FUELDIRECT
FORECOURT CONTROLLER

Dispenser Development Guide

- General Theory of Development

© Copyright 2021

DISPENSER DEVELOPMENT GUIDE

PURPOSE

It is the intention of Progressive International Electronics to provide all the information necessary about its own products and software to aid companies who are interfacing with Progressive products. The Dispenser Development Guide is a comprehensive document which offers these explanations, as well as data pertaining to interfacing with other petroleum equipment. For more detail on any product not manufactured by PIE, always refer to that product's accompanying documentation.

EXPLANATION OF DOCUMENT FORMAT

The following documentation standards are applied throughout the Progressive International's Dispenser Development Guide.

- Comments are noted in *italics*.
- Variable data formats are represented by X(s).
- Command format text is case sensitive, and is represented as such throughout this document.

NOTICE

This document may contain typographical errors or technical inaccuracies. Progressive International Electronics reserves the right to revise and improve its equipment, as well as this document, as required. This publication details the process of interfacing to our products at this time, and may not accurately describe this process at all times in the future. Specifications are subject to change without notice. Software revisions are documented in the CD which accompanies this manual prior to making revisions to the hard copy.

COPYRIGHT

Copyright © 2021 Progressive International Electronics, Inc. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Progressive International Electronics, Inc.

All brands or product names are trademarks or registered trademarks of their respective companies.

HISTORY OF DOCUMENTATION CHANGES & REVISIONS

Version 1.0 — October 10, 2004

Original Issue

Version 2.0

Reader Methods, Keypad Configuration – added Tokheim Premier C Series In-Site keypad layout

Version 3.0 – April 2005

Dispenser Methods – added Dispenser Information
Reader Methods – added Reader Information
Tank Monitor Methods – added Tank Monitor Start Report, Tank Monitor Report Status
and Tank Monitor Report

Version 4.0 – August 2005

Reader Methods – added barcode sequence to PrintControl
Reader Methods – further defined PacketQueInput Method
Reader Methods – further defined PacketQueOutput Method

Version 4.1 – April 2006
Minor corrections

Version 4.2 – July 2007
Added Car Wash Methods

Version 5.0 – March 2012
Added Socket Interface Addendum

Version 6.0 – October 2021
Remove OLE2 Server Information

CONTENTS

General Theory of Development.....1
OVERVIEW OF APPLICATION DEVELOPMENT.....1
FOUR PHASES OF POS DEVELOPMENT.....2
PIE'S APPLICATION DEVELOPMENT TOOLS.....6
FUNDAMENTAL DEVELOPMENT PROCEDURES.....7

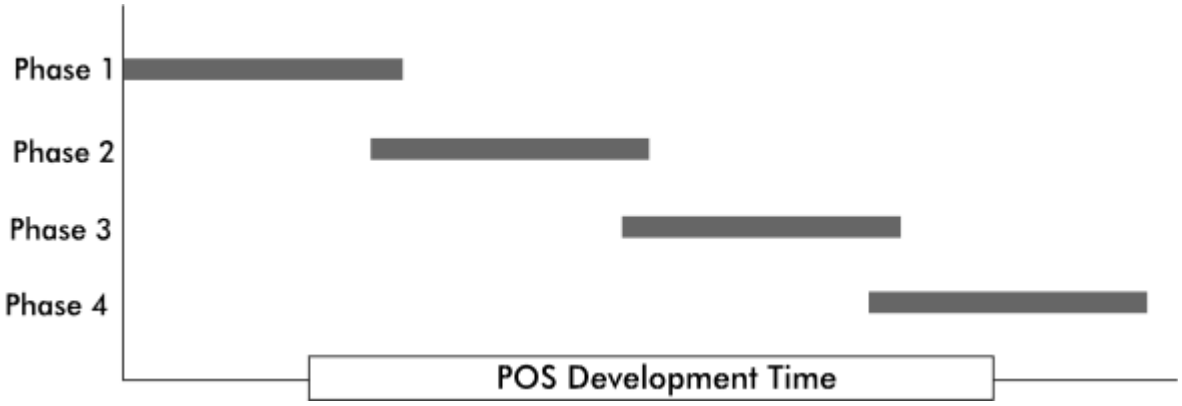
GENERAL THEORY OF DEVELOPMENT
OVERVIEW OF APPLICATION DEVELOPMENT

Progressive International Electronics' FuelDirect controller provides all the functions necessary for a Point of Sale (POS) system to seamlessly control fueling dispensers and card readers.

