

BX-965 REPORT PROCESSOR INTERFACE OPTION MANUAL

BX-965-9800 REV B



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About this Document

This manual addendum describes the hardware and software configurations used on the BAM-1020 particulate monitor when operated with the optional BX-965 Report Processor back panel option. This option includes an expanded back panel assembly on the BAM-1020, which contains a data report microprocessor with extra data ports. This allows data to be retrieved at anytime without being interrupted or delayed by the measurement cycle. The BX-965 also supports additional memory and USB and Ethernet ports.

The BX-965 Report Processor is required for the PM_{10-2.5} (coarse) measurement system, and is also recommended for all data collection systems involving frequent digital polling of the BAM-1020 data ports.

This information is meant to supplement the BAM-1020 Operation Manual, Revision G or later.

Technical Support

Should you still require support after consulting your printed documentation, we encourage you to contact one of our expert Technical Service representatives during normal business hours of 7:00 a.m. to 4:00 p.m. Pacific Standard Time, Monday through Friday. In addition, technical information and service bulletins are often posted on our website. Please contact us and obtain a Return Authorization (RA) tracking number before sending any equipment back to the factory. This allows us to track and schedule service work and expedite customer service.

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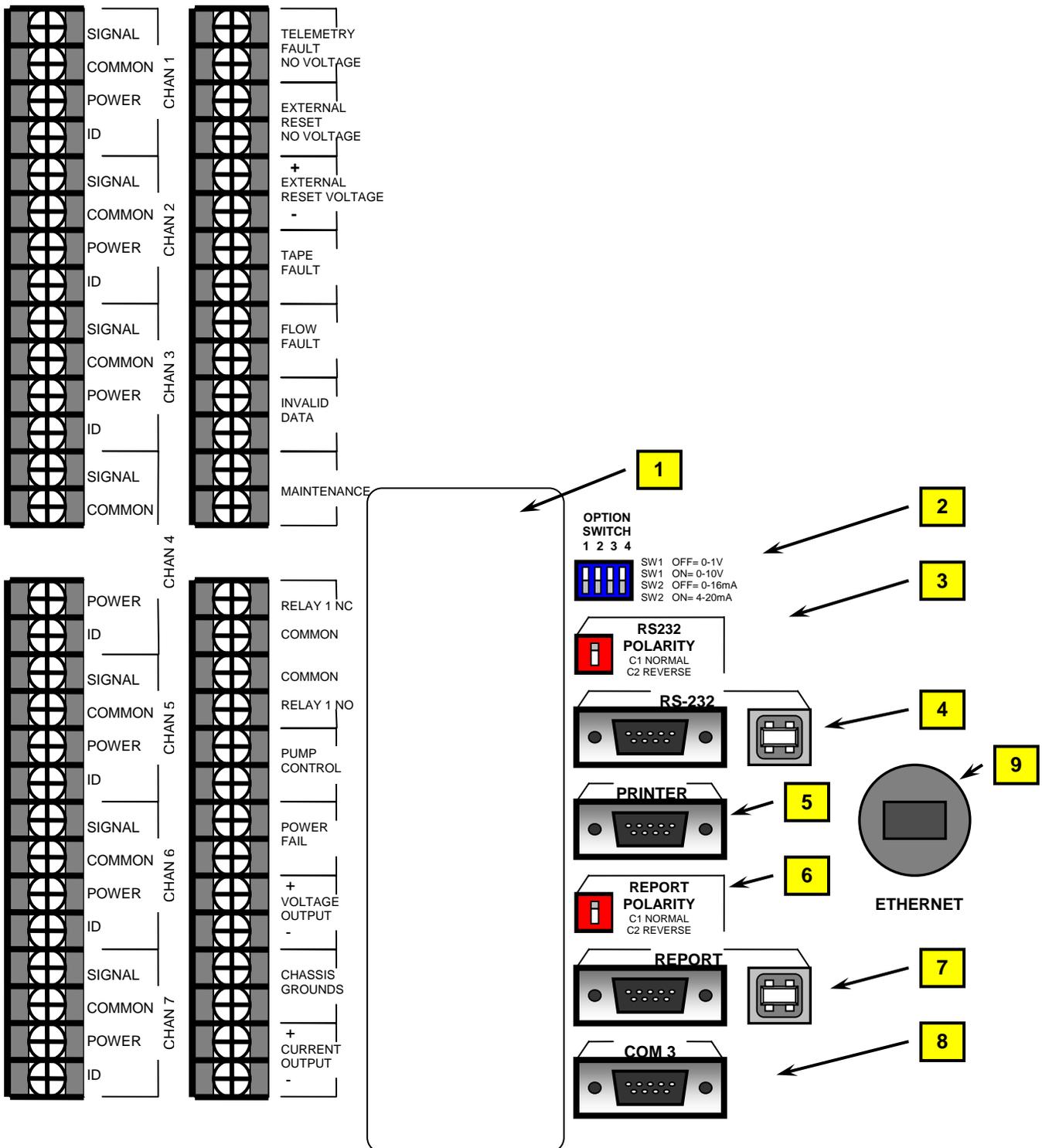
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1 New Back Panel Connections

