>
<td><strong>UP</strong> — places the gate arm in the up position.</td>
</tr>
<tr>
<td></td>
<td>Arm will remain until switch setting is changed.</td>
</tr>
<tr>
<td></td>
<td><strong>OFF</strong> — turns motor off.</td>
</tr>
<tr>
<td></td>
<td><strong>AUTO</strong> — gate arm raises and lowers based on loop inputs (typically, switch remains in this position during normal operation).</td>
</tr>
<tr>
<td>Power Connectors</td>
<td>Primary power feed.</td>
</tr>
<tr>
<td>Control Power Switch</td>
<td><strong>ON</strong> — gate is online and operating</td>
</tr>
<tr>
<td></td>
<td><strong>OFF</strong> — gate is offline to the Omega</td>
</tr>
<tr>
<td></td>
<td><strong>OFF</strong> — gate is offline to the Omega</td>
</tr>
<tr>
<td>115/230VAC Selector Switch</td>
<td>Controls the line voltage (115VAC or 230VAC) to the motor.</td>
</tr>
<tr>
<td>1/2 Amp Fuse</td>
<td>Controls higher voltage components</td>
</tr>
<tr>
<td>Aux 1 Relay (High Voltage)</td>
<td>Output that can be used to turn on a sign, such as a Full sign.</td>
</tr>
<tr>
<td>1 Amp Fuse</td>
<td>Controls lower voltage components</td>
</tr>
<tr>
<td>Omega LCD Controller Connectors</td>
<td>Connects the Omega Controller to the Connection Panel. Refer to “Omega LCD Controller,” on page 22.</td>
</tr>
<tr>
<td>J16 - Reader Power Supply Connector</td>
<td>Connector for an optional Card Reader.</td>
</tr>
<tr>
<td>Input Status LEDs</td>
<td>Identifies when an input is active.</td>
</tr>
</tbody>
</table>
Reviewing the Components

### Table 1.1 Connection Panel Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIP Switch Bank 4</td>
<td>Used to set the gate to No Config Mode. Refer to “Set DIP Switches for Lane Operation Modes in No Config Mode,” on page 69.</td>
</tr>
<tr>
<td>Config LED</td>
<td>Identifies when the Config Module is being used.</td>
</tr>
<tr>
<td>10 VDC LED</td>
<td>Status LED for 10 VDC.</td>
</tr>
<tr>
<td>24 VDC LED</td>
<td>Status LED for 24 VDC.</td>
</tr>
</tbody>
</table>
Omega LCD Controller

The Omega LCD Controller is a microprocessor-based unit that controls the logic functions of the gate. Figure 1.4 on page 23 illustrates an Omega LCD Controller.
The Omega LCD Controller is equipped with a six-key keypad which is used to program and monitor the Barrier Gate functions. Each key on the keypad is assigned two functions and is color-coded to differentiate between the two functions:

- **Monitor Mode** (yellow legend) — Use the Monitor Mode to review the status and settings for components such as the Configuration Module, Omega LCD Controller, Connection Panel, or lane status.

- **Menu Mode** (blue legend) — Use the Menu Mode to program the gate options, review reports, and send gate commands.

The keys on the keypad interface with a 16-character LCD display on the Omega LCD Controller. Figure 1.3 illustrates an Omega LCD Controller keypad.

![Figure 1.4 Omega LCD Controller](image-url)
Figure 1.5 Omega LCD Controller Keypad

Configuration Module

The Configuration Module is a factory-programmed cartridge that plugs into the Connection Panel and defines the Barrier Gate software options. You can plug any Omega LCD Controller into the gate without concern for software options and previous programming, as the gate programming is defined in the Configuration Module. Figure 1.6 on page 25 illustrates the location of the Barrier Gate Configuration Module on the Connection Panel. For information about the configuration features that are available in the Configuration Module, refer to Appendix C, “Configuration Options”.

Detector Loops

The standard Barrier Gate detector loops are 2’ 6" x 6" (.76 m x 1.8 m), 16 gauge, THHN insulated wire. For asphalt or concrete (without metal mesh) installation, use 5 turns of wire; for metal mesh, reinforced concrete installation (such as parking decks), use 3 turns of wire. For information about loops, refer to Chapter 2 “Loop Installation”.

Figure 1.6 Configuration Module
Mechanical Components

A 1/3 HP 115 VAC single phase instant-reversing motor drives the gate arm. The motor is connected by double V-belts to a heavy duty 60-1 single reduction speed reducer. Power is transmitted to the gate arm drive shaft through a crank and connecting rod. Adjustable cams limit gate arm travel. The crank and drive shaft are constructed of cold-rolled steel. The connecting rod is cut from heavy duty cold rolled steel with self-lubricating oil lite bearings. All metal parts are plated in order to prevent rust and corrosion. Refer to Figure 1.7 on page 27 for a view of the mechanical components.
Figure 1.7 Barrier Gate Internal View

- Bearing Block
- Down Limit Switch
- Down Limit Cam
- Vee Belt
- Motor
- Motor Capacitor
- Up Limit Cam
- Up Limit Switch
- Main Shaft
- Bearing Block
- Connecting Rod
- Speed Reducer
- Heater Cartridge
- Reducer Oil Filler Plug
- Connection Panel
- Omega LCD Controller
Working with the Menus

Both hardware and software control how the Barrier Gate functions. Functions are controlled by:

- **Configuring the DIP switches** — DIP switches determine the mode of operation for the lane. Refer to “Field Connections on the Connection Panel,” on page 49.

- **Programming the software that controls the gate** — Software controls the information that the system will process. Software also allows you to customize the parts of your system that may change on a regular basis and further controls some of the hardware. Provided that you have set the DIP switches correctly and have the appropriate firmware, you can program a variety of options.

Appendix C “Configuration Options” describes all the configuration module features that are specific to the Barrier Gate. Chapter 5, “Programming the Barrier Gate,” starting on page 85 provides instructions for programming the gate.

Navigating the Omega LCD Controller Menus

Use the keys on the Omega LCD Controller keypad to navigate the Omega LCD Controller menus. Figure 1.8 shows an example of an Omega LCD Controller menu.

**Figure 1.8** Omega LCD Controller Menu

```
PROGRAMMING.....
```

The following table describes how to move through menus and screens, and how to select an option.
### Table 1.2 Navigating Menus on the Omega LCD Controller

<table>
<thead>
<tr>
<th>If You Want To...</th>
<th>Do This...</th>
<th>Keypad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go to the next screen.</td>
<td>Press the STATUS/DOWN key.</td>
<td><img src="image" alt="Keypad Diagram" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go to the previous screen.</td>
<td>Press the MISC/Up key.</td>
<td><img src="image" alt="Keypad Diagram" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scroll through the menu.</td>
<td>Press the MISC/Up or Status/Down key.</td>
<td><img src="image" alt="Keypad Diagram" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 1.2 Navigating Menus on the Omega LCD Controller

<table>
<thead>
<tr>
<th>If You Want To...</th>
<th>Do This...</th>
<th>Keypad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select a menu item.</td>
<td>Press the <strong>SCROLL/ENT</strong> key.</td>
<td><img src="image" alt="Keypad Diagram" /></td>
</tr>
<tr>
<td>Exit from a menu option.</td>
<td>Press the <strong>CONFIG/ESC</strong> or <strong>COUNTS/END</strong> key.</td>
<td><img src="image" alt="Keypad Diagram" /></td>
</tr>
<tr>
<td>Display the options in fields that you can choose from.</td>
<td>Press the <strong>STATUS/DOWN</strong> or <strong>MISC/UP</strong> key.</td>
<td><img src="image" alt="Keypad Diagram" /></td>
</tr>
<tr>
<td>Select an option in the field.</td>
<td>Press the <strong>SCROLL/ENT</strong> key.</td>
<td><img src="image" alt="Keypad Diagram" /></td>
</tr>
</tbody>
</table>
Chapter 2

Loop Installation

Loop Overview

Loop detectors detect the presence of a vehicle within a specific zone around and above the loop. Before you install a gate in your parking facility, you must install the loops.

The loop, or coil of wire, is embedded in the ground. The gate’s internal loop detector circuit generates an electronic signal that passes through the loops. When the signal is applied to the loop coil, an electromagnetic field is generated around the loop. Metal passing through this field causes a change in the signal. The gate detects this change and the controller generates an output that indicates vehicle presence on the loop.

Loop Detector Operation

The loop coil is the inductive component of an oscillator located in the electronic module. The oscillator generates a signal whose frequency is dependent on internal components and the external loop.

Metal passing over the inductance loop alters the frequency of the loop. When this occurs, the electronic module in the Omega LCD Controller detects the change in frequency. This indicates that a vehicle is on the loop. The Omega LCD Controller generates an output signal to enable either the Passport 360 (Vend A) or the ticket issuing device (Vend B). This indicates that a vehicle is present on the loop.

The loop detector generates a pulse output representing each vehicle passing over the loop, along with a constant presence output that stays on as long as the vehicle remains on the loop. The pulse output, which “closes” for about a 1/4 second, is generally used for vehicle counts, whereas the presence output closes for the duration a vehicle is on the loop.

Hardware Requirements

The loop coil consists of a number of turns of insulated, stranded wire embedded in a sawslot cut into the pavement. The wire should have a minimum insulation thickness of 0.045” (1.13 mm), and exhibit a stable dielectric constant. A 16 -18 gauge stranded, THHN insulation wire is recommended. Other wire types may not be able to withstand the chemical attack and
environmental stress exerted on loops. This is especially important in areas where temperature extremes cause the pavement to expand and contract. In areas where loops are exposed to these extreme conditions, a PVC pre-formed loop is recommended for greater longevity and more reliable service.

*Note:* Wire with improper insulation will eventually break down, which can cause false detections, impaired sensitivity, or complete inoperability of the loop detector circuit.

**Typical Loop Layout**

A typical loop layout is shown in Figure 2.1 on page 32.

*Figure 2.1  Typical Loop Layout*

Your lane layout determines where you place the loop in a lane. Refer to the equipment layout drawings provided in your engineering package for specific instructions on positioning the loops.

*Be sure of the loop location! Improperly installed loops can cause problems with normal lane operation.*

**Installing the Loops**

Figure 2.2 illustrates the loop installation in concrete. A saw slot is cut 1/4" — 3/8" wide by 1.5" deep. The saw slot is a rectangular shape to the specified loop dimensions, plus a slot for lead conduit. (See “Determine the Loop Size,” page 34.) The saw slot is grouted with Bondo P-606 detector loop sealant or equivalent.
Use these guidelines when installing the loop:

- Keep loop leads to a maximum length of 100' (30.5 m). See “Set the Loop Lead Length,” page 36.
- Typically, the primary and secondary loops are positioned approximately 2' - 4' apart; however, the specific locations of the loops depend upon the application.
- Loop lead in wires must be twisted a minimum of 6 - 10 turns per foot.
- Loop leads must not share conduit with any other power or signal conductors.
- Loop wire must be 16 -18 THHN type insulation, single conductor stranded wire.
- Loop must be constructed from a single continuous conductor without splicing.
- The sides of any loop must be positioned a minimum of 2" from parallel lengths of reinforcement rod whose diameter is larger than 1/4".
- Stationary reinforcement metal, if necessary, may be positioned below the horizontal...
plane of the detector loop. The presence of stationary metal in the field will decrease the sensitivity of the loop. If sensitivity problems occur, settings may have to be set higher to compensate for the change. See “Loop Sensitivity,” page 41, for instructions on setting loop sensitivity.

- Do not splice wire in slot or conduit.
- Do not fracture wire insulation. Loops shorted to ground will cause detector malfunction.
- Do not use a screwdriver or other sharp tool to place the wire in the slot.
- Do not place loop over expansion joints or cracks.
- Do not secure loop directly to wire mesh or rebar. Use non-metallic cradles or stand-offs to hold loop in place during pour.

Install the loop wires so that loop wire movement is eliminated. Any movement could cause false detects. Remove all sharp bends and corners in the saw slot before the wire is inserted. Be very careful not to score or abrade the insulation jacket.

Loops installed in concrete typically outlast those installed in asphalt. Asphalt, being softer, tends to move or slide in the path where vehicles stop, particularly where the base is not stable or may be subject to water retention. Loops will appear stretched in the direction of the traffic flow, sometimes three to four inches beyond their original outline. Loops exposed to this type of stress are subject to premature failure.

Remember, the loop coil is an integral part of the detector circuit. Use care during installation.

**Determine the Loop Size**

The Loop Detector in the Omega LCD Controller works with various sizes of loops. In general, a larger loop size will increase the height and width of the electromagnetic field generated by the loops, enabling the detector to detect a wide range of vehicles.

Table 2.1 shows standard, recommended loop sizes for different applications.
### Table 2.1 Standard Loop Sizes

<table>
<thead>
<tr>
<th>Loop Size (L x W)</th>
<th>Area</th>
<th>Perimeter</th>
<th>Lane Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feet Meters</td>
<td>Feet Meters</td>
<td>Feet Meters</td>
<td></td>
</tr>
<tr>
<td>2.5 x 6</td>
<td>.76 m x 1.8 m</td>
<td>15 sq. ft.</td>
<td>1.35 m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Use this loop size to ensure tailgate detection (a second vehicle following within 6” of another vehicle).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>With this loop size, if the conditions of the installation are not optimal, some higher bed vehicles may not be consistently detected.</td>
</tr>
<tr>
<td>4 x 6</td>
<td>1.2 m x 1.8 m</td>
<td>24 sq. ft.</td>
<td>2.23 m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• High bed vehicles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In some applications, tailgate detection may not work as consistently as the 2.5’ x 6’ loop size. Tailgate sensitivity must be adjusted to achieve optimal performance.</td>
</tr>
<tr>
<td>5 x 9</td>
<td>1.5 m x 2.7 m</td>
<td>45 sq. ft.</td>
<td>4.05 m²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Oil tankers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Dump trucks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tailgate detection within six inches of another vehicle typically will not work for a loop this size.</td>
</tr>
</tbody>
</table>

Note: 3 turns in asphalt; 5 turns in decks and reinforced concrete.
The size of the loop used depends on the application. For example, if standard size passenger vehicles as well as high bed vehicles use the lane, use the 4’ x 6’ loop size. If you use the 2.5’ x 6’ (.76 m x 1.8 m) loop size, the height of the electromagnetic field may be too short to continuously detect high bed vehicles, such as modified pickup trucks.

**Note:** If you use a loop size wider than 2.5’ (.76 m) you may lose the tailgate option.

Figure 2.3 illustrates the shape of the field that the loop coil generates. The field strength is greatest along the edges of the loop and decreases toward the middle of the loop. In general, as the perimeter of the loop increases, the size of the electrical field along the loop wire also increases.

Motorcycle and bicycle traffic is not allowed in gated lanes. Vehicles with minimal amounts of metal may not be continuously detected as they cross loops because of the decreased sensitivity in the middle of the loop. This may cause the gate arm to come down while the vehicle is still on the loop.

**Set the Loop Lead Length**

A lead-in cable should be used when the lead-in length exceeds 30’ (1 m). The length of the loop lead-in cable depends on the inductance of the loop itself, but the length should not exceed 100’ (30.49 m). The inductance of the lead-in cable should not be more than 20 percent of the total inductance seen at the loop lead input of the detector module.
Use a 16-18 AWG stranded, twisted-pair wire. The cable should have a minimum twist of 6 - 10 turns per foot.

**Note:** Splicing is not recommended, but if you splice the lead cable, twist and solder the wires before sealing. This will ensure that the cable is water proof.

Lead cable has approximately 0.1 to 0.2 microhenries inductance per foot (.3 m) and 24 picofarads capacitance per foot (.3 m). Table 2.2 shows maximum lead lengths for various loop inductances.

### Table 2.2 Loop Lead Table

<table>
<thead>
<tr>
<th>Total Inductance (microhenries)</th>
<th>Max. Lead-in Inductance (microhenries)</th>
<th>Loop Inductance (microhenries)</th>
<th>Loop Lead-in Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Feet</td>
</tr>
<tr>
<td>50</td>
<td>10</td>
<td>40</td>
<td>66.6</td>
</tr>
<tr>
<td>55</td>
<td>11</td>
<td>44</td>
<td>73.3</td>
</tr>
<tr>
<td>60</td>
<td>12</td>
<td>48</td>
<td>80</td>
</tr>
<tr>
<td>65</td>
<td>13</td>
<td>52</td>
<td>86.6</td>
</tr>
<tr>
<td>70</td>
<td>14</td>
<td>56</td>
<td>93.3</td>
</tr>
<tr>
<td>75</td>
<td>15</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>64</td>
<td>106.6</td>
</tr>
</tbody>
</table>

These instructions and specifications are based on laboratory conditions and are subject to change depending on actual field situations, existing layouts, and pavement and soil conditions as well as any unique circumstances of traffic flow.

### Crosstalk and Loop Coil Frequency

“Crosstalk” may occur when two coil loops are placed within close proximity of each other and are operating at or near the same frequency. Crosstalk causes the detectors to operate incorrectly and detect vehicle presence on the adjacent loop. To avoid crosstalk, frequencies of loops installed in adjacent lanes should be separated by at least 20 KHZ.

If you think you are experiencing crosstalk, use the Crosstalk option on the Omega LCD Controller to view the current loop frequencies. See “View Current Loop Frequencies,” page 38.
Each loop frequency DIP switch on the Omega LCD Controller has two possible frequency settings: high or low. When you receive the gate from the factory, the loop frequency DIP switches are set to high frequency. Normally, you should not need to change the frequency settings for the loops, but if you are experiencing crosstalk, you may use the DIP switches to change the frequency of adjacent loops that are operating within 20 KHz of each other. Refer to Figure 3.5 on page 58 for the location of the DIP switch banks. Table 2.3 shows the DIP switch settings for the loop frequencies.

Note: Frequencies of loops installed in adjacent lanes should be separated by at least 20 KH.

Table 2.3 Omega LCD Controller DIP Switch Settings for Loop Frequency

<table>
<thead>
<tr>
<th>DIP Switch</th>
<th>Loop</th>
<th>Frequency When DIP Switch OPEN</th>
<th>Frequency When DIP Switch CLOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>B</td>
<td>High Frequency</td>
<td>Low Frequency</td>
</tr>
<tr>
<td>6</td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: This switch is used only if you have a third loop.

View Current Loop Frequencies

If you think you are experiencing crosstalk, run a crosstalk test on each of the loop detectors in your Universal PS. For more information refer to “Crosstalk,” on page 44.

Follow these steps to run the test:

1. On the Omega LCD Controller, press the MONITOR/MENU key until the MENU MODE screen displays on the LCD display. The Omega LCD Controller will automatically scroll to the PROGRAMMING screen.
2. Press the **MISC/UP** key until the **MISCELLANEOUS** screen displays. Press the **SCROLL/ENT** key.

![MISCELLANEOUS](image)

3. Press the **MISC/UP** key until the **CROSSTALK** screen displays. Press the **SCROLL/ENT** key.

![CROSSTALK](image)

4. Do one of the following:
   a. Press the **MISC/UP** key until the **LOOP A** screen displays. Press the **SCROLL/ENT** key. Go to step 5 on page 40.

![LOOP A](image)

   b. Press the **MISC/UP** key until the **LOOP B** screen displays. Press the **SCROLL/ENT** key. Go to step 5 on page 40.

![LOOP B](image)

   c. Press the **MISC/UP** key until the **LOOP C** screen displays. Press the **SCROLL/ENT** key. Go to step 5 on page 40.

![LOOP C](image)
5. The current loop frequency separation displays. Values of 30 or greater difference between A, B, and C usually indicates intermittent crosstalk trouble.

\[
\begin{array}{ccc}
+ & 00 & - 10 00
\end{array}
\]

6. Press the **COUNTS/END** key until the **MISCELLANEOUS** screen displays.

7. Press the **MONITOR/MENU** key. The **MONITOR MODE** screen displays.

Once you know the current loop frequencies, make sure that the loop is operating within the optimum frequency range. Refer to Table 2.4, which shows various loop sizes, number of turns, typical corresponding loop inductance, and operating frequency.

**Table 2.4** Loop Sizes and Operating Frequency

<table>
<thead>
<tr>
<th>Loop Size (Recommended)</th>
<th>Perimeter</th>
<th>Typical Inductance (microhenries)</th>
<th>Frequency (kHz) +/- 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feet</td>
<td>Meters</td>
<td>Feet</td>
<td>Meters</td>
</tr>
<tr>
<td>2.5' x 6'</td>
<td>.76 m x 1.8 m</td>
<td>17'</td>
<td>5.2 m</td>
</tr>
<tr>
<td>2.5' x 6'</td>
<td>.76 m x 1.8 m</td>
<td>17'</td>
<td>5.2 m</td>
</tr>
<tr>
<td>2.5' x 6'</td>
<td>.76 m x 1.8 m</td>
<td>17'</td>
<td>5.2 m</td>
</tr>
<tr>
<td>4' x 7'</td>
<td>1.2 m x 2.1 m</td>
<td>22'</td>
<td>6.7 m</td>
</tr>
</tbody>
</table>
Crosstalk and Loop Coil Frequency

You can estimate loop inductance by using the following formula:

\[ \text{Inductance} = \frac{(N \times P) \times (N + 1)}{4} \]

where \( N \) = Number of Turns and \( P \) = Perimeter of Loop.

Crosstalk can be corrected by modifying the DIP switch settings on the Omega LCD Controller to change the frequency of one of the detectors, or by switching the leads of one of the detector loops. Refer to Table 2.3, on page 38 for the DIP switch settings.

### Loop Sensitivity

You may program the sensitivity of the loop detectors to determine the distance at which a vehicle is detected as it approaches the loop coil. Sensitivity settings range from 1 to 9, with 1 being the most sensitive and 9 being the least sensitive. To program loop sensitivity settings, see “Setting Gate Sensitivity” on page 85.

To determine the correct sensitivity setting, take into account the amount of metal in the environment, as well as the type of vehicles that will be using the lane. For example, if you use 2' 6" x 6' (.76 m x 1.8 m) loops that are in close proximity, such as in multiple entrance lanes in a parking garage, you should use a mid-level sensitivity setting. This would minimize adjacent lanes affecting each other. If small pick-up trucks are being detected, a high sensitivity setting may be used.

**Note:** If you set the sensitivity too high, you may get unnecessary detect situations or the detector may lock up. Also, when you increase the loop size, you increase the range of sensitivity, but you lower the level of sensitivity.

If crosstalk occurs, and the frequencies have been offset, the next lowest sensitivity may have to be used. See “Crosstalk and Loop Coil Frequency,” page 37.

**Note:** Reinforcement rods in the concrete in the area of the loop will decrease the loop sensitivity.

### Table 2.4 Loop Sizes and Operating Frequency

<table>
<thead>
<tr>
<th>Loop Size (Recommended)</th>
<th>Perimeter</th>
<th>Turn</th>
<th>Typical Inductance (micro-henries)</th>
<th>Frequency (kHz) +/- 10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feet</td>
<td>Meters</td>
<td>Feet</td>
<td>Meters</td>
<td>A Low</td>
</tr>
<tr>
<td>4’ x 7’</td>
<td>1.2 m x 2.1 m</td>
<td>22’</td>
<td>6.7 m</td>
<td>3*</td>
</tr>
<tr>
<td>5’ x 9’</td>
<td>1.5 m x 2.7 m</td>
<td>28’</td>
<td>8.5 m</td>
<td>2*</td>
</tr>
<tr>
<td>5’ x 9’</td>
<td>1.5 m x 2.7 m</td>
<td>28’</td>
<td>8.5 m</td>
<td>3</td>
</tr>
<tr>
<td>8’ x 8’</td>
<td>2.4 m x 2.4 m</td>
<td>32’</td>
<td>9.8 m</td>
<td>2*</td>
</tr>
</tbody>
</table>

* Recommended number of turns

You can estimate loop inductance by using the following formula:
To program the tailgate sensitivity settings from 1 to 9 on the Omega LCD Controller, see “Setting Gate Sensitivity” on page 85.

You may also set loop sensitivity settings using the Connection Panel DIP switches. However, Connection Panel DIP switch settings are limited — you may set only 2 (high sensitivity) or 5 (medium sensitivity). The Omega LCD Controller will respond to the values you last programmed — from either the Controller or the DIP switches. However, if you cold start the gate, loop sensitivity settings will default to the settings defined by the DIP switches on the Connection Panel. Refer to “Set the DIP Switches for Loop Sensitivity” on page 61 for information about setting DIP switches for loop sensitivity.

Detecting Vehicles that Tailgate

The tailgate detection feature allows the Omega LCD Controller to detect the presence of a second vehicle following within six inches of another vehicle passing over a 2’ 6” x 6’ (.76 m x 1.8 m) loop coil. By detecting this condition as a tailgate, the controller can accurately count this transaction as two vehicles instead of one.

Tailgate detection maintains the integrity of any vehicle counting system, even in high traffic volume. For information on reviewing tailgate counts, see Chapter 9, “Diagnostics and Troubleshooting,” starting on page 139.

Note: Disable the tailgate option in lanes where vehicles pulling trailers are using the lane, such as at campgrounds and boat launching areas. Also, if your loop size is larger than 2.5’ (.76 m) you may lose the tailgate function. For more information about loop size and optimal performance, see “Determine the Loop Size,” page 34.

When you choose to have tailgate detection turned on, you may program tailgate sensitivity settings from 1 to 8, with 1 being the most sensitive and 8 being the least sensitive. A setting of 9 disables the tailgate function. To program the tailgate sensitivity settings on the Omega LCD Controller, see “Setting Gate Sensitivity” on page 85.

To turn on tailgate detection, you must set DIP switch 7 on the Connection Panel (open = tailgate detection off; closed = tailgate detection on). You may also set tailgate sensitivity settings using the Connection Panel DIP switches. However, Connection Panel DIP switch settings are limited — you may set only 2 (high sensitivity) or 5 (medium sensitivity). The Omega LCD Controller will respond to the values you last programmed — from either the Controller or the DIP switches. However, if you cold start the gate, tailgate sensitivity settings will default to the settings defined by the DIP switches on the Connection Panel. Refer to “Set the DIP Switches for Tailgate Detection and Sensitivity” on page 62 for information about setting DIP switches for tailgating features.
Tuning Loops

Periodically, the loops self-tune in order to track frequency changes caused by temperature changes. Changes in the environment can cause the frequency to drift. The tuning process sets the current loop frequency as the new base frequency (called the free run frequency) and calculates the new detection points based on the new frequency. Self-tuning occurs only when the loop does not detect the presence of a vehicle (called presence mode). If a loop remains in presence mode, even when a vehicle is not present, you may need to manually tune the loops by using the Tune Loops command on either the Omega LCD Controller (see “Commands Menu” on page 125) or in the Facility Management System (refer to the appropriate FMS documentation).

When a vehicle stays on the loop longer than usual, the loop’s non-presence frequency setting may drift upward. When the vehicle leaves, the loop might remain in presence mode, even though there is no vehicle present. If this happens, the loop will self-correct the situation if the loop frequency remains below the system-specified drift detection point and remains stable for a system-specified period of time.

Troubleshooting the Loop Detector

Several factors, such as climatic conditions, crosstalk, hidden inductors, etc., may cause your loop detector or loop itself to function improperly. You can take certain preventive measures to maintain the integrity of the loop.

Loop Detector Malfunction

Breakdown of wire insulation allows water to penetrate to the wire, causing loop failure. A typical saw cut in cement should last three to four years. However, one or more of the following factors may cause a defective loop:

- Sharp objects such as screwdrivers were used to install the loop.
- THHN cross-linked polyethylene wire was not used for loop.
- Faulty loop sealant was used, exposing wires to tire abuse.
- The loop was punctured by debris, such as sharp rocks, nails, etc., caught in the saw slot.
- Lightening or induced voltage surges occurred.
- The road surface around or through the loop’s circumference or lead-in cracked or shifted.

