BAM 1020 GENERATION 2 COMMAND SPECIFICATION

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1. Overview

This document describes the implementation of the Generation 2 command subset included as part of the STANDARD 7500 protocol used in the BAM 1020.

2. Generation 2 Commands

2.1. Overview

The subset of Generation 2 commands is included for backwards compatibility. You are encouraged to migrate over to the rich set of command provide with the 7500 protocol where possible.

The PT command is used to switch between Generation 2 commands and the standard 7500 protocol commands. See the command description below.

3. Terminal Mode

Single character commands are available only in terminal mode.

Enter terminal mode by sending the three (3) consecutive carriage return (ASCII CR) characters. The time delay between carriage return characters can be no longer that 3-seconds.

An asterisk (*) character appears when terminal mode has been entered, 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.

Sending the <Esc> character will exit terminal mode.

5-minutes of inactivity will also exit terminal mode.

4. Command Summary

4.1. Single Character Command List

Command	Description
4	Print the Setting report
5	Print the Current Date and Time
6	Print the CSV report menu
7	Print the Error report
8	Print the Utility menu
9	Print the Data file pointers
b	Xmodem Data file download
c	Clear the data memory
d	Set the Date
h,H,?	Print the System menu
p	Set the Data file pointer
t	Set the Time

4.2. CSV Report Command List

These commands execute from the CSV report menu.

Command	Description
2	Print all the Data file records
3	Print the new Data file records
4	Print the newest/last Data file record
5	Print all the Flow Stats file records
6	Print the new Flow Stats file records
7	Print all the 5-Min Flow file records
8	Print the new 5-Min Flow file records
9	Print the Error report

4.3. <Esc> Command List

These commands execute following a carriage return character (ASCII CR).

Command	Description
3	Set the new Data file pointer
6	Set the new Flow Stats file pointer
8	Set the new 5-Min Flow file pointer
DT	Get/Set the Date and Time
MN	Get/Set the Maintenance 'M' flag/bit
PT	Get/Set protocol type
RV	Print the Model, firmware Part number, and firmware Revision
SS	Get the serial number

5. Single Character Commands

These commands are available in terminal mode.

A single character command executes immediately upon receipt.

5.1. 4 – Print the Settings Report

Command	Description
4	Print the Settings report.

Response

```
BAM 1020 Settings Report
2020-06-12 16:27:07

     Station ID, 1
  Serial Number, A14540

       Firmware, 83347, R9.0.0
        Display, 82451, R1.1
      Digital 1, 597, 10503-01, R01.0.0

              K, 1.000
     Background, 0.0000
            Usw, 0.302
  Span Membrane, 0.851
     Conc Units, ug/m3
     Beta Count, 4-MINUTE
     Conc Error, FULL SCALE VALUE
     Inlet Type, PM10
     Span Check, 24 HR
   Factory Mode, OFF

  Standard Temp, 25 C
  Tape Pressure, 150
     Pres Units, mmHg

  FRH Set Point, 35
      Low Power, 20

     BAM Sample, 50
    MET Average, 1 HR
     Cycle Mode, STANDARD
    Maintenance, OFF

     Time Stamp, ENDING
Interval Output, 0

     Conc Range, 1000 ug/m3
    Conc Offset, -15 ug/m3
 Analog Range 1, 0-1.0 V
 Analog Range 2, 0-1.0 V
      DAC Cal 1, 0.0,0,1.0,29789
      DAC Cal 2, 0.0,0,1.0,29789

         RS-232, 115200
Flow Control-232, NONE
         RS-485, 115200

    Modbus Port, RS-232
 Modbus Address, 1
     Byte Order, 512
```

```
    IP Config, Static, DHCP
   IP Address, 0.0.0.0, 0.0.0.0:7500
  Subnet Mask, 0.0.0.0, 0.0.0.0
      Gateway, 0.0.0.0, 0.0.0.0

  Report Type, GENERATION 2
    Conc Type, ACTUAL
   Conc Range, 1000 ug/m3
  Conc Offset, -15 ug/m3
Dynamic Range, STANDARD
       BP Log, NONE
     Memb Log, NONE
       RH Log, NONE
      FRH Log, NONE
       FT Log, NONE

    Flow Zero, 0.03

Name,  Offset,  Slope
Flow,   0.000,  1.000
  AT,   0.000
  BP,  69.269
  FT,   0.000
 FRH,   0.000
  FP, -30.754

 Sound Volume, 10
     Language, English

     Channel,       1,       2,       3,       4,       5,       6,       7,       8,
        Name,    Conc,    Qtot,   XXXXX,   XXXXX,   XXXXX,   XXXXX,   XXXXX,      AT,
       Units,   ug/m3,      m3,     XXX,     XXX,     XXX,     XXX,     XXX,       C,
        Prec,       0,       3,       0,       0,       0,       0,       0,       1,
    FS Volts,   2.500,   2.500,   1.000,   1.000,   1.000,   1.000,   1.000,   2.500,
        Mult,    1000,   3.000,       1,       1,       1,       1,       1,   120.0,
      Offset,   -15.0,   0.000,       0,       0,       0,       0,       0,   -50.0,
  Vect/Scalar,       S,       S,       S,       S,       S,       S,       S,       S,
    Inv Slope,       N,       N,       N,       N,       N,       N,       N,       N,
```

