Development Guide

Pump Control Center Protocol

(Protocol for Pump Interface and Card Reader Interface)

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HISTORY OF DOCUMENTATION CHANGES & REVISIONS

Version 2.3 — July 29, 1996

Pump Interface Section, Command Descriptions, *Key Queue Control*:
DES encryption updated.

Card Reader Interface Section, *PCC Card Reader Keyboard Layouts*:
Added "Wayne Keyboard" Layout.

Card Reader Interface Section, *Reader Specific Information, Gilbarco*:
Added "Scroll" flag.

Version 2.4 — March 26, 1997

Pump Interface, Command Descriptions, *Sale Information Command*:
Corrected decimal point in value of Volume of Sale (to 0000000.000).

Pump Interface, Command Descriptions, *Error Command*:

- Under Reader Codes System, added Dynamic Command Error and Queue Overflow Error.
- Under Pump Operation Codes, added Bank Error

Card Reader Interface, Command Descriptions, *Card Queue Control*
Under Read Operation, added data for implementing Track 3.

Card Reader Interface, Command Descriptions, *Preloadable Messages Command*
Reader numbers defined for both ports, port 1, and port 2.

PCC Card Reader Keyboard Layouts
Added Schlumberger SAM keyboard layout.

Reader Specific Information
Added information for Wayne/Dresser and Schlumberger readers.

Version 2.5 — May 9, 1998

Pump Commands, *Error Command*
Under Reader Specific Codes, added Packet Queue Flush Error.

Pump Commands, *Authorize Command*
Under Flag Operation, added new limit (9).

Pump Commands, *Sale Information Command*
Under Extended Sale Field Tags, added Preset Limit (L)

Pump Commands, *Error Command*

1. Under Pump Codes, changed Reserved Bits to 06-07, added new Preset Limit (08).
2. Under Reader Specific Codes, added Dynamic Queue Flush (23) and Requires Reader Configuration (09).

Pump Commands, *System Version Command*
Added Extended System Version Command.

Pump Commands, *Code Download Command*
Incorporated PCC Download documentation.

Card Reader Commands
Moved Card Reader Interface Comments to appropriate command sections.

Card Reader Commands, *Keyboard Configuration Command*

1. Added notes to Purpose of Keyboard Configuration Command.
2. Moved Card Reader Key Position Layouts to this section.

Card Reader Commands, *Reader Status Command*
Under Printer status Bits, changed some bits and further defined bits.

Special Commands, *Block Storage Command*
Moved from Card Reader Commands

Version 3.0 — February 1999

Revised to unify all Dispenser Development Guide documents.

Version 3.1 — June 1999

Pump Commands, *Status Request*, added Select Status Request.

Version 4.0 — February 2000

Pump Commands, *Authorization Command*, added New Limit feature and Multi-grade Lock Authorization.

Status Request Command, added Select Status.

Cash Queue Control, full implementation of features.

Version 4.1 — March 2000

Removed *Block Storage Command*. Changed command structure sequence for *Cash Queue Command.*

Version 5.0 — July 2002

Pump Commands, *PPU Command*, added Flag Operations E and D.

Card Reader Commands, *Key Entry Control Command*, added cursor display control to string.

Reader Specific Information, Gilbarco, added Gilbarco InfoScreen Specific Control.

Version 6.0 — February 2005

Card Reader Commands, Keypad Configuration, added Tokheim Premier C Series In-Site keypad configuration.

Version 6.1 — April 2005

Minor corrections.

Version 7.0 — April 2011

Authorize Command and Authorize Command Examples

Version 7.1 — July 2021

Tank Monitor Commands

Car Wash Commands

Version 7.2 — January 2022

Extended Pump Commands: *Set Decimal Point Modifier* and *Extended Authorize*

Version 7.3 — April 2022

Extended Reader Status, PIN Entry Data and EMV Set Amounts commands

Version 7.4 — July 2022

EMV Application Data and Extended Totals commands

Version 7.5 — July 2022

State of Charge added to Sale Information command

Version 7.6 — August 2022

Sound Payments Transaction Queue command

Version 7.7 — December 2022

EMV configuration command
Get License Info command

Version 7.8 — September 2023

Add Bennett Reader keypad layout information
Remove Schlumberger information

Version 7.9 — October 2023

Update "Diagram: Response to Select Status Request Command" to show correct status

Version 8.0 — April 2024

Update Extended Totals (!I) commands
Add Extended PPU (!J) command
Add Extended Sale Information (!B) command

Version 8.1 — January 2025

Update Flow Rate response in Extended Sales Information Command (!B)
Document Deauthorize Command (N)

Version 8.2 — January 2025

Clarify the Deauthorize Command (N)

Version 8.3 — March 2025

Update B Command response: MOP flag options should be 1 & 2, not 0 & 1

Version 8.4 — March 2025

Update !J Command: WO operation only includes PPU DP and Slow Down

PURPOSE OF THIS DOCUMENT

This manual describes in detail the protocol used to with the Pump Control Center systems.

Instructions for installing or servicing PCC controllers, electronic fuel pumps or dispensers and POS terminals are not included. Additional documentation is available from PIE for hardware installation. For more detail on any product not manufactured by PIE, always refer to that product's accompanying documentation.

NOTICE

Progressive International Electronics reserves the right to revise and improve this document as required. This publication details our Pump Control Centers at this time, and may not accurately describe these products at all times in the future. Specifications are subject to change without notice.

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Development Guide

Pump Control Center Protocol

EXPLANATION OF DOCUMENT STANDARDS

The following documentation standards are applied throughout this document.

/ Comments are noted in *italics*.

X Variable data formats are represented by X(s).

Dollar fields are described by $. *Data fields are described by* v. *The required fixed length and format of these fields is indicated in each command format. Decimals are implied only.*

Spaces In formats for commands, spaces between fields are used for clarification only.
Spaces should not be included in the actual string sent to the controller.

[ ] Numbers shown in square brackets represent hex values, such as [0x20].

These abbreviations are used.

MOP Method of payment.
MPD Multiple product dispenser.
PCC Pump Control Center. Term used collectively to refer to the PCC systems manufactured by Progressive International Electronics.
PIE Progressive International Electronics, Inc.
POS Point of sale terminal.
SPD Single product dispenser.

General Protocol

Introduction to PCC

Pump and Card Reader

This document contains the protocol used to communicate with PCC systems.

Pump Commands

The entire process of controlling fueling pumps is accomplished with a few commands to the PCC. This protocol may be used to control up to 99 fueling positions with eight grades on each position. Currently, the PCC systems support only 32 fueling positions with eight hoses per position.

Card Reader Commands

The Card Reader command set is used with the island card readers located in the fuel dispensers. Sending a keyboard layout activates the PCC Card Reader Interface. Each reader must also be sent a printer header and footer message. Commands are passed to and from the reader in “queues.” Each queue entry contains enough information to complete the command. Entries are processed in chronological order.

The Pump Control Center Protocol uses a simple "2's" complement check byte. Command and response data are transferred in a formatted frame, beginning with a **Start of Text** (ASCII STX [0x02]), followed by the command and data or response, followed by **End of Text** (ASCII ETX [0x03]) and the check byte. All data (except the check byte) are ASCII characters. All commands are one character. The pump number is comprised of two characters; the hose number is one character. All commands are "ACKed" (0x06) "NAKed" (0x15); however, the responses are not. If the controlling device finds an error in the response, simply request the response again.

General Protocol

Table of PCC and Card Reader Interface

Pump Commands		Card Reader Commands	
A	Authorize	Z	Keyboard Configuration
B	Sale Information	Y	Reader Status
C	Stop	X	Key Queue Control
D	Resume	W	Card Queue Control
E	Error	V	Cash Queue Control
F	Status Request	U	Print Queue Control
G	Reset	T	Display Queue Control
H	Blend	S	Key Entry Control
I	Polled Totals	R	Preloadable Messages
J	PPU	Q	Beeper Control
K	System Version	P	Packet Transfer
L	Code Download	*P	PIN Entry Data
M	Event Mode Control	*Q	EMV Set Preset Amount
!A	Extended Authorize	*R	EMV Application Data
!B	Extended Sale Information	*S	Sound Payments Transaction Queue
!I	Extended Polled Totals	*Y	Extended Reader Status
!J	Extended PPU		
!O	Decimal Point Modifiers		

Protocol Command Format

STX CMD [Pump#] [Hose#] [. . . Data . . .] ETX CD

STX	0x02
CMD	Command Code (one or two characters)
Pump #	Fueling Position (two or four characters)
Hose #	Grade Number (one character)
Reader #	Reader Position (two characters)
Flag	Flag Digit (one character)
Data	Programming Data or Action
ETX	0x03
CD	Check Digit

The check digit is constructed by adding all of the characters of the string, starting with the STX and ending with the ETX, then subtracting the value from "00" and sending the result. The check digit is masked off to seven (7) bits. Pump and reader numbering are from 01 - 32. A reader number of "00" is used to indicate global addressing for those commands that support this feature.

Pump Commands

Authorize

A — *Initiates a fueling operation*

Authorize Command Character A

Purpose of Authorize Command

Initiates a fueling operation. A limit may be set to dollar, volume amount or no limit (Fillup). If a Fillup operation is requested, the dollar and volume fields are ignored. All decimal points are implied rather than actually being sent. A hose number of zero allows any hose to be authorized.

New Limit and Multi-Grade Lock Authorization features of the Authorize command, as well as the Authorize command process for implementing them, are discussed on the following pages.

The Authorize Command also includes an Extended capability. The purpose of the Extended option is to increase the preset amount. The Extended option 'E' increases amounts from 6 to 10 digits of both Dollar and Volume. This option applies to all flags of the Authorization Command. The implied decimal points remain the same (2 for Dollar and 3 for Volume) when the option 'E' is implemented. Extended Authorization commands are documented in the following Formats for Authorize Command

To deauthorize a fueling position, the Stop and Resume commands are used. First, the Stop command is sent. The Resume command is sent only after a Stop status is indicated for the fueling position.

Format for Authorize Command

STX A Pump# Hose# Flag $$$$.$$ vvv.vvv ETX CD
In the actual command, decimal points are implied only.

Extended Format for Authorize Command:

STX A Pump# Hose# E Flag $$$$.$$ vvv.vvv ETX CD
In the actual command, decimal points are implied only.

Authorize Command Character=A	
Pump #=XX	*(01 to 32)*
Hose #=X	*(0 to 8, with 0 authorizing any hose — also see Multi-grade Lock Authorization which follows)*
Flag=X	*(Type of authorization — see Description)*
Dollar Limit Amount=$$$$.$$	*(0000.01 to 9999.99)*
Volume Limit Amount=vvv.vvv	*(000.001 to 999.999)*

Description of Flag Operation

0	Dollar Limit	*(Credit price)*
1	Dollar Limit	*(Cash price)*
2	Volume Limit	(*Credit price)*
3	Volume Limit	*(Cash price)*
4	Fillup	*(No limit)*
9	New Limit	*(Only dollar preset amount may be changed, not MOP — see New Limit section which follows)*

Response to Authorize Command

ACK/NAK only

Authorize Command Example

- Pump 1
- Any Hose
- $25.00

Command:
STX A 0101002500000000 ETX CD
Response:
ACK

Authorize — Implementing New Limit Feature

Authorize Command Character A

Purpose of Authorize Command Implementing New Limit

Progressive International has implemented a feature of the Authorize command which enables the user to change the preset value for a fueling transaction after an Authorize command has been sent to the controller. This New Limit feature is commonly known as Preset-On-The-Fly.

Format for Authorize Command

STX A Pump# Hose# Flag $$$$.$$ vvv.vvv ETX CD

Flag Operation — New Limit

9	New Limit	*(Only preset amount may be changed, not MOP)*

Special Considerations:

- Due to the nature of this operation, MOP changes are not permitted.
- New Limit field must be the limit field for which the original preset was sent.
- When using New Limit, all fields must exist.
- Some dispensers can have their presets changed after flow has begun. Caution should be exercised using this option with the amount of fuel presently being dispensed is marginally close to the original preset limit. With this scenario, a possibility for an overrun condition exists.

Error Notes:

- A system error 06 will occur if this flag is used without a previous authorization being sent for that pump #.
- A pump error 08 will occur if the controller cannot change the preset due to dispenser-specific situations.

Authorize — Implementing Multi-Grade Lock Feature

Authorize Command Character A

Purpose of Authorize Command Implementing Multi-Grade Lock

To initiate a fueling transaction with specific grade combinations.

To implement this feature, Hose# must be set to 0x3f. *This alerts the controller to expect a bit pattern of grades to restrict. This bit pattern is appended to the normal Authorize command as two bytes representing the hoses to restrict:* $0x3X_1$ $0x3X_2$

First byte $0x3X_1$

X= bit 0 = grade 5
bit 1 = grade 6
bit 2 = grade 7
bit 3 = grade 8

Second byte $0x3X_2$

X= bit 0 = grade 1
bit 1 = grade 2
bit 2 = grade 3
bit 3 = grade 4

Format for Authorize Command Implementing Multi-Grade Lock

STX A Pump# Hose# Flag $$$$.$$ vvv.vvv 0x3X 0x3X ETX CD

Format for Extended Authorize Command Implementing Multi-Grade Lock

STX A Pump# Hose# E Flag $$$$.$$ vvv.vvv ETX CD

Example 1 — Authorize Command Implementing Multi-Grade Lock

Grades restricted:
1, 2 & 5

Command:
STX A Pump# 0x3f Flag $$$$$$ vvvvvv 0x31 0x33 ETX CD
Response:
ACK

Example 2 — Authorize Command Implementing Multi-Grade Lock

Grade restricted:
1 only

Command:
STX A Pump# 0x3f Flag $$$$$$ vvvvvv 0x30 0x31 ETX CD
Response:
ACK

Example 3 — Authorize Command Implementing Multi-Grade Lock

Grades restricted:
1 through 8

Command:
STX A Pump# 0x3f Flag $$$$$$ vvvvvv 0x3f 0x3f ETX CD
Response:
ACK

Pump Commands

Sale Information

B — *Reads the sale data or clear the Sale Ready flag*

Sale Information Command Character B

Purpose of Sale Information Command

Used to read the sale information or clear the Sale Ready flag. This command may be used at any time during a sale in progress. All known fields will be filled in. Once the sale is complete, the information in this response indicates what actually took place at the fueling position. The R flag indicates a Read Sale operation and the C flag indicates a Clear Sale Ready operation.

