

# **BAM 1022 USER 7500 SPECIFICATION**



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## 1. Overview

This document describes the implementation of the 7500 protocol commands used in BAM 1022.

## 2. Instrument Communication Modes

### 2.1. Overview

There are three modes of communication:

1. User communication – This is a user interactive mode using simple letter commands for ease of use.
2. Computer communication – This mode is used for computer-to-device communication. It requires a level of data integrity.
3. Network communication – This mode is used for computer-to-device communication with more than one device on a network.

### 2.2. User Communication

In the user communication mode (terminal mode), the user simply presses the Enter key, <cr>, three times to enter the mode. In this mode simple character commands can be issued with no <Esc> character required.

An asterisk character appears during wake-up, and also after a command has completed. The asterisk indicates that the instrument is ready for a new command. Commands are echoed back from the instrument in this mode. The characters must be echoed as received in the instrument.

A help menu can be viewed by sending H, h, or ?; giving all the commands available to the user. Factory commands are not shown.

Pressing <Esc> or Q<cr> will exit terminal mode.

### 2.3. Computer Communication

In the computer communication mode the command format requires a level of data integrity – checksum.

This mode is entered whenever an <Esc> character is sent to the instrument.

Character echo is suppressed in this mode.

### 2.3.1. Computer Command Format

The computer command has the following format:

```
<Esc>Cmd p1 p2*cs<cr>
```

Computer commands are prefaced with an <Esc> (0x1B) character followed directly by a command, Cmd, which is variable in length depending on the command. After the command characters there can be zero or more parameter fields, p1 p2. Each parameter field is delimited by one or more Space characters (0x20). The end of the message is signaled by the Checksum Delimiter character \* (0x2A) followed by the checksum, cs, and finally terminated with a carriage return <cr> (0x0D) character.

A computer command example follows:

```
<Esc>RV*1234<cr>
```

All command responses are terminated with a checksum

```
RV 092, 99999-1, R9.9.9*1234<cr><lf>
```

### 2.3.2. Checksum Computation

Checksum is calculated as the 16 bit unsigned integer sum of all of the characters after the <Esc> character up to but not including the Checksum Delimiter Character \* (0x2A). It is printed out as an ASCII decimal number.

The result is always 5 characters in length with leading zeros.

The checksum may be bypassed in the following manner: \*//<cr>.

### 3. Command Summary

#### 3.1. Command List

Command	Description
#	Request MetRecord Revision
1	Request settings report
2	Request All User data report
3	Request New User data report
4	Request Last User data report
7	Request Alarm event report
A	Network address command
C	Clear data log file
D	Get/Set date part of the real time clock
H	Help menu
Q	Quit out of terminal mode
T	Get/Set time part of the real time clock
AR	Get/Set analog output range
CA	Clear alarm log file
CO	Get/Set analog concentration offset
CR	Get/Set analog concentration range
CU	Get/Set concentration units
DS	Report data log channel descriptors
DT	Get/Set the date and time of the real time clock
HS	Get/Set Ethernet flow control
ID	Get/Set location ID or address
NW	Get/Set <Esc>A network mode
OI	Get output interval
OP	Get/Set operation command
PR	Print report: 0 – Settings, 1 – User, 2 – Alarm, 3 – Diagnostics (#)
PW	Unlock protected commands (User or Factory)
QH	Report current readings header
RQ	Report current readings without header
RV	Report Model/Part/Revision

SB	Get/Set baud rate
SS	Get Met One serial number
ST	Get/Set sample time (data log period)
TS	Get/Set timestamp mode
UD	Get/Set previous days to copy to USB drive
UF	Get/Set file to copy to USB drive
UN	Get/Set data log channel units
GTC	Start touch screen calibration
SPW	Get/Set user password
XRD	Get record descriptor report
XRF	XMODEM read file
BKGD	Get/Set background offset
FTSP	Get/Set filter temperature set point
SPAN	Get/Set span calibration verification
DSCRC	Get the data log channel descriptors CRC
RTPER	Get/Set real-time average period
TPRES	Get/Set tape advanced pressure
XRDCRC	Get file descriptors CRC

## 4. BAM 1022 Commands

The command and responses shown below are for computer mode unless otherwise noted. User mode responses are more verbose and similar in nature.

### 4.1. # – Request MetRecord Revision

Command	Description
#	Request the MetRecord Revision.