5.2. 5 – Print the Current Data and Time

Command	Description
5	Print the Current Data and Time

Response
* 5   06/12/2020 16:29:42 X1198 *

5.3. 6 – Print the CSV Report Menu

Command	Description
6	Print the CSV report menu. The > character prompt indicates only the commands in the CSV menu are available. A carriage return will exit the menu.

Response
* 6 CSV Type Reports   2 - Display All Data 3 - Display New Data 4 - Display Last Data 5 - Display All Flow Stats 6 - Display New Flow Stats 7 - Display All 5-Min Flow 8 - Display New 5-Min Flow 9 - Display Error Log >

5.3.1. CSV 2 – Print All the Data File Records

Command	Description
2	Print All the Data file records

Response [Report Type set to GENERTION 2]

```
> 2
Station,  1
Time,Conc(ug/m3),Qtot(m3),XXXXX(XXX),XXXXX(XXX),XXXXX(XXX),FRH(%),FT(C),AT(C),E,U,M,I,L,R,N,F,P,D,C,T,
06/12/20 18:00,     5, 0.699,     0,     0,     0,    31,  25.2,  24.1,0,0,0,0,0,0,0,0,0,0,0,0,
```

Response [Report Type set to CHINA HJ 653]

```
> 2
Station,  1
Time,Conc(ug/m3),Qtot(m3),XXXXX(XXX),XXXXX(XXX),XXXXX(XXX),FRH(%),FT(C),AT(C),ConcS(ug/m3),QtotS(m3),
BP(kPa),Flow(lpm),E,U,M,I,L,R,N,F,P,D,C,T,
06/12/20 18:00,    5.4, 0.699,     0,     0,     0,    31,  25.2,  24.1,    5.6, 0.674,
  97.4, 16.66,0,0,0,0,0,0,0,0,0,0,0,0,
```

5.3.2. CSV 3 – Print the New Data File Records

Command	Description
3	Print the new Data file records since the last command. Use the <Esc>3 command to set the new file pointer

Response

```
Same as CSV 2 response.
```

5.3.3. CSV 4 – Print the Last Data File Record

Command	Description
4	Print the last Data file record.

Response
Same as CSV 2 response.

5.3.4. CSV 5 – Print All the Flow Stats File Records

Command	Description
5	Print All the Flow Stats file records.