Due to the limitations of some dispensers, the information displayed will not necessarily be what was authorized via the Authorization command.

Format for Sale Information Command

STX B Pump# Flag ETX CD

Sale Information Command Character=B
Pump #=XX *(01 to 32)*
Flag=X *(Type of sale information — see below)*

Description of Flag Operation

R	Read Sale Information
C	Clear Sale Ready Status
E	Extended Sale Information *(See Format for Extended Sale Information Command and Response to Extended Sale Information Command on following page(s))*

The Clear Sale Ready status may only be accomplished when the Sale Ready status is set.

Response to Sale Information Command

For Read Operation:

STX Pump# Hose# Flag $$$$.$$ vvv.vvv ETX CD

Pump #=XX	*(01 to 32)*
Hose #=X	*(0 to 8)*
Flag=X	*(1 or 2)*
Dollar Amount=$$$$.$$	*(Amount, using 2 decimal points)*
Volume Amount=vvv.vvv	*(Amount, using 3 decimal places)*

Description of Flag Indicators

1	Credit Sale
2	Cash Sale

For Clear Operation:

ACK/NAK only

For Extended Sale Operation:
(See Command Format and Response which follow.)

Format for Extended Sale Information Command

STX B Pump# E Tag(s) ETX CD

In the actual command, decimal points are implied only.

Description of Extended Sale Field Tags		
Tag	Tag Description	Tag Response Data Format
H	Hose Number	X *(0 to 8)*
M	MOP of Sale	X *(1 or 2)*
$	Dollar Amount of Sale	$$$$$$$$$$
V	Volume of Sale	vvvvvvvvv
P	Unit Price of Sale	$$$$$$
S	Current Pump Status	XX *Refer to Status Request Command*
T	Pump Polled Totals	Fvvvvvvvvvv$$$$$$$$$$$$$$$$$$$$ *(Above data returned in following order: F=Totals type, 10 digits of volume totals, 10 digits of credit dollar totals, and 10 digits of cash dollar totals)*
L	Preset Limit	$$$$$$
C	State of Charge	XXXXXXXXXX (formatted as XXX.XXXXXXX) *This value is only used for Hydrogen dispensers.*

Response to Extended Sale Information Command

When a Sale Information Command is issued with an E tag, it is treated as an extended sale command and will return data in the following format:

STX Pump#Tag1Data1 . . . Tag_nData_n ETX CD

The Extended Sale Information Command will return the requested information in the order in which the fields were requested. Each field is a fixed length as shown in the Tag Response Data Format column of the table above.

Sale Information Command Example

- Pump 1
- Read
- Hose 2
- Cash
- $25.75 sale
- 24.315 gal

Command:
STX B 01R ETX CD
Response:
ACK STX 0122002575024315 ETX CD

Extended Sale Information Command Example

- Pump 1
- Hose 1
- Credit
- $15.00 sale
- 14.164 gal
- Pump idle
- 3 Cash & Credit Totals
- Volume Totals 1234567.890
- Credit Dollar Totals $54321543.21
- Cash Dollar Totals $12312312.35
- State of Charge 99.1234567%

Command:
STX B01EHM$VPSTLC ETX CD
Response:
ACK STX 01H1M1$0000001500V0000014164 P001059S02T31234567890543215432112312312 31235L005000C0991234567 ETX CD

Pump Commands

Stop

C—*Terminates action at one or all fueling positions*

Stop Command Character C

Purpose of Stop Command

Used to terminate the action at one or all fueling positions. Once this command is issued, a Resume command must be issued to clear the Stop status. A fueling position of '00' indicates an All Stop operation.

When Stop command is initiated, the fueling position may or may not go to an End of Sale status, depending upon the brand and type of dispenser.

Format for Stop Command

STX C Pump# ETX CD

Stop Command Character=C
Pump #=XX *(01 to 32)*

Response to Stop Command

ACK/NAK only

Stop Command Example

- Stop
- Pump 5

Command:
STX C05 ETX CD
Response:
ACK

Pump Commands

Resume

D — *Restarts action at one or all fueling positions*

Resume Command Character D

Purpose of Resume Command

Restarts action at one or all fueling positions. A fueling position of '00' indicates an All Resume operation. This command is used in response to a Stop status.

The Resume command will allow the fueling position to resume dispensing after a Stop command has been issued only if the pump handle has not been hung up.

Format for Authorize Command

STX D Pump# ETX CD

Resume Command Character=D
Pump #=XX *(01 to 32)*

Response to Resume Command

ACK/NAK only

Resume Command Example

- Resume
- Pump 5

Command:
STX D05 ETX CD
Response:
ACK

Pump Commands

Error

E — *Reads queued pump, reader or system errors*

Error Command Character E

Purpose of Error Command

Reads queued errors related to the dispensers or system and is useful in diagnosing problems with dispenser operations. Each error response includes the fueling position number (00=System Error) and an error code. Errors should be read and then cleared one at a time. If the Error Queue status bit is still set, another error is queued.

Always read and then save errors to a log file which is date and time stamped. When seeking technical assistance from Progressive International Electronics, this log file enables PIE to identify problems more quickly and accurately.

If the Error Command is issued with a flush flag (C), all error information is cleared.

Format for Error Command

STX E Flag ETX CD

Error Command Character=E
Flag=X *(Operation type — see below)*

Description of Flag Operation

R	Read the Error
E	Extended Error Read
S	Extended String Read *(Returns a data string 25 bytes long)*
W	Clear the Top Error
C	Flush the Error Queue

Response to Error Commands

Clear/Flush Error Response:

ACK/NAK only

Read Error Response:

STX Pump# EC ETX CD

Pump #=XX	*(01 to 32)*
EC=XX	*(Error Type — see descriptions)*

Extended Read Error Response:

STX Pump# EC EX ETX CD

Pump #=XX	*(01 to 32)*
EC=XX	*(Error Type — see descriptions)*
EX=XX	*(Extended Error Code)*

Extended String Read Error Response:

STX Pump# String ETX CD

Pump #=XX	*(01 to 32)*
String	*(Data string 25 bytes long)*

Description of Error Codes

System Codes

05	Invalid Command Received
06	Authorization Failed

Dispenser Codes

01	Unit price on fueling position incorrect; price indicated on the fueling position is not the price sent to it
02	Dispenser did not stop at preset amount; dispenser "overran" the limit sent to it; should not use this dispenser for preset operations
03	Invalid data received from dispenser; cannot get valid data from dispenser; sales or totals data may not be valid
04	Communication down for this dispenser; dispenser is not responding to commands and had been working
05	Invalid dispenser status; dispenser is returning invalid status
06-07	Reserved
08	New preset error

Reader Codes System (40)

50	Reader command error
51	Card queue overflow error
52	Cash queue overflow error
53	Key queue overflow error
54	Display queue overflow error
60	Print queue overflow error
61	Print command error
70	Numeric mode error
80	Dynamic command error
81	Dynamic queue overflow error

Reader Specific Codes (41 - 61)

04	Reader communication down
05	Card reader command error
09	Requires reader configuration
50	Reader card error

If the following entries occur, the queue entry is aborted:

14	Key configure queue flush error
15	Print queue flush error
16	Display queue flush error
17	Dynamic queue flush error

These values will be returned as ASCII values representing their HEX equivalents.

Error Command Example

- Reader 10
- Print queue error

Command:
STX EE ETX CD
Response:
STX 4A 15 [43] ETX CD

Pump Commands

Status Request

F — *Reads the status of the system and each fueling position*

Status Request Command Character F

Purpose of Status Request Command

Reads the status of the system and each fueling position. The status indications are "bit" oriented. The first status in the response is the System Status. The remainder of the statuses are for all 32 fueling positions and are returned in order — 1 to 32. The Standard Extended Status (E flag) consists of two ASCII characters. The lower nibble (4 bits) of the character contains the status bits. The upper nibble is always a '3' (0011 binary). *See Select Status (1 flag) description for return value information.*

Format for Status Request Command

STX F Flag ETX CD

Status Request Command Character=F

Status Flag Character Definitions:

E = Standard Extended Status

1 = Select Status

Response to Status Request Command

STX Ss Pp Pp . . . . Pp ETX CD

69 characters are transferred (including STX, ETX & CD*) for the Extended status. See System Status Definitions, Description of System Status, Pump Status Definitions, and Description of Pump Status on following pages.*

System Status Definitions

Event Mode	Indicates event mode has been selected for this port. *See Event Mode Command* M.
All Comm Down	Indicates the communications link to all dispensers is down. In half duplex systems, this bit indicates that the transmit character is not even being echoed.
Error Queued	Indicates an error is stored in the error queue and needs to be retrieved.
Controller Reset	Indicates that the controller is reset and all information has been cleared. The controller requires dispenser initialization.
Emergency Stop	Indicates an emergency stop has been issued and has been sent to the dispensers.

Description of System Status

S = Bit 3 = Event mode active
Bit 2 = Reserved
Bit 1 = Card reader status changed
Bit 0 = Communication down for all dispensers

s = Bit 3 = Error in the error queue
Bit 2 = Controller has completed a reset and requires configuration
Bit 1 = Reserved
Bit 0 = Emergency stop sent to dispensers

Dispenser Status Definitions

Stop	Indicates that a Pump Stop command was sent by the POS or that the dispenser is in a stopped state. This bit can only be cleared by issuing a Resume command from the POS.
Drive Away	Asserted when the dispenser dollar value has not increased for a period of seven (7) seconds. This bit may go on and off many times during a sale. Its purpose is to alert the store clerk to check for a possible drive-away situation.
Flowing	Indicates the sale dollar amount is not zero. Some dispensers are unable to indicate the sale flowing, in which case this bit will not be asserted.
Sale Complete	Indicates a completed sale and that all information is collected and available, including dollar and volume amounts as well as updated polled pump totals.
Auth Allowed	POS has sent an Authorization command to a fueling position. The authorization will be held until a handle signal is received from the dispenser.
Auth Sent (Armed)	Pump has been sent an Authorization command and dispenser is armed.
Logged On	Indicates an active communication for this dispenser. This bit may be disabled if a communication error is detected. At this point, this bit will remain off until communication is reestablished.
Handle	Indicates the current handle position for this dispenser.
Customer Made Selection	Indicates customer has selected one of many different options at the dispenser, such as cash/credit, push-to-start, grade-select, etc. This bit is dispenser/application dependent.

Description of Extended Flag (E) Dispenser Status

P = Bit 3 = Dispenser has been sent a Stop command
Bit 2 = Drive away — *dispenser flowing and amount has not increased for 7 seconds*
Bit 1 = Dispenser is dispensing fuel
Bit 0 = Sale is complete and ready to be read

p = Bit 3 = Controller allowed to authorize dispenser
Bit 2 = Authorization sent to the dispenser
Bit 1 = Dispenser logged on — *dispenser configured and communication established; bit will reset if communication for this dispenser is lost and then set when communication is restored*
Bit 0 = A dispenser handle is lifted and a request for service is active

Description of Select Flag (1) Dispenser Status

This status has the hose number embedded in the upper nibble to the second dispenser status byte. There are 10 handle conditions — No Handle, Unknown Handle, and Handle 1-8. No Handle occurs when no handle is lifted. Unknown Handle occurs when a handle is lifted, but the number is unknown. Handle 1-8 reflects the handle selected.