For installation guidelines, refer to “Installing the Loops,” page 32.
You can test the integrity of your loop’s insulation with a Megohm meter or “megger.” The megger produces a 500 volt potential between the loop wire and a good earth ground.

*If your megger has a 500 volt and 1200 volt setting, make sure it has been set to 500 volt. If you test a good loop with the 1200 volt setting, you may damage the insulation (rated for only 600 volt) and cause the loop to fail.*

Follow the instructions on the megger and make sure you disconnect both loop wires from the terminal or detector unit before proceeding with the test. If you are checking loops suspected of intermittent failure or in dry climates, soak the area around the loop with water one hour prior to testing. Doing so will ensure an accurate reading. The meter should indicate a reading in excess of 100 megohms of resistance to ground. Record the readings for future reference.

**Shorted Loops**

The loop’s environment can affect loop life. Damaged loops installed in dry climates may operate several months before a problem is detected, as there is no water to short the loop out to earth ground. However, soon after a good rain, the loop will begin to fail as water penetrates the insulation, shorting it out.

Diagnosing a shorted loop can be difficult, particularly when the problem is intermittent. Symptoms of a shorted loop may include the following:

- Erratic detector behavior as vehicles pass over the loop
- Failure to consistently detect cars
- Failure to detect high bed vehicles
- Detector starts failing shortly after a rain shower

Additionally, having the proper diagnostic tools such as megger, DVM, loop locator, and inductance meter with a 0-200 microhenries scale will make it easier to detect a shorted loop.

*Note:* A shorted loop must be removed and replaced.

**Crosstalk**

Another less common cause for loop failure is crosstalk from adjacent loops. Crosstalk usually occurs when two loops in close proximity are operating in the same frequency range. Crosstalk can be corrected by adjusting the frequency settings of the detectors so that adjacent loops do not operate within the same frequency range. Refer to “Crosstalk and Loop Coil Frequency” on page 37 for adjusting the frequency setting. If you have changed the frequencies and are still experiencing crosstalk, you may need to change the sensitivity. Refer to “Loop Sensitivity,” page 41, for instructions on setting loop sensitivity.
Hidden Inductors

Reinforcement bars or mesh may affect the operation of a loop detector if the bars or mesh exist in the form of a closed loop located in close proximity of the active loop. Occasionally, you may encounter a situation where mutual coupling is occurring due to a shorted abandoned loop or grid of rebar that is acting like a shorted or “closed” loop. The closed loop reduces an active loop’s sensitivity and causes intermittent lane failure.

The condition created by the closed loop, sometimes referred to as swamping, causes the active loop’s field to induce eddy currents into the nearby closed loop. The eddy currents in turn create a magnetic field in the closed loop. This diminishes the active loop’s field and raises its base operating frequency. The closed loop draws the magnetic flux of the active loop down toward itself, effectively reducing the height of the active loop’s magnetic lines of flux. Figure 2.4 illustrates the signal strength of a typical loop as compared to the effect of a hidden inductor on signal strength.
Using a Loop Locator

Use a Loop Locator such as the Intersection Development Corporation’s Model 505 Loop finder to locate the loop and find its field strength. The loop finder can also indicate the presence of hidden, “closed loops.”

To test the strength of the loop, follow these directions:

1. Run the tester probe perpendicularly across the loop edges.
2. As you pass the probe tip over the loop perimeter, there should be a linear rise in signal strength.

*Note:* The linear rise in strength starts at about 10" (25.40 cm) from either side of the loop, and peaks at about 1" (2.5 cm) from the loop. Refer to Figure 2.4 for the signal strength of a typical loop.

3. As you pass the probe directly over the active loop wires, the meter will drop to zero. It stays at zero as you pass the probe between the opposing magnetic fields.

4. As you move the probe past the center line, the meter should rise, peaking immediately. As you continue to move the probe away from the loop edge, the meter should decrease in a linear fashion.
CHAPTER 3

Barrier Gate Electronics
Installation

Gate Configuration Overview

This chapter describes how to configure the electrical components of the Universal PS.

This chapter contains the following topics:

- “Field Connections on the Connection Panel” on page 49
- “Installing the Configuration Module” on page 53
- “Removing the Configuration Module” on page 54
- “Installing the Omega LCD Controller” on page 55
- “Removing the Omega LCD Controller” on page 57
- “Setting the DIP Switches on the Connection Panel” on page 57
- “Set the DIP Switches for Base Mode/Sub Mode” on page 58
  - “Set the DIP Switches for Device Number” on page 59
  - “Set the DIP Switches for Rebound Features” on page 60
  - “Set the DIP Switches for Loop Sensitivity” on page 61
  - “Set the DIP Switches for Tailgate Detection and Sensitivity” on page 62
- “Starting the Barrier Gate” on page 63
  - “Cold Starting the Gate” on page 63
  - “Warm Starting the Gate” on page 65
- “Setting the Time and Date on the Omega LCD Controller” on page 65
- “Operating the Gate without a Configuration Module” on page 68
  - “Set DIP Switches for Lane Operation Modes in No Config Mode” on page 69
  - “Set Loop Sensitivity for No Config Mode” on page 71

Field Connections on the Connection Panel

You can order the Barrier Gate in a large variety of configurations. The Connection Panel connections will vary depending upon the purchased options.

Note: Before you install and configure the terminal connection on the Connection Panel, check to make sure that the 115/230 volt switch on the Connection Panel is in the correct position, based on your regional line voltage.
Chapter 3 • Barrier Gate Electronics Installation

Figure 3.1 on page 51 illustrates terminal connections for a Barrier Gate with the standard configuration module, without any optional software or inputs and outputs. Figure 3.2 on page 52 illustrates terminal connections for a Barrier Gate without the standard configuration module. If your gate includes any software options, the Input and Output terminals may be defined differently.

Check your Engineering Package for actual terminal usage diagrams to determine Input and Output definitions.

Table 3.1, on page 53 lists the minimum inputs and outputs for the Barrier Gate to function. The recommended minimum size to be used for field connection signal control wires is #18 gauge.
Figure 3.1 Barrier Gate Connection Panel with Standard Configuration Module

Field Connections on the Connection Panel
Figure 3.2 Barrier Gate Connection Panel without Standard Configuration Module
Installing the Configuration Module

The Configuration Module is required to access the features you may have ordered with the gate. It contains the input and output definitions and the options and reports for the gate. Figure 3.3 on page 54 illustrates the location of the Configuration Module.

Note: If the Configuration Module is not installed in the gate, you will still be able to operate the gate, but will be unable to access all the features available with the gate.

The Configuration Module is typically installed at the factory.

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Vend A</td>
<td>3 Vend A Enable</td>
</tr>
<tr>
<td>2 Vend B</td>
<td>4 Vend B Enable</td>
</tr>
<tr>
<td>3</td>
<td>5 Pulse A</td>
</tr>
<tr>
<td>4</td>
<td>6 Pulse B</td>
</tr>
<tr>
<td>5</td>
<td>7 Presence A</td>
</tr>
<tr>
<td>6</td>
<td>8 Presence B</td>
</tr>
<tr>
<td>7 Ticket Request</td>
<td>9</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>12 Common</td>
<td>14</td>
</tr>
<tr>
<td>13 Common</td>
<td>15</td>
</tr>
<tr>
<td>14 Common</td>
<td>16</td>
</tr>
</tbody>
</table>
If you remove it for repairs/maintenance, follow these steps to reinstall it.

1. Spray the Configuration Module Connector with contact cleaner to ensure a good connection.

2. With the power OFF, plug the Configuration Module into the Configuration Module Connector on the Connection Panel. Figure on page 54 shows the location of the Configuration Module and the Control Power Switch.

3. Cold start the Omega LCD Controller. See “Starting the Barrier Gate,” page 63 for instructions.

**Removing the Configuration Module**

Follow these steps if you need to remove the Configuration Module to send it to the factory for repair.

*Do not plug or unplug the Configuration Module with the power on, otherwise you may damage the unit.*
To remove the configuration module:

Refer to Figure 3.3 on page 54 for the location of the Configuration Module and the Control Power switch.

1. Make sure the Control Power switch is OFF. (Failure to terminate power may result in damage to the Configuration Module.)

2. Remove the Configuration Module by pulling it out and away from the Configuration Module Connector on the front of the Connection Panel.

Installing the Omega LCD Controller

The Omega LCD Controller and Configuration Module control the way in which your Barrier Gate functions. Figure 3.4 on page 55 illustrates the location of the DIP switches on the Omega LCD Controller and the position of the DIP switches if they are open.

![Figure 3.4 Omega LCD Controller and Open DIP Switches](image)

To secure the Omega LCD Controller and set the DIP switches, complete the following steps.

Refer to Figure 3.3 on page 54 for the following steps.

1. Make sure the Control Power switch and the Gate and Heater AUTO/UP/OFF switches on the Power Supply are in the OFF position.

---

*Do not plug or unplug the Omega LCD Controller with the power on; otherwise, you may damage the unit.*
2. Set the DIP switches on the Omega LCD Controller as shown in Table 3.2, on page 56.

**Note:** When you receive the gate from the factory, the Loop Frequency DIP switches will be set to the high frequency. You should not need to change the frequency unless you are experiencing crosstalk. See “Crosstalk and Loop Coil Frequency” on page 37. To set detector loop frequency to low, close the DIP switches.

<table>
<thead>
<tr>
<th>DIP Switch</th>
<th>Omega LCD Controller</th>
<th>Normal Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reset Omega LCD Controller</td>
<td>Open</td>
</tr>
<tr>
<td>2</td>
<td>Drain Supercap in Omega LCD Controller(^1)</td>
<td>Open</td>
</tr>
<tr>
<td>3</td>
<td>Unused</td>
<td>Open</td>
</tr>
<tr>
<td>4</td>
<td>Detector Loop A: High Frequency</td>
<td>Open</td>
</tr>
<tr>
<td>5</td>
<td>Detector Loop B: High Frequency</td>
<td>Open</td>
</tr>
<tr>
<td>6</td>
<td>Detector Loop C: High Frequency</td>
<td>Open</td>
</tr>
<tr>
<td>7</td>
<td>Sets mode for loading firmware to Flash memory. (Closed when loading firmware; see Chapter 8, “Updating the Firmware,” starting on page 131.)</td>
<td>Open</td>
</tr>
<tr>
<td>8</td>
<td>Continue communication protocol if there are more devices that are online.</td>
<td>Open</td>
</tr>
<tr>
<td></td>
<td>Terminate communications if there are no more devices that are online.</td>
<td>Closed</td>
</tr>
</tbody>
</table>

\(^1\) You must turn power OFF before you drain the Supercap in the Omega LCD Controller.

**Note:** If the Barrier Gate is the last communicating device in an online system, close DIP switch 8 on the Omega LCD Controller. This indicates to the system that there are no more communicating devices online.

3. Spray the pins and the connector on the Omega LCD Controller with contact cleaner to ensure a good connection.

4. With the LCD screen side of the Omega LCD Controller facing the front towards you and the connector end facing the rear of the Barrier Gate, slide the Omega LCD Controller into the Connection Panel and plug into the connectors.
Removing the Omega LCD Controller

Follow this procedure to remove the Omega LCD Controller from the gate.

---

Do not plug or unplug the Omega LCD Controller with the power on; otherwise you may damage the unit.

---

To remove the Omega LCD Controller:

1. Make sure the Control Power switch and the Gate and Heater AUTO/UP/OFF switches on the Power Supply are in the OFF position. Refer to Figure 3.3 on page 54.

2. Pull the Omega LCD Controller forward to release it from the key slots and Connector on the Connection Panel.

3. Remove the Omega LCD Controller from the gate.

Setting the DIP Switches on the Connection Panel

In the Barrier Gate, the DIP switches that determine lane operation are located on the Connection Panel. Follow the steps in this section to set the DIP switches on Switch Banks 1, 2, and 3. Figure 3.5 on page 58 shows the location of the switch banks.

This topic includes instructions for the following:

- “Set the DIP Switches for Base Mode/Sub Mode” on page 58
- “Set the DIP Switches for Device Number” on page 59
- “Set the DIP Switches for Rebound Features” on page 60
- “Set the DIP Switches for Loop Sensitivity” on page 61
- “Set the DIP Switches for Tailgate Detection and Sensitivity” on page 62
**Set the DIP Switches for Base Mode/Sub Mode**

The DIP switches on DIP Switch Bank 1 are used to set the lane operation, also known as the mode setting. Refer to Chapter D, “Lane Operation,” starting on page 169 for diagrams of the lane configurations showing how these mode settings are used.

DIP switches 1-3 set the placement of the loop(s) in the lane, called ‘Base Mode’ setting. DIP switches 4 and 5 set the placement of devices in the lane, called ‘Sub Mode’ setting. DIP switches 6-8 are always closed. Set the DIP switches as shown in Table 3.3, on page 59.

**Note:** DIP switches 6, 7, and 8 must be closed for all mode settings. If they are open, the gate will work properly but the mode setting for the gate will appear incorrectly in the facility management system’s System Activity Monitor.

---

**Figure 3.5 Location of DIP Switch Banks on the Connection Panel**

![Diagram of DIP Switch Banks on the Connection Panel]

Switch Bank 1
Switch Bank 2
Switch Bank 3
Switch Bank 4
Table 3.3 DIP Switch Settings for Base Mode/Sub Mode

<table>
<thead>
<tr>
<th>Mode</th>
<th>Switch Bank 1 DIP Switches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Base Mode 1 - Sub Mode 1</td>
<td>closed</td>
</tr>
<tr>
<td>Base Mode 2 - Sub Mode 1</td>
<td>closed</td>
</tr>
<tr>
<td>Base Mode 2 - Sub Mode 2</td>
<td>closed</td>
</tr>
<tr>
<td>Base Mode 2 - Sub Mode 3</td>
<td>closed</td>
</tr>
<tr>
<td>Base Mode 3 - Sub Mode 1</td>
<td>closed</td>
</tr>
<tr>
<td>Base Mode 3 - Sub Mode 2</td>
<td>closed</td>
</tr>
<tr>
<td>Base Mode 3 - Sub Mode 3</td>
<td>closed</td>
</tr>
<tr>
<td>Base Mode 5 - Sub Mode 2</td>
<td>OPEN</td>
</tr>
<tr>
<td>Base Mode 6 - Sub Mode 1</td>
<td>OPEN</td>
</tr>
<tr>
<td>Base Mode 6 - Sub Mode 2</td>
<td>OPEN</td>
</tr>
</tbody>
</table>

Set the DIP Switches for Device Number

DIP switches 1-5 on Switch Bank 2 are used to set the device number. Set the DIP switches as follows:

- If the gate is an offline (non-communicating) device, close DIP switches 1-5.
- If the gate is online (communicating), assign a device number to the gate by opening one or more of DIP switches 1-5 on Switch Bank 2 so that their values total the desired device number. Refer to Table 3.5, on page 58 for the value of the DIP switches when they are open.
**Table 3.4 DIP Switch Settings for Device Number**

<table>
<thead>
<tr>
<th>Switch Bank 2</th>
<th>DIP Switch</th>
<th>Value When Open</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>16</td>
</tr>
</tbody>
</table>

For example, to assign device number 5 to the gate, you would open DIP switches 1 and 3.

---

**Set the DIP Switches for Rebound Features**

DIP switches 7 and 8 on Switch Bank 2 are used to set rebound features. DIP switch 6 is unused; it does not matter whether the DIP switch is open or closed.

You may set the rebound sensitivity setting from either the Connection Panel or by programming the settings in the Omega LCD Controller. The Connection Panel DIP switch sensitivity setting is limited to 1 (high) or 5 (medium). In the Omega LCD Controller, you can program the sensitivity setting in a range from 1 to 9. The Omega LCD controller will respond to the values you last programmed. Refer to “Setting Gate Sensitivity” on page 85 for instructions on programming rebound sensitivity in the Omega LCD Controller.

- **DIP switch 7 on Switch Bank 2** is used to enable or disable the Presence B Rebound feature. If you disable the feature, the gate arm will rebound only if it encounters an object as it lowers. If you enable this feature, the gate arm will rebound when a vehicle presence is detected on Loop B. Set DIP switch 7 as shown in Table 3.5, on page 61.

- **DIP switch 8 on Switch Bank 2** is used to set the sensitivity of the gate motor current sensing system, which causes the gate arm to rebound if it senses a vehicle under the arm. Set DIP switch 8 as shown in Table 3.5, on page 61.
Setting the DIP Switches on the Connection Panel

Table 3.5 DIP Switch Settings for Rebound Features

<table>
<thead>
<tr>
<th>DIP Switch</th>
<th>Feature</th>
<th>Value When Open</th>
<th>Value When Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Unused (does not matter how DIP switch is set)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>7</td>
<td>Reset loop rebound delay</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>8</td>
<td>Motor current rebound sensitivity</td>
<td>5 (medium sensitivity)</td>
<td>1 (high sensitivity)</td>
</tr>
</tbody>
</table>

Set the DIP Switches for Loop Sensitivity

Loop sensitivity determines at what distance from the loop coil that the loop detector detects the presence of a vehicle. You may set different sensitivities for three different loops (A, B and C). Set the DIP switches as shown in Table 3.6, on page 61.

You may set the loop sensitivity settings from either the Connection Panel or by programming the settings in the Omega LCD Controller. Connection Panel DIP switch sensitivity settings are limited to 2 (high) or 5 (medium). In the Omega LCD Controller, you can program sensitivity settings in a range from 1 to 9. The Omega LCD Controller will respond to the values you last programmed. However, if you cold start the Omega LCD Controller, loop sensitivity settings will default to the settings defined by the DIP switches on the Connection Panel. Refer to “Setting Gate Sensitivity” on page 85 for instructions on programming loop sensitivity in the Omega LCD Controller.

Table 3.6 DIP Switch Settings for Loop Sensitivity

<table>
<thead>
<tr>
<th>DIP Switch</th>
<th>Feature</th>
<th>Value When Open</th>
<th>Value When Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Detector Sensitivity for Loop A</td>
<td>5 (medium sensitivity)</td>
<td>2 (high sensitivity)</td>
</tr>
<tr>
<td>2</td>
<td>Detector Sensitivity for Loop B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Detector Sensitivity for Loop C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Set the DIP Switches for Tailgate Detection and Sensitivity

Four DIP switches on Switch Bank 3 control whether tailgate detection is enabled and the sensitivity at which it operates. The tailgate detection feature detects the presence of a second vehicle following within six inches of another vehicle passing over a 2’ 6” x 6’ (.76 m x 1.8 m) loop coil. Tailgate sensitivity determines how sensitive the loop detector is at detecting the presence of the second vehicle. You may set different sensitivities for three different loops (A, B, and C).

You may set the tailgate sensitivity settings from either the Connection Panel or by programming the settings in the Omega LCD Controller. Connection Panel DIP switch sensitivity settings are limited to 2 (high) or 5 (medium). In the Omega LCD Controller, you can program sensitivity settings in a range from 1 to 8. (A setting of 9 disables tailgate detection.) The Omega LCD Controller will respond to the values you last programmed. However, if you cold start the Omega LCD Controller, tailgate sensitivity settings will default to the settings defined by the DIP switches on the Connection Panel. Refer to “Setting Gate Sensitivity” on page 85 for instructions on programming tailgate sensitivity in the Omega LCD Controller.

To set the DIP switches for tailgate detection and sensitivity:

1. Set DIP switch 7 to turn tailgate detection on or off, as shown in Table 3.7, on page 62.

2. Do one of the following to set tailgate sensitivity:
   - If you turned off tailgate detection by setting DIP switch 7 to ‘open,’ you may skip this step. It does not matter how you set tailgate sensitivity on DIP switches 4, 5, and 6, as tailgate sensitivity for all loops will automatically be set at 9 in the Omega LCD Controller, which will disable tailgate detection.
   - If you turned on tailgate detection by setting DIP switch 7 to ‘closed,’ set DIP switches 4, 5, and 6 as shown in Table 3.7, on page 62.

<table>
<thead>
<tr>
<th>DIP Switch</th>
<th>Feature</th>
<th>Value When Open</th>
<th>Value When Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Tailgate Sensitivity for Loop A</td>
<td>5 (medium sensitivity)*</td>
<td>2 (high sensitivity)*</td>
</tr>
<tr>
<td>5</td>
<td>Tailgate Sensitivity for Loop B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Tailgate Sensitivity for Loop C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Tailgate Detection</td>
<td>Off (tailgating is allowed)</td>
<td>On (tailgating is not allowed)</td>
</tr>
</tbody>
</table>
Starting the Barrier Gate

You may “cold start” or “warm start” the Barrier Gate. The method you use depends on whether or not you are operating in No Config mode and whether or not you have changed DIP switch settings.

This topic includes instructions for the following:

- “Cold Starting the Gate” on page 63
- “Warm Starting the Gate” on page 65

Cold Starting the Gate

There are two different conditions in which you will “cold start” the gate:

- When you change DIP switch settings and you want the settings to take effect when you turn on the gate.

- When there is no configuration module in the Omega LCD Controller and you want to operate the gate in No Config mode. Refer to “Operating the Gate without a Configuration Module” on page 68.

To cold start the gate:

1. Turn the Control Power switch on the Connection Panel to ON, and at the same time, hold down the MONITOR/MENU key on the Omega LCD Controller. Figure 3.6 on page 64 shows the location of the Control Power switch, and Figure 3.7 on page 64 shows the keys on the Omega LCD Controller.
2. Continue to hold down the MONITOR/MENU key until MENU MODE displays on the LCD screen.
3. Release the MONITOR/MENU key.

---

If the Omega LCD Controller has no configuration module, when you start the gate without holding down the MONITOR/MENU key, the Omega LCD Controller will not operate.

---

Warm Starting the Gate

To warm start the gate, simply place the Control Power switch in the ON position (refer to Figure 3.6 on page 64.

Setting the Time and Date on the Omega LCD Controller

Once you install the hardware, connect the wiring, and set the DIP switches, you must program the Omega LCD Controller. To do this, use the programming buttons, located on the lower left corner of the Omega LCD Controller. The changes will be reflected on the LCD display on the Omega LCD Controller. In order for the Barrier Gate to function minimally, you must program the time and date. See Chapter 5, “Programming the Barrier Gate,” starting on page 85 for more information about programming the Omega LCD Controller.

When you initially turn on the Barrier Gate, the system uses January 1, 1993 as a default value. In order for the Barrier Gate to function properly, you must reset the time and date. Figure 3.8 on page 66 illustrates the menu on the Omega LCD Controller that you should use. If the Barrier Gate is online with a Facility Management System (FMS), you may also send the time and date to the gate using Device Commands in the FMS.
Figure 3.8  Time and Date Menu

To reset the time and date, use the following steps:

1. Hold down the MONITOR/MENU key until you are in the MENU Mode. Press the MISC/Up key until the PROGRAMMING screen displays.

2. From the PROGRAMMING screen, press the SCROLL/ENT key.

3. If the TIME/DATE screen is not displayed, press the MISC/Up key until it displays. Then press the SCROLL/ENT key.

4. Select the date format, by pressing the MISC/Up key until the format you want to select displays. You may select either M/D/Y or D/M/Y. Then press the SCROLL/ENT key.
5. Set the time, by completing the following steps:
   a. Change the hour, by pressing the **MISC/Up** key to increase the number or press the **STATUS/Down** to decrease the displayed number.
   b. The screen will reflect the changes you make.
   c. When the hour you want to set displays, press the **SCROLL/ENT** key.
   d. The cursor will move to the minutes field.
   e. Change the minutes, by pressing the **MISC/Up** key to increase the number or press the **STATUS/Down** key to decrease the number.
   f. The screen will reflect your changes.
   g. When the minutes you want to set display, press the **SCROLL/ENT** key.
   h. The cursor will move to the first date field.

   ![Time Screen]

   20:53  01/01/96

6. Set the date, by completing the following steps:
   a. For each number of the date, press the **MISC/Up** key to increase the number, or press the **STATUS/Down** key to decrease the number. The screen will reflect the changes you make.
   b. When the number you want to set displays, press the **COUNTS/END** key. The cursor will move to the date field.
   c. After you set the day, month, and year, press the **SCROLL/ENT** key. The first line of the **TIME/DATE** screen displays again.

   ![Date Screen]

   20:53  03/15/99
Operating the Gate without a Configuration Module

The Barrier Gate can operate without a Configuration Module, if the gate has been configured in a ‘No Config’ mode. You can perform the following functions in the Omega LCD Controller without a Configuration Module:

- Set the time and date in the Omega LCD Controller.
- Program the timers, such as back-out timer, etc.
- Send commands from the Omega LCD Controller.
- Perform crosstalk and run-time diagnostics tests.
- View the Exception Event Report.

Note: Configuration Module options such as counters and time zone features are not available in the No Config Mode.

If you warm start the gate (turn on the Power Control switch without holding down the MONITOR/MENU key on the Omega LCD Controller), and the Omega LCD Controller does not detect the presence of the Configuration Module within two seconds after power-up, the Omega LCD Controller will not operate, and the following will occur:

Note: If the Omega LCD Controller detects the re-appearance of the Configuration Module within two seconds, it continues to function normally.

- If it is a communicating gate, it sends a latched alarm message “CONFIG FAILURE” to the facility management system.

Note: If you plug in a new Configuration Module after the alarm message is sent, the Omega LCD Controller will ignore the re-appearance of the Configuration Module. You must reset the Omega LCD Controller by turning it off and then on again to enable it to recognize the Configuration Module.

- The Omega LCD Controller waits for an additional five seconds to allow the alarm message to be forwarded to the facility management system. After the message is sent, the Omega LCD Controller does the following:
  - Resets the gate and mode logic.
  - Sends a “BAD CFG” event message to the Total and Exception Event Reports.
  - Displays the message “CONFIG FAILURE” on the LCD display.
You can temporarily operate your gate without the Configuration Module. Refer to Table 3.8, on page 69 to review the Inputs and Outputs for your Barrier Gate when you operate it in a No Config Mode.

### Table 3.8 “No Config” Mode Inputs and Outputs

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Vend A</td>
<td>3 Gate Up (active if raised)</td>
</tr>
<tr>
<td>2 Vend B</td>
<td>4 Gate Up (active if lowered)</td>
</tr>
<tr>
<td>3 Rebound</td>
<td>5 Pulse A</td>
</tr>
<tr>
<td>4 Override</td>
<td>6 Pulse B</td>
</tr>
<tr>
<td>5 undefined</td>
<td>7 Presence A</td>
</tr>
<tr>
<td>6 undefined</td>
<td>8 Presence B</td>
</tr>
<tr>
<td>7 Ticket Request</td>
<td>9 Illegal Forward</td>
</tr>
<tr>
<td>8 undefined</td>
<td>10 Illegal Reverse</td>
</tr>
<tr>
<td>9 undefined</td>
<td>11 Monthly Forward</td>
</tr>
<tr>
<td>10 undefined</td>
<td>12 Transient Forward</td>
</tr>
<tr>
<td>11 Sensitivity B - Switch 8 (B2)</td>
<td>13 undefined</td>
</tr>
<tr>
<td>12 Common</td>
<td>14 undefined</td>
</tr>
<tr>
<td>13 Common</td>
<td>15 Unused</td>
</tr>
<tr>
<td>14 Common</td>
<td>16 Unused</td>
</tr>
</tbody>
</table>

This topic includes instructions for the following:

- “Set DIP Switches for Lane Operation Modes in No Config Mode” on page 69
- “Set Loop Sensitivity for No Config Mode” on page 71

### Set DIP Switches for Lane Operation Modes in No Config Mode

When operating in No Config mode, the Barrier Gate may be used in four different lane configurations. Table 3.9, on page 70 shows the DIP switch settings for these modes on the Connection Panel DIP Switch Bank 4. Base Mode 1, Sub Mode 1 is a one loop lane operation; the other three modes are two-loop lane operations. Refer to Appendix D “Lane Operation” starting on page 169 for graphic illustrations of these modes.
To set the lane operation mode for a gate in No Config mode:

1. Set DIP switches 1-4 on Switch Bank 4 of the Connection Panel. (Switch banks 1-3 are not used for No Config mode.) Refer to Table 3.9, on page 70.