Response
> 5 Flow Statistics Report 06-15-20 15:45:55, 1 Time,Elapsed(HH:mm:ss),Flow(lpm),CV(%),Vol(m3),Flag,AT(C),AT Min,AT Max,BP(mmHg),BP Min,BP Max 06-12-20 17:08:38,00:41:58,16.67,0.3,0.699,0,24.1,24.0,24.3,730.4,730.3,730.6

5.3.5. CSV 6 – Print the New Flow Stats File Records

Command	Description
6	Print the new Flow Stats file records since the last command. Use the <Esc>6 command to set the new file pointer

Response
Same as CSV 5 response.

5.3.6. CSV 7 – Print All the 5-Min Flow File Records

Command	Description
7	Print All the 5-Min Flow file records.

Response
> 7 5-Minute Flow Report 06-15-20 15:47:43, 1 Time,Flow(lpm),AT(C),BP(mmHg),FP(mmHg) 06-12-20 17:13:41,16.71,24.0,730.4,552.5

5.3.7. CSV 8 – Print the New 5-Min Flow File Records

Command	Description
8	Print the new 5-Min Flow file records since the last command. Use the <Esc>8 command to set the new file pointer.

Response
Same as CSV 7 response.

5.3.8. CSV 9 – Print the Error Report

Command	Description
9	Print the Error report.

Response
The response is the same as command 7 below.

5.4. 7 – Print the Error Report

Command	Description
7	Print the Error report.

Response

```
* 7
06/12/20 16:40:30, Tape
06/12/20 16:40:30, Tape,Latch
06/12/20 16:40:30, Tape,Shuttle Reset
06/12/20 16:40:30, Tape,Shuttle Fine
06/12/20 16:40:30, Tape,Forward Move
06/12/20 16:40:30, Tape,Forward Timeout
06/12/20 16:40:30, Tape,Backward Move
06/12/20 16:40:30, Tape,Backward Timeout
06/12/20 16:40:30, Tape,Tension
06/12/20 16:40:30, Tape,Un-Tension
06/12/20 16:40:30, Tape,Capstan Forward Move
06/12/20 16:40:30, Tape,Capstan Forward Timeout
06/12/20 16:40:30, Tape,Capstan Backward Move
06/12/20 16:40:30, Tape,Capstan Backward Timeout
06/12/20 16:40:30, Tape,Capstan Fine Backward Move
06/12/20 16:40:30, Tape,Capstan Fine Forward Timeout
06/12/20 16:40:30, Tape,Tape Break
06/12/20 16:40:30, Tape,Fail Safe
06/12/20 16:40:30, Tape,Unknown Subcategory
06/12/20 16:40:30, Count
06/12/20 16:40:30, Count,Mass
06/12/20 16:40:30, Count,Membrane
06/12/20 16:40:30, Count,Stability
06/12/20 16:40:30, Count,Unknown Subcategory
06/12/20 16:40:30, Membrane Deviation
06/12/20 16:40:30, Membrane Deviation,5%
06/12/20 16:40:30, Membrane Deviation,Unknown Subcategory
06/12/20 16:40:30, Pressure
06/12/20 16:40:30, Pressure,Filter Pressure
06/12/20 16:40:30, Pressure,Unknown Subcategory
06/12/20 16:40:30, Flow
06/12/20 16:40:30, Flow,QTotal
06/12/20 16:40:30, Flow,5% Out-of-regulation
06/12/20 16:40:30, Flow,Flow Failure
06/12/20 16:40:30, Flow,AT Failure
06/12/20 16:40:30, Flow,AT Disconnected
06/12/20 16:40:30, Flow,Internal FP Failure
06/12/20 16:40:30, Flow,Internal RH Failure
06/12/20 16:40:30, Flow,External BP Failure
06/12/20 16:40:30, Flow,Pump Off Failure
06/12/20 16:40:30, Flow,Unknown Subcategory
06/12/20 16:40:30, Nozzle
06/12/20 16:40:30, Nozzle,Up
06/12/20 16:40:30, Nozzle,Down
```

```
06/12/20 16:40:30, Nozzle,Unknown Subcategory
06/12/20 16:40:30, Membrane Timeout
06/12/20 16:40:30, Membrane Timeout,Withdraw
06/12/20 16:40:30, Membrane Timeout,Extend
06/12/20 16:40:30, Membrane Timeout,Unknown Subcategory
06/12/20 16:40:30, Power Fail
06/12/20 16:40:30, Internal
06/12/20 16:40:30, Internal,Mass
06/12/20 16:40:30, Internal,Membrane
06/12/20 16:40:30, Internal,Stability
06/12/20 16:40:30, Internal,Coarse
06/12/20 16:40:30, Internal,Unknown Subcategory
06/12/20 16:40:30, Maintenance
```