Response	Description
# 7500 r	7500 – This document number r – The revision of this document implemented in firmware

Example
#<cr> # 7500 C<cr><lf>



## 4.2. 1 – Report Settings

Command	Description
1	Report the settings. There is never a checksum after each line.

Response
<pre> BAM 1022 Settings Report 2014-10-29 16:23:13      Firmware, 81650, R0.6.0.2a       CPLD, 81699, R0.1.0 Serial Number, I10222   Location, 1     Baud Rate, 9600 Ethernet FlowControl, NONE   Data Average, 1 HR RealTime Period, 30   Tape Period, 1 HR Tape Pressure, 250       K, 1.000   Background, 0.0000       Us, 0.285   Audit Span, 0.780   Conc Units, ug/m3   USB Days, 1   USB Files, ALL Analog Range 1, 0-5.0 V Analog Range 2, 0-5.0 V   Conc Span, 1000 ug/m3   Conc Offset, 0 ug/m3 Hourly Timestamp, ENDING   FT Set Point, 45.0     FT P-Gain, 1.000     FT I-Gain, 1.000 RealTime Alpha, 0.2316 RealTime Gamma, 0.1500   Beep Volume, 10 ModBus Address, 1   Byte Order, 512   Factory Mode, OFF  Name, Offset, Slope FLOW, 0.000, 1.000 AT, 0.000 </pre>

BP, 0.000  
FT, 0.000  
UPPER, 0.000  
LOWER, 0.000  
FRH, 0.000  
BOX, 0.000  
ENCL1, 0.000

DAC Cal 1, 0.0,0,5.0,52428  
DAC Cal 2, 0.0,0,5.0,52428

Factory Settings  
Cal Span, 1.717

### 4.3. 2 – Report All Data

Command	Description
2	Report all the data. The 2 command always sends the data in CSV format.

**Header Response:** A report header is present for the CSV format when execute from terminal mode. It is suppressed in computer mode.

Data Report

2014-10-29 16:26:22

Location, 1, I10222

Time, ConcRT (ug/m3) , ConcHR (ug/m3) , Flow (lpm) , AT (C) , RH (%) , BP (mmHg) , FT (C) , FRH (%) , Status

**Data Response:** COUNTS, CSV. An <Esc> or <cr> character will cancel a report.

2014-10-29 14:00:00,+099999,+099999,+00.0,+024.4,045,000,+024.2,042,00128

2014-10-29 15:00:00,+099999,+099999,+00.0,+024.7,045,000,+024.6,042,00128

2014-10-29 16:00:00,+099999,+099999,+00.0,+024.8,045,000,+024.7,042,00128

#### 4.4. 3 – Report New Data

Command	Description
3	Report the new data since the last request.

Response:

The response is the same as the 2-command.

#### 4.5. 4 – Report Last Data

Command	Description
4	Report the last data record.
4 0	Report all the data.
4 -1	Report the new data since the last request.
4 n	Report the last n -records where n is less than or equal to the maximum amount of records stored in the device.
4 d	Report the data back to date d (yyyy-MM-dd HH:mm:ss).

Response:

The response is the same as the 2-command.

#### 4.6. 7 – Report Alarm Events

Command	Description
7	Report all alarm events

#### Response:

##### Alarm Report

2014-10-29 16:37:10

Location, 1, I10222

##### Time, Alarm

2014-10-29 13:53:42, POWER OUTAGE  
2014-10-29 13:53:46, MAINTENANCE  
2014-10-29 13:54:43, SENSOR RANGE, BP, 977.0  
2014-10-29 14:05:08, POWER OUTAGE  
2014-10-29 14:05:13, MAINTENANCE  
2014-10-29 14:06:09, SENSOR RANGE, BP, 976.8  
2014-10-29 14:25:33, POWER OUTAGE  
2014-10-29 14:25:39, MAINTENANCE  
2014-10-29 14:26:34, SENSOR RANGE, BP, 976.6  
2014-10-29 14:54:16, POWER OUTAGE  
2014-10-29 14:54:19, MAINTENANCE  
2014-10-29 14:55:17, SENSOR RANGE, BP, 976.2  
2014-10-29 14:58:07, POWER OUTAGE  
2014-10-29 14:58:10, MAINTENANCE  
2014-10-29 14:59:08, SENSOR RANGE, BP, 976.1  
2014-10-29 15:02:40, POWER OUTAGE  
2014-10-29 15:02:45, MAINTENANCE  
2014-10-29 15:03:41, SENSOR RANGE, BP, 976.1  
2014-10-29 15:17:16, POWER OUTAGE  
2014-10-29 15:17:19, MAINTENANCE  
2014-10-29 15:18:17, SENSOR RANGE, BP, 975.9

#### 4.7. C – Clear Data Log

Command	Description
C Y	Clear the data log.