2. Cold start the Omega LCD Controller for the settings to take effect. For instructions on cold starting, see “Starting the Barrier Gate,” page 63.

<table>
<thead>
<tr>
<th>Setting</th>
<th>DIP Switch 1</th>
<th>DIP Switch 2</th>
<th>DIP Switch 3</th>
<th>DIP Switch 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Mode 1 - Sub Mode 1</td>
<td>closed</td>
<td>OPEN</td>
<td>OPEN</td>
<td>OPEN</td>
</tr>
<tr>
<td>Base Mode 2 - Sub Mode 2</td>
<td>OPEN</td>
<td>closed</td>
<td>OPEN</td>
<td>OPEN</td>
</tr>
<tr>
<td>Base Mode 2 - Sub Mode 1</td>
<td>closed</td>
<td>closed</td>
<td>OPEN</td>
<td>OPEN</td>
</tr>
<tr>
<td>Base Mode 2 - Sub Mode 3</td>
<td>OPEN</td>
<td>OPEN</td>
<td>OPEN</td>
<td>OPEN</td>
</tr>
</tbody>
</table>
Set Loop Sensitivity for No Config Mode

If you operate your Barrier Gate in a No Config mode, you must use DIP switches 5-8 on DIP Switch Bank 4 of the Connection Panel to set loop sensitivity, as follows:

- DIP switches 5 and 6 determine Loop A sensitivity. Refer to Table 3.10, on page 71 to determine the setting for these switches.

**Table 3.10** Loop A Sensitivity DIP Switch Settings for No Config Mode

<table>
<thead>
<tr>
<th>Setting</th>
<th>DIP Switch 5</th>
<th>DIP Switch 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium Sensitivity</td>
<td>OPEN</td>
<td>OPEN</td>
</tr>
<tr>
<td>Low Sensitivity</td>
<td>closed</td>
<td>OPEN</td>
</tr>
<tr>
<td>Medium Sensitivity &amp; Tailgate Detection Off</td>
<td>OPEN</td>
<td>closed</td>
</tr>
<tr>
<td>High Sensitivity</td>
<td>closed</td>
<td>closed</td>
</tr>
</tbody>
</table>

- DIP switches 7 and 8 determine Loop B sensitivity. Refer to Table 3.11, on page 71 to determine the setting for these switches.

**Table 3.11** Loop B Sensitivity DIP Switch Settings for No Config Mode

<table>
<thead>
<tr>
<th>Setting</th>
<th>DIP Switch 7</th>
<th>DIP Switch 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium Sensitivity</td>
<td>OPEN</td>
<td>OPEN</td>
</tr>
<tr>
<td>Low Sensitivity</td>
<td>closed</td>
<td>OPEN</td>
</tr>
<tr>
<td>Medium Sensitivity &amp; Tailgate Detection Off</td>
<td>OPEN</td>
<td>closed</td>
</tr>
<tr>
<td>High Sensitivity</td>
<td>closed</td>
<td>closed</td>
</tr>
</tbody>
</table>
CHAPTER 4

Mechanical Installation

Mechanical Installation Overview

This chapter describes how to install the hardware components of the Universal PS.

This chapter contains the following topics:

■ “Installing the Barrier Gate Cabinet” on page 73
■ “Installing the Barrier Gate Arm” on page 77
  ● “Install a Standard Barrier Gate Arm” on page 78
  ● “Install a Folding Barrier Gate Arm” on page 79
■ “Adjusting the Cam for Barrier Gate Arm Travel” on page 80
■ “Setting the Barrier Gate for Automatic Operation” on page 82
  ● “Opening the Gate During Power Failure” on page 83
  ● “Opening the Barrier Gate in an Emergency” on page 83

Installing the Barrier Gate Cabinet

When you install gate equipment, it becomes permanently connected to a power source. As a result, the equipment must have a readily accessible disconnect device incorporated in the fixed wiring. The disconnect must have a control separation of at least 3 mm.

The first step in setting up your Barrier Gate is to install the cabinet that houses the gate.

Install the cabinet so that the end portion of the gate arm is more than 2’ (62 cm) from any rigid object, such as a wall, when fully extended in the down position. If the distance is less than 2’ (62 cm), a person may get trapped between the end portion and the rigid object, causing bodily injury to the individual.
To set up the cabinet:

1. Remove the cabinet from the carton or packaging. Leave the cabinet bolted to the bottom pallet until you are ready to install it.

   *Note:* Be careful not to damage the cabinet finish.

2. Using the key provided, unlock the cabinet doors.

3. Remove the bolts that fasten the cabinet to the pallet and place the cabinet in position on the curb, as shown in Figure 4.1 on page 74.

   *Note:* Make sure that the gate arm flange is facing in the direction appropriate for the applicable gate orientation. Refer to Figure 4.2 on page 75.

**Figure 4.1** Center Cabinet Alignment

- Conduit w/Cap Bushing to be Stubbed 2" (5.08 cm) Above Mounting Surface
- 3/4" (1.90 cm) Diameter in Four Places
- 1 1/4" (3.18 cm) TYP
- 7 1/2" (19.05 cm) TYP
- 15" (38 cm) TYP
- 18" (45.72 cm)
- Curb Line
4. Mount the cabinet in an upright position. If the lane slopes, place the cabinet on a concrete pad as shown in Figure 4.3 on page 76.
5. Mark the location of the mounting holes on the concrete. Make sure that the center line of the cabinet base is 18" (45.72 cm) from the curb line.

For step 6 through step 8, refer to “Anchor Bolt Installation,” on page 77.

6. Remove the cabinet from the position, and follow the manufacturer’s instructions for installing the anchor bolts. The recommended bolt is Redhead #JS-38H, 3/8” x 3” stud anchor, or equivalent.

7. With the bolts installed, place the mounting gasket over the bolts, and then set the cabinet on top of the gasket, aligning the bolts up through the holes of the cabinet.

8. Install the washers and nuts, and tighten them in place.
9. Attach wiring to the proper terminals on the Connection Panel. Refer to your Field Connection Diagram.

All electrical wiring must be connected exactly as indicated in your Field Connection Diagram.

10. If you are installing an older gate, remove the small screw from the plastic gear reducer cap. This allows the gear reducer to have a vent.

   Newer gates have a vent hole in the brass gear reducer cap screw, so it does not need to be removed.

   You can distinguish a gate’s age by the material from which the cap is made. The gear reducer cap in a newer gate is brass; the gear reducer cap in an older gate is plastic.

   If you do not remove the screw, expansion and contraction can cause the seals in the reducer to leak oil. This applies only to older gates, which have a plastic gear reducer cap.

Installing the Barrier Gate Arm

The Universal PS can accommodate either a standard gate arm or a folding gate arm.
This topic includes instructions on how to:

- “Install a Standard Barrier Gate Arm” on page 78
- “Install a Folding Barrier Gate Arm” on page 79

Install a Standard Barrier Gate Arm

To install the standard Barrier Gate arm, complete the following steps:

1. Set the Control Power switch to ON. This will turn on power to the gate.
2. Move the Gate switch between the UP and the AUTO positions to move the Barrier Gate mechanism up and down several times. Refer to Figure 4.8 on page 83.
3. Set the Control Power switch to OFF. This will turn off the power to the gate.

Refer to Figure 4.5 on page 79 for step 4 through step 9.
4. Loosen the four bolts holding together the gate arm flange and flange cover. These should be bolted together on the side of the gate cabinet.
5. Slide out the flange cover.
6. Slide in the gate arm between the flange and the flange cover.
7. Place the flange cover on top of the gate arm.
8. Align the four holes in the flange cover with the four holes in the gate arm flange.

Note: The gate arm flange has two sets of four holes. Use the outer set of holes for installing the regular gate arm.

Double check and tighten all terminal connections and mechanical fasteners before you turn on the power.
9. Bolt the assembly together.

10. Position limit switches and cams correctly and tighten them (Figure 4.7 on page 81). If the Barrier Gate arm drops before starting up, adjust the limit switch cams. Refer to “Adjusting the Cam for Barrier Gate Arm Travel” on page 80 for instructions on cam adjustment.

Install a Folding Barrier Gate Arm

If a lane has a low overhead clearance, you may need to install a folding Barrier Gate arm.

To install a folding Barrier Gate arm, complete the following steps:

1. Set the Control Power switch to ON. This will turn on power to the gate.

2. Move the Gate switch between the UP and the AUTO positions to move the Barrier Gate mechanism up and down several times. Refer to Figure 4.8 on page 83.

3. Set the Control Power switch to OFF. This will turn off the power to the gate.

   Refer to Figure 4.6 on page 80 for step 4 through step 6.

4. Remove the four bolts on the Barrier Gate arm flange.

5. Align the four holes in the Barrier Gate arm with the four holes in the gate arm flange.

   **Note:** The gate arm flange has two sets of four holes. Use the inner set of holes for installing the folding Barrier Gate arm.

6. Bolt the gate arm to the folding Barrier Gate arm flange.
7. Connect one end of the gate arm cable to the stabilizer in the Barrier Gate arm. Connect the other end to the opening in the side of the gate cabinet, adjacent to the Barrier Gate arm flange. Refer to Figure E.2 on page 204.

8. Position limit switches and cams correctly and tighten them (Figure 4.7 on page 81). If the Barrier Gate arm drops before starting up, adjust the limit switch cams. Refer to “Adjusting the Cam for Barrier Gate Arm Travel” on page 80 for instructions on cam adjustment.

**Adjusting the Cam for Barrier Gate Arm Travel**

You can control how far the Barrier Gate arm will travel in either direction by adjusting the screws on the Up Limit Cam and/or the Down Limit Cam, as illustrated in Figure 4.7 on page 81.
**Adjusting the Cam for Barrier Gate Arm Travel**

**Figure 4.7 Adjusting the Cam**

Do one of the following to adjust the Barrier Gate arm:

1. Loosen the thumbscrew on the Down Limit Cam.
2. Do one of the following:
   - To adjust for more downward travel, rotate the screw slightly in the “B” direction.
   - To adjust for less downward travel, rotate the screw slightly in the “A” direction.
3. Tighten the thumbscrew.
4. Turn on the power.
5. Test the Barrier Gate arm travel by moving the Gate switch between the UP and AUTO positions.

*Turn power off before adjusting the cams. If power to the Barrier Gate is not turned off, severe personal injury may occur.*

---

To adjust the **downward** Barrier Gate arm travel:

1. Loosen the thumbscrew on the Down Limit Cam.
2. Do one of the following:
   - To adjust for **more downward** travel, rotate the screw slightly in the “B” direction.
   - To adjust for **less downward** travel, rotate the screw slightly in the “A” direction.
3. Tighten the thumbscrew.
4. Turn on the power.
5. Test the Barrier Gate arm travel by moving the Gate switch between the UP and AUTO positions.
To adjust the **upward** Barrier Gate arm travel:

1. Loosen the thumbscrew on the Up Limit Cam.

2. Do one of the following:
   - To adjust for **more upward** travel, rotate the screw slightly in the “B” direction.
   - To adjust for **less upward** travel, rotate the screw slightly in the “A” direction.

3. Tighten the thumbscrew.

   **Note:** If the cams are loose, tighten the set screw on the back side of each cam assembly, as a loose cam will affect the gate arm travel. Refer to Figure 4.7 on page 81.

4. Turn on the power.

5. Test the Barrier Gate arm travel by moving the Gate switch between the UP and AUTO positions.

### Setting the Barrier Gate for Automatic Operation

When the gate switch is set to ‘Auto,’ it will open in response to a vend signal from devices such as a ticket issuing device, vehicle detector, card reader, Facility Management System command, or push button. This is the most typical operation setting.

To set the Barrier Gate for Automatic operation:

1. Open the gate door.

2. Place the Gate switch in the AUTO position. Refer to Figure 4.8 on page 83.
Opening the Gate During Power Failure

If the power fails, follow this procedure to open or close the gate:

1. Turn off the power to the gate at the source.
2. Manually rotate the motor pulley by pulling on the Vee-belts until the gate arm is in the desired position.

Opening the Barrier Gate in an Emergency

To open the Barrier Gate in an emergency, follow these steps:

1. Move the Gate switch to the UP position. This will raise the Barrier Gate arm, which will remain in the up position. You cannot lower the Barrier Gate arm again while the switch is in the UP position.
2. Move the Gate switch to the AUTO position to resume automatic gate operation.

If you do not turn the power off, severe personal injury may occur.
CHAPTER 5

Programming the Barrier Gate

Programming Overview

This section describes how to program the Omega LCD Controller in the Universal PS. Use these optional programming options to configure the Barrier Gate functions. If the gate is online to the Facility Management System, you can program the gate though the Device Commands feature, or you can program the gate using the Omega LCD Controller.

Note: In order for the gate to function minimally, you must program the time and date. See “Setting the Time and Date on the Omega LCD Controller” on page 65.

This section contains the following topics:

- “Setting Gate Sensitivity” on page 85
- “Programming Timer Features” on page 89
- “Resetting Counters” on page 92
- “Defining Function Time Zones” on page 93
- “Programming Differential Counters (Optional Feature)” on page 97
- “Programming an Alarm Message” on page 99

Setting Gate Sensitivity

There are four sensitivity settings in the Omega LCD Controller:

- **Loop Sensitivity** — Determines at what distance from the loop coil the loop detector detects the presence of a vehicle. You may set unique sensitivities for three different loops.

- **Tailgate Sensitivity** — Determines how sensitive the loop detector is at detecting the presence of a second vehicle following within six inches of another vehicle over a 2' 6" x 6' (.76 m x 1.8 m) loop coil. You may set unique sensitivities for three different loops.

- **Rebound Motor Sensitivity** — Determines the sensitivity of the gate motor current sensing system, which causes the gate arm to rebound if it senses a vehicle under the arm.

- **Broken Gate Arm Sensitivity** — Determines the sensitivity of the broken gate arm sensor, which monitors the motor current to determine whether the arm on the gate is broken. This functionality is no longer available.
Sensitivity settings range from 1 to 9, with 1 being the most sensitive and 9 being the least sensitive.

**Note:** For tailgate sensitivity, a sensitivity setting of 9 disables the tailgate function.

Sensitivity settings may also be set using DIP switches on the Connection Panel; however, Connection Panel DIP switch settings are limited. Some sensitivity settings will default to the sensitivity settings defined by the DIP switches on the Connection Panel when you cold start the gate. Refer to “Setting the DIP Switches on the Connection Panel” on page 57 for Connection Panel DIP switch sensitivity settings.

Figure 5.1 on page 86 illustrates the location of the menu items to set your sensitivity settings.

**Figure 5.1** Omega LCD Controller Sensitivity Programming Menu

To program the sensitivity settings, complete the following steps:

1. From the PROGRAMMING screen, press the SCROLL/ENT key once.

---

```
PROGRAMMING

SENSITIVITY

Pres A Sen =
Pres B Sen =
Pres C Sen =
Tlgt A Sen =
Tlgt B Sen =
Tlgt C Sen =
Reb Mot Sen =
Bkn Arm Sen =

Sensitivity of Loop Detector B
Tailgate Sensitivity of Loop Detector A
Tailgate Sensitivity of Loop Detector C
Sensitivity setting for the Broken Gate Arm sensor. This functionality is no longer available.

Sensitivity of Loop
Sensitivity of Loop
Tailgate Sensitivity of Loop Detector B

Sensitivity setting for the gate motor current sensing system which causes the gate arm to rebound if it senses a vehicle under the arm.
```
2. Press the **MISC/UP** key until the SENSITIVITY screen displays; then press the **SCROLL/ENT** key.

![SENSITIVITY](image)

3. Do one of the following to select the desired sensitivity function:
   - To set the rebound motor sensitivity, press the **MISC/UP** key until the Reb Mot Sen screen displays.
     
     ![Reb Mot Sen = 5](image)
     
     - To set the broken gate arm sensitivity, press the **MISC/UP** key until the Bkn Arm Sen screen displays. *This functionality is no longer available.*
       
       ![Bkn Arm Sen = 5](image)
       
     - To set the presence A sensitivity, press the **MISC/UP** key until the Pres A Sen screen displays.
       
       ![Pres A Sen = 5](image)
       
     - To set the presence B sensitivity, press the **MISC/UP** key until the Pres B Sen screen displays.
       
       ![Pres B Sen = 5](image)
Chapter 5 • Programming the Barrier Gate

- To set the presence C sensitivity, press the MISC/UP key until the Pres C Sen screen displays.

  ![Pres C Sen = 5](image1)

- To set the tailgate sensitivity of loop A, press the MISC/UP key until the Tlgt A Sen screen displays.

  ![Tlgt A Sen = 5](image2)

- To set the tailgate sensitivity of loop B, press the MISC/UP key until the Tlgt B Sen screen displays.

  ![Tlgt B Sen = 5](image3)

- To set the tailgate sensitivity of loop C, press the MISC/UP key until the Tlgt C Sen screen displays.

  ![Tlgt C Sen = 5](image4)

4. Press the SCROLL/ENT key.

5. Press the MISC/UP key to increase the number, or press the STATUS/DOWN key to decrease the number. The settings range from 1 = most sensitive, and 9 = least sensitive (except for Tailgate Sensitivity, where 9 = tailgate off).

6. When the number you want to select displays, press the SCROLL/ENT key.

7. When you have finished programming the sensitivity, press the COUNTS/END key until the PROGRAMMING screen displays.

  ![PROGRAMMING](image5)
Programming Timer Features

There are four standard timers that determine the amount of time the Barrier Gate arm remains in a raised position, based on the cause of the raised arm. The four programmable timer features include:

- **No Loop Backout Timer** — sets the number of seconds that the gate will wait after a vend before the arm automatically lowers, as long as no vehicle travels over the reset loop. The default is 0 seconds, which turns the timer off. When the timer is set to 0, the arm will remained raised for approximately 1 1/4 hours, as long as no vehicle travels over the reset loop. Settings range from 0 to 99.

- **Loop Backout Timer** — sets the number of seconds that a vehicle can take to travel between Loop A and Loop B before the Barrier Gate arm lowers. The timer begins when the vehicle moves off Loop A. If the timer is set to 0, the gate arm lowers as soon as the vehicle leaves Loop A. The default is 0.5 seconds. Settings range from 0 to 9.5.

  **Note:** If Loop A and Loop B are 8' 3" (2.52 m) apart, set the timer at 0.

- **Rebound Up Timer** — sets the number of seconds that the gate remains in the raised position when a rebound occurs. The default is 0 seconds. If set to 0, the Barrier Gate arm comes down immediately after the arm is raised in a rebound condition. Settings range from 0 to 99.

- **Up Alarm Timer** — sets the number of seconds that the Barrier Gate waits, prior to generating an alarm, when the gate arm remains in the raised position. The default is 105 seconds. Settings range from 0 to 999.

Figure 5.2 on page 90 illustrates the Miscellaneous Timers menu in the Omega LCD Controller.
To define timers:

1. From the PROGRAMMING screen, press the SCROLL/ENT key once.

2. Press the MISC/UP key until the MISC TIMERS screen displays; then press the SCROLL/ENT key.
3. Do one of the following to select the desired timer function:
   - To set the no loop backout timer, press the MISC/Up key until the NO LP BO TMR screen displays.
     ![NO LP BO TMR=00]
   - To set the loop backout timer, press the MISC/Up key until the LP BO TMR screen displays.
     ![LOOP BO TMR=00]
   - To set the rebound up timer, press the MISC/Up key until the REBOUND UP screen displays.
     ![REBOUND UP = 00]
   - To set the up alarm timer, press the MISC/Up key until the UP ALARM screen displays.
     ![UP ALARM = 000]

4. Press the SCROLL/ENT key.

5. Press the MISC/Up key to increase the number, or press the STATUS/DOWN key to decrease the number.

6. When the number you want to select displays, press the SCROLL/ENT key.

7. When you have finished programming the timers, press the COUNTS/END key until the PROGRAMMING screen displays.
   ![PROGRAMMING]
Resetting Counters

The Omega LCD Controller stores counters that provide a variety of information such as the number of times a presence was detected on each loop, number of monthly vehicles that entered the facility, number of transient vehicles that entered the facility, etc. These counters may be resettable or non-resettable. Each counter acts as an accumulating counter and stores 999,999 counts before returning to zero and restarting the counts. For a description of available counters, see Appendix C “Configuration Options” starting on page 157. To review counts, see “Viewing Count Information” on page 116.

Resettable counts can be reset from the Programming Menu in the Omega LCD Controller. Figure 5.3 on page 92 illustrates the RESET COUNTS menu.

**Figure 5.3** Omega LCD Controller RESET COUNTS Menu

To reset the counters:

1. From the PROGRAMMING screen, press the SCROLL/ENT key once.

2. Press the MISC/UP key until the RESET COUNTS screen displays; then press the SCROLL/ENT key.
3. On one of the following:

- To reset all resettable counters, press the **MISC/UP** key until the **ACCUMULATORS** screen displays; then press the **SCROLL/ENT** key to reset the counters.

![ACCUMULATORS](image)

- To reset all resettable counters, press the **MISC/UP** key until the **HOURLY COUNTS** screen displays; then press the **SCROLL/ENT** key to reset the counters.

![HOURLY COUNTS](image)

4. When you have finished resetting counts, press the **COUNTS/END** key until the **PROGRAMMING** screen displays.

![PROGRAMMING](image)

**Defining Function Time Zones**

Use this menu option to program time periods during which specific functions are activated and deactivated. Six programmable timer options are available:

- **Time Zone for Override** — use this option to activate or deactivate raising the Barrier Gate at a specified time without storing counts.

- **Raise/Lower Time Zone** — use this option activate or deactivate raising the Barrier Gate at a specified time while continuing to store counts.

- **Monthly Device Time Zone** — use this option to activate or deactivate a monthly device at a specified time.

- **Transient Time Zone** — use this option to activate or deactivate a transient device at a specified time.

- **Auxiliary 1 On/Off Time Zone** (available in a custom configuration) — use this option to activate or deactivate a relay contact at a specified time.

- **Auxiliary 2 On/Off Time Zone** (available in a custom configuration) — use this option to activate or deactivate a relay contact at a specified time.
Time Zones can be defined from the Programming Menu in the Omega LCD Controller. Figure 5.4 on page 94 illustrates the TIME ZONES menu.

**Figure 5.4** Omega LCD Controller TIME ZONES Menu

To define a time zone function:

1. From the PROGRAMMING screen, press the **SCROLL/ENT** key once.

2. Press the **Misc/Up** key until the TIME ZONES screen displays.

3. Press the **Scroll/Ent** key.
4. Press the **MISC/Up** key until the desired feature screen displays:

- OVERRIDE
- RAISE/LOWER
- ENABLE TRANS
- ENABLE MONTH
- RELAY 1 ON/OFF
- RELAY 2 ON/OFF

5. Press the **SCROLLENTER** key.

6. To define the Time Zone number:
   a. Press the **MISC/Up** key to increase the number.
   b. Press the **STATUS/DOWN** key to decrease the number.
   c. Press the **SCROLL/ENT** key.

```plaintext
A# 01:U 00:00 SU
```
7. To enable/disable the Time Zone:
   a. Press the MISC/UP key until the desired value displays. Select from U (Unused), E (Enabled), or D (Disabled).
   b. Press the SCROLL/ENT key.

8. To define the activation/deactivation time (Hour:Minute):
   a. Press the MISC/UP key to increase the hour number, or press the STATUS/DOWN key to decrease the hour number.
   b. Press the SCROLL/ENT key. The cursor moves to the minutes field.
   c. Press the MISC/UP key to increase the minute number, or press the STATUS/DOWN key to decrease the minute number.
   d. Press the SCROLL/ENT key.

9. To define the activation/deactivation day:
   a. Press the MISC/UP key until the day you want to select displays.
   b. Press the SCROLL/ENT key.

10. Repeat this process until all activating/deactivating time zones have been define.

11. When you have finished programming time zones, press the CONFIG/ESC key until the PROGRAMMING screen displays.
Programming Differential Counters (Optional Feature)

Use this option to define the Single or Dual Differential Counters, if this option is included with your Barrier Gate. Use this menu option to:

- Program the total number of parking spaces available for each counter. For example, if your facility has 1,000 spaces, you can program the differential facility counter as “1000.” The Differential Counter is capable of storing up to 9,999 counts to track vehicles in a facility with up to 10,000 spaces.

If you are defining the Differential Counter as a total facility space counter, the Omega LCD Controller subtracts a count each time a vehicle enters the facility and adds a count each time a vehicle exits the facility.

- Program the Differential Counters to count monthly or transient activity. In this configuration, the Omega LCD Controller subtracts a count each time a monthly or transient vehicle enters the facility and adds a count each time a monthly or transient vehicle exits the facility.

For both differential counter uses, when the count reaches zero, the Full Output is activated.

Figure 5.5 on page 97 illustrates the menu item for programming Differential Counters.

Figure 5.5 Omega LCD Controller DIFF COUNTER Menu

To program the Differential Counters:

1. From the PROGRAMMING screen, press the SCROLL/ENT key once.
2. Press the **MISC/UP** key until the **DIFF COUNTER** screen displays.

![DIFF COUNTER](image)

3. Press the **SCROLL/ENT** key.

4. Press the **MISC/UP** key until the desired differential counter screen displays.

![DIFF 1 = +0000](image)

![DIFF 2 = +0000](image)

5. Press the **SCROLL/ENT** key.

6. Press the **MISC/UP** key to select either + (to add to the count), or - (to deduct from the count). For example, if the counter is used to count spaces, and 25 spaces in your lot are under construction and not usable, you may set the differential counter to -25.

![DIFF 1 = -0000](image)

7. Press the **SCROLL/ENT** key.

8. To set the first digit of the differential count:
   a. Press the **MISC/UP** key to increase the number.
   b. Press the **STATUS/DOWN** key to decrease the number.
   c. Press the **SCROLL/ENT** key.
   d. Repeat step a and step b for the remaining digits in the counter.

![DIFF 1 = -0025](image)
9. Repeat this process to program another differential counter, if appropriate.

10. When you have finished programming differential counts, press the **COUNTS/END** key until the PROGRAMMING screen displays.

Programming an Alarm Message

Use this option to define and enable an alarm message when the Monitor Input is in either an ‘Open’ state or a ‘Closed’ state - depending on configuration. When you access Monitor Input programming, the Omega LCD Controller display indicates which terminal is defined as the Monitor Input.

*Note:* The default setting for Monitor Input is “Unused.” Program this option only if you want the Monitor Input to generate an alarm message.

Figure 5.6 on page 99 illustrates the MONITOR INPUTS menu.

**Figure 5.6** Omega LCD Controller MONITOR INPUTS Menu

To define the Monitor Input:

1. From the PROGRAMMING screen, press the **SCROLL/ENT** key once.
2. Press the MISC/Up key until the MONITOR INPUTS screen displays.

3. To define the desired state, either Open or Closed (the state that will trigger the alarm message), press the MISC/Up key until the desired state displays; then press the SCROLL/ENT key.

4. To define the action for the selected state (Alarm or Unused), press the MISC/Up key until the desired action displays; then press the SCROLL/ENT key.

5. To program the alarm message:
   a. Press the MISC/Up or STATUS/DOWN key to scroll through the list of alphanumeric characters.
   b. When the desired character displays, press the SCROLL/ENT key.
   c. Repeat step a and step b until the message is complete.

