

Electronic Preset Delivery System

# Smith Meter® AccuLoad® IV

Communications Manual

Bulletin MN06204L Issue/Rev 0.2 (9/21)



## ***Important***

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All information and technical specifications in this documentation have been carefully checked and compiled by the author. However, we cannot completely exclude the possibility of errors. TechnipFMC is always grateful to be informed of any errors. Contact us on the website.

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## ***Caution***

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The default or operating values used in this manual and in the program of the AccuLoad IV are for factory testing only and should not be construed as default or operating values for your metering system. Each metering system is unique and each program parameter must be reviewed and programmed for that specific metering system application.

## ***Disclaimer***

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## 1—Introduction

This manual fully describes how the Smith Meter AccuLoad IV Electronic Preset communicates with other computing devices—from a simple terminal to a high-end SCADA system computer running a terminal automation system—when using the Smith protocol.

Incorporated within the AccuLoad IV is the ability to communicate directly (for example: without a modem or multiplexer) with a host or other device via Ethernet (Smith SMIP protocol, TCP/IP port 7734) or serially via an EIA-232C and/or an EIA-485 compatible remote serial terminal or minicomputer. Depending on the communication type, certain key information from multiple AccuLoad IVs can be requested (polled). If the AccuLoad IVs are so programmed, the meter position desired may be remotely authorized and released for the operator's use. Via this interface, the host computer may additionally authorize specific additives, set the batch volume, reset alarms, remotely program certain AccuLoad IV program codes, etc.

To configure the AccuLoad for host communications, the following program codes must be specified as shown in the chart below:

### System Communications Directory options

System Program Codes for Ethernet communications port configurations	
734	IP Discovery
735	IP Address
736	Netmask
737	Gateway
738	Ethernet Host Control
739	Ethernet Timeout

System Program Codes for serial communications port configuration				
Port 1	Port 2	Port 3	Port 4	
707	712	717	722	Function
708	713	718	723	Baud
709	714	719	724	Data/Parity
710	715	720	725	Control
711	716	721	726	Timeout

System Program Codes for arm addresses and other communication options (affects both serial and Ethernet)	
701	Load Arm #1 Address (1—99)
702	Load Arm #2 Address (1—99)
703	Load Arm #3 Address (1—99)
704	Load Arm #4 Address (1—99)
705	Load Arm #5 Address (1—99)
706	Load Arm #6 Address (1—99)
731	Comm Link Programming (Level of Access)
732	Modbus Endian Selection

Refer to the AccuLoad IV Operator Reference Manual ([MN06200](#)) for detailed information on the configuration of these communications parameters.

### **Using the Smith Meter protocol Over TCP/IP**

The AccuLoad IV has a reserved port that supports Smith Meter terminal communications. This protocol is currently fixed at port 7734. The AccuLoad IV expects a single complete command to be contained in each packet received. The AccuLoad IV will currently ignore fragmented commands or any additional commands after the first in a packet. Due to the relatively small size of the Smith command frame, this usually poses no problem for the communicating client. However, most Telnet-type programs will attempt to send data as soon as it is entered, so the resulting packets received by the AccuLoad IV do not have complete commands and are ignored. The AccuMate has a built-in tool—the terminal emulator—that sends an entire command in one packet. Custom software written to communicate with the AccuLoad can duplicate this functionality easily by submitting a completely formed communication command along with any required arguments to the TCP transport layer all at once.

Both terminal or minicomputer mode protocol framing will work via the TCP/IP connection. Note that with Minicomputer Mode, the LRC is redundant to the inherent security provided by TCP and is not checked (and may optionally be left off entirely).

### **Additional information—Using a Web Browser to View AccuLoad IV Information**

By pointing your web browser at the IP address of the AccuLoad IV, you can retrieve various web pages from the device showing the current state of operation, etc. For example, assuming a AccuLoad IV programmed with address 192.168.1.13 is on your network, enter `http://192.168.1.13` in your web browser to display the home page.

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## 2—Communication Protocols

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### Communication Types

The type of communicating device that is being used in the system with an AccuLoad IV is programmable and can be defined in the communications directory of the AccuLoad IV.

**Terminal (Term Host)**—The AccuLoad IV communications ports communicate with a terminal type device using a simplified communications protocol.

**Minicomputer (Minicomp Host)**—The AccuLoad IV communications ports communicate with a minicomputer type device using a sophisticated and secure communications protocol.

**Modbus Host**—The AccuLoad IV communication ports support Modbus communications.

**Card Reader**—Permits the AccuLoad.net to communicate with the Smith Meter® Card Reader

**Network Printing**—Allows the ability of the AccuLoad to print to a network printer.

**Printer**—The AccuLoad IV will automatically print a report at the end of each transaction. One AccuLoad IV will communicate with a printer.

**Shared Printer**—The AccuLoad IV will automatically print a report at the end of each transaction. Multiple AccuLoads may communicate with a single printer.

**Smart Injector**—Permits the AccuLoad IV to communicate with smart additive injector systems. (Examples are Gate City Blend-Pak and Mini-Pak, Titan Pak3 and Smith Meter® AccuTroller.)

### Communications for Terminal Mode of Operation

The AccuLoad IV System Program Code Communications Port Function must be set to Terminal Host. This character-oriented protocol uses the ASCII character " \* " to define the start of a message and Carriage Return-Line Feed (CR-LF) characters to terminate the message. No error checking other than parity on each character is performed.

The message format is:

*	A1 A2	text	CR	LF
---	-------	------	----	----

for an instruction to AccuLoad IV, or

*	A1 A2	text	CR	LF
---	-------	------	----	----

for a response from AccuLoad IV

Where:

- \* = Asterisk (hexadecimal "2A")
- Text = Character string containing instructional or response information
- CR = Carriage Return (hexadecimal "0D")
- LF = Line feed (hexadecimal "0A")
- A1 A2 = AccuLoad IV Address (01 to 99)

The universal or global address "00" is an invalid address and must not be assigned to any AccuLoad IV. The address, A1 A2, always consists of two ASCII characters.

Data is formatted using ASCII characters and each character frame consists of 1 start bit, 7 or 8 data bits, none, even or odd parity, and 1 or 2 stop bits. A maximum communication rate of 38,400 baud is supported. There is no echo back of received characters by the AccuLoad IV in the Terminal Mode of operation.

### Communications for Minicomputer Mode of Operation

This character-oriented protocol uses the transmission control character STX to define the start of a message, and ETX to terminate the message. A Longitudinal Redundancy Check (LRC) character follows the ETX character for additional message error detection beyond the traditional parity check done on each transmitted character.

The message format is:

STX	A1 A2	text	ETX	LRC
-----	-------	------	-----	-----

for an instruction to AccuLoad IV, or

NL	STX	A1 A2	text	ETX	LRC	PAD
----	-----	-------	------	-----	-----	-----

for a response from AccuLoad IV

Where:

- NL = Null character Hex "00"
- STX = Start of Text Hex "02"
- Text = Character string containing instructional or response information
- ETX = End of Text Hex "03"
- LRC = Longitudinal Redundancy Check
- PAD = Pad character Hex "7F"
- A1 A2 = AccuLoad IV Address (01 to 99)

The LRC is an ASCII character computed as the exclusive OR (XOR) sum of all characters following the STX and including the ETX transmission control characters.

The universal or global address "00" is an invalid address and must not be assigned to any AccuLoad. The address, A1 A2, always consists of two ASCII characters.

Data is formatted using ASCII characters and each character frame consists of 1 start bit, 7 or 8 data bits, none, even or odd parity, and 1 or 2 stop bits. There is no echo back of received characters by the AccuLoad IV in the Minicomputer Mode of communications.

### Text Format

Command and Response text will be shown enclosed in single quotes. Embedded spaces are represented by an underscore character ( \_ ). Any other character representation will be described where used.

An "OK" is used in response to any action type command that has been successfully carried out. For request-only commands, a good response will report the data requested in the format shown for that command.

A "NOXX" (XX represents a two-character code) is used to show that the command has been rejected. The two-character code represents the condition causing the rejection. For an expanded description of these codes, see "Appendix II."

Time-out, or no response received from the AccuLoad IV, occurs when the command string has been entered incorrectly. The communicating program should set an upper limit on the amount of time it will wait for a response from any AccuLoad, and register a time-out when that time has elapsed, to prevent a bad command from locking up the communications. Commands must be formatted exactly as stated. Invalid addresses, incomplete data, and excess data are all causes for this to occur. A more detailed explanation follows:

**Invalid Address**—An AccuLoad IV will ignore a command whose address does not match its own. The communication address is programmed into the AccuLoad IV System program code 701 and following.

**Incomplete Data**—The code format for each communication command is stated in the Command Reference Guide section. If any portion of the command is left out, a time-out will occur.

**Excess Data**—Commands must be formatted exactly as stated. No excess data may be inserted or added.

### Communication Control Selections

The amount of control that the communicating device has over the AccuLoad IV is programmable for various degrees of control.

**Polling Only**—Permits the EIA-232 or EIA-485 communication device to request information only.

**Poll and Authorize**—Permits the EIA-232 or EIA-485 communication device to request information and to authorize operation.

**Remote Control**—Permits the EIA-232 or EIA-485 communication device to have complete control over all operations.

**XON/XOFF**—Printer security protocol, designed to keep the printer buffer from overflowing. The printer sends an XOFF (13 hex) when the print buffer is nearly full. The AccuLoad stops sending data until the printer sends an XON (11 hex) signifying that it is ready for more data.

**Poll and Program**—Identical to "Polling Only" and adds programming privilege, but excludes authorizing privilege.

**PTB-FX Protocol**—This security level is designed to support the PTB weights and measures agency-approved printer interface. This interface is currently supported by and applies to the Epson FX-850 printer. This interface uses a data block structure with handshaking. The AccuLoad initially sends an ENQ (enquire) to the printer. The printer then responds with an ACK (acknowledge) and is now ready to receive a block of data from the AccuLoad. A block of data is defined to be one line to be printed. The data is wrapped between a STX (start of text) and an ETX (end of text) and is followed by the longitudinal redundancy checksum for the data block. After the AccuLoad has sent the data block, the printer will then respond with an ACK if the data was received correctly or a NAK (negative acknowledge) if not received correctly. If the printer responds with a NAK, the data block will be re-transmitted.

**PTB-LQ PROTOCOL**—This security level is designed to support a PTB weights and measures agency-approved printer interface. This interface is currently supported by and applies to the Epson LQ-570 printer.

This interface uses a data block structure with handshaking. The AccuLoad initially sends an ENQ (enquire) to the printer. The printer then responds with an ACK (acknowledge) and is now ready to receive a block of data from the AccuLoad. A block of data is defined to be one line to be printed. The data is wrapped between a STX (start of text) and an ETX (end of text) and is followed by the longitudinal redundancy checksum for the data block. After the AccuLoad has sent the data block, the printer will then respond with an ACK if the data was received correctly or a NAK (negative acknowledge) if not received correctly. If the printer responds with a NAK, the data block will be re-transmitted.

Each command listed in the command reference guide section of this manual indicates the supporting communication modes.

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### **3—Communications With Smart Additive Injectors**

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The AccuLoad IV communicates with the Titan, Gate City Smart Additive, and Smith Meter® Smart Additive Systems. After three tries, if there is no response from the additive injector system, an alarm will be set and the AccuLoad IV will respond to the alarm as it has been instructed to do in the programming.

The AccuLoad IV controls the smart additive subsystem totally through communications. The additive pacing is by communications. For example, the additive system receives communication commands at the same interval at which the piston injectors would receive a signal to inject. With smart injectors, no incoming pulses are required by the additive injector. Certain parameters must be established in the additive subsystem prior to each batch and injector commands are issued during the batch and at the end of the batch. In all cases, the parameters and commands are only issued to those additive injector systems that have been authorized for use for the current batch.

#### **Pass-by Communications Mode**

The pass-by communications mode is designed to allow supervisory computers to communicate with smart additive injectors under the control of the AccuLoad IV.

Commands from the supervisory computer will be received from the AccuLoad IV on one communications line and forwarded to the additive injection subsystem on another communications line. Queries and control commands will only be permitted while the AccuLoad IV is in the ready mode. No queries or commands will be accepted by the AccuLoad while it is in the run mode or the programming mode.

Communications from a supervisory computer to a smart additive injector is a three-step process. First, the supervisory computer will issue a pass-by command to the AccuLoad IV. The AccuLoad IV will acknowledge receipt of the command to the supervisory computer. Next, the AccuLoad will add framing characters, as required, and issue the command to the smart additive injector. The additive injector will return an appropriate response to the AccuLoad. The final step will occur when the supervisory computer requests the additive's response from the AccuLoad IV.

The communications scheme was developed to maintain a response time consistent with other commands sent by the supervisory computer.

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## 4—Command Reference Guide

### Command Code AB—Allocate Blend Recipes

This command allocates the blend recipes that will be allowable for selection. This allocation is a subset of those enabled in the program mode.

#### Command:

```
"AB_C1C2C3...C13"
```

Where: C1C2C3...C13 is the three- to thirteen-character bit map described on the following pages.

#### Responses:

```
"OK" Good Response. Recipes have been allocated
```

```
or...
```

```
"NOXX" Recipes have not been allocated
```

#### Remarks:

1. A one allocates the corresponding recipe number for selection. Allocation is cancelled on transaction done status being set.
2. Allocation is also cancelled if, when in Remote Control Mode, a power-fail restart occurs between batches.
3. This command does not require all characters. A minimum of three characters is accepted. For those characters omitted, the corresponding recipes are not allocated.
4. This command will automatically exit from Program Mode when initiated.

#### Constraints:

Recipe allocation remains in effect for the current transaction only.

#### Special Case:

None.

#### Comm. Modes:

Polling Only, Poll and Authorize, or Remote Control

**Command to Allocate Recipes, Character 1**

Character		Recipe Request			
Char	Hex	Recipe #4	Recipe #3	Recipe #2	Recipe #1
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 2**

Character		Recipe Request			
Char	Hex	Recipe #8	Recipe #7	Recipe #6	Recipe #5
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 3**

Character		Recipe Request			
Char	Hex	Recipe #12	Recipe #11	Recipe #10	Recipe #9
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 4**

Character		Recipe Request			
Char	Hex	Recipe #16	Recipe #15	Recipe #14	Recipe #13
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

### Command to Allocate Recipes, Character 5

Character		Recipe Request			
Char	Hex	Recipe #20	Recipe #19	Recipe #18	Recipe #17
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

### Command to Allocate Recipes, Character 6

Character		Recipe Request			
Char	Hex	Recipe #24	Recipe #23	Recipe #22	Recipe #21
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 7**

Character		Recipe Request			
Char	Hex	Recipe #28	Recipe #27	Recipe #26	Recipe #25
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 8**

Character		Recipe Request			
Char	Hex	Recipe #32	Recipe #31	Recipe #30	Recipe #29
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 9**

Character		Recipe Request			
Char	Hex	Recipe #36	Recipe #35	Recipe #34	Recipe #33
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 10**

Character		Recipe Request			
Char	Hex	Recipe #40	Recipe #39	Recipe #38	Recipe #37
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 11**

Character		Recipe Request			
Char	Hex	Recipe #44	Recipe #43	Recipe #42	Recipe #41
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 12**

Character		Recipe Request			
Char	Hex	Recipe #48	Recipe #47	Recipe #46	Recipe #45
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Command to Allocate Recipes, Character 13**

Character		Recipe Request			
Char	Hex	Reserved	Reserved	Recipe #50	Recipe #49
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

## Command Code AN—Read Analog Engineering Value

This command returns the current analog engineering value for the specified analog I/O point.

### Command:

"AN X" Read Analog Engineering Value

**Where:** X... is the analog I/O point desired (1-6).

### Responses:

"AN VVVVV.V"

**Where:** X is the analog I/O point desired (1-6 VVVV.V is the current value in the programmed engineering scale units.

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling Only, Poll & Authorize, or Remote Control, Poll & Program

## Command Code AO—Set General Purpose Analog Output Engineering Value

This command sets a new engineering value associated with the general-purpose analog output, effectively changing the current/voltage out to a new value. The engineering value is scaled to the appropriate output voltage/current based on the programmed 4 mA or 1V (min) and 20 mA or 5 V (max.) engineering values for the specified I/O point.

### Command:

```
"AO_X_VVVV.VV"
```

**Where:** X = Analog I/O point

VVVV.VV = the new engineering value to set

### Responses:

**"OK"** AccuLoad IV has set the new value.

or...

**"NOXX"** The new value was not set.

or

**"NOO1"** The requested operation cannot be performed while the AccuLoad IV is in program mode.

**Remarks:** None

**Constraints:** Output must be configured as general-purpose analog output.

**Special Case:** None

**Comm. Modes:** Polling Only, Poll & Authorize, Remote Control, Poll & Program

## Command Code AP—Authorize Transaction to Preset

This command authorizes a transaction and displays the "PRESET" prompt.

### Command:

"AP" Authorize Transaction  
"AP\_A1A2A3A4A5A6" Authorize AccuLoad to preset with additives

**Where:** A1A2A3... is the optional six-character additive selection code.

### Responses:

"OK" AccuLoad IV has been authorized for transaction.

or...

"NOXX" The transaction failed to release.

or...

NO30 will be returned if the additive specified is not currently allocated to the arm to which the command was directed.

NO36 will be returned if the AccuLoad is being used with a card reader and the card data is invalid or has expired.

### Remarks:

1. If the additive qualifier (A1A2A3...) is not used, the Additive selection will operate as currently programmed in the AccuLoad IV. For authorization with additives, only one recipe may be allocated. Additives selected in the qualifier must be programmed for use.
2. If more than one recipe is enabled, the "Select Recipe" prompt will be displayed.

### Constraints:

The "AP" will reset the transaction done, batch done and keypadpending flags.

### Special Case:

None

### Comm. Modes:

Poll & Authorize

**Additive Selection Codes for AP and AU—Character A1**

Character Sent (A1)		Add 4	Add 3	Add 2	Add 1
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Additive Selection Codes for AP and AU—Character A2**

Character Sent (A2)		Add 8	Add 7	Add 6	Add 5
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Additive Selection Codes for AP and AU—Character A3**

Character Sent (A3)		Add 12	Add 11	Add 10	Add 9
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Additive Selection Codes for AP and AU—Character A4**

Character Sent (A4)		Add 16	Add 15	Add 14	Add 13
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Additive Selection Codes for AP and AU—Character A5**

Character Sent (A5)		Add 20	Add 19	Add 18	Add 17
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

**Additive Selection Codes for AP and AU—Character A6**

Character Sent (A6)		Add 24	Add 23	Add 22	Add 21
Char	Hex				
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
A	41	X		X	
B	42	X		X	X
C	43	X	X		
D	44	X	X		X
E	45	X	X	X	
F	46	X	X	X	X

### Command Code AR—Alarm Reset

This command resets one of the alarms currently registered at the AccuLoad IV.

**Command:**

<b>"AR"</b>	Reset all alarms in all tables
<b>"AR_XX_DD"</b>	Reset specific alarm for a specified directory
<b>"AR_XX_IN_YY"</b>	Reset specific alarm for the specified injector
<b>Where:</b>	XX = Two-character alarm code DD = Directory, where SY = System P1 = Product 1 P2 = Product 2 P3 = Product 3 P4 = Product 4 P5 = Product 5 P6 = Product 6 AR = Arm M1 = Meter 1 M2 = Meter 2 (Ratio, hybrid blending configuration only) M3 = Meter 3 (Ratio, hybrid blending configuration only) M4 = Meter 4 (Ratio, hybrid blending configuration only) M5 = Meter 5 (Ratio, hybrid blending configuration only) M6 = Meter 6 (Ratio, hybrid blending configuration only) IN = Additive Injector RR = Recipe (01—50) YY = Injector (01—24)

**Responses:**

<b>"OK"</b>	Good response to the Alarm Reset Command.
or...	
<b>"NOXX"</b>	The alarm was not reset.

**Remarks:** The two-character alarm code must be one of those alarms that can be reset through communications. All alarms except "DA" can be cleared through communications.

**Constraints:** The alarm code must be able to be reset through communications. If it is allowed, it must be pending or a "NO" will be returned.

**Special Case:** A special code, "AA," may be used to reset all resettable alarms that are pending in the directory specified.

**Comm. Modes:** Poll & Authorize or Remote Control

## Alarm Status Codes That Can Be Reset Through Communications—System

### Resettable Alarms—System

Code	Condition
CM	Communications Alarm—Communications failure on one of the communications channels.
CP	FA Sening Alarm
EM	Email Error
HB	HMI B Failure
ME	Excess Arms Active—Indicates that more than six arms are active when using the AccuLoad IV-SA. No more than six arms can be active at once.
NP	Network Printer Alarm
PA	Power-fail Alarm—The unit either had a power failure or a hardware reset occurred.
PP	Printer Failure—The printer failure alarm is set when the AccuLoad IV fails to get a good response from a printer after sending data to be printed. The AccuLoad IV will continue to resend the data to the printer until the communication port timeout setting expires, at which time the printer alarm is set. This alarm can also become active when an XON/XOFF timeout occurs when not using PTB protocol.
SP	Shared Printer—An output was attempted to the shared printer but was unsuccessful because the shared printer remained busy longer than the programmed communications timeout.
A1	Add-Pak Power-fail—Indicates that a power failure has occurred on Add-Pak #1.
A2	Add-Pak Power-fail—Indicates that a power failure has occurred on Add-Pak #2.
C1	Add-Pak Communications Alarm—Communications failure on Add-Pak #1.
C2	Add-Pak Communications Alarm—Communications failure on Add-Pak #2.
D1	Add-Pak Diagnostic Alarm—Indicates a failure on Add-Pak #1.
D2	Add-Pak Diagnostic Alarm—Indicates a failure on Add-Pak #2.
P1	Add-Pak #1 Auto-Detect Failed—Indicates that the AccuLoad has failed to detect Add-Pak Board #1
P2	Add-Pak #2 Auto-Detect Failed—Indicates that the AccuLoad has failed to detect Add-Pak Board #2
U1	User Alarm #1
U2	User Alarm #2
U3	User Alarm #3
U4	User Alarm #4
U5	User Alarm #5
U6	User Alarm #6
U7	User Alarm #7
U8	User Alarm #8
U9	User Alarm #9
U0	User Alarm #10

## Alarm Status Codes That Can Be Reset Through Communications— Injector

### Resettable Alarms—Injector

Code	Condition
AD	Auto-Detect Failed—Indicates that a specific Smart Injector was unable to be located on any comm port.
FA	Additive Feedback Error—Indicates that the additive feedback has exceeded the programmed number of errors.
AC	Additive Communications Error—Indicates a failure on the master/slave communications line between the AccuLoad IV and the Additive Injector Subsystem.
KA	Low Additive Error—Indicates that not enough additive was injected during one cycle or an average of several cycles.
MA	Excessive Additive Pulses Error—Indicates that too many additive flow meter pulses were detected.
NA	No Additive Pulses Error—Indicates that the additive flow meter's pulses were not detected.
RA	Additive Frequency Error—Indicates that the additive volume is too high for the rate selected; a second dose of additive is being requested before delivery of the first dose completes.
UA	"Unauthorize" Error—Indicates that the unauthorize command failed at the end of the batch for an additive. Authorization may have to be removed manually (by power cycling the additive system) to prevent unwanted additive in subsequent batches/transactions.
GA	General Additive Error—Indicates that there is an additive injector error.
OR	Overspeed Injector—Indicates that the meter on the metered injector has exceeded its specified maximum frequency.
CR	Command Refused Error—Indicates that the command from the AccuLoad to the injector was rejected.
AH	Additive High Temperature Alarm—Used only for flow controlled additive types. Temperature probe or transducer is out of range with high alarm setting.
AL	Additive Low Temperature Alarm—Used only for flow controlled additive types. Temperature probe or transducer is out of range with low alarm setting.
AT	Additive Temperature Probe—Used only for flow controlled additive types. Short or open condition in temperature probe.
PS	Pulse Security—Used only with the security option. Indicated that an excessive number of out-of-sequence errors in the A-B pulse stream have been detected on one of the flow controlled additive meters.
XA	Indicates a collision in the incoming pulse stream. (The signals on A and A-bar or B and B-bar are the same).
CT	Indicates that the additive total received from the smart additive system may be erroneous

## Alarm Status Codes That Can Be Reset Through Communications—Arm

### Resettable Alarms—Arm

Code	Condition
CA	Additive Clean Line—The additive clean line volume delivered has under-run the additive clean line volume programmed.
CL	Clean Line—The clean line volume delivered has under-run the clean line volume programmed by at least the amount of clean line alarm limit.
DE	DE Head Alarm (unloading only)—Indicates an illegal combination of inputs. If the low flow switch is covered, the stop float must be covered. If the high flow switch is covered, both the stop float and the low flow switches must also be covered.
HF	High Flow—Flow rate has exceeded limit set by Excess High Flow program parameter for more than 4 seconds.
OA	Overrun—Volume delivered has exceeded the preset amount by at least the number of units set in the Overrun Limit program code.
SF	Storage Full—Indicates that the archived transaction area is full. The operator must clear stored standby transactions in order to continue.
TK	Ticket—Ticket was cranked from ticket printer while the batch loading was in progress.
ZF	Zero Flow—The AccuLoad did not see flow through the system before the zero flow timer expired.
CD	Card Removed—The card was removed from the card reader prior to the end of the transaction.
RP	Report Storage Full

## Alarm Status Codes That Can Be Reset Through Communications—Meter

### Resettable Alarms—Meter

Code	Condition
DR	Density Transducer—Density transducer failure or out-of-range condition
FR	Indicates that reverse flow occurring during a batch has exceeded the programmed "reverse flow limit" (system 203).
LA	Leakage Alarm—Indicates that leakage between transactions has exceeded the programmed "leakage alarm limit" (system 202).
PM	The ProMass Meter has a system problem status alarm. This alarm indicates that the meter should be checked for programming errors.
PO	Predict Overrun—Indicates that the AccuLoad has stopped the batch because it suspects a valve fault condition will result in an overrun occurring.
PR	Pressure Transducer—Pressure transducer failure or out-of-range condition
PS	Pulse Security—Used only with the security pulse option. Indicates that an excessive number of out-of-sequence errors in the A-B pulse stream have been detected
SC	Solenoid Count—Indicates that the solenoid count has exceeded the "solenoid alarm count" (system 201). This alarm will only be set when the load arm is idle.
TP	Temperature Probe—Short or open condition in the temperature probe circuit
VF	Valve Fault—Indicates that the meter was still registering flow when the valve fault timer expired after the AccuLoad commanded the valve to close
XA	Indicates a collision in the incoming pulse stream. (The signals on A and A-bar or B and B-bar are the same)
MF	Mass Meter Comm Failure
PM	ProMass Alarm

## Alarm Status Codes That Can Be Reset Through Communications— Product

### Resettable Alarms—Product

Code	Condition
BH	Blend High Alarm—An overflow on this product has caused a blend tolerance to be exceeded.
BL	Blend Low Alarm—An underflow on this product has caused the blend tolerance to be exceeded.
BP	Back Pressure—Back pressure per the entries set cannot be maintained during flow enough to maintain entry set in product program code.
BV	Block Valve Alarm—The valve did not close within 10 seconds after receiving the signal to close.
HD	High Density—Density transducer is out of range of the high alarm setting.
HF	High Flow Alarm—Flow rate has exceeded limit set by Excess High Flow program code for more than 4 seconds.
HP	High Pressure—Pressure transducer is out of range of the high alarm setting.
HT	High Temperature—Temperature probe or transducer is out of range of the high alarm setting.
LD	Low Density—Density transducer is out of range of the low alarm setting.
LF	Low Flow Alarm—Flow rate was at or below the minimum flow rate established by Low Flow Limit program code for longer than 8 seconds.
LP	Low Pressure—Pressure transducer is out of range of the low alarm setting.
LT	Low Temperature—Temperature probe or transducer is out of range of the low alarm setting.
OA	Overrun Alarm—Volume delivered has exceeded the preset amount by at least the number of units set in the overrun limit program code.
PA	Product Stop Alarm—Hybrid Blending Arms only—This alarm indicates that there was an under-run of product after the ratio product was shut down. Therefore, the line may not be clear of the ratio product.
UF	Unauthorized Flow—The AccuLoad has detected unauthorized flow.
ZF	Zero Flow—The AccuLoad did not see flow through the system before the Zero Flow Timer expired.