5.5. 8 – Print the Utility Menu

Command	Description
8	Print the Utility menu.

Response

```
* 8

 > BAM 1020 < Utility Commands

ASCII Commands:

c     - Clear Data Memory (Password required)
d     - Set Date (Password required)
h,H,? - Display > BAM 1020 < System Menu
p     - Modify Modem Pointer
t     - Set Time (Password required)

BINARY Commands:

b     - XMODEM Download of Data

*
```

5.6. 9 – Print the Data File Pointers

Command	Description
9	Print the Data file pointers. The data file is a cyclic memory device with data records stored in sequence. When the memory device is full the oldest data is overwritten. The data logger uses four pointers to control access to the memory device. A data pointer points to a word location. The file size is 65536 word locations. A data pointer value range is from 0 to 65535.

Response
* 9 Data:00705 Modem:00000 Full Locs:00705 Binary:00000 X3900 *

Pointer	Description
Data	Points to the next location to store data.
Modem	The modem pointer works with the RS232 commands to keep track of the read point for the ASCII data retrieve selections. The value of this pointer cannot be modified.
Full Loc	Displays the number of locations stored in the memory device. When the memory device is full this number will always indicate 65535.
Binary	This pointer is used by the binary XMODEM download. It pointers to the beginning of the file download. Binary downloads require presetting of the binary pointer. Use the ‘p’ command to set the value. The user should keep track of the pointer during each download.

5.7. b – Xmodem Data File Download

Command	Description
b	Command b starts the XMODEM download of Data file. The XMODEM protocol can be found on the Internet. Just search for “XMODEM Specification.”

Response

5.8. c – Clear the Data Memory

Command	Description
c	Command c clears all the data memory. The Error, Data, Flow Stats, and the 5-Min Flow files are cleared. The Password must be four (4) characters with leading zeros.

Response
* c Enter Password (Function Key #'s): 0000 WARNING!!!: Reset Destroys All Data! Continue? (Y) or (N)? (Press Enter to Cancel): y Resetting Data Memory - Please Wait Memory Reset Complete X7382 *

5.9. d – Set the Date

Command	Description
d	Command d sets the date.

Response

```
* d

Enter Password (Function Key #'s): 0000
Date: 02/07/2018  X4379: 02/07/2018

Date: 02/07/2018  X1057

*
```

5.10. h – Print the System menu

Command	Description
h	Command h prints the System menu.

Response

```
* h

-----------------------------
| > BAM 1020 <  System Menu |
-----------------------------

Select One of the Following:

4 - Display System Configuration
5 - Display Date / Time
6 - CSV Type Report
7 - Display Errors
8 - Display > BAM 1020 < Utility Commands
9 - Display Pointers

<Esc>PT 0 - Exit Generation 2 Command Mode

    Press <Enter> to Exit a Selection

*
```

5.11. p – Set the Data File Pointer

Command	Description
p	Command p sets the Data file pointer.

Response
* p Binary:00000 15 Data:00000 Modem:00000 Full Locs:00000 Binary:00015 X5037 *

5.12. t – Set the Time

Command	Description
t	Command t sets the time.