P =	Bit 7 =	1 (always returned)
	Bit 6 =	Reserved
	Bit 5 =	Reserved
	Bit 4 =	Customer made selection
	Bit 3 =	Pump stopped
	Bit 2 =	Drive away
	Bit 1 =	Flowing
	Bit 0 =	Sale complete
p =	Bit 7 =	Handle Bit 8 ı
	Bit 6 =	Handle Bit 4 ı binary handle number bits
	Bit 5 =	Handle Bit 2 ı *Refer to Handle Bit Definitions which follow*
	Bit 4 =	Handle Bit 1 ı
	Bit 3 =	Authorized allowed
	Bit 2 =	Authorized sent
	Bit 1 =	Dispenser logged on — *dispenser configured and communication established; this bit will reset if the communication for this dispenser is lost and set when communication is restored*
	Bit 0 =	A dispenser handle is lifted and a request for service is active

Handle Bit Definitions

8 4 2 1 ← binary coding

1 0 0 1	No Handle — *handle bit off*
1 0 0 1	Unknown Handle — *handle bit on*
0 0 0 1	Handle 1
0 0 1 0	Handle 2
0 0 1 1	Handle 3
0 1 0 0	Handle 4
0 1 0 1	Handle 5
0 1 1 0	Handle 6
0 1 1 1	Handle 7
1 0 0 0	Handle 8

Status Request Command Example

Command:
STX FE ETX CD
Response:
See following diagrams

Diagram: Response to Standard Extended Status Request Command

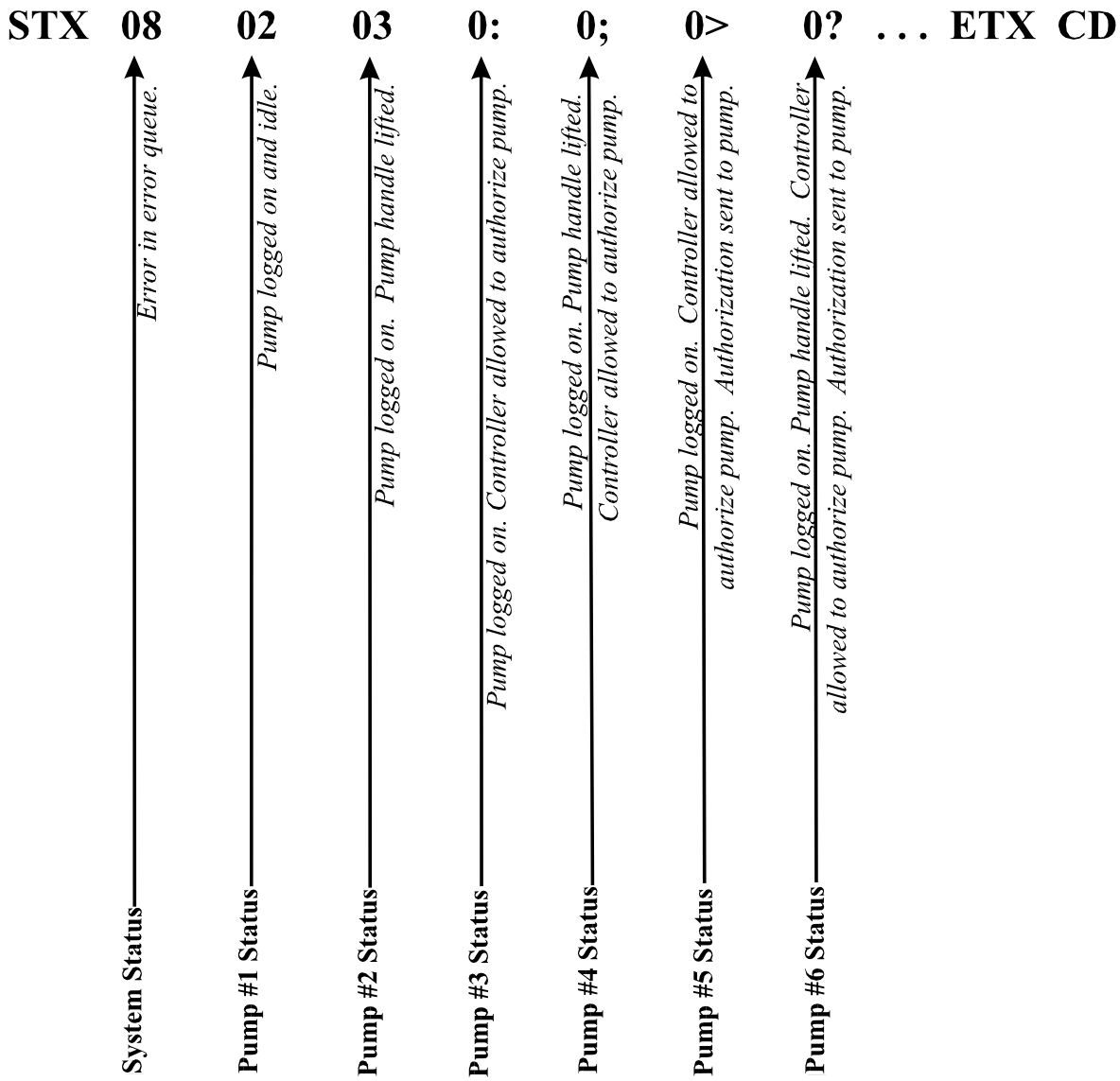
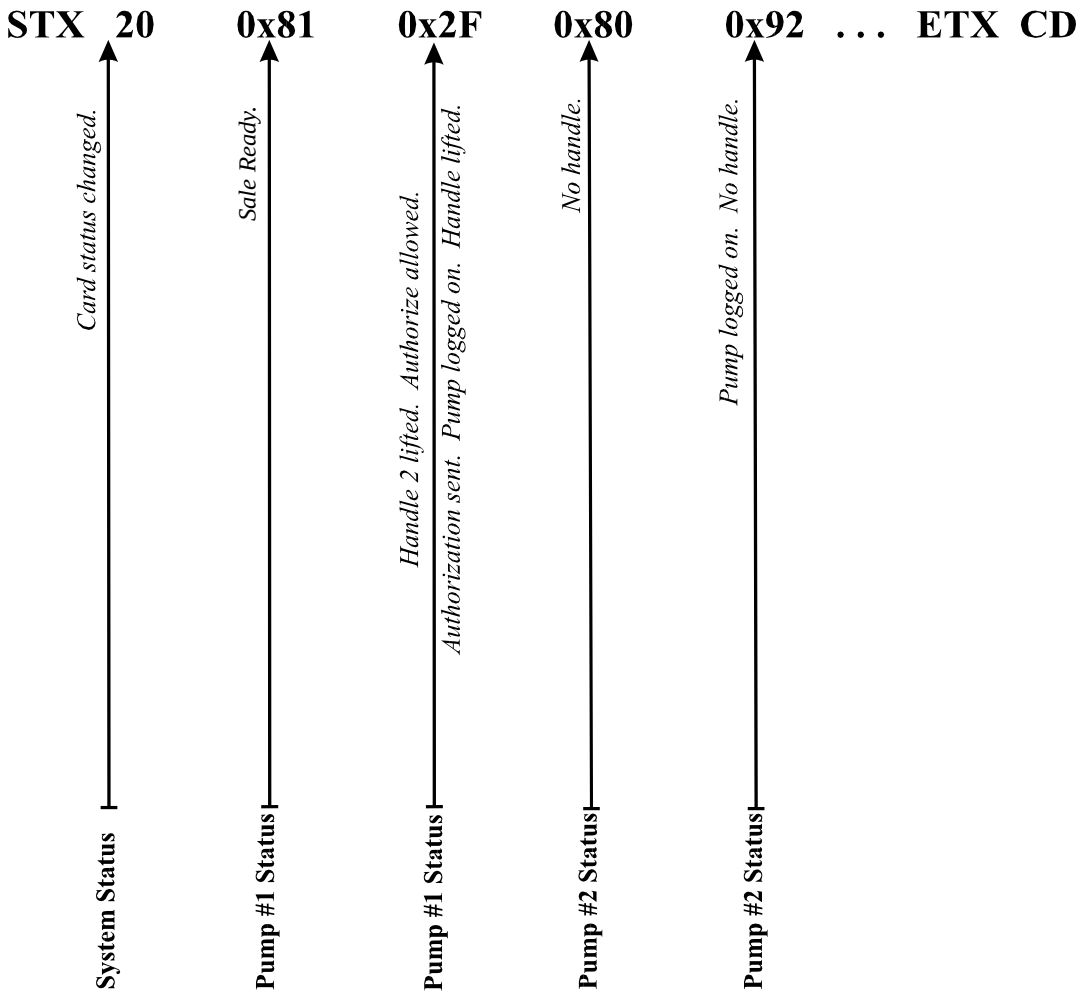


Diagram: Response to Select Status Request Command



Pump Commands

Reset

G — Resets the data and configuration of the controller

Reset Command Character G

Purpose of Reset Command

Resets the controller. Extreme caution must be exercised when issuing this command. Use of the Reset Command within the POS application is not recommended, since the result is a total reset of all data and configuration information. Also, the Controller Reset status bit (bit 2 of system status two) is set by this command.

After issuing a Reset Command, the controlling program must configure the controller before any operations can be performed (i.e., send PPUs and/or reader keypad configurations).

Format for Reset Command

STX G ETX CD

Response to Reset Command

ACK/NAK only

Reset Command Example

Command:
STX G ETX CD
Response:
ACK

Pump Commands

Blend

H — *Sets blend ratio in the dispensers*

Blend Command Character H

Purpose of Blend Command

Sets the blend ratio in dispensers that allow the controller to adjust the gasoline grade blend ratio. The blend is set by dispenser and hose. The value specified is the percent of Hose 1 used in each hose (i.e., hose 1 = 100% and the last hose = 0%). Blend ratios can be set in 1% increments.

Format for Blend Command

STX H Pump# Hose# XXX ETX CD

Command Code Character=H	
Pump #=XX	*(01 to 32)*
Hose #=X	*(0 to 8)*
XXX	*(Percent of Hose #1 ratio -- 001 to 100)*

Response to Blend Command

ACK/NAK only

Blend Command Example

- Hose 2
- 50%

Command:
STX 012050 ETX CD
Response:
ACK

Pump Commands

Polled Totals

I — *Reads totals from requested dispenser and hose number*

Polled Totals Command Character I

Purpose of Polled Totals Command

Used to read the totals from the requested dispenser and hose number.

Some dispensers may not have totals. Also, totals cannot be read if the fueling position is Not Idle. Some dispensers can return volume, along with separate cash and credit totals. Other dispensers combine cash and credit totals into one money total. This combined cash/credit money total will be returned by the controller in the credit position and the cash position will be 0.

Volume totals returned by dispensers are always combined cash and credit volume totals.

Format of Polled Totals Command

STX I Pump# Hose# ETX CD

Polled Totals Command Character=I
Pump #=XX *(01 to 32)*
Hose #=X *(0 to 8)*

Response to Polled Totals Command

STX Pump# Hose# Flag vvvvvv.vvv XXXXXXX.XX YYYYYYYY.YY ETX CD

Pump #=XX	*(01 to 32)*
Hose #=X	*(0 to 8)*
Flag=X	*(Totals type — see following description)*
Volume Total=vvvvvv.vvv	*(0000000.001 to 9999999.999)*
Credit Total=XXXXXXXX.XX	*(00000000.01 to 99999999.99)*
Cash Total=YYYYYYYY.YY	*(00000000.01 to 99999999.99)*

Description of Totals Flag

0	Totals not available for this dispenser
1	Pump busy; try later
2	Cash & Credit combined money totals with combined volume
3	Cash & Credit separated money totals with Combined volume

If the flag is a 0 or 1, the totals fields will be zero. Decimal points are implied.

Polled Totals Command Example

- Pump 1
- Hose 3
- Totals Type 3
- Volume 1234512.345
- Credit Total $9875432.10
- Cash Total $5555123.45

Command:
STX I013 ETX CD
Response:
ACK STX 013312345123459876543210555551234 5 ETX CD

Pump Commands

PPU

J — *Reads or sets the price per unit on the fueling position*

PPU Command Character J

Purpose of PPU Command

Reads or sets the price per unit on the fueling position. With this command, the controller may be configured. A price must be sent to hose number 1 if the dispenser exists. If multiple hoses are sent prices, the dispenser is considered to be a multi-product dispenser (MPD). Only those fueling positions which exist should be sent prices. Otherwise, the system operation will be slowed drastically. Also, it is good programming practice to send the prices starting with the highest hose on the dispenser and ending with hose number 1. Both price fields must be filled in. If only one price is required, fill both fields with the same price. If a dispenser is to be taken off-line, send a price of "0.000" to hose number one. (Other hoses are optional.)

For a Read operation, the price fields are ignored and decimal places are implied only.

Format for PPU Command

STX J Pump# Hose# Flag XXX.XXX YYY.YYY ETX CD

PPU Command Character=J	
Pump #=XX	*(01 to 32)*
Hose #=X	*(0 to 8)*
Flag=X	*(Type of PPU information — see below)*
Credit Price=XXX.XXX	*(000.001 to 999.999)*
Cash Price=YYY.YYY	*(000.001 to 999.999)*

Description of Flag Operation

R	Read Operation
W	Write Operation
E	Enable PPU with Handle Off Hook
D	Disable PPU with Handle Off Hook

Response to PPU Command

For Write Operation:

ACK/NAK only

For Read Operation:

STX Pump# Hose# XXX.XXX YYY.YYY ETX CD

Pump #=XX	*(Dispenser — 01 to 32)*
Hose #=X	*(Hose number — 0 to 8)*
Credit Price=XXX.XXX	*(000.001 to 999.999)*
Cash Price=YYY.YYY	*(000.001 to 999.999)*

PPU Command Example 1

- Pump 5
- Hose 1
- Credit Price $1.119
- Cash Price $1.019

Command:
STX J051W001119001019 ETX CD
Response:
ACK

PPU Command Example 2 — Enable PPU with Handle Off Hook

- Pump 3
- Hose 2
- Credit Price $1.129
- Cash Price $1.029

Command:
STX J032E001129001029 ETX CD
Response:
ACK

Pump Commands

System Version

K — *Returns software versions of sections of controller*

System Version Command Character K

Purpose of System Version Command

Returns the software versions of the sections of the controller.

Each section version is terminated with a NULL character. Actual spaces [20] will be embedded in information returned.

Format for System Version Command

STX K ETX CD

Response to System Version Command

STX Sys Pmp1 Rdr1 Pmp2 Rdr2 ETX CD

System Version Command Character=K

Sys=system version	*(format — sys x.xx*	*MM/DD/YY)*
Pmpx=pump version	*(format — pmp x.xx*	*MM/DD/YY)*
Rdrx=reader version	*(format — rdr x.xx*	*MM/DD/YY)*

Format for Extended System Version Command

STX KE ETX CD

Response to Extended System Version Command

Same as above response — PIEx.xx (indicating Progressive's core code version).

Format for Extended System Version Command:

STX KE ETX CD

Response to Extended System Version Command:

STX Sys Pmp1 Rdr1 Pmp2 Rdr2 Core Code ETX CD

Core Code PROM Version *(Format — PIE 1.00 MM/DD/YY)*

System Version Command Example

Command:			
STX KE ETX CD			
Response:			
ACK STX	PCC	4.40	04/17/98 [00]
	DW	P5.90	04/16/98 [00]
	DW	C3.80	01/06/98 [00]
	DW	P5.90	04/16/98 [00]
	DW	C5.80	01/06/98 [00]
	PIE	1.00	04/17/98 [00] ETX CD

Pump Commands

Deauthorize

N — *Deauthorize a fueling position*

Deauthorize Command Character N

Purpose of Deauthorize Command

Remove the authorization from a fueling position that was authorized but no flow has occurred. This is used to change an authorization type (Fillup to Preset, for example) or to remove the authorization when no one has used the fueling position and it should not remain ready for use.