### Command Code AT—Request Additive Volumes by Transaction

This command retrieves additive transaction volumes from AccuLoad IV.

**Command:**

**Current Transaction**

"AT\_XX" Cumulative transaction additive volume

"AT\_XX\_Z" Total additive, by volume type, of transaction in progress if that type is available

**Local Storage Transaction**

"AT\_XX\_NNN" Total additive in an historic transaction

"AT\_XX\_Z\_NNN" Total additive, by volume type, in an historic transaction for flow controlled additives

**Where:** XX = 1 through 24 (Additive #)  
 Z = G (GV Total); N (GST Total); M (Mass Total)  
 NNN = number of transactions back into local storage to retrieve the data

**Responses:**

**Good Response:**

**Current Transaction**

"AT\_XX\_YY\_VVVVV.VVV" For "AT\_XX"

"AT\_XX\_YY\_Z\_VVVVV.VVV" For "AT\_XX\_Z"

**Local Storage Transaction**

"AT\_XX\_YY\_VVVVV.VVV\_NNN" For "AT\_XX\_YY\_NN"

"AT\_XX\_YY\_Z\_VVVVV.VVV\_NNN" For "AT\_XX\_YY\_Z\_NNN"

**Where:** XX = 1 through 24 (Additive #)  
 YY = Total Number of Batches Completed  
 VVVVV.VVV = Total Additive Transaction Volume  
 Z = R for Raw or Indicated (IV) Total  
 G for Gross (GV) Total  
 N for Gross at Standard Temperature (GST) Total  
 M for Mass Total

NNN = # of transactions back into Local Storage to retrieve the data

or...

"NOXX" Additive volume cannot be reported

**Remarks:** None

**Constraints:** Volume units are assumed as the type programmed into AccuLoad IV. Additive must be assigned to the arm that is addressed. Volume types are available for flow control additives only.

**Special Case:** If bays are configured, the returned value is the bay transaction total.

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll and Program

### Command Code AU—Authorize Transaction

This command authorizes a transaction at the AccuLoad IV. The AccuLoad will continue to display READY until the SET key is pressed. Then the "PRESET" or recipe selection prompt will be displayed.

**Command:**

<b>"AU"</b>	Authorize AccuLoad
<b>"AU_A1A2A3A4A5A6"</b>	Authorize AccuLoad with Additives
<b>Where:</b> A1A2A3A3A4A5A6 = the optional, six-character additive selection code. (See tables after AP command).	

**Responses:**

<b>"OK"</b>	Good Response. The AccuLoad IV has been authorized for the transaction.
or...	
<b>"NOXX"</b>	The transaction was not authorized.
(NO30 will be returned if the additive specified is not currently allocated to the arm to which the command was directed.)	

**Remarks:**

1. If the additive qualifier (A1A2...) is not used, the Additive selection will operate as currently programmed in the AccuLoad IV. For authorization with additives, only one recipe may be allotted. Additives selected in the qualifier must be programmed for use.
2. If more than one recipe is enabled, the "Select Recipe" prompt will be displayed.

**Constraints:**

The "AU" will reset the transaction done, batch done and keypad pending flags. Additive must be assigned to the arm that is being authorized.

**Special Case:**

None

**Comm. Modes:**

Poll & Authorize

### Command Code AV—Request Additive Volumes by Batch

This command retrieves additive batch volumes from AccuLoad IV.

**Command:**

<b>Current Transaction</b>	
"AV_XX"	Total additive of batch in progress (delivery type for flow controlled additive)
"AV_XX_Z"	Total additive, by volume type, of batch in progress if that type is available
"AV_XX_YY"	Total additive of a specified batch
"AV_XX_YY_Z"	Total additive of specified batch, specified volume type if volume was stored
<b>Local Storage Transaction</b>	
"AV_XX_YY_NNN"	Total additive of a specified batch in an historic transaction
"AV_XX_YY_Z_NNN"	Total additive, volume type, of specified batch in a historic transaction for flow controlled additives
<b>Where:</b> XX = 1 through 24 (Additive #)	
YY = Batch Number Requested	
Z = G (GV Total); N (GST Total); M (Mass Total)	
NNN = number of transactions back into Local Storage to retrieve the data	

**Responses:**

<b>Good Response</b>	
"AV_XX_YY_VVVVV.VVV"	For "AV_XX", "AV_XX_YY"
"AV_XX_Z_VVVVV.VVV"	For "AV_XX_Z"
"AV_XX_YY_Z_VVVVV.VVV"	For "AV_XX_YY_Z"
<b>Local Storage Transaction</b>	
"AV_XX_YY_VVVVV.VVV_NNN"	For "AV_XX_YY_NN"
"AV_XX_YY_Z_VVVVV.VVV_NNN"	For "AV_XX_YY_Z_NNN"
<b>Where:</b> XX = 1 through 24 (Additive #)	
YY = Batch Number Requested	
R = R for Raw or Indicated (IV) Total	
G for Gross (GV) Total	
N for Gross at Standard Temperature (GST) Total	
M for Mass Total	
VVVVV.VVV = Total Additive Batch Volume	
NNN = Number of transactions back into Local Storage to retrieve the data	
or...	
<b>"NOXX"</b>	

**Remarks:** If bays are configured, the AV for the current batch returns the current batch on the arm addressed (or NO39 if no batch is in progress for the arm). For an AV command for a completed batch, the batch argument specified in the batch is the bay-based transaction, and hence may return a batch completed on an arm that is not the arm being addressed.

**Constraints:** Volume units are assumed as the type programmed into AccuLoad IV. Volume types are available for flow controlled additives only.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll and Program

## Command Code BA—Bay Assignment

This command retrieves the position of each arm in the bay.

### Command:

```
"BA"
```

### Responses:

#### Good Response:

```
"BA_A1A2A3A4A5A6"
```

**Where:** An *n* is a character representing the position of arm *n*:

'A' = Bay A

'B' = Bay B

'?' = In transit

or...

```
"NOXX"
```

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll and Program

### Command Code BR—Boolean/Algebraic Variable Read

This command retrieves the Boolean/Algebraic data from AccuLoad IV.

**Command:**

**"BR\_X\_YYY"** Reads the Boolean / Algebraic Variable.

**Where:** X = F—Algebraic Variable (single precision, floating point)  
           B—Boolean Variable  
           T—Timer Variable  
           S—String\* (for revision II & above)

          YYY = Variable number

**Responses:**

**Good Response:**

**"BR\_X\_YYY\_D...D"**

**Where:** X = F—Algebraic Variable (single precision, floating point)  
           B—Boolean Variable  
           T—Timer Variable  
           S—String

          YYY = Variable number  
           D...D = Data; 0 to 255 for Boolean variables and numeric string for algebraic and timer variables

          or...

**"NOXX"**

**Remarks:** String can be up to 32 characters in length.

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll and Program

## Command Code BW—Boolean/Algebraic Variable Write

This command writes to the Boolean/Algebraic registers in AccuLoad IV.

### Command:

"BW\_X\_YYY\_D...D"      Writes to the Boolean/Algebraic Registers.

**Where:** X = F—Algebraic Variable (single precision, floating point)

B—Boolean Variable

T—Timer Variable

A—Set User Alarm (Leave off \_D...D)

S—String\* (revision II & above)

YYY = Variable number

D...D = The data; up to 255 for Boolean variables and numeric floating point string for algebraic and timer variables (no radix point allowed for timer variables)

### Responses:

#### Good Response:

"BR\_X\_YYY\_D...D"

**Where:** X = F—Algebraic Variable (floating point)

B—Boolean Variable

T—Timer Variable

A—Set User Alarm (no \_D...D is returned)

S—String

YYY = Variable number

D...D = The data; up to 255 for Boolean variables and numeric string for algebraic and Timer variables

or...

"NOXX"

**Remarks:**            String can be up to 32 characters in length.

**Constraints:**        None

**Special Case:**        None

**Comm. Modes:**      Polling only, Poll & Authorize, Remote Control, Poll and Program

### Command Code CD—Card Reader Data

This command returns card reader data to the host.

**Command:**

```
"CD"
"CD_C1C2"
"CD_NNN"
"CD_V"

Where: C1C2 (optional) is a two-character bitmap
          NNN (optional) is the number of transactions back in storage
```

**Responses:**

```
Good Response:
"CD_S1_HHHHHHHH"  For CD (and CD_C1C2 when no card read error)
"CD_VVVVVV_K"
"CD_VVVVVV_K"      For CD_V
"CD_S1"            For CD_C1C2 (when card read error)
"CD_HHH_N..._NNN"  For CD_NNN

Where: S1 is a one-character status indication—0 = Data good
          S1 = 1—Timed out (after 3 seconds from the time the card was swiped)
          HHHHHHHH is the data encoded on the card
          NNN is the number of transactions back
          Both 26-bit and 37-bit card data formats are supported
          'VVVVVV' is the tag ID returned for the vehicle, or alternatively the entered response to the
          prompt for Vehicle ID.
          'K' is a terminating character; 'R'—if data comes from a Nedap Reader; 'E' - if entered as a
          prompt response
          For the 26-bit data format, the nine characters of card data are returned as follows:
          002NNXXXX

Where: 002 is fixed and is added to the data read from the card
          NN is the facility code in hexadecimal (decimal range is 0—255)
          XXXX is the card ID in hexadecimal (decimal range is 0—65535)
          For the 37-bit data format, the nine characters of card data can consist of any digits 0-9, A-F
```

**Remarks:** None

**Constraints:** Override bit must be set to control I/O on the card reader.  
 Override bit cleared returns control of the I/O to the card reader.  
 Red and green LED bits both on results in an amber LED on reader.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### CD Command, Optional Character C1

Character		Hex Value			
Char	Hex	0x08 Override I/O Control	0x04 Override I/O Control	0x02 Override I/O Control	0x01 Override I/O Control
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Note:** Override bit must be set to control I/O on card reader. Override bit cleared returns control of these I/O to the card reader.

### CD Command, Optional Character C2

Character		Hex Value			
Char	Hex	0x08 Contact Closed	0x04 Beep	0x02 Red LED On	0x01 Green LED On
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Note:** Red and green LED both on = amber LED on reader.

**Response to CD Command, Character S1**

Character		Hex Value			
Char	Hex	0x08 Reserved for Future Use	0x04 Reserved for Future Use	0x02 Card Validated	0x01 Card Read Error
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

## Command Code CF—AccuLoad Configuration

This command provides the hardware configuration of the requested AccuLoad. The first character is a 1 if an A4B is installed in the unit and communicating. The second character is always a '1'.

### Command:

```
"CF"
```

### Responses:

#### Good Response:

```
"CF_XY"
```

**Where:** X = A4B status

Y = Always '1'

or...

```
"NOXX"
```

### Remarks:

These parameters may take one of two values. An ASCII zero will indicate that the feature is not present, while an ASCII 1 will indicate that the feature is present.

**Note:** A host should allow for future expansion of the argument field in this response as additional optional features may be added in later revisions.

Example: An AccuLoad IV-QT is configured as a 6-product ratio blender. The response should be as follows: CF 11.

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll and Program

### Command Code CP—Request Contaminant Percentage

This command requests the percentage of contaminant from the AccuLoad IV.

**Command:**

<b>Current Transaction</b>	
"CP"	Current percentage of contaminant for the current batch
"CP_YY"	Percentage of contaminant for a specified batch
<b>Local Storage</b>	
"CP_YY_NNN"	Returns the requested percentage of contaminant for a previously completed batch
<b>Where:</b> YY = Batch Number (01—10)	
NNN = Number of transactions back into Local Storage to retrieve data	

**Responses:**

<b>Current Transaction</b>	
"CP_YY_XXX.X"	Good response
<b>Local Storage</b>	
"CP_YY_XXX.X_NNN"	Good response
<b>Where:</b> YY = Batch Number (01—10)	
XXX.X = Percentage of contaminant	
NNN = Number of transactions back into Local Storage to retrieve data	
or...	
"NOXX"	The percentage of contaminant was not read
<b>Where:</b> XX = "03" Value rejected	
= "05" No transaction ever done	
= "19" Option not installed	

**Remarks:** None

**Constraints:** Applies to arms configured as unloading arms only. Other arm configurations will result in NO19 being returned.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code DA—Release Keypad and Display

This command returns the control of the keypad and display to the AccuLoad IV.

### Command:

"DA"

### Responses:

**"OK"**            **Good Response.** Keypad and display have been released to AccuLoad IV and the keypad data pending flag is reset.

or...

**"NOXX"**            The keypad and display were not released.

**Remarks:**            None

**Constraints:**        A "NO01" response will be returned if another arm is in the program mode locally or via communications.

**Special Case:**        None

**Comm. Modes:**        Poll & Authorize or Remote Control

## Command Code DD—Delete Driver Card Data

This command removes a driver card from the list of valid cards in the AccuLoad IV. It modifies the current run database but does not update the table in non-volatile memory. After any combination of DI and DD commands are sent, the DU command should be used to make the changes permanent by writing the data to non-volatile (flash) memory.

### Command:

```
"DD_HHHH...H"
```

**Where:** HHHH...H is the card value of the record to delete

### Responses:

#### Good Response:

```
"OK"
```

or...

```
"NOXX"
```

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code DI—Insert Driver Card Data

The DI command inserts (adds) a driver card to the list of valid cards in the AccuLoad IV. It modifies the current run database but does not update the table in non-volatile memory. After any combination of DI and DD commands are sent, the DU command should be used to make the changes permanent by writing the data for non-volatile (flash) memory.

### Command:

```
"DI_HHHH...H"
```

**Where:** HHHH...H is the card data value for the record to be inserted

### Responses:

**Good Response:**

```
"OK"
```

or...

```
"NOXX"
```

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code DQ—Query Driver Card Data

The DQ command returns the card data for the specified record index. This command is included to allow a host to retrieve the list of valid cards from the AccuLoad IV. Note that the index for any one card entry may change when records have been inserted or deleted, as they are maintained in sorted order internally.

**Command:**

```
"DQ_NNN"  
  
Where: NNN is the index of the card database record that is being requested
```

**Responses:**

```
Good Response:  
  
"DQ_HHHH...H"  
  
Where: HHHH...H is the card data for the requested record  
  
or...  
  
"NOXX"
```

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code DS—Display Density Sample

This command retrieves one of ten density samples from the AccuLoad IV for the current batch.

### Command:

**"DS\_X"** For the current batch — returns the density sample requested

**Where:** X = Specific Density Sample (0 — 9)

### Responses:

#### Good Response:

**"DS\_X\_VVVV.V"**

**Where:** X = 0—9, # of density sample

VVVV.V = Density of sample in programmed density units

or...

**"NOXX"**

**Where:** "XX" = "00" Invalid Command

= "03" Value out of Range

= "37" Data Not Available

**Remarks:** None

**Constraints:** Only available with Unloading arms.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code DU—Update Driver Database in Non-Volatile Memory

The DU command rebuilds the driver card data table in non-volatile memory, after freeing any memory used by deleted records and re-sorting the table by card number. This command is to be used by the host after the host has issued any combination of DI or DD commands to modify the driver card database at the AccuLoad IV. Failure to issue this command after modifying the database via DI or DD will cause those changes to be lost if the AccuLoad is powered down.

### Command:

```
"DU"
```

### Responses:

**Good Response:**

```
"OK"
```

or...

```
"NOXX"
```

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code DY—Request Dynamic Display Values

This command retrieves a current dynamic display value from the AccuLoad IV.

### Command:

**"DY\_ddxx"**

**Where:** dd = dynamic display type

SY = system

IN = injector

P1 = product #1

P2 = product #2

P3 = product #3

P4 = product #4

P5 = product #5

P6 = product #6

CP = current product (straight and sequential blending only)

RR= recipe number (01—50 for a specific recipe)

Bz = batch, where "z" is 1...9 for batches 1-9, and "A" for batch 10

CB = current batch

CR = current recipe

TR = transaction

FA = flow controlled additives

xx = variable number to access

### Responses:

**"DY\_V..V\_D..D"** Good Response.

**Where:** V..V = the value of the variable

D..D = description of the variable (may contain spaces)

**"NOXX"** Requested display not returned.

<b>Remarks:</b>	<p>No response exceeds 31 characters.</p> <p>For bay configurations, the following information applies:</p> <ol style="list-style-type: none"><li>1. All additives on the bay can be accessed via any valid arm address located on the bay.</li><li>2. Batch values are for the bay-based batch.</li><li>3. Not all transaction "DY" values are available when bays are configured. For example: average temperature, pressure, meter factor, etc.</li></ol>
<b>Constraints:</b>	<p>NO06 will be returned if the requested batch has not been delivered (Bz qualifier).</p> <p>NO05 will be returned if there is no transaction in progress and no transaction has ever been done (TR qualifier).</p> <p>NO30 will be returned if a product or recipe is requested which is not currently allocated to the arm to which the command was directed.</p> <p>NO31 will be returned if the command format does not match the current configuration for the arm.</p>
<b>Special Case:</b>	None
<b>Comm. Modes:</b>	Polling only, Poll & Authorize, Remote Control, Poll and Program

## System "DY\_SYxx" Dynamic Display Values

Index (xx)	Description	Response	
00	Current Flow Rate Units/Min, Arm 1	DY Flow (Arm 1)	XXXXX.X Gal/Min
01	Current Flow Rate Units/Min, Arm 2	DY Flow (Arm 2)	XXXXX.X Gal/Min
02	Current Flow Rate Units/Min, Arm 3	DY Flow (Arm 3)	XXXXX.X Gal/Min
03	Current Flow Rate Units/Min, Arm 4	DY Flow (Arm 4)	XXXXX.X Gal/Min
04	Current Flow Rate Units/Min, Arm 5	DY Flow (Arm 5)	XXXXX.X Gal/Min
05	Current Flow Rate Units/Min, Arm 6	DY Flow (Arm 6)	XXXXX.X Gal/Min
06	Current Flow Rate Units/Hr, Arm 1	DY Flow (Arm 1)	XXXXXXXX.X Gal/Hr
07	Current Flow Rate Units/Hr, Arm 2	DY Flow (Arm 2)	XXXXXXXX.X Gal/Hr
08	Current Flow Rate Units/Hr, Arm 3	DY Flow (Arm 3)	XXXXXXXX.X Gal/Hr
09	Current Flow Rate Units/Hr, Arm 4	DY Flow (Arm 4)	XXXXXXXX.X Gal/Hr
10	Current Flow Rate Units/Hr, Arm 5	DY Flow (Arm 5)	XXXXXXXX.X Gal/Hr
11	Current Flow Rate Units/Hr, Arm 6	DY Flow (Arm 6)	XXXXXXXX.X Gal/Hr
12	Current Recipe Name, Arm 1	DY Recipe (Arm 1)	XXXXXXXXXX
13	Current Recipe Name, Arm 2	DY Recipe (Arm 2)	XXXXXXXXXX
14	Current Recipe Name, Arm 3	DY Recipe (Arm 3)	XXXXXXXXXX
15	Current Recipe Name, Arm 4	DY Recipe (Arm 4)	XXXXXXXXXX
16	Current Recipe Name, Arm 5	DY Recipe (Arm 5)	XXXXXXXXXX
17	Current Recipe Name, Arm 6	DY Recipe (Arm 6)	XXXXXXXXXX
18	Current Preset, Arm 1	DY Preset (Arm 1)	XXXXXX Gal
19	Current Preset, Arm 2	DY Preset (Arm 2)	XXXXXX Gal
20	Current Preset, Arm 3	DY Preset (Arm 3)	XXXXXX Gal
21	Current Preset, Arm 4	DY Preset (Arm 4)	XXXXXX Gal
22	Current Preset, Arm 5	DY Preset (Arm 5)	XXXXXX Gal
23	Current Preset, Arm 6	DY Preset (Arm 6)	XXXXXX Gal
24	Current Delivered Volume, Arm 1	DY Arm 1 Delivered	XXXXXX.XX Gal
25	Current Delivered Volume, Arm 2	DY Arm 2 Delivered	XXXXXX.XX Gal
26	Current Delivered Volume, Arm 3	DY Arm 3 Delivered	XXXXXX.XX Gal
27	Current Delivered Volume, Arm 4	DY Arm 4 Delivered	XXXXXX.XX Gal
28	Current Delivered Volume, Arm 5	DY Arm 5 Delivered	XXXXXX.XX Gal
29	Current Delivered Volume, Arm 6	DY Arm 6 Delivered	XXXXXX.XX Gal
30	Current Remaining Volume, Arm 1	DY Arm 1 Remaining	XXXXXX.XX Gal
31	Current Remaining Volume, Arm 2	DY Arm 2 Remaining	XXXXXX.XX Gal
32	Current Remaining Volume, Arm 3	DY Arm 3 Remaining	XXXXXX.XX Gal
33	Current Remaining Volume, Arm 4	DY Arm 4 Remaining	XXXXXX.XX Gal
34	Current Remaining Volume, Arm 5	DY Arm 5 Remaining	XXXXXX.XX Gal
35	Current Remaining Volume, Arm 6	DY Arm 6 Remaining	XXXXXX.XX Gal
36	Time of Last Power Fail	DY Pwr Fail	MM-DD-YY HH:MM:SS

## Injector (DY INxx) Dynamic Displays

**Note:** If Injectors 1 through 4 are flow control type, responses to DY\_INXX appear in the table immediately following the table below.