6. When you have finished programming differential counts, press the COUNTS/END key until the PROGRAMMING screen displays.
CHAPTER 6

Monitoring

Monitoring Overview

Use the Omega LCD Controller Monitor Mode to view gate data, including diagnostic information, software and hardware configuration settings, lane transactions, report messages, count, and lane status.

This section contains the following topics:

- “Viewing the Diagnostic Information” on page 101
  - “DIP Switch Hexadecimal Representation” on page 102
  - “View the Diagnostic Information on the Miscellaneous Menu” on page 103
- “Viewing the Software and Hardware Configuration Menus” on page 105
- “Reviewing Lane Transaction Information” on page 110
- “Accessing Report Messages” on page 114
- “Viewing Count Information” on page 116
- “Viewing Lane Status Functions” on page 121

Viewing the Diagnostic Information

To help you troubleshoot the Universal PS, the Omega LCD Controller provides the following data:

- Configured date and time
- Firmware version on the Omega LCD Controller
- Hexadecimal representation settings of the Configuration Module DIP switch banks
- Analogue to digital conversion data
- 12V power signature data
- Watchdog timer setting
DIP Switch Hexadecimal Representation

Use the SW 1-3 (Switchbank 1 - 3) item in the MISCELLANEOUS menu to verify that the Omega LCD Controller is reading the Configuration Module DIP switches correctly. SW 1-3 is a hexadecimal representation of the DIP switches on each switch bank. Figure 6.1 on page 102 illustrates how to read the SW 1-3 menu.

**Figure 6.1 Understanding SW 1-3**

The first hexadecimal digit corresponds to DIP switches 1-4. The second hexadecimal digit corresponds to DIP switches 5-8. To convert the hexadecimal value, use the table on the left for the first hexadecimal digit. Use the table on the right for the second hexadecimal digit. 1 indicates the DIP switch is open. 0 indicates that the DIP switch is closed.
### Table 6.1 Hexadecimal Values of DIP Switches

<table>
<thead>
<tr>
<th>Hexadecimal Values</th>
<th>Binary Equivalent DIP Switch</th>
<th>Hexadecimal Values</th>
<th>Binary Equivalent DIP Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td></td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>0</td>
<td>0 0 0 0</td>
<td>0</td>
<td>0 0 0 0</td>
</tr>
<tr>
<td>1</td>
<td>0 0 0 1</td>
<td>1</td>
<td>0 0 0 1</td>
</tr>
<tr>
<td>2</td>
<td>0 0 1 0</td>
<td>2</td>
<td>0 0 1 0</td>
</tr>
<tr>
<td>3</td>
<td>0 0 1 1</td>
<td>3</td>
<td>0 0 1 1</td>
</tr>
<tr>
<td>4</td>
<td>0 1 0 0</td>
<td>4</td>
<td>0 1 0 0</td>
</tr>
<tr>
<td>5</td>
<td>0 1 0 1</td>
<td>5</td>
<td>0 1 0 1</td>
</tr>
<tr>
<td>6</td>
<td>0 1 1 0</td>
<td>6</td>
<td>0 1 1 0</td>
</tr>
<tr>
<td>7</td>
<td>0 1 1 1</td>
<td>7</td>
<td>0 1 1 1</td>
</tr>
<tr>
<td>8</td>
<td>1 0 0 0</td>
<td>8</td>
<td>1 0 0 0</td>
</tr>
<tr>
<td>9</td>
<td>1 0 0 1</td>
<td>9</td>
<td>1 0 0 1</td>
</tr>
<tr>
<td>A</td>
<td>1 0 1 0</td>
<td>A</td>
<td>1 0 1 0</td>
</tr>
<tr>
<td>B</td>
<td>1 0 1 1</td>
<td>B</td>
<td>1 0 1 1</td>
</tr>
<tr>
<td>C</td>
<td>1 1 0 0</td>
<td>C</td>
<td>1 1 0 0</td>
</tr>
<tr>
<td>D</td>
<td>1 1 0 1</td>
<td>D</td>
<td>1 1 0 1</td>
</tr>
<tr>
<td>E</td>
<td>1 1 1 0</td>
<td>E</td>
<td>1 1 1 0</td>
</tr>
<tr>
<td>F</td>
<td>1 1 1 1</td>
<td>F</td>
<td>1 1 1 1</td>
</tr>
</tbody>
</table>

**View the Diagnostic Information on the Miscellaneous Menu**

Figure 6.2 on page 104 illustrates the diagnostic information on the Miscellaneous Menu.
To view the diagnostic information on the MISCELLANEOUS Menu:

1. Press the **MONITOR/MENU** key until the **MONITOR MODE** screen displays.

2. Press the **MISC/UP** key to scroll to the MISCELLANEOUS menu.

3. Do one of the following:
   - To scroll through the screen, line by line, press the **SCROLL/ENT** key.
   - To have the unit automatically scroll through the information, hold the **SCROLL/ENT** key until you see the message SCROLL START...
   - To end the automatic scrolling process, press the **SCROLL/ENT** until you see the message SCROLL STOP...
4. To return to the MISCELLANEOUS screen, press the Misc/UP key.

5. To return to the MENU MODE screen, press the Monitor/Menu key.

Viewing the Software and Hardware Configuration Menus

Use this process to review the hardware and software configurations of the Barrier Gate. This topic includes the following menu options:

- **Settings** — displays the DIP switch settings on the Connection Panel. The DIP switches are set at the factory. Figure 6.3 on page 106 illustrates the information on the Settings Menu.

- **Options** — displays the software options that are included in your Barrier Gate configuration module. You will see the line items for the options present in your system. Figure 6.4 on page 107 illustrates the information on the Options Menu.

- **Inputs** — displays the software function of each Input terminal connection. These vary with the options included with your configuration module. To review the Inputs that are available, see Appendix C “Configuration Options” starting on page 157. Figure 6.5 on page 108 illustrates the information on the Inputs Menu (your features may vary from what is shown).

- **Outputs** — displays the software function of each Output terminal connection. These vary with the options included with your configuration module. To review the Outputs available, see Appendix C “Configuration Options” starting on page 157. Figure 6.6 on page 109 illustrates the information on the Inputs Menu (your features may vary from what is shown).
**Figure 6.3 Omega LCD Controller SETTINGS Menu**

**MONITOR MODE**

Lane operation configuration

- Indicates whether Vend B is enabled by a Presence, Auto Ticket Issuing Device Pulse, or a Ticket Request
- Sensitivity of motor current rebound sensing system which makes the gate arm rebound if it detects vehicle presence under the gate
- Sensitivity of Detector A, which detects vehicle presence on Loop A
- Sensitivity setting for detecting tailgating vehicles on Loop A
- Sensitivity setting for detecting tailgating vehicles on Loop C

**SETTINGS**

- Mode: B# S#
- Device Num =
- Vend B En =
- Reb Pr B =
- Reb Mot Sen =
- Bkn Arm Sen =
- Loop A Sen =
- Loop B Sen =
- Loop C Sen\(^1\) =
- Tlgt A Sen =
- Tlgt B Sen =
- Tlgt C Sen\(^2\) =

---

1. The Loop C Sen setting will show only if you have the optional Loop C.
2. The Tlgt C Sen setting will show only if you have the optional Loop C.

---

Gate identifying number

- Indicates whether the gate arm will rebound after sensing a presence on Loop B
- Sensitivity of broken gate arm sensor. *Functionality no longer available.*
- Sensitivity of Detector B, which detects presence on Loop B
- Sensitivity of Detector C, which detects presence on Loop C
- Sensitivity setting for detecting tailgating vehicles on Loop B
Figure 6.4 Omega LCD Controller OPTIONS Menu

<table>
<thead>
<tr>
<th>MONITOR MODE</th>
<th>OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RS422 Comm</td>
</tr>
<tr>
<td></td>
<td>Count Report</td>
</tr>
<tr>
<td></td>
<td>Loop C</td>
</tr>
<tr>
<td></td>
<td>Dir Arming</td>
</tr>
<tr>
<td></td>
<td>Time Zn: Over</td>
</tr>
<tr>
<td></td>
<td>Time Zn: Raise</td>
</tr>
<tr>
<td></td>
<td>Time Zn: Month</td>
</tr>
<tr>
<td></td>
<td>Time Zn: Trans</td>
</tr>
<tr>
<td></td>
<td>Time Zn: Out 1</td>
</tr>
<tr>
<td></td>
<td>Time Zn: Out 2</td>
</tr>
<tr>
<td></td>
<td>Bkn Gate Arm</td>
</tr>
</tbody>
</table>

- **Hourly Count Report option** (up to eight reports available)
- **Directional Arming option**; raises the gate only if the vehicle is traveling in the correct direction
- **Raise/Lower Time Zone Control software**; raise/lower the gate arm and store counts
- **Transient Enable Time Zone Control software**; activate or deactivate a transient device at specific times
- **Broken Gate Arm monitoring feature**; enables the Omega LCD Controller to sound an alarm if the gate arm is broken. *This functionality is no longer available.*
- **Omega LCD Controller communications option**
- **Optional third loop, Loop C**
- **Override Time Zone Control software**; raise the gate arm at specified times without storing counts
- **Monthly Enable Time Zone Control software**; activate or deactivate a monthly device at specified times
- **Defines one of the 32 (16 each) Outputs as Time Zone Output 1 or 2 control**; use the Output at specified times for other functions.
Figure 6.5 Omega LCD Controller INPUTS Menu

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1=VEND A</td>
<td>Input terminal #1 has been defined as Vend A Input</td>
</tr>
<tr>
<td>2=VEND B</td>
<td>Input terminal #2 has been defined as Vend B Input</td>
</tr>
<tr>
<td>3=REBOUND</td>
<td>Input terminal #3 has been defined as Rebound Input</td>
</tr>
<tr>
<td>4=OVERIDE</td>
<td>Input terminal #4 has been defined as Override Input</td>
</tr>
<tr>
<td>5=FULL A</td>
<td>Input terminal #5 has been defined as Full A (Monthly parking lot full) Input</td>
</tr>
<tr>
<td>6=FULL B</td>
<td>Input terminal #6 has been defined as Full B (Transient parking lot full) Input</td>
</tr>
<tr>
<td>7=TKT REQ</td>
<td>Input terminal #7 has been defined as Ticket Request Input</td>
</tr>
<tr>
<td>8=R/L INP</td>
<td>Input terminal #8 has been defined as Raise Gate Input</td>
</tr>
<tr>
<td>9=UNDEFND</td>
<td>Input terminal #9 has no software function</td>
</tr>
<tr>
<td>10-UNDEFND</td>
<td>Input terminal #10 has no software function</td>
</tr>
<tr>
<td>11=UNDEFND</td>
<td>Input terminal #11 has no software function</td>
</tr>
<tr>
<td>12=COMMON</td>
<td>Input terminal #12, #13, and #14 reserved Common</td>
</tr>
<tr>
<td>13=COMMON</td>
<td></td>
</tr>
<tr>
<td>14=COMMON</td>
<td></td>
</tr>
</tbody>
</table>
To view the hardware and software configuration:

1. Press the **MONITOR/MENU** key until the **MONITOR MODE** screen displays.

2. Press the **CONFIG/Esc** key to scroll to the desired menu (SETTINGS, OPTIONS, INPUTS, OUTPUTS.)
3. Do one of the following:

- To scroll through the screen, line by line, press the SCROLL/ENT key.
- To have the unit automatically scroll through the information, hold the SCROLL/ENT key until you see the message SCROLL START...
- To end the automatic scrolling process, press the SCROLL/ENT until you see the message SCROLL STOP...

4. To return to the option first selected, or to choose another option, press the CONFIG/ESC key.

5. To return to the MENU MODE screen, press the MONITOR/MENU key.

**Reviewing Lane Transaction Information**

The Barrier Gate stores all lane activity data. You can view a summary of the stored data in one of two formats:

- **Total Event Reports** — provides a list of all standard and exception lane activity in a lane. These messages provide a short description of the event along with the time that the event occurred.

- **Exception Events Reports** — provides a list of all unusual (exception) events in the lane. This includes events such as component malfunctions and diagnostic events.

The report messages will appear on the Omega LCD Controller display screen.

Table 6.2, on page 111 defines all possible report messages.
### Table 6.2 Reports Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Report</th>
<th>Total</th>
<th>Exception</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm OK</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Gate arm is OK (has been replaced).</td>
</tr>
<tr>
<td>Bkn Arm</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Gate arm is broken.</td>
</tr>
<tr>
<td>Clr LpA</td>
<td>X</td>
<td></td>
<td></td>
<td>Vehicle cleared Loop A.</td>
</tr>
<tr>
<td>Clr LpB</td>
<td>X</td>
<td></td>
<td></td>
<td>Vehicle cleared Loop B.</td>
</tr>
<tr>
<td>Clr LpC</td>
<td>X</td>
<td></td>
<td></td>
<td>Vehicle cleared Loop C.</td>
</tr>
<tr>
<td>DnLm OK</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Down limit switch is OK (fixed).</td>
</tr>
<tr>
<td>DoorOff</td>
<td>X</td>
<td></td>
<td></td>
<td>Gate door is open (requires Gate Door Input).</td>
</tr>
<tr>
<td>EmA Clr</td>
<td>X</td>
<td></td>
<td></td>
<td>Vehicle cleared Loop Emulator A.</td>
</tr>
<tr>
<td>EmB Clr</td>
<td>X</td>
<td></td>
<td></td>
<td>Vehicle cleared Loop Emulator B.</td>
</tr>
<tr>
<td>EmC Clr</td>
<td>X</td>
<td></td>
<td></td>
<td>Vehicle cleared Loop Emulator C.</td>
</tr>
<tr>
<td>Emul A</td>
<td>X</td>
<td></td>
<td></td>
<td>Presence detected from Loop Emulator A Input.</td>
</tr>
<tr>
<td>Emul B</td>
<td>X</td>
<td></td>
<td></td>
<td>Presence detected from Loop Emulator B Input.</td>
</tr>
<tr>
<td>Emul C</td>
<td>X</td>
<td></td>
<td></td>
<td>Presence detected from Loop Emulator C Input.</td>
</tr>
<tr>
<td>Fre Vnd</td>
<td>X</td>
<td></td>
<td></td>
<td>Free vend (in free Gate modes)</td>
</tr>
<tr>
<td>FuA Off</td>
<td>X</td>
<td></td>
<td></td>
<td>Full A Input deactivated.</td>
</tr>
<tr>
<td>FuB Off</td>
<td>X</td>
<td></td>
<td></td>
<td>Full B Input deactivated.</td>
</tr>
<tr>
<td>FuC Off</td>
<td>X</td>
<td></td>
<td></td>
<td>Full C Input deactivated.</td>
</tr>
<tr>
<td>FuD Off</td>
<td>X</td>
<td></td>
<td></td>
<td>Full D Input deactivated.</td>
</tr>
<tr>
<td>Full A</td>
<td>X</td>
<td></td>
<td></td>
<td>Full A Input activated.</td>
</tr>
<tr>
<td>Full B</td>
<td>X</td>
<td></td>
<td></td>
<td>Full B Input activated.</td>
</tr>
<tr>
<td>Full C</td>
<td>X</td>
<td></td>
<td></td>
<td>Full C Input activated.</td>
</tr>
<tr>
<td>Full D</td>
<td>X</td>
<td></td>
<td></td>
<td>Full D Input activated.</td>
</tr>
<tr>
<td>Gate Dn</td>
<td>X</td>
<td></td>
<td></td>
<td>Gate arm lowered.</td>
</tr>
<tr>
<td>Gate Up</td>
<td>X</td>
<td></td>
<td></td>
<td>Gate arm up.</td>
</tr>
<tr>
<td>Il Tgt</td>
<td>X</td>
<td></td>
<td></td>
<td>Illegal tailgate occurred in either forward or reverse direction.</td>
</tr>
<tr>
<td>Ill Fwd</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Illegal Forward occurred.</td>
</tr>
<tr>
<td>Ill Rev</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Illegal Reverse occurred.</td>
</tr>
<tr>
<td>Ill V A</td>
<td>X</td>
<td>x</td>
<td></td>
<td>Illegal Vend A occurred.</td>
</tr>
<tr>
<td>Ill V B</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Illegal Vend B occurred.</td>
</tr>
</tbody>
</table>
Table 6.2 Reports Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Report</th>
<th>Total</th>
<th>Exception</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ill V C</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Illegal Vend C occurred</td>
</tr>
<tr>
<td>Ill V D</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Illegal Vend D occurred</td>
</tr>
<tr>
<td>M F Bck</td>
<td>X</td>
<td></td>
<td></td>
<td>Monthly Forward back-out occurred.</td>
</tr>
<tr>
<td>M R Bck</td>
<td>X</td>
<td></td>
<td></td>
<td>Monthly Reverse back-out occurred.</td>
</tr>
<tr>
<td>Man G U</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Gate raised by manual gate up switch.</td>
</tr>
<tr>
<td>Man Off</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Manual gate up switch off.</td>
</tr>
<tr>
<td>Mnth Ds</td>
<td>X</td>
<td></td>
<td></td>
<td>Monthly device does not function as Monthly Time Zone is disabled.</td>
</tr>
<tr>
<td>Mnth En</td>
<td>X</td>
<td></td>
<td></td>
<td>Monthly device functional as Monthly Time Zone is enabled.</td>
</tr>
<tr>
<td>Mon Fwd</td>
<td>X</td>
<td></td>
<td></td>
<td>Monthly Forward count.</td>
</tr>
<tr>
<td>Mon Rev</td>
<td>X</td>
<td></td>
<td></td>
<td>Monthly Reverse count.</td>
</tr>
<tr>
<td>No DnLm</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Down limit switch failure.</td>
</tr>
<tr>
<td>No UpLm</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Up limit switch failure.</td>
</tr>
<tr>
<td>Overide</td>
<td>X</td>
<td></td>
<td></td>
<td>Gate arm raised by Override command or Input.</td>
</tr>
<tr>
<td>Ovr Cmd</td>
<td>X</td>
<td></td>
<td></td>
<td>Gate arm raised by Override command.</td>
</tr>
<tr>
<td>Ovr Inp</td>
<td>X</td>
<td></td>
<td></td>
<td>Gate arm raised by Override Input.</td>
</tr>
<tr>
<td>Over TZ</td>
<td>X</td>
<td></td>
<td></td>
<td>Override Time Zone activated. Omega LCD Controller raises gate arm without storing counts.</td>
</tr>
<tr>
<td>Ovr Off</td>
<td>X</td>
<td></td>
<td></td>
<td>Override Time Zone deactivated.</td>
</tr>
<tr>
<td>Pres A</td>
<td>X</td>
<td></td>
<td></td>
<td>Presence detected on Loop A.</td>
</tr>
<tr>
<td>Pres B</td>
<td>X</td>
<td></td>
<td></td>
<td>Presence detected on Loop B.</td>
</tr>
<tr>
<td>Pres C</td>
<td>X</td>
<td></td>
<td></td>
<td>Presence detected on Loop C.</td>
</tr>
<tr>
<td>Pwr Dwn</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Power to gate is Off.</td>
</tr>
<tr>
<td>Pwr Up</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Power to gate is On.</td>
</tr>
<tr>
<td>R/L Inp</td>
<td>X</td>
<td></td>
<td></td>
<td>Raise/Lower Input is active.</td>
</tr>
<tr>
<td>R/L Off</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Raise/Lower Time Zone deactivated.</td>
</tr>
<tr>
<td>Rai Cmd</td>
<td>X</td>
<td></td>
<td></td>
<td>Raise/Lower command sent.</td>
</tr>
<tr>
<td>Rai TZ</td>
<td>X</td>
<td></td>
<td></td>
<td>Raise/Lower Time Zone activated. Omega LCD Controller raises/lowers gate and stores counts.</td>
</tr>
<tr>
<td>Reb Ext</td>
<td>X</td>
<td></td>
<td>X</td>
<td>Rebound occurred due to external rebound Input signal.</td>
</tr>
</tbody>
</table>
### Table 6.2 Reports Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Report</th>
<th>Exception</th>
<th>Message Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reb PrB</td>
<td>X</td>
<td>X</td>
<td>Rebound occurred due to motor current rebound activation, which sensed a presence under the gate arm.</td>
</tr>
<tr>
<td>T F Bck</td>
<td>X</td>
<td></td>
<td>Transient back-out occurred.</td>
</tr>
<tr>
<td>Tkt Jam</td>
<td>X</td>
<td></td>
<td>Ticket jam in Ticket Issuing Device. Please service.</td>
</tr>
<tr>
<td>Tkt Low</td>
<td>X</td>
<td>X</td>
<td>Tickets low in the Ticket Issuing Device.</td>
</tr>
<tr>
<td>Tkt Pre</td>
<td>X</td>
<td></td>
<td>Ticket in Ticket Issuing Device throat.</td>
</tr>
<tr>
<td>Tkt Req</td>
<td>X</td>
<td></td>
<td>Ticket Request Input active.</td>
</tr>
<tr>
<td>Tlgt A</td>
<td>X</td>
<td></td>
<td>Tailgate detected on Loop A.</td>
</tr>
<tr>
<td>Tlgt B</td>
<td>X</td>
<td></td>
<td>Tailgate detected on Loop B.</td>
</tr>
<tr>
<td>Tlgt C</td>
<td>X</td>
<td></td>
<td>Tailgate detected on Loop C.</td>
</tr>
<tr>
<td>Tra Fwd</td>
<td>X</td>
<td></td>
<td>Transient Forward count.</td>
</tr>
<tr>
<td>Tran Ds</td>
<td>X</td>
<td>X</td>
<td>Transient device does not function as Transient Time Zone is disabled.</td>
</tr>
<tr>
<td>Tran En</td>
<td>X</td>
<td>X</td>
<td>Transient device functional as Transient Time Zone is enabled.</td>
</tr>
<tr>
<td>Tune Lp</td>
<td>X</td>
<td>X</td>
<td>Tune Loop command sent.</td>
</tr>
<tr>
<td>TZ01 En</td>
<td>X</td>
<td></td>
<td>Time Zone Output 1 enabled.</td>
</tr>
<tr>
<td>TZ01 Ds</td>
<td>X</td>
<td></td>
<td>Time Zone Output 1 disabled.</td>
</tr>
<tr>
<td>TZ02 En</td>
<td>X</td>
<td></td>
<td>Time Zone Output 1 enabled.</td>
</tr>
<tr>
<td>TZ02 Ds</td>
<td>X</td>
<td></td>
<td>Time Zone Output 2 disabled.</td>
</tr>
<tr>
<td>U F Bck</td>
<td>X</td>
<td></td>
<td>Unknown forward back-out occurred (in free gate modes).</td>
</tr>
<tr>
<td>U R Bck</td>
<td>X</td>
<td></td>
<td>Unknown reverse back-out occurred (in free gate modes).</td>
</tr>
<tr>
<td>Ukn Fwd</td>
<td>X</td>
<td></td>
<td>Unknown forward occurred (in free gate modes).</td>
</tr>
<tr>
<td>Ukn Rev</td>
<td>X</td>
<td></td>
<td>Unknown reverse occurred (in free gate modes).</td>
</tr>
<tr>
<td>UpLm OK</td>
<td>X</td>
<td>X</td>
<td>Up limit switch is OK (fixed).</td>
</tr>
<tr>
<td>Vnd MF1</td>
<td>X</td>
<td></td>
<td>Monthly Forward 1 (no arming) occurred.</td>
</tr>
<tr>
<td>Vnd MF2</td>
<td>X</td>
<td></td>
<td>Monthly Forward 2 (arming) occurred.</td>
</tr>
<tr>
<td>Vnd MR 1</td>
<td>X</td>
<td></td>
<td>Monthly Reverse 1 (no arming) occurred.</td>
</tr>
<tr>
<td>Vnd MR 2</td>
<td>X</td>
<td></td>
<td>Monthly Reverse 2 (arming) occurred.</td>
</tr>
</tbody>
</table>
### Accessing Report Messages

Report messages will appear on the Omega LCD Controller display screen. Figure 6.7 on page 115 illustrates the information on the Reports Menu.

#### Table 6.2 Reports Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Report</th>
<th>Exception</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vnd TF1</td>
<td>X</td>
<td>Transient Forward 1 (no arming) occurred.</td>
</tr>
<tr>
<td>Vnd TF2</td>
<td>X</td>
<td>Transient Forward 2 (arming) occurred.</td>
</tr>
<tr>
<td>Vnd TR1</td>
<td>X</td>
<td>Transient Reverse 1 (no arming) occurred.</td>
</tr>
<tr>
<td>Vnd TR2</td>
<td>X</td>
<td>Transient Reverse 2 (arming) occurred.</td>
</tr>
<tr>
<td>VndA En</td>
<td>X</td>
<td>Vend A enabled.</td>
</tr>
<tr>
<td>VndB En</td>
<td>X</td>
<td>Vend B enabled.</td>
</tr>
<tr>
<td>VndC En</td>
<td>X</td>
<td>Vend C enabled.</td>
</tr>
<tr>
<td>VndD En</td>
<td>X</td>
<td>Vend D enabled.</td>
</tr>
</tbody>
</table>
To access the Report messages:

1. Press the **MONITOR/MENU** key until the **MONITOR MODE** screen displays.

2. Press the **MISC/UP** key to scroll to the **REPORTS** menu.

3. Press the **SCROLL/ENT** key.

4. Press the **MISC/UP** key until the desired report screen displays.

5. Press the **SCROLL/ENT** key.

6. Scroll down through the report by pressing the **STATUS/DOWN** key.

7. Press the **SCROLL/ENT** key.
8. To return to the **MENU MODE** screen, press the **MONITOR/MENU** key.

**MONITOR MODE**

---

**Viewing Count Information**

The Omega LCD Controller stores count information for a variety of functions, including the number of times the gate raised, the number of monthly and transient vends occurred, etc. You can review four types of counts under the Counts menu:

- **Resettable Counts** — provide count data for a selected time period, such as on a monthly, weekly, or even daily basis. You must reset the counters in the Omega LCD Controller. See “Resetting Counters” on page 92, for the instructions.

- **Non-Resettable Counts** — provide count data from the time the gate was first set up in the facility. These counts cannot be reset.

- **Differential Counts** — tracks the total number of parking spaces available in the facility (Single Differential Counts), or tracks monthly or transient activity (Dual Differential Counts), depending on gate options. (Single Differential Counts is included in an optional package; Dual Differential Counts is available in a custom configuration.) For programming information, refer to “Programming Differential Counters (Optional Feature),” on page 97.

- **Hourly Counts** — show the counts per hour for all the hourly counts options configured in the gate (available in custom configuration).

The menu items for the Resettable and Non-Resettable counts are the same. Figure 6.8 on page 117 and Figure 6.9 on page 118 illustrate the Non-Resettable Counts menu with all the counts available for the gate.