Deauthorize command should only be used when no flow has occurred.

Format for Deauthorize Command

STX N Pump# ETX CD

PPU Command Character=N
Pump #=XX *(01 to 32)*

Response to Deauthorize Command

ACK/NAK only

Deauthorize Command Example

- Pump 3

Command:
STX N03 ETX CD
Response:
ACK

Extended Pump Commands

Extended Authorize

!A — *Initiates a fueling operation*

Extended Authorize Command Characters !A

Purpose of Extended Authorize Command

Authorizes a specified dispenser. This functions the same as the non-extended authorize command listed above in this document, but allows for higher dispenser Ids (up to 9999) and formats the decimal points of the data depending on what is set in the optional Decimal Point Modifier command.

Format for Authorize Command

STX !A Pump# Hose# Flag $$$$$$$$$ vvvvvvvv ETX CD
In the actual command, decimal points are implied only.

Extended Format for Authorize Command:

STX !A Pump# Hose# E Flag $$$$$$$$$ vvvvvvvv ETX CD
Decimal point format will vary depending on what is sent in the optional Decimal Point Modifier command.

Authorize Command Character=!A	
Pump #=XXXX	*(0001 to 9999)*
Hose #=X	*(0 to 8, with 0 authorizing any hose — also see Multi-grade Lock Authorization which follows)*
Flag=X	*(Type of authorization — see Description)*
Dollar Limit Amount=$$$$$$$$$	*(0000000.001 to 9999999999)*
Volume Limit Amount=vvvvvvvvv	*(0000000.001 to 9999999999)*

	Description of Flag Operation	
0	Dollar Limit	*(Credit price)*
1	Dollar Limit	*(Cash price)*
2	Volume Limit	(*Credit price)*
3	Volume Limit	*(Cash price)*
4	Fillup	*(No limit)*
9	New Limit	*(Only dollar preset amount may be changed, not MOP — see New Limit section which follows)*

Response to Authorize Command

ACK/NAK only

Authorize Command Example

- Pump 1
- Any Hose
- $25.00

Command:
STX !A000101000000250000000000000 ETX CD
Response:
ACK

Extended Authorize — Implementing New Limit Feature

Extended Authorize Command Characters !A

Purpose of Extended Authorize Command Implementing New Limit

Progressive International has implemented a feature of the Authorize command which enables the user to change the preset value for a fueling transaction after an Authorize command has been sent to the controller. This New Limit feature is commonly known as Preset-On-The-Fly.

Format for Extended Authorize Command

STX !A Pump# Hose# Flag $$$$$$$$$ vvvvvvvv ETX CD

Flag Operation — New Limit

9	New Limit	*(Only preset amount may be changed, not MOP)*

Special Considerations:

- Due to the nature of this operation, MOP changes are not permitted.
- New Limit field must be the limit field for which the original preset was sent.
- When using New Limit, all fields must exist.
- Some dispensers can have their presets changed after flow has begun. Caution should be exercised using this option with the amount of fuel presently being dispensed is marginally close to the original preset limit. With this scenario, a possibility for an overrun condition exists.

Error Notes:

- A system error 06 will occur if this flag is used without a previous authorization being sent for that pump #.
- A pump error 08 will occur if the controller cannot change the preset due to dispenser-specific situations.

Extended Authorize — Implementing Multi-Grade Lock Feature

Extended Authorize Command Characters !A

Purpose of Extended Authorize Command Implementing Multi-Grade Lock

To initiate a fueling transaction with specific grade combinations.

To implement this feature, Hose# must be set to 0x3f. *This alerts the controller to expect a bit pattern of grades to restrict. This bit pattern is appended to the normal Authorize command as two bytes representing the hoses to restrict:* $0x3X_1$ $0x3X_2$

First byte $0x3X_1$

X= bit 0 = grade 5
bit 1 = grade 6
bit 2 = grade 7
bit 3 = grade 8

Second byte $0x3X_2$

X= bit 0 = grade 1
bit 1 = grade 2
bit 2 = grade 3
bit 3 = grade 4

Format for Authorize Command Implementing Multi-Grade Lock

STX A Pump# Hose# Flag $$$$$$$$$ vvvvvvvv 0x3X 0x3X ETX CD

Format for Extended Authorize Command Implementing Multi-Grade Lock

STX A Pump# Hose# E Flag $$$$$$$$$ vvvvvvvv ETX CD

Example 1 — Authorize Command Implementing Multi-Grade Lock

Grades restricted:
1, 2 & 5

Command:
STX !A Pump# 0x3f Flag $$$$$$$$$$ vvvvvvvvvv 0x31 0x33 ETX CD
Response:
ACK

Example 2 — Authorize Command Implementing Multi-Grade Lock

Grade restricted:
1 only

Command:
STX !A Pump# 0x3f Flag $$$$$$$$$$ vvvvvvvvvv 0x30 0x31 ETX CD
Response:
ACK

Example 3 — Authorize Command Implementing Multi-Grade Lock

Grades restricted:
1 through 8

Command:
STX !A Pump# 0x3f Flag $$$$$$$$$$ vvvvvvvvvv 0x3f 0x3f ETX CD
Response:
ACK

Extended Pump Commands

Extended Sales Information

!B — *Reads the sale data or clear the Sale Ready flag*

Extended Sales Information Command Characters - !B

Purpose of Extended Sales Information Command

Used to read the sale information or clear the Sale Ready flag. This command may be used at any time during a sale in progress. All known fields will be filled in. Once the sale is complete, the information in this response indicates what actually took place at the fueling position. The R flag indicates a Read Sale operation and the C flag indicates a Clear Sale Ready operation.

Format for Extended Sale Information Command

STX B Pump# Flag ETX CD

Sale Information Command Character=!B
Pump #=XXXX *(0001 to 9999)*
Flag=X *(Type of sale information — see below)*

Description of Flag Operation

R	Read Sale Information
C	Clear Sale Ready Status
E	Extended Sale Information

(See Format for Extended Sale Information Command and Response to Extended Sale Information Command on following page(s))

The Clear Sale Ready status may only be accomplished when the Sale Ready status is set.

Response to Extended Sale Information Command

For Read Operation:

STX Pump# Hose# Flag $$$$.$$ vvv.vvv ETX CD

Pump #=XXXX	*(Fueling position — 0001 to 9999)*
Hose #=X	*(Hose number — 0 to 8)*
Flag=X	*(Type of sale, cash or credit — 1 or 2)*
Dollar Amount=$$$$.$$	*(Amount, using 2 decimal points)*
Volume Amount=vvv.vvv	*(Amount, using 3 decimal places)*

Description of Flag Indicators

1	Credit Sale
2	Cash Sale

For Clear Operation:

ACK/NAK only

For Extended Sale Operation:
(See Command Format and Response which follow.)

Format for Extended Sale Information Command

STX B Pump# Tag(s) ETX CD

In the actual command, decimal points are implied only.

Description of Extended Sale Field Tags		
Tag	Tag Description	Tag Response Data Format
H	Hose Number	X *(0 to 8)*
M	MOP of Sale	X *(1 or 2)*
$	Dollar Amount of Sale	$$$$$$$$$$
V	Volume of Sale	vvvvvvvvv
P	Unit Price of Sale	$$$$$$
S	Current Pump Status	XX *Refer to Status Request Command*
T	Pump Polled Totals	Fvvvvvvvvvv$$$$$$$$$$$$$$$$$$$$ *(Above data returned in following order: F=Totals type, 10 digits of volume totals, 10 digits of credit dollar totals, and 10 digits of cash dollar totals)*
L	Preset Limit	$$$$$$
C	State of Charge	XXXXXXXXXX (formatted as XXX.XXXXXXX) *This value is only used for Hydrogen dispensers.*
F	Flow Rate *(measured in units/second)*	PPP.PPPAAA.AAA *(000.001-999.999 for each) PPP.PPP – Peak Flow Rate AAA.AAA – Average Flow Rate*

Response to Extended Sale Information Command

When a Sale Information Command is issued with an E tag, it is treated as an extended sale command and will return data in the following format:

STX Pump#Tag1Data1 . . . $Tag_n Data_n$ ETX CD

The Extended Sale Information Command will return the requested information in the order in which the fields were requested. Each field is a fixed length as shown in the Tag Response Data Format column of the table above.

Sale Information Command Example

- Pump 1
- Read
- Hose 2
- Cash
- $25.75 sale
- 24.315 gal

Command:
STX !B 0001R ETX CD
Response:
ACK STX 000122002575024315 ETX CD

Extended Sale Information Command Example

- Pump 1
- Hose 1
- Credit
- $15.00 sale
- 14.164 gal
- Pump idle
- 3 Cash & Credit Totals
- Volume Totals 1234567.890
- Credit Dollar Totals $54321543.21
- Cash Dollar Totals $12312312.35
- State of Charge 99.1234567%
- Peak Flow Rate 10.421 gal/sec
- Average Flow Rate 8.639 gal/sec

Command:
STX !B01EHM$VPSTLCF ETX CD
Response:
ACK STX 0001H1M1$0000001500V0000014164 P001059S02T31234567890543215432112312312351235L005000C0991234567F010421008639 ETX CD

Extended Pump Commands

Extended Polled Totals

!I — *Receives totals from the dispenser*

Extended Polled Totals Command Characters - !I

Purpose of Extended Polled Totals Command

Used to read the totals from the requested dispenser and hose number.

This command has the same purpose as the non-extended Polled Totals command, but also allows for 4 digit pump numbers, and returns state of charge information for Hydrogen dispensers. The command can send decimal point values for how the totals are formatted in the response, and the response contains Record Separators (0x1e) to ensure that any length of data can be sent.

Some dispensers may not have totals. Also, totals cannot be read if the fueling position is Not Idle. Some dispensers can return volume, along with separate cash and credit totals. Other dispensers combine cash and credit totals into one money total. This combined cash/credit money total will be returned by the controller in the credit position and the cash position will be 0.

Volume totals returned by dispensers are always combined cash and credit volume totals.

Format of Extended Polled Totals Command

STX !I Pump# Hose# Volume Decimal# Money Decimal# ETX CD

Extended Polled Totals Command Characters=!I	
Pump #=XXXX	*(0001 to 9999)*
Hose #=X	*(0 to 8)*
Volume Decimal #=X	*(0 to 3)*
Money Decimal #=X	*(0 to 3)*

Response to Extended Polled Totals Command

STX Pump# Hose# Flag 0x1e vvvvvv.vv 0x1e XXXXXXX.XX 0x1e YYYYYYYY.YY 0x1e ZZZZZZZZ.ZZ ETX CD

Pump #=XXXX	*(01 to 9999)*
Hose #=X	*(0 to 8)*
Flag=X	*(Totals type — see following description)*
Volume Total=vvvvvvv.vvv	*(0000000.001 to 9999999.999)*
Credit Total=XXXXXXXX.XX	*(00000000.01 to 99999999.99)*
Cash Total=YYYYYYYY.YY	*(00000000.01 to 99999999.99)*
State of charge=ZZZZZZZZ.ZZ	*(00000000.01 to 99999999.99)*

Description of Totals Flag	
0	Totals not available for this dispenser
1	Pump busy; try later
2	Cash & Credit combined money totals with combined volume
3	Cash & Credit separated money totals with Combined volume

If the flag is a 0 or 1, the totals fields will be zero. Decimal points are implied.

Extended Polled Totals Command Example

- Pump 1
- Hose 3
- Totals Type 3
- Volume 12345123.45
- Credit Total $987543210
- Cash Total $555512345
- State of Charge 77777543.21

Command:
STX !I 0001330 ETX CD
Response:
ACK STX 000133 0x1e 1234512345 0x1e 9876543210 0x1e 5555512345 0x1e 7777754321 ETX CD

Extended Pump Commands

Extended PPU

!J — *Reads or sets the price per unit on the fueling position*

Extended PPU Command Characters - !J

Purpose of Extended PPU Command

Reads or sets the price per unit on the fueling position. With this command, the controller may be configured. A price must be sent to hose number 1 if the dispenser exists. If multiple hoses are sent prices, the dispenser is considered to be a multi-product dispenser (MPD). Only those fueling positions which exist should be sent prices. Otherwise, the system operation will be slowed drastically. Also, it is good programming practice to send the prices starting with the highest hose on the dispenser and ending with hose number 1. Both price fields must be filled in. If only one price is required, fill both fields with the same price. If a dispenser is to be taken off-line, send a price of "0.000" to hose number one. (Other hoses are optional.)

For a Read operation, the price fields are ignored and decimal places are implied only.

Format for Extended PPU Command

STX !J Pump# Hose# FlagLength Flag XXXXXX.XXX YYYYYYY.YYY Optional ETX CD

PPU Command Character=!J	
Pump #=XXXX	*(0001 to 9999)*
Hose #=X	*(0 to 8)*
Flag Length=X	*(1 or 2)*
Flag=X or XX *(Determined by Flag Length)*	*(Type of PPU information — see below)*
Credit Price=XXXXXX.XXX	*(0000000.001 to 9999999.999)*
Cash Price=YYYYYYY.YYY	*(0000000.001 to 9999999.999)*

Description of Flag Operation	
R	Read Operation
W	Write Operation
WO	Write Operation with Options
E	Enable PPU with Handle Off Hook
D	Disable PPU with Handle Off Hook

If the WO flag is used, optional data can be included in the command using the following tags. When using each option it is expected that the POS will send the tag followed by the corresponding data. See Extended PPU Command Example 2 — Send Decimal Points below for an example.