Response
C Y

Example
C Y<cr> C Y<cr><lf>

#### 4.8. D – Request or Set the Date Only

Command	Description
D	Request the date part of the real time clock.
D yyyy-MM-dd	Set the date part of the real time clock.

Response
D yyyy-MM-dd

Parameter	Description
yyyy	Years 2000 – 2037
MM	Months 1 – 12
dd	Days 1 – 31

Example
D<cr> D 2013-01-08<cr><lf>  D 2013-01-08<cr> D 2013-01-08<cr><lf>

## 4.9. H – Help Menu

Command	Description
H or ?	Report the help menu.

Response
<p>BAM 1022 Help Menu</p> <ul style="list-style-type: none"><li>1 - Report Settings</li><li>2 - Report All Data</li><li>3 - Report New Data</li><li>4 - Report Last Data</li><li>7 - Report Alarm Log</li><li>C - Clear Data Log</li><li>D - Set Date</li><li>T - Set Time</li><li>Z - Enable Remote Control</li><li>AR - Set Analog Range</li><li>CA - Clear Alarm Log</li><li>CO - Set Conc Offset</li><li>CR - Set Conc Range</li><li>CU - Set Conc Units</li><li>DT - Set Date/Time</li><li>HS - Set Ethernet Flow Control</li><li>ID - Set Location ID</li><li>OP - Get Operational State</li><li>PR - Print Report</li><li>QH - Report Data Record Header</li><li>RV - Report Model/Part/Revision</li><li>RQ - Report current readings</li><li>SB - Set Baud Rate</li><li>SS - Get Serial Number</li><li>ST - Set Sample Time</li><li>TS - Set Time Stamp</li><li>SPW - Set User Password</li><li>BKGD - Set Background Offset</li><li>FTSP - Set FT Set Point</li><li>RTPER - Set Real-Time Period</li><li>TPRES - Set Tape Pressure</li></ul>

#### 4.10. Q – Exit User Mode

Command	Description
Q	Exit User mode and enter Computer mode.

Response	Description
Q Exit User Mode	The command was successful.

Example
Q<cr> Q Exit User Mode<cr><lf>

#### 4.11. T – Request or Set the Time Only

Command	Description
T	Request the time part of the real time clock.
T HH:mm:ss	Set the time part of the real time clock.

Response	Description
T HH:mm:ss	HH – Hours 0 – 23. mm – Minutes 0 – 59. ss – Seconds 0 – 59, this parameter is optional. When omitted the value will be 0.

Example
T<cr> T 13:18:38<cr><lf>  T 14:13:12<cr> T 14:13:12<cr><lf>



#### 4.12. AR – Request or Set the Analog Output Range

Command	Description
AR	Request the analog output range.
AR 0	Request the number of analog output channels
AR c e	Set the analog output range where c is the channel number and e is the enumerator for values 0-0-1.0 V, 1-0-2.5 V, 2-0-5.0 V, 3-4-20 mA

Responses	Description
AR c	c – the number of analog output channels
AR c, e-v	c – the channel number e – the enumerator value v – the analog output value

Example
<pre> AR&lt;cr&gt; AR 1,2-0-5.0 V&lt;cr&gt;&lt;lf&gt; AR 2,2-0-5.0 V&lt;cr&gt;&lt;lf&gt;  AR 0&lt;cr&gt; AR 2&lt;cr&gt;&lt;lf&gt;  AR 2 2&lt;cr&gt; AR 2,2-0-5.0 V&lt;cr&gt;&lt;lf&gt; </pre>

### 4.13. CA – Clear Alarm Log

Command	Description
CA Y	Clear the alarm log.

Response
CA Y

Example
<pre>CA Y&lt;cr&gt; CA Y&lt;cr&gt;&lt;lf&gt;</pre>

### 4.14. CO – Request or Set the Concentration Offset

Command	Description
CO	Request the concentration offset.
CO e	Set the concentration offset, where e is 0--15 ug/m3, 1--10 ug/m3, 2--5 ug/m3, 3-0 ug/m3, 4-5 ug/m3

Response	Description
CO e-V	e – The enumerator setting. V – The concentration offset value.