The optional BX-965 Report Processor back panel contains all of the same connections as the standard BAM-1020, with the addition of new connections for data retrieval options. See the BAM-1020 manual Rev G or later, Section 8.3 and 10.2 for descriptions of the standard met channels and relay connections. The expanded connections for the BX-965 option are shown in the diagram and described below.



1. **Expansion Terminal:** This is a new terminal location which allows future access to extra analog input channels and relay channels. None of these terminal functions are supported by the BAM-1020 at this time. A cover plate is included.
2. **OPTION SWITCH:** This switch selects the analog output voltage or current loop range for the BAM-1020, and is unchanged in function from normal units.
3. **RS-232 POLARITY:** This switch changes the polarity of the TX and RX signals (pins 2 and 3) on the 9-pin RS-232 serial port only, as on normal BAM-1020 units. This is used for compatibility with certain serial cables. This switch does not affect the USB ports or any other serial port polarities.
4. **RS-232:** The classic 9-pin RS-232 two-way serial port has been retained to keep compatibility with certain customer's existing data systems. See the BAM-1020 manual. The Report Processor back panel now contains an additional USB port, which allows a computer without an 9-pin RS-232 COM port to access data from the BAM. The port converts the BAM serial data to USB. Windows drivers are required to use the USB port, and are supplied on a CD with part number 80328. The communications settings on the computer will still have to be established just like before. See Section 9 of the BAM-1020 manual. **Note:** The USB ports on the BAM-1020 are serial converters only. The BAM will not recognize any USB peripheral devices such as flash memory drives, nor will the BAM be recognized as a flash storage device or drive by a PC.
5. **PRINTER:** This is the classic printer output port, just like on normal BAM-1020 units. It can still be used for factory diagnostic output or serial printer functions. See the BAM-1020 manual. Output only.
6. **REPORT POLARITY:** This null switch functions just like the RS-232 polarity switch described above, except it affects the new REPORT serial port only. This switch does not affect the USB ports or any other serial port polarities.
7. **REPORT:** This is the new serial port interface which has been added to the BX-965 back panel of the BAM-1020 to support the new Report Processor functions. Data reports may be retrieved through this port at any time during the hour without being interrupted or delayed due to sample cycle functions. This is primarily used for application where the BAM must report frequent digital data values to a data collection system. The REPORT function also includes a USB port which allows a computer without an 9-pin RS-232 COM port to access data from the BAM. The port converts the BAM serial data to USB like the RS-232 USB port described above. Windows drivers are supplied. **Note:** The USB ports on the BAM are serial converters only. The BAM will not recognize any USB peripheral devices such as flash memory drives, nor will the BAM be recognized as a flash storage device or drive by a PC.
8. **COM 3:** This is the serial network connection for PM_{10-2.5} (PM-coarse) units only. In the coarse configuration, two BAM-1020 units are connected together with a serial cable through this port, and the units communicate together to make the measurement. The BAMs must be equipped with appropriate firmware for coarse functionality.
9. **ETHERNET:** This is an Ethernet port for network and TCP/IP applications. Drivers for the port are included on the supplied 80328 CD. The Ethernet port is included on all BX-965 kits after March 2011. Older Report Processors have a hole plug in this position.

2 Report Processor Functions

The BAM-1020 contains a 68HC11 microprocessor which controls all aspects of the unit's operation, including mechanical transport activity and data logging. When digital data is retrieved from the BAM-1020, this processor outputs the requested file to the RS-232 serial port. However, if digital data is requested at certain times during the measurement cycle when the microprocessor is busy performing mechanical movements, then the requests for data may be ignored because the system is busy. This is often not a problem since the delays are brief, but it can be a problem if the system is in the middle of uploading a large data file through the serial port when a critical mechanical motion must be performed, such as tape movement near the beginning or the end of the sample hour, or if the data system requests data from the BAM frequently during the sample hour. In these case, the data can be interrupted or delayed in order for the unit to perform the critical motion.