**Note:** The COUNTS menu on your gate will reflect your gate’s configuration, and may differ from what displays in this manual.
**Figure 6.8** Omega LCD Controller Non-Resettable/Resettable COUNTS Menu

<table>
<thead>
<tr>
<th>COUNTS</th>
<th>NON-RESTABLE</th>
<th>NON-RESTABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td># of times gate arm rebounded from Loop B</td>
<td>Reb Mot =</td>
<td># of times rebounded due to gate motor sensing</td>
</tr>
<tr>
<td># of times the Omega LCD Controller was powered up</td>
<td>Reb PrB =</td>
<td># of times the loops were tuned</td>
</tr>
<tr>
<td># of transient patron backouts at entry</td>
<td>Tune Lp =</td>
<td># of monthly patron backouts out at entry</td>
</tr>
<tr>
<td>Total # of forward traversals into facility</td>
<td>Pwr Up =</td>
<td># of illegal forwards into facility</td>
</tr>
<tr>
<td># of transient patron backouts at exit</td>
<td>M F Bck =</td>
<td># of monthly patron backouts in exit lane</td>
</tr>
<tr>
<td>Total # of illegal reversals out of facility</td>
<td>T F Bck =</td>
<td></td>
</tr>
<tr>
<td># of illegal reversals out of facility</td>
<td>Tot Fwd =</td>
<td></td>
</tr>
<tr>
<td># of times Vend B was enabled out of sequence</td>
<td>Ill Fwd =</td>
<td></td>
</tr>
<tr>
<td># of times Vend D was enabled out of sequence</td>
<td>M R Bck1 =</td>
<td></td>
</tr>
<tr>
<td># of times gate arm was raised manually</td>
<td>T R Bck =</td>
<td></td>
</tr>
<tr>
<td># of times vehicle presence was detected on Loop A</td>
<td>Tot Rev =</td>
<td></td>
</tr>
<tr>
<td># of times vehicle presence was detected on Loop B</td>
<td>Ill Rev =</td>
<td></td>
</tr>
<tr>
<td># of times Vend B was enabled out of sequence</td>
<td>Ill V A =</td>
<td></td>
</tr>
<tr>
<td># of times Vend C was enabled out of sequence</td>
<td>Ill V B =</td>
<td></td>
</tr>
<tr>
<td>Number of transient reverse-travelling vehicles that backed out.</td>
<td>Ill V C =</td>
<td></td>
</tr>
<tr>
<td># of times gate was raised from the override</td>
<td>Ill V D =</td>
<td></td>
</tr>
<tr>
<td># of times vehicle detected on Loop C</td>
<td>Tra Rev =</td>
<td></td>
</tr>
</tbody>
</table>
Figure 6.9 Omega LCD Controller Non-Resettable/Resettable COUNTS Menu, Cont.

<table>
<thead>
<tr>
<th>Emul A</th>
<th>Emul B</th>
<th>Emul C</th>
<th>Mon Fwd</th>
<th>Tra Fwd</th>
<th>TgB Fwd</th>
<th>Mon Rev</th>
<th>TgB Rev</th>
<th>Reb Ext</th>
<th>Extrn 1</th>
<th>Extrn 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 M R Bck and T R Bck counts will be displayed only if you have the Dual Direction Operation option.

Figure 6.10 illustrates a Differential Counts menu.

*Note:* If your Barrier Gate does not include a Differential Counter package, DIFFERENTIAL will not display as an option under the COUNTS menu.
The Hourly Counts menu shows the counts per hour for all the hourly counts options you have ordered (available in a custom configuration). For example, if you have ordered the Monthly Forward and Transient Forward counts with your gate, hourly counts for these two options will display under the Hourly Counts menu on the Omega LCD Controller. Figure 6.11 on page 120 illustrates a sample Hourly Counts menu with the Monthly Forward option.

**Note:** If your gate does not include any Hourly Count Reports, HOURLY will not display as an option under the COUNTS menu. Hourly counts are available in a custom configuration.
To review Counts:

1. Press the **MONITOR/MENU** key until the **MONITOR MODE** screen displays.

2. Press the **COUNTS/END** key to scroll to the desired menu (RESETABLE, NON-RESETABLE, DIFFERENTIAL, HOURLY.)

3. Do one of the following:
   - To scroll through the screen, line by line, press the **SCROLL/ENT** key.
   - To have the unit automatically scroll through the information, hold the **SCROLL/ENT** key until you see the message SCROLL START...
   - To end the automatic scrolling process, press the **SCROLL/ENT** until you see the message SCROLL STOP...
4. To return to the option first selected, or to choose another option, press the **COUNTS/END** key.

![NON-RESETABLE](image)

5. To return to the **MENU MODE** screen, press the **MONITOR/MENU** key.

![MENU MODE...](image)

**Viewing Lane Status Functions**

The Omega LCD Controller stores information about lane status functions, including the loop frequency, available Inputs and Outputs, and which Inputs and Outputs are active. Access this information using the **STATUS/DOWN** key from the Monitor Mode. Figure 6.12 on page 122 illustrates the menu items that you can review in the MONITOR MODE by using the **STATUS/DOWN** key.
Figure 6.12 Omega LCD Controller LANE STATUS Menu

To review Lane Status information:

1. Press the **MONITOR/MENU** key until the MONITOR MODE screen displays.

2. Press the **STATUS/DOWN** key until the LANE STATUS screen displays.
3. Do one of the following:
   ● To scroll through the screen, line by line, press the SCROLL/ENT key.
   ● To have the unit automatically scroll through the information, hold the SCROLL/ENT key until you see the message SCROLL START...
   ● To end the automatic scrolling process, press the SCROLL/ENT until you see the message SCROLL STOP...

4. To return to the MENU MODE screen, press the MONITOR/MENU key.
CHAPTER 7

Barrier Gate Commands

Commands Overview

Use the Commands feature to send various action requests to the gate. These action requests initiate an immediate action. Some commands initiate a condition that stays in effect until you send the opposite command to disable the condition. For example, raising the Universal PS arm.

This section covers the following commands:

- “Accessing the Commands Menu” on page 127
  - “Tune Loops” on page 127
  - “Raise/Lower the Gate Arm” on page 128
  - “Override Gate” on page 128
  - “Turn on/off a Full Sign” on page 129
  - “Enable/Disable the Gate” on page 129
  - “Remote Vend the Gate” on page 130

Commands Menu

Not all commands shown in Figure 7.1 on page 126 may be available in your system. Some are dependent on optional features that may not be available in your system

Figure 7.1 on page 126 illustrates the full COMMANDS menu items.
Figure 7.1 Omega LCD Controller COMMANDS Menu

<table>
<thead>
<tr>
<th>COMMANDS</th>
<th>TUNES LOOPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAISE GATE</td>
<td>RAISE GATE</td>
</tr>
<tr>
<td>OVERRIDE GATE</td>
<td>OVERRIDE GATE</td>
</tr>
<tr>
<td>LOWER GATE</td>
<td>LOWER GATE</td>
</tr>
<tr>
<td>FULL ON</td>
<td>FULL ON</td>
</tr>
<tr>
<td>TRANSIENT FWD</td>
<td>TRANSIENT FWD</td>
</tr>
<tr>
<td>TRANSIENT REV</td>
<td>TRANSIENT REV</td>
</tr>
<tr>
<td>TOTAL FWD</td>
<td>TOTAL FWD</td>
</tr>
<tr>
<td>TOTAL REV</td>
<td>TOTAL REV</td>
</tr>
<tr>
<td>FULL OFF</td>
<td>FULL OFF</td>
</tr>
<tr>
<td>TRANSIENT FWD</td>
<td>TRANSIENT FWD</td>
</tr>
<tr>
<td>TRANSIENT REV</td>
<td>TRANSIENT REV</td>
</tr>
<tr>
<td>TOTAL FWD</td>
<td>TOTAL FWD</td>
</tr>
<tr>
<td>TOTAL REV</td>
<td>TOTAL REV</td>
</tr>
<tr>
<td>ENABLE VEND</td>
<td>ENABLE VEND</td>
</tr>
<tr>
<td>TRANSIENT FWD</td>
<td>TRANSIENT FWD</td>
</tr>
<tr>
<td>TRANSIENT REV</td>
<td>TRANSIENT REV</td>
</tr>
<tr>
<td>MONTHLY FWD</td>
<td>MONTHLY FWD</td>
</tr>
<tr>
<td>MONTHLY REV</td>
<td>MONTHLY REV</td>
</tr>
<tr>
<td>DISABLE VEND</td>
<td>DISABLE VEND</td>
</tr>
<tr>
<td>TRANSIENT FWD</td>
<td>TRANSIENT FWD</td>
</tr>
<tr>
<td>TRANSIENT REV</td>
<td>TRANSIENT REV</td>
</tr>
<tr>
<td>MONTHLY FWD</td>
<td>MONTHLY FWD</td>
</tr>
<tr>
<td>MONTHLY REV</td>
<td>MONTHLY REV</td>
</tr>
<tr>
<td>REMOTE VEND</td>
<td>REMOTE VEND</td>
</tr>
<tr>
<td>MONTHLY FWD</td>
<td>MONTHLY FWD</td>
</tr>
<tr>
<td>MONTHLY REV</td>
<td>MONTHLY REV</td>
</tr>
</tbody>
</table>

- Tunes loops
- Raises gate arm but ignores all counts except Differential Counts and External Count Source 1 and 2
- Activates FULL sign configured for forward-direction transient vehicles
- Activates FULL sign configured for forward-direction vehicles, both transient and monthly
- Turns off FULL sign configured for forward-direction transient vehicles
- Turns off FULL sign configured for forward-direction vehicles, both transient and monthly
- Allows vends to occur for forward-direction transient vehicles (re-enables after disabling)
- Allows vends to occur for forward-direction monthly vehicles (re-enables after disabling)
- Disables vends from occurring for forward-direction transient vehicles
- Disables vends from occurring for forward-direction monthly vehicles
- Remotely activates a vend for a forward-direction monthly vehicle
- Allows vends to occur for reverse-direction transient vehicles
- Activates FULL sign configured for reverse-direction transient vehicles
- Activates FULL sign configured for reverse-direction vehicles, both transient and monthly
- Turns off FULL sign configured for reverse-direction transient vehicles
- Turns off FULL sign configured for reverse-direction vehicles, both transient and monthly
- Allows vends to occur for reverse-direction transient vehicles re-enables after disabling)
- Allows vends to occur for reverse-direction monthly vehicles (re-enables after disabling)
- Disables vends from occurring for reverse-direction transient vehicles
- Disables vends from occurring for reverse-direction monthly vehicles
- Remotely activates a vend for a reverse-direction monthly vehicle
Accessing the Commands Menu

To access the Commands menu:

1. Hold down the MONITOR/MENU key until the MENU MODE screen displays.

2. Press the MISC/UP key until the COMMANDS screen displays.

3. Press the SCROLL/ENT key.

4. Press the MISC/UP key until the desired command screen displays.

5. Go to:
   - “Tune Loops” on page 127
   - “Raise/Lower the Gate Arm” on page 128
   - “Override Gate” on page 128
   - “Turn on/off a Full Sign” on page 129
   - “Enable/Disable the Gate” on page 129
   - “Remote Vend the Gate” on page 130

Tune Loops

Use this command to tune the loops. Loops should never be tuned while a vehicle is present in the lane!

To tune loops:

1. Access the COMMANDS menu. Refer to “Accessing the Commands Menu,” on page 127.
2. On the TUNE LOOPS screen, press the SCROLL/ENT key to send the command.

![TUNE LOOPS]

### Raise/Lower the Gate Arm

Use this command to raise the Barrier Gate arm *while maintaining counts*. Note that the gate arm will not lower until the LOWER GATE command is given. This command differs from the REMOTE VEND command, where the gate arm will lower when the vehicle drives off the detector loop.

To raise/lower the gate arm:

1. Access the COMMANDS menu. Refer to “Accessing the Commands Menu,” on page 127.
2. On the RAISE GATE (or LOWER GATE) screen, press the SCROLL/ENT key to send the command.

![RAISE GATE]

### Override Gate

Use this command to raise the Barrier Gate arm and *disable counts*. Note that the gate arm will not lower until the LOWER GATE command is given. Refer to “Raise/Lower the Gate Arm,” on page 128.

To override the gate:

1. Access the COMMANDS menu. Refer to “Accessing the Commands Menu,” on page 127.
2. On the OVERRIDE GATE screen, press the SCROLL/ENT key to send the command.

![OVERRIDE GATE]
Turn on/off a Full Sign

Use this command to turn a full sign on or off.

To turn on a full sign:

1. Access the COMMANDS menu. Refer to “Accessing the Commands Menu,” on page 127.
2. Press the MISC/UP key until the FULL ON (or FULL OFF) screen displays.

3. Press the SCROLL/ENT key.
4. Press the MISC/UP key until the type of full sign you want to turn on (or off) displays.
5. Press the SCROLL/ENT key to send the command.

Enable/Disable the Gate

Use this command to enable or disable the Barrier Gate vend action. Vends are enabled by default. For example, if the transient forward input is activated, the gate vends. If you do not want the gate to vend when the input occurs, send the Disable Vend command to disable the vend. If you send a command to disable a vend, you must send the command to enable it if you want it to function again.

To enable/disable the gate vend:

1. Access the COMMANDS menu. Refer to “Accessing the Commands Menu,” on page 127.
2. Press the MISC/UP key until the ENABLE VEND (or DISABLE VEND) screen displays.

3. Press the SCROLL/ENT key.
4. Press the MISC/UP key until the type of vend you want to enable (or disable) displays.
5. Press the SCROLL/ENT key to send the command.
Remote Vend the Gate

Use this command to raise the Barrier Gate arm until the vehicle drives off the detector loop. This is different from the RAISE GATE command, which does not lower the gate arm when the vehicle drives off the detector loop.

To remote vend the gate:

1. Access the COMMANDS menu. Refer to “Accessing the Commands Menu,” on page 127.

2. Press the MISC/UP key until the REMOTE VEND screen displays.

3. Press the SCROLL/ENT key.
Chapter 8

Updating the Firmware

Updating Overview

Beginning with revision K, the Omega LCD Controller no longer has a socketed EPROM. Firmware is instead stored in a Flash memory device on the circuit board, so you can load or update firmware via a serial connection from a computer with the FlashProgrammer program.

This chapter contains the following:

- “Before You Start” on page 131
- “Installing the FlashProgrammer Program” on page 131
- “Connecting the Computer to the Omega LCD Controller” on page 133
- “Loading Firmware to the Omega LCD Controller” on page 134

Before You Start

To load firmware to the Omega LCD Controller, you must have the following:

- Laptop or desktop computer with a serial port
- RS232 serial cable (with special pin-out, available for purchase from 3M)
- FlashProgrammer program installed on the computer, available from the 3M web site (instructions included in this chapter)
- Firmware file, available from the 3M web site
- oload.bin file available from the 3M web site

Note: The oload.bin file must be located in the same folder as the firmware file.

Installing the FlashProgrammer Program

The FlashProgrammer program allows you to upgrade firmware on the Omega LCD Controller (and other 3M devices). You must install this program on the computer you will be using to load the firmware to the Omega LCD Controller.
To install FlashProgrammer:

1. Obtain the FlashProgrammer Program files from the 3M web site, your 3M VAR, or your support technician, and copy the files to your computer.

2. Double-click the setup.exe file from the folder where you copied the FlashProgrammer files. The following window is displayed.

3. Click OK
4. The program will be installed to the C:\Program Files\FlashProgrammer folder. To use this default, click the installation button. If you want to change the destination, click Change Directory, find and select the folder you want to install to, and then click the installation button.

5. Select the program group this application will reside in, and then click Continue.

6. After the program is installed and the above message box is displayed, click OK.

Connecting the Computer to the Omega LCD Controller

Connect the computer with the FlashProgrammer program to the Omega LCD Controller using an RS-232 serial cable.

The cable connects to a communications port on the computer and to the RJ-11 port on the Omega LCD Controller. Refer to Figure 8.2 on page 134 for the location of this port.

Make sure the connection cable has the pin-out shown in Figure 8.1 on page 134.
Chapter 8 • Updating the Firmware

After you have installed the FlashProgrammer program and connected the computer to the Omega LCD Controller, follow these steps to load the Omega LCD Controller firmware.

To load the firmware to the Omega LCD Controller:

1. Copy the firmware installation files from the 3M web site to the hard drive on the computer you are using to load the firmware.

   *Note:* The oload.bin file must be located in the same folder as the firmware file.
2. Disconnect the RS-422 communication cable from the Omega LCD Controller, so that the rest of the system is not affected by the data being transmitted to the Omega LCD Controller from the computer.

3. On the Omega LCD Controller, close DIP switch 7.

4. Reset the Omega LCD Controller by closing DIP switch 1. Wait about 5 seconds, and then open DIP switch 1 again.

5. Start the FlashProgrammer program by clicking **Start** ➤ **Programs** ➤ **FlashProgrammer**. An introduction window is displayed and then the following window is displayed:

6. From the **Serial Port** menu, click **Setup**, and make sure that the correct COM port is selected, typically COM 1.

7. From the **Options** menu, select **Omega**.
8. Either click the Select File button, or from the File menu, click Select File.

A warning window will display. Make sure you consider it carefully. You must select the correct firmware file for the equipment you want to update, or the device may be inoperative. Click the warning window to close it, and then a window similar to the following will display:

9. Select the desired Omega firmware file. The file must end with the “.flash” extension. Then, click Open.

10. A window will display, confirming your selection. Either click Continue to accept your selection, or click Cancel to return to the Flash Programmer window.

11. After you click Continue, the program will attempt to connect to the device. The message box in the window will display “Connecting...”

Once a connection is established, the message box in the window will display “Downloading...” and it will download the selected firmware file. Do not click Cancel or Exit during the download unless absolutely necessary. The firmware will not be properly updated. If you do click Cancel or Exit, you must start the procedure again with step 4.
Loading Firmware to the Omega LCD Controller

During the download, the following will occur:

- The communication LEDs on the Omega LCD Controller should begin blinking immediately. If they do not, the serial cable may not be connected properly or the correct COM port may not be selected.

- Within about 20 seconds from the start of the download, the red loop status LEDs should begin blinking rapidly and continue to blink until either the firmware download is complete or an error occurs. If the LEDs do not begin blinking within 20 seconds, an error in the transfer of the bootstrap program may have occurred. If this occurs check the cable connection and DIP switch settings and begin the procedure again with step 2.

If the red loop status LEDs light solidly at any time during the download, an error has occurred, which could be caused by one of the following: a corrupt flash file, a defective serial port or cable, or electrical noise interfering with the serial data transfer. If this happens, try starting the procedure again with step 4.

If an error occurs during the download, one of the following two error messages will display in the message box in the window:

- **Download Error.** An error occurred downloading the file or burning the flash. In this case, click **Cancel** and start the procedure again at step 4.

- **Error.** An error occurred in the connection between the device and the PC. Make sure the cables are connected securely. Click **Cancel**, and start the procedure again at step 4.

12. When the firmware download is complete, the red loop status LEDs should no longer be lit. The message box in the window will display “Download Complete.” When the download is completed, do the following:

   a. On the Omega LCD Controller, open DIP switch 7.

   b. Reset the Omega LCD Controller by closing DIP switch 1. Wait about 5 seconds, and then open DIP switch 1 again.

13. Click **Exit** to close the FlashProgrammer program.
CHAPTER 9

Diagnostics and Troubleshooting

Diagnostics and Troubleshooting Overview

Use the instructions in this section to diagnose and troubleshoot issues with the Universal PS. This section includes the following topics:

- “Diagnostics” on page 139
  - “Run-Time Diagnostics” on page 140
  - “Run Diagnostics Manually” on page 140

- “Troubleshooting” on page 146
  - “Barrier Gate Does Not Operate” on page 146
  - “Barrier Gate Arm Raises and Lowers Without Stopping” on page 147
  - “Detector Operates Incorrectly and Adjacent Loop’s Vehicles Detected” on page 147
  - “Barrier Gate Arm Does Not Travel Far Enough” on page 147
  - “No Text On Omega LCD Display” on page 148
  - “Black Dust Inside Cabinet” on page 148

Diagnostics

This section covers the following diagnostic procedures:

- “Run-Time Diagnostics” on page 140
- “Run Diagnostics Manually” on page 140
  - “Communication Diagnostics” on page 142
  - “LCD Display Diagnostics” on page 143
  - “Keypad Diagnostics” on page 143
  - “Input/Output Diagnostics” on page 144
  - “Exception Event Report” on page 145
Run-Time Diagnostics

The Omega LCD Controller continuously performs run-time diagnostics on all hardware components while the Barrier Gate is in operation. If the Omega LCD Controller determines that one or more of these checks has failed or a component is malfunctioning, it sends a message to the Exception Event Report, indicating which component failed and the time of the failure. Table 9.1 lists the messages that will appear if a component fails.

Table 9.1 Run-Time Diagnostics Message

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad Ram</td>
<td>RAM test failed - RAM chip needs replacing.</td>
<td>Call the factory.</td>
</tr>
<tr>
<td>Bad Rom</td>
<td>ROM test failed - ROM chip needs replacing.</td>
<td>Call the factory.</td>
</tr>
<tr>
<td>Bad Clock</td>
<td>Internal Clock Test failed.</td>
<td>Call the factory.</td>
</tr>
<tr>
<td>Slow Cfg</td>
<td>Frequency Error - Config test failed.</td>
<td>Call the factory.</td>
</tr>
<tr>
<td>Bad Cfg</td>
<td>Check Sum Error - Config test failed.</td>
<td>Call the factory.</td>
</tr>
<tr>
<td>Bad LpA</td>
<td>Loop frequency too high, too low, or unstable in Loop A.</td>
<td></td>
</tr>
<tr>
<td>XPr LpA</td>
<td>Extended presence on Loop A.</td>
<td>Tune Loop A.</td>
</tr>
<tr>
<td>Bad LpB</td>
<td>Loop frequency too high, too low, or unstable in Loop B.</td>
<td></td>
</tr>
<tr>
<td>XPr LpB</td>
<td>Extended presence on Loop B.</td>
<td>Tune Loop B.</td>
</tr>
<tr>
<td>Bad LpC</td>
<td>Loop frequency too high, too low, or unstable in Loop C.</td>
<td></td>
</tr>
<tr>
<td>XPr LpC</td>
<td>Extended presence on Loop C.</td>
<td>Tune Loop C.</td>
</tr>
<tr>
<td>Vdc Max</td>
<td>110 line voltage too high.</td>
<td></td>
</tr>
<tr>
<td>Vdc Min</td>
<td>110 line voltage too low.</td>
<td></td>
</tr>
</tbody>
</table>

Run Diagnostics Manually

In addition to run-time diagnostics, you can perform manual diagnostics on the following components:

- Communication Port
- Input and Output Logic
- Keypad Keys
- LCD Display
To view information that may be helpful to diagnostics, see “View the Diagnostic Information on the Miscellaneous Menu” on page 103.

To manually run diagnostics:

1. Set the DIP Switches on Switch Bank 1 of the Connection Panel in the OPEN position, as shown in Figure 9.1.

   Note: If DIP Switches 6, 7, and 8 are not open, you will be unable to run Communication, Keypad, and Input/Output Diagnostics.

   Figure 9.1 DIP Switches in the Open Position

2. To test the RS 422 (Port Controller) communication port, connect an RS 422 Loopback Connector into the RS 422 communication port of the Omega LCD Controller. Figure 9.2 on page 142 illustrates an RS 422 Loopback Connector.

   Note: If you do not use the RS 422 Loopback Connector, the communications portion of the diagnostics will fail.

   Note: If you are not using an Omega LCD Tester, contact the manufacturer for the appropriate input and output connections in order to run Input/Output diagnostics.
3. If you are using an Omega LCD Tester, press the Loop Back Test switch on the tester to close it. The LED on the switch will light to indicate that the switch is closed.

   **Note:** If the Loop Back Test switch is not closed, you will get a lot of failures in the Input/Output diagnostics.

4. Cold start the Omega LCD Controller to reset it by holding down the **MONITOR/MENU** key while powering up the Omega LCD Controller.

The Omega LCD Controller will begin running diagnostic tests, beginning with the communication test, the LCD display test, the keypad test, and ending with Input/Output diagnostics. The Omega LCD Controller will simultaneously display the Exception Event Report on the LCD display. You will see the following message on the LCD display:

```
LATEST EVENT
```

The Omega LCD Controller will run the Communication Diagnostics next. Continue to “Communication Diagnostics” on page 142.

**Communication Diagnostics**

If the communication test fails, either from a malfunction of the port or a missing Loopback Connector, the following message displays after the “LATEST EVENT” message:

```
BAD 422 10:23:99
```
Otherwise, you see the following message on the LCD display:

![Pwr Up 10:23:99](image)

The Omega LCD Controller will run the LCD display diagnostics next. Continue to “LCD Display Diagnostics” on page 143.

**LCD Display Diagnostics**

The LCD display will blink and blank out three times successively, as shown below. If one of the “bars” is missing, you may have a problem with the LCD display. Please contact the factory for assistance.

![LCD Display](image)

After the Omega LCD Controller has completed the LCD display diagnostics, you will see the following message on the LCD display, as the Omega LCD Controller begins Keypad diagnostics:

![Keypad](image)

**Keypad Diagnostics**

Keypad diagnostics help you to determine that none of the keys are stuck and the keypad is functioning properly. Each key on the keypad has a corresponding number, as shown in Figure 9.3 on page 144.
To check the operation of each key:

1. Press the key.

2. If the key is functioning properly, you will see the number corresponding to the key on the LCD display, as shown below:

   ![Figure 9.3 Keypad Numbers](image)

   If the number does not display when you press a key, the keypad may have an internal malfunction. Please call the factory for assistance.

   If you do not press a key and still see a number after “KEYPADS,” the key is stuck. If this occurs, press and release the key. If you are unable to release the stuck key, the keypad may have an internal malfunction. Please call the factory for assistance.

   **Note:** The only exception to this is key 6. When you press key 6, the number 6 will not display. Pressing key 6 will end Keypad diagnostics and the Omega LCD Controller will begin Input/Output diagnostics.

3. Press key 6 to end Keypad diagnostics and begin Input/Output diagnostics. Refer to “Input/Output Diagnostics,” on page 144.

### Input/Output Diagnostics

If any of the inputs or outputs fail during the diagnostics, you will see a message similar to the one shown in Figure 9.4 on page 145.

**Note:** If you do not use an Omega LCD Tester or do not wire the inputs and outputs for testing, it will appear as if all the input/output pairs failed.
Figure 9.4  Sample Input/Output Diagnostic Message

This type of message indicates that there is a failure of *either* the output, identified by the number to the left of the colon, *or* a failure of the input, identified by the number to the right of the colon. If you see this type of message, please contact the factory for assistance.

**Note:** If the Loop Back Test switch is not on, or closed, it will appear as if all the input/output pairs failed.

The Omega LCD Controller will continue to cycle through Input/Output diagnostics until you reset the Omega LCD Controller. The 12V LED on the Omega LCD Tester will turn off for a couple of seconds at the beginning of each test cycle.

Follow this procedure to reset the Omega LCD Controller:

1. Turn the power to the Omega LCD Controller to OFF.
2. Press the Loop Back Test switch on the Omega LCD Tester to open the switch. The LED on the switch will go off to indicate that the switch is open.
3. Reset the DIP Switches on Switch Bank 1 of the Connection Panel to their original position.
4. Cold start the Omega LCD Controller by holding the MONITOR/MENU key and turning the power to Omega LCD Controller ON.

The Omega LCD Controller is now ready for normal operation.

**Exception Event Report**

The Exception Event Report provides a list of all component malfunction and diagnostic events. You can review the diagnostic information in the Exception Event Report during the diagnostics or after you have completed all diagnostics. Refer to Chapter 6, “Monitoring,” starting on page 101 for instructions on how to access the Exception Event Report.
Troubleshooting

Use the topics in this section to troubleshoot issues with the Barrier Gate. Troubleshooting topics include:

- “Barrier Gate Does Not Operate” on page 146
- “Barrier Gate Arm Raises and Lowers Without Stopping” on page 147
- “Detector Operates Incorrectly and Adjacent Loop’s Vehicles Detected” on page 147
- “Barrier Gate Arm Does Not Travel Far Enough” on page 147
- “No Text On Omega LCD Display” on page 148
- “Black Dust Inside Cabinet” on page 148

Barrier Gate Does Not Operate

If your Barrier Gate fails to operate, do the following:

- Check the electrical gate function by putting the UP-OFF-AUTO switch on the Connection Panel in the UP position. The gate arm should raise. If it does not raise, check the following:
  
  - Check the main power supply to ensure that the gate is receiving power, there are no blown fuses, and the main power wiring is intact.
  
  - Check the motor circuit breaker at the bottom of the gate motor to make sure that the breaker has not tripped.
  
  - Check to make sure that the ON-OFF switch on the Connection Panel is in the ON position.
  