Example
<pre>CO&lt;cr&gt; CO 1-0 ug/m3&lt;cr&gt;&lt;lf&gt;  CO 4&lt;cr&gt; CO 4-5 ug/m3&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.16. CR – Request or Set the Concentration Range

Command	Description
CR	Request the concentration range.
CR e	Set the concentration offset, where e is 0-100 ug/m3, 1-200 ug/m3, 2-500 ug/m3, 3-1000 ug/m3, 4-2000 ug/m3, 5-5000 ug/m3, 6-10000 ug/m3

Response	Description
CR e-V	e – The enumerator setting. V – The concentration range value.

Example
CR<cr> CR 6-10000 ug/m3<cr><lf>  CR 4<cr> CR 4-2000 ug/m3<cr><lf>

#### 4.17. CU – Request or Set the Count Units

Command	Description
CU	Request count unit setting.
CU e	Set the count unit setting, where e is 0-ug/m3, 1-mg/m3.

Response	Description
CU e-unit	e – The enumerator setting. unit – The unit sort name.

Example
CU<cr> CU 0-ug/m3<cr><lf>  CU 1<cr> CU 1-mg/m3<cr><lf>

## 4.18. Field Descriptors

Retrieval commands are used to query the instrument for Descriptor Information Table. These commands can be accessed by any serial device such as a data logger or software.

Information can be retrieved in either in single line responses or in bulk. Single line responses are needed for devices with limited serial input buffer sizes.

### 4.18.1. DS 0 – Query Abbreviated Descriptor Information

Command	Description
DS 0	This command returns the general header information.

Response	Description
DS n, id, r	The response will indicate the general descriptor information. n – Number of field descriptor lines available. id – Location ID r – Reserved for future use. 0 is the default.

Example
DS 0<cr> DS 10,1,0<cr><lf>

#### 4.18.2. DS c – Specific Descriptor Information

Command	Description
DS c	This command returns the specific channel header information in the Descriptor Information Table. c – Channel number.

Response
DS c,FieldName,MeasureType,units,prec,math,max,min

Parameter	Description
c	Field number – 1 based.
FieldName	Field name string in printable ASCII. This is the user selected name for the measurement. Example: AT1 for air temp, FT1 for flow temp, etc.
MeasureType	Measurement type string in printable ASCII See the definitions in Appendix A of the 7500 Protocol document
units	Engineering units string in printable ASCII. See the definitions in Appendix B of the 7500 Protocol document.
prec	Display value precision.
math	Math type field. Vector (V), Scalar (S), Total (T), Minimum (MIN), Maximum (MAX), Standard Deviation (STD), Bitwise OR (OR), No Math (NO).
max	Maximum measurement value.
min	Minimum measurement value.

Example
DS 3<cr> DS 3,ConcHR,CONC,ug/m3,0,S,10000,-15<cr><lf>

#### 4.18.3. DS – Request All Descriptor Information

Command	Description
DS	This command returns all of the general and header information. The command can be used for devices that have a large serial input buffer size.

Example
<pre> DS&lt;cr&gt; DS 1,Time,TIME,,0,NO,0,0&lt;cr&gt;&lt;lf&gt; DS 2,ConcRT,CONC,ug/m3,0,S,10000,-15&lt;cr&gt;&lt;lf&gt; DS 3,ConcHR,CONC,ug/m3,0,S,10000,-15&lt;cr&gt;&lt;lf&gt; DS 4,Flow,FLOW,lpm,1,S,20.0,0.0&lt;cr&gt;&lt;lf&gt; DS 5,AT,AT,C,1,S,70.0,-50.0&lt;cr&gt;&lt;lf&gt; DS 6,RH,RH,%,0,S,100,0&lt;cr&gt;&lt;lf&gt; DS 7,BP,BP,mmHg,0,S,825,200&lt;cr&gt;&lt;lf&gt; DS 8,FT,AT,C,1,S,70.0,-50.0&lt;cr&gt;&lt;lf&gt; DS 9,FRH,RH,%,0,S,100,0&lt;cr&gt;&lt;lf&gt; DS 10,Status,INFO,,0,OR,0,0&lt;cr&gt;&lt;lf&gt; </pre>

#### 4.18.4. DSCRC – Descriptor table CRC

Command	Description
DSCRC	<p>This command returns the instrument descriptor table CRC. The intent is for the system or software to query and save this CRC. The value is then compared on subsequent reads to check for any instrument configuration changes.</p> <p>If the CRC does not match the previous CRC then check for a change in the field configuration parameters.</p>

Response	Description
DSCRC hhhh	hhhh – The CRC value in hexadecimal.