A secondary data serving microprocessor and memory array has been added to the optional BX-965 rear panel interconnect circuit board. This "Report Processor" continuously synchronizes with the data files of main CPU. Since the report processor does not control any aspects of the measurement cycle, it is free to deliver the data files through its own dedicated REPORT serial port at any time throughout the hour. The file menu system, data file types, and download processes are virtually identical to the classic RS-232 serial data port.

The **REPORT** serial port is a standard RS-232 serial protocol with a DB-9 connector, just like the classic "RS-232" serial port. In addition, a USB output is provided for computers without a regular DB-9 COM serial port. The classic RS-232 serial port on the BAM-1020 is still available, and the functionality has not changed from previous versions. The classic data collection commands from the RS-232 port still work to collect data through the REPORT serial port. See Section 9 of the BAM-1020 manual if you are not already familiar with the serial port commands. The CSV New Data or Last Data files are usually used in most applications.

System Menu:

```
> BAM 1020 <   System Menu
```

- 1 - Display Current Day
- 2 - Display All Data
- 3 - Display New Data
- 4 - Display Settings
- 5 - Display Date / Time
- 6 - CSV Report Menu
- 7 - Display Errors
- c - Clear Data Memory
- h - Display System Menu (H,?)

CSV Report Menu

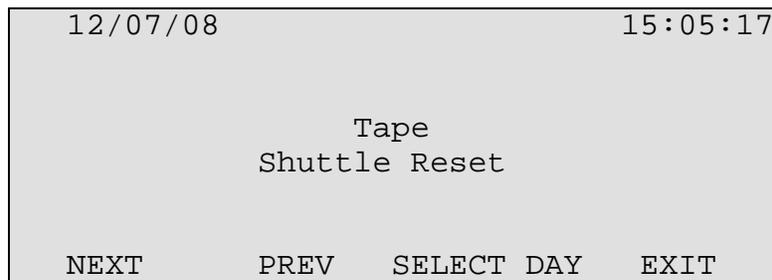
```
CSV Report Menu
```

- 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

3 Error Reporting

One of the few differences in the data file output through the report processor is the errors report. The BAM-1020 data system has only 12 categories of errors, each represented by a letter in the data array, such as T tape break or L power failure, etc. Some of these 12 categories are used to indicate only one specific error, while others such as F flow alarm or T Tape alarm may indicate several different possible conditions with the same bit.

To better define these multiple-use error bits, new subcategories have been added for BAM-1020 firmware revisions 3.4.0 or later. When the error log is viewed in the user interface, the error category and subcategory are both listed, making the error more specific. In the example below, a category T (tape) error occurred with a subcategory (Shuttle Reset) error indicated. This particular example tells you that there was an error with the tape control system; specifically that the unit timed out after trying the move the shuttle for 22 seconds.



New Error view showing subcategory

These new subcategories are particularly helpful for troubleshooting a specific error, and for distinguishing between a critical error which affects the data vs. a potentially harmless data alarm flag. These subcategories will appear in the error log view screens on the BAM display, and in the digital error log output only through the **REPORT** serial port. The regular concentration data output files will still only display a **0** or **1** in each of the 12 category letter columns, indicating the presence (1) or lack of (0) an error of that category requiring further investigation.

Following is a complete list of error categories and the new subcategories:

E	Error Report Text
1	Interface Reset, Cycle Not Finished
2	Interface Reset, Not Allowed

U	Error Report Text
1	Interface Fault

M	Error Report Text
1	MET Cal

I	Error Report Text
1	Internal, Conc
2	Internal, Mass
3	Internal, Membrane

4	Internal, Stability
5	Internal, Coarse
6	Internal, 80350 Link Down

L	Error Report Text
1	Power Fail

R	Error Report Text
1	Reference, Withdraw
2	Reference, Extend

N	Error Report Text
1	Nozzle, Up
2	Nozzle, Down
3	Nozzle, Delta-T

F	Error Report Text
1	Flow, QTotal
2	Flow, Average
3	Flow, 5% Out-of-regulation
4	Flow, Flow Failure
5	Flow, AT Failure
6	Flow, AT Disconnected
7	Flow, Internal BP Failure
8	Flow, External BP Failure
9	Flow, Self Test