Response
* t Enter Password (Function Key #'s): 0000 Time: 13:39 X4180: 13:40 Time: 13:40 X0834 *

6. <Esc> Commands

These commands are prefaced with the Esc character (ASCII ESC) and terminated with a carriage return character (ASCII CR).

6.1. <Esc>3 – Set New Data File Pointer

Command	Description
<Esc>3 h	Set the new Data file pointer to the current time minus h hours. Command-3 will start printing from this timestamp.

Response
<Esc>3 New data pointer: 02-06-18 15:00:01 * 5   02/08/2018   13:19:39 X1208 <Esc>3 24 New data pointer: 02-07-18 13:19:47

6.2. <Esc>6 – Set New Flow State File Pointer

Command	Description
<Esc>6 h	Set the new Flow Stats file pointer to the current time minus h hours. Command-6 will start printing from this timestamp.

Response
<Esc>6 New data pointer: 02-06-18 14:08:24 * 5   02/08/2018   13:22:51 X1196 <Esc>6 24 New data pointer: 02-07-18 13:22:56

6.3. <Esc>8 – Set New 5-Min Flow File Pointer

Command	Description
<Esc>8 h	Set the new 5-Min Flow file pointer to the current time minus h hours. Command-8 will start printing from this timestamp.

Response
<Esc>8 New data pointer: 02-06-18 14:08:24 * 5   02/08/2018   13:22:51 X1196 <Esc>8 24 New data pointer: 02-07-18 13:22:56

6.4. <Esc>DT – Get or Set Date and Time

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

Response
<Esc>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

```
<Esc>DT<cr>
DT 2013-01-08 11:39:23<cr><lf>

<Esc>DT 2013<cr>
DT 2013-01-01 00:00:00<cr><lf>

<Esc>DT 20130108<cr>
DT 2013-08-08 00:00:00<cr><lf>

<Esc>DT 2013-01-081141<cr>
DT 2013-01-08 11:41:00<cr><lf>
```

6.5. <Esc>MN – Get or Set the Maintenance 'M' Flag

Command	Description
<Esc>MN	Get the Maintenance setting.
<Esc>MN ?	Get the Maintenance enumerator list.
<Esc>MN e	Set the Maintenance setting, where e is 0-OFF,1-ON.

Response	Description
MN e-n	e – The enumerator setting. n – The enumerator name

Example
<Esc>MN<cr> MN 0-OFF<cr><lf> <Esc>MN ?<cr> MN 0-OFF,1-ON<cr><lf> <Esc>MN 1<cr> MN 1-ON<cr><lf>

6.6. <Esc>PT – Get or Set Protocol Type

Command	Description
<Esc>PT	Get the Protocol Type setting.
<Esc>PT ?	Get the Protocol Type enumerator list.
<Esc>PT e	Set the Protocol Type setting, where e is 0-STANDARD,1-GENERATION 2.

Response	Description
PT e-n	e – The enumerator setting. n – The enumerator name. 0-STANDARD: Serial commands comply to this STANDARD 7500 protocol. 1-GENERATION 2: Serial commands comply to the second-generation BAM 1020 protocol.

Example
<Esc>PT<cr> PT 0-STANDARD <cr><lf> <Esc>PT ?<cr> PT 0-STANDARD,1-GENERATION 2<cr><lf> <Esc>PT 1<cr> PT 1-GENERATION 2<cr><lf>

6.7. <Esc>RV – Print Model, Firmware, Revision

Command	Description
RV	Report the model number, firmware part number, and revision string.

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

Example
<Esc>RV<cr> BAM 1020, 83347, R9.0.0<cr><lf>

6.8. <Esc>SS – Get the Serial Number

Command	Description
<Esc>SS	Get the product serial number.

Response	Description
<Esc>SS A99999	A99999 – Follows the MOI standard definition.

Example
<Esc>SS<cr> SS A14540<cr><lf>