Index (xx)	Description	Response	
00	Injector 1 Current Pulse Rate	DY Inj 1 Cal	XXXX.XX
01	Injector 2 Current Pulse Rate	DY Inj 2 Cal	XXXX.XX
02	Injector 3 Current Pulse Rate	DY Inj 3 Cal	XXXX.XX
03	Injector 4 Current Pulse Rate	DY Inj 4 Cal	XXXX.XX
04	Injector 5 Current Pulse Rate	DY Inj 5 Cal	XXXX.XX
05	Injector 6 Current Pulse Rate	DY Inj 6 Cal	XXXX.XX
06	Injector 7 Current Pulse Rate	DY Inj 7 Cal	XXXX.XX
07	Injector 8 Current Pulse Rate	DY Inj 8 Cal	XXXX.XX
08	Injector 9 Current Pulse Rate	DY Inj 9 Cal	XXXX.XX
09	Injector 10 Current Pulse Rate	DY Inj 10 Cal	XXXX.XX
10	Injector 11 Current Pulse Rate	DY Inj 11 Cal	XXXX.XX
11	Injector 12 Current Pulse Rate	DY Inj 12 Cal	XXXX.XX
12	Injector 13 Current Pulse Rate	DY Inj 13 Cal	XXXX.XX
13	Injector 14 Current Pulse Rate	DY Inj 14 Cal	XXXX.XX
14	Injector 15 Current Pulse Rate	DY Inj 15 Cal	XXXX.XX
15	Injector 16 Current Pulse Rate	DY Inj 16 Cal	XXXX.XX
16	Injector 17 Current Pulse Rate	DY Inj 17 Cal	XXXX.XX
17	Injector 18 Current Pulse Rate	DY Inj 18 Cal	XXXX.XX
18	Injector 19 Current Pulse Rate	DY Inj 19 Cal	XXXX.XX
19	Injector 20 Current Pulse Rate	DY Inj 20 Cal	XXXX.XX
20	Injector 21 Current Pulse Rate	DY Inj 21 Cal	XXXX.XX
21	Injector 22 Current Pulse Rate	DY Inj 22 Cal	XXXX.XX
22	Injector 23 Current Pulse Rate	DY Inj 23 Cal	XXXX.XX
23	Injector 24 Current Pulse Rate	DY Inj 24 Cal	XXXX.XX
24	Injector 1 Programmed Pulse Rate	DY Inj 1 Prg	XXXX.XX
25	Injector 2 Programmed Pulse Rate	DY Inj 2 Prg	XXXX.XX
26	Injector 3 Programmed Pulse Rate	DY Inj 3 Prg	XXXX.XX
27	Injector 4 Programmed Pulse Rate	DY Inj 4 Prg	XXXX.XX
28	Injector 5 Programmed Pulse Rate	DY Inj 5 Prg	XXXX.XX
29	Injector 6 Programmed Pulse Rate	DY Inj 6 Prg	XXXX.XX
30	Injector 7 Programmed Pulse Rate	DY Inj 7 Prg	XXXX.XX
31	Injector 8 Programmed Pulse Rate	DY Inj 8 Prg	XXXX.XX
32	Injector 9 Programmed Pulse Rate	DY Inj 9 Prg	XXXX.XX
33	Injector 10 Programmed Pulse Rate	DY Inj 10 Prg	XXXX.XX
34	Injector 11 Programmed Pulse Rate	DY Inj 11 Prg	XXXX.XX
35	Injector 12 Programmed Pulse Rate	DY Inj 12 Prg	XXXX.XX
36	Injector 13 Programmed Pulse Rate	DY Inj 13 Prg	XXXX.XX
37	Injector 14 Programmed Pulse Rate	DY Inj 14 Prg	XXXX.XX
38	Injector 15 Programmed Pulse Rate	DY Inj 15 Prg	XXXX.XX
39	Injector 16 Programmed Pulse Rate	DY Inj 16 Prg	XXXX.XX
40	Injector 17 Programmed Pulse Rate	DY Inj 17 Prg	XXXX.XX
41	Injector 18 Programmed Pulse Rate	DY Inj 18 Prg	XXXX.XX
42	Injector 19 Programmed Pulse Rate	DY Inj 19 Prg	XXXX.XX
43	Injector 20 Programmed Pulse Rate	DY Inj 20 Prg	XXXX.XX
44	Injector 21 Programmed Pulse Rate	DY Inj 21 Prg	XXXX.XX
45	Injector 22 Programmed Pulse Rate	DY Inj 22 Prg	XXXX.XX
46	Injector 23 Programmed Pulse Rate	DY Inj 23 Prg	XXXX.XX
47	Injector 24 Programmed Pulse Rate	DY Inj 24 Prg	XXXX.XX

## Injector DY INxx Responses for Flow Controlled Injector Type

Index (xx)	Description	Response
00	Injector 1 Current Pulse Rate	DY Meter Inj 1      XXXX.X Gal/per min
01	Injector 2 Current Pulse Rate	DY Meter Inj 2      XXXX.X Gal/per min
02	Injector 3 Current Pulse Rate	DY Meter Inj 3      XXXX.X Gal/per min
03	Injector 4 Current Pulse Rate	DY Meter Inj 4      XXXX.X Gal/per min

## Product "DY\_PNxx" Dynamic Display Values

Index (xx)	Description	Response
00	Current Flow Rate, Units/Minute	DY Flow      XXXXX.X Gal/Min
01	Current Flow Rate, Units/Hour	DY Flow      XXXXXXX.X Gal/Hr
02	Batch Average Temperature	DY Batch Avg Temp      SXXXX.X F
03	Batch Average Density	DY Batch Avg Dens      XXXX.X Kg/M3
04	Batch Average API	DY Batch Avg API      SXXX.X
05	Batch Average Reference Density	DY Avg Ref Dens      XXXX.X Lb/F3
06	Batch Average Relative Density	DY Avg Rel Dens      X.XXXX
07	Batch Average Pressure	DY Batch Avg Press      XXXX.XX PSI
08	Batch Average Vapor Pressure	DY Avg Vapor Press      XXXX.XX PSI
09	Batch Average Meter Factor	DY Batch Avg Mtr Factor      X.XXXXX
10	Batch Average CTL	DY Batch Avg CTL      X.XXXXX
11	Batch Average CPL	DY Batch Avg CPL      X.XXXXX
12	Current Temperature	DY Temperature      SXXXX.X F
13	Current Density	DY Density      SXXXX.X Kg/M3
14	Current Meter Factor	DY Cur Mtr Factor      X.XXXXX
15	Current Valve Requested Position	DY      Valve Requested Close
16	Current Percentage of Batch	DY Actual Blend      XXX %
17	Desired Percentage of Batch	DY Desired Blend      XXX %
18	Current Batch Raw Volume	DY IV Batch      XXXXXXX.XX Gal
19	Current Batch Gross Volume	DY GV Batch      XXXXXXX.XX Gal
20	Current Batch GST Volume	DY GST Batch      XXXXXXX.XX Gal
21	Current Batch GSV Volume	DY GSV Batch      XXXXXXX.XX Gal
22	Current Batch Mass Total	DY Mass Batch      XXXXXXX.XX Lbs
23	Transaction Raw Volume	DY IV Trans      XXXXXXX.XX Gal
24	Transaction Gross Volume	DY GV Trans      XXXXXXX.XX Gal
25	Transaction GST Volume	DY GST Trans      XXXXXXX.XX Gal
26	Transaction GSV Volume	DY GSV Trans      XXXXXXX.XX Gal
27	Transaction Mass Total	DY Mass Trans      XXXXXXX.XX Lbs
28	Current Reference Density (Calculated)	DY Cur Ref Dens      XXXX.X Lb/F3
29	Batch Average CTPL	DY Batch Avg CTPL      X.XXXXX
30	Instantaneous Blend Percentage	DY Inst Blend      XXX.XX%
31	Deviation Count	DY Deviation Cnt      XXXXXXX.X
32	Ref Dens @ Ref Dens Temp	DY Ref Dens@DensTe      XXXX.XX Lb/Ft3
33**	Avg Rel Dens@60F & Prs	DY Avg Rel Dens@60F & Prs      X.XXXXX
34	Ethanol Grade (%v/v)	DY Ethanol Grade (%v/v)      X.XXX

\*\* E tables only (relative density @ 60° F and current pressure) used in CPL calculation.

### Recipe "DY\_DDxx" Dynamic Display Values

Index (xx)	Description	Response
00	Recipe Name and Number	DY Recipe                    XX—XXXXXXXX (1)
01	Transaction Indicated Volume	DY IV Recipe                XXXX.XX Gal
02	Transaction Gross Volume	DY GV Recipe                XXXX.XX Gal
03	Transaction GST Volume	DY GST Recipe               XXXX.XX Gal
04	Transaction GSV Volume	DY GSV Recipe               XXXX.XX Gal
05	Transaction Mass Total	DY Mass Recipe               XXXXX.XX lb

### Batch "DY\_BNxx" Dynamic Display Values

Index (xx)	Description	Response
00	Recipe Name and Number	DY Recipe                    XX—XXXXXXXX (1)
01	Indicated (Raw) Batch Volume	DY IV Batch                 XXXXXXXX.XX Gal
02	Gross Batch Volume	DY GV Batch                 XXXXXXXX.XX Gal
03	GST Batch Volume	DY GST Batch                XXXXXXXX.XX Gal
04	GSV Batch Volume	DY GSV Batch                XXXXXXXX.XX Gal
05	Mass Batch Total	DY Mass Batch               XXXXXXXX.XX lb
06	Batcg Average Temperature	DY Batch Avg Temp         SXXXX.XX F
07	Batch Average Density	DY Batch Avg Dens         XXX.XX Lb/F3
08	Batch Average Pressure	DY Batch Avg Pres         XXXX.XX PSI
09	Batch Average Meter Factor	DY Batch Avg Mtr Factor    X.XXXXX
10	Batch Average CTL	DY Batch Avg CTL           X.XXXXX
11	Batch Average CPL	DY Batch Abv CPL           X.XXXXX
12	Additive #1 Batch Volume	DY Add 1 Batch             XXXXXXXX.XXX
13	Additive #2 Batch Volume	DY Add 2 Batch             XXXXXXXX.XXX
14	Additive #3 Batch Volume	DY Add 3 Batch             XXXXXXXX.XXX
15	Additive #4 Batch Volume	DY Add 4 Batch             XXXXXXXX.XXX
16	Additive #5 Batch Volume	DY Add 5 Batch             XXXXXXXX.XXX
17	Additive #6 Batch Volume	DY Add 6 Batch             XXXXXXXX.XXX
18	Additive #7 Batch Volume	DY Add 7 Batch             XXXXXXXX.XXX
19	Additive #8 Batch Volume	DY Add 8 Batch             XXXXXXXX.XXX
20	Additive #9 Batch Volume	DY Add 9 Batch             XXXXXXXX.XXX
21	Additive #10 Batch Volume	DY Add 10 Batch            XXXXXXXX.XXX
22	Additive #11 Batch Volume	DY Add 11 Batch            XXXXXXXX.XXX
23	Additive #12 Batch Volume	DY Add 12 Batch            XXXXXXXX.XXX
24	Additive #13 Batch Volume	DY Add 13 Batch            XXXXXXXX.XXX
25	Additive #14 Batch Volume	DY Add 14 Batch            XXXXXXXX.XXX
26	Additive #15 Batch Volume	DY Add 15 Batch            XXXXXXXX.XXX
27	Additive #16 Batch Volume	DY Add 16 Batch            XXXXXXXX.XXX
28	Additive #17 Batch Volume	DY Add 17 Batch            XXXXXXXX.XXX
29	Additive #18 Batch Volume	DY Add 18 Batch            XXXXXXXX.XXX
30	Additive #19 Batch Volume	DY Add 19 Batch            XXXXXXXX.XXX
31	Additive #20 Batch Volume	DY Add 20 Batch            XXXXXXXX.XXX
32	Additive #21 Batch Volume	DY Add 21 Batch            XXXXXXXX.XXX
33	Additive #22 Batch Volume	DY Add 22 Batch            XXXXXXXX.XXX
34	Additive #23 Batch Volume	DY Add 23 Batch            XXXXXXXX.XXX
35	Additive #24 Batch Volume	DY Add 24 Batch            XXXXXXXX.XXX

## Transaction "DY\_TRxx" Dynamic Display Values

Index (xx)	Description	Response
00	Recipe Name and Number	DY Multiple Recipes
01	Indicated (Raw) Transaction Volume	DY IV Trans           XXXXXXXX.XX Gal
02	Gross Transaction Volume	DY GV Trans           XXXXXXXX.XX Gal
03	GST Transaction Volume	DY GST Trans          XXXXXXXX.XX Gal
04	GSV Transaction Volume	DY GSV Trans          XXXXXXXX.XX Gal
05	Mass Transaction Totals	DY Mass Trans         XXXXXXXX.XX Gal
06	Transaction Average Temperature	DY Trans Avg Temp     SXXXX.X F
07	Transaction Average Density	DY Trans Avg Dens     XXXX.X Lb/F3
08	Transaction Average Pressure	DY Trans Avg Pres     XXXX.X PSI
09	Transaction Average Meter Factor	DY Trans Avg Mtr Factor                   X.XXXXX
10	Transaction Average CTL	DY Trans Avg CTL       X.XXXXX
11	Transaction Average CPL	DY Trans Avg CPL       X.XXXXX
12	Additive #1 Transaction Volume	DY Add 1 Trans         XXXXXXXXX.XXX
13	Additive #2 Transaction Volume	DY Add 2 Trans         XXXXXXXXX.XXX
14	Additive #3 Transaction Volume	DY Add 3 Trans         XXXXXXXXX.XXX
15	Additive #4 Transaction Volume	DY Add 4 Trans         XXXXXXXXX.XXX
16	Additive #5 Transaction Volume	DY Add 5 Trans         XXXXXXXXX.XXX
17	Additive #6 Transaction Volume	DY Add 6 Trans         XXXXXXXXX.XXX
18	Additive #7 Transaction Volume	DY Add 7 Trans         XXXXXXXXX.XXX
19	Additive #8 Transaction Volume	DY Add 8 Trans         XXXXXXXXX.XXX
20	Additive #9 Transaction Volume	DY Add 9 Trans         XXXXXXXXX.XXX
21	Additive #10 Transaction Volume	DY Add 10 Trans        XXXXXXXXX.XXX
22	Additive #11 Transaction Volume	DY Add 11 Trans        XXXXXXXXX.XXX
23	Additive #12 Transaction Volume	DY Add 12 Trans        XXXXXXXXX.XXX
24	Additive #13 Transaction Volume	DY Add 13 Trans        XXXXXXXXX.XXX
25	Additive #14 Transaction Volume	DY Add 14 Trans        XXXXXXXXX.XXX
26	Additive #15 Transaction Volume	DY Add 15 Trans        XXXXXXXXX.XXX
27	Additive #16 Transaction Volume	DY Add 16 Trans        XXXXXXXXX.XXX
28	Additive #17 Transaction Volume	DY Add 17 Trans        XXXXXXXXX.XXX
29	Additive #18 Transaction Volume	DY Add 18 Trans        XXXXXXXXX.XXX
30	Additive #19 Transaction Volume	DY Add 19 Trans        XXXXXXXXX.XXX
31	Additive #20 Transaction Volume	DY Add 20 Trans        XXXXXXXXX.XXX
32	Additive #21 Transaction Volume	DY Add 21 Trans        XXXXXXXXX.XXX
33	Additive #22 Transaction Volume	DY Add 22 Trans        XXXXXXXXX.XXX
34	Additive #23 Transaction Volume	DY Add 23 Trans        XXXXXXXXX.XXX
35	Additive #24 Transaction Volume	DY Add 24 Trans        XXXXXXXXX.XXX

## Flow Controlled Additives “DY\_FAx” Dynamic Display Values

Index (xx)	Description	Response	
00	Additive 1 Current Batch IV (Raw)	DY A1 IV Batch	XXXXX.XXX Gal
01	Additive 1 Current Batch GV (Gross)	DY A1 GV Batch	XXXXX.XXX Gal
02	Additive 1 Current Batch GST Volume	DY A1 GST Batch	XXXXX.XXX Gal
03	Additive 1 Current Batch Mass Total	DY A1 Mass Batch	XXXXXX.XXX lb
04	Additive 1 Current Batch Temperature	DY A1 Current Temp	XXX.X F
05	Additive 1 Batch Average Temperature	DY A1 Batch Avg Temp	XXX.X F
06	Additive 1 Batch Average Density	DY A1 Batch Avg Den	XXX.X Lb/ft3
07	Additive 1 Batch Average CTL	DY A1 Batch Avg CTL	X.XXXX
08	Additive 1 IV (Raw) Transaction Total	DY A1 IV Trans	XXXXXX.XXX Gal
09	Additive 1 GV (Gross) Trans Total	DY A1 GV Trans	XXXXXX.XXX Gal
10	Additive 1 GST Transaction Total	DY A1 GST Trans	XXXXXX.XXX Gal
11	Additive 1 Mass Transaction Total	DY A1 Mass Trans	XXXXXX.XXX lb
12	Additive 2 Current Batch IV (Raw)	DY A2 IV Batch	XXXXX.XXX Gal
13	Additive 2 Current Batch GV (Gross)	DY A2 GV Batch	XXXXX.XXX Gal
14	Additive 2 Current Batch GST Volume	DY A2 GST Batch	XXXXX.XXX Gal
15	Additive 2 Current Batch Mass Total	DY A2 Mass Batch	XXXXXX.XXX lb
16	Additive 2 Current Batch Temperature	DY A2 Current Temp	XXX.X F
17	Additive 2 Batch Average Temperature	DY A2 Batch Avg Temp	XXX.X F
18	Additive 2 Batch Average Density	DY A2 Batch Avg Den	XXX.X Lb/ft3
19	Additive 2 Batch Average CTL	DY A2 Batch Avg CTL	X.XXXX
20	Additive 2 IV (Raw) Transaction Total	DY A2 IV Trans	XXXXXX.XXX Gal
21	Additive 2 GV (Gross) Trans Total	DY A2 GV Trans	XXXXXX.XXX Gal
22	Additive 2 GST Transaction Total	DY A2 GST Trans	XXXXXX.XXX Gal
23	Additive 2 Mass Transaction Total	DY A2 Mass Trans	XXXXXX.XXX lb
24	Additive 3 Current Batch IV (Raw)	DY A3 IV Batch	XXXXX.XXX Gal
25	Additive 3 Current Batch GV (Gross)	DY A3 GV Batch	XXXXX.XXX Gal
26	Additive 3 Current Batch GST Volume	DY A3 GST Batch	XXXXX.XXX Gal
27	Additive 3 Current Batch Mass Total	DY A3 Mass Batch	XXXXXX.XXX lb
28	Additive 3 Current Batch Temperature	DY A3 Current Temp	XXX.X F
29	Additive 3 Batch Average Temperature	DY A3 Batch Avg Temp	XXX.X F
30	Additive 3 Batch Average Density	DY A3 Batch Avg Den	XXX.X Lb/ft3
31	Additive 3 Batch Average CTL	DY A3 Batch Avg CTL	X.XXXX
32	Additive 3 IV (Raw) Transaction Total	DY A3 IV Trans	XXXXXX.XXX Gal
33	Additive 3 GV (Gross) Trans Total	DY A3 GV Trans	XXXXXX.XXX Gal
34	Additive 3 GST Transaction Total	DY A3 GST Trans	XXXXXX.XXX Gal
35	Additive 3 Mass Transaction Total	DY A3 Mass Trans	XXXXXX.XXX lb
36	Additive 4 Current Batch IV (Raw)	DY A4 IV Batch	XXXXX.XXX Gal
37	Additive 4 Current Batch GV (Gross)	DY A4 GV Batch	XXXXX.XXX Gal
38	Additive 4 Current Batch GST Volume	DY A4 GST Batch	XXXXX.XXX Gal
39	Additive 4 Current Batch Mass Total	DY A4 Mass Batch	XXXXXX.XXX lb
40	Additive 4 Current Batch Temperature	DY A4 Current Temp	XXX.X F
41	Additive 4 Batch Average Temperature	DY A4 Batch Avg Temp	XXX.X F
42	Additive 4 Batch Average Density	DY A4 Batch Avg Den	XXX.X Lb/ft3
43	Additive 4 Batch Average CTL	DY A4 Batch Avg CTL	X.XXXX
44	Additive 4 IV (Raw) Transaction Total	DY A4 IV Trans	XXXXXX.XXX Gal
45	Additive 4 GV (Gross) Trans Total	DY A4 GV Trans	XXXXXX.XXX Gal
46	Additive 4 GST Transaction Total	DY A4 GST Trans	XXXXXX.XXX Gal
47	Additive 4 Mass Transaction Total	DY A4 Mass Trans	XXXXXX.XXX lb

### Command Code EA—Enquire Alarms

This command requests the alarm status from the AccuLoad IV (short form).

**Command:**

**"EA\_DD"** (Request alarm status of directory)

**Where:** DD = directory specification

- SY = System
- P1 = Product 1
- P2 = Product 2
- P3 = Product 3
- P4 = Product 4
- P5 = Product 5
- P6 = Product 6
- AR = Arm
- IN = Injector
- M1 = Meter 1
- M2 = Meter 2 (ratio, hybrid blending configuration only)
- M3 = Meter 3 (ratio, hybrid blending configuration only)
- M4 = Meter 4 (ratio, hybrid blending configuration only)
- M5 = Meter 5 (ratio, hybrid blending configuration only)
- M6 = Meter 6 (ratio, hybrid blending configuration only)
- RR = Recipe

**Responses:**

<b>"EA_SY_A1A2A3A4A5A6A8A9A10A11"</b>	<b>Good Response.</b> Eleven characters for System
<b>"EA_Px_A1A2A3A4"</b>	<b>Good Response.</b> Four characters for Products
<b>"EA_AR_A1A2A3"</b>	<b>Good Response.</b> Three characters for Arm
<b>"EA_IN_A1A2A3 ... A83"</b>	<b>Good Response.</b> Eighty-three characters for Additive Injectors
<b>"EA_Mx_A1A2A3"</b>	<b>Good Response.</b> Three characters for Meter
<b>"EA_RR_A1"</b>	<b>Good Response.</b> One character for Recipe
or...	
<b>"NOXX"</b>	Alarm status cannot be reported

**Remarks:** Allow for additional characters to be added to the end when alarms are added in the future.

**Constraints:** NO30 will be returned if the meter, product or additive specified is not currently configured to the arm which the request was sent.

NO31 will be returned if the command format does not match the current configuration for the arm.

**Special Case:** None.

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program.

### Enquire Alarms Response—Decoding

Each of the characters (A1, A2, A3 etc.) in the response indicates the state of 4 separate alarms. Each character can be one of sixteen values representing every possible combination of the four alarms. If none of the four alarms is active, a zero character will be returned and if all four alarms are active, a "?" character will be returned. See Appendix IV for additional detail and the following table for each possible return character and value.

Character (Hex Value)	Alarm States (X=On, Blank=Off)			
	Alarm #4	Alarm #3	Alarm #2	Alarm #1
0 (0x30)	Reserved	Reserved	Reserved	Reserved
1 (0x31)	Reserved	Reserved	Reserved	X
2 (0x32)	Reserved	Reserved	X	Reserved
3 (0x33)	Reserved	Reserved	X	X
4 (0x34)	Reserved	X	Reserved	Reserved
5 (0x35)	Reserved	X	Reserved	X
6 (0x36)	Reserved	X	X	Reserved
7 (0x37)	Reserved	X	X	X
8 (0x38)	X	Reserved	Reserved	Reserved
9 (0x39)	X	Reserved	Reserved	X
: (0x3A)	X	Reserved	X	Reserved
; (0x3B)	X	Reserved	X	X
< (0x3C)	X	X	Reserved	Reserved
= (0x3D)	X	X	Reserved	X
> (0x3E)	X	X	X	Reserved
? (0x3F)	X	X	X	X

**Enquire Alarms Response—System**

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A1				Firmware Error
A2	A4M Comm Failure	System Prog Error	Watchdog	Internal Error
A3	Communication Error	Power Fail	Passcode Reset	A4B Comm Failure
A4	User Alarm 1	Printer Fault	Shared Printer Error	Reserved
A5	User Alarm 5	User Alarm 4	User Alarm 3	User Alarm 2
A6	User Alarm 9	User Alarm 8	User Alarm 7	User Alarm 6
A7	Add-Pak #1 Diagnostic	Add-Pak #2 Power Fail	Add-Pak #1 Power Fail	User Alarm 10
A8	A4I #1 Comm Fault	A4I #2 Autodetect Fault	A4I #1 Autodetect Fault	Add-Pak #2 Diagnostic
A9	Excess Bay Arms	HMI B Fault	HMI A/Node Fault	A4I #2 Comm Fault
A10	Sening Comm Fault	Network Printer Fault	Reserved	Data Retention Fault
A11	Reserved	Reserved	Email Fault	Factory Diag Fault

**Enquire Alarms Response—Product**

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A1	High Flow	High Density	Back Pressure	Product Program Error
A2	Low Flow	Low Density Alarm	High Temperature	High Pressure
A3	Overrun Alarm	Zero Flow	Low Temperature	Low Pressure
A4	Product Stop	Blend Low	Blend High	Block Valve

**Enquire Alarms Response—Arm**

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A1	Arm Ticket Alarm	Arm Over-run	Arm Zero Flow Fault	Arm Programming Error
A2	Storage Full Alarm	Reserved	Additive Clean Line Alarm	Product Clean Line Alarm
A3	Max Arms Alarm	Report Storage Full	Card Removed Alarm	A4B Comm Failure

**Enquire Alarms Response - Injector**

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A1	Injector 4 Feedback	Injector 3 Feedback	Injector 2 Feedback	Injector 1 Feedback
A2	Injector 8 Feedback	Injector 7 Feedback	Injector 6 Feedback	Injector 5 Feedback
A3	Injector 12 Feedback	Injector 11 Feedback	Injector 10 Feedback	Injector 9 Feedback
A4	Injector 16 Feedback	Injector 15 Feedback	Injector 14 Feedback	Injector 13 Feedback
A5	Injector 20 Feedback	Injector 19 Feedback	Injector 18 Feedback	Injector 17 Feedback

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A6	Injector 24 Feedback	Injector 23 Feedback	Injector 22 Feedback	Injector 21 Feedback
A7	Injector 4 Comm Error	Injector 3 Comm Error	Injector 2 Comm Error	Injector 1 Comm
A8	Injector 8 Comm Error	Injector 7 Comm Error	Injector 6 Comm Error	Injector 5 Comm Error
A9	Injector 12 Comm Error	Injector 11 Comm Error	Injector 10 Comm Error	Injector 9 Comm Error
A10	Injector 16 Comm Error	Injector 15 Comm Error	Injector 14 Comm Error	Injector 13 Comm Error
A11	Injector 20 Comm Error	Injector 19 Comm Error	Injector 18 Comm Error	Injector 17 Comm Error
A12	Injector 24 Comm Error	Injector 23 Comm Error	Injector 22 Comm Error	Injector 21 Comm Error
A13	Injector 4 Low Additive Error	Injector 3 Low Additive Error	Injector 2 Low Additive Error	Injector 1 Low Additive Error
A14	Injector 8 Low Additive Error	Injector 7 Low Additive Error	Injector 6 Low Additive Error	Injector 5 Low Additive Error
A15	Injector 12 Low Additive Error	Injector 11 Low Additive Error	Injector 10 Low Additive Error	Injector 9 Low Additive Error
A16	Injector 16 Low Additive Error	Injector 15 Low Additive Error	Injector 14 Low Additive Error	Injector 13 Low Additive Error
A17	Injector 20 Low Additive Error	Injector 19 Low Additive Error	Injector 18 Low Additive Error	Injector 17 Low Additive Error
A18	Injector 24 Low Additive Error	Injector 23 Low Additive Error	Injector 22 Low Additive Error	Injector 21 Low Additive Error
A19	Injector 4 Excess Pulses	Injector 3 Excess Pulses	Injector 2 Excess Pulses	Injector 1 Excess Pulses
A20	Injector 8 Excess Pulses	Injector 7 Excess Pulses	Injector 6 Excess Pulses	Injector 5 Excess Pulses
A21	Injector 12 Excess Pulses	Injector 11 Excess Pulses	Injector 10 Excess Pulses	Injector 9 Excess Pulses
A22	Injector 16 Excess Pulses	Injector 15 Excess Pulses	Injector 14 Excess Pulses	Injector 13 Excess Pulses
A23	Injector 20 Excess Pulses	Injector 19 Excess Pulses	Injector 18 Excess Pulses	Injector 17 Excess Pulses
A24	Injector 24 Excess Pulses	Injector 23 Excess Pulses	Injector 22 Excess Pulses	Injector 21 Excess Pulses
A25	Injector 4 No Pulses	Injector 3 No Pulses	Injector 2 No Pulses	Injector 1 No Pulses
A26	Injector 8 No Pulses	Injector 7 No Pulses	Injector 6 No Pulses	Injector 5 No Pulses
A27	Injector 12 No Pulses	Injector 11 No Pulses	Injector 10 No Pulses	Injector 9 No Pulses
A28	Injector 16 No Pulses	Injector 15 No Pulses	Injector 14 No Pulses	Injector 13 No Pulses
A29	Injector 20 No Pulses	Injector 19 No Pulses	Injector 18 No Pulses	Injector 17 No Pulses
A30	Injector 24 No Pulses	Injector 23 No Pulses	Injector 22 No Pulses	Injector 21 No Pulses
A31	Injector 4 Frequency	Injector 3 Frequency	Injector 2 Frequency	Injector 1 Frequency
A32	Injector 8 Frequency	Injector 7 Frequency	Injector 6 Frequency	Injector 5 Frequency
A33	Injector 12 Frequency	Injector 11 Frequency	Injector 10 Frequency	Injector 9 Frequency
A34	Injector 16 Frequency	Injector 15 Frequency	Injector 14 Frequency	Injector 13 Frequency
A35	Injector 20 Frequency	Injector 19 Frequency	Injector 18 Frequency	Injector 17 Frequency