  - Check all wiring connections on the Connection Panel:
    
      1) Turn off the main power source.
      
      2) Make sure that all terminal screws are tight and all wires are firmly anchored under the screw.
      
      3) Check wire connections to the gate and limit switches.
      
      4) Turn on the power and check the electrical gate function again.

      If you are still unable to obtain a gate cycle, please call the factory for assistance.
Barrier Gate Arm Raises and Lows Without Stopping

If the gate arm raises and lowers without stopping, check the following:

- Check the limit switches for proper cam adjustment. Refer to Chapter 3, “Barrier Gate Electronics Installation,” starting on page 49 for instructions on cam adjustment.

- If the limit cams are properly adjusted and the gate continues to raise and lower without stopping, you may have a faulty limit switch. You may have a faulty limit switch if:
  - The gate runs when the Gate control switch is in the UP position, you may have a faulty up limit switch. Contact the factory for assistance.
  - The gate runs when the Gate control switch is in the AUTO position, you may have a faulty down limit switch. Contact the factory for assistance.

- Check the tension on the Vee-belt, as improper belt tension may also cause this problem. Tighten the Vee-belt on the motor. If this does not solve the problem, you may need to replace the Vee-belt and/or pulleys.

If the gate runs properly, raising and lowering when the UP-OFF-AUTO switch is operated, but does not operate as a system (for example, with a ticket issuing device, Card Reader, etc.) perform diagnostics on the Omega LCD Controller. If you continue to have problems, contact the factory for assistance.

Detector Operates Incorrectly and Adjacent Loop’s Vehicles Detected

When two or more loops are placed within close proximity of each other and are operating at or near the same frequency, “crosstalk” may occur. Crosstalk causes the detectors to operate incorrectly and detect vehicle presence on the adjacent loop. If you think you are experiencing crosstalk, see “Crosstalk and Loop Coil Frequency” on page 37.

Barrier Gate Arm Does Not Travel Far Enough

Extreme temperature changes will affect how far the gate arm travels after the limit switch has been activated. You may find that on the first cold day, the gate arm stops before reaching a horizontal position. If the gate is used infrequently, the lubricant in the speed reducer will not warm up enough to restore the desired arm position. You should adjust the down limit switch to compensate for the temperature change. Refer to Chapter 3, “Barrier Gate Electronics Installation,” starting on page 49 for instructions on limit switch adjustment.

All power to the gate must be turned off before attempting cam adjustment. Remove the fuse from the Power Supply Assembly. If power is not shut off, severe personal injury may occur.
Check to make sure that the limit switch has not become loose. If the switch is loose, the cam may not depress the limit switch enough to activate it. Adjust the switch if necessary.

**No Text On Omega LCD Display**

You may encounter a situation where the Omega LCD display shows only black bars and no text. This can occur upon installation or even suddenly after your Barrier Gate has been working properly.

One of the possible reasons for the Omega LCD failure is that the Omega LCD program may have degraded. This happens if the Omega LCD Controller was left unplugged for several weeks, discharging the backup Supercap power.

To prevent Omega LCD failure, follow these steps after you have installed your Barrier Gate or after you retrieve the Omega LCD Controller from storage:

1. Turn the power to the Omega LCD Controller to OFF.
2. Close DIP switch 2 on the Omega LCD Controller. Refer to Figure 9.5 for location of the DIP switches.

![Figure 9.5 Omega LCD Controller](image)

3. Wait for two minutes, then open DIP switch 2.
4. Hold down the MONITOR/MENU key while turning the power to the Omega LCD Controller to ON. Continue holding down the MONITOR/MENU key until you can read the configuration module settings.

**Black Dust Inside Cabinet**

A buildup of black dust inside the cabinet may indicate that the pulleys are misaligned and are cutting the Vee-belt. The dust that you see is actually pieces of the belt. Realigning the pulleys should solve the problem.
CHAPTER 10

Preventive Maintenance

Maintenance Overview

The Universal PS has been designed to provide years of service. In order to maximize the service of your gate and to ensure the greatest available equipment uptime, follow the prescribed maintenance schedule. This will allow you to perform maintenance at a time of your choosing, and not as a result of a peak-time emergency. Refer to Table 10.1 for a maintenance schedule. You may also use this chart to keep a service record for your gate.

### Table 10.1 Maintenance Schedule and Service Record

<table>
<thead>
<tr>
<th>Maintenance Item</th>
<th>Minimum</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect Cabinet for Vehicular Damage</td>
<td>Every 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Belt Tension</td>
<td>Every 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Limit Switches</td>
<td>Every 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Speed Reducer Fluid1</td>
<td>Every 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check and Tighten Nuts, Bolts, Screws</td>
<td>Every 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unplug &amp; Replug Sockets, Cables, Connectors</td>
<td>Every 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Heater and Thermostat2</td>
<td>Every 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Power Inputs (max/min)</td>
<td>Every 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perform Manual Diagnostics</td>
<td>Every 30 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wash &amp; Wax Cabinet Exterior</td>
<td>Every 3 months</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 10 • Preventive Maintenance

Table 10.1 Maintenance Schedule and Service Record

<table>
<thead>
<tr>
<th>Maintenance Item</th>
<th>Minimum</th>
<th>Date</th>
<th>Date</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spray Omega LCD Controller pins and connectors with Contact Cleaner</td>
<td>Every 3 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spray Configuration Module Connector with Contact Cleaner</td>
<td>Every 3 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Loop Frequencies(^3) (See “View Current Loop Frequencies” on page 38.)</td>
<td>Every 6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change Vee Belts</td>
<td>Every 6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Bearings(^4)</td>
<td>Every year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Loop Sealant</td>
<td>Every year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check/Replace Loop Wires</td>
<td>Every 4 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replace Gate Cabinet Safety Sticker</td>
<td>Every 4 years</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 The Sight Glass located at the top of the Speed Reducer shows an air pocket when the fluid is at an acceptable level. You should not need to drain and refill unless you observe an external leak. If you need to refill the lubricant, use Mobile SHC 634 synthetic gear lubricant. If this is not available, use American Multipurpose Gear Lubricant #80/90. **Do not mix synthetic lubricant with a standard petroleum based gear lubricant.**

2 When the outside temperature is below 50° F (10° C), place the manual heater switch in the AUTO position during hours of operation to keep the heater running.

3 At the first sign of any detector malfunction, inaccurate counts, or unusual mechanical noises in the gate, document the problem and contact your 3M VAR for service.

4 Pay special attention to the two bearings in the gate cabinet and the two bearings located between the Speed Reducer and the output shaft. If these bearings wear out, it will produce excessive wear on the Speed Reducer.
**Placing an Order**

To place an order:

1. Locate the applicable part number. Refer to “Finding a Part Number.”

   If the part number is not included in this manual, contact 3M Customer Support for part names, part numbers, prices, and delivery information at one of the following telephone numbers:

   USA and Canada: 877-777-3571  
   Global support: 512-984-9255

2. Fill out a purchase order from your company.

3. **For U.S. orders:**

   Fax, email, mail, or telephone the purchase order to:

   3M Company - MVSS  
   3M Center, Bldg 235-3A-09  
   St. Paul, MN 55144-1000

   Email: parkingorderprocessing@mmm.com  
   Phone: 1-877-777-3571  
   Fax: 1-800-591-9293

4. **For International orders not through a 3M subsidiary:**

   Fax, email, mail, or telephone the purchase order to:

   3M Company  
   3M Center, Global Channel Services  
   I-94 & McKnight Rd  
   Saint Paul, MN 55144-1000

   Email: 3MGCSOrders@mmm.com  
   Office: 1-651-736-5381  
   Fax: 1-651-736-5672
Finding a Part Number

Contact a 3M Parking Customer Support representative for part number information. For the United States and Canada, call 877-777-3571; the 3M global number is 512-984-9255.

Requesting a Repair

If a problem occurs with a product part, in many cases you can return the part to the Repair Center for repair. All repairs require the following:

- Returned Materials Authorization (RMA) form.

- Purchase order (PO) number. A PO number is required whether the repair is under warranty or not.

To request a repair:

1. Contact Product Support at 877-777-3571; the 3M global number is 512-984-9255.

2. Acquire a PO number from your company.

3. Fill out the RMA form. In addition to the Customer and Product information, be sure to include the following information:

   - In the Customer PO Number field, enter the PO number assigned by your company. A PO number is required whether the repair is under warranty or not.

   - If the part is under warranty, enter the original sales order number in the Warranty box.

   - If the part is no longer under warranty, check the Billable box.

   - To expedite the repairs, check Yes next to Expedited Service Requested.

   Note: The cost of expedited service is indicated on the RMA form.

4. E-mail or fax the form to the e-mail address or fax number provided on the bottom of the form. Within 36 hours, you will receive an RMA number from 3M Customer Support.

5. Ship the part to the address indicated on the RMA approval.

SHIPPING/RECEIVING NOTICE

Include the RMA number on the shipping label. 3M cannot accept packages without RMA numbers.
APPENDIX B

Product Support

Getting Help

If you have a product question that is not addressed in the documentation, contact your 3M Parking Value Added Reseller (VAR). If you are a VAR or you do not have a VAR, call 3M Product Support at one of the telephone numbers listed in the table below.

Whether you call, write, or fax, please have the following information available:

- A description of the events and the order in which they occurred
- The type of hardware you are using, with serial number and model number
- Firmware version, if applicable
- The type and configuration of software you are using
- Original sales order number
- Any messages that appear on your display screen and the exact wording
- Project name
- Returned Materials Authorization (RMA) number, if applicable

Table B.1 3M Product Support Phone Numbers

<table>
<thead>
<tr>
<th>Location</th>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>(877) 777-3571</td>
<td>(512) 984-3367</td>
</tr>
<tr>
<td>Canada</td>
<td>(877) 777-3571</td>
<td>(512) 984-3367</td>
</tr>
<tr>
<td>Central America</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South America</td>
<td>(512) 984-9255</td>
<td>(512) 984-3367</td>
</tr>
</tbody>
</table>
Accessing the 3M Parking VAR Resource Center

If you are a 3M Parking Value Added Reseller (VAR), please request the link to the VAR resource center by emailing:

parkingtechsupport@mmm.com.

The resource center site will contain the following:

- Product information
- Software upgrades when they are available
- Frequently Asked Questions
- Explosion drawings and product part numbers for some products
Appendix C

Configuration Options

Configuration Options Overview

This appendix describes all configuration features available for the Universal PS. The standard configuration module includes many features. Additional features may be purchased in one of several configuration module packages offered by 3M. In addition, configuration modules are also available with custom programming to suit specific site needs. Refer to the Federal APD Price Book for more information about configuration module packages.

This appendix contains the following:

- “Single Differential Counter” on page 157
- “Dual Differential Counter” on page 158
- “Dual Direction Operation” on page 158
- “Communication Options” on page 158
- “Directional Arming” on page 158
- “Third Loop Detector (Loop C)” on page 158
- “Automatic Time Zone Control Options” on page 159
- “Inputs” on page 159
- “Outputs” on page 161
- “Internal Resettable and Non-Resettable Counters” on page 166
- “Hourly Count Reports” on page 168

Single Differential Counter

A Differential Counter adds to, and subtracts from, the total number of spaces in a facility to provide a count of the number of spaces available in the facility or a particular area. This calculation is based on entries and exits.

The Differential Counter is set up with the total number of spaces available. As vehicles enter the facility, the count decreases. As vehicles exit the facility, the count increases. A Differential Counter Output is activated when the count reaches 0.

This option, available in a configuration module package, provides you with one internal differential counter — Differential Count #1 — and includes one Add Input and one Subtract Input.
Appendix C • Configuration Options

Dual Differential Counter

The Dual Differential Counter works in the same way as the Single Differential Counter but it provides you with two internal differential counts: Differential Count #1 and Differential Count #2. You can use one counter to count the monthly spaces available and the second counter to count the transient spaces available. The Dual Differential Counter is available in a custom configuration module.

Dual Direction Operation

Dual Direction Operation includes the third loop — Loop C — and Vends C and D Inputs for reverse direction monthly and transient vend inputs. It allows you to use Base Modes 4-6 for lane operation (See Appendix D “Lane Operation” starting on page 169 for additional information on lane functions.) You can also accurately track reverse direction counts with this option.

Dual Direction Operation is used for two-way lanes with vend devices placed on both sides of the gate. When Dual Direction Operation is used with Loop C, you can arm both forward and reverse direction devices. Dual Direction Operation is available in a configuration module package.

Communication Options

The Universal PS standard configuration includes a communication feature that allows you to interface with a Facility Management System (FMS). The communication option allows the gate to send count information and status conditions to the FMS, and allows the FMS to send commands to the gate.

Directional Arming

The Universal PS standard configuration includes Directional Arming logic, which enables you to arm a device only if the vehicle is traveling in the proper direction. In modes using Directional Arming, the gate will not arm the transient device, usually a ticket issuing device, unless it sees Presence A followed by Presence C. See Appendix D “Lane Operation” starting on page 169 for sample lane layouts using Directional Arming logic.

Note: A third Loop Detector (Loop C) is required for Directional Arming and is included in this software package.
Third Loop Detector (Loop C)

The Universal PS standard configuration includes a third loop detector, which provides an additional loop with Pulse and Presence. Loop C may be used in conjunction with the Loop A and Loop B detectors to provide directional counting and/or directional arming. If you use Dual Directional Operation software with this option, Loop C enables the ticket issuing device to be armed in both the forward and reverse direction of the lane. Refer to Appendix D “Lane Operation” starting on page 169 for sample lane layouts using the Loop C detector.

Automatic Time Zone Control Options

The Universal PS standard configuration allows the Omega LCD Controller logic to control the following four programmable timer options that require no relay:

- **Time Zone for Override** allows you to program the Override function that raises the gate without storing counts. It also enables you to deactivate the Override function at particular times.

- **Raise/Lower Time Zone** allows you to program the Raise/Lower function that raises the gate and continues to store counts. It also enables you to deactivate the Raise/Lower function at particular times.

- **Monthly Device Time Zone** enables you to program the Omega LCD Controller to activate or deactivate a monthly device at particular times.

- **Transient Time Zone** enables you to program the Omega LCD Controller to activate or deactivate a transient device at particular times.

Each Time Zone Control option corresponds to 20 actions that enable or disable the function. You define each action by indicating whether the action should enable or disable the function. You also set the time of day and day of the week when the action should take place. For example, you want to lock a ticket issuing device at night and unlock it for transient use each morning. You would use one action to lock it and another action to unlock it, for a total of two actions each day. You would use a total of 14 actions to enable and disable the ticket issuing device for the entire week.

*Note:* Hours for Time Zone options are defined in military time.

Inputs

The Barrier Gate may use up to 11 inputs, depending which features are programmed into the configuration module. Many inputs are included in the standard configuration module and others are available with a configuration module package or custom programmed configuration module. Refer to “Viewing the Software and Hardware Configuration Menus” on page 105, to determine which are programmed in your gate’s configuration module. Refer to Table C.1 for a list of all available Inputs.
Refer to your Engineering Package for information on which input features are located on each numbered terminal. *Always refer to your Engineering Package for the exact location of each input function.*

**Table C.1 Available Inputs**

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vend A</td>
<td>Monthly device forward direction input pulse that signals the gate arm to raise.</td>
</tr>
<tr>
<td>Vend B</td>
<td>Transient forward direction device input pulse that signals the gate arm to raise.</td>
</tr>
<tr>
<td>Full A</td>
<td>When the Monthly lot is full, this input is activated. It locks out Vend A input signals and does not let any monthly parkers into the facility. The input may be connected to a switch, a Differential Counter, or a Full Output.</td>
</tr>
<tr>
<td>Full B</td>
<td>When the Transient lot is full, this input is activated. It locks out Vend B input signals and does not let any transient parkers into the facility.</td>
</tr>
<tr>
<td>Raise/Lower</td>
<td>Signals gate arm to raise or lower. When gate arm is raised with a Raise Input signal, counts will continue to be stored.</td>
</tr>
<tr>
<td>Override</td>
<td>Signals gate arm to raise. Counts will not be stored when a gate is raised with the Override Input signal.</td>
</tr>
<tr>
<td>Rebound</td>
<td>Signals gate arm to raise when external safety edge rebound device is activated.</td>
</tr>
<tr>
<td>Ticket Request</td>
<td>Prevents parking patrons from simultaneously using a Ticket Issuing Device and a monthly card.</td>
</tr>
<tr>
<td>Full C</td>
<td>Locks out Vend C Input signals when active.</td>
</tr>
<tr>
<td>Full D</td>
<td>Locks out Vend D Input signals. Must be used with all Free In gate operations.</td>
</tr>
<tr>
<td>Loop A Emulator</td>
<td>Presence A Input signal from external detection device output acts as a Loop Detector A Input for the Barrier Gate.</td>
</tr>
<tr>
<td>Loop B Emulator</td>
<td>Presence B Input signal from external detection device output acts as a Loop Detector B Input for the Barrier Gate.</td>
</tr>
<tr>
<td>Loop C Emulator</td>
<td>Presence C Input signal from external detection device output acts as a Loop Detector C Input for the Barrier Gate.</td>
</tr>
<tr>
<td>Vend C (Used with Dual Directional Operation)</td>
<td>Reverse device Input pulse that signals the gate arm to raise for Monthly vehicles exiting the facility in a forward direction.</td>
</tr>
</tbody>
</table>
### Outputs

The Barrier Gate may use up to 16 outputs, depending on which features are programmed into the configuration module. Many outputs are included in the standard configuration module and others are available with a configuration module package or custom programmed configuration module. Refer to “Viewing the Software and Hardware Configuration Menus” on page 105, to determine which are programmed in your gate’s configuration module. Table C.2 on page 162 lists all Outputs available for the Barrier Gate.

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vend D (Used with Dual Directional Operation)</td>
<td>Reverse device Input pulse that signals the gate arm to raise for Transient vehicles exiting the facility in a forward direction.</td>
</tr>
<tr>
<td>External Count Source 1</td>
<td>Internal counter input signal. Counts the number of times Input has been activated.</td>
</tr>
<tr>
<td>External Count Source 2</td>
<td>Internal counter input signal. Counts the number of times Input has been activated.</td>
</tr>
<tr>
<td>Monitor (Communicating gate only)</td>
<td>Programmable Input used to monitor activities in the facility. A programmable 16-character string message is sent to the FMS when this Input is activated.</td>
</tr>
<tr>
<td>Vend E (Used with Value Card/ Credit Card)</td>
<td>Input signal from Value Card/credit card use that signals the gate to raise.</td>
</tr>
<tr>
<td>In Sense (Used with Value Card/ Credit Card)</td>
<td>Input signal from Value Card/credit card use that signals the gate to respond to a Value Card/credit card transaction.</td>
</tr>
<tr>
<td>DC1 Add (Used with Single Differential Counter)</td>
<td>Input to Omega LCD Controller differential counter to add a count.</td>
</tr>
<tr>
<td>DC2 Sub (Used with Single Differential Counter)</td>
<td>Input to Omega LCD Controller differential counter to subtract a count.</td>
</tr>
</tbody>
</table>
See your Engineering Package for information on which output features are located on each numbered terminal. *Always refer to your Engineering Package for the exact location of each output function.*

**Table C.2 Available Outputs**

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence A</td>
<td>Use this Output to monitor when a vehicle is detected on Loop A.</td>
</tr>
<tr>
<td>Presence B</td>
<td>Use this Output to monitor when a vehicle is detected on Loop B. You can also use it as a safety loop for Swing and Slide gates or an overhead door.</td>
</tr>
<tr>
<td>Pulse A</td>
<td>This Output will pulse for approximately 1/4 second when a vehicle is detected on Loop A. It is used mainly as a counter output.</td>
</tr>
<tr>
<td>Pulse B</td>
<td>This Output will pulse for approximately 1/4 second when a vehicle is detected on Loop B. It is used mainly as a counter output.</td>
</tr>
</tbody>
</table>
| Vend A Enable       | This Output enables or disables the monthly device for vehicles traveling in a forward direction. May be used for Interlock.  
We recommend that you use the Vend Enable Output instead of the Presence A Output to interlock a device. Presence A closes only if a vehicle is on Loop A, whereas Vend Enable provides the following additional checks to ensure that the device is enabled:  
Vend enable/disable command status  
Full Command and communication status  
Directional status and position of vehicles in the lane |
| Vend B Enable       | This Output enables or disables the transient device for vehicles traveling in a forward direction. |
| Monthly Forward Count | Counter output for total number of monthlies traveling in a forward direction over the loops with a valid vend. |
| Transient Forward Count | Counter output for total number of transients traveling in a forward direction over the loops with a valid vend. |
| Illegal Reverse Count | Counter output for total number of monthlies and transients traveling in a reverse direction over the loops which did not have a valid vend. (For example, the gate arm was broken.) |
| Illegal Forward Count | Counter output for total number of monthlies and transients traveling in a forward direction over the loops which did not have a valid vend. (For example, the gate arm was broken.) |
| Presence C Output   | Use this Output to monitor when a vehicle is detected on Loop C.            |
### Outputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse C Output</td>
<td>Use this Output to count the number of times a vehicle was detected on Loop C.</td>
</tr>
<tr>
<td>Monthly Forward Back-Out Count</td>
<td>Counter output for total number of monthlies traveling over the loops in a forward direction with a valid vend but then backing out. For example, On A, Off A, or On A, On B, Off B, Off A. When you are using Anti-Passback in a monthly access system, you may detect backouts of <em>host-based</em> monthly cards by programming a Monitor input in the reader. When you do this, a message will appear in the FMS Monitor window, and the card ID will be updated with the correct in/out status, allowing Anti-Passback to accurately prevent misuse. For this to work, the Barrier Gate must have a configuration module with the Monthly Forward Backout output, and the gate output must be wired to the input on the reader. (If using ScanNet, you must be on ScanNet version 5.0 or later, and you must be running CAMP.)</td>
</tr>
<tr>
<td>Transient Forward Back-Out Count</td>
<td>Counter output for total number of transients traveling over the loops in a forward direction with a valid vend but then backing out. For example, On A, Off A, or On A, On B, Off B, Off A.</td>
</tr>
<tr>
<td>Monthly Reverse Back-Out Count</td>
<td>Counter output for total number of monthlies traveling over the loops in a reverse direction with a valid vend but then backing out. For example, On B, Off B, or On B, On A, Off A, Off B.</td>
</tr>
<tr>
<td>Transient Reverse Back-Out Count</td>
<td>Counter output for total number of transients traveling over the loops in a reverse direction with a valid vend but then backing out. For example, On B, Off B, or On B, On A, Off A, Off B.</td>
</tr>
<tr>
<td>Monthly Reverse Count</td>
<td>Counter output for total number of monthlies who travelled in a reverse direction, with a valid vend, over the loops.</td>
</tr>
<tr>
<td>Transient Reverse Count</td>
<td>Counter output for total number of transients who travelled in a reverse direction, with a valid vend, over the loops.</td>
</tr>
<tr>
<td>Total Reverse Count</td>
<td>Counter output for total number of monthlies and transients who travelled in a reverse direction over the loops. Count also includes illegal reverse.</td>
</tr>
<tr>
<td>Total Forward Count</td>
<td>Counter output for total number of monthlies and transients who travelled in a forward direction over the loops. Count also includes illegal forward.</td>
</tr>
<tr>
<td>Vend C Enable Output</td>
<td>This output enables or disables the monthly device for vehicles traveling in the reverse direction in a dual direction lane.</td>
</tr>
</tbody>
</table>
Table C.2 Available Outputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vend D Enable Output</td>
<td>This output enables or disables the transient device for vehicles traveling in the reverse direction in a dual direction lane.</td>
</tr>
<tr>
<td>Transient Forward Full Output (Communicating gate only)</td>
<td>This output allows you to use the extra high voltage relay offered in the gate to turn on the “Full” signs when transient spaces in a facility are no longer available. This output may be driven by the FMS Count Control system. When transient space becomes available, the output is deactivated. This deactivates the gate’s high voltage, which then turns the “Transient Full” sign off.</td>
</tr>
<tr>
<td>Lot Forward Full Output (Communicating gate only)</td>
<td>This output allows you to use the extra high voltage relay offered in the gate to turn on the “Full” signs when monthly and transient spaces in a facility are no longer available. This output may be driven by the FMS Count Control system. When monthly or transient space becomes available, the output is deactivated. This deactivates the gate’s high voltage, which then turns the “Full” sign off.</td>
</tr>
<tr>
<td>Transient Reverse Full Output (Communicating gate only)</td>
<td>This output allows you to use the extra high voltage relay offered in the gate to turn on the “Full” or some other signs when transient spaces in a particular area are no longer available. This output may be driven by the FMS Count Control system or a command from the FMS. When transient space becomes available, the output is deactivated. This deactivates the gate’s high voltage, which then turns the “Transient Full” sign off.</td>
</tr>
</tbody>
</table>
**Outputs**

**Table C.2 Available Outputs**

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot Reverse Full Output (Communicating gate only)</td>
<td>This output allows you to use the extra high voltage relay offered in the gate to turn on the “Full” or some other signs when monthly or transient spaces in a particular area are no longer available. This output may be driven by the FMS Count Control system. When monthly or transient space becomes available, the output is deactivated. This deactivates the gate’s high voltage, which then turns the “Transient Full” sign off.</td>
</tr>
<tr>
<td>Time Zone Output</td>
<td>This output may be used to activate Full signs, disable transient devices at night, or turn on a closed circuit TV camera (CCTV) at a preprogrammed time each day. Since this is a continuous output, not a pulse output, it will remain activated until the programmed time has elapsed. Two timer outputs are available. Each Time Zone Control option corresponds to 20 actions that enable or disable the function. You define each action by indicating whether the action should enable or disable the function. You also set the time of day and day of the week when the action should take place. For example, you want to lock a ticket issuing device at night and unlock it for transient use each morning. You would use one action to lock it and another action to unlock it, for a total of two actions each day. You would use a total of 14 actions to enable and disable the ticket issuing device for the entire week. Hours for Time Zone options are defined in military time.</td>
</tr>
<tr>
<td>Differential 1</td>
<td>This output is activated when the difference between the total number of spaces in the facility and the number of occupied spaces is zero, based on counts in the Omega LCD Controller differential counter.</td>
</tr>
<tr>
<td>Vend E Enable</td>
<td>This output enables the Value Card/credit card device for vehicles traveling in a forward direction.</td>
</tr>
</tbody>
</table>
Internal Resettable and Non-Resettable Counters

Internal Resettable and Non-Resettable Counters are stored in the Omega LCD Controller’s memory. Each counter acts as an accumulating counter and can store 999,999 counts before returning to zero and beginning the counts again. Refer to Table C.3 for a list of all available internal counters.