Description of Optional Tags		
Tag	Tag Description	Tag Data Format
P	PPU Decimals	X *(0 to 3)*
S	Slow Down Value	XX *(0 to 99)*

Response to Extended PPU Command

For Write Operation:

ACK/NAK only

For Read Operation:

STX Pump# Hose# XXXXXX.XXX YYYYYYY.YYY ETX CD

Pump #=XXXX	*(0001 to 9999)*
Hose #=X	*(0 to 8)*
Credit Price=XXXXXX.XXX	*(0000000.001 to 9999999.999)*
Cash Price=YYYYYYY.YYY	*(0000000.001 to 9999999.999)*

Extended PPU Command Example 1

- Pump 5
- Hose 1
- Credit Price $1.119
- Cash Price $1.019

Command:
STX !J000511W000000111900000001019 ETX CD
Response:
ACK

Extended PPU Command Example 2 — Send Decimal Points

- Pump 2
- Hose 3
- Credit Price $10.99
- Cash Price $10.89
- PPU Decimal 2
- Slow Down 15

Command:
STX !J000232WO000000109900000001089P2S15 ETX CD
Response:
ACK

Extended PPU Command Example 3 — Enable PPU with Handle Off Hook

- Pump 3
- Hose 2
- Credit Price $1.129
- Cash Price $1.029

Command:
STX !J000321E000000112900000001029 ETX CD
Response:
ACK

Extended Pump – Set Decimal Point Modifier

!O — Used to set a Decimal Point Modifier for data transfer

Set Decimal Point Modifier Command Characters *!O (letter O, not zero)*

Purpose of Decimal Point Modifier Command

Stores a specific decimal point format for Dollar, Volume, and PPU that the POS wants to send/receive data in. For example, if the POS sends a Dollar decimal point of 0 in this command, then all data sent from this pump will come across in the format $000000, rather than $0000.00.

Format for Decimal Point Modifier Command

STX !O Pump# DollarDP VolumeDP PPUDP ETX CD

Pump #=XXXX	*(0001 to 9999)*
Dollar DP=X	*(0 to 3)*
Volume DP=X	*(0 to 3)*
PPU DP=X	*(0 to 3)*

Set Decimal Point Modifier Command Example

- Pump 1
- Dollar DP of 0
- Volume DP of 2
- PPU DP of 1

Command:
STX !O0001021 ETX CD
Response:
ACK

Card Reader Commands

Keypad Configuration

Z — Used to configure keypad layout of a specific card reader

Keypad Configuration Command Character Z

Used to configure the keypad layout of the appropriate pump's card reader. It also communicates to the controller that a reader exists at this address. The Keypad Configuration Command clears Key Enable settings.

Various graphic overlays may be used on any given brand dispenser. All card reader keypads are defined by assigning a Keycode to a key position.

Refer to the following pages for reader key position layouts for specific pump brands. The keypad assignment must represent what the controlling application expects the PCC system to return for a given key entry. All key positions must be assigned. If a key position is unused on the keypad, then a null character [00] must be assigned to this position. To take a card reader off-line, assign a null [00] to all key positions. To put the reader back on-line, send a valid keypad configuration with actual keycodes.

Format for Keypad Configuration Command

STX Z Reader# $Key_1 Key_2 \ldots Key_n$ e ETX CD

Keypad Configuration Command Character=Z	
Reader number=XX	*(01 to 32)*
e	*(End of keycode data — hex [65])*
Key_n	*(Keycode for position n)*

Predefined Keys

S	Start code	D	Debit
E	Enter code	N	No
L	Clear code	R	Credit
B	Backspace code	A	Cash
C	Cancel code	Y	Yes
H	Help		

Keys are predefined as upper case. These predefined keys must be used where applicable.

Response to Keypad Configuration Command

ACK/NAK only

Keypad Configuration Command Example

• Reader 1
Gilbarco CRIND

Command:
STX Z01123[00]R456AZ789NYL0ECe ETX CD
Response:
ACK/NAK

Keypad Configuration Sample

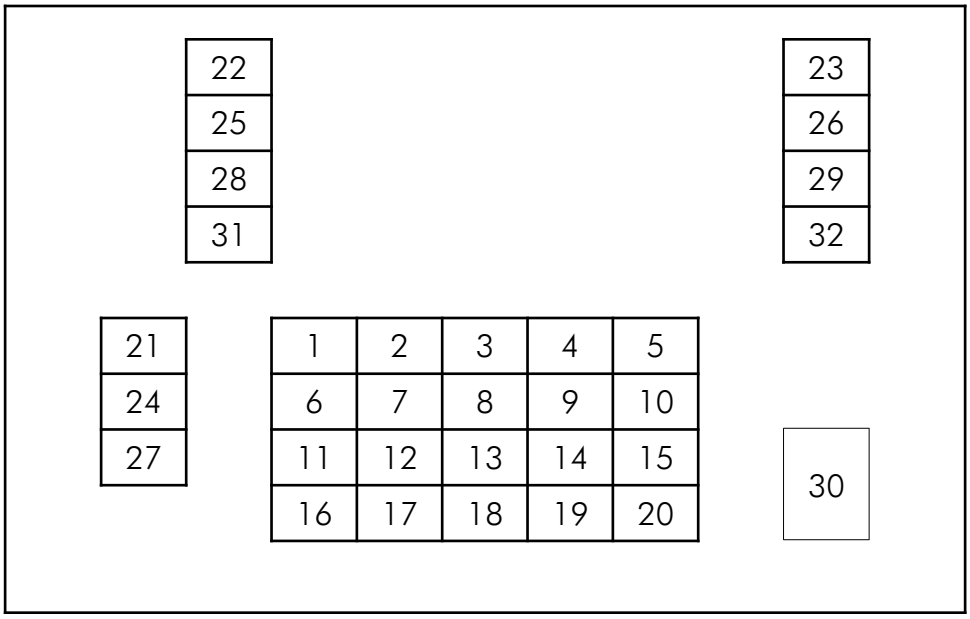
1 1	2 2	3 3	4	5 R
6 4	7 5	8 6	9 A	10 Z
11 7	12 8	13 9	14 N	15 Y
16 L	17 0	18 E	19 H	20 C

Small numbers in the upper left-hand corner of each key indicate the key position in this sample configuration of a Gilbarco CRIND™. (See Card Reader Key Position Layout 1.)

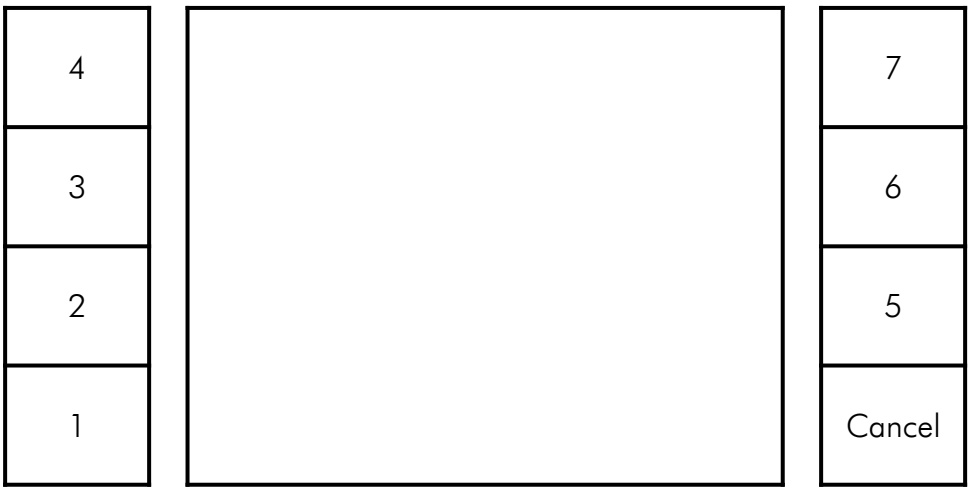
Card Reader Key Position Layouts

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

Layout: Gilbarco CRIND™



Layout: Gilbarco InfoScreen



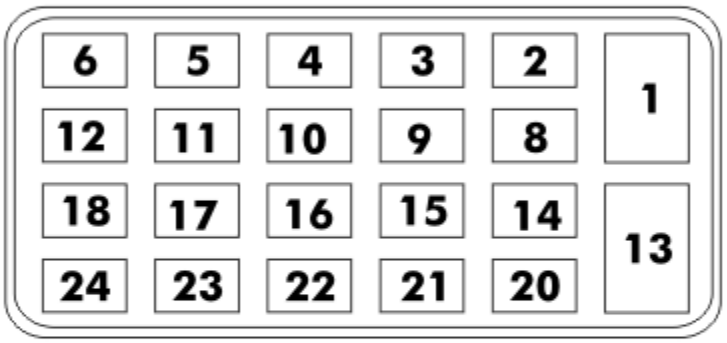
Layout: Bennett SPM

The keypad is fixed and only the 7 soft keys around the screen need to be configured as shown above. The bottom-right key is fixed as Cancel.

Sample Keypad configuration: STUVWXYe

Product Selection Keypad Key Numbers

Operator Interface Keypad Numbers
(Keypad numbers 7 & 9 are not used)



Layout: Tokheim Premier C Series In-Site

1	7	13	19
2	8	14	20
3	9	15	21
4	10	16	22
5	11	17	23
6	12	18	24

Layout: Tokheim DPT™

6	5	4	3	2	1
12	11	10	9	8	7
18	17	16	15	14	13
24	23	22	21	20	19

Layout: Tokheim Premier DPT™

16	17	18	19	20
11	12	13	14	15
6	7	8	9	10
1	2	3	4	5

Layout: Wayne

Card Reader Commands

Reader Status

Y — *Retrieves the status indicators pertaining to the card reader section of controller*

Reader Status Command Character Y

Purpose of Reader Status Command

Retrieves status indicators pertaining to the controller's card reader section. The first three status bytes indicate the current queue conditions. The next bytes (one per reader), indicate reader conditions.

Format for Reader Status Command

STX Y ETX CD

Reader Status Command Character=Y

Response to Reader Status Command

STX S1 S2 S3 RRRRRRRRRRRRRRRRRRRRRRRRRRRRRR ETX CD

S1 =	bit 7	*(Don't care)*
	bit 6	*(1)*
	bit 5	*(Reserved)*
	bit 4	*(Reserved)*
	bit 3	*(Cash Out Queue full)*
	bit 2	*(Cash In Queue empty)*
	bit 1	*(Card Queue full)*
	bit 0	*(Card Queue empty)*

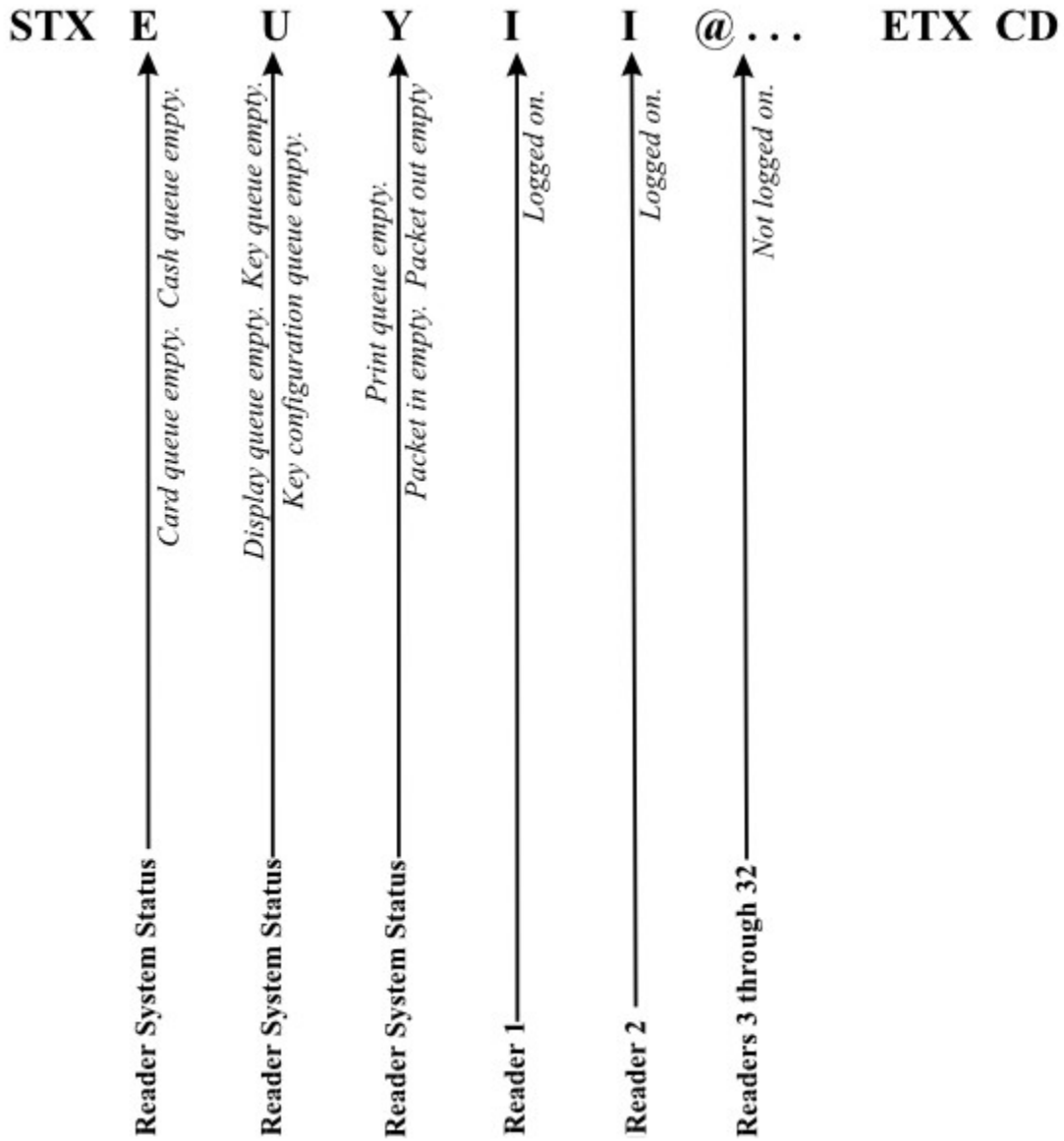
S2	=	bit 7	*(Don't care)*
		bit 6	*(1)*
		bit 5	*(Key Config Queue full)*
		bit 4	*(Key Config Queue empty)*
		bit 3	*(Key Queue full)*
		bit 2	*(Key Queue empty)*
		bit 1	*(Display Queue full)*
		bit 0	*(Display Queue empty)*
S3	=	bit 7	*(Don't care)*
		bit 6	*(1)*
		bit 5	*(Packet Out full)*
		bit 4	*(Packet Out empty)*
		bit 3	*(Packet In empty)*
		bit 2	*(Print Entry active)*
		bit 1	*(Print Queue full)*
		bit 0	*(Print Queue empty)*
R	=		*(Reader Dependent Status)*
		bit 7	*(Don't care)*
		bit 6	*(1)*
		bits 5 & 4	*(Printer Status — see below)*
		0 0	*(No Error)*
		0 1	*(Error)*
		1 0	*(Paper Out)*
		1 1	*(Paper Low)*
		bit 3	*(Printer Idle — 1=Idle)*
		bits 2 &1	
		0 0	*(Not Active)*
		0 1	*(Numeric — No Echo)*
		1 0	*(Function only)*
		1 1	*(Numeric Echo)*
		bit 0	*(Reader Logged)*

Reader Status Command Example

- Readers 1 & 2 logged on
- Readers 3-32 not logged on

Command:
STX Y ETX CD
Response:
See description below

Description of Reader Status Command Response



Card Reader Commands

Key Queue Control

X — *Reads and clears entries in the key queue*

Key Queue Control Command Character X

Purpose of Key Queue Control Command

Reads and clears entries in the key queue. The reader status will indicate "Key Queue Not Empty", signaling that there is information in the queue to be read.