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A36	Injector 24 Frequency	Injector 23 Frequency	Injector 22 Frequency	Injector 21 Frequency
A37	Injector 4 Unauthorize Fail	Injector 3 Unauthorize Fail	Injector 2 Unauthorize Fail	Injector 1 Unauthorize Fail
A38	Injector 8 Unauthorize Fail	Injector 7 Unauthorize Fail	Injector 6 Unauthorize Fail	Injector 5 Unauthorize Fail
A39	Injector 12 Unauthorize Fail	Injector 11 Unauthorize Fail	Injector 10 Unauthorize Fail	Injector 9 Unauthorize Fail
A40	Injector 16 Unauthorize Fail	Injector 15 Unauthorize Fail	Injector 14 Unauthorize Fail	Injector 13 Unauthorize Fail
A41	Injector 20 Unauthorize Fail	Injector 19 Unauthorize Fail	Injector 18 Unauthorize Fail	Injector 17 Unauthorize Fail
A42	Injector 24 Unauthorize Fail	Injector 23 Unauthorize Fail	Injector 22 Unauthorize Fail	Injector 21 Unauthorize Fail
A43	Injector 4 General Error	Injector 3 General Error	Injector 2 General Error	Injector 1 General Error
A44	Injector 8 General Error	Injector 7 General Error	Injector 6 General Error	Injector 5 General Error
A45	Injector 12 General Error	Injector 11 General Error	Injector 10 General Error	Injector 9 General Error
A46	Injector 16 General Error	Injector 15 General Error	Injector 14 General Error	Injector 13 General Error
A47	Injector 20 General Error	Injector 19 General Error	Injector 18 General Error	Injector 17 General Error
A48	Injector 24 General Error	Injector 23 General Error	Injector 22 General Error	Injector 21 General Error
A49	Injector 4 Over-speed	Injector 3 Over-speed	Injector 2 Over-speed	Injector 1 Over-speed
A50	Injector 8 Over-speed	Injector 7 Over-speed	Injector 6 Over-speed	Injector 5 Over-speed
A51	Injector 12 Over-speed	Injector 11 Over-speed	Injector 10 Over-speed	Injector 9 Over-speed
A52	Injector 16 Over-speed	Injector 15 Over-speed	Injector 14 Over-speed	Injector 13 Over-speed
A53	Injector 20 Over-speed	Injector 19 Over-speed	Injector 18 Over-speed	Injector 17 Over-speed
A54	Injector 24 Over-speed	Injector 23 Over-speed	Injector 22 Over-speed	Injector 21 Over-speed
A55	Injector 4 Command Refused	Injector 3 Command Refused	Injector 2 Command Refused	Injector 1 Command Refused
A56	Injector 8 Command Refused	Injector 7 Command Refused	Injector 6 Command Refused	Injector 5 Command Refused
A57	Injector 12 Command Refused	Injector 11 Command Refused	Injector 10 Command Refused	Injector 9 Command Refused
A58	Injector 16 Command Refused	Injector 15 Command Refused	Injector 14 Command Refused	Injector 13 Command Refused
A59	Injector 20 Command Refused	Injector 19 Command Refused	Injector 18 Command Refused	Injector 17 Command Refused
A60	Injector 24 Command Refused	Injector 23 Command Refused	Injector 22 Command Refused	Injector 21 Command Refused
A61	Injector 4 Auto- detect Fault	Injector 3 Auto- detect Fault	Injector 2 Auto- detect Fault	Injector 1 Auto- detect Fault
A62	Injector 8 Auto- detect Fault	Injector 7 Auto- detect Fault	Injector 6 Auto- detect Fault	Injector 5 Auto- detect Fault

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #1
A63	Injector 12 Auto-detect Fault	Injector 11 Auto-detect Fault	Injector 10 Auto-detect Fault	Injector 9 Auto-detect Fault
A64	Injector 16 Auto-detect Fault	Injector 15 Auto-detect Fault	Injector 14 Auto-detect Fault	Injector 13 Auto-detect Fault
A65	Injector 20 Auto-detect Fault	Injector 19 Auto-detect Fault	Injector 18 Auto-detect Fault	Injector 17 Auto-detect Fault
A66	Injector 24 Auto-detect Fault	Injector 23 Auto-detect Fault	Injector 22 Auto-detect Fault	Injector 21 Auto-detect Fault
A67	Injector 4 High Temp	Injector 3 High Temp	Injector 2 High Temp	Injector 1 High Temp
A68	Injector 4 Low Temp	Injector 3 Low Temp	Injector 2 Low Temp	Injector 1 Low Temp
A69	Injector 4 Temperature Probe	Injector 3 Temperature Probe	Injector 2 Temperature Probe	Injector 1 Temperature Probe
A70	Injector 4 Pulse Security	Injector 3 Pulse Security	Injector 2 Pulse Security	Injector 1 Pulse Security
A71	Injector 4 Transmitter Integrity	Injector 3 Transmitter Integrity	Injector 2 Transmitter Integrity	Injector 1 Transmitter Integrity
A72	Injector 4 Additive Comm Totals	Injector 3 Additive Comm Totals	Injector 2 Additive Comm Totals	Injector 1 Additive Comm Totals
A73	Injector 8 Additive Comm Totals	Injector 7 Additive Comm Totals	Injector 6 Additive Comm Totals	Injector 5 Additive Comm Totals
A74	Injector 12 Additive Comm Totals	Injector 11 Additive Comm Totals	Injector 10 Additive Comm Totals	Injector 9 Additive Comm Totals
A75	Injector 16 Additive Comm Totals	Injector 15 Additive Comm Totals	Injector 14 Additive Comm Totals	Injector 13 Additive Comm Totals
A76	Injector 20 Additive Comm Totals	Injector 19 Additive Comm Totals	Injector 18 Additive Comm Totals	Injector 17 Additive Comm Totals
A77	Injector 24 Additive Comm Totals	Injector 23 Additive Comm Totals	Injector 22 Additive Comm Totals	Injector 21 Additive Comm Totals
A78	Injector 4 Digital Solenoid Counts	Injector 3 Digital Solenoid Counts	Injector 2 Digital Solenoid Counts	Injector 1 Digital Solenoid Counts
A79	Reserved	Reserved	Reserved	Reserved
A80	Reserved	Reserved	Reserved	Reserved
A81	Reserved	Reserved	Reserved	Reserved
A82	Reserved	Reserved	Reserved	Reserved
A83	Reserved	Reserved	Reserved	Reserved

### Enquire Alarms Response—Meter

Character	Alarm #4	Alarm #3	Alarm #2	Alarm #4
A1	Valve Fault	Meter Pulse Security Alarm	Meter Transmitter Integrity Fault	Meter Program Error
A2	Reserved	Density Transducer Fault	Pressure Transducer Fault	Temperature Transducer Fault
A3	Solenoid Acutation Count Alarm	Reserved	Reserved	Mass Meter Comm. Fail
A4	Reverse Flow	Leakage	Overrun Prediction Alarm	Promass Fault

## Command Code EB—End Batch

This command cancels the remaining batch volume.

### Command:

"EB"

### Responses:

**"OK"** **Good Response.** Batch flagged as complete if batch is in progress. Batch authorization is removed.

or...

**"NOXX"** The batch volume has not been canceled.

**Remarks:** None

**Constraints:** NO01 will be returned if the other side is in the program mode locally or via communications.

**Special Case:** Valve will be commanded to close if it has not already been commanded to do so.

**Comm. Modes:** Remote Control

### Command Code EE—Enquire Status Extended

This command retrieves the operational status of AccuLoad IV and is simply an extended version of the EQ command. Data is returned in a bit-mapped format.

**Command:**

"EE"

**Responses:**

**"OK"**    **Good Response.** Command accepted and AccuLoad will attempt to print reports.

A<sub>1</sub> through A<sub>20</sub>

Where each "A" is a "quasi hex" value;  
"0 1 2 3 4 5 6 7 8 9 : ; < = > ?".

or...

**"NOXX"**    Data not retrieved.

*Note: A1- A16 are in the same format as the EQ command; A19—A20 not used.*

**Remarks:**            For bay configurations, SA, SF, TD and TP refer to the bay; other flags continue to be specific to the arm.

If the AccuLoad is unable to start a transaction because it would require over-writing a protected or pending transaction report, the AccuLoad will respond to SB, AU and AP commands with a NO10 (storage full).

**Constraints:**        None

**Special Case:**        See notes under tables.

**Comm. Modes:**        Polling Only, Poll & Authorize, Remote Control, Poll & Program.

### Response to "EE" Enquire, Character A17

Character		Condition			
Char	Hex	Pending Report*	Pending Report Storage Full*	Printer Standby*	New Valve Diagnostic Data**
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

\* See PP command for information.

\*\* See VD command for information.

### Response to "EE" Enquire, Character A18

Character		Condition			
Char	Hex	Reserved	Reserved	Nedap Comm Fail	New Vehicle Tag Data
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

### Command Code EQ—Enquire Status

This command retrieves the operational status of AccuLoad IV. Data is returned in a bit-mapped format.

**Command:**

"EQ" Request Status
---------------------

**Responses:**

<p>"AAAAAAAAAAAAAAAA"      <b>Good Response:</b> 16 characters. For descriptions of each of the characters, see the following pages.</p> <p>Where each "A" is a "quasi hex" value; "0 1 2 3 4 5 6 7 8 9 ; ; &lt; &gt; ?".</p>
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**Remarks:** Allow for additional characters to be added on the end for future status indicators.

For bay configurations—SA, SF, TD, and TP—refer to the bay. Other flags continue to be specific to the load arm.

**Constraints:** None

**Special Case:** See notes under tables.

**Comm. Modes:** Polling Only, Poll & Authorize, Remote Control, Poll & Program

### Response to "EQ" Enquire, Character A1

Character		Condition			
Char	Hex	Program Mode	Released	Flowing	Authorized
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Note:** X shows an asserted condition. The AccuLoad IV is considered released whenever the valve is opened and has not been commanded to close.

### Response to "EQ" Enquire, Character A2

Character		Condition			
Char	Hex	Transaction in Progress	Transaction Done	Batch Done	Keypad Data Pending
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Note:** X shows an asserted condition. "Alarm Conditions" are not conditions that will result in an AccuLoad alarm being generated; they are combinations of status conditions that should be unable to occur at the same time.

### Response to "EQ" Enquire, Character A3

Character		Condition			
Char	Hex	Alarm On	Standby Transactions Exist	Storage Full	In Standby Mode
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Note:** X shows an asserted condition. Some alarm conditions cannot reset through the communication channel. (See Alarm Reset command "AR")

The "(not used)" positions in this table reflect the attempt to remain mostly compatible with AccuLoad II. Many of these values were used for standby mode operations; they shall be reported as "off" in the AccuLoad IV.

### Response to "EQ" Enquire, Character A4

Character		Condition			
Char	Hex	Program Value Changed	Delayed Prompt in Effect	Display Message Time-out	Power-fail Occurred
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Note:** X shows an asserted condition.

### Response to "EQ" Enquire, Character A5

Character		Condition			
Char	Hex	Checking Entries	Input #1	Input #2	Input #3
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Note:** X shows an asserted condition (= AC input at contact).

### Response to "EQ" Enquire, Character A6

Character		Condition			
Char	Hex	Input #4	Input #5	Input #6	Input #7
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Note:** X shows an asserted condition (= AC input at contact).

### Response to "EQ" Enquire, Character A7

Character		Condition			
Char	Hex	Input #8	Input #9	Input #10	Input #11
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Note:** X shows an asserted condition (= AC input at contact).

**Response to "EQ" Enquire, Character A8**

Character		Condition			
Char	Hex	Input #12	Input #13	Input #14	Input #15
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Response to "EQ" Enquire, Character A9**

Character		Condition			
Char	Hex	Input #16 (BIO #1) *	Input #17 (BIO #2) *	Input #18 (BIO #3) *	Input #19 (BIO #4) *
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

\* If configured as an input.

### Response to "EQ" Enquire, Character A10

Character		Condition			
Char	Hex	Input #20 (BIO #5) *	Input #21 (BIO #6) *	Input #22 (BIO #7) *	Input #23 (BIO #8) *
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

\* If configured as an input.

### Response to "EQ" Enquire, Character A11

Character		Condition			
Char	Hex	Input #24 (A4I #1)	Input #25 (A4I #1)	Input #26 (A4I #1)	Input #27 (A4I #1)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

### Response to "EQ" Enquire, Character A12

Character		Condition			
Char	Hex	Input #28 (A4I #1)	Input #29 (A4I #1)	Input #30 (A4I #1)	Input #31 (A4I #1)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

### Response to "EQ" Enquire, Character A13

Character		Condition			
Char	Hex	Input #32 (A4I #1)	Input #33 (A4I #1)	Input #34 (A4I #2)	Input #35 (A4I #2)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

### Response to "EQ" Enquire, Character A14

Character		Condition			
Char	Hex	Input #36 (A4I #2)	Input #37 (A4I #2)	Input #38 (A4I #2)	Input #39 (A4I #2)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

### Response to "EQ" Enquire, Character A15

Character		Condition			
Char	Hex	Input #40 (A4I #2)	Input #41 (A4I #2)	Input #42 (A4I #2)	Input #43 (A4I #2)
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

**Response to "EQ" Enquire, Character A16**

Character		Condition			
Char	Hex	Printing In Progress	Permissive Delay	Card Data Present	Preset In Progress
0	30				
1	31				X
2	32			X	
3	33			X	X
4	34		X		
5	35		X		X
6	36		X	X	
7	37		X	X	X
8	38	X			
9	39	X			X
:	3A	X		X	
;	3B	X		X	X
<	3C	X	X		
=	3D	X	X		X
>	3E	X	X	X	
?	3F	X	X	X	X

### Command Code ER—Event Recall

This command retrieves historical data using the sequence number of the data.

**Command:**

```
"ER_S...S"

Where: S...S is the sequence number.
```

**Responses:**

```
Good Response:

"ER_SSSSSSSSS_DDDDDDDD_HHNN_X_EEEEE_A...A"

Where: SSSSSSSSSS = Sequence number
       DDDDDDDD   = Standard Time 'MMDDYYYY'
                   or Military Time "DDMMYYYY"

           MM     = Month
           DD     = Day
           YYYY   = Year
           HH     = Hours
           NN     = Minutes
           X      = A (Standard Time—AM), P (Standard Time—PM),
                   M (Military Time)
           EEEEE = Type Number (Returned, but not currently used)
           A...A = Data Variable length string (may contain "tab" characters)

or...

"NOXX" Data not retrieved.
```

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Poll & Authorize, Poll & Program, or Remote Control

### Command Code ES—Last Event Recall

This command requests the sequence number for a specified event stored by the AccuLoad IV.

**Command:**

```

"ES" (deprecated form—use "ES_N")
"ES_X"
"ES_X_DDDDDDDD_HHMM_T" (for X - 'D')

Where: X = "N" for newest (most recent) event "O" for oldest event
           "D" for most recent event on or before date/time specified
           For "ES_D", the date argument above must be in the format specified

Where: DDDDDDDD = Date (MMDDYYYY standard convention or DDMMYYYY military convention)
           HHMM = Time
           T = Time type (A for AM, P for PM, M for military)
    
```

**Responses:**

```

Good Response:
"ES_SSSSSSSSS" (for deprecated form)
"ES_X_SSSSSSSSS" (for all others)

Where: SSSSSSSSS = Sequence number
or...

"NOXX" Data not available
    
```

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Poll & Authorize, Poll & Program, or Remote Control

## Command Code ET—End Transaction

This command removes authorization and flags the transaction as complete.

### Command:

"ET"

### Responses:

**"OK"** **Good Response:** Transaction is flagged as complete if a transaction is in progress. Authorization is removed.

or...

**"NOXX"** Transaction was not ended

**Remarks:** If bays are configured, this command will end the transaction for the entire bay.

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Poll & Authorize, Poll & Program, or Remote Control

### Command Code FL—Read Flow Count

This command retrieves raw pulse and volume counts from the AccuLoad IV.

**Command:**

"FL"	Read flow count for the arm (straight, sequential, ratio, hybrid sequential meter)
"FL_Px"	Read raw pulse counts for specified product (ratio blending only). Read raw pulse counts for specified ratio products (only) on a hybrid arm.
"FL_R"	Read raw volume or mass for the arm (straight, sequential, ratio, hybrid sequential meter).
"FL_Px_R"	Read raw volume or mass for specified product (ratio blending only and products only on a hybrid arm.)
<b>Where:</b> x = Product Number 1, 2, 3, 4, 5, or 6 for ratio blending	
X = Product Number 1, 2, 3, 4, 5 for hybrid arm (only if ratio product)	

**Responses:**

"FL_VVVVVVVV"	<b>Good Response.</b> Flow count for arm (straight product or ratio blending).
"FL_VVVVVVVV_Px"	<b>Good Response.</b> Flow count for specified product (ratio, sequential, hybrid.)
"FL_VVVVVVVV_VV"	<b>Good Response.</b> Raw volume or mass amount for the arm.
"FL_VVVVVVVV_VV_Px"	<b>Good Response.</b> Raw volume or mass amount for specified product.
<b>Where:</b> VVVVVVVV = Raw Pulse Count	
or...	
"NOXX"	Did not receive the raw counts from the AccuLoad

**Remarks:** For straight product applications the response will not include the Px parameter. The count is reset to zero at the start and end of each transaction.

**Constraints:** VVVVVVVV is unfactored raw pulse count. This value is reset to zero at start and end of each transaction.

Sequential blending applications and Hybrid Arm Sequential Products: The Px parameter will indicate the component currently flowing. In this case, the flow count may not reflect the pulses for the component indicated. For example, if the first component delivered 1000 pulses and the second component delivered 750 pulses, the response will show FL 1000 P1 after component one has completed its delivery and FL 1750 P2 after component two completes its delivery.

Ratio blending applications and Hybrid Arm Sequential Products: FL without the Px parameter will return the current pulse count through the arm, i.e., the sum of the two component products' flow count. The Px parameter will not be returned.

NO31 will be returned if the command FL\_Px is directed to an arm currently configured for straight product or sequential blending. NO 31 will be returned if the product regulated is a sequential product on a hybrid arm.

**Special Case:** Px reflects the product currently being loaded or the last product that was loaded, if loading is not currently active. Stray pulses from the meter may accumulate and register in the FL command between loads. In the event of unauthorized flow such as this, the Px product designation does not necessarily indicate which product is leaking.

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code FS—Full Screen

This command will cause the AccuLoad to bring the requested arm into focus on the top panel of the Run/Ready Mode screen when parameter 139 - System Status Display is set to "Yes". If the arm is currently in focus, there will be no action. If parameter 139 - System Status Display is set to "No", there will be no action.

**Command:**

"FS"

**Responses:**

"OK"    **Good Response:**  
or...  
  
"NOXX"  
  
**Where: X =**  
      "00" If there are any trailing characters after the second character in the two-byte code  
      "01" If the unit is in Program Mode  
      "07" If the port is not in "Remote Control" or "Poll & Authorize" Mode

**Remarks:**        If transaction is in progress and at dynamic displays, the dynamic displays will be exited and the delivery screen will be displayed. If the AccuLoad is displaying the "Main Menu" or any of its sub-menus, that menu will be exited and the ready screen will be displayed.

**Constraints:**     If the Host Prompt Keypad is active on an arm when the FS command is issued, the arm will not change focus until the Host Prompt Keypad is no longer displayed

**Comm. Modes:**    Poll & Authorize, Remote Control

## Command Code GD—Get Date and Time

This command retrieves the current date and time from the AccuLoad IV.

### Command:

```
"GD"
```

### Responses:

```
"GD_DDDDDDDD_HHNN_X"   Good Response.
```

```
Where: DDDDDDDD = MMDDYYYY (Standard Time)
```

```
           = DDMMYYYY (Military Time)
```

```
HH         = hours
```

```
NN         = minutes
```

```
MM         = month
```

```
DD         = day
```

```
YYYY      = year
```

```
X          = A (Standard Time - A.M.)
```

```
           = P (Standard Time - P.M.)
```

```
           = M (Military Time)
```

```
or...
```

```
"NOXX" The date and time were not read from the AccuLoad IV.
```

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code GK—Get Key

This command retrieves the last key that was pressed at the AccuLoad IV prompt entry virtual keypad.

### Command:

"GK"

### Responses:

"GK\_XX"    **Good Response.** Last key pressed.

"GK\*XX"    **Good Response.** Last key pressed, this arm has current focus.

**Where:** XX = "\_0" through "\_9" for numeric keys

= "E1" for the "ENTER" key

= "P1" for the "PRINT" key

= "A1" for the "START" key

= "B1" for the "SET" key

= "C1" for the "CLEAR" key

= "S1" for the "STOP" key

= "F1" for the "F1" key

= "F2" for the "F2" key

= "- +" for the "+/-" key

= "\_." for the "." key

**Remarks:**            None

**Constraints:**        NO32 will be returned if no key has ever been pressed.

**Special Case:**        None

**Comm. Modes:**        Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code GP—Get Program Identifier

This command requests information about the installed application software in AccuLoad IV. There are options to request either the revision or the software identification (MD5 checksums).

### Command:

<b>"GP"</b>	Retrieve Firmware Identifier
<b>"GP_R"</b>	Retrieve Firmware Revision

### Responses:

<b>"GP_SSSSSSS"</b>	<b>Good Response.</b> Firmware Identifier.
<b>"GP_XX.XX"</b>	<b>Good Response.</b> Firmware Revision.
<b>Where:</b>	SSSSSSSS = eight hexadecimal digit identifier
	XX.XX = firmware revision
	or...
<b>"NOXX"</b>	Did not read the firmware signatures.

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code IC—Injector Command

This command is used to specify the command to be sent to a smart additive injector.

### Command:

**"IC\_c..c"**

**Where:** IC = Injector Command literal

c..c = command text (as shown below)

c..c = AAAY...Y

**Where:** AAA = Injector comm address (ASCII)

Y ... Y = Injector command (ASCII)

(Gate City Protocol I and Titan PAC-3 Protocol)

**Note:** The AccuLoad installs an STX before c..c, an ETX and calculated LRC after c..c, and then sends this out the injector comm port.

### Responses:

**"OK"** Good Response.

or...

**"NOXX"**

**Where:** X = "01" In the Programming Mode

= "02" AccuLoad IV Released

= "06" Operation Not Allowed

= "19" Option Not Installed

When the AccuLoad IV receives an "IC" command, a "NO06" response will be moved into the appropriate response buffer. This "NO06" response will indicate that no response has yet been received from the Additive Injector Subsystem. This will prevent the supervisory computer from issuing an immediate "IR" command and reading an old response from a previous command that may have been issued to a different additive subsystem.

If communications with an additive subsystem has not been selected in the programming mode, this command will return a "NO" response.

If the specified command is valid for the AccuLoad's current mode of operation, the query or command is copied into the additive command buffer. If the address is invalid, i.e., there is no additive injector with that address connected to the AccuLoad, no response will ever be received. If the command is improperly constructed or not valid for the type of additive injector selected, the additive injector will respond appropriately and the supervisory computer can decode the response given.

STX and ETX characters are added to the command. The LRC is calculated and added onto the end of the command.

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code IR—Injector Response

This command is used to retrieve the response from a pass-by command to an Additive Injection Subsystem.

### Command:

```
"IR"
```

### Responses:

```
"IR_r..r"
```

**Where:** IR = Injector Response command

r..r = response text (see below)

r..r of AAAY..Y

AAA = Injector comm address (ASCII)

Y..Y = Injector response (ASCII)

(Gate City Protocol I and Titan PAC-3 Protocol)

**Note:** The AccuLoad receives the response from the injector, then strips off the STX, ETX, and LRC, and what remains is "r..r" above.

or...

```
"NOXX"
```

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code LC—Request Load Reference Density

This command requests the load reference density corrected to reference from the AccuLoad IV.

**Command:**

<b>Current Transaction</b>	
"LC_R"	Current batch reference density
"LC_P"	Current product batch reference density
"LC_Px"	Current batch reference density of the specified product
"LC_YY"	Batch reference density for the specified batch
"LC_YY_Px"	Batch reference density for the specified batch and the specified product
<b>Local Storage</b>	
"LC_YY_NNN"	Batch reference density of a stored transaction
"LC_YY_Px_NNN"	Batch reference density for a specified product of a stored transaction
<b>Where:</b> R	= Indicated Current Batch
P	= Constant (Current Product)
Px	= Product 1, 2, 3, 4, 5, or 6
NNN	= Number of transactions back into Local Storage to retrieve data
YY	= Batch Number requested (01-10)

**Responses:**

<b>Current Transaction</b>	
"LC_YY_RR_SVVVV.V"	<b>Good Response.</b> For commands LC_R, LC_YY
"LC_YY_Px_VVVV.V"	<b>Good Response.</b> For commands LC_P, LC_Px, LC_YY_PX.
<b>Local Storage</b>	
"LC_YY_RR_SVVVV.V_NNN"	<b>Good Response.</b> For commands LC_YY_NNN
"LC_YY_Px_VVVV.V_NNN"	<b>Good Response.</b> For commands LC_Px_NNN
<b>Where:</b> VVVV.V	= reference density value (where most significant digit can be "-" minus sign)
NNN	= Number of transactions back into Local Storage to retrieve data
YY	= Batch number (01-10)
RR	= Recipe Number (01-50)
Px	= Product 1, 2, 3, 4, 5, or 6
S	= Sign (+/-)
or...	
"NOXX"	The load reference density was not read.