When designing a POS system to run a fueling site, the process can be broken down into phases. A diagram of the four phases of POS development is shown below. Although this is only a general guideline of the design process, the order shown is very important. As an example, it is essential that dispenser control is successfully implemented and fully tested before any card reader control is attempted. With this sequence in mind, it is important to realize that it is not necessary to complete all phases before selling your system. This is just a recommended order of development that coincides with a staged marketing plan.

From observing many POS developments over the years, we have seen that each phase of this process typically takes six months to a year. Obviously, each stage can be completed more quickly when more resources are devoted to the project.

The chart below illustrates how the four phases of the project should progress.



Phase 1: Data Collection

Gain an understanding of how fueling sites operate. Visiting several different types of fueling sites and monitoring their operation will be very helpful. Pay particular attention to these two areas:

- In-store operations — Requirements are a combination of management and operator functionality. Managers want systems that run efficiently and in concert with their entire business information technology. They also require systems that provide security and accountability of their store merchandise and fuel. Designing a flexible database/reporting system will help satisfy the many different requirements managers place on a POS. On the other hand, POS operators need a friendly interface that is not intimidating. Simple screens, well laid-out keyboards, fast, user-friendly printers and quick training cycles are a must from an operator standpoint.

- Customer at the dispenser — Can and create operation scenarios that will boggle the mind! Observing what takes place at the gas island will prepare you for the worst — and enable you to create an application that takes the worst-case scenario into consideration. Customers can be impatient and their actions, such as pushing the same key repeatedly or jiggling the dispenser handle, demonstrate just a few of the problems that can be created.

How your POS deals with these requirements and potential challenges will determine its market value.

Phase 2: Application Development — POS and Dispensers

- Get POS application communicating successfully with FuelDirect interface, which is a Windows-based driver. *Refer to PIE's Application Development Tools later in this section for more information.*

- Get dispensers running successfully in lab using PIE's and software dispenser simulator. At no additional charge, PIE provides software to develop, test and demonstrate the FuelDirect controllers. *See PIE's Application Development Tools.*

- Get dispensers running successfully in lab on test dispensers (purchased from dispenser manufacturers such as Gilbarco, Wayne, etc.). This will allow the closest simulation of a fueling site without being on location. To prevent a great deal of on-site debugging, we highly recommend that this step be implemented.

- Secure beta test site to test dispenser application. Many petroleum marketers are willing to supply a beta site, since both the developer and the petroleum marketer will benefit.

- Market dispenser control version of POS system.

Phase 3: Application Development — Card Reader/Credit Card

- Get readers running successfully in lab using PIE's and software dispenser simulator. At no additional charge, PIE provides software to develop, test and demonstrate the FuelDirect controllers. *See PIE's Application Development Tools.*

- Get readers running successfully in lab on test dispensers. (Test dispensers may be purchased from dispenser manufacturers such as Gilbarco or Wayne.)

- Bank cards such as VISA and MasterCard are the next logical POS enhancement, since many card verification networks provide approval for bank cards. Carefully consider which of the many card verification networks best suits your needs. As an example, some of the major oil credit cards are supported by these networks, and others are not. Also, some major oil credit cards have direct verification networks which must be used for approval and require a POS certification which is very selective. A number of design issues must be considered when implementing a card system. The card reader service and credit card network access/approval method should be carefully developed.

- Secure beta test site to test dispenser/credit card application.

- Market dispenser/reader version of POS system.

Phase 4 (optional): Application Development — Card Reader/Debit Card

- Implement debit card operation. This is undoubtedly the most difficult aspect of the total POS solution to implement due to encryption schemes employed for card security. Three primary system design issues need to be addressed — card reader service, debit card network access, and data encryption.

- Configure card readers. Card readers can be configured to support DES, the industry standard encryption method. Note that, due to the additional expense of adding this option, some dispenser card readers do not have DES encryption keypads. Contact the dispenser manufacturer to acquire the security module, security module protocol and dispenser/reader simulator with DES keyboard for testing.