P	Error Report Text
1	Pressure, Delta-Pressure

D	Error Report Text
1	BAM Cal, Membrane 5%
2	BAM Cal, Membrane 0.025

C	Error Report Text
1	Count, Mass
2	Count, Membrane
3	Count, Stability

T	Error Report Text
1	Tape, Latch
2	Tape, Shuttle Reset
3	Tape, Shuttle Fine
4	Tape, Forward Move
5	Tape, Forward Timeout
6	Tape, Backward Move
7	Tape, Backward Timeout
8	Tape, Tension
9	Tape, Un-Tension
10	Tape, Capstan Forward Move
11	Tape, Capstan Forward Timeout
12	Tape, Capstan Backward Move
13	Tape, Capstan Backward Timeout
14	Tape, Capstan Fine Backward Timeout
15	Tape, Capstan Fine Forward Timeout
16	Tape, Self Test

4 New Serial Port Commands for Advanced Applications

These commands are for advanced applications. The following are new serial port commands:

Command	Description
<Esc>RV <cr>	Firmware Version
<Esc>H<cr>	Esc Command Menu
<Esc>DP f ts<cr>	Extended Pointer Command
<Esc>PR f ts<cr>	Print CSV Report Command
<Esc>FS<cr>	File System Test

Message Format

Messages are prefaced with an Esc (0x1B) character followed directly by a command which is variable in length depending on the command. After the command there can be zero or more parameter fields. Each parameter field is delimited by one or more Space characters (0x20). The end of the message is terminated with a carriage return (0x0D) character. An example follows:

```
<Esc>RV<cr>
```

Conventions

The examples below use the following conventions

Angle brackets denote non printable ASCII characters. For example <Esc> or <cr><lf>.

All commands are in Upper Case. All Upper Case characters in a command definition will be taken as literal input.

Lower case characters are used to describe the context of certain parameters or fields within a given command definition. Parameters are delimited by space characters.

Time Stamps

The new command formats will allow the use of Time Stamp fields. These Time Stamps will be used for setting the Data Pointers for files allowing much finer control over which records(s) to output. The following rules will apply for all parameters listed as Time Stamp in the specification.

Time Stamps will be straight numerical strings describing a Date and Time with the following format:

YYYYMMDDHHMMSS

Each of the fields are the exact number of characters shown. Leading zeros will be added as necessary to pad these fields to their exact width. There will be no dashes, slashes or colons in the string.

The Time Stamp string may be cut short. Only the fields necessary to describe the time you wish to achieve are necessary. All fields to the right of the ignored field must also be eliminated.

Time Stamps prior to the beginning of the file will resolve to the first record of the file. Time Stamps which are after the last record in the file will resolve to the End of File.

The following table will document the different fields of the Time Stamp.

Field	Description
YYYY	This is a four digit Year. This field is mandatory.
MM	The first MM field denotes the Month. It must fall within the range of 01 to 12. If this field is left off, the Month will default to January.
DD	The DD field denotes the Day of the Month. If this field is left off, the Day will default to 01.
HH	The HH field denotes the Hours. This is in 24 Hour time format and ranges from 00 to 23. If this field is left blank the Time will default to 00:00:00 (Midnight).
MM	The second MM field denotes the Minutes. If this field is left blank it will default to 00.
SS	The SS field denotes the Seconds. If this field is left blank it will default to 00

File Numbers

Several of the commands take a File Number to determine which file to operate on. The standard file numbers are as follows:

File Number	Description
0	Settings File
1	The data logger file.
2	The Error File.
3	The flow statistics file.
4	The 5-minute flow file.

Esc Command Menu

Command	Description
<Esc>H<cr>	<p><Esc> Command Menu</p> <p><Esc>RV<cr> - Reports Firmware Revisions <Esc>DP f ts<cr> - Set New Data Pointer <Esc>PR f ts<cr> - Print Report <Esc>XRF f ts<cr> - XMODEM Read File <Esc>FS<cr> - File System Test</p> <p>File (f) numbers supported: 0 - Settings file 1 - Data file 2 - Error file 3 - Flow statistics file 4 - 5-Minute flow file</p> <p>Time start (ts) specifiers: No ts parameter will report All data. ts = -1 parameter will report New data. ts = 1 to 2000 will report Past ts hours of data. ts = YYYYMMDDHHMMSS will report data from time ts.</p>

Firmware Revision

Report the revision of the firmware on the 80350 board as well as the revision of the firmware on the host BAM processor.