Example
<pre> DSCRC&lt;cr&gt; DSCRC 1AE4&lt;cr&gt;&lt;lf&gt; </pre>

#### 4.19. DT – Request or Set the Date and Time

Command	Description
DT	Request the date and time part of the real time clock.
DT yyyyMMddHHmmss DT yyyy-MM-dd HH:mm:ss	Set the date and time part of the real time clock.

Response
DT yyyy-MM-dd HH:mm:ss

Parameter	Description
yyyy	Years 2000 – 2037
MM	Months 1 – 12
dd	Days 1 – 31
HH	Hours 0 – 23
mm	Minutes 0 – 59
ss	Seconds 0 – 59

Example
DT  DT 2013-01-08 11:39:23 <lf>  DT 2013  DT 2013-01-01 00:00:00 <lf>  DT 20130108  DT 2013-08-08 00:00:00 <lf>  DT 2013-01-081141  DT 2013-01-08 11:41:00 <lf>



#### 4.21. HS – Request or Set the Ethernet Flow Control

Command	Description
HS	Request the Ethernet flow control.
HS e	Set the Ethernet flow control, where e is 0-NONE, 1-RTS/CTS,

Response	Description
HS e-n	x – The enumerator setting. n – The Ethernet flow control setting name

Example
HS<cr> HS 0-NONE<cr><lf>  HS 1<cr> HS 1-RTS/CTS<cr><lf>

#### 4.22. ID – Request or Set the Location ID

Command	Description
ID	Request the Location ID.
ID id	Set the Location ID. The range is 1 to 999.

Response	Description
ID id	id – The location ID. The ID value is three characters with leading zero's.

Example
ID<cr> ID 001<cr><lf>  ID 2<cr> ID 002<cr><lf>

#### 4.23. NW – Set Network Mode

Command	Description
NW	Request the measurement concentration setting.
NW m	Set the network mode where m is 0-Off, 1-On.

Response	Description
NW 0	Network mode is off
NW 1	Network mode is on

Example
<pre>NW&lt;cr&gt; NW 0 &lt;cr&gt;&lt;lf&gt;  NW 1&lt;cr&gt; NW 1&lt;cr&gt;&lt;lf&gt;  &lt;Esc&gt;A 1 NW 0*cs&lt;cr&gt; NW 0&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.24. OI – Request or Set the Output Interval

Command	Description
OI i	Set Output Interval. This command is provided for compatibility with 7500 protocol masters which expect to turn off output with this command. Use SR command.  Where i is the Interval. 0=No volunteered output, 1=Output at end of measurement.

Response	Description
OI 0	Response is the same whether setting or getting the parameter

Example
<pre>OI&lt;cr&gt; OI 0&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.25. OP – Request or Set the Operation State

Command	Description
OP	Request the current operation state.
OP n	Set the operation state where n is 0=stop operation, 1=start operation

Response	Description
OP n-state	n – the current state enumerator state – the name of the current state

Example
<pre>OP&lt;cr&gt; OP 1-UNIT OFF&lt;cr&gt;&lt;lf&gt;  OP 1&lt;cr&gt; OP 3-STARTING...&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.26. PR – Print Report

Command	Description
PR 0	Report the settings.
PR 1	Report all data.
PR 2	Report all alarm events.

#### Response:

PR 0 – The response is the same as the 1-command.

PR 1 – The response is the same as the 2-command.

PR 2 – The response is the same as the 7-command.

#### 4.27. PW – Unlock Factory Commands

Command	Description
PW n	This command Unlocked the user protected commands.

Response	Description
PW Unlocked	If the user password is correct, you will see this response.

#### Example

```
PW 1234<cr>  
PW Unlocked<cr><lf>
```

#### 4.28. QH – Report Data Record Header

Command	Description
QH	Report data record header.

Response
Time, ConcRT (ug/m3) , ConcHR (ug/m3) , Flow (lpm) , AT (C) , RH (%) , BP (mmHg) , FT (C) , FRH (%) , Status

Example
QH<cr> Time, ConcRT (ug/m3) , ConcHR (ug/m3) , Flow (lpm) , AT (C) , RH (%) , BP (mmHg) , FT (C) , FRH (%) , Status

#### 4.29. RQ – Request Last Record

Command	Description
RQ	Request the instantaneous measurement record.