The top entry is not cleared until a "clear" command is issued.

Format for Key Queue Control Command

STX X Flag ETX CD

Key Queue Control Command Character=X
Flag=X *(Type of operation — see below)*

Description of Flag Operation

R	Read Entry
C	Clear Entry

Response to Key Queue Control Command

Clear Operation:

ACK/NAK only

Read Operation:

STX HH kk... [NULL] ETX CD

HH	*(Reader number — 2 characters)*
k	*(Returned key code)*

Key Queue Control Command Example

- Read Key Queue
- Keys returned are 54321E

Command:
STX X R ETX CD
Response:
ACK STX 0154321E[00] ETX CD

Card Reader Commands

Card Queue Control

W — *Reads and clears entries in the card queue*

Card Queue Control Command Character W

Purpose of Card Queue Control Command

Reads and clears entries in the card queue. The reader status will indicate "Card Queue Not Empty," signaling that there is information in the queue to be read.

The top entry is not cleared until a "clear" command is issued.

Format for Card Queue Control Command

STX W Flag ETX CD

Flag=X *(Type of operation — see below)*

Description of Flag Operation

R	Read Entry
C	Clear Entry

Response to Card Queue Control Command

Clear Operation:

ACK/NAK only

Read Operation:

STX HH track 1 [NULL] track 2 [NULL] track 3 [NULL] ETX CD

HH	*(Reader number — 01 to 32)*
track 1	*(Track 1 data terminated by a Null character)*
track 2	*(Track 2 data terminated by a Null character)*
track 3	*(Track 3 data terminated by a Null character)*

Return information can be up to 250 characters. If both track 1 and track 2 are Null data, then the card was read with an error.

Card Queue Control Command Example

- Reader 1
- Card data

12345123451234 5TESTCARDDATA

Command:
STXWR ETX CD
Response:
STX0112345123451234 5TEST CARDDATA[00] ETX CD

Card Reader Commands

Cash Queue Control

V — *Manages the outgoing and incoming cash queues*

Cash Queue Control Command Character V

The Cash Queue Control Command may only be implemented if PCCZ/PCXZ code is Signature 4 or later version.

Purpose of Cash Queue Control Command

This command is used to send commands to and retrieve data from the cash acceptor on a dispenser reader. The commands and data are managed via incoming and outgoing queues. *See the reader status command (Y) for information on the status bits associated with this command.*

Format for Cash Queue Command

There are three fundamental types of Cash Queue command:

Write — Issues a command to a cash acceptor via the Cash Out queue
Read — Read the data in the cash acceptor queue via the Cash In queue
Clear — Clear an entry in the cash acceptor Cash In queue

The command structure for each of these operations is shown in this section.

WRITE COMMAND STRUCTURE

STX V W HH Flag [optional data] ETX CD

Description of Flag Operation

[optional data] field is used to send additional numeric data with certain flags shown below.

EE Enable cash acceptor (2 byte flag)
ED Disable cash acceptor (2 byte flag)
Z Cash acceptor status request*
S Stack bill in acceptor**
R Return bill to customer***
C Clear accumulated bills
T Set maximum bill type — use with the following optional data fields:
- 001 $1 bill maximum
- 005 $5 bill maximum
- 010 $10 bill maximum
- 020 $20 bill maximum
- 050 $50 bill maximum
- 100 $100 bill maximum

0 Set bill orientation — use with the following optional data fields:
- B Black side up
- G Green side up
- 2 Both directions

* Forces a cash acceptor status request queue entry. A solicited cash acceptor status request always returns a CB=000.
** Generates two cash acceptor status request queue entries (stacked and idle).
*** Generates two cash acceptor status request queue entries (returned and idle).

Response to Write

ACK/NAK only

READ COMMAND STRUCTURE

STX V R ETX CD

Format for Cash In Queue

HH $S_1S_2S_3S_4S_5S_6$[sp]CB=XXX[sp]AB=YYY[00]

HH	Head number with which data is associated (01 to 32)
S_1	Status 1 (controller status) — *see following Status Return chart*
S_2	Status 2 (controller status)
S_3	Status 3 (controller status)
S_4	Status 4 (controller status)
S_5	Status 5 (acceptor status)
S_6	Status 6 (acceptor status)
XXX	Current bill in acceptor (3 digit $ value)
YYY	Accumulated bills in acceptor since last clear (3 digit $ value)
[sp]	Space character [0x20]

A solicited cash acceptor status request always returns a CB=000.

Status Return Values

*All values returned as hex values (*30h — 46h*) representing* 0 — 9 *and* A — F

Controller Status Codes (bit oriented values)

S1	S2	S3	S4	
0	0	0	0	Cash acceptor disabled
x	x	x	1	Cash acceptor enabled
x	x	1	x	Solicited status
•	•	•	•	Reserved values
•	•	•	•	
[h]	[h]	[h]	[h]	

Acceptor Status Codes (numeric values)

S5	S6	
0	0	Note acceptor idle
0	1	Note escrowed
0	2	Note stacked
0	3	Note returned
0	4	Bill rejected
0	5	Acceptor jammed
0	6	Acceptor cassette full
0	7	Acceptor cassette removed
0	8	Acceptor cassette replaced
0	9	Acceptor power up
•	•	
•	•	Reserved codes
•	•	
F	E	Note status unknown**
F	F	Note acceptor error

** *If this status is returned, an additional hex value is returned* [hh]*, showing the value the controller was given*

x *represents a variable bit value*

[h] *represents a hexadecimal digit*

It is highly recommended that an audit trail file for all cash queue related data (cash queue commands and cash queue responses) be maintained

Response to Read

ACK only with data/NAK

If the command is ACKed, data will follow from the current Cash In Queue entry.

CLEAR COMMAND STRUCTURE

STX V C ETX CD

Response to Clear

ACK/NAK

Card Reader Commands

Print Queue Control

U — *Sends a print job to the printer through a queue*

Print Queue Control Command Character U

Purpose of Print Queue Control Command

Sends a print job to the printer through a "queue." Multiple strings may be sent to the queue so as to allow large messages to be sent. Each type of job sent must be complete and for only one printer at a time. Each print job is tagged with the reader number and message type.

- *Each string must follow sequential numbering. Maximum string size is 240 characters.*
- *The maximum header or footer job size is 240 characters, including carriage returns, line feeds and spaces. Header and footer messages must be sent for each printer immediately after logging on.*
- *The maximum receipt job size is 700 characters.*
- *Linefeed only (New Line) = [0A]*
- *Do not send papercut character. A papercut will be automatically appended to a footer print job.*
- *Add enough linefeeds after footer text to ensure that complete message is ejected from printer.*
- *00 is used for Header #.*

Format for Print Queue Control Command — Data Strings

STX U nn 'sss....sss'[NULL] dd ETX CD

Print Queue Control Command Character=U

nn	*(String number — 2 ASCII decimal digits)*
ss	*(Print data)*
dd	*(Next string number — 2 ASCII digits)*

Response to Print Queue Control Command — Data Strings

ACK/NAK only

Format for Print Queue Control Command — Ending String

STX U FF hh t ETX CD

Print Queue Control Command Character=U

FF	*(Ending flag — 2 ASCII 'F' characters)*
hh	*(Reader number — 2 ASCII digits)*
t	*(Print job type)*

Response to Print Queue Control Command — End String

ACK/NAK only

Description of Print Job Types

H	Header
F	Footer
R	Receipt (causes a receipt to be printed)

Description of String Flags

OO	First data string
nn	Subsequent data strings
FF	Ending string

Print Queue Control Command Example

- GLOBAL print header
- Text is “Header Test”

Command:
STX U00 Header Test [00] 01 ETX CD
Response:
ACK
Command:
STX UFF 00H ETX CD
Response:
ACK

Card Reader Commands

Display Queue Control

T — *Sends data to the display unit*

Display Queue Control Command Character T

Purpose of Display Queue Control Command

Sends data to the display unit.

The maximum number of display characters is 80. Each display message is complete and assumed to start at the first display position.

Line feed only (new line) = $0A_{16}$

Format for Display Queue Control Command

STX T HH 'sss....sss' [NULL] ETX CD

HH = Reader Number *(01 to 32 for specific reader or 00 for global — all — readers)*

ss = Display Data

Response to Display Queue Control Command

ACK/NAK only

Print Queue Control Command Example

- Display message is test display

Command:
STX T01 TestDisplay[00] ETX CD
Response:
ACK/NAK

Card Reader Commands

Key Entry Control

S — *Activates keyboard and specifies type of keyboard input allowed*

Key Entry Control Command Character S

Purpose of Key Entry Control Command

Activates the keyboard and specifies the type of keyboard input allowed.

Entry can be any one of the following:

- *Any Key*
- *Numeric with Echo*
- *Numeric Without Echo*

Format for Key Entry Control Command

STX S HH n e d cETX CD

Key Entry Control Command Character=S	
HH	*(Reader Number — 2 characters)*
n	*(N=normal or #=numeric)*
e	*(e=echo on or n=echo off)*
d	*(d=DES encryption on or n=DES encryption off)*
	(c=display control s=set cursor for numeric n=no cursor control)

DES encryption can only be set on numeric entry.

Response to Key Entry Control Command

ACK/NAK only

Key Entry Control Command Example 1

- Reader 1
- Numeric mode with echo
- No cursor control

Command:
STX S01# e n nETX
Response:
ACK

Key Entry Control Command Example 2

- Reader 2
- Numeric mode with echo
- With cursor control

Command:
STX S01# e n sETX
Response:
ACK

Card Reader Commands

Preloadable Messages

R — *Accesses coded display messages*

Preloadable Messages Command Character R

Purpose of Preloadable Messages Command

Accesses the reader's series of display messages used for "Print Receipt" and "Card Swipe" functions.

Programming must be implemented before sending the keyboard configuration command (command character Z).

Print Default Messages

1 Printing Receipt
2 Receipt Complete
3 Please Take Receipt
4 Printer Error

Card Default Messages

1 Remove Card Quickly
2 Insert Card Again
3 Invalid Card
4 One Moment Please
5 Card Inserted Wrong/Please Try Again

Miscellaneous Display

1 Cancel Key Message
2 Invalid Key

Format for Preloadable Messages Command

STX R HH d n 'sssss...ss' [NULL] ETX CD

HH	*(Reader Number — 2 characters; see below)*
d	*(P=Printer Display or C=Card Display or M=Miscellaneous)*
n	*(Display Message Number — 1 character)*
ss	*(Display Data)*

Reader Number Port Specifications

00	both ports
01	port 1 only
17	port 2 only

Response to Preloadable Messages Command

ACK/NAK only

Preloadable Messages Command Example

• Preload card message 1 to "Remove Card Now"

Command:
STX R01C1 Remove Card Now [00] ETX CD
Response:
ACK

Card Reader Commands

Beeper Control

Q — *Activates the beeper for specified number of beeps*

Beeper Control Command Character Q

Purpose of Beeper Control Command

Activates the beeper for a specified number of beeps.

This command utilizes the display buffer queue. Refer to the display queue flags during the processing of this command.

Some reader brands do not support selectable beep counts. Best effort will be made to comply with the commands request.

Format for Beeper Control Command

STX Q HH cc ETX CD

Beeper Control Command Character=Q
Reader Number=HH *(01 to 32)*
Number of Beeps to Sound=cc *(01 to 10)*

Response to Beeper Control Command

ACK/NAK only

Beeper Control Command Example

- Reader 1
- Beep 5 times

Command:
STX Q0105 ETX CD
Response:
ACK

Card Reader Commands

Packet Transfer

P — *Passes packets of information to and from the card reader*

Packet Transfer Command Character P

Purpose of Packet Transfer Command

Passes packets of information to and from the card reader.

Contact Progressive International Electronics for further instructions on the implementation of this command.