  FuelDirect utilizes a pass-thru scheme to transfer all security module messages. In so doing, our FuelDirect makes no attempt at decoding the data, ensuring data security at the controller level. Note that certification on a DES network requires significant expenditures of time and money, since debit networks must ensure successful performance in all areas.

- Secure beta test site to test dispenser and credit/debit application.

- Market dispenser/reader version of POS with debit capabilities.

Progressive International supplies FuelDirect documentation which defines the interface protocol and facilitates the process of attaching directly to our FuelDirect server. POS systems using Windows operating systems are ideally suited for this style of interface.

To aid in the development of the POS to FuelDirect server, PIE provides a dispenser simulator at no charge.

FUNDAMENTAL DEVELOPMENT PROCEDURES

These fundamental procedures are necessary to properly operate PIE's FuelDirect controller:

- The FuelDirect must be regularly polled for fuel position information and queue count (at least once a second). Use the Status Flow Chart provided with PIE's documentation to interpret status and act accordingly. *See Example Flow Chart in this section for start-up process.*

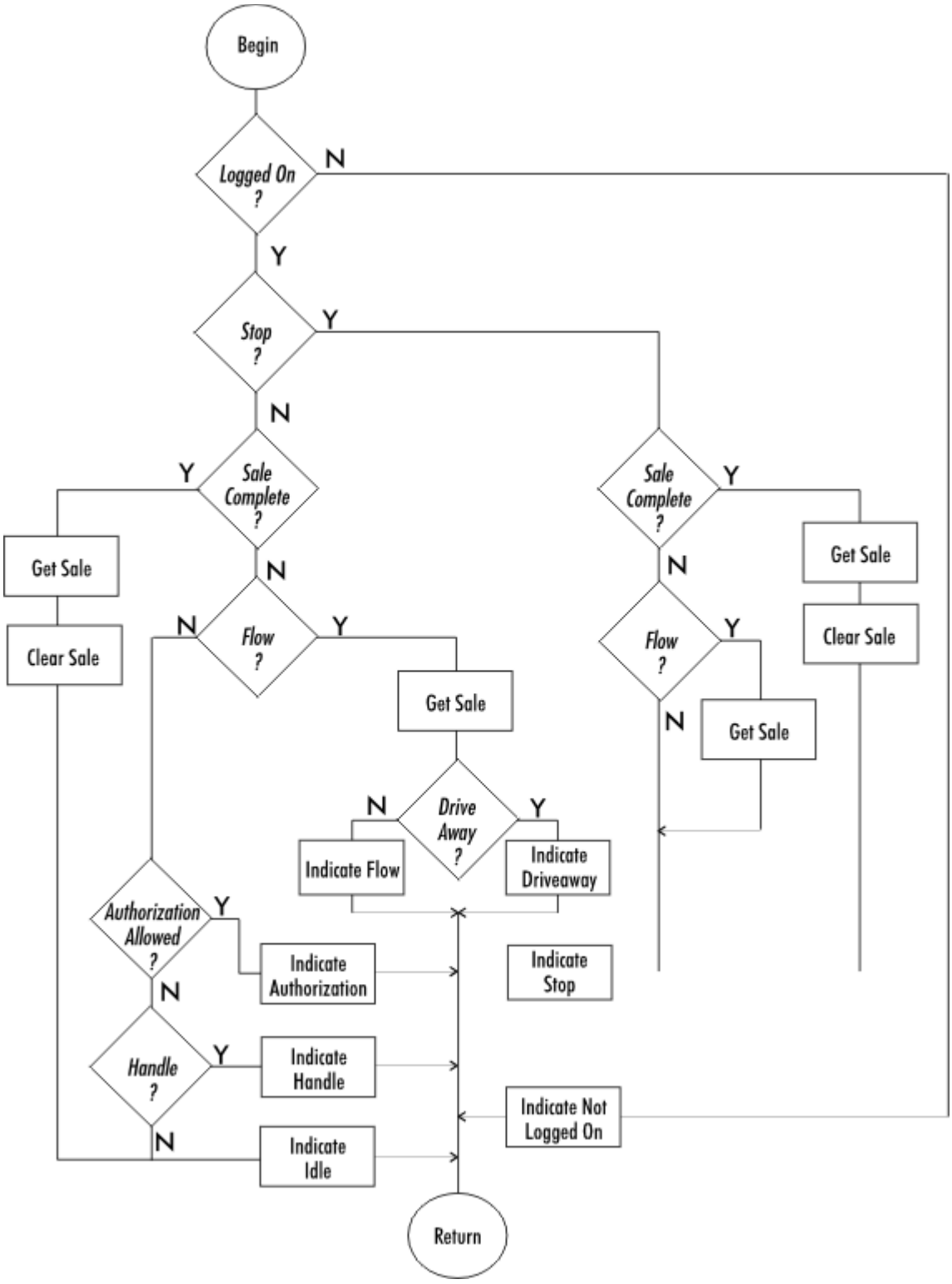
- Price information must be sent to a dispenser position to initiate communication from the controller to the dispenser. Price information indicates to the controller what style dispenser exists — single product dispenser (SPD) or multiple product dispenser (MPD). This information must match the dispenser configuration to function correctly. Pricing should never be sent for a dispenser that does not exist. Doing so will significantly slow the system operation.