Response:
2014-10-30 09:41:14,+099999,+099999,+00.0,+024.0,046,000,+023.7,043,00004,* 03638

Example:
RQ<cr> 2014-10-30 09:41:14,+099999,+099999,+00.0,+024.0,046,000,+023.7,043,00004,* 03638

### 4.30. RV – Report Model, Firmware, Revision

Command	Description
RV	Request the model number, firmware part number, and revision string. Instruments with more than one processor or programmable devices will include more than one part number and revision on the next subsequent lines.

Response	Description
RV m, p, r	m – Device model name. p – Firmware part number. r – Firmware revision.

Example
RV<cr> BAM 1022, 81650, R0.6.0.2a<cr><lf> CPLD, 81699, R0.1.0<cr><lf>

#### 4.30.1. **RV 0 – Request the number of processor/devices supported**

Command	Description
RV 0	Request the number of processor or programmable devices.

Response	Description
RV n	n – Number processor or programmable devices.

Example
RV 0<cr> RV 2<cr><lf>

#### 4.30.2. **RV n – Request individual processor/device information**

Command	Description
RV n	Request the model number, firmware part number, and revision for a specified processor or programmable device n.

Response	Description
RV e m, p, r	e – Device enumerator. m – Device model name. p – Firmware part number. r – Firmware revision.

Example
RV 1<cr> RV 1 BAM 1022, 81650, R0.6.0.2a<cr><lf>  RV 2<cr> RV 2 CPLD, 81699, R0.1.0<cr><lf>

#### 4.31. SB – Request or Set the Serial Baud Rate

Command	Description
SB	Request the serial baud rate setting.
SB e	Set the serial baud rate where e is 2-1200, 3-2400, 4-4800, 5-9600, 6-19200, 7-38400, 8-57600, 9-115200.

Response	Description
SB e-name	e – Serial baud rate enumerator. name – baud rate name.

Example
SB<cr> SB 5-9600<cr><lf>  SB 6<cr> SB 6-19200<cr><lf>

#### 4.32. SS – Request or Set the Serial Number

Command	Description
SS	Request the serial number.

Response	Description
SS A99999	

Example
SS<cr> SS A99999<cr><lf>



### 4.33. ST – Request or Set the Sample Time

Command	Description
ST	Request the Sample Time.
ST e	Set the Sample Time. e – the Sample Time, where e is 0-1 MIN, 1-5 MIN, 2-10 MIN, 3-15 MIN, 4-30 MIN, 5-1 HR

Response	Description
ST e-v	e – The enumerator value. v – The current sample time value.

Example
ST<cr> ST 5-1 HR<cr><lf>  ST 1<cr> ST 1-5 Min<cr><lf>

#### 4.34. TS – Request or Set the Timestamp Mode

Command	Description
TS	Request temperature unit setting.
TS e	Set the temperature unit setting, where e is 0-ENDING, 1-BEGINNING.

Response	Description
TS e-unit	e – The enumerator setting. unit – The unit sort name.

Example
<pre>TS&lt;cr&gt; TS 1-BEGINNING&lt;cr&gt;&lt;lf&gt;  TS 0&lt;cr&gt; TS 0-ENDING&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.35. UD – Request or Set the Previous Days to Copy to USB Drive

Command	Description
UD	Request the previous days to copy to the USB drive.
UD d	Set the previous days to copy setting, where d is from 0-999.

Response	Description
UD d	d – The number of previous days to copy to the USB drive.

Example
<pre>UD&lt;cr&gt; UD 0&lt;cr&gt;&lt;lf&gt;  UD 99&lt;cr&gt; UD 99&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.36. UF – Request or Set the File to Copy to the USB Drive

Command	Description
UF	Request the file to copy setting for the USB drive.
UF e	Set the previous days to copy setting, where e is 0-USER, 1-ALL

Response	Description
UF e-n	e – the setting enumerator n – the setting name

Example
UF<cr> UF 0-USER<cr><lf>  UF 1<cr> UF 1-ALL<cr><lf>

#### 4.37. UN c – Request Specific Channel Available Field Units

Command	Description
UN c	Request the list of available channel/field units. c – Desired channel/field

Response	Description
UN 1-a, ...	Returns the available units for the channel/field units. See Appendix C for a list of the approved unit codes. 1-a – The enumerator and name ... – More enumerators and names If a field has no units associated with it, a single response with an enumerator of 0 is returned with a unit name of N/A