Format for Packet Transfer Command

Write:

STX P Flag Reader# CCC [. . . DATA . . .] ETX CD

Packet Transfer Command Character=P	
Reader #=XX	*(2 characters)*
Data Character Count=CCC	*(3 characters)*
Data	*Transfer data characters — maximum 240)*

Read/Clear:

STX P Flag ETX CD

Description of Flag Operation

W	Write
R	Read
C	Clear

Response to Packet Transfer Command

Write:

ACK/NAK only

Read:

STX HH CCC [. . . DATA . . .] ETX CD

Clear:

ACK/NAK only

If a data character is STX, ETX or 10 HEX, it must be preceded by a 10 HEX. This character is not part of the byte count. It will be stripped from the command, but the byte following the 10 HEX is included in the CD and the byte count.

EMV Reader Commands

EMV Set Preset Amount

**Q — Set Preset Amount for EMV Transactions*

EMV Set Preset Amount Command Characters *Q

Purpose of EMV Set Preset Amount Command

Sets the maximum amount to be used as the preset amount for EMV transactions. 2 decimal points are assumed. If this command is sent after the readers have already been logged on, then the controller will need to be reset to reflect the changes.

Format for EMV Set Preset Amount Command

STX *Q aaaaaaaaaaaa ETX CD

EMV Set Preset Amount Command Characters=*Q
a = preset amount (12 digits, 2 decimal points assumed)

Response to EMV Set Preset Amount Command

NAK if command has invalid data.
ACK if was successful.

EMV Set Preset Amount Command Example

- Preset amount of $100.

Command:
STX !Q 000000010000 ETX CD
Response:
ACK

EMV Reader Commands

Extended Reader Status

*Y — *Retrieves additional status data needed for EMV transactions*

Extended Reader Status Command Characters *Y

Purpose of Extended Reader Status Command

Retrieves status indicators pertaining to the controller's card reader section. The first three status bytes indicate the current queue conditions, and are broken down in the original Reader Status command definition above. There are two additional status bytes that follow (S4 and S5), these contain information needed for EMV transactions and the queue data needed for the applicable commands. The next bytes (one per reader), indicate reader conditions. The amount of Reader bytes is variable, and there will be 16 bytes for each reader channel defined in the controller. If there is 1 reader channel defined, expect 16 reader bytes, 32 for 2 channels, 48 for 3 channels, and so on. It is a good practice for POS developers to read in the command until you see the 0x03 [ETX] flag that marks the end of the data, and simply use what data is needed for your purposes.

Format for Extended Reader Status Command

STX *Y ETX CD

Response to Extended Reader Status Command

STX S1 S2 S3 S4 S5 RRRRRRRRRRRRRRR ... ETX CD

S4	= bit 7	*(Don't care)*
	bit 6	*(1)*
	bit 5	*(EMV App. Selected Queue full)*
	bit 4	*(EMV App. Selected Queue empty)*
	bit 3	*(EMV OAR Queue full)*
	bit 2	*(EMV OAR Queue empty)*
	bit 1	*(EMV Trans. Result Queue full)*
	bit 0	*(EMV Trans. Result Queue empty)*
S5	= bit 7	*(Don't care)*
	bit 6	*(1)*
	bit 5	*(PIN Entry Queue full)*
	bit 4	*(PIN Entry Queue empty)*
	bit 3	*(APDU Queue full)*
	bit 2	*(APDU Queue empty)*
	bit 1	*(PIN Block Queue full)*

- Readers 1 & 2 logged on
- Readers 3-16 not logged on
- One reader Channel defined in controller.
- All queues empty

Command:
STX *Y ETX CD
Response:
STX *EUYUUII@@@@@@@@@@@@@@* *ETX CD*

EMV Reader Commands

PIN Entry Data

*P — *Retrieves or Clears PIN Entry data needed for EMV transactions*

PIN Entry Data Command Characters *P

Purpose of PIN Entry Data Command

Retrieves the top entry in the PIN Entry Queue. This will contain both the PIN Block and the KSN needed to pass along to the card server used by the POS.

Format for PIN Entry Data Command

STX *P f ETX CD

Extended Reader Status Command Characters=*P
Function = f
R = Reads the top entry in the PIN Entry Queue
C = Clears the top entry in the PIN Entry Queue

Response to PIN Entry Data Command - Read

NAK if empty
or
STX rr c PP pppp... KK kkkk... ETX CD

Reader ID=rr	(00-99)
Was Cancelled=c	(1 for cancelled, 0 for not cancelled)
Pin Block Length=PP	(00-FF, is a hex value)
PIN Block Data=pppp	... (contains the PIN Block Data, expect the number of bytes given in the PIN Block Length)
KSN Length=KK	(00-FF, is a hex value)
KSN Data=kkkk...	(contains the KSN Data, expect the number of bytes given in the KSN Length)

Response to PIN Entry Data Command - Clear

ACK if cleared successfully

NAK if empty

PIN Entry Data Command Example

- Reader ID 1
- Not cancelled
- PIN Block Length of 0x10 (16)
- PIN Block Data: 1234567890123456
- KSN Length of 0x10 (16)
- KSN Data: 0987654321098765

Command:
STX !P R ETX CD
Response:
STX 01 0 10 1234567890123456 10 0987654321098765 ETX CD

EMV Reader Commands

EMV Application Data

*R — *EMV Application Data*

EMV Application Data Command Characters *R

Purpose of EMV Application Data Command

Sends/Clears the EMV Application Data and Public Keys needed to operate readers using the Conexxus protocol. Also used to save the data to a file, and to check the status to see whether FDSharp needs to be reset. If new data is sent after FDSharp already begins sending data to a terminal, then the file will need to be saved and FDSharp will need to be restarted for the changes to take effect. This file is saved as "EMVData.xml" in the same folder as FDSharp.

Format for EMV Application Data Command

STX *R rr F ... ETX CD

Flag=F	*(Type of operation — see below)*
Reader ID=rr	(00-99) Reader ID 0 performs the action for ALL readers

Description of Flag Operation

A	Set Application Data
B	Set Public Key Data
C	Clear all Public Keys
D	Clear all Application Data
F	Save/signal finished
S	Get status

Format for Set Application Data Command – A flag (Set TAC values and other data)

STX *RA rr A aaa B bbb C ccc D ddd E eee F fff G ggg H hhh I iii J jjj K kkk L lll M mmm N nnn O ooo P ppp ETX CD

Set Application Data Command – A flag=*RA
ReaderID = rr (00-99)

Each of the upper case letters that follow *RA are flags to signal which data is to follow (e.g. B). These flags are defined below. The corresponding lowercase letters (e.g. bbb) must be formatted with the size of that dataset, followed by the data. Each of the datasets (e.g. bbb) in this command expects 2 bytes (00-99) containing the size of the dataset, followed by the actual dataset. For example, the B flag (application name) would be formatted as B04VISA or B10MASTERCARD. If an RID/PIX combination that already exists is sent by the POS, then the values for that RID/PIX combination will be overwritten with the new data.

A – RID
B – Application Name
C – PIX
D – Application Version
E – TAC Default
F – TAC Denial
G – TAC Online
H – DDOL
I – TDOL
J – Selection Indicator
K – Floor Limit
L – Threshold Value
M – Target Percentage
N – Max Target Percentage
O – Terminal Capabilities
P – Pin Bypass (Y for yes, N for no. e.g. P01Y)
*The only required fields are A, B, C, D, E, F, and G, but it is recommended to send all fields where possible.

Response to Set Application Data Command – A flag

ACK/NAK only

Set Application Data Command – A flag Example

- Reader ID 1
- A flag
- RID (A) A000000003
- Application Name (B) "VISA CREDIT"
- PIX (C) 1010
- Application Version (D) 84
- TACDefault (E) D84000A800
- TACDenial (F) 0010000000
- TACOnline (G) D84004F800
- DDOL (H) 9F3704
- TDOL (I) 9F02065F2A029A039C019505 9F3704
- Selection Indicator (J) 01
- Floor Limit (K) 0
- Threshold Value (L) 0
- Target Percentage (M) 0
- Max Target Percentage (N) 0
- Terminal Capabilities (M) not present
- Pin Bypass (P) Off

Command:
STX *R A 01 A10A000000003B11VISA CREDITC041010D0284E10D84000A800F100010000000G10D84004F800H069F3704I309F02065F2A029A039C0195059F3704J0201K010L010M0299N0299P01N ETX CD
Response:
ACK

Format for Set Application Data Command – B flag (Set Public Key data)

STX *RB rr A aaa Q qqq R rrr S sss T ttt U uuuu V vvvv ETX CD

Set Application Data Command – B flag=*RB
ReaderID = rr (00-99)

Each of the upper case letters that follow *RB are flags to signal which data is to follow (e.g. A). These flags are defined below. The corresponding lowercase letters (e.g. aaa) must be formatted with the size of that dataset, followed by the data. Most of the datasets (e.g. aaa) in this command expects 2 bytes (00-99) containing the size of the dataset, followed by the actual dataset. Hash Value (U) and Modulus (V) both expect a size of 3 however (000-999), since the length of these can be greater than 99. If an RID/Number combination that already exists is sent by the POS, then the values for that RID/Number combination will be overwritten with the new data.

A – RID
Q – Sign Algorithm
R – Exponent
S – Number
T – Hash Algorithm
U – Hash Value
V – Modulus

Response to Set Application Data Command – B flag

ACK/NAK only

Set Application Data Command – B flag Example

- Reader ID 1
- B flag
- RID (A) A000000003
- Sign Algorithm (Q) 01
- Exponent (R) 03
- Number (S) 01
- Hash Algorithm (T) 01
- Hash Value (U)

D34A6A776011C7E7CE3AEC5F03AD2F8CFC5503CC

- Modulus (V)

C696034213D7D8546984579D1D0F0EA519CFF8DEFFC429354CF3A871A6F7183F1228DA5C7470C055387100CB935A712C4E2864DF5D64BA93FE7E63E71F25B1E5F5298575EBE1C63AA617706917911DC2A75AC28B251C7EF40F2365912490B939BCA2124A30A28F54402C34AECA331AB67E1E79B285DD5771B5D9FF79EA630B75

Command:
STX *R B 01 A10A000000003Q0201R0203S0201T0201U40D34A6A776011C7E7CE3AEC5F03AD2F8CFC5503CCV256C696034213D7D8546984579D1D0F0EA519CFF8DEFFC429354CF3A871A6F7183F1228DA5C7470C055387100CB935A712C4E2864DF5D64BA93FE7E63E71F25B1E5F5298575EBE1C63AA617706917911DC2A75AC28B251C7EF40F2365912490B939BCA2124A30A28F54402C34AECA331AB67E1E79B285DD5771B5D9FF79EA630B75 ETX CD
Response:
ACK

Format for Set Application Data Command – C flag (Clear all Public Keys)

STX *RC rr ETX CD

Set Application Data Command – C flag=*RC
Reader ID = rr

This command is used to clear all the data sent from the A flag for a specific Reader ID. Reader ID 00 does this for all Readers.

Response to Set Application Data Command – C flag

ACK/NAK only

Set Application Data Command – C flag Example

- Reader ID 1
- C flag

Command:
STX *R C 01 ETX CD
Response:
ACK

Format for Set Application Data Command – D flag (Clear all Public Keys)

STX *RD rr ETX CD

Set Application Data Command – D flag=*RD
Reader ID = rr

This command is used to clear all the public keydata sent from the B flag for a specific Reader ID. Reader ID 00 does this for all Readers.

Response to Set Application Data Command – D flag

ACK/NAK only

Set Application Data Command – D flag Example

- Reader ID 1
- D flag

Command:
STX *R D 01 ETX CD
Response:
ACK

Format for Set Application Data Command – F flag (Save all EMV Data)

STX *RF 00 ETX CD

Set Application Data Command – F flag=*RF

This command is used to save all EMV data for all readers to "EMVData.xml", which is located in the same folder as FDSharp.exe.

Response to Set Application Data Command – F flag

ACK/NAK only

Set Application Data Command – F flag Example

- F flag

Command:
STX *R F 00 ETX CD
Response:
ACK

Format for Set Application Data Command – S flag (Get Status)

STX *RS 00 ETX CD

Set Application Data Command – S flag=*RS

This command is used to get the status and other information for which readers are sending the EMV configuration data, if the file is saved, and other data.

Response to Set Application Data Command – S flag

STX *RD 00 ETX CD

Set Application Data Command – S flag=*RS

This command is used to save all EMV data for all readers to "EMVData.xml", which is located in the same folder as FDSharp.exe.

aa = number of channels currently sending application data to a terminal (2 bytes, 00-99).
bb = number of channels currently sending public key data to a terminal (2 bytes, 00-99).
c = is loading save file. (1 byte, 0 if currently loading or 1 for not currently loading)
d = is saving save file. (1 byte, 0 if currently saving or 1 for not currently saving)
e = *did receive new data (1 byte, 0 if no new data received, 1 if new data was received).
f = *has started sending app data (1 byte, 0 if no terminals have started sending app data or public key data, 1 if any terminal has started sending app data or public key data)

*note on e/f: These bytes are used to determine when to send a "save/signal finish" flag, and when FDSharp requires a reset for changes to apply.
The e byte will only be set to 1 if any "new" data is sent to FDSharp, so if we get any duplicate data that was already loaded from the save file, then

e is 0. The e byte will be reset to 0 once the Save/signal finish flag is sent from the POS. If byte e is 1 after you finish sending data, then send a save/signal finish command, and if both e and f are 1 after you finish sending data, then restart fdsharp after saving for the changes to take effect. If both bytes are 0, or only f is 1 and e is 0, after the POS finishes sending data, then there is no need to save or restart FDSharp, and normal operations can continue.

e=0, f=0: no save or restart required.
e=0, f=1: no save or restart required.
e=1, f=0: save required, no restart required.
e=1, f=1: save required, then restart required.