**Remarks:** Response field padded with leading spaces. If value is negative, minus sign will immediately precede most significant digit.

- Constraints:** Density units are as programmed in the AccuLoad IV.
- NO06 will be returned for a product request if the product requested was not delivered in the transaction.
- NO30 will be returned if the product specified is not currently configured to the arm to which the command was directed.
- NO31 will be returned if product load averages are requested for an arm currently configured for straight product delivery.
- NO39 (No current batch on this arm) will be returned if transaction is in progress on bay but there is no active batch on the addressed arm. "YY" specifies the bay-based batch number.
- Special Case:** None
- Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code LD—Request Load Average Density

This command requests load average density from the AccuLoad IV.

**Command:**

<b>Current Transaction</b>	
"LD_R"	Current batch average density
"LD_P"	Current product batch average density
"LC_Px"	Current batch average density of the specified product
"LD_YY"	Batch average density for the specified batch
"LD_YY_Px"	Batch average density for the specified batch and the specified product
<b>Local Storage</b>	
"LD_YY_NNN"	Batch average density of a stored transaction
"LD_YY_Px_NNN"	Batch average density for a specified product of a stored transaction
<b>Where:</b> R	= Indicated Current Batch
P	= Constant (Current Product)
Px	= Product 1, 2, 3, 4, 5, or 6
NNN	= Number of transactions back into Local Storage to retrieve data.
YY	= Batch Number requested (01-10)

**Responses:**

<b>Current Transaction</b>	
"LD_YY_RR_SVVVV.V"	<b>Good Response.</b> For commands LD_R, LD_YY
"LD_YY_Px_VVVV.V"	<b>Good Response.</b> For commands LD_P, LD_Px, LD_YY_PX
<b>Local Storage</b>	
"LD_YY_RR_SVVVV.V_NNN"	<b>Good Response.</b> For commands LD_YY_NNN
"LD_YY_Px_VVVV.V_NNN"	<b>Good Response.</b> For commands LD_Px_NNN
<b>Where:</b> VVVV.V	= average value (where most significant digit can be "-" minus sign)
NNN	= Number of transactions back into Local Storage to retrieve data
YY	= Batch number (01-10)
RR	= Recipe Number (01-50)
Px	= Product 1, 2, 3, 4, 5, or 6
S	= Sign (+/-)
or...	
"NOXX"	The load average density was not read.

**Remarks:** Response field padded with leading spaces. If value is negative, minus sign will immediately precede most significant digit.

- Constraints:** Density units are as programmed in the AccuLoad IV.
- NO06 will be returned for a product request if the product requested was not delivered in the transaction.
- NO30 will be returned if the product specified is not currently configured to the arm to which the command was directed.
- NO31 will be returned if product load averages are requested for an arm currently configured for straight product delivery.
- NO39 (No current batch on this arm) will be returned if transaction is in progress on bay but there is no active batch on the addressed arm. "YY" specifies the bay-based batch number.
- Special Case:** None
- Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code LO—Request Logout of Program Mode

This command forces an immediate logout of Program Mode and all changes made by the PC command to be saved.

### Command:

"LO"

### Responses:

"OK"

or...

"NOXX"

**Remarks:** Ten seconds after last being issued a PC command, the AccuLoad begins the logout process. The "LO" command starts it immediately. All changes made by the PC command are not available (made active) until the logout process is complete.

**Constraints:** Logout may only be forced if the login occurred on the same comm port (i.e., Port #1 cannot logout Port #2).

**Special Case:** None

**Comm Modes:** Poll & Authorize, Remote Control, Poll & Program

### Command Code LP—Request Load Average Pressure

This command requests the value of the load average pressure from the AccuLoad IV.

**Command:**

<b>Current Transaction</b>	
"LP_R"	Current load average pressure for the current recipe
"LP_YY"	Load average pressure for previous batch of the current transaction
"LP_P"	Current load average pressure for the current product
"LP_Px"	Current load average pressure of specified product (ratio, sequential)
"LP_YY_Px"	Batch average pressure for a specified product (sequential, ratio)
<b>Local Storage</b>	
"LP_YY_NNN"	Load average pressure for the batch indicated in local storage
"LP_YY_Px_NNN"	Batch average pressure for a specified product stored in local storage(sequential ratio)
<b>Where:</b> R	= Current Batch
P	= Current Product
Px	= Product 1, 2, 3, 4, 5, or 6
YY	= Batch Number requested (01-10)
NNN	= Number of transactions back into local storage to retrieve data

**Responses:**

<b>Current Transaction</b>	
"LP_YY_RR_VVVV.V"	For "LD_R" and "LD_YY"
"LP_YY_Px_VVVV.V"	For command "LP_P," "LP_Px, LP_YY_Px"
<b>Local Storage</b>	
"LP_YY_Px_VVVV.V_NNN"	For "LP_YY_Px_NNN"
"LP_YY_RR_VVVV.V_NNN"	For "LP_YY_NNN"
<b>Where:</b> YY	= Batch number (01-10)
RR	= Recipe Number (01-50)
Px	= Product 1, 2, 3, 4, 5, or 6
VVVV.V	= average value
NNN	= Number of transactions back into Local Storage to retrieve data
or...	
"NOXX"	The load average density was not read.

<b>Remarks:</b>	None
<b>Constraints:</b>	<p>Pressure units are as programmed for the AccuLoad IV.</p> <p>NO06 will be returned for a product request if the product requested was not delivered in the transaction.</p> <p>NO30 will be returned if the product specified is not currently configured to the arm to which the command was directed.</p> <p>NO31 will be returned if product load averages are requested for an arm currently configured for straight product delivery.</p> <p>NO39 (No current batch on this arm) will be returned if transaction is in progress on bay but there is no active batch on the addressed arm. "YY" specifies the bay-based batch number.</p>
<b>Special Case:</b>	None
<b>Comm. Modes:</b>	Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code LS—Request Last Density Sample

This command requests the last density sample taken during an unloading batch.

**Command:**

<b>Current Transaction</b>	
"LS"	Last density sample from the current batch
"LS_YY"	Last density sample for a specified batch
<b>Local Storage</b>	
"LS_YY_NNN"	Returns the density sample for a previously completed batch
<b>Where:</b> YY	= Batch Number (01-10)
NNN	= Number of transactions back into local storage to retrieve data

**Responses:**

<b>Current Transaction</b>	
"LS_YY_XXXX.X"	Good Response.
<b>Local Storage</b>	
"LS_YY_XXXX.X_NNN"	Good Response
<b>Where:</b> YY	= Batch Number (01—10)
XXXX.X	= Last density sample in programmed density units
NNN	= Number of transactions back into Local Storage to retrieve data
or...	
"NOXX"	The last density sample was not read.
<b>Where:</b> XX	= "03" Value rejected
	= "05" No transaction ever done
	= "19" Option not installed

**Remarks:** If bays are configured, LS will return the sample for the current batch on the arm addressed, and CP YY will return the percentage for the bay batch number specified by YY (which may be a batch from another arm on the bay).

**Constraints:**

1. Density units are as programmed in the AccuLoad IV.
2. Applies to arms configured as unloading arms only. Other arm configurations will result in NO19 being returned.

**Special Case:** None.

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program.

### Command Code LT—Request Load Average Temperature

This command requests the value of the load average temperature from the AccuLoad IV.

**Command:**

Current Transaction	
"LT_R"	Current batch average
"LT_YY"	Batch average
"LT_YY_NNN"	Batch average for local storage transaction
"LT_P"	Current average of the current product (sequential, hybrid sequential product)
"LT_Px"	Current average of specified product (ratio, sequential, hybrid)
"LT_YY_Px"	Batch average for specified product (ratio, sequential, hybrid)
"LT_YY_Px_NNN"	Batch average for specified product for local storage transaction (sequential, ratio, hybrid)
<b>Where:</b> R	= Current Batch
P	= Current Product
Px	= Product 1, 2, 3, 4, 5, or 6
YY	= Batch Number requested
NNN	= Number of transactions back into local storage to retrieve data

**Responses:**

Current Transaction	
"LT_YY_RR_SVVVV.V"	For command(s) "LT_R", "LT_XX"
"LT_YY_RR_SVVVV.V_NNN"	For command(s) "LT_XX_NNN"
"LT_YY_Px_SVVVV.V"	For command(s) "LT_P", "LT_Px", "LT_XX_Px"
"LT_YY_Px_SVVVV.V_NNN"	For command(s) "LT_XX_Px_NNN"
<b>Where:</b> YY	= Batch number requested
RR	= Recipe (01-50)
S	= Sign (+ or -)
Px	= Product 1, 2, 3, 4, 5, or 6
VVVV.V	= average value
NNN	= Number of transactions back into Local Storage to retrieve data
or...	
"NOXX"	The load average density was not read.

---

<b>Remarks:</b>	None
<b>Constraints:</b>	<p>Temperature units are as programmed for the AccuLoad IV. Negative temperature is possible.</p> <p>NO06 will be returned for a product request if the product requested was not delivered in the transaction.</p> <p>NO30 will be returned if the product specified is not currently configured to the arm to which the command was directed.</p> <p>NO31 will be returned if product load averages are requested for an arm currently configured for straight product delivery.</p> <p>NO39 (No current batch on this arm) will be returned if transaction is in progress on bay but there is no active batch on the addressed arm. "YY" specifies the bay-based batch number.</p>
<b>Special Case:</b>	None
<b>Comm. Modes:</b>	Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code MP—Minimum Preset

This command requests the minimum preset allowed for the recipe specified.

**Command:**

```
"MP_RR"  
  
Where: RR = recipe number (01-50)
```

**Responses:**

```
"MP_RR_VVVVVV" Good Response  
  
Where: RR      = Recipe Number (01 - 50)  
       VVVVVV = Minimum Preset  
  
or...  
  
"NOXX" Minimum preset not returned
```

**Remarks:** None

**Constraints:** NO30 will be returned if the recipe specified is not currently configured to the arm (or bay, if bays are configured) to which the command was directed.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program.

## Command Code MS—Override HMI Swing Arm Position

This command allows the host to override the current state of the swing arm detect switch, and force an arm to be displayed on a particular HMI regardless of the swing arm's current position. This is useful when a driver needs to be notified to swing the arm to the other loading position.

### Command:

**"MS\_X"**

**Where:** X = A to move arm's display to side A (HMI\_A)

X = B to move arm's display to side B (HMI\_B)

### Responses:

**Good Response: OK**

or...

**"NOXX"**

**Where:** XX = "01" In the Program Mode

= "03" Value Rejected

= "07" Wrong Control Mode

= "13" AccuLoad Authorized

= "19" Option Not Installed

### Remarks:

Once the host has sent a command to override the detect switch, the AccuLoad will continue to ignore the detect switch setting until either the swing arm is moved into the requested position or the host sends another "MS" command to move the arm to the correct HMI.

If an automation command is sent to a KDC to authorize a transaction (i.e., AU, AP or SB) and the swing arm is not in the correct position, the AccuLoad will respond with the following error code: **"NO35"—Swing Arm not in correct position.**

**Constraints:** None

**Special Case:** A "NO19" response occurs when there are no detect switches configured.

**Comm Modes:** Poll & Authorize, Remote Control

### Command Code NR—New Recipe

This command is valid only for Unlimited Preset arms. It allows for on-the-fly recipe changes during delivery. This command will also authorize an unlimited preset arm as if an AU/AP or SB command was sent.

**Command:**

```
"NR_RR"

Where: RR = Recipe Number (01-50)
```

**Responses:**

```
"OK"    Good Response
or...

"NOXX"
```

**Remarks:**

To specify an additive mask via communications you should continue to use the AB command to select the recipe, followed by the AU/AP or SB to specify the additive mask.

If the NR is received during a batch, the recipe will be changed immediately. The portion of the batch already delivered will not be affected (except any existing deviation from the desired ratio will still be taken into account if possible). The remainder of the batch will be delivered using the blend percentages specified by the new recipe.

If Recipe Select inputs are defined, the NR command will override the recipe selected via the digital inputs.

**Constraints:**

Unlimited preset mode only

**Special Case:**

None

**Comm. Modes:**

Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code OA—Other Arm Addresses

This command requests the address of the other arm(s) configured in this AccuLoad IV.

**Command:**

"OA"

**Responses:**

**"OA\_WW\_XX\_YY\_ZZ\_AA\_BB" Good Response.**

**Where:** WW = address of Arm 1 (00—99)  
          XX = address of Arm 2 (00—99)  
          YY = address of Arm 3 (00—99)  
          ZZ = address of Arm 4 (00—99)  
          AA = address of Arm 5 (00—99)  
          BB = address of Arm 6 (00—99)

or...

**"NOXX"** The address was not returned.

**Remarks:** A value of zero indicates the arm cannot be addressed via communications.

**Constraints:** None

**Comm Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code OR—Output Relay

This command will activate or deactivate a general-purpose relay output.

**Command:**

```

"OR_XX_Y"

Where: XX = the output number (01—78)
       Y  = desired state (1 = on, 0 = off)
    
```

**Responses:**

<b>"OK"</b>	<b>Good Response.</b> The command was accepted and the desired state was output to the selected contact.
or...	
<b>"NOXX"</b>	The command was rejected. The AccuLoad did not request a state change at the selected output.

**Remarks:** "NO03" will be returned if XX or Y is out of range. "NO06" will be returned if the output is not assigned as a general-purpose output.

**Constraints:** This command will not be allowed if the corresponding relay is not configured as a general-purpose relay.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code PC—Change Program Code Values

This command instructs the AccuLoad IV to change the value of one of the programmable entries (001 through 9999) in the directory specified.

### Command:

"PC\_DD\_XXX\_V...V"

or...

"PC\_DD\_XXXX\_V...V"

or...

"PC\_DD\_XXX+VVV.V" For alternate floating point parameters (see note)

or...

"PC\_DD\_XXXX+VVV.V" For alternate floating point parameters (see note)

**Where:** DD = Major Directory  
 = CF—Configuration  
 = SY—System  
 = AR—Arm  
 = Mx—Meter 1, 2, 3, 4, 5, or 6  
 = Px—Product 1, 2, 3, 4, 5, or 6  
 = BA—Bay A  
 = BB—Bay B  
 = 01-50—Recipe Number  
 X...X = Program Parameter Number  
 V...V = New Value, content depends on parameter

### Responses:

**Good Response:** See example responses below

"PV\_DD\_XXX\_V...V" Good Response for three-digit codes

or...

"PV\_DD\_XXXX\_V...V" Good Response for four-digit codes

**Where:** DD = Major Directory  
 = CF—Configuration  
 = SY—System  
 = AR—Arm  
 = Mx—Meter 1, 2, 3, 4, 5, or 6  
 = Px—Product 1, 2, 3, 4, 5, or 6  
 = BA—Bay A  
 = BB—Bay B  
 = 01-50—Recipe Number  
 X...X = Program Parameter Number  
 V...V = New Value, content depends on parameter

or...

"NOXX" The program value was not changed

- Remarks:** Due to the varying lengths of programmable text fields, the number of digits or alpha characters entered for a program code can number up to a maximum of 30. However, the number of digits or alpha characters stored will depend on the maximum length of the parameter being changed.
  
- Constraints:** Refer to the Reference section in the Operators Manual for a complete list of parameters in each directory.  
  
NO01 will be returned if another load arm is in the program mode locally or via communications.
  
- Special Case:** None
  
- Comm. Modes:** Poll & Authorize, Remote Control, Poll & Program
  
- Note:** The “+” argument appended to the PC command string affects the number of significant digits returned for floating point numbers. For the “+” version of the command, additional decimal digits may be included in the response beyond the specified format for the program code if they are non-zero (up to a maximum of six total digits to the right of the decimal point).

***Examples***

01PV 01 005	PV 01 005 000.0 1st Percentage
01PC 01 005 23.36	PC 01 005 023.4 1st Percentage
01PV 01 005	PV 01 005 023.4 1st Percentage
01PV 01 005+	PV 01 005 023.36 1st Percentage
01PC 01 005+23.64	PC 01 005 023.64 1st Percentage
01PV 01 005	PV 01 005 023.6 1st Percentage
01PV 01 005+	PV 01 005 023.64 1st Percentage

## Command Code PF—Request Time of Power-Fail

This command requests the time and date the last power-fail occurred.

### Command:

```
"PF"
```

### Responses:

```
"PF_DDDDDDDD_AAAA_X" Good Response.
```

**Where:** DDDDDDDD = Power-fail Date

= (MMDDYYYY for Standard Time)

= (DDMMYYYY for Military Time)

AAAA = Power-fail Time (HHMM)

X = A (Standard Time — A.M.)

= P (Standard Time — P.M.)

= M (Military Time)

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code PN—Batch Net Mass for Vapor Recovery System

This command retrieves the net mass for a batch. The net mass is the mass measured from the delivery meter (ex. Meter #1) less the mass measured by the vapor recovery meter (ex. Meter #2).

**Command:**

"PN" for the current batch net mass  
 "PP YY" for the completed batch net mass

**Responses:**

"PN\_MMMMMMM.MM" **Good Response.** Current batch net mass  
 "PN\_YY\_MMMMMMM.MM" **Good Response.** Completed batch net mass  
  
**Where:** YY = batch number (1-10)  
 MMMMMMM.MM = batch net mass  
  
 or...  
  
 "NOXX"

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code PP—Print Report to Printer

This command initiates a reprint of the requested transaction at the printer for the arm.

**Note:** This command code is available only when using Revision 10 and above firmware.

### Command:

<b>"PP"</b>	for the most recently completed transaction
<b>"PP NNN"</b>	for NNN transactions back in local storage
<b>"PP ST"</b>	for standby transactions that have failed to print

### Responses:

<b>Good Response:</b>	"OK"
	or...
	<b>"NOXX"</b>
<b>Where:</b>	XX = "41" No pending reports to print

**Remarks:** None

**Constraints:** A printer port must be configured.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code PR—Program Change Recall

This command retrieves program mode changes from the AccuLoad audit trail log using the sequence number of the data.

**Command:**

```
"PR_S...S"

Where: S...S is the sequence number
```

**Responses:**

```
Good Response: "PR_SSSSSSSSS_DDDDDD_HHNN_X_EEEEE_A...A"

Where: SSSSSSSSS = Sequence number
       DDDDDDD = Standard Time "MMDDYYYY"
              or Military Time "DDMMYYYY"
           MM = Month
           DD = Day
           YYYY = Year
           HH = Hours
           NN = Minutes
           X = A (Standard Time—A.M.), P (Standard Time—P.M.), M (Military Time)
       EEEEE = Type Number—Returned, but not currently used
       A...A = 0_WW_ZZZ <Tab> Old Data <Tab> New Data
           WW = Directory designation
           00 = System
           Px = Product Number (01—06)
           00 = Recipe Number (01—50)
           ZZZ = Program Code Number

or...

"NOXX" Data not retrieved.
```

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Poll & Authorize, Remote Control, Poll & Program

### Command Code PS—Last Program Code Change Recall

This command retrieves the last changed program codes sequence number for a program mode change stored by AccuLoad IV in the program change (audit) log.

**Command:**

"PS" (Deprecated form use "PS\_N")

"PS\_X"

"PS\_X\_DDDDDDDD\_HHNN\_Y" (for X = "D")

**Where:** X = N = Newest (most recent) entry  
           O = Oldest entry still available  
           D = Most recent entry on or before a specified date/time

For "PS\_D" the date argument above must be in the format specified

Where: DDDDDDDD is the date (MM DD YYYY for Standard Convention and DD MM YYYY for Military Convention)

HHH is the time

X is the time type (A for A.M., P for P.M., M for Military)

**Responses:**

"PS\_SSSSSSSSS"      **Good Response.** (Deprecated form)

"PS\_X\_SSSSSSSSS"    (all others)

**Where:** SSSSSSSSSS = Sequence number

or...

"NOXX" Sequence number not retrieved.

**Remarks:**            None

**Constraints:**        None

**Special Case:**       None

**Comm Modes:**        Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code PT—Print Transaction to Host

This command allows a transaction report to be generated directly to the host over the existing communications line. The AccuLoad first responds with an OK response (framed normally per the current host protocol) followed by the report text. No additional framing characters appear before, during, or after the report text.

### Command:

"PT" for the most recently completed transaction  
  
"PT NNN" for NNN transactions back in local storage

### Responses:

#### Good Response:

"OK" (followed by the report text)

or...

"NOXX"

**Remarks:** None

**Constraints:** A printer port must be configured.

**Special Case:** This case is not supported via TCP/IP (Ethernet or SLIP).

**Comm Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code PV—Request Program Code Values

This command requests program values from the AccuLoad IV.

### Command:

"PV\_DD\_XXX"

or...

"PV\_DD\_XXXX"

or...

"PV\_DD\_XXX+ " For alternate floating point response (see note)

or...

"PV\_DD\_XXXX+ " For alternate floating point response (see note)

**Where:** DD = Major Directory  
 = CF—Configuration  
 = SY—System  
 = AR—Arm  
 = Mx—Meter 1, 2, 3, 4, 5, or 6  
 = Px—Product 1, 2, 3, 4, 5, or 6  
 = 01-50—Recipe Number  
 = BA—Bay A  
 = BB—Bay B  
 X...X = Program Code Number  
 + = See note on next page

### Responses:

"PV\_DD\_XXX\_V...V" Good Response for three-digit codes

"PV\_DD\_XXXX\_V...V" Good Response for four-digit codes

**Where:** DD = Directory  
 = CF—Configuration  
 = SY—System  
 = AR—Arm  
 = Mx—Meter 1-6  
 = Px—Product 1-6  
 = 01-50—Recipe Number  
 = BA—Bay A  
 = BB—Bay B  
 X...X = Program Code Number  
 V...V = Value of the parameter

or...

"NOXX" Program value not read.

- Remarks:** None
- Constraints:** None
- Special Case:** None
- Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program
- Note:** The “+” argument appended to the PV command string affects the number of significant digits returned for floating point numbers. For the “+” version of the command, additional decimal digits may be included in the response beyond the specified format for the program code if they are non-zero (up to a maximum of six total digits to the right of the decimal point).

**Examples**

01PV 01 005	PV 01 005 000.0 1st Percentage
01PC 01 005 23.36	PC 01 005 023.4 1st Percentage
01PV 01 005	PV 01 005 023.4 1st Percentage
01PV 01 005+	PV 01 005 023.36 1st Percentage
01PC 01 005+23.64	PC 01 005 023.64 1st Percentage
01PV 01 005	PV 01 005 023.6 1st Percentage
01PV 01 005+	PV 01 005 023.64 1st Percentage

### Command Code PX—Transaction Net Mass for Vapor Recovery System

This command retrieves the net mass for a transaction. The net mass is the mass measured from the delivery meter (ex. Meter #1) less the mass measured by the vapor recovery meter (ex. Meter #2).

**Command:**

"PX" For the current transaction net mass

"PX\_NNN" For the historic transaction request

**Responses:**

"PX\_MMMMMMM.MM" **Good Response.** Current transaction net mass

"PX\_NNN\_MMMMMMM.MM" **Good Response.** Historical transaction net mass

**Responses:**

"PN\_MMMMMMM.MM" **Good Response.** Current transaction net mass

"PN\_YY\_MMMMMMM.MM" **Good Response.** Historical transaction net mass

**Where:** NNN = number of transactions back into local storage to retrieve data  
 MMMMMMM.MM = transaction net mass

or...

"NOXX"

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code RA—Request Alarm Status

This command requests current alarm conditions from the AccuLoad IV.

**Command:**

```
"RA_DD"

Where: DD = Major Directory
           = P1—Product 1
           = P2—Product 2
           = P3—Product 3
           = P4—Product 4
           = P5—Product 5
           = P6—Product 6
           = AR—Arm
           = IN—Injector
           = M1—Meter 1
           = M2—Meter 2 (ratio, hybrid blending configuration only)
           = M3—Meter 3 (ratio, hybrid blending configuration only)
           = M4—Meter 4 (ratio, hybrid blending configuration only)
           = M5—Meter 5 (ratio, hybrid blending configuration only)
           = M6—Meter 6 (ratio, hybrid blending configuration only)
```

**Responses:**

<b>"HF OA TP"</b>	<b>Good Response.</b> A character string consisting from 1 to 5 status codes separated by a single space. Each status code is two characters.
<b>"OK"</b>	OK is returned if there are no alarms for that directory
<b>"NOXX"</b>	Bad response

**Remarks:** The good response is a character string consisting from 1 to 5 status codes separated by a single space. Each status code is two characters, see AR for Alarm Mnemonics.

If alarms exist for any injector, the two-character alarm code will be included in the response string. To determine the specific injector experiencing the alarm condition, the EA command must be used.

**Constraints:** NO31 will be returned if the command format does not match the current configuration of the arm.

**Special Case:** If no alarm condition is set, an "OK" response is issued.

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program.

## Command Code RB—Request Batch Totals

This command retrieves batch data from the AccuLoad IV.

### Command:

#### Current Transaction

"RB"	Current batch volume, delivery volume type
"RB_Px"	Current batch, specified product (ratio, sequential, hybrid)
"RB_YY"	Completed batch volume, delivery volume type
"RB_YY_X"	Completed batch volume, specified volume type
"RB_YY_Px"	Product volume of batch, delivery volume type
"RB_YY_X_Px"	Product volume of batch, specified volume type

#### Local Storage Transaction

"RB_YY_NNN"	Historic transaction requests
"RB_YY_Px_NNN"	Returns the product volume type
"RB_YY_X_NNN"	Returns the batch in the volume type requested if that volume type was stored.
"RB_YY_Z_Px_NNN"	Returns the product in the volume type requested if that volume type was stored.