Table C.3  Available Resettable and Non-resettable Counts

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pres A</td>
<td>Number of times vehicle presence was detected on Loop A.</td>
</tr>
<tr>
<td>Pres B</td>
<td>Number of times vehicle presence was detected on Loop B.</td>
</tr>
<tr>
<td>Pres C</td>
<td>Number of times vehicle presence was detected on Loop C.</td>
</tr>
<tr>
<td>Emul A</td>
<td>Number of times the Loop A Emulator input indicated vehicle presence from external detection device A.</td>
</tr>
<tr>
<td>Emul B</td>
<td>Number of times the Loop B Emulator input indicated vehicle presence from external detection device B.</td>
</tr>
<tr>
<td>Emul C</td>
<td>Number of times the Loop C Emulator input indicated vehicle presence from external detection device C.</td>
</tr>
<tr>
<td>Mon Fwd</td>
<td>Number of Monthly Forward Counts (Card Reader Vend A)</td>
</tr>
<tr>
<td>M F Bck</td>
<td>Number of Monthly Forward Back-Out Counts</td>
</tr>
<tr>
<td>Tra Fwd</td>
<td>Number of Transient Forward Counts (ticket issuing device Vend B)</td>
</tr>
<tr>
<td>T F Bck</td>
<td>Number of Transient Forward Back-Out Counts</td>
</tr>
<tr>
<td>Tot Fwd</td>
<td>Total number of Transient and Monthly vehicles which traveled in forward direction in the lane.</td>
</tr>
<tr>
<td>Ill Fwd</td>
<td>Number of illegal forward counts (vehicle crashing through the gate without a vend).</td>
</tr>
<tr>
<td>TgB Fwd</td>
<td>Number of times a vehicle tailgated through lane over Loop B in a forward direction.</td>
</tr>
<tr>
<td>Mon Rev</td>
<td>Number of Monthly reverse counts (Card Reader Vend C).</td>
</tr>
<tr>
<td>M R Bck</td>
<td>Number of Monthly reverse back-out counts.</td>
</tr>
<tr>
<td>Tra Rev</td>
<td>Number of Transient reverse counts (ticket issuing device Vend D).</td>
</tr>
<tr>
<td>T R Bck</td>
<td>Number of Transient reverse back-out counts.</td>
</tr>
<tr>
<td>Input</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tot Rev</td>
<td>Total number of Monthly and Transient reverse counts.</td>
</tr>
<tr>
<td>Ill Rev</td>
<td>Number of illegal reverse counts (vehicle crashing through the gate or exiting without a vend when gate arm is up).</td>
</tr>
<tr>
<td>TgB Rev</td>
<td>Number of reverse tailgate counts in the lane.</td>
</tr>
<tr>
<td>Ill V A</td>
<td>Number of illegal Vend A Inputs (card holder used card without vehicle presence in forward Vend A).</td>
</tr>
<tr>
<td>Ill V B</td>
<td>Number of illegal Vend B Inputs (ticket pulled from ticket issuing device without vehicle presence in forward Vend B).</td>
</tr>
<tr>
<td>Ill V C</td>
<td>Number of illegal Vend C Inputs (card holder used card without vehicle presence in reverse Vend C).</td>
</tr>
<tr>
<td>Ill V D</td>
<td>Number of illegal Vend D Inputs (ticket pulled from ticket issuing device without vehicle presence in reverse Vend D).</td>
</tr>
<tr>
<td>Gate Up</td>
<td>Number of times gate was raised by a legal vend. This count includes overrides and rebounds but not illegal events such as tailgates.</td>
</tr>
<tr>
<td>Man G U</td>
<td>Number of times gate was raised manually.</td>
</tr>
<tr>
<td>Override</td>
<td>Number of times the gate was raised from the Override Input.</td>
</tr>
<tr>
<td>Reb Ext</td>
<td>Number of times an external rebound device was activated.</td>
</tr>
<tr>
<td>Reb Mot</td>
<td>Number of times the gate’s motor current sensing system detected a vehicle under the gate’s arm and rebounded the gate.</td>
</tr>
<tr>
<td>Reb PrB</td>
<td>Number of times the gate rebounded due to detection of presence on Loop B.</td>
</tr>
<tr>
<td>Tune Lp</td>
<td>Number of times the loops were tuned.</td>
</tr>
<tr>
<td>Pwr Up</td>
<td>Number of times the CPU in the Omega LCD Controller went through a power cycle of DIP Switch reset procedure.</td>
</tr>
<tr>
<td>Extrn 1</td>
<td>Number of times External Count Source 1 Input was activated.</td>
</tr>
<tr>
<td>Extrn 2</td>
<td>Number of times External Count Source 2 Input was activated.</td>
</tr>
<tr>
<td>R/L Input</td>
<td>Number of times the Raise/Lower Input occurred.</td>
</tr>
<tr>
<td>Reb Input</td>
<td>Number of times the Rebound Input occurred.</td>
</tr>
</tbody>
</table>
Hourly Count Reports

Hourly Count Reports are available in custom configuration modules. They enable you to store total hourly counts for up to eight internal counters in each gate (chosen from the list of resettable and non-resettable counts in Table C.3 on page 166). Each counter will store the activity for the last seven days. You can generate a statistical report detailing the total hourly counts for each of the count features you select.

Note: If you have the Single Differential Counter and Dual Differential Counter features you can also store Starting, Hourly Minimum, or Hourly Peak Counts in Hourly Count Reports.
Appendix D

Lane Operation

Lane Operation Overview

The Universal PS has a variety of features which allow you total control of your facility. This chapter provides information on Connection Panel DIP Switch settings, device and loop placement, and a brief description of lane options.

This appendix contains the following topics:

- “Understanding Gate Logic” on page 169
- “Setting Base Modes and Sub Modes” on page 170
- “Setting Vends” on page 171
- “Lane Layout Samples” on page 172

Understanding Gate Logic

Mode Logic

The Barrier Gate has expanded mode logic with a number of features. Some of these features are:

- The Omega LCD Controller provides programmable back-out timers to prevent the gate from resetting if a car gets between loops.
- The Omega LCD Controller also provides a back-out timer for operation without an arming loop.
- Directional Loop arming logic includes a reset loop that recognizes a back-out condition even if a vehicle moves completely off dual arming loops and onto the reset loop prior to backing out.
- The Ticket Request Input prevents the operation of any other entry control device once the ticket issuing device has been vended. This prevents someone from pushing the button on the ticket issuing device to dispense a ticket, then using the Card Reader to vend the gate prior to pulling the ticket.
Directional Logic

Directional Logic provides you with the following features for additional lane operation control:

- The directional logic feature allows the Omega LCD Controller to recognize the direction of vehicle traffic over the loops. Used with a free exit gate, this feature prevents the gate from vending if a vehicle drives far enough under the arm to activate the opening loop from the wrong direction.

- Because of the Directional Arming option, the Omega LCD Controller requires the vehicles to travel in a specific direction over the loops (on Loop A, on Loop C) to arm the vend device(s). The Dual Direction Operation option, along with the Omega LCD Controller’s directional logic, allows you to control a reversing lane with a single barrier gate and also allows you to monitor and control devices on either side of the gate.

Setting Base Modes and Sub Modes

Use the DIP switches on the Connection Panel to configure the gate for the desired lane operation by setting the Base Mode and Sub Mode. The Base Mode generally refers to the placement of the loop or loops in the lane. Sub Mode generally refers to the placement of devices in the lane.

DIP switches 1-3 on Switch Bank 1 of the Connection Panel determine the Base Mode of the lane operation, while DIP Switches 4 and 5 on Switch Bank 1 of the Connection Panel determine the Sub Mode of the lane. For more information about how to set these DIP switches, see “Set the DIP Switches for Base Mode/Sub Mode” on page 58.

Note: Configurations which use Vends C and D require the Dual Direction software package. Configurations which use Loop C require the Third Loop software package. If your gate is not ordered with these options, you will be unable to use Base Mode - Sub Mode configurations which use Vends C and D and or Loop C.
Setting Vends

If you do not use the appropriate vend inputs for devices, as shown in the lane configurations on the following pages, the Omega LCD Controller will not interpret counts correctly and the lane will not function properly. For example, you should not use a Card Reader, which is a Vend A, as Vend B. Refer to Table D.1 for a description of the different vends.

**Table D.1 Vends**

<table>
<thead>
<tr>
<th>Vend</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vend A</td>
<td>Monthly device (Card Reader) in forward direction¹</td>
</tr>
<tr>
<td>Vend B</td>
<td>Transient device (ticket issuing device, Fee Computer) in a forward direction</td>
</tr>
<tr>
<td>Vend C</td>
<td>Monthly device (Card Reader) in a reverse direction</td>
</tr>
<tr>
<td>Vend D</td>
<td>Transient device (Fee Computer) in a reverse direction</td>
</tr>
</tbody>
</table>

¹ The Omega LCD Controller considers vehicle travel on A then B as a forward count, regardless of the position of the devices in the lane. Similarly, B to A travel is always considered a reverse count.

In the sample layout drawings on the following pages, possible device/vend configurations are shown. However, you need not use all the vends available in a particular configuration if the application does not require it. For example, Figure D.4 shows Base Mode 2 - Sub Mode 3 with a Push-Button ticket issuing device and Card Reader in a lane. Figure D.5, Figure D.6, Figure D.7, and Figure D.8 show this same Base Mode - Sub Mode configuration with different device combinations.

**Set Vend B Enable Output to Pulse**

The Vend B Enable Output for the Omega LCD Controller enables the transient (Vend B) device. This output may be set to either the Pulse or Presence output signal.

*Note:* Vends A, C, and D are always Presence Vend Enable outputs.

Both Auto and Push-Button ticket issuing devices require a Pulse signal from the Vend B Enable output. Exit verifiers and cashier exit devices require Presence for Vend B Enable output.

For Auto ticket issuing devices, Vend B Enable should be a Pulse signal. However, when a vehicle drives onto the arming loop, the ticket issuing device automatically issues a ticket.

*Note:* The Omega LCD Controller ignores the Ticket Request input in modes defined for Auto ticket issuing devices.

For Push-Button ticket issuing device modes, a Ticket Request Input signal is required before Vend B Enable output will pulse to allow the ticket issuing device to issue a ticket. The Ticket Request Input is activated when the push button is pressed.
Set Vend B Enable Output to Presence

For all transient devices except ticket issuing devices (Exit verifiers and cashier exit devices), you must set Vend B Enable for Presence.

To set Vend B Enable for Presence, follow this procedure:

1. Install a jumper between Input #7 (Ticket Request Input) and Input #13 (Input Common).
2. Cold start the Omega LCD Controller. Hold own the MONITOR/MENU key while powering up the Omega LCD Controller.

Lane Layout Samples

Figure D.2 - Figure D.8 provide examples of one-way, two loop lanes. Figure D.9 - Figure D.13 show examples of one-way, three loop configurations. Figure D.14 - Figure D.23 provide examples of two-way lane configurations for single loop, two loop, and three loop configurations. The configurations shown in Figure D.15 - Figure D.23 are available in the Universal PS only if Dual Direction Operation software is included in the gate.

Note: The devices shown in these diagrams are examples of typical lane operation. Your actual operation may require devices which differ from those shown. For example, the diagram may show a ticket issuing device in the forward direction of the lane for transient Vend B. However, you could also use a Fee Computer for a transient Vend B in this configuration.
Figure D.1 shows a single detector loop, for a one-way exit or entry lane for controlling monthly (Vend A) and/or transient (Vend B) traffic. As only one loop is used, the entry control devices are always enabled.

Only Vend A is used in the example.
Figure D.2 Pay In/Free Out

Figure D.2 shows a two-way lane with entry control device and automatic fee exit vend. Vend A or Vend B opens the gate in the entry direction. (This example shows only Vend A.) Presence on Loop A vends the gate for free exit. Counts for free exit are forward counts.

Note: In this configuration, the monthly/transient entry counts will be reverse counts as the Omega LCD Controller always considers A to B vehicle travel as a forward count regardless of the position of devices in the lane. Similarly, B to A travel is always considered reverse counts.

This configuration can also be used for a Free In/Pay Out lane.
Figure D.3 shows a one-way lane with a remote Card Reader followed by an Auto ticket issuing device. Unless the Card Reader has been used, the ticket issuing device automatically issues a ticket when a car drives onto Loop A in the forward direction. The gate arm lowers after the vehicle clears Loop B.
Figure D.4  Pay In with Arming Loop for Push-Button Ticket Issuing Device/Card Reader

Base Mode 2 - Sub Mode 3

Figure D.4 on page 176 shows a one-way entry lane with monthly (Card Reader) and transient (ticket issuing device) control devices mounted side by side in a forward direction. These devices are interlocked with Loop A, preventing their operation unless a vehicle is present on the loop.

Figure D.5 on page 177, Figure D.6 on page 178, and Figure D.7 on page 179 provide additional examples of the Base Mode 2 - Sub Mode 3 configuration, showing the different device combinations available.
**Figure D.5** Pay In with Arming Loop for Ticket Issuing Device Only

Figure D.5 shows a one-way entrance lane with a transient control device (ticket issuing device - Vend B) in a forward direction. The device is interlocked with Loop A, preventing its operation unless a vehicle is present on the loop.

Figure D.4, Figure D.6, and Figure D.7 provide additional examples of the Base Mode 2 - Sub Mode 3 configuration, showing the different device combinations available.
Figure D.6 shows a one-way exit lane with monthly (Vend A) and transient (Vend B) control devices mounted side by side in a forward direction. These devices are interlocked with Loop A, preventing their operation unless a vehicle is present on the loop.

Figure D.4, Figure D.5, and Figure D.7 provide additional examples of the Base Mode 2 - Sub Mode 3 configuration, showing the different device combinations available.
**Figure D.7** Pay Out with Arming Loop for Fee Computer Only

Base Mode 2 - Sub Mode 3

Figure D.7 shows a one-way exit lane with a transient control device (Fee Computer - Vend B) in a forward direction. The fee computer is interlocked with Loop A, preventing computer operation unless a vehicle is present on the loop.

Figure D.4, Figure D.5, and Figure D.6 provide additional examples of the Base Mode 2 - Sub Mode 3 configuration, showing the different device combinations available.
Figure D.8 shows a free gate, with no entry control devices. The lane is a one-way forward direction lane. Presence on Loop A vends the gate. Vehicles travel over Loop A, then on and off Loop B, which resets the gate.
In the configuration in Figure D.9, the ticket issuing device automatically issues a ticket when a car drives onto Loop A in the forward direction, unless the Card Reader has been used. Loop C arms the monthly device (Vend A). The gate arm lowers after the vehicle clears Loop B.
Use this wiring for:

- Pay Operation w/Arming Loop for Card Reader/Auto ticket issuing device as shown in Figure D.9 on page 181
- Pay In/Pay Out w/Arming for Entry Reader, Auto ticket issuing device only as shown in Figure D.19 on page 191
Figure D.11 shows a one-way lane with monthly and transient control devices mounted side by side in a forward direction. If there is no vehicle on Loop C, these devices will not operate. Loop A is provided as an escape lane monitor or may be used if vend devices are located far from the gate.

When Loop C detects a presence and either Vend A or Vend B is activated, if Loop A detects a presence with no presence on Loop B, the gate lowers. The Omega LCD Controller then assumes that the vehicle exited via the escape lane.
In Figure D.12, the monthly (Vend A) and transient (Vend B) devices are interlocked with Loop A and Loop C. The vehicle must travel from Loop A to Loop C to enable Vends A and B. The gate arm lowers after the vehicle clears Loop B.
In the configuration in Figure D.13, the ticket issuing device automatically issues a ticket when the car drives onto Loop A and then Loop C in the forward direction, unless the Card Reader has been used. Loop A and Loop C act as the arming loop for the transient device (Vend B). The gate arm lowers after the vehicle clears Loop B.
Figure D.14 shows a two-way, single detector loop lane for controlling monthly and/or transient traffic without arming. This configuration is usually used with card in/card out configurations where monthly (Vend A) is the forward direction and monthly (Vend C) is reverse direction. This configuration is recommended for use with offline (no communication) and non-counting systems only.
Figure D.15  Pay In/Pay Out with Arming Loop for Auto Ticket Issuing Device Only

Base Mode 2 - Sub Mode 2

Figure D.15 shows a two-way lane with a remote Card Reader, followed by an Auto ticket issuing device, as the entry control devices. The ticket issuing device automatically issues a ticket when a vehicle drives onto Loop A in the forward direction, unless the Card Reader has been used. If you have ordered optional Vend C and Vend D with the gate, a vend in the reverse direction from either a monthly device (Vend C) or a transient device (Vend D) vends the gate. In either direction, the gate arm lowers after the vehicle clears Loop B.

You need Dual Direction option for this configuration.
Figure D.16 shows a two-way lane with monthly and transient control devices mounted side by side in both forward and reverse direction. Forward direction devices interlock with Loop A to prevent operation of the devices unless there is a vehicle present on Loop A. There are no interlocking loops for optional reverse direction devices.

You need Dual Direction option for this configuration.
Figure D.17 Pay In/Out w/Arming for Entry TID/Reader, Exit Reader/Fee Computer

Base Mode 3 - Sub Mode 1

Figure D.17 shows a two-way lane with transient/monthly control devices interlocked with Loop A in the forward direction and with Loop C in the reverse direction. If a vehicle is not present on Loop A (forward direction) or Loop C (reverse direction), the devices will not operate. Vend A and Vend B open the gate in the forward direction and Vend C and Vend D open the gate in the reverse direction.

You need Dual Direction option for this configuration.
Figure D.18 shows a two-way lane with a remote reader and a transient control device interlocked with Loop A in the forward direction. The transient/monthly devices are interlocked with Loop C in the reverse direction. If a vehicle is not present on Loop A (forward direction) or Loop C (reverse direction), the devices will not operate.

You need Dual Direction option for this configuration.
Figure D.19  Pay In/Out w/Arming Loop for Entry Auto TID and Exit Fee Computer

Figure D.19 shows a two-way lane with a remote reader and a transient device interlocked with Loop A in the forward direction. A remote reader and a transient control device are interlocked with Loop C in the reverse direction. If a vehicle is not present on Loop A (forward direction) or Loop C (reverse direction), the devices will not operate. Vend A and Vend B open the gate in the forward direction and Vend C and Vend D open the gate in the reverse direction.

You need Dual Direction option for this configuration.
In the configuration shown in Figure D.20, a ticket is automatically issued when a vehicle drives onto Loop A in the forward direction, unless the Card Reader has been used. Loop C is interlocked with the monthly device (Vend A). In the reverse direction, a vend from the monthly device (Vend C) or the transient device (Vend D) vends the gate. In either direction, the gate arm lowers after the vehicle clears Loop B.

You need Dual Direction option for this configuration.
Figure D.21  Pay In/Pay Out w/Escape Lane Entry

**Base Mode 5 - Sub Mode 2**

Figure D.21 shows a two-way lane with monthly and transient control devices mounted side by side in both forward and reverse direction. (This example shows only Vend C in the reverse direction.) Forward direction devices are interlocked with Loop C to prevent their operation unless a vehicle is present on Loop C. Loop A is provided as an escape lane monitor and may also be used if the vend devices are far from the gate. (Use two loops to extend presence so that a vehicle traveling through the lane will always be on Loop C or Loop A.)

If Loop C detects a presence, either Vend A or Vend B occurs, and Loop A detects a presence without a presence on Loop B, the gate lowers and the Omega LCD Controller assumes that the vehicle exited through the escape lane.

You need Dual Direction option for this configuration.
The configuration shown in Figure D.22, Loop A and Loop C are interlocked with the monthly (Vend A) and transient (Vend B) devices. The transient device in this example is a Push-Button ticket issuing device. The vehicle must travel from Loop A to Loop C to enable Vends A and B. In the reverse direction, a vend from either a monthly device (Vend C) or a transient device (Vend D) vends the gate. In either direction, the gate arm lowers after the vehicle clears Loop B.

You need Dual Direction option for this configuration.
In the configuration shown in Figure D.23, a ticket is automatically issued when a car drives onto Loop A and then Loop C in the forward direction, unless the Card Reader has been used. Loop A and Loop C provide arming for the transient device (Vend B). In the reverse direction, a vend from either a monthly device (Vend C) or a transient device (Vend D) vends the gate. In either direction, the gate arm lowers after the vehicle clears Loop B. **You need Dual Direction option for this configuration.**
Appendix E

Part Numbers

Ordering Parts

The following section provides the information that you need to order parts used in the Universal PS.

About Barrier Gate Part Numbers

For each gate you order, you must order the following:

- Gate (includes cabinet and mechanical components)
- Gate Arm
- Configuration Module (for all gates except Raise/Lower functionality)
- Foreign Language Option for Gate Label (optional)

Gate Cabinet and Mechanical Component Options

When you order a Barrier Gate, you may choose any combination of the following:

- Right Hand or Left Hand arm location
- 120 volt or 220 volt
- Yellow, White, Silver, or Special paint
- Door on Driveway Side (lane side, instead of back of cabinet)
- Raise/Lower functionality only (no controller)

Each combination of the above has a different part number. For example, you may order a gate that has a Left Hand arm location, 120V, White, Door on Driveway Side, and Raise/Lower functionality only.

For a complete listing of part numbers, refer to the Federal APD Price Book or contact your VAR.
Gate Arm Options

When you order a gate, you may choose any combination of the following:

■ 10 foot or 12 foot
■ Left Hand or Right Hand (must be compatible with gate cabinet)
■ Folding or not
■ Folding to meet American Disability Act requirements
■ Door on Driveway Side (must be compatible with gate cabinet)

Each combination of the above has a different part number. For example, you may order a 12 foot, folding gate arm with a left hand arm location.

For a complete listing of part numbers, refer to the Federal APD Price Book or contact your VAR.

Configuration Module Options

When you order a gate, you may order one of the following configuration module packages. However, a gate with Raise/Lower functionality only does not require a configuration module.

■ Standard
■ Dual Direction
■ Value Card/Credit Card
■ Single Differential Counter
■ Custom Configuration

For a complete listing of part numbers, refer to the Federal APD Price Book or contact your VAR.

Language Options

If your gate will be installed at a non-English-speaking location, you may need to order a language option for the gate labels. These labels are available in several languages, for the gate cabinet, gate arm, or both.

For a complete listing of part numbers, refer to the Federal APD Price Book or contact your VAR.
Parts for Upgrading Legacy Gates

The Universal PS retrofits to existing legacy G-90 and G-90 LCD gates. You can upgrade these legacy gates with the following parts, which include all necessary items for the upgrade:

Table E.1 Legacy G-90 and G-90 LCD Upgrade Parts

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>75-0302-0598-5</td>
<td>Upgrade, G-90 LCD to G-90 CD</td>
</tr>
<tr>
<td>75-0302-0600-9</td>
<td>Upgrade, G-90 LCD to G-90 CD 220 Volt</td>
</tr>
<tr>
<td>75-0302-0597-7</td>
<td>Upgrade, G-90 to G-90 CD</td>
</tr>
<tr>
<td>75-0302-0599-3</td>
<td>Upgrade, G-90 to G-90 CD 220 Volt</td>
</tr>
</tbody>
</table>
Figure E.1 Barrier Gate Assembly
### Table E.2 Barrier Gate Assembly

<table>
<thead>
<tr>
<th>Ref#</th>
<th>Part#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>51-25276Y/W</td>
<td>G-90 Universal Drive, Cabinet, Yel/Wht</td>
</tr>
<tr>
<td></td>
<td>51-25276S</td>
<td>G-90 Universal Drive, Cabinet, Spec</td>
</tr>
<tr>
<td></td>
<td>51-25277Y/W</td>
<td>Coverplate, G-90 Universal Drive, Cabinet, Yel/Wht</td>
</tr>
<tr>
<td></td>
<td>51-25277S</td>
<td>Coverplate, G-90 Universal Drive, Cabinet, Spec</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(51-25277 covers one of the main shaft holes, right or left)</td>
</tr>
<tr>
<td>2</td>
<td>50-18008Y/W</td>
<td>Door, G-90 Gate Series Aluminum, Yel/Wht</td>
</tr>
<tr>
<td></td>
<td>50-18008S</td>
<td>Door, G-90 Gate Series Aluminum, Spec</td>
</tr>
<tr>
<td>3</td>
<td>26-9800-1053-7</td>
<td>Lock, T-Handle</td>
</tr>
<tr>
<td>4</td>
<td>26-9800-0908-3</td>
<td>Weatherstripping, 1/8 x 1/2 Closed Cell</td>
</tr>
<tr>
<td>5</td>
<td>26-9800-1476-0</td>
<td>Motor, 1/3 HP 50/60 CYC 1 PH w/Capacitor</td>
</tr>
<tr>
<td></td>
<td>26-9800-1475-2</td>
<td>Motor, 220 VAC 50/60 CYC w/Cap Drive</td>
</tr>
<tr>
<td>6</td>
<td>78-0060-3892-7</td>
<td>Pulley, Gate Double</td>
</tr>
<tr>
<td>7</td>
<td>26-9800-1463-8</td>
<td>Vee Belt, 27&quot;</td>
</tr>
<tr>
<td>8</td>
<td>26-9800-1481-0</td>
<td>Reducer</td>
</tr>
<tr>
<td></td>
<td>78-0060-1967-9</td>
<td>Label, Gear Reducer Lubrication</td>
</tr>
<tr>
<td>9</td>
<td>26-9800-1460-4</td>
<td>Pulley, 4&quot; x 5/8&quot; Gear Reducer</td>
</tr>
<tr>
<td>10</td>
<td>78-0060-1981-0</td>
<td>Bearing Block Assy, Metal</td>
</tr>
<tr>
<td>11</td>
<td>78-0060-1974-5</td>
<td>Connecting Rod Assy, Metal</td>
</tr>
<tr>
<td>12</td>
<td>78-0060-3922-2</td>
<td>Stud</td>
</tr>
<tr>
<td>13</td>
<td>78-0060-1963-8</td>
<td>Flange, Gate Universal w/Cutter Blade</td>
</tr>
<tr>
<td>14</td>
<td>78-0060-2995-9</td>
<td>Gate Arm, 10’ Finished</td>
</tr>
<tr>
<td></td>
<td>78-0060-2996-7</td>
<td>Gate Arm, 12’ Finished</td>
</tr>
<tr>
<td>15</td>
<td>26-9800-1057-8</td>
<td>Switch, Limit</td>
</tr>
<tr>
<td>16</td>
<td>26-9800-1058-6</td>
<td>Switch Cover, Limit</td>
</tr>
<tr>
<td>17</td>
<td>75-0302-1595-0</td>
<td>Drive Pin, 5/16 x 2 1/2</td>
</tr>
</tbody>
</table>
### Table E.2 Barrier Gate Assembly

<table>
<thead>
<tr>
<th>Ref#</th>
<th>Part#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>78-0060-3921-4</td>
<td>Cam, Limit</td>
</tr>
<tr>
<td>19</td>
<td>78-0060-1922-4</td>
<td>Main Shaft, Left Hand</td>
</tr>
<tr>
<td></td>
<td>78-0060-1919-0</td>
<td>Main Shaft, Right Hand</td>
</tr>
<tr>
<td>20</td>
<td>78-0060-1959-6</td>
<td>Flange Cover</td>
</tr>
<tr>
<td>21</td>
<td>26-9800-1458-8</td>
<td>Collar, w/Set Screw 1 1/4&quot;</td>
</tr>
<tr>
<td>22</td>
<td>75-0302-0534-0</td>
<td>Guide, Limit Switch (11-0045)</td>
</tr>
<tr>
<td>23</td>
<td>78-0060-1966-1</td>
<td>Label, Gate Arm Caution Foldover (English; other languages available)</td>
</tr>
<tr>
<td>24</td>
<td>78-0060-3313-4</td>
<td>Flange Assy, Break Away</td>
</tr>
<tr>
<td>25</td>
<td>78-0060-3314-2</td>
<td>Heater Assy, G-90 Series</td>
</tr>
<tr>
<td>26</td>
<td>78-0060-1627-9</td>
<td>Bracket, G-90 Heater</td>
</tr>
<tr>
<td>27</td>
<td>78-0060-1972-9</td>
<td>Heater, G-90 Series Cartridge (2 required for 220V models)</td>
</tr>
<tr>
<td></td>
<td>26-9800-0932-3</td>
<td>Plug, Nylon 2 Pin Male</td>
</tr>
<tr>
<td></td>
<td>11-2591</td>
<td>Amp Pin, Male 18 AWG Hook-Up</td>
</tr>
<tr>
<td>28</td>
<td>26-9800-1479-4</td>
<td>Clamp, 3/8&quot; Tube Heater</td>
</tr>
<tr>
<td>30</td>
<td>75-0302-0857-5</td>
<td>Controller, Omega LCD V2</td>
</tr>
<tr>
<td>31</td>
<td>78-0060-1934-9</td>
<td>Connections Panel Cover, G-90 CD/SST</td>
</tr>
<tr>
<td>32</td>
<td>75-0302-0853-4</td>
<td>Config Package, CD Gate Standard Program</td>
</tr>
<tr>
<td></td>
<td>75-0302-0856-7</td>
<td>Config Package, CD Gate Dual Direction &amp; Standard</td>
</tr>
<tr>
<td></td>
<td>75-0302-0855-9</td>
<td>Config Package, CD Gate Single Differential Counter &amp; Standard</td>
</tr>
<tr>
<td></td>
<td>75-0302-0854-2</td>
<td>Config Package, CD Gate Value Card/Credit Card &amp; Standard</td>
</tr>
<tr>
<td></td>
<td>75-0302-0852-6</td>
<td>Config Package, CD Gate w/Custom Programming</td>
</tr>
<tr>
<td>33</td>
<td>78-0060-3559-2</td>
<td>G-90 CD Connection Panel, 120V</td>
</tr>
<tr>
<td></td>
<td>78-0060-3560-0</td>
<td>G-90 CD Connection Panel, 220 VAC</td>
</tr>
<tr>
<td>34</td>
<td>78-0060-1933-1</td>
<td>Connections Panel Adapter, G-90 CD/SST</td>
</tr>
</tbody>
</table>
### Table E.2  Barrier Gate Assembly

<table>
<thead>
<tr>
<th>Ref#</th>
<th>Part#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>not shown</td>
<td>78-0060-1960-4</td>
<td>Label, Gate Post Warning</td>
</tr>
<tr>
<td>not shown</td>
<td>78-0060-1964-6</td>
<td>Label, Gate Arm Warning (Flange)</td>
</tr>
<tr>
<td>not shown</td>
<td>78-0060-1965-3</td>
<td>Label, Mechanical/Electrical Warning</td>
</tr>
<tr>
<td>not shown</td>
<td>78-0060-1961-2</td>
<td>Gasket, Gate Cabinet Mounting</td>
</tr>
</tbody>
</table>
**Figure E.2** Folding Gate Arm Assembly (53-18037)

Warning!
1. Always affix a warning label when replacing broken or vandalized gate arms.
2. Recommended replacement of broken gate arms with 1 x 4 soft pine wood only.
3. The use of any other materials, such as metal and/or plastic arms, is not recommended as they may cause injury or property damage.