Example
<pre>UN 3&lt;cr&gt; UN 3 1-ug/m3,2-mg/m3&lt;cr&gt;&lt;lf&gt;  UN 1&lt;cr&gt; UN 1 0-N/A&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.38. UN c u – Set Specific Channel Field Units

Command	Description
UN c u	<p>Set the channel/field units.</p> <p>c – Desired channel/field</p> <p>u – Enumerated unit (1, 2, 3 etc.)</p> <p>Enumerators are 1 based. Sending a 0 enumerator to this command will echo back the current setting with no changes.</p>

Response	Description
UN c 1-a	<p>Returns the enumerator and unit name after the change.</p> <p>c – channel/field</p> <p>1-a – The enumerator and unit name</p>

Example
<pre>UN 3 1&lt;cr&gt; UN 3 1-ug/m3&lt;cr&gt;&lt;lf&gt;  UN 3 0&lt;cr&gt; UN 3 1-ug/m3&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.39. GTC – Start the Touch Screen Calibration

Command	Description
GTC	Start the touch screen calibration.

Response
Begin touch calibrate...

Example
GTC<cr> Begin touch calibrate...<cr><lf>

#### 4.40. SPW – Request or Set the User Password

Command	Description
SPW	Request the user password.
SPW wxyz	Set the user password, where <i>w, y, x, z</i> are digits from 1 – 9.

Response	Description
SPW ----	---- - The user password has not been entered and therefore cannot be shown.
SPW wxyz	wxyz – The current user password.

Example
SPW<cr> SPW ----<cr><lf>  PW 1234<cr> PW Unlocked<cr><lf> SPW<cr> SPW 1234<cr><lf>  SPW 1122<cr> SPW 1122<cr><lf>

#### 4.41. XRD – Request the X-Modem Record Descriptors

Command	Description
XRD e	Request the X-modem record descriptors, where e is 1=data file record.

Response	Description

Example
<pre> XRD 1&lt;cr&gt; XRD 1,3,10,1,LE&lt;cr&gt;&lt;lf&gt; 1,Time,,0,NO,DATEIME,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; 2,Status,,0,OR,UINT32,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; 3,ConcRT,mg/m3,3,S,FLOAT,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; 4,ConcHR,mg/m3,3,TOH,FLOAT,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; 5,FLOW,LPM,1,S,FLOAT,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; 6,AT,C,1,S,FLOAT,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; 7,RH,%,0,S,FLOAT,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; 8,BP,mmHg,0,S,FLOAT,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; 9,FT,C,1,S,FLOAT,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; 10,FRH,%,0,S,FLOAT,1.0E+00,0.0E+00,2.5E+00&lt;cr&gt;&lt;lf&gt; </pre>

#### 4.42. XRF – X-modem Read File

Command	Description
XRF f	Start a X-Modem Read where f is 1-User Data, 2-Alarms

Response	Description

Example
XRF 1<cr>

#### 4.43. BKGD – Request or Set the Background Offset

Command	Description
BKGD	Request the background offset setting.
BKGD n	Set the background offset setting, where n is from -0.050 to 0.050.

Response	Description
BKGD n	n – the background offset setting value

Example
BKGD<cr> BKGD 0.0000<cr><lf>  BKGD 0.035<cr> BKGD 0.035<cr><lf>



#### 4.44. FTSP – Request or Set the Filter Temperature Set Point

Command	Description
FTSP	Request the filter temperature set point.
FTSP n	Set the filter temperature set point, where n is from 0.0 to 50.0.

Response	Description
FTSP n	n – the filter temperature set point value

Example
FTSP <cr> FTSP 45.0<cr><lf>  FTSP 35<cr> FTSP 35.0<cr><lf>

#### 4.45. SPAN – Request or Set the Span Calibration Verification

Command	Description
SPAN	Request the span calibration verification value.
SPAN n	Set the span calibration verification, where n is from 0.4 to 2.0.

Response	Description
SPAN n	n – the span calibration verification value.

Example
SPAN<cr> SPAN 0.780<cr><lf>  SPAN 1<cr> SPAN 1.000<cr><lf>

#### 4.46. RTPER – Request or Set the Real-time Average Period

Command	Description
RTPER	Request the real-time average period.
RTPER n	Set the real-time average period, where n is from 15 to 60.

Response	Description
RTPER n	n – the span calibration verification value.