(Future EMV documentation will be implemented after certification)

Set Application Data Command – S flag Example

- S flag
- 1 terminal sending app data
- 1 terminal sending public key data
- Is not loading save file
- Is not saving save file
- Did receive new data from POS
- Has started sending EMV configuration data to the terminal.

Command:
STX *R S 00 ETX CD
Response:
STX 01010011 ETX CD

Card Reader Commands

Sound Payments Transaction Queue

*S — *Sound Payments Transaction Queue*

Sound Payments Transaction Queue Characters *S

Purpose of Sound Payments Transaction Queue Command

Used to retrieve and clear the reader and dispenser information associated with sales authorized from the Sound Payments IFSF bridge. There are two sub-commands: Read the top queue entry and Clear the top queue entry.

Format for Sound Payments Transaction Queue Command - Read

STX *SR ETX CD

Sound Payments Transaction Queue Command -Read Characters=*SR

Response to Sound Payments Transaction Queue Command - Read

NAK if queue is empty

or

STX d b D V P c r p h e I N L E ETX CD

Pump ID=d	(0-9999, 4 bytes)
Is From Bridge=b	(1 if sale was authorized from the sound payments bridge, 0 if not)
Sale Dollar=D	(10 bytes, defaults to 2 decimal places)
Sale Volume=V	(10 bytes, defaults to 3 decimal places)
Sale PPU=P	(10 bytes, defaults to 3 decimal places)
Has Card Info=c	(1 if card info follows, 0 if not. If this byte is 0 then the below bytes will not be sent from FDSharp and this will end the command)
Reader ID=r	(0-9999, 4 bytes)
Last 4 digits of PAN=p	(0-9999, 4 bytes)
PAN Hash=h	(128 bytes, this is an encrypted hash of the PAN)
Has EMV Data=e	(1 if emv data follows, 0 if not. If this bytes is 0 then the below bytes will not be sent from FDSharp and this

	will end the command)
Cardholder name length=I	(2 bytes, holds the length of the cardholder name that follows)
Cardholder name=N	(variable length, expect the number of bytes given in the cardholder name length)
EMV data length=L	(4 bytes, holds the length of the EMV Data that follows)
*EMV data=E	(variable length, expect the number of bytes given in the EMV data length)

*EMV data description:

The EMV data section will contain several EMV tags, shown below. After each EMV tag will follow 2 bytes (hexadecimal) that define the length of the data in that tag, the amount of characters to follow will be twice as many as the length. So an 8A tag with a value of 5A33 will have a length of 2, and look like this: "8A025A33". It is recommended to:

- Find if the tag is 2 or 4 characters (if the second character is an F, then the tag will be 4 characters)
- Read the next 2 bytes, after the tag, for the length (x)
- Then read the next (x*2) number of bytes before reading another tag

These are the tags that will be sent in the Sound Payments Transaction Queue Command:

- 82
- 8A
- 9A
- 95
- 9B
- 5F2A
- 5F34
- 9F02
- 9F03
- 9F07
- 9F0D
- 9F0E
- 9F0F
- 9F10
- 9F12
- 9F1A
- 9F21
- 9F26
- 9F27
- 9F34
- 9F36
- 9F37
- 9F06

The descriptions for these tags can be found on https://emvlab.org/emvtags/

Sound Payments Transaction Queue Command - Read Example

- Dispenser ID: 0001
- Transaction was from bridge
- Sale Dollar: 137.16
- Sale Volume: 123.456
- Sale PPU: 1.111
- Has Card Info
- Reader ID: 0001
- Last 4 digits of PAN: 5678
- PAN Hash: Oxd7t6W5ZHz2HUJO3Rvw0OpZZmdf49QRM5IxFSgag8cYljR4bg4cP3GOSf28Xmis3ec7OfBCd+20D5r4M+NiprnZTFwD/4RZmx0gVI5jrDakMfyCFZPC81FPasDqnUGJ
- Has EMV Data
- Name Length: 9
- Name: "Test Name"
- EMV Data Length: 0336
- EMV Data: 5F2A0208405F3401038202380008A025A339A032208189F02060000000001009F03060000000000009F0702FFC09F0D05FC50A0000009F0E050000000000009F0F05F870A4980009F10120210600000000000000000000000FF9F120A4D617374657243617264 9F1A0208409F21031602209F2608A2C3B5FC189048969F2701809F34034203009F360200279F37040DBAA6129505000004800009B02E8009F0607A0000000041010

Command:
STX *SR ETX CD
Response:
STX 0001100000137160000123456000000111110001567 8OXd7t6W5ZHz2HUJO3Rvw0OpZZmdf49QRM5IxFSgag8cYljR4bg4cP3GOSf28Xmis3ec7OfBCd+20D5r4M+NiprnZTFwD/4RZmx0gVI5jrDakMfyCFZPC81FPasDqnUGJ109Test Name03365F2A0208405F340103820238008A025A339A032208189F02060000000000001009F03060000000000009F0702FFC09F0D05FC50A000009F0E0500000000000009F0F05F870A498009F1012021060000000000000000000000000000000FF9F120A4D617374657243617264 9F1A0208409F21031602209F2608A2C3B5FC189048969F2701809F34034203009F360200279F37040DBAA6129505000004800009B02E8009F0607A0000000041010 ETX CD

Format for Sound Payments Transaction Queue Command - Clear

STX *SC ETX CD

Sound Payments Transaction Queue Command -Clear Characters=*SC

This command clears the top entry in the Sound Payments Transaction Queue.

Response to Sound Payments Transaction Queue Command - Clear

ACK if successful, or NAK if queue is empty

Sound Payments Transaction Queue Command - Read Example

Command:
STX *SC ETX CD
Response:
ACK

Tank Monitor Commands

Start Report

**A — Used to start a tank monitor report on a specific dispenser*

Start Tank Monitor Report Command Characters *A

Purpose of Start Tank Monitor Report Command

Starts a Tank Monitor Report on a specific tank number.

Format for Start Tank Monitor Report Command

STX *A nn ttttttt ETX CD

Tank Monitor Number=nn *(01 to 32)*
ID Token=ttttttt *(00000000 to ffffffff)*

**ID Token is a 32 bit unique ID token used to identify each independent outside client.*

Response to Start Tank Monitor Report Command

ACK/NAK only

Start Tank Monitor Report Command Example

- Tank Number 1
- ID 0x00253681

Command:
STX *A0100253681 ETX CD
Response:
ACK

Tank Monitor Commands

Get Report Status

**B — Used to get the report status on a specific tank*

Get Tank Monitor Report Status Command Characters *B

Purpose of Get Tank Monitor Report Status Command

Gets the Tank Monitor Report status using a unique ID.

Format for Get Tank Monitor Report Status Command

STX *B ttttttt ETX CD

ID Token=ttttttt *(00000000 to ffffffff)*

**ID Token is a 32 bit unique ID token used to identify each independent outside client.*

Response to Get Tank Monitor Report Status Command

STX s ETX CD

Report Status=s (1 to 3)

1 = Report Busy

2 = Report Ready

3 = Report Error

Get Tank Monitor Report Status Command Example

- ID 0x00253681
- Report Ready

Command:
STX *B00253681 ETX CD
Response:
STX 2 ETX CD

Tank Monitor Commands

Get Report

**C — Used to get the report on a specific tank*

Get Tank Monitor Report Command Characters *C

Purpose of Get Tank Monitor Report Command

Gets a Tank Monitor Report using a unique ID.

Format for Get Tank Monitor Report Command

STX *C ttttttt ETX CD

ID Token=ttttttt *(00000000 to ffffffff)*

**ID Token is a 32 bit unique ID token used to identify each independent outside client.*

Response to Get Tank Monitor Report Command

STX nn s m I bbbb iii... A bbbb aaa... L bbbb lll... D bbbb ddd... ETX CD

Tank Number=nn *(01 to 32)*

Report Status=s *(1 to 3)*

1 = Report Busy
2 = Report Ready
3 = Report Error

Tank Type=m *(0 to 2)*

0 = Error
1 = TLS 250
2 = TLS 350+

b – Length of upcoming report (0 to 5000, always 4 characters)
I – Inventory report next (always I)
i – Inventory report (up to 1000 characters)
A – Alarm report next (always A)
a – Alarm report (up to 1000 characters)

L – Leak report next (always L)

l – Leak report (up to 200 characters)

**Only for TLS 350+ (not returned for TLS 250)*

D – Delivery report next (always D)

d – Delivery report (up to 5000 characters)

Get Tank Monitor Report Command Example

- ID 0x00253681
- Tank Number 1
- Report Ready
- Tank Type TLS 250

Command:
STX *C00253681 ETX CD
Response:
STX 0121I0005abcdeA0010abcdefghijL0003abc ETX CD

Car Wash Commands

Status Request

**D — Used to get the status on a specific Car Wash*

Request Car Wash Status Command Characters *D

Purpose of Request Car Wash Status Command

Gets the Car Wash status of a specific Car Wash.

Format for Request Car Wash Status Command

STX *D ii ETX CD

Car Wash ID=ii *(00 to 32)*

Response to Request Car Wash Status Command

STX ii uu oo ww ETX CD

Car Wash ID=ii	*(00 to 32)*
Customer Status=uu	*(always 00)*
Controller Status=oo	*(always 00)*
Wash Status=ww	*(00-02)*

00 – Idle
02 – Out of Service

Request Car Wash Status Command Example

- Car Wash ID 01
- Wash Status: Idle

Command:
STX *D01 ETX CD
Response:
STX 01000000 ETX CD

Car Wash Commands

Get Operator Status

**E — Used to get the operator status on a specific Car Wash*

Get Car Wash Operator Status Command Characters *E

Purpose of Get Car Wash Operator Status Command

Gets the Car Wash operator status of a specific Car Wash.

Format for Get Car Wash Operator Status Command

STX *E ii ETX CD

Car Wash ID=ii *(00 to 32)*

Response to Get Car Wash Operator Status Command

STX ii oo ETX CD

Car Wash ID=ii *(00 to 32)*
Operator Status=oo *(0-3)*
0 – Idle
1 – Busy
2 – Data Ready
3 – Error

Get Car Wash Operator Status Command Example

- Car Wash ID 01
- Operator Status: Data Ready

Command:
STX *E01 ETX CD
Response:
STX 012 ETX CD

Car Wash Commands

Info Request

**F — Used to request information from a specific Car Wash*

Car Wash Info Request Command Characters *F

Purpose of Car Wash Info Request Command

Requests specific information from a specific Car Wash.

Format for Car Wash Info Request Command

STX *F ii ETX CD

Car Wash ID=ii *(00 to 32)*

Response to Car Wash Info Request Command

STX ii oo ETX CD

Car Wash ID=ii *(00 to 32)*
Operator Status=oo *(0-3)*
0 – Idle
1 – Busy
2 – Data Ready
3 – Error

Car Wash Info Request Command Example

- Car Wash ID 01
- Operator Status: Data Ready

Command:
STX *E01 ETX CD
Response:
STX 012 ETX CD

Generic FDSharp Commands

Get License Info

**T — Get License Info*

Get License Info Characters *T

Purpose of Get License Info Command

Used to get the status and expiration date of the software license in FDSharp.

Format for Get License Info Command

STX *T ETX cd

Response to Get License Info Command

STX S MMddyyyyhhmmss ETX cd

Status=S	(1 for permanent license, 0 for timed license)
Expiration Month=MM	(2 bytes, 01-12)
Expiration Day=dd	(2 bytes, 01-31)
Expiration Year=yyyy	(4 bytes, 2022-9999)
Expiration Hour=hh	(2 bytes, 00-23, military time)
Expiration Minute=mm	(2 bytes, 00-59)
Expiration Second=ss	(2 bytes, 00-59)

The Expiration date bytes will only be sent if the Status flag is returned as 0, indicating that it is a timed license. If the Status flag returns as 1, the status flag will be the last character in the response. The Expiration date/time is in UTC, and should be converted by the POS to the applicable timezone.

Get License Info Command Example

- Timed License
- Expiration Date 12/22/2022
- Expiration Time 03:51:23 pm

Command:
STX *T ETX CD
Response:
STX 012222022155123 ETX CD

Dispenser Specific Information

Tokheim

Authorize Command — new limit

- Dispenser must support the AE46 command.

Gilbarco

Authorize Command — new limit

- PCXZ must have gil_pump version 3.70 8/28/97 or later.
- New limit must be sent prior to flow.

Wayne-Dresser

Authorize Command — new limit

- PCXZ must have dw_pump version 5.00 9/02/97 or later.
- New limit may be sent at any time prior to previous limit being reached.
- If increasing or decreasing original limit set, allow for some delay in communication. If insufficient time is allowed, error message may result or new limit may not be attained.

Reader Specific Information

Tokheim

- Display:
  - 4 x 20 characters
  - no graphics
  - scrolling not supported
- DES encryption to be supported – *Contact PIE for release date*
- Beeper options – 1 or 3
- Reader software must be Version JP020800 or later

Gilbarco

- Display:
  - 1 x 20 characters
  - Scroll Flag 0_X13_{HEX} (Must be first display character)
- DES encryption supported
- Beeper options – 1 to 10
- Only Print Default preloadable messages are supported – P1 through P4
- Receipts must be 40 lines long
- CRIND software must be version 51.1.6 or later

Wayne-Dresser

- Display:
  2 x 20 characters
  no graphics
  scrolling not supported
- DES encryption supported
- DES key read returned in packet with K as first character
  If DES key read is double-wide, one position must be unused
- Packet Command Flag
  Include as first character of data flag to describe to which type device the packet is being sent — card reader or MSM
  C = Card Reader
  M = MSM
  Device #01 Bank 0 MSM
  Device #17 Bank 1 MSM

- Beeper options — 1 to 10
- Only Print and Card Default preloadable messages are supported —
  P1 through P4 and C1 through C5