**Note:** An ADA folding gate arm is also available: part #75-0302-0754-4 (left hand) and part #75-0302-0755-1 (right hand).
### Table E.3  Folding Gate Arm Assembly

<table>
<thead>
<tr>
<th>Ref#</th>
<th>Part#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stabilizer Assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>78-0060-3311-8</td>
<td>Gate Arm, Stabilizer Assy (Not Shown)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3/8-16 Nut</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3/8&quot; Lock Washer</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>10/24 Nut</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>10/24 1 1/2&quot; Screw</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>75-0302-1598-4</td>
<td>Screw, 3/8 x 1 Shoulder</td>
</tr>
<tr>
<td>6</td>
<td>3/8&quot; Flat Washer</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>11-0055</td>
<td>Locknut, 5/16&quot; - 18</td>
</tr>
<tr>
<td>8</td>
<td>78-0060-1921-6</td>
<td>Stabilizer, Gate Arm</td>
</tr>
<tr>
<td>Folding Arm Flange Assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>3/8&quot; Flat Washer</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3/8-16 x 1 3/4&quot; Bolt</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>3/8&quot; Lock Washer</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>75-0302-1595-0</td>
<td>Drive Pin, 5/16 x 2 1/2</td>
</tr>
<tr>
<td>13</td>
<td>78-0060-1963-8</td>
<td>Flange, Gate Universal w/Cutter Blade</td>
</tr>
<tr>
<td>Cable Assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>78-0060-3315-9</td>
<td>Cable Assy, G-89/G-90 Folding Arm (Not Shown)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>3/8&quot; Flat Washer</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>3/8-16 x 1 1/2&quot; Bolt</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3/8&quot; Nut</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>10/24 Nut</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>75-0302-1594-3</td>
<td>Turnbuckle, 3&quot;</td>
</tr>
</tbody>
</table>
### Table E.3  Folding Gate Arm Assembly

<table>
<thead>
<tr>
<th>Ref#</th>
<th>Part#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>75-0302-1593-5</td>
<td>Cable, 3/16&quot; Diameter Steel</td>
</tr>
<tr>
<td>20</td>
<td>75-0302-1592-7</td>
<td>Swedge Fitting</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>3/8-16 Lock Nut</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>3/8&quot; Flat Washer</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>3/8-16 x 2&quot; Bolt</td>
</tr>
<tr>
<td>24</td>
<td>75-0302-1597-6</td>
<td>Spacer, G-89/G-90 Folding Gate Arm Cable</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>3/8&quot; Lock Washer</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>3/8&quot; ID, 1 1/4&quot; OD Fender Washer</td>
</tr>
<tr>
<td>27</td>
<td></td>
<td>8-1 1/2&quot; Sheet Metal Screw</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 ft. Gate Arm Assembly</td>
</tr>
<tr>
<td>28</td>
<td>78-0060-3316-7</td>
<td>Gate Arm Assy, 10’ G-90 Cut for Folding Replacement (includes Bushing 20-0056)</td>
</tr>
<tr>
<td>29</td>
<td>75-0302-1596-8</td>
<td>Bushing, 3/8&quot;</td>
</tr>
<tr>
<td>30</td>
<td>78-0060-1966-1</td>
<td>Label, Gate Arm Caution Foldover (English; other languages available)</td>
</tr>
</tbody>
</table>
Appendix F

Omega LCD Menus

LCD Keypad Functions

Programming and Monitoring Omega LCD Functions

There are six buttons on the Omega LCD keypad, which interface with a 16-character display on the Omega LCD board. The keypad buttons are used to either program or monitor the Omega LCD.

The Omega LCD display can operate in one or two modes: Monitor Mode (yellow legends) or Menu Mode (blue legends).

Monitor Mode provides you with information about the status and settings of the Configuration Module, the Omega LCD, terminal board, the status of the lane and count information. Menu Mode enables you to program gate options, send gate commands, and view reports.

The MONITOR - MENU button, will always act as a toggle switch between these Monitor and Menu Modes. The other buttons on the Omega LCD keypad function differently depending on the mode (Monitor or Menu) you are in.

Monitor Mode

In Monitor Mode, the Omega LCD has an automatic scroll feature which will display monitor options for a few seconds then move on to the next option available. For example, when viewing resettable counters, the Omega LCD may display Pres A =000001 for a few seconds and then display Pres B =000001 and so on.

Keep in mind, if you:

- Hold down the SCROLL key in Monitor Mode the screen will display Start Scroll and then Stop Scroll.
- Release this key when the display shows Stop Scroll, the monitor display will stay on the last function displayed.
- Want to move more quickly through the displays, but do not want to reactivate the automatic scroll feature, press SCROLL (don’t hold it down) and the display will toggle to the next function available.
The Monitor Mode menu options include (refer to Figure F.1 on page 208):

- **COUNTS** — accesses the Counts menu options. There are four primary counter options: Resettable counter, Non-resettable counter, Differential counters, and Hourly counters. You will only see these display functions if your gate was ordered with these features. When you press COUNTS to display the count functions, the LCD will display the last function you were viewing. To toggle the functions between the four mentioned above, press the COUNTS key until the function you want to view is displayed.

- **STATUS** — displays the lane status functions for the gate.

- **CONFIG** — accesses the config options.

- **MISC** — displays miscellaneous information used for service and troubleshooting purposes.

---

**Figure F.1 Monitor Mode Menu**

MONITOR MODE....

SCROLL

COUNTS

STATUS

CONFIG

MISC

SCROLL START....

LANE STATUS....

MISCELLANEOUS

SCROLL STOP....

- Loop A = 999990 *
- Loop B = 999990 *
- Up = Ove Reb Cmd
- Input 1 - 12
- 123456789012
- Time + 23:59:59
- Wed 01/07/92
- A-1.0.0 09/01/92
- SW1-3 * 27 19 0
- CFG VER# = 0 0
- Rst= 0: 0
- Vdc Min = 13.99
- Vdc Max = 15.99
- Watchdog=On
**Config Option - Monitor Mode**

The following functions display in Monitor Mode when the Config button is pressed (refer to Figure F.2 on page 210):

**Settings** — displays the DIP switch settings.

*Note:* If the gate does not include the third loop detector option, the **Det C sens** and **Tail C sens** do not display on this menu.

**Options** — identifies which software options are included in this Configuration Module. If the gate was ordered without any software options, the Options menu does not display.

**Input** — indicates the software function of each input on the terminal board, as defined by the Configuration Module. The items listed in Figure F.2 on page 210 represent the input functions for a standard barrier gate, without any options.

**Output** — indicates the software function of each output on the terminal board, as defined by the Configuration Module. The items listed in Figure F.2 on page 210 represent the output functions for a standard barrier gate, without any options.
Counts Options - Monitor Mode

The following functions display in Monitor Mode when the Counts button is pressed (refer to Figure F.3 on page 211):

**Non-Resettable** and **Resettable** — counts available on the gate as defined by the available gate options defined in the Configuration Module.

**Differential** — displays the current number of spaces available for either Differential Count 1 or both Differential Counts 1 and 2, depending on the Count option packaged purchased.

*Note:* Differential displays only if Differential Counter option is purchased.

**Hourly** — displays the type of counter and then the most recent day and date of counts stored. Report shows the counts for each hour period, from 00 to 23.

*Note:* Hourly displays only if Hourly Count Reports option is purchased.
Counts Options - Monitor Mode

Figure F.3 Monitor Mode - Counts Option

To scroll through the various Count reports, press the COUNTS button. Refer to Figure F.4 on page 212.
Figure F.4  Viewing Hourly Count Reports

Press the **COUNTS** button to scroll between counter types.

To scroll through the days of the week, press the **COUNTS** button. Refer to Figure F.5 on page 212.

Figure F.5  Scrolling Between Days of Week

To scroll through the hours of the day, press the **SCROLL** button. Refer to Figure F.6 on page 213.
Menu Mode

In Menu Mode, use the six-button keypad to navigate the available displays. The following button functionality applies:

ENTER — press to enter data or select a menu function.
END — press to finish data entry, before selecting the next function.
DOWN — press to scroll down through a list of functions.
ESC — press to move up a menu level, without saving data.
UP — press to scroll up through a list of functions.

The following options are available in Menu Mode (refer to Figure F.7 on page 215):

**Total Events** — this report provides a list of all standard and exceptional lane activity. These messages provide a short description of the event and the time the even occurred. For example, “Pres A” indicates that the Omega LCD detected a vehicle presence on Loop A at the time of the message. Use the UP and DOWN buttons to scroll through the report. The report is sorted by latest event first, oldest event last.
Exception Events — this report provides a list of all unusual events that occurred in the lane. This includes events such as illegal vends, component malfunctions, and diagnostic events. The report is sorted by latest event first, oldest event last.

Note: Messages that display in the Exception Event Report all display in the Total Event Report.
Programming Option - Menu Mode

Use the LCD keypad to program the time and date in the Omega LCD, set loop detector sensitivity and sensitive reversing logic timers, as well as reset counts stored in resettable counts and in the hourly count reports, if these features are installed in the gate. Refer to Figure F.8 on page 216.
Figure F.8 Mode Menu - Programming Option

Commands Option - Menu Mode

Use the LCD keypad to send commands to the gate (refer to Figure F.9 on page 218). The following apply:

- Transient Forward Full requires the Transient Forward Full output.
- Transient Reverse Full requires Transient Reverse Full output.
- Total Forward Full requires the Total Forward output.
- Total Reverse Full requires the Total Reverse output.

Differential Counters, Time Zones, and Monitor Input are optional software features. The dotted line indicates that these features will display only when they ordered with the gate.
■ The FMS Full 1 Command activates the Transient Forward Full output.

■ The FMS Full 2 command activates the Total Forward output.

■ You may remotely activate a monthly reverse vend only if your gate includes the Vend C input.

■ You may disable or enable a monthly reverse vend or transient reverse vend only if your gate includes Vend C (monthly reverse) or Vend D (transient reverse) input functions, respectively.

■ The Raise Gate command will raise the gate arm, but will continue to store counts.

■ The Override Gate command will raise the gate arm, but will store only differential Counts and External Count Source 1 and 2 counts.

■ The Lower Gate command will lower the gate arm, which has been raised from either an Override or Raise gate action.
**Figure F.9** Menu Mode - Commands Option

Functions shown in dotted lines are optional and will display on this menu only if ordered with the gate.
INDEX

A

accumulators, programming ........................................ 92
alarm message, programming ........................................ 99
automatic time zone control option .................................. 159
  monthly device time zone ........................................ 159
  raise/lower time zone ............................................. 159
  time zone for override
    about ................................................................ 159
    transient time zone ............................................ 159
auxiliary 1 on/off time zone, programming .................... 93
auxiliary 2 on/off time zone, programming .................... 93

B

base mod ............................................................... 170
base mode .................................................................. 170
broken arm sensor .................................................... 85
broken gate arm sensor, setting ................................ 87

cabinet, installing .................................................. 73
cam adjustment ...................................................... 80
cold starting .......................................................... 63
Command Menu
  accessing ................................................................ 127
  commands menu .................................................... 125
  communication menu ............................................. 158
  communication port diagnostics .............................. 142
components
  configuration module .............................................. 24
  Connection Panel .................................................. 19
  detector loops ...................................................... 25
  gate arm ............................................................. 19
  gate housing ........................................................ 18
  mechanical .......................................................... 26
  \textit{see also} installing
configuration module .............................................. 24
  removing ................................................................ 54
configuration, viewing ............................................. 109
Connection Panel .................................................... 19
  DIP switches ......................................................... 58
  field connections .................................................. 49
  inputs/outputs, no config mode ............................... 69
  installing ............................................................. 57
counts
  non-resettable ...................................................... 166
resettable ............................................................. 166
types of ................................................................. 116
viewing ................................................................. 120
crosstalk
  about ................................................................... 44
testing for ............................................................. 147

differential counts, viewing ........................................ 120
DIP switch
  hexadecimal representation ...................................... 102
  setting
    base mode .......................................................... 170
    detector sensitivity .............................................. 61, 62
    lane operation .................................................... 59, 170
    lane operation, no config mode ............................ 69
    sensitivity, config mode ..................................... 85
    sensitivity, no config mode ................................ 71
    sub mode ........................................................... 58, 170
    switch bank 1 ..................................................... 58
    tailgate sensitivity .............................................. 60, 61, 62
directional arming ................................................... 158
directional logic ...................................................... 170
dual differential counter .......................................... 158
dual direction operation ........................................... 158
date, programming .................................................. 65
DC1 Add Input ....................................................... 161
DC2 Sub Input ....................................................... 161
detector loops ......................................................... 25
diagnostic information, viewing ............................... 101, 104
diagnostics, Omega LCD Controller
  communication port ................................................. 142
  input/output ........................................................ 144
  keypad ................................................................ 143
  LCD display ........................................................ 143
  manual ................................................................. 140
  run-time .............................................................. 140
Differential 1 Output ................................................ 165
differential counters
  dual ................................................................. 158
  programming ....................................................... 97
  single ............................................................... 157
differential counts .................................................. 149
diagnostic information, viewing ............................... 101, 104
diagnostics, Omega LCD Controller
  communication port ................................................. 142
  input/output ........................................................ 144
  keypad ................................................................ 143
  LCD display ........................................................ 143
  manual ................................................................. 140
  run-time .............................................................. 140
Differential 1 Output ................................................ 165
differential counters
  dual ................................................................. 158
  programming ....................................................... 97
  single ............................................................... 157
differential counts .................................................. 149
diagnostic information, viewing ............................... 101, 104
diagnostics, Omega LCD Controller
  communication port ................................................. 142
  input/output ........................................................ 144
  keypad ................................................................ 143
  LCD display ........................................................ 143
  manual ................................................................. 140
  run-time .............................................................. 140
differential counts .................................................. 149

electric field, inductance loop ..................................... 36
emergency gate operation .......................................... 83
exception events
  report ................................................................. 110, 145
  viewing ............................................................... 115
External Count Source 1 and 2 Input ......................... 161

75-0302-1440-9 Barrier Gate Manual - Version 1.1 219
Index

External Count Source 2 Input ........................................... 161

F

facility space counters, programming ................................... 97
field connections, Connection Panel ................................... 49
folding gate arm, installing ............................................... 79
full sign, turn on/off ....................................................... 129

gate arm ........................................................................ 19
  installing .................................................................... 77
  override .................................................................... 128
  raise/lower .................................................................. 128
  troubleshooting ......................................................... 147
gate arm assembly, folding, part numbers ....................... 204
gate cabinet
ing  installing .............................................................. 73
troubleshooting ........................................................... 148
gate housing .................................................................. 18
gate operation
e  emergency ............................................................... 83
  no config mode ........................................................ 68
  power failure ............................................................ 83
gate vend, enable/disable ................................................ 129

G

gate arm assembly, folding, part numbers ........................... 204
gate cabinet
ing  installing .............................................................. 73
troubleshooting ........................................................... 148
gate housing .................................................................. 18
gate operation
e  emergency ............................................................... 83
  no config mode ........................................................ 68
  power failure ............................................................ 83

gate arm ....................................................................... 19
  installing .................................................................... 77
  override .................................................................... 128
  raise/lower .................................................................. 128
  troubleshooting ......................................................... 147
gate arm assembly, folding, part numbers ....................... 204

gate cabinet
ing  installing .............................................................. 73
troubleshooting ........................................................... 148
gate housing .................................................................. 18
gate operation
e  emergency ............................................................... 83
  no config mode ........................................................ 68
  power failure ............................................................ 83
gate vend, enable/disable ................................................ 129
  troubleshooting ......................................................... 147

H

hardware
  options ...................................................................... 105
  requirements, inductance loop .................................... 31
  hexadecimal representation, DIP switches .................... 102
  hidden inductors ....................................................... 45
  hourly count reports .................................................. 168
  hourly counts
    programming .......................................................... 92
    viewing .................................................................. 120

I

Illegal Forward or Reverse Count Output ......................... 162
Illegal Reverse Count Output ......................................... 162
In Sense Input .................................................................. 161
inductance loop
  electrical field ......................................................... 36
  estimating loop inductance ........................................ 41
  hardware requirements ............................................. 31
  hidden inductors ....................................................... 45
  installation .................................................................. 32
  lead-in cable ........................................................... 36
  loop detector malfunction ........................................ 43
  loop locator, using .................................................... 46
See also loop
  sensitivity .................................................................. 41
  shorted loops .......................................................... 44
  tailgate option .......................................................... 42
  troubleshooting ......................................................... 43
    loop detector malfunction ....................................... 43
    shorted loops ........................................................ 44
    tuning ..................................................................... 43
input terminals, viewing ................................................ 122
input/output diagnostics, Omega LCD Controller ........... 144
inputs
  active inputs, viewing ............................................... 122
  DC1 Add .................................................................. 161
  DC2 Sub .................................................................. 161
  External Count Source 2 .......................................... 161
  In Sense ................................................................... 161
  Monitor .................................................................... 161
  no config mode ........................................................ 69
  Omega LCD Controller .............................................. 105
  Vend C ....................................................................... 160
  Vend D ....................................................................... 161
  Vend E ....................................................................... 161
installing
  Connection Panel ....................................................... 57
  folding gate arm ....................................................... 79
  gate cabinet .............................................................. 73
  inductance loop ........................................................ 32
  Omega LCD Controller .............................................. 55
  standard gate arm ..................................................... 77

K

keypad, Omega LCD Controller
  about ......................................................................... 23
diagnostics ................................................................. 143

L

lane layout samples ........................................................ 172
lane operation
  base mode .................................................................. 170
  DIP switches, setting ................................................ 58, 170
  directional logic ......................................................... 170
  mode logic .................................................................. 169
  sub mode ................................................................... 170
  vends ........................................................................ 171
lane status, viewing ........................................................ 121
latest event, viewing ...................................................... 115
LCD Controller see Omega LCD Controller
LCD display
  diagnostics ................................................................. 143
  troubleshooting ......................................................... 148
Index

lead-in cable, inductance loop ........................................................... 36
loop backout timer, programming ................................................. 89
loop C ................................................................. 158
loop detector
  malfunction .......................................................... 43
  operation .......................................................... 31
  presence output ............................................... 31
  pulse output ................................................... 31
  sensitivity ....................................................... 127, 85
see also inductance loop
loop frequency, viewing ......................................................... 122
loop inductance, estimating ..................................................... 46
loop locator, using .......................................................... 46
loops
  layout of .......................................................... 32
  overview .......................................................... 31
  tuning ............................................................. 127
about .............................................................. 43
Lot Forward Full Output ......................................................... 164
Lot Reverse Full Output ......................................................... 165
lower gate arm ............................................................... 128

M
malfunction, loop detector ......................................................... 43
manual diagnostics, Omega LCD Controller ................................ 140
mechanical components .......................................................... 26
menu
  commands ......................................................... 125
  navigating ........................................................ 28
  Omega LCD Controller, using ..................................... 28
menu mode ............................................................... 23
miscellaneous timers, programming ....................................... 90
mode logic .................................................................. 169
Monitor Input ............................................................... 161
Monitor Input, programming .................................................. 99
monitor mode ............................................................... 23
monthly device time zone
  about ............................................................... 159
  programming ...................................................... 93
Monthly Forward Back-Out Count Output ................................ 163
Monthly Forward Count Output ........................................... 162
Monthly Reverse Back-Out Count Output ................................ 163
Monthly Reverse Count Output ........................................... 163

N
no config mode
  DIP switch settings
    lane operation .................................................. 69
    sensitivity ....................................................... 71
  gate operation .................................................... 68
inputs/outputs .................................................................. 69
warm start .................................................................. 68
no loop backout time, programming ...................................... 89
non-resettable counters ..................................................... 166
non-resettable counts, viewing ......................................... 120

O
oldest event, viewing ......................................................... 115
Omega LCD Controller
  accumulators, programming ........................................... 92
  commands menu .................................................... 125
  communication port diagnostics ................................... 142
  date, programming ................................................ 65
  diagnostics, manual .............................................. 140
  exiting from an option ........................................... 30
  going to the next screen, menu ................................... 29
  going to the previous screen, menu ............................ 29
  input/output diagnostics ......................................... 144
  inputs .................................................................. 105
  installing ............................................................ 55
  keypad
    about .............................................................. 23
    diagnostics ....................................................... 143
  LCD display
    diagnostics ........................................................ 143
    troubleshooting ................................................ 148
  menu mode .......................................................... 23
  monitor mode ....................................................... 23
  navigating menus .................................................. 28
  non-resettable counts menu ....................................... 116
  options
    about .............................................................. 105
    displaying ........................................................ 30
  outputs .................................................................. 105
  overview ................................................................ 22
  removing ............................................................. 57
  non-resettable counts menu ....................................... 116
  run-time diagnostics ................................................ 140
  scrolling through the menu ........................................ 29
  selecting an item, menu ............................................ 30
  selecting an option, menu ......................................... 30
  settings .............................................................. 105
  time, programming ................................................ 65
  operation, gate
    emergency ........................................................ 83
    no config mode ................................................... 68
    power failure ...................................................... 83
  options, Omega LCD Controller ....................................... 105
  output terminals, viewing ........................................... 122
  outputs
    Differential 1 .................................................... 165
## Index

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illegal Forward Count</td>
<td>162</td>
</tr>
<tr>
<td>Illegal Reverse Count</td>
<td>162</td>
</tr>
<tr>
<td>Lot Forward Full</td>
<td>164</td>
</tr>
<tr>
<td>Lot Reverse Full</td>
<td>165</td>
</tr>
<tr>
<td>Monthly Forward Back-Out Count</td>
<td>163</td>
</tr>
<tr>
<td>Monthly Forward Count</td>
<td>162</td>
</tr>
<tr>
<td>Monthly Reverse Back-Out Count</td>
<td>163</td>
</tr>
<tr>
<td>Monthly Reverse Count</td>
<td>163</td>
</tr>
<tr>
<td>no config mode</td>
<td>69</td>
</tr>
<tr>
<td>Omega LCD Controller</td>
<td>105</td>
</tr>
<tr>
<td>Presence A</td>
<td>162</td>
</tr>
<tr>
<td>Presence B</td>
<td>162</td>
</tr>
<tr>
<td>Presence C</td>
<td>162</td>
</tr>
<tr>
<td>Pulse A</td>
<td>162</td>
</tr>
<tr>
<td>Pulse B</td>
<td>162</td>
</tr>
<tr>
<td>Pulse C</td>
<td>163</td>
</tr>
<tr>
<td>Pulse D</td>
<td>164</td>
</tr>
<tr>
<td>Pulse E</td>
<td>165</td>
</tr>
<tr>
<td>override gate arm</td>
<td>128</td>
</tr>
<tr>
<td>Total Forward Count</td>
<td>163</td>
</tr>
<tr>
<td>Total Reverse Count</td>
<td>163</td>
</tr>
<tr>
<td>Transient Forward Back-Out Count</td>
<td>163</td>
</tr>
<tr>
<td>Transient Forward Count</td>
<td>162</td>
</tr>
<tr>
<td>Transient Forward Full</td>
<td>164</td>
</tr>
<tr>
<td>Transient Reverse Back-Out Count</td>
<td>163</td>
</tr>
<tr>
<td>Transient Reverse Count</td>
<td>163</td>
</tr>
<tr>
<td>Vend A Enable</td>
<td>162</td>
</tr>
<tr>
<td>Vend B Enable</td>
<td>162</td>
</tr>
<tr>
<td>Vend C Enable</td>
<td>163</td>
</tr>
<tr>
<td>Vend D Enable</td>
<td>164</td>
</tr>
<tr>
<td>Vend E Enable</td>
<td>165</td>
</tr>
<tr>
<td>Time Zone</td>
<td>65</td>
</tr>
<tr>
<td>Time Zone for override</td>
<td>93</td>
</tr>
<tr>
<td>Time Zones</td>
<td>93</td>
</tr>
<tr>
<td>up alarm timer</td>
<td>89</td>
</tr>
<tr>
<td>Pulse A Output</td>
<td>162</td>
</tr>
<tr>
<td>Pulse B Output</td>
<td>162</td>
</tr>
<tr>
<td>Pulse C Output</td>
<td>163</td>
</tr>
<tr>
<td>pulse output</td>
<td>31</td>
</tr>
</tbody>
</table>

### R

- raise gate arm ........................................................................ 128
- raise/lower time zone option ............................................ 159
- raise/lower time zone, programming ................................... 93
- rebound motor sensitivity .................................................. 85
- DIP switch, setting ......................................................... 60
- programming ....................................................................... 87, 91
- rebound up timer, programming .......................................... 89
- remote vend ......................................................................... 130
- removing
  - configuration module .................................................. 54
  - Omega LCD Controller .................................................. 57
- reports
  - exception events .......................................................... 110, 145
  - total events .................................................................... 110
- requirements, inductance loop hardware .................................. 31
- resettable counters
  - about ............................................................................. 166
  - programming .................................................................... 92
- resettable counts, non-resettable counts ................................ 166
- resettable counts, viewing .................................................. 120
- RMA (Returned Materials Authorization) .................................. 154
- run-time diagnostics, Omega LCD Controller ............................ 140

### S

- sensitivity
  - broken arm
    - about ............................................................................. 85
    - programming .............................................................. 87
Index

exception events ................................................. 115
hardware/software configuration ......................... 109
hourly counts .................................................... 120
input terminals .................................................... 122
lane status information ...................................... 122
latest event ........................................................ 115
loop frequency ................................................... 122
non-resettable counts ....................................... 120
oldest event ....................................................... 115
output terminals ............................................... 122
resettable counts .............................................. 120
transaction information .............................. 110, 115

W

warm starting ....................................................... 65
no config mode ................................................... 68