- Always collect errors that the controller reports using the error command. A log file containing all reported errors should be maintained. The error log file is especially helpful in diagnosing problems during code development and site installation. This is an automatic function of the FuelDirect server for Windows-based systems.

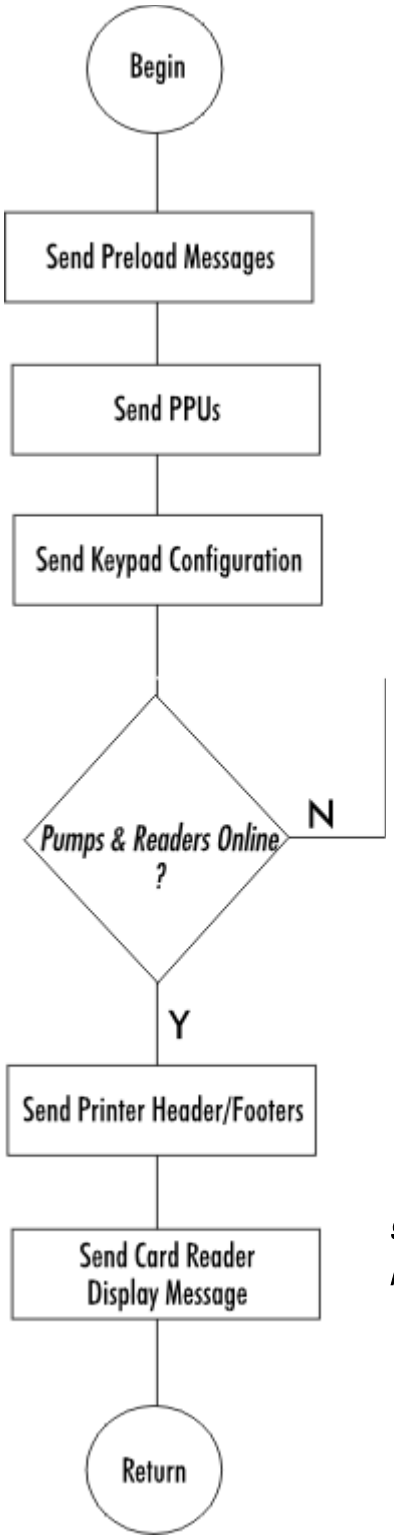
- POS architecture should service dispenser/reader operations in a timely fashion. The customer at the dispenser is not willing to wait an eternity for dispenser authorization. And to the fueling customer, three seconds is an eternity!

PIE has made every attempt to design its FuelDirect to provide seamless operation from one dispenser/reader brand to another. Still, there are some dispenser/reader brand-specific issues that the developer needs to keep in mind. For instance, a few dispenser models are unable to return polled totals. Refer to the Dispenser/Reader Specific Information listing at the end of this Dispenser Development Guide.

Dispenser Status Interrogation Flow Chart



Example: Start-up Flow Chart for Dispenser/Reader Operation



This flow chart represents the general process that takes place during initialization.

ExFloCht.wpg