Command	Description
<Esc>RV<cr>	<p>This command reports the Revision string of both CPU boards.</p> <p>The <Esc> parameter is the Esc key. The <cr> parameter is the Enter key.</p> <p>Response:</p> <pre>Firmware BAM, 3236-55 V4.2.0 Firmware 80350, 80353-04 R2.1.0</pre>

New Data Pointer Command

IMPORTANT NOTE: The data pointer reset commands used through the REPORT port on the Report Processor are not the same as the data pointer reset commands used for the main BAM-1020 CPU through the RS-232 port! See Section 9.8 of the BAM-1020 manual, Rev G or later for the escape command sequence for the main CPU data pointer reset.

The following protocols set the report processor “new data” file pointer to the specified time.

Command	Description
<code><Esc>DP f ts<cr></code>	<p>The <code><Esc></code> parameter is the Esc key.</p> <p>The <code>f</code> parameter is the file number to set the data pointer.</p> <p>The <code>ts</code> parameter is the Time Stamp string.</p> <p>The <code><cr></code> parameter is the Enter key.</p> <p>Example:</p> <pre>DP 3 200712030945</pre> <p>Response</p> <pre>DP 3 03-Dec-07 09:45:00</pre>

Print Report Commands

Start a CSV type report for a given file and starting from a specified time.

Command	Description
<code><Esc>PR f ts<cr></code>	<p>Print report command where <code>f</code> is the file number and <code>ts</code> is time specifier.</p> <p>File numbers supported are:</p> <ul style="list-style-type: none"> 0 – Settings file 1 – Data file 2 – Error file 3 – Flow statistics file 4 – 5-Minute flow file <p>The time specifiers supported are:</p> <ul style="list-style-type: none"> No <code>ts</code> parameter – Report all data -1 – Report new data <code>ts</code> – Time Stamp string searches for the closest matching record to the given Date/Time.
<code><Esc>PR 1<cr></code>	Report all Data example
<code><Esc>PR 1 -1<cr></code>	Report new Data example
<code><Esc>PR 1 20071125081500<cr></code>	Report Data from 11-25-07 08:15:00 example

XMODEM Read File

This command is for Met One use only.

File System Test

Command	Description
<Esc>FS<cr>	<p>Performs a File System Test of all of the files.</p> <p>The <Esc> parameter is the Esc key.</p> <p>The <cr> parameter is the Enter key.</p> <p>Response:</p> <pre data-bbox="672 688 786 716"><Esc>fs</pre> <pre data-bbox="672 779 927 806">File System Test</pre> <pre data-bbox="672 821 906 848">File System OK!</pre>

5 Gesytec (Bayern-Hessen) Protocol

The Gesytec (Bayern-Hessen) Protocol is provided to communicate with a BAM 1020 from an established European network. The protocol is used to retrieve measurement values at some periodic rate. This is a polled type protocol. Only the DA command is supported for data retrieval.

This protocol is available from both the RS-232 port, and the REPORT port.

Measurement Parameters

Following is a list of measurement parameters available for data retrieval.

They are hourly or average values; not real time values.

Parameter Name	Description
CONC	Measured concentration (mg/m ³) for the sample period using the currently selected volume. Calculated at the end of the sample period.
Q_STD	Measured Q (m ³) for the sample period using volume at standard conditions. Calculated at the end of the sample period.
Q_ACT	Measured Q (m ³) for the sample period using volume at actual conditions. Calculated at the end of the sample period.
STAB	Stability is calculated as: $m = k * \frac{s}{m\mu} \ln\left(\frac{I1}{I1x}\right)$ Where k is the factory calibration factor, and mu is modified usw. Calculated at the end of the sample period.
REF	Reference Membrane is calculated as: $m = \frac{1}{m\mu} \ln\left(\frac{I1}{I2}\right)$ Where mu is modified usw. Calculated at the end of the sample period.
FLOW	Average flow rate for the BAM sample period.
CV	Flow rate coefficient of variance for the BAM sample period.
AT	Average ambient temperature for the BAM sample period.
BP	Average ambient pressure for the BAM sample period.
Analog Inputs 1 to 6	User defined. Average value at the end of the Met sample period (1 min, 5 min, ...).
PM10s	PM10 concentration in standard conditions. For PM-coarse systems only, where this unit is enabled as the PM10 master unit.
PM2.5	PM2.5 concentration from slave unit. For PM-coarse systems only, where this unit is enabled as the PM10 master unit.
PMc	PM-coarse concentration. For PM-coarse systems only, where this unit is enabled as the PM10 master unit. Coarse = PM10 – PM2.5.