Example
<pre>RTPER &lt;cr&gt; RTPER 60&lt;cr&gt;&lt;lf&gt;  RTPER 30&lt;cr&gt; RTPER 30&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.47. TPRES – Request or Set the Tape Advanced Pressure

Command	Description
TPRES	Request the tape advanced pressure setting.
TPRES n	Set the tape advanced pressure setting, where n is from 50 to 350.

Response	Description
TPRES n	n – the tape advanced pressure setting.

Example
<pre>TPRES &lt;cr&gt; TPRES 250&lt;cr&gt;&lt;lf&gt;  TPRES 150&lt;cr&gt; TPRES 150&lt;cr&gt;&lt;lf&gt;</pre>

#### 4.48. XRDCRC – Request the File Descriptor CRC

Command	Description
XRDCRC 1	Request the file descriptor CRC.

Response	Description
XRDCRC f hhhh	f – the file number. hhhh – the file record descriptor CRC value in hexadecimal.

Example
XRDCRC 1<cr> XRDCRC 1 7923<cr><lf>

## 5. Modbus Map

### 1.1. 3x Modbus Map

Name	Address	Type	Points	Description
Word	0	Uint16	1	Fixed value of 1
Dword	1	Uint32	2	Fixed value of 123456789
Float	3	Float32	2	Fixed value of 123456.0
String	5	String	3	Fixed value of "ABCDE"
Year	100	Uint16	1	Current time Year
Month	101	Uint16	1	Current time Month
Day	102	Uint16	1	Current time Day
Hour	103	Uint16	1	Current time Hour
Minute	104	Uint16	1	Current time Minute
Second	105	Uint16	1	Current time Second
Date/Time	106	Uint32	2	Current Unix time (Seconds since Jan 1 1970)
N Channel	200	Uint16	1	Number of channels in last data record
Serial Number	201	String	4	MOI serial number (8 Bytes including 0 terminator)
Revision	205	String	20	Product Model, part number, and revision
Digital Revision	225	String	20	Digital sensor Model, part number, and revision

### Instantaneous real time readings

Name	Address	Type	Points	Description
Date/Time	1000	Uint32	2	Current Unix time (Seconds since Jan 1 1970)
Status	1002	Uint32	2	Current alarm status
Conc RT	1004	Float	2	Real time concentration (ug/m3 or mg/m3)
Conc HR	1006	Float	2	Previous hour's concentration (ug/m3 or mg/m3)
Flow	1008	Float	2	(LPM) Flow rate
AT	1010	Float	2	(C) Ambient temperature
RH	1012	Float	2	(%) External relative humidity
BP	1014	Float	2	(mmHg) Barometric pressure
FT	1016	Float	2	(C) Filter temperature
FRH	1018	Float	2	(%) Filter relative humidity
PX1	1020	Float	2	(mmHg) Upper tape pressure
PX2	1022	Float	2	(mmHg) Lower tape pressure
BT	1024	Float	2	(C) Box temperature
Encl	1026	Float	2	(C) Enclosure temperature
Beta	1028	Float	2	(Hz) Beta counts

### Last data record readings

Name	Address	Type	Points	Description
Date/Time	2000	Uint32	2	Unix timestamp (Seconds since Jan 1 1970)
Status	2002	Uint32	2	Alarm status
Conc RT	2004	Float	2	Real time concentration (ug/m3 or mg/m3)
Conc HR	2006	Float	2	Previous hour's concentration (ug/m3 or mg/m3)
Flow	2008	Float	2	(LPM) Flow rate
AT	2010	Float	2	(C) Ambient temperature
RH	2012	Float	2	(%) External relative humidity
BP	2014	Float	2	(mmHg) Barometric pressure
FT	2016	Float	2	(C) Filter temperature
FRH	2018	Float	2	(%) Filter relative humidity

## 1.2. 4x Modbus Map

Name	Address	Type	Points	Description
Modbus Address	0	Int16	1	Modbus address
Byte Order	1	Int16	1	Value 1 to 4
Password	60	Int16	1	Unlock User and Factory settings. Do not publish to the customer.
Year	100	Uint16	1	Set time Year
Month	101	Uint16	1	Set time Month
Day	102	Uint16	1	Set time Day
Hour	103	Uint16	1	Set time Hour
Minute	104	Uint16	1	Set time Minute
Second	105	Uint16	1	Set time Second
Date/Time	106	Uint32	2	Set Unix time (Seconds since Jan 1 1970)