<b>Where:</b> X	= R for raw total (Indicated Volume—IV)
	= G for gross volume (GV)
	= N for gross @ standard temperature volume (GST)
	= P for net pressure & temperature volume (GSV)
	= M for mass total
Px	= Product 1, 2, 3, 4, 5, or 6
YY	= Batch Number requested (01-10)
NNN	= Number of transactions back into Local Storage to retrieve data

**Responses:**

<b>Current Transaction</b>	
"RB_YY_X_A1A2A3A4A5A6_RR_VVVVVVV"	For "RB," "RB_YY," and "RB_YY_X"
"RB_YY_X_A1A2A3A4A5A6_Px_VVVVVVV"	For "RB_YY_Px," "RB_YY_Px_X," and "RB_Px"
<b>Local Storage Transaction</b>	
"RB_YY_X_A1A2A3A4A5A6_RR_VVVVVVV_NNN"	For "RB_XX_NNN" and "RB_XX_X_NNN"
"RB_YY_X_A1A2A3A4A5A6_Px_VVVVVVV_NNN"	For "RB_XX_Px_NNN" and "RB_XX_Px_X_NNN"
<b>Where:</b> YY	= Batch number requested or current batch
X	= R for raw total = G for gross total = N for gross at standard temperature total = P for net temperature & pressure = M for mass totals
A1	= Additive selection code character 1
A2	= Additive selection code character 2
A3	= Additive selection code character 3
A4	= Additive selection code character 4
A5	= Additive selection code character 5
A6	= Additive selection code character 6
Px	= Product 1, 2, 3, 4, 5, or 6
RR	= Recipe Number 01—50
VVVVVVV	= average value (where most significant digit can be "-" minus sign)
NNN	= Number of transactions back into Local Storage to retrieve data.
or...	
<b>"NOXX"</b>	

- Remarks:** The batch is not considered complete until the start key is pressed for the next batch, or the transaction is ended. RB\_YY will always fail on the current batch even after BD status is reported in Command EQ or RS.  
See AU and AP for additive code (A1A2A3...).  
If bays are configured, the returned value is the bay-based batch total.
- Constraints:** Batch volume units are assumed as the type programmed into AccuLoad IV.  
NO03 will be returned for a product request if the product requested was not delivered in the batch.  
NO30 will be returned if the product specified is not currently configured to the arm to which the command was directed.  
NO31 will be returned if the product batch totals are requested for an arm currently configured for straight product delivery
- Special Case:** None
- Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code RC—Request Recipe Composition

This command requests the blend composition of the completed batch.

**Command:**

<b>Current Transaction</b>	
"RC_YY"	Request composition of the completed batch
<b>Local Storage Transaction</b>	
"RC_YY_NNN"	Request composition of a transaction stored in local storage
<b>Where:</b> YY	= Batch Number
NNN	= Number of transactions back into local storage

**Responses:**

<b>Current Transaction</b>	
"RC_YY_RR_AAA.A_BBB.B_CCC.C_DDD.D_EEE.E_FFF.F"	<b>Good Response.</b> Sequential Blending
<b>Local Transaction Storage</b>	
"RC_YY_RR_AAA.A_BBB.B_CCC.C_DDD.D_EEE.E_FFF.F_NNN"	<b>Good Response.</b>
<b>Where:</b> RR	= Recipe Number 01—50
YY	= Batch number
AAA.A	= Percentage of Product 1
BBB.B	= Percentage of Product 2
CCC.C	= Percentage of Product 3
DDD.D	= Percentage of Product 4
EEE.E	= Percentage of Product 5
FFF.F	= Percentage of Product 6
NNN	= Number of Transactions Back (for historical recall)
or...	
"NOXX"	The value was not read.
<i><b>Note:</b> Percentages are returned only for products configured for the arm. For example, if three products are configured for the load arm, the response will be shortened as the AccuLoad will suppress the product 4 percentage. Products appear in order (i.e., Product 1, Product 2...)</i>	

- Remarks:** Zero will be returned for products not delivered in the batch.  
If bays are configured, the returned value is the bay-based batch number's recipe composition.
- Constraints:** NO03 will be returned if the requested batch is incomplete or has not been delivered.  
NO31 will be returned if the recipe composition is requested for an arm currently configured for straight product delivery.
- Special Case:** None
- Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code RD—Request Current Transducer Value

This command requests the value of one of the probes or transducers installed and wired to the AccuLoad IV.

**Command:**

<b>"RD_Z"</b>	Request transducer value
<b>"RD_Z_Px"</b>	Request transducer value for the specified product
<b>Where:</b> Z = T (current temperature)	
	= P (current pressure)
	= D (current density)
	Px = Product 1, 2, 3, 4, 5, or 6

**Responses:**

<b>"RD_Z_VVVV.V"</b>	<b>Good Response.</b> Pressure or density, straight product
<b>"RD_Z_SVVVV.V"</b>	<b>Good Response.</b> Temperature, straight product.
<b>"RD_Z_VVVV.V_Px"</b>	<b>Good Response.</b> Pressure or density, ratio or sequential or hybrid blending
<b>"RD_Z_SVVVV.V_Px"</b>	<b>Good Response.</b> Temperature, ratio or sequential or hybrid blending.
<b>* "RD_Z_VVVV.V_VVVV.V_VVVV.V_VVVV.V"</b>	<b>Good Response.</b> Pressure or density, ratio blender
<b>"RD_Z_SVVVV.V_SVVVV.V"</b>	<b>Good Response.</b> Temperature, ratio blender
<b>* "RD_Z_SVVVV.V_SVVVV.V_SVVVV.V_SVVVV.V"</b>	<b>Good Response.</b> Temperature, ratio blender
<b>Where:</b> Z	= T (current temperature)
	= P (current pressure)
	= D (current density)
	VVVV.V = current pressure or density value
	SVVVV.V = current temperature value
	Px = Product 1, 2, 3, 4, 5, or 6
or...	
<b>"NOXX"</b>	The value was not read.

**Remarks:** Length of response \* depends on the number of meters programmed for the arm.

**Constraints:** NO30 will be returned if the requested product is not allocated to the arm to which the command was directed.

NO31 will be returned if the command format does not match the current configuration for the arm.

On a hybrid arm "RD\_Z" returns value for the sequential products meter. "RD\_Z\_Px" is for ratio assigned products only.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code RE—Reset Status Conditions

This command resets or acknowledges pending status conditions of the AccuLoad IV.

**Command:**

```
"RE_XX"

Where: XX = two-character code as detailed below
```

**Responses:**

```
"OK"    Good Response. Status condition has been reset. Status condition will no longer appear
         in response to status requests (EQ and RS)

or...

"NOXX"  The status condition has not been reset
```

**Remarks:** For bay configurations, the RE TD command clears the transaction done flag for the bay. RE BD still affects only the arm addressed.

**Constraints:** When using a card reader, RE CD will cancel card validation and prevent additional transactions without another card-in (if AccuLoad IV is configured for card-in required options).

**Special Case:** "TD" and "BD" statuses are also reset on authorize commands.

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

**Valid Status Codes for RE**

Code	Condition
BD	Batch Done Status
CD	Card Data Is Present
NC	Nedap Reader Communications Fail
PC	Program Mode Value Has Changed
PF	Unit Has Power-failed
SA	Standby Mode
TD	Transaction Done Status (also resets BD)
VT	Vehicle Data Request

**Note:** If the status code is already reset, a "NO06" will be returned.

### Command Code RF—Recipe Flow Rates

This command returns calculated first and second high flow rates and low flow rates for each of the products for a ratio blender. These flow rates are not the programmed flow rates. They represent the flow rates calculated by the AccuLoad according to the percentages programmed for this recipe.

**Command:**

```
"RF_RR"

Where: RR = Recipe Number (01—50)
```

**Responses:**

```
"RF_RR_HHHHH_SSSSS_LLLLL_HHHHH_SSSSS_LLLLL [HHHHH_SSSSS_LLLLL] [
HHHHH_SSSSS_LLLLL] [HHHHH_SSSSS_LLLLL] [HHHHH_SSSSS_LLLLL]"

Where: HHHHH = Product high flow rate
       SSSSS = Product second high flow rate
       LLLLL = Product low flow rate

Note: "[ ]" denote optional values; data is returned starting with Product 1 and counting up until the
number of products configured for that arm is reached.
or...

"NOXX"      Flow rates not returned.
```

- Remarks:** These flow rates are not the programmed flow rates, they represent the flow rates calculated by the AccuLoad to create a ratio blend which remains in spec throughout the duration of the batch, given the programmed blend ratio.
- Constraints:** NO31 will be returned if the command format does not match the current configuration of the arm/bay.
- Special Case:** None
- Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code RK—Read Keypad

This command instructs the AccuLoad IV to transmit any pending data entered at the keypad to the requesting device.

**Command:**

```
"RK"
```

**Responses:**

```

"RK_NNNN...N" Good Response.
Where: NNNN...N is a string of from 1 to 25 characters, where the final character is a non-numeric
terminating key represented as indicated below:

Numeric keypad data zero through nine will be represented by their ASCII character
equivalents.

The following are accepted as terminating keys only and will be represented as follows:
    Enter key ("ENTER") = "E"
    Print key ("PRINT") = "P"
    Start key ("START") = "A"
    Set key ("SET") = "B"

The Clear key ("CLEAR") has a function and therefore will not be represented on the
display. If pressed, the last character entered will be cleared and another character may be
entered in its place. If pressed a second time, the entire field will be cleared and the entry
will have to be repeated.

or...

"NOXX" Pending data was not available.
```

**Remarks:** The response string NNNN...N will contain leading zeros to the length of response specified in the prompt that was issued. If the expected input length for a prompt is 4 digits and only 2 digits are entered, 2 leading zeros and the 2 digits input at the keypad will be displayed in the response to the "RK." If the prompt was issued with the option for variable input field length (adding 40 to expected data length), leading zeros are still returned. If the prompt was issued with the delimiter "[" or "]," the initiating keystroke is NOT returned in the response to the "RK."

**Constraints:** Once a terminating key is pressed at the keypad the message "PLEASE WAIT" will be displayed. Keypad data is not cleared from the AccuLoad IV until a "WX," "WD," or "DA" command has been issued. After data pending, the keypad is locked until a "WX" or "WD" command has been issued for prompt or a "DA" command removes minicomputer control. If none of these occur within 3 minutes, AccuLoad IV will time-out and release the keypad and display from minicomputer control.

**Special Case:** None

**Comm. Modes:** Poll & Authorize (1) or Remote Control (2)

### Command Code RL—Show Recipes Loaded

This command requests a bitmap of recipes that have been loaded in the current or previous transaction.

**Command:**

<b>Current Transaction</b>	
"RL"	Requests recipes loaded in the transaction
<b>Local Storage Transaction</b>	
"RL_NNN"	Requests recipes loaded in an historical transaction
<b>Where:</b> NNN = number of transactions back into local storage	

**Responses:**

<b>Current Transaction</b>	
"RL_C1C2C3...C13"	<b>Good Response.</b> Bit map of the loaded recipes
<b>Local Storage Transaction</b>	
"RL_C1C2C3...C13_NNN"	<b>Good Response.</b> Bit map of the loaded recipes
<b>Where:</b> C1...C13 are bit mapped characters indicating recipes 01-50 (See command AB for tables.)	
NNN = number of transactions back into local storage	
or...	
"NOXX"	The bit map has not been returned.

**Remarks:** The recipes loaded bitmap will be cleared on authorization of a transaction (if Poll/Authorize or Remote Control) or when the AccuLoad is released for delivery for the first batch of a transaction (Polling Only). For bay-based transactions, this bitmap will show all recipes loaded for the bay.

**Constraints:** NO05 will be returned if no transaction has ever been completed.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code RN—Show Recipe Numbers

This command returns the recipe numbers for each of the batches loaded in the current or previous transaction.

**Command:**

<b>Current Transaction</b>	
"RN"	Requests recipe numbers loaded in the transaction
<b>Local Storage Transaction</b>	
"RN_NNN"	Requests recipes numbers loaded in an historical transaction
<b>Where:</b> NNN = number of transactions back into local storage	

**Responses:**

<b>Current Transaction</b>	
"RN_RR_RR_RR_RR_RR_RR_RR_RR_RR"	<b>Good Response.</b> Recipe numbers.
<b>Local Storage Transaction</b>	
"RN_RR_RR_RR_RR_RR_RR_RR_RR_RR_NNN"	<b>Good Response.</b> Recipes loaded in the historical transaction
<b>Where:</b> RR = Recipe number 01-50 NNN = number of transactions back into local storage	
or...	
<b>"NOXX"</b> The recipe number has not been returned.	

**Remarks:** Up to ten batches may be reported. The number of batches reported will be determined by the number of batches per transaction parameter and not the number of batches actually loaded in any given transaction. For bay-based transactions, the response will include all recipes loaded for the bay.

**Constraints:** NO05 will be returned if no transaction has ever been completed.  
  
If a batch was not delivered, 00 will be returned as the recipe number for the undelivered batch.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code RP—Request Preset

This command requests the current preset value being loaded at the AccuLoad IV.

### Command:

```
"RP"
```

### Responses:

```
"RP_XXXXXX" Good Response.
```

**Where:** XXXXXX = Preset Volume

or...

```
"NOXX" The current preset value was not read.
```

**Remarks:** The preset value is returned with leading spaces e.g., RP \_ \_  
\_1000.

**Constraints:** The preset value is only available from the AccuLoad IV while the AccuLoad IV is Authorized, Released, Flowing, and Transaction in Progress. RP will return the actual preset value from the time the load is started ("SA" command or pressing the "START" key) until batch done status is set.

**Special Case:** None. If bays are configured, an RP to an arm on the bay with no batch in progress will return " 'NO39'—No current batch on arm."

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program.

### Command Code RQ—Request Current Flow Rate

This command retrieves the current flow rate(s) from the AccuLoad IV.

**Command:**

<b>"RQ"</b>	Flow rate for the current product or system flow rate
<b>"RQ_Px"</b>	Flow rate for the specified product (ratio, hybrid ratio products)
<b>"RQ_P"</b>	Flow rate for all component products (ratio blending, hybrid blending)
<b>Where:</b>	P = Constant for ratio blending applications
	Px = Products 1, 2, 3, 4, 5, or 6 (P is a constant for ratio and hybrid blending applications)

**Responses:**

<b>"RQ_XXXX"</b>	<b>Good Response.</b> Current flow rate
<b>"RQ_XXXX_Px"</b>	<b>Good Response.</b> Flow rate of a specific product
<b>"RQ_XXXX_XXXX [XXXX] [XXXX] [XXXX] [XXXX]"</b>	<b>Good Response.</b> Flow rates for component products (ratio only)
<b>Where:</b>	XXXX = current flow rate
	Px = Products 1, 2, 3, 4, 5, or 6
	or...
<b>"NOXX"</b>	Flow rate was not returned.

**Remarks:** None.

**Constraints:** NO31 will be returned if the command format is inconsistent with the currently configured mode of operations.

**Special Case:** Hybrid Blending: RQ\_P will return flow rates for all ratio products. RQ returns flow rate for the sequential product currently flowing.

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code RR—Request Recipe

This command requests the current recipe number from AccuLoad IV.

### Command:

"RR"

### Responses:

"RQ\_NN" Good Response.

**Where:** NN = Recipe Number (01—50)

or

"NOXX" Recipe number not returned.

### Remarks:

The recipe number returned by the RR will remain in effect until another recipe is selected, either by allocating a single recipe (AB command) or by selection at the AccuLoad keypad. Neither batch done nor transaction done clears the recipe number from the "RR" response.

### Constraints:

NO05 will be returned if no transaction has ever been completed.

NO39 will be returned if bays are configured and an RR is sent to an arm with no batch in progress, when a bay transaction is in progress.

### Special Case:

None

### Comm. Modes:

Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code RS—Request Status

This command requests the operational status of the AccuLoad IV. Data is returned as two-character mnemonics for each status reported. A maximum of twenty status codes will be reported.

**Command:**

"RS"    Request Status
------------------------

**Responses:**

"XX_XX_XX_XX ..."	<b>Good Response.</b> A character string consisting of from 1 to 20 status codes separated by a single space. Each status code is two characters. See table on the following page for more information about status codes.
-------------------	--

**Remarks:**            The AccuLoad IV is considered released whenever the valve is open and has not been commanded to close.

Some alarm conditions cannot be reset through the Communication channel. (See Alarm Reset command.)

For bay configurations—SA, SF, TD, and TP—refer to the bay. Other flags continue to be specific to the load arm.

**Constraints:**            None

**Special Case:**            A trailing space is returned after the final status code.

**Comm. Modes:**            Polling only, Poll & Authorize, Remote Control, Poll & Program

#### Request Status Codes for RS

Code	Condition
AL	Alarm active
AU	Arm authorized
BD	Arm batch done
CD	Card data present
CE	Checking entries
DP	Delayed prompt is in effect ("WP" or "WQ" command)
FL	Arm flowing
I1	Input 1 on
I2	Input 2 on
I3	Input 3 on
I4	Input 4 on
I5	Input 5 on
I6	Input 6 on
I7	Input 7 on
I8	Input 8 on
I9	Input 9 on
IA	Input 10 on
IB	Input 11 on
IC	Input 12 on
ID	Input 13 on
IE	Input 14 on

Code	Condition
IF	Input 15 on
IG	Input 16 on
IH	Input 17 on
II	Input 18 on
IJ	Input 19 on
IK	Input 20 on
IL	Input 21 on
IM	Input 22 on
IN	Input 23 on
JA	Input 24 (A4I, optional) on
JB	Input 25 (A4I, optional) on
JC	Input 26 (A4I, optional) on
JD	Input 27 (A4I, optional) on
JE	Input 28 (A4I, optional) on
JF	Input 29 (A4I, optional) on
JG	Input 30 (A4I, optional) on
JH	Input 31 (A4I, optional) on
JI	Input 32 (A4I, optional) on
JJ	Input 33 (A4I, optional) on
JK	Input 34 (A4I, optional) on
JL	Input 35 (A4I, optional) on
JM	Input 36 (A4I, optional) on
JN	Input 37 (A4I, optional) on
JO	Input 38 (A4I, optional) on
JP	Input 39 (A4I, optional) on
JQ	Input 40 (A4I, optional) on
JR	Input 41 (A4I, optional) on
JS	Input 42 (A4I, optional) on
JT	Input 43 (A4I, optional) on
KY	Keyboard data pending
LR	Pending (locked) reports
NC	Nedap Reader Communications Fail
PC	Program parameter changed
PD	Permissive delay active
PF	Power-fail has occurred since last reset
PP	Printing in progress
PR	Preset in Progress
PS	Printer standby (printer is down)
PW	In program mode
RL	Arm released
RS	Pending report storage full
TD	Arm transaction done
TO	Display message timed out
TP	Arm transaction in progress
SA	In standby mode
SF	Storage full
ST	Standby transactions exist
VT	New vehicle ID tag available

### Command Code RT—Request Transaction Totals

This command instructs AccuLoad IV to transmit the transaction data.

**Command:**

<b>Current Transaction</b>	
"RT_Z"	Transaction Volume—sum of the recipes
"RT_Z_RR"	Transaction single recipe volume
"RT_Z_Px"	Transaction volume for the product specified
<b>Local Storage Transaction</b>	
"RT_Z_NNN"	Transaction Volume - sum of the recipes
"RT_Z_RR_NNN"	Transaction single recipe volume
"RT_Z_Px_NNN"	Transaction volume for the product specified
<b>Where: Z</b>	= R for raw total (Indicated Volume—IV) = G for gross volume (GV) = N for gross @ standard temperature volume (GST) = P for gross @ standard temperature and pressure volume (GSV) = M for mass total
Px	= Product 1, 2, 3, 4, 5, or 6
RR	= Recipe 01—50, or "MR" to indicate multiple recipes
NNN	= Number of transactions back into local storage to retrieve data

**Responses:**

<b>Current Transaction</b>	
"RT_Z_YY_RR_VVVVVVV"	<b>Good Response.</b> Transaction volume—sum of the recipes
"RT_Z_YY_Px_VVVVVVV"	<b>Good Response.</b> Transaction volume—specified product
<b>Local Storage Transaction</b>	
"RT_Z_YY_RR_VVVVVVV_NNN"	<b>Good Response.</b> Transaction volume—sum of the products
"RT_Z_YY_Px_VVVVVVV_NNN"	<b>Good Response.</b> Transaction volume—specified product
<b>Where: Z</b>	= R for raw total (Indicated Volume—IV) = G for gross volume (GV) = N for gross @ standard temperature volume (GST) = P for gross @ standard temperature and pressure volume (GSV) = M for mass total
Px	= Products 1, 2, 3, 4, 5, or 6
YY	= Total number of batches
RR	= Recipe 01-50
VVVVVVV	= Total transaction volume
NNN	= Number of transactions back into local storage to retrieve data
or...	
"NOXX"	No transaction data was returned.

---

<b>Remarks:</b>	<p>For Total Volume Requests; (RT_Z and RT_Z_NNN) "MR" as the recipe number on the response indicates a multiple recipe transaction. Recipes delivered in batches can be determined via batch volume requests RB or by using the RL or RN commands.</p> <p>For bay configurations, the returned values represent bay transaction totals.</p>
<b>Constraints:</b>	<p>Transaction Volume Units are assumed to be as programmed into AccuLoad IV.</p> <p>NO03 will be returned for a product or recipe request if the product or recipe requested was not delivered in the transaction.</p> <p>NO30 will be returned if the product or recipe specified is not currently configured to the arm to which the command was directed.</p> <p>NO31 will be returned if product transaction totals are requested for an arm currently configured for straight product delivery.</p>
<b>Special Case:</b>	None
<b>Comm. Modes:</b>	Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code SA—Remote Start

This command remotely starts the AccuLoad IV as though the "START" key was pressed.

### Command:

"SA"

### Responses:

"OK"     **Good Response.** AccuLoad IV is released for flow to begin

or...

"NOXX"   AccuLoad IV is not released for remote start.

**Remarks:**            None

**Constraints:**        NO01 will be returned if the AccuLoad is in the program mode locally or via communications.

**Special Case:**        None

**Comm. Modes:**        Poll & Authorize or Remote Control

## Command Code SB—Set Batch

This command authorizes a batch and presets Batch Volumes for a transaction.

### Command:

```
"SB_VVVVVV"
```

```
"SB_A1A2A3A4A5A6_VVVVVV"
```

**Where:** A1A2A3A4A5A6 = Additive selection code  
 VVVVVV = Volume to preset

### Responses:

**"OK"** **Good Response.** Batch volume has been accepted

or...

**"NOXX"** The batch volume has not been set.

### Remarks:

If the additive qualifier (A1A2A3...) is not used, the additive selection will operate as currently programmed in the AccuLoad IV. For authorization with additives, only one recipe may be allotted. Additives selected in the qualifier must be programmed for use. Additives will be injected for all components of the blend recipe. If more than one recipe is enabled, the "Select Recipe" prompt will be displayed.

See also Remarks for "AB" - Allocate Blend Recipes command.  
 (\*)

See Command Codes AP and AU for a description of A1A2... characters.

### Constraints:

Batch volume must not exceed programmed maximum batch size and must not be below the programmed minimum batch size. Units value must correspond to what is programmed into AccuLoad IV for units of measurement.

### Special Case:

An authorization command with batch size of 0 allows the driver to select batch size. Driver may clear any preset batch size and enter a new batch volume providing that it is less than the preset batch size. A batch amount of zero while in the Auto Preset Mode will result in the maximum batch amount being displayed; a non-zero set batch amount will override the maximum batch amount as the auto preset amount and cannot be overridden by the driver while in the Auto Preset Mode.

**Comm. Modes:** Remote Control.

### Command Code SD—Set Date and Time

This command sets the date and time in the AccuLoad IV.

**Command:**

```
"SD_DDDDDDDD_HHNN_X"

Where: DDDDDDDD = MMDDYYYY (Standard Time)
          DDDDDDDD = DDMMYYYY (Military Time)
          MM      = Month
          DD      = Day
          YYYY    = Year
          HH      = Hours
          NN      = Minutes
          X       = A (Standard Time—A.M.)
                  = P (Standard Time—P.M.)
                  = M (Military Time)
```

**Responses:**

```
"OK"           Good Response: Time and date value accepted and seconds reset to zero
or...

"NOXX"        The time and date were not accepted.
```

**Remarks:** None

**Constraints:** Time value must be within range programmed into AccuLoad IV - 0000 to 2359 for Military, 0000 to 1259 for Standard; month must be within the range of 1 to 12; day must be in the range valid for the month chosen.

**Special Case:** Leading spaces may be used in place of leading zeros for month, day, year, hours, and minutes. However, this is not recommended.

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code SF—Authorize and Set Fixed Amount Batch (without Override)

This command is similar to the 'SB—Set Batch' command in that it allows an automation system to authorize a batch in remote control with a predefined batch volume. However unlike with 'SB' the amount specified cannot be overridden by the driver. The display appears in full screen mode.

**Command:**

```
"SF_VVVVVV"

"SF_A1A2A3A4A5A6_VVVVVV"

Where: A1A2A3A4A5A6 = Additive selection code
          VVVVVV      = Volume to preset
```

**Responses:**

<b>"OK"</b>	<b>Good Response:</b> Batch volume has been accepted
or...	
<b>"NOXX"</b>	The batch volume has not been set.

**Remarks:**

If the additive qualifier (A1A2A3...) is not used, the additive selection will operate as currently programmed in the AccuLoad IV. For authorization with additives, only one recipe may be allotted. Additives selected in the qualifier must be programmed for use. Additives will be injected for all components of the blend recipe. If more than one recipe is enabled, the "Select Recipe" prompt will be displayed.

See also Remarks for "AB" - Allocate Blend Recipes command.  
(\*)

See Command Codes AP and AU for a description of A1A2A3... characters.

**Constraints:**

Batch volume must not exceed programmed maximum batch size and must not be below the programmed minimum batch size. Units value must correspond to what is programmed into AccuLoad IV for units of measurement.

**Comm. Modes:**

Remote Control

### Command Code SP—Remote Stop

This command instructs the AccuLoad IV to stop, halting product delivery on all arms.