Protocol Setup

The measurement parameters returned by the DA command are setup from the DATA QUERY screen. This screen can be found on the SETUP menu.

N: 18			DATA QUERY FIELDS		
01	CONC	02	Q_STD	03	Q_ACT
04	STAB	05	REF	06	FLOW
07	CV	08	AT	09	BP
10	AN1	11	AN2	12	AN3
13	AN4	14	AN5	15	AN6
16	PM10s	17	PM2.5	18	PMC
	SAVE				EXIT

This screen allows the operator to select the total number of available data parameters to send, and to select what order to send them in.

The Parameter N at the top left of the screen is the number of fields to be returned by the DA command. This number can be set from 00 to 18 using the up/down arrow keys. A value of 0 will disable the protocol. Each increment of the N field adds to the number of activated parameters in the list. Each parameter in the list contains the name for that parameter. Only those fields which are active will have names displayed. Unused fields are blank.

The left/right arrows can be used to navigate among parameters in the active list. The up/down arrows can be used to change the selected parameter. The list of available parameters is shown in the table above. Analog channels 1-6 will display their selected field names from the Sensor Setup. Repeating a parameter multiple times in the list is allowed.

For example: You want only five certain data parameters to appear in the data array. First set the N field to 05 with the up/down keys. The first five fields will be activated and displayed in the list, but will not necessarily be the five exact parameters you want. Use the right/left arrow keys to select the first parameter in the list, then use the up/down arrows to scroll through the whole list of available parameters until the correct one is shown. Then move to the next parameter in the list and select the desired parameter from the list again. Repeat until all parameters in the list are exact data parameters that you want, in the correct order.

The parameters on this page will have their own private copy of the setup variables. Pressing Save will copy these values over to permanent configuration memory and give a visual confirmation on the top row of the screen.

The Protocol

The following is a description of the Gesytec (Bayern-Hessen) Protocol. The following table lists the abbreviations used to describe this protocol:

Abbreviation	Hex Values	Description
<CR>	0x0D	Carriage Return Character
<LF>	0x0A	Line Feed Character
<STX>	0x02	ASCII Start of Text Character
<ETX>	0x03	ASCII End of Text Character
<SP>	0x20	Space
<BCC>		Block Checksum. Calculation described below.

Block Checksum <BCC>

The Block Checksum is calculated as the bitwise XOR (Exclusive Or) of all of the characters in the message string including the framing characters <STX> and <ETX>. The Checksum is initialized to 0x00 before starting.

The Block Checksum consists of two ASCII characters which represent the hexadecimal equivalent of the 1 byte checksum value.

If a command is terminated by an <ETX> character, the <BCC> is used. If the command is terminated by a <CR> then no <BCC> is used.

Basic Command Structure

The basic command structure follows two alternate forms.

```
<STX>Command text<ETX><BCC>
```

or

```
<STX>Command text<CR>
```

Each command is framed by control characters <STX> at the start and terminated with either <ETX> or <CR>.

If a command is terminated with <ETX> then two additional characters <BCC> follow the <ETX> character as the Block Checksum.

DA Command.

The DA Command is the Data Query command. The unit responds with the current measurement data according to the setup screen. This allows the user to choose the number of data fields and which measurements from the list will be retrieved.

The command structure for the DA data query command is as follows:

```
<STX>DA<address><ETX><BCC>
```

The <address> is optional and can be left out completely. The <address> if present must match the Station ID. Additional Space can be present after the address. The valid range of Station ID numbers is from 1 to 99.

The <address> can be represented with either leading 0's or leading <SP>'s. The following are different acceptable formats of the DA command with the Station ID of 5:

```
<STX>DA<CR>
```

```
<STX>DA005<CR>
```

```
<STX>DA<SP><SP>5<ETX><BCC>
```

```
<STX>DA<ETX><BCC>
```

The data query string is valid and will be answered with a transmission only if the command starts with <STX> followed by the characters DA, and the <address> (if present) matches the Station ID, and the command is terminated by either a <CR> or <ETX> followed by the correct checksum <BCC>.