**Command:**

"SP"
------

**Responses:**

"OK"	Good Response.
or...	
"NOXX"	The AccuLoad IV was not stopped.

**Remarks:** None

**Constraints:** Valve and pump are shut down whether flow is present or not. If a batch is in progress, the "START" key or the Remote Start command "SA" must be used to continue the batch.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code SR—Show Recipes Currently Allocated

This command requests from the AccuLoad IV recipes that are currently allocated.

**Command:**

```
"SR"
```

**Responses:**

```
"SR_C1C2C3...C13"           Good Response.

Where: C1...C13 are bit mapped characters indicating recipes 01-50. See AB command for
           recipe bit maps for C1—C13.
```

**Remarks:**

1. Before recipes are allocated with the "AB" command, the response from the "SR" will show all recipes that are currently programmed for this load arm at the AccuLoad IV. After recipes are allocated, the response from the "SR" will show only those recipes selected in the "AB." Recipe allocation is canceled when transaction done status is set.
2. See also Remarks for "AB" - Allocate Blend recipes command.  
(\* )

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code ST—Remote Stop on Arm

This command instructs the AccuLoad IV to stop flow on an individual arm, halting product delivery on that arm only. Any other arms with flow in progress are not affected.

**Command:**

<b>"ST"</b>	Stop Arm Flow
-------------	---------------

**Responses:**

<b>"OK"</b>	<b>Good Response.</b>
or...	
<b>"NOXX"</b>	The flow to the arm was not stopped.

**Remarks:** None

**Constraints:** Valve and pump are shut down whether flow is present or not. If a batch is in progress, the "START" key or the Remote Start command "SA" must be used to continue the batch.

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code SV—Extended Services Routines

This command is for factory use.

### Command:

"SV"<packet>

**Where:** <packet> is a binary buffer, no longer than 1K bytes.

### Responses:

**Good Response.**

"SV"<packet>

**Where:** <packet> is a binary buffer, no longer than 1K bytes

or...

"NOXX" Data not retrieved.

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm. Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code SW—Swing Arm Position

This command allows the host communications protocol to detect the current position of the swing arm.

### Command:

"SW"

### Responses:

#### Response: SW\_S

**Where:** X = "A" for Side A  
          = "B" for Side B  
          = "?" for arm in transit

or...

#### "NOXX"

**Where:** XX = "03" Value Rejected  
          = "07" Wrong Control Mode  
          = "19" Option Not Installed

**Remarks:** None

**Constraints:** None

**Special Case:** A "NO19" response occurs when there are no detect switches configured for that arm.

**Comm Modes:** Polling Only, Poll & Program, Poll & Authorize, and Remote Control

### Command Code TA—Set Transaction

This command sets the maximum transaction volume.

**Command:**

<p>"TA_V...V"</p> <p><b>Where:</b> V...V = Maximum Preset Total for Transaction</p> <p>Range = 0—999999</p>
---

**Responses:**

<p>"OK"</p> <p>or...</p> <p>"NOXX"</p>	<p><b>Good Response.</b> The transaction volume has been accepted</p> <p>The transaction volume was not accepted.</p>
--	---

**Remarks:** None

**Constraints:** Unit value must correspond to what is programmed into the AccuLoad IV for units of measurement and for delivery and preset display.

A "NO19" response occurs when there are no detect switches configured for that arm.

**Special Case:** None

**Comm Modes:** Poll & Authorize or Remote Control

### Command Code TI—Show Prompt Data Entry

This command retrieves the current or stored prompts data entered in the AccuLoad IV by the operator in response to one of five local prompts configured at and issued by the AccuLoad.

**Command:**

**Current Transaction**

"TI\_X"

**Local Storage Transaction**

"TI\_X\_NNN"

**Where:** X = Prompt number (1 through 5)

          NNN = Number of transactions back into local storage to retrieve data

**Responses:**

**Current Transaction**

"TI\_X\_AAAAAAAAA"           **Good Response.**

**Local Storage Transaction**

"TI\_X\_AAAAAAAAA\_NNN"       **Good Response.**

**Where:** X                   = Prompt Number (1—5)

          AAAAAAAA       = Prompt Data Entry (Numeric)

          NNN               = Number of transactions back into local storage to retrieve data

or...

"NOXX"                       No prompt data retrieved.

**Remarks:**           None

**Constraints:**       This information does not include responses to prompts issued by the communication commands WA, WD, WP, WQ or WX.

**Special Case:**       None

**Comm Modes:**       Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code TN—Show Transaction Stop Date and Time

This command retrieves the transaction stop date and time and internal transaction number.

**Command:**

**Current Transaction**

"TN"

**Local Storage Transaction**

"TN\_NNN"

**Where:** NNN = Number of transactions back into local storage to retrieve data

**Responses:**

**Current Transaction**

"TN\_IIII\_DDDDDDDD\_AAAA\_X"      **Good Response.**

**Local Storage Transaction**

"TN\_IIII\_DDDDDDDD\_AAAA\_X"      **Good Response.**

**Where:**

IIII	= Internal Transaction Number
DDDDDDDD	= Transaction Stop Date
	= (MMDDYYYY for Standard Time)
	= (DDMMYYYY for Military Time)
AAAA	= Transaction Stop Time (HHMM)
X	= A (Standard Time - A.M.)
	= P (Standard Time - P.M.)
	= M (Military Time)

or...

"NOXX"                      The transaction stop date and time were not retrieved.

**Remarks:**              None

**Constraints:**            None

**Special Case:**           None

**Comm Modes:**          Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code VB—Batch Vapor Recovered Mass

This command retrieves the vapor recovered mass for a batch.

**Command:**

"VB"	Current batch recovered mass
"VB_YY"	Completed batch mass
"VB_YY_NNN"	Historical transaction request

**Responses:**

"VB_MMMMMMM.MM"	Current batch mass
"VB_YY_MMMMMMM.MM"	Completed batch mass
"VB_YY_NNN_MMMMMMM.MM"	Historic
<b>Where:</b> YY = Batch number (1-10)	
NNN = Number of transactions back into local storage to retrieve data	
MMMMMMM.MM = Batch mass	
or...	
"NOXX"	

**Remarks:** None

**Constraints:** None

**Special Case:** None.

**Comm Modes:** Polling Only, Poll & Program, Poll & Authorize, and Remote Control

### Command Code VC—Control Valve Solenoid Actuation Diagnostic Counters

This command retrieves the solenoid actuation counts from the AccuLoad IV.

**Command:**

"VC"	Read solenoid actuation counts (straight, sequential, unloading arms)
"VC_Mx"	Read solenoid actuation counts (specific meter's control valve on ratio/hybrid arm)
"VC_Ix"	Flow controlled injector
"VC_S_VVVVVVVV"	Set/reset actuation count (straight, sequential, unloading arms)
"VC_Mx_S_VVVVVVVV"	Set/reset actuation count (ratio, hybrid arms)
"VC_Ix_S_VVVVVVVV"	Set/reset actuation count for flow controlled injector valve

**Responses:**

"VC_XXXXXXXX_YYYYYYYY"	<b>Good response.</b> Solenoid counts (straight, sequential arms)
"VC_Mx_XXXXXXXX_YYYYYYYY"	<b>Good response.</b> Solenoid counts (straight, Hybrid arms)
"VC_Ix_XXXXXXXX_YYYYYYYY"	<b>Good response.</b> Solenoid counts (flow controlled injector)
"OK"	<b>Good response.</b> Sets/resets actuation count (VC_S_VVV.V; VC_Mx_S_VVV.V)

*Note: The solenoid actuation count values returned will be padded with leading zeroes.*

**Where:** X = "1" through "6" for meter 1 through 6 respectively  
 S = "U" for Upstream solenoid, "D" for Downstream solenoid  
 VVVVVVVV = Count value (reset to 0 assumed if not specified)  
 XXXXXXXX = Current value of upstream solenoid counter  
 YYYYYYYY = Current value of downstream solenoid counter

**Constraints:** Not available with transaction in progress (NOXX).

**Special Case:** For injectors (Ix), must be a flow controlled type.

**Comm Modes:** Polling Only, Poll & Program, Poll & Authorize, and Remote Control

### Command Code VD—Valve (Closure) Diagnostic

This command retrieves the time it takes for the product flow control valve to completely close, the volume of product that has been delivered and the flow rate at the time after the STOP button (or remote stop) has been pressed. This command will also retrieve the same information if there is a loss of permissive resulting in valve closure or if a communication command is issued to stop the batch.

**Command:**

<b>"VD"</b>	Capture latest valve diagnostic data for valve on meter 1 (straight, sequential, unloading arms)
<b>"VD_Mx"</b>	Capture latest valve diagnostic data for specified valve (ratio/hybrid arms)
<b>"VD_R"</b>	Reset valve diagnostic data on load arm (straight, sequential, unloading arms).
<b>"VC_Mx_R"</b>	Reset valve diagnostic data for a specified valve on a load arm (ratio/hybrid arms)
<b>Where:</b> X = Meter number on the load arm	

**Responses:**

<b>"VD_TT.T_AAA_FFFFFFFF"</b>	<b>Good response.</b>
<b>"VD_Mx_TT.T_AAA_FFFFFFFF"</b>	<b>Good response.</b>
<b>"OK"</b>	<b>Good response.</b> Valve diagnostic reset
<b>"OK"</b>	Specific valve diagnostic reset
<b>Where:</b> TT.T = Time in seconds that was required before zero flow occurred	
AAA = Amount of volume delivered after valve commanded to close	
FFFFFFF = Flow rate of product when batch was commanded to stop	
or...	
<b>"NOXX"</b> XX = "31" Invalid for current configuration.	

**Remarks:** To indicate to the host computer system that a new set of valve diagnostic data is available, the response from the EE command will be updated with a "New Valve Diagnostic Data Available" flag. The bit for the status condition will be set when the batch is stopped due to the conditions indicated above. When the batch is resumed or ended the flag will be cleared.

**Constraints:** NO31 will be returned if the command format does not match the current configuration of the arm.

NO31 will be returned if the arm is not configured for "Straight with VRS."

**Special Case:** None

**Comm Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

## Command Code VT—Request Meter Totalizer Data from the AccuLoad IV

This command requests a totalizer value from the AccuLoad IV.

### Command:

"VT_Z_Px"	Product Non-resettable totals. Valid for sequential and ration blending configurations.
"VT_Aaa"	Additive non-resettable totals.
"VT_Z_RR"	Recipe non-resettable totals. Valid for any configuration.
"VT_Z_Y_Px"	Product starting or ending non-resettable total for current transaction.
"VT_Z_Y_Px_NNN"	Product starting or ending non-resettable totals for previous transactions.
"VT_V"	Non-resettable totals for the vapor recovered mass for the load arm (Straight with VRS)

**Where:** Aaa = A01 (Additive 1)

= A02 (Additive 2)

= • :

= • :

= • :

= A24 (Additive 24)

Z = R for raw total (Indicated Volume—IV)

= G for gross volume (GV)

= N for gross at standard temperature volume (GST)

= P for gross at standard temperature and pressure volume (GSV)

= M for mass totals

Px = Product 1, 2, 3, 4, 5, or 6

RR = Recipe Number 01—50

Y = S for starting non-resettable total, E for ending non-resettable

NNN = Number of transactions back

V = Vapor recovered mass for the load arm

**Responses:**

"VT_Z_Px_VVVVVVVV"	<b>Good Response.</b> Product Totals, blending configuration
"VT_Aaa_VVVVVV.VVV"	<b>Good Response.</b> Additive Totals
"VT_Z_RR_VVVVVVVV"	<b>Good Response.</b> Recipe Totals
"VT_Z_Y_Px_VVVVVVVV"	<b>Good Response.</b> Product starting or ending non-resettable total for current transaction
"VT_Z_RR_VVVVVVVV_NNN"	<b>Good Response.</b> Product starting or ending non-resettable totals for previous transactions
"VT_V_VVVVVVVV "	<b>Good Response.</b> Vapor recovered mass
<b>Where:</b>	
Z	= R for raw total (Indicated Volume—IV) = G for gross volume (GV) = N for gross volume at standard temperature (GST) = P for net volume temperature and pressure (GSV) = M for mass totals
VVVVVVVV	= 9-digit totalizer volume
Aaa	= A01 (Additive 1) = A02 (Additive 2) = A03 (Additive 3) = • : = • : = A24 (Additive 24)
Px	= Product 1, 2, 3, 4, 5, or 6
RR	= Recipe Number 01—50
Y	= S for starting non-resettable total = E for ending non-resettable
NNN	= Number of transactions back
or...	
"NOXX"	Totals were not retrieved.

**Remarks:**

If the AccuLoad is programmed for "dynamic leakage update" (System 336), the non-resettable totals will be updated with leakage volume while the AccuLoad is idle. The "VT Z Px" command will return the current value of the non-resettable totals which will include any leakage that has occurred since the end of the last transaction.

If the AccuLoad is programmed for “update non-resettables with leakage at transaction start” (System 336), the non-resettable totals will remain static while the AccuLoad is idle (i.e. leakage will not be added until start of next transaction). The “VT Z Px” command will return the value of the non-resettable totals captured at the end of the last transaction.

As always, if a transaction is in progress, the “VT Z Px” command will return the current value of the dynamically updated non-resettable totals.

The “VT Z S” command may be sent at any time during or after a transaction to retrieve the non-resettable totals captured at the start of the transaction.

If “VT X E” is sent while the AccuLoad is idle, the non-resettable totals captured at the end of the last transaction will be returned. This value will not include any leakage that may have occurred after the last transaction is ended.

If “VT Z E” is sent to retrieve the ending transaction non-resettable totals while a transaction is still in progress, and will be appended to the volume indicating the value returned may not be the final value.

Products, Recipes, and Additives must be allocated to the arm addressed.

**Constraints:** NO30 will be returned if the additive component, or recipe requested is not currently configured to the arm to which the request was directed.

NO31 will be returned if the arm is not configured for “Straight with VRS.”

**Special Case:** None

**Comm Modes:** Polling only, Poll & Authorize, Remote Control, Poll & Program

### Command Code VX—Transaction Vapor Recovered Mass

This command retrieves the vapor recovered mass for a transaction.

**Command:**

"VX"	Current transaction recovered mass
"VX_NNN"	Historic transaction request

**Responses:**

"VX_MMMMMMM.MM"	Current transaction recovered mass
"VX_NNN_MMMMMMM.MM"	Historic transaction request
<b>Where:</b> NNN = Number of transactions back into local storage to retrieve data	
MMMMMM.MM = batch mass	
or...	
"NOXX"	

**Remarks:** None

**Constraints:** None

**Special Case:** None

**Comm Modes:** Polling Only, Poll & Program, Poll & Authorize, and Remote Control

### Command Code WA—Write Second Line of Message to Appear on Display

This command instructs the AccuLoad IV to display the second line of a message, up to 30 characters in length. The message is displayed on the line below the message specified with a WD, WP, WQ or WX command. The format is identical to these commands; however, the time out value is ignored. The delimiter character is not ignored; the last command set determines the expected input form.

**Command:**

**"WA\_NNN\_X...Xd99"**

**Where:** X...X = An alphanumeric character string of up to 30 characters (see Remarks).

NNN = timeout value in seconds. An entry of 000 will cause the timeout value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

d = A required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

& = Input data is entered directly with no initiator required; any function key except the "CLEAR" or the "STOP" may be used to terminate the input sequence.

[ = An "ENTER" key must initiate the input sequence; any function key except the "CLEAR" or "STOP" may be used to terminate the input sequence.

] = An "ENTER" key must initiate the input sequence; only an "ENTER" key will be accepted for terminating the input sequence.

**Note:** *The above delimiters are acceptable as part of the alphanumeric message.*

99 = Represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

**EXAMPLE:** To request an input field length of 5, enter "05." To also include the option, enter "45." If the option is not included the operator will have to put in 5 digits and then press the terminating key, any more than 5 digits and the message "Error Press Clear" will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host.

**Responses:**

**"OK"**      **Good Response.** Message has been accepted for the alphanumeric display (left justified)

or...

**"NOXX"**      The message was not accepted.

- Remarks:** The following characters can be displayed on the AccuLoad IV display. (X...X part of command).
- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
- a b c d e f g h i j k l m n o p q r s t u v w x y z
- 0 1 2 3 4 5 6 7 8 9
- + ! " # \$ % & ' ( ) - . / : ; < = > @ [ \ ^ \_ ' { | } ° ? \* space
- The message will be displayed on the third line of the display and will wrap to the fourth line where necessary.
- Constraints:** "WD" or "WX" must be issued first. Input field length must be zero if one was previously defined in the first message issued. If it is not, a "NO06" will be returned. "WA" cannot be used with delayed prompts "WP" or "WQ."
- NO01 will be returned if another load arm is in the program mode locally or via communications.
- Special Case:** None
- Comm Modes:** Poll & Authorize or Remote Control

## Command Code WB—Write Third Line of Message to Appear on Display

The WB command allows writing a 30-character message which is displayed two lines below the message specified with a WD, WP, WQ, or WX command. The format is identical to these commands; however, the timeout value is ignored. The delimiter character is not ignored. The last command set determines the expected input form.

The commands that write to lines other than the first (WA, WB, WC, WE) must be preceded by one of the prompt commands that write to the first line (WD, WP, WQ, WX).

### Command:

**"WB\_NNN\_X...Xd99"**

**Where:** X...X = An alphanumeric character string of up to 30 characters

NNN = Prompt timeout value (001-999)

d = A required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

& = Input data is entered directly with no initiator required; any function key except the "CLEAR" or the "STOP" may be used to terminate the input sequence.

[ = An "ENTER" key must initiate the input sequence; any function key except the "CLEAR" or "STOP" may be used to terminate the input sequence.

] = An "ENTER" key must initiate the input sequence; only an "ENTER" key will be accepted for terminating the input sequence.

**Note:** *The above delimiters are acceptable as part of the alphanumeric message.*

99 = Represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

**EXAMPLE:** To request an input field length of 5, enter "05." To also include the option, enter "45." If the option is not included the operator will have to put in 5 digits and then press the terminating key, any more than 5 digits and the message "Error Press Clear" will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host

### Responses:

**"OK"**      **Good Response.** Message has been accepted for the alphanumeric display (left justified)

or...

**"NOXX"**      The message was not accepted.

- Remarks:** The following characters can be displayed on the AccuLoad IV display. (X...X part of command).
- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
a b c d e f g h i j k l m n o p q r s t u v w x y z  
0 1 2 3 4 5 6 7 8 9  
+ ! " # \$ % & ' ( ) - . / : ; < = > @ [ \ ^ \_ ' { | } ° ? \* space
- The message will be displayed on the third line of the display and will wrap to the fourth line where necessary.
- Constraints:** "WD" or "WX" must be issued first. Input field length must be zero if one was previously defined in the first message issued. If it is not, a "NO06" will be returned. "WA" cannot be used with delayed prompts "WP" or "WQ."
- NO01 will be returned if another load arm is in the program mode locally or via communications.
- Special Case:** None
- Comm Modes:** Poll & Authorize or Remote Control

## Command Code WC—Write Fourth Line of Message to Appear on Display

The WC command allows writing a 30-character message which is displayed three lines below the message specified with a WD, WP, WQ, or WX command. The format is identical to these commands; however, the timeout value is ignored. The delimiter character is not ignored. The last command set determines the expected input form.

The commands that write to lines other than the first (WA, WB, WC, WE) must be preceded by one of the prompt commands that write to the first line (WD, WP, WQ, WX).

### Command:

**"WC\_NNN\_X...Xd99"**

**Where:** X...X = An alphanumeric character string of up to 30 characters

NNN = Prompt timeout value (001-999).

d = A required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

& = Input data is entered directly with no initiator required; any function key except the "CLEAR" or the "STOP" may be used to terminate the input sequence.

[ = An "ENTER" key must initiate the input sequence; any function key except the "CLEAR" or "STOP" may be used to terminate the input sequence.

] = An "ENTER" key must initiate the input sequence; only an "ENTER" key will be accepted for terminating the input sequence.

**Note:** The above delimiters are acceptable as part of the alphanumeric message.

99 = Represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

**EXAMPLE:** To request an input field length of 5, enter "05." To also include the option, enter "45." If the option is not included the operator will have to put in 5 digits and then press the terminating key, any more than 5 digits and the message "Error Press Clear" will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host

### Responses:

**"OK"**      **Good Response.** Message has been accepted for the alphanumeric display (left justified)

or...

**"NOXX"**      The message was not accepted.

- Remarks:** The following characters can be displayed on the AccuLoad IV display. (X...X part of command).
- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
a b c d e f g h i j k l m n o p q r s t u v w x y z  
0 1 2 3 4 5 6 7 8 9  
+ ! " # \$ % & ' ( ) - . / : ; < = > @ [ \ ^ \_ ' { | } ° ? \* space
- The message will be displayed on the third line of the display and will wrap to the fourth line where necessary.
- Constraints:** "WD" or "WX" must be issued first. Input field length must be zero if one was previously defined in the first message issued. If it is not, a "NO06" will be returned. "WA" cannot be used with delayed prompts "WP" or "WQ."
- NO01 will be returned if another load arm is in the program mode locally or via communications.
- Special Case:** None
- Comm Modes:** Poll & Authorize or Remote Control

### Command Code WD—Write to Display

This command instructs the AccuLoad IV to display a 30-character message. The time displayed and length of response are also specified in the command. Data will be echoed to the screen upon input by the operator. This command may be used alone or it may be used in conjunction with any combination of the WA, WB, WC or WE commands.

**Command:**

**"WD\_NNN\_X...Xd99"**

**Where:** X...X = An alphanumeric character string of up to 30 characters (see Remarks).

NNN = time-out value in seconds. An entry of 000 will cause the time-out value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

d = A required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

& = Input data is entered directly with no initiator required; any function key except the "CLEAR" or the "STOP" may be used to terminate the input sequence.

[ = An "ENTER" key must initiate the input sequence; any function key except the "CLEAR" or "STOP" may be used to terminate the input sequence.

] = An "ENTER" key must initiate the input sequence; only an "ENTER" key will be accepted for terminating the input sequence.

**Note:** *The above delimiters are acceptable as part of the alphanumeric message.*

99 = Represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

**EXAMPLE:** To request an input field length of 5, enter "05." To also include the option, enter "45." If the option is not included the operator will have to put in 5 digits and then press the terminating key, any more than 5 digits and the message "Error Press Clear" will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host

**Responses:**

**"OK"**      **Good Response.** Message has been accepted for the alphanumeric display (left justified)

or...

**"NOXX"**      The message was not accepted.

- Remarks:** The following characters can be displayed on the AccuLoad IV display. (X...X part of command).
- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
- a b c d e f g h i j k l m n o p q r s t u v w x y z
- 0 1 2 3 4 5 6 7 8 9
- + ! " # \$ % & ' ( ) - . / : ; < = > @ [ \ ^ \_ ' { | } ° ? \* space
- The message will wrap to the second line of the display where necessary.
- Constraints:** NO01 will be returned if another load arm is in the program mode locally or via communications.
- Special Case:** Keypad data pending flag and data are cleared.
- Comm Modes:** Poll & Authorize or Remote Control.

## Command Code WE—Write Fifth Line of Message to Appear on Display

The WE command allows writing a 30-character message which is displayed four lines below the message specified with a WD, WP, WQ, or WX command. The format is identical to these commands; however, the timeout value is ignored. The delimiter character is not ignored. The last command set determines the expected input form.

The commands that write to lines other than the first (WA, WB, WC, WE) must be preceded by one of the prompt commands that write to the first line (WD, WP, WQ, WX).

### Command:

**"WB\_NNN\_X...Xd99"**

**Where:** X...X = An alphanumeric character string of up to 30 characters

NNN = Prompt timeout value (001-999)

d = A required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

& = Input data is entered directly with no initiator required; any function key except the "CLEAR" or the "STOP" may be used to terminate the input sequence.

[ = An "ENTER" key must initiate the input sequence; any function key except the "CLEAR" or "STOP" may be used to terminate the input sequence.

] = An "ENTER" key must initiate the input sequence; only an "ENTER" key will be accepted for terminating the input sequence.

**Note:** The above delimiters are acceptable as part of the alphanumeric message.

99 = Represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

**EXAMPLE:** To request an input field length of 5, enter "05." To also include the option, enter "45." If the option is not included the operator will have to put in 5 digits and then press the terminating key, any more than 5 digits and the message "Error Press Clear" will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host

### Responses:

**"OK"**      **Good Response.** Message has been accepted for the alphanumeric display (left justified)

or...

**"NOXX"**      The message was not accepted.

- Remarks:** The following characters can be displayed on the AccuLoad IV display. (X...X part of command).
- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
- a b c d e f g h i j k l m n o p q r s t u v w x y z
- 0 1 2 3 4 5 6 7 8 9
- + ! " # \$ % & ' ( ) - . / : ; < = > @ [ \ ^ \_ ' { | } ° ? \* space
- The message will be displayed on the third line of the display and will wrap to the fourth line where necessary.
- Constraints:** "WD" or "WX" must be issued first. Input field length must be zero if one was previously defined in the first message issued. If it is not, a "NO06" will be returned. "WB" cannot be used with delayed prompts "WP" or "WQ."
- NO01 will be returned if another load arm is in the program mode locally or via communications.
- Special Case:** None
- Comm Modes:** Poll & Authorize or Remote Control

## Command Code WP—Write Delayed Prompt with Echo

This command sends a delayed prompt message to the AccuLoad IV. This message will be displayed when the "SET" key is pressed enabling the keypad for input. The time displayed and length of response are also specified in the command. Data will be echoed to the screen upon input by the operator. This command may be used alone or it may be used in conjunction with any combination of the WA, WB, WC or WE commands.

### Command:

**"WP\_NNN\_X...Xd99"**

**Where:** X...X = An alphanumeric character string of up to 30 characters (see Remarks).

NNN = time-out value in seconds. An entry of 000 will cause the time-out value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

d = A required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

& = Input data is entered directly with no initiator required; any function key except the "CLEAR" or the "STOP" may be used to terminate the input sequence.

[ = An "ENTER" key must initiate the input sequence; any function key except the "CLEAR" or "STOP" may be used to terminate the input sequence.

] = An "ENTER" key must initiate the input sequence; only an "ENTER" key will be accepted for terminating the input sequence.

**Note:** *The above delimiters are acceptable as part of the alphanumeric message.*

99 = Represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

**EXAMPLE:** To request an input field length of 5, enter "05." To also include the option, enter "45." If the option is not included the operator will have to put in 5 digits and then press the terminating key, any more than 5 digits and the message "Error Press Clear" will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host.

### Responses:

**"OK"** **Good Response.** Message has been accepted and will be displayed when the "SET" key is pressed at the start of a transaction only. Sets keypad pending status when keypad input is completed. Timer is not started until the "SET" key is pressed.

or...

**"NOXX"** The message was not accepted.

- Remarks:** The following characters can be displayed on the AccuLoad IV display. (X...X part of command).
- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
a b c d e f g h i j k l m n o p q r s t u v w x y z  
0 1 2 3 4 5 6 7 8 9  
+ ! " # \$ % & ' ( ) - . / : ; < = > @ [ \ ^ \_ ' { | } ° ? \* space
- The prompt will wrap to the second line of the display where necessary.
- Constraints:** Cancellation occurs on receiving a "DA" command or on power-down.
- NO01 will be returned if another load arm is in the program mode locally or via communications.
- Special Case:** The "DP" status bit will be set on acceptance of the "WP" command and cleared on cancellation (issuance of DA). The "TO" status bit will be cleared on acceptance of a DA.
- Comm Modes:** Poll & Authorize or Remote Control

### Command Code WQ—Write Delayed Prompt with Security Echo

This command sends a delayed prompt message to the AccuLoad IV. This message is displayed when the SET key is pressed enabling the keypad for input with security echo ("X"). The time displayed and length of response are also specified in the command. Data will be echoed to the screen upon input by the operator. This command may be used alone or it may be used in conjunction with any combination of the WA, WB, WC or WE commands.

**Command:**

**"WQ\_NNN\_X...Xd99"**

**Where:** X...X = An alphanumeric character string of up to 30 characters (see Remarks).

    NNN = time-out value in seconds. An entry of 000 will cause the time-out value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

    d = A required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

    & = Input data is entered directly with no initiator required; any function key except the "CLEAR" or the "STOP" may be used to terminate the input sequence.

    [ = An "ENTER" key must initiate the input sequence; any function key except the "CLEAR" or "STOP" may be used to terminate the input sequence.

    ] = An "ENTER" key must initiate the input sequence; only an "ENTER" key will be accepted for terminating the input sequence.

**Note:** *The above delimiters are acceptable as part of the alphanumeric message.*

    99 = Represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

**EXAMPLE:** To request an input field length of 5, enter "05." To also include the option, enter "45." If the option is not included the operator will have to put in 5 digits and then press the terminating key, any more than 5 digits and the message "Error Press Clear" will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host

**Responses:**

**"OK"**      **Good Response.** Message has been accepted and will be displayed when the "SET" key is pressed at the start of a transaction only. Sets keypad pending status once keypad input is completed. Timer is not started until the "SET" key is pressed.

or...

**"NOXX"**      The message was not accepted.

- Remarks:** The following characters can be displayed on the AccuLoad IV display. (X...X part of command).
- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
a b c d e f g h i j k l m n o p q r s t u v w x y z  
0 1 2 3 4 5 6 7 8 9  
+ ! " # \$ % & ' ( ) - . / : ; < = > @ [ \ ^ \_ ' { | } ° ? \* space
- The prompt will wrap to the second line of the display where necessary.
- Constraints:** Cancellation occurs on receiving a "DA" command or on power-down.
- NO01 will be returned if another load arm is in the program mode locally or via communications.
- Special Case:** The "TO" status bit will be cleared on acceptance of a DA command. The "DP" status bit will be set on acceptance of the "WQ" command and cleared on cancellation (issuance of a DA).
- Comm Modes:** Poll & Authorize or Remote Control

## Command Code WX—Write to the Display in Security Mode

This command sends a message to the AccuLoad IV and enables the keypad for input in an echo "X" or Security Mode. The time displayed and length of response are also specified in the command. Data will be echoed to the screen upon input by the operator. This command may be used alone or it may be used in conjunction with any combination of the WA, WB, WC or WE commands.

### Command:

**"WX\_NNN\_X...Xd99"**

**Where:** X...X = An alphanumeric character string of up to 30 characters (see Remarks).

NNN = time-out value in seconds. An entry of 000 will cause the time-out value to default to what was entered for the first display message or if a non-zero entry is used, it will override the previous value entered.

d = A required delimiter used to signify the input field. There are three different delimiters each indicating a unique handling of the input process. They are as follows:

& = Input data is entered directly with no initiator required; any function key except the "CLEAR" or the "STOP" may be used to terminate the input sequence.

[ = An "ENTER" key must initiate the input sequence; any function key except the "CLEAR" or "STOP" may be used to terminate the input sequence.

] = An "ENTER" key must initiate the input sequence; only an "ENTER" key will be accepted for terminating the input sequence.

**Note:** The above delimiters are acceptable as part of the alphanumeric message.

99 = Represents the input field length. This may be encoded to allow a variable length input field up to the length specified here. The range of the input length is 00 to 20. To encode the option of the variable length input, add 40 to the desired input field length.

**EXAMPLE:** To request an input field length of 5, enter "05." To also include the option, enter "45." If the option is not included the operator will have to put in 5 digits and then press the terminating key, any more than 5 digits and the message "Error Press Clear" will appear on the AccuLoad IV display. If the option is included, the terminating key can be pressed at any time sending data to the Host.

### Responses:

**"OK"**      **Good Response.** Message has been accepted for the alphanumeric display (left justified). Keypad enabled for input in Echo 'X' Mode.

or...

**"NOXX"**      The message was not accepted.

- Remarks:** The following characters can be displayed on the AccuLoad IV display. (X...X part of command).
- ABCDEFGHIJKLMNOPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz  
0123456789  
+!"#\$%&'()-./:;<=>@[ \ ^ \_ ' { } ° ? \* space
- The prompt will wrap to the second line of the display where necessary.
- Constraints:** NO01 will be returned another load arm is in the program mode locally or via communications.
- Special Case:** The "TO" status bit will be cleared on acceptance of a "WD," "WX," "WP" or "WQ" command. Also, keypad data pending flag and data are cleared.
- Comm Modes:** Poll & Authorize or Remote Control

### Command Code XC—Change Parameter Security Level

This command sets the current security levels for a program mode parameter using the AccuLoad III style directory code + program code number. This mechanism is deprecated and included for backward compatibility with AccuLoad III legacy automation interfaces. New implementations should use the AccuLoad IV specific 'XW' command.

**Command:**

```
"XC_XX_YYY...Z"
or ...
"XC_XX_YYYY...Z"

Where: X...X = Program mode major directory
           CF = Configuration
           SY = System
           AR = Arm
           Mx = Meter (1-6)
           Px = Product (1-6)
           01...50 = Recipe

           Y...Y = Parameter number

           Z = Security Level (1-5)
```

**Responses:**

```
"XC_XX_YYY_Z_A..A" Message was accepted.
or ...
"XC_XX_YYYY_Z_A..A" Message was accepted.

Where: X...X = Program mode major directory
           CF = Configuration
           SY = System
           AR = Arm
           Mx = Meter (1-6)
           Px = Product (1-6)
           01...50 = Recipe

           Y...Y = Parameter number

           Z = Security Level (1-5)

           A..A = The programmed value

or...
"NOXX"
```

**Remarks:** None

**Constraints:** Security level for parameters in the security directory cannot be modified (pass codes etc.).

**Special Case:** None

**Comm Modes:** Poll/Authorize, Remote Control, Poll/Program

### Command Code XV—Read Parameter Security Level

This command requests the current security levels for a program mode parameter using the AccuLoad III style directory code and program code number. This mechanism is deprecated and included for backward compatibility with AccuLoad III legacy automation interfaces. New implementations should use the AccuLoad IV specific 'XR' command.

**Command:**

```

"XV_XX_YYY"

or ...

"XV_XX_YYYY"

Where: X...X = Program mode major directory
          CF = Configuration
          SY = System
          AR = Arm
          Mx = Meter (1-6)
          Px = Product (1-6)
          01...50 = Recipe

          Y...Y = Parameter number
    
```

**Responses:**

```

"XV_XX_YYY_Z_A..A"    Message was accepted.

or ...

"XV_XX_YYYY_Z_A..A"   Message was accepted.

Where: XX = Program mode major directory
          CF = Configuration
          SY = System
          AR = Arm
          Mx = Meter (1-6)
          Px = Product (1-6)
          01...50 = Recipe

          Y...Y = Parameter number

          Z = Currently programmed security level

          A..A = The programmed value

or...

"NOXX" Message was not accepted.
    
```

**Remarks:** None

**Constraints:** Security level for parameters in the security directory cannot be modified (pass codes etc.).

**Special Case:** None

**Comm Modes:** Poll/Authorize, Remote Control, Poll/Program

## Appendix I—Reference for "NOXX" Responses

**Table 1.** NOXX Responses

Code	Condition
XX	Description
00	Command Nonexistent
01	In Program Mode
02	Released
03	Value Rejected
04	Flow Active
05	No Transaction Ever Done
06	Operation Not Allowed
07	Wrong Control Mode
08	Transaction In Progress
09	Alarm Condition
10	Storage Full
11	Operation Out Of Sequence
12	Power Fail During Transaction
13	Authorized
14	Program Code Not Used
15	Display/Keypad In Use
16	Ticket Not In Printer
17	No Keypad Data Pending
18	No Transaction In Progress
19	Option Not Installed
20	Start After Stop Delay
21	Permissive Delay Active
22	Print Request Pending
23	No Meter Enabled
24	Must Be In Program Mode
25	Ticket Alarm During Transaction
26	Volume Type Not Selected
27	Exactly One Recipe Must Be Enabled
28	Batch Limit Reached
29	Checking Entries
30	Product/Recipe/Additive Not Assigned
31	Invalid Argument for Configuration
32	No Key Ever Pressed
33	Maximum Active Arms in Use
34	Transaction Not Standby
35	Comm Swing Arm Out of Position
36	Card-In Required
37	Data Not Available
38	Too Many Shared Additives Selected
39	No Current Batch on This Arm
40	Invalid on Virtual Arm
41	No Pending Reports
42	Valve Opening Delay
89	Database Access Error
90	Must Use Mini Protocol
91	Buffer Error
92	Keypad Locked
93	Data Recall Error
94	Not In Program Mode
95	Security Access Not Available
96	Data Request Queued Ask Later
97	Comflash Archiving
99	Internal Error

## Appendix II—Alphanumeric Character Set Used By the AccuLoad IV

The following characters are translated by the AccuLoad to display special characters not found on a typical keyboard: the tilde (~) will display as a degree sign at the AccuLoad; degree signs sent by the AccuLoad in a response will appear as a tilde (~) on your computer. The vertical bar (|) translates to a script lowercase 'l', used to denote liters of volume.

Lowercase letters may not be used to issue any of the two-digit command codes (SB, GD, EA, etc.); a NO00, command non-existent, will be returned as the response.

Some special characters (for example, [, ], &, +, -, and .) are used in prompting or other data entry; all other special characters and lowercase letters are typically used in prompts and textual descriptions entered at the AccuLoad, such as the product name, etc. The comma (,) may not be used within any prompt (WD, WA, WX, WQ, WP.)

### ASCII Codes

ASCII	DECIMAL	HEX
NUL	0	0
STX	2	2
ETX	3	3
LF	10	A
CR	13	D
SP	32	20
!	33	21
"	34	22
#	35	23
\$	36	24
%	37	25
&	38	26
`	39	27
(	40	28
)	41	29
*	42	2A
+	43	2B
'	44	2C
-	45	2D
.	46	2E
/	47	2F
0	48	30
1	49	31
2	50	32
3	51	33
4	52	34
5	53	35
6	54	36
7	55	37
8	56	38
9	57	39
:	58	3A
;	59	3B
<	60	3C
=	61	3D

ASCII	DECIMAL	HEX
>	62	3E
?	63	3F
@	64	40
A	65	41
B	66	42
C	67	43
D	68	44
E	69	45
F	70	46
G	71	47
H	72	48
I	73	49
J	74	4A
K	75	4B
L	76	4C
M	77	4D
N	78	4E
O	79	4F
P	80	50
Q	81	51
R	82	52
S	83	53
T	84	54
U	85	55
V	86	56
W	87	57
X	88	58
Y	89	59
Z	90	5A
[	91	5B
\	92	5C
]	93	5D
^	94	5E
-	95	5F
`	96	60
a	97	61
b	98	62
c	99	63
d	100	64
e	101	65
f	102	66
g	103	67
h	104	68
i	105	69
j	106	6A
k	107	6B
l	108	6C
m	109	6D
n	110	6E
o	111	6F
p	112	70
q	113	71
r	114	72

ASCII	DECIMAL	HEX
s	115	73
t	116	74
u	117	75
v	118	76
w	119	77
x	120	78
y	121	79
z	122	7A
{	123	7B
	124	7C
}	125	7D
~	126	7E
DEL	127	7F

---

## ***Appendix III—Unauthorized Flow***

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Unauthorized flow occurs when the AccuLoad picks up and accumulates stray pulses from the meter between transactions. This may be leakage, or it may be product moving back and forth in the meter. These raw pulse counts are accumulated in the flow counter and can be viewed in the response to the "FL" command. These raw pulses can be converted to units of volume (gallons, liters, etc.) by dividing the accumulated pulse count by the input resolution for the meter. For example, if input resolution is set to 50, an accumulated pulse count of 104 reflects unauthorized flow of a little more than 2 units of volume (gallons, liters, etc).

When the AccuLoad is authorized for a transaction, the flow counter is zeroed. This updates the non-resettable total for the product by the amount accumulated in the flow counter.

The presence of unauthorized flow is indicated by a status of flowing without a corresponding released status in the response to the "EQ" or "RS" commands.

## Appendix IV—Using the Bit-Map Tables

---

Many command codes in this manual use bit-mapping to encode information as concisely as possible. Up to four discrete bits of information may be represented by a single ASCII character, both as commands to and responses from the AccuLoad. Most command codes that use bit-mapping consist of two or more such ASCII characters. This appendix describes how to encode or decode a single ASCII character; the process can be repeated for each additional character.

Each option listed across the top of the table carries a binary weighted value associated with it. From right to left, the values are 1, 2, 4, and 8. This is why the table headers may appear to be listed backwards. Special characters are used to represent hexadecimal values A through F, which equate to decimal values 10 through 15, when the bit values for selected options are added together. The "char" column, not the "hex" column, is used to encode and decode ASCII characters.

### Encoding a Bit-Mapped Character

An X in the table indicates a selected option. First, determine which of the four column header options will be encoded. Find the row that contains Xs for the options selected. The character listed along the left axis is equal to the value of the options selected.

For example, consider the "AB" command. Suppose we want to enable recipes 1, 3, 6, 7, and 8. Recipes 1 and 3 can be represented in the first ASCII character. The row containing Xs for 1 and 3 only corresponds to the ASCII character "5." Therefore, the first character of the AB command will be 5. Recipes 6, 7, and 8 can be represented in the second ASCII character. The character corresponding to these values is a "E," so the second character of the AB command will be E. Because no recipes have been selected that can be encoded in the third, fourth, fifth, or sixth characters of the AB command, these characters will be 0's.

The complete AB command to enable recipes 1, 3, 6, 7 and 8 is "AB 5E0000."

### Decoding a Bit-Mapped Character

An X in the table indicates an asserted value. Decoding a character is just the opposite of encoding a character. Find the returned ASCII character in the column along the left. For each X in that row, refer to the column header to determine what option or condition is asserted.

For example, consider the following response to the "EQ" command: "580027"

"5" represents AccuLoad IV Authorized and AccuLoad IV Released

"8" represents Transaction in Progress

"0" represents no conditions met in character 3

"0" represents no conditions met in character 4

"2" represents Input #2 contact

"7" represents Input #5, Input #6, and Input #7

"0" represents no conditions met in character 7

"0" represents no conditions met in character 8.

---

## **Appendix V—Communications Primer**

---

Samuel F.B. Morse's dot-dash telegraph code is the earliest example of a practical, time sequential, data-coding scheme for transmission of information by communication equipment. This code is considered the predecessor of the ones and zeros modern digital communication codes now used for serial data transmission of time sequenced information over a pair of wires.

Like Morse Code, digital codes provide a means of representing numbers, letters of the alphabet, or other special characters in a digital information system. A digital code is a pattern of binary digits or bits, zeros and ones arranged in a predefined order. One familiar code used for arithmetic computations in digital systems is the Binary Coded Decimal, commonly known as BCD code. The BCD code is a weighted code in that a numerical weight is assigned to each bit position in the code. Using a 4-bit BCD code for an example, the left-most bit has a numeric weighted value of 8, the next bit has a numeric weighted value of 4, the next to the last bit a weight value of 2 and the last bit, a value of 1. The total value of the coded number is equal to the sum of the numerical weights of the bits represented by the binary digit 1. Four-bit BCD codes are valid only for numbers between 0 and 9. For example, the number 3 is represented by a BCD code of "0011," and the number 9 is "1001." To represent 39, the respective BCD code is "0011 1001."

There are many different codes used to perform specific tasks in digital systems, but the one most widely used in digital communications systems is the American Standard Code for Information Interchange, or simply ASCII code. Like other binary codes, the ASCII code is a weighted code.

The ASCII code is a more complex code than BCD since it uses patterns of seven bits to represent 128 characters consisting of either upper or lowercase letters of the alphabet, punctuation characters, and control characters in addition to numbers. For example, the ASCII code representation of the number 39 is "0110011 0111001." A complete ASCII code character table is shown in Table 1.

A computer system always requires some digital data transmission between its various parts: CPU to peripherals, CPU to memory, or memory to peripherals. Data transmission to and from these devices must conform to some accepted standard. To date, the only widely used transmission standards deal with serial digital data. There are essentially three organizations that issue standards that define serial digital communication interface circuits, their electrical and timing characteristics, the manner in which they operate, and the mechanical details of the appropriate connectors. These organizations are the Electronics Industries Association (EIA), the International Consultative Committee for Telephony and Telegraphy (CCITT), and the International Standards Organization (ISO).

EIA Standard, EIA-232 (formerly known as RS-232) is a venerable yet still prevalent serial interface standard. This standard is extensively used by terminals, data sets, measuring instruments, and controllers for data transmission rates typically up to 115,200 bits per second for transmission cables up to 50 feet in length. EIA-232 is a single-ended voltage mode transmission system standard that defines data communication between equipment using alternating pulses which can be in one of two states - either high (logic 1) or low (logical 0). These states are often called "mark"(logic 1) or "space" (logic 0). Per EIA, the logical 1 level must be within +3.75

to +25 volts DC, while the logical 0 level must be within -3.75 to -25 volts DC; any other voltage levels are unacceptable.

EIA-232 is not the only serial interface standard or system. EIA-422, 485 and 20mA current loop are other long-distance current mode digital communication standards. These differential voltage or current mode standards are better suited for longer distance, high speed communications than the single-ended voltage mode predecessor. Although not a revolutionary concept, the current mode system dates to the oldest form of binary serial transmission: the telegraph. In this system, a current, usually 20mA, flows through a single loop to represent a logic level one, and turns off, "open key" to represent logic zero.

Serial data is typically transmitted among or between devices in an asynchronous fashion. In asynchronous data transmission, each transmitted character is formed by using a start bit which signals the beginning of the character before the ASCII code pattern, and one or two stop bits after the code pattern signaling the end of the character. The ASCII character is described fully by seven bits with an optional parity bit in the eighth position for error control. Therefore, each transmitted ASCII character requires at least ten bits for complete definition. As the communication equipment receives the asynchronously transmitted characters, the start and stop bits are stripped off, parity is checked, and the character itself is interpreted and treated accordingly whether it is alphanumeric data or control information.

"Baud rate" and "bit rate" are two distinct terms used to describe the speed of data transmission. These terms are often used synonymously and cause much confusion if not completely understood. The baud is a measurement unit dating back to the days of Morse Code, and it is defined as the shortest signaling element. In modern telecommunications language, the data rate is more often specified in bits per second (bps), because a single change of state in a signal can represent a group of two or more data bits. If each signal event represents only one bit condition, baud rate equals bps. Typical asynchronous serial baud rates are 1200, 2400, 4800, 9600, 19200, 38400, 57.6K and 115.2K bps. To have an interactive session between two computing devices, both devices must be transmitting and receiving at the same baud rate, or there must be an intermediate memory device, called a buffer, that accommodates the differences in speed. Refer to the AccuLoad.net installation manual to determine the appropriate baud rate based on cable length for each unique installation site.

### **Ethernet and TCP/IP Communications**

The proliferation of personal computing beginning in the 1970s gave rise to the need to interconnect groups of computers to better share data, communicate to peripheral devices (printers, modems...) and now interface to instruments. The most popular of these groups are known as Local Area Networks (LANs). These networks consist of nodes, where computers, peripherals and instruments are connected to the network, and interconnecting wire or fiber optic cable to interconnect the nodes. A LAN can consist of a few nodes up to several hundred but will be confined to a few buildings within a few thousand meters of one another. Technologies were developed to establish standard interface hardware as well as secure control of the flow of data on the LAN. Ethernet emerged as the primary medium for LANs. The Ethernet technology equipment; interface cards, hubs, switches, and cabling have become commodity items. Software protocols were developed to standardize sharing and

transfer of files, mail messages, access to peripherals, and access to the internet. Again, a primary standard has emerged in the TCP/IP protocol. The acronym TCP/IP comes from two protocols developed for the internet; Transmission Control Protocol and Internet Protocol.

**The AccuLoad IV provides an integral Ethernet host port for networking.**

### ASCII Code Table

ASCII CHARACTER	DECIMAL	HEX	BINARY
NUL	0	0	000 0000
STX	2	2	000 0010
ETX	3	3	000 0011
LF	10	A	000 1010
CR	13	D	000 1101
SP	32	20	010 0000
!	33	21	010 0001
"	34	22	010 0010
#	35	23	010 0011
\$	36	24	010 0100
%	37	25	010 0101
&	38	26	010 0110
'	39	27	010 0111
(	40	28	010 1000
)	41	29	010 1001
*	42	2A	010 1010
+	43	2B	010 1011
,	44	2C	010 1100
-	45	2D	010 1101
.	46	2E	010 1110
/	47	2F	010 1111
0	48	30	011 0000
1	49	31	011 0001
2	50	32	011 0010
3	51	33	011 0011
4	52	34	011 0100
5	53	35	011 0101
6	54	36	011 0110
7	55	37	011 0111
8	56	38	011 1000
9	57	39	011 1001
:	58	3A	011 1010
;	59	3B	011 1011
<	60	3C	011 1100
=	61	3D	011 1101
>	62	3E	011 1110
?	63	3F	011 1111
@	64	40	100 0000
A	65	41	100 0001
B	66	42	100 0010
C	67	43	100 0011
D	68	44	100 0100
E	69	45	100 0101
F	70	46	100 0110
G	71	47	100 0111

ASCII CHARACTER	DECIMAL	HEX	BINARY
H	72	48	100 1000
I	73	49	100 1001
J	74	4A	100 1010
K	75	4B	100 1011
L	76	4C	100 1100
M	77	4D	100 1101
N	78	4E	100 1110
O	79	4F	100 1111
P	80	50	101 0000
Q	81	51	101 0001
R	82	52	101 0010
S	83	53	101 0011
T	84	54	101 0100
U	85	55	101 0101
V	86	56	101 0110
W	87	57	101 0111
X	88	58	101 1000
Y	89	59	101 1001
Z	90	5A	101 1010
[	91	5B	101 1011
\	92	5C	101 1100
^	94	5E	101 1101
_	95	5F	101 1111
`	96	60	110 0000
a	97	61	110 0001
b	98	62	110 0010
c	99	63	110 0011
d	100	64	110 0100
e	101	65	110 0101
f	102	66	110 0110
g	103	67	110 0111
h	104	68	110 1000
i	105	69	110 1001
j	106	6A	110 1010
k	107	6B	110 1011
l	108	6C	110 1100
m	109	6D	110 1101
n	110	6E	110 1110
o	111	6F	110 1111
p	112	70	111 0000
q	113	71	111 0001
r	114	72	111 0010
s	115	73	111 0011
t	116	74	111 0100
u	117	75	111 0101
v	118	76	111 0110
w	119	77	111 0111
x	120	78	111 1000
y	121	79	111 1001
z	122	7A	111 1010
{	123	7B	111 1011
/	124	7C	111 1100
}	125	7D	111 1101
°	126	7E	111 1110
DEL	127	7F	111 1111

## Related Publications

The following literature can be obtained from TechnipFMC Measurement and Production Solutions Literature Fulfillment at [measurement.fulfillment@TechnipFMC.com](mailto:measurement.fulfillment@TechnipFMC.com) or online at [http://info.smithmeter.com/literature/online\\_index.html](http://info.smithmeter.com/literature/online_index.html).

When requesting literature from Literature Fulfillment, please reference the appropriate bulletin number and title.

AccuLoad IV-QT Hardware Worksheet .....	Bulletin <a href="#">AB06213</a>
AccuLoad IV-ST and N4 Hardware Worksheet .....	Bulletin <a href="#">AB06214</a>
Operator Reference.....	Bulletin <a href="#">MN06200</a>
Installation and Maintenance.....	Bulletin <a href="#">MN06201</a>
Upgrade SA from III to IV.....	Bulletin <a href="#">MN06206</a>
Modbus Communications .....	Bulletin <a href="#">MN06131L</a>
Upgrade for S and Q .....	Bulletin <a href="#">MN06203</a>
Parts List.....	Bulletin <a href="#">PO06200</a>
Specifications .....	Bulletin <a href="#">SS06200</a>
Calculations .....	Bulletin <a href="#">TP06004</a>

## Technical Support

### *Field Service Response Center*

24/7 Technical Support/Schedule  
a Technician: 1-844-798-3819  
System Installation Supervision,  
Start-Up, Commissioning Services,  
and Training Available

Revisions included in MN06204L Issue/Rev. 0.2 (9/21):  
Command FS added.

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.