If the query command is terminated with a <CR> the response will also be terminated with a <CR> and no <BCC> will be used. If the command is terminated with <ETX><BCC> then the response will also be required to terminate with <ETX><BCC>.

The format of the Response String is as follows.

```
<STX>MD[nn]<SP>[address]<SP>[measured value 1]<SP>[Status]<SP>
[Serial #]<SP>[SFKT]<SP>[address+1]<SP>[measured value 2]
<SP>[Status]<SP>[Serial #]<SP>[SFKT]<SP><ETX><BCC> or <CR><LF>
```

[nn]: Number of variables to follow. Two digits with leading 0 ie 02.

[address]: Station ID, 3 characters, leading zeros are transmitted.

[Measured value]: In exponential representation. 4 characters mantissa, 2 characters exponent each with a sign. The decimal point is implied to be after the first digit and is not transmitted. For example, 23.7 would be represented as +2370+01

[Status]: Status consists of two parts, Operation Status and Error Status. These are two character hexadecimal values separated by <SP> which represent status byte and error byte conditions indicated by bit positions. These values are shown in the accompanying tables.

[Serial #]: Three digit Serial Number with leading zeros.

[SFKT]: Space provided for future use in special functions. It currently consists of a string of six 0's.

An Example follows:

Inquiry: <STX>DA<CR>

Response:

```
<STX>MD03 001 +2578+02 00 00 023 000000<SP>
002 +5681+00 00 00 023 000000<SP>
003 +1001+03 00 00 023 000000<CR><LF>
```

Operation Status:

Hex	Description
00:	Normal Operation
02:	Maintenance / Keyboard active (M-Status)

Error Status:

Hex	Description
01:	Airflow wrong (F,P)
02:	Filter tape broke (T)
04:	Detector/Count/Sensor error (C)
08:	Not used
10:	all other errors (E,U,I,L,R,N,D)

6 Ethernet Port Setup and Operation

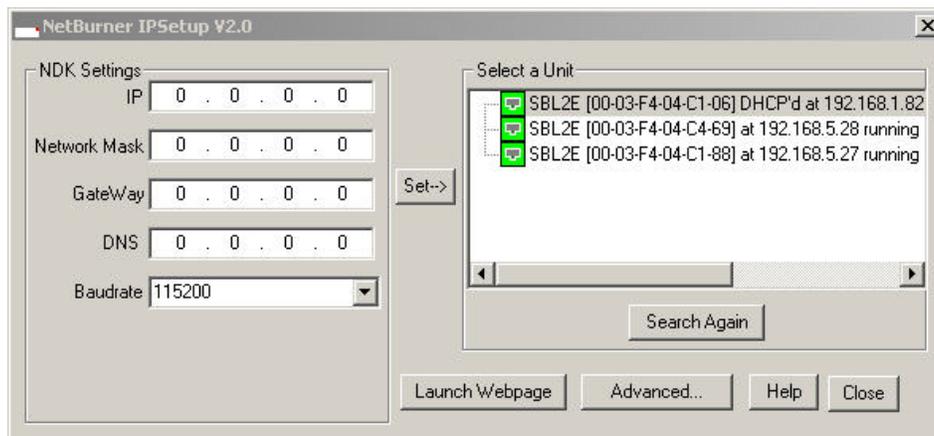
All BX-965 Report Processor options built after March 2011 include Ethernet functionality for network applications. The Ethernet connector is mounted in a bulkhead fitting in the new back panel, and it connects to the digital system of the Report Processor on the new back panel circuit board. It is necessary to configure the Ethernet port with some supplied drivers.

Setting the Static IP Address of the BAM:

1. Turn on BAM-1020. Set BAM-1020 baud rate to 38400 in the SETUP menu.
2. Connect CAT5 Ethernet cable between local network and Ethernet connector on the back of the BAM-1020.
3. Insert the supplied USB/Ethernet Driver CD (part 80328) into your PC. The following menu window should appear:



4. Click on the Ethernet Config button. The following screen will appear:

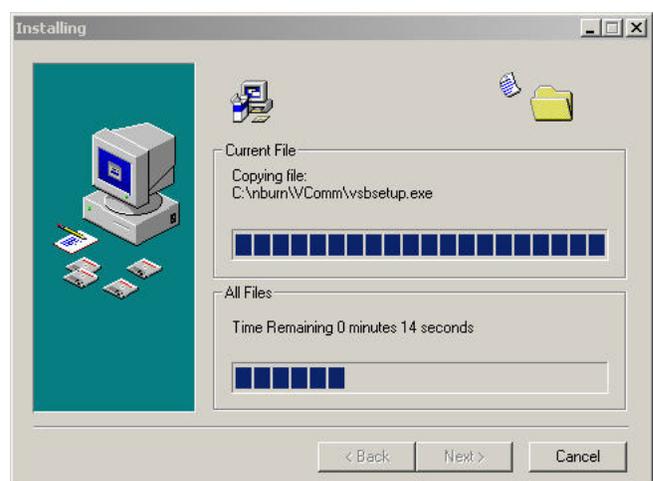
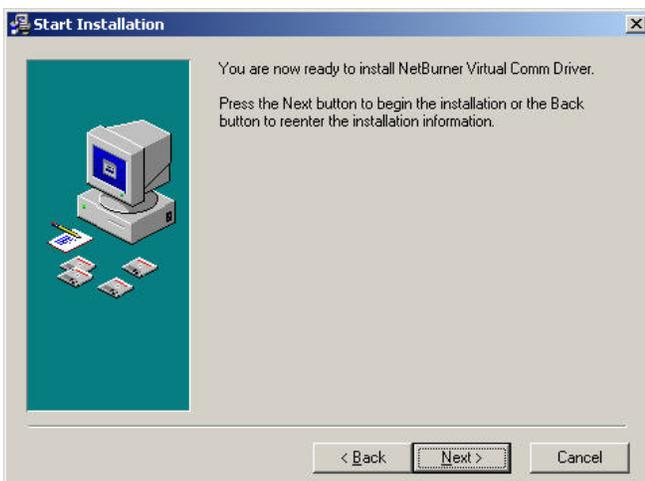
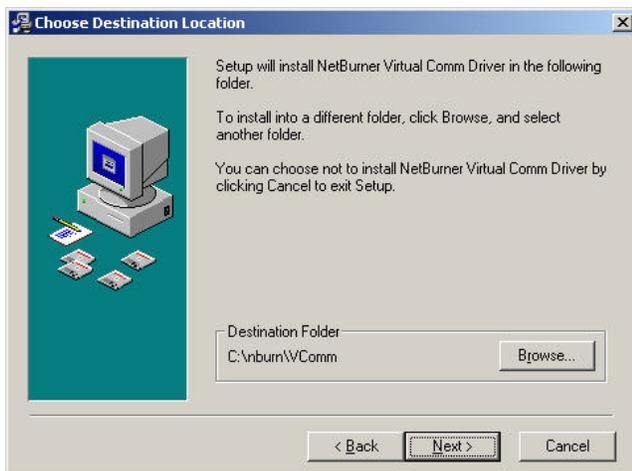


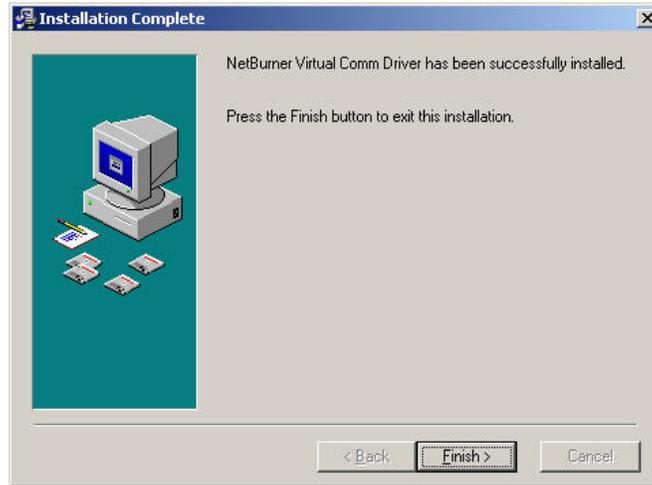
5. Click on the "Select a Unit" line that shows a DHCP'd in the title.
6. Type in your static IP address in the IP window. Be sure to write this number down as you will need it later.
7. Type in a Network Mask in the Network Mask window.
8. Set the baud rate to 38400.
9. Press the Set→ button to change the IP address of the BAM.
10. Click the X close button.

Installing the Virtual Serial Port Drivers:



1. From the Drivers CD, click the Ethernet Drivers button. The Choose Destination screen will appear as shown below. Click on the Next button. Select your operating system and click Next. The Start Installation screen will appear. Click Next. The Installing screen will display that the software is installing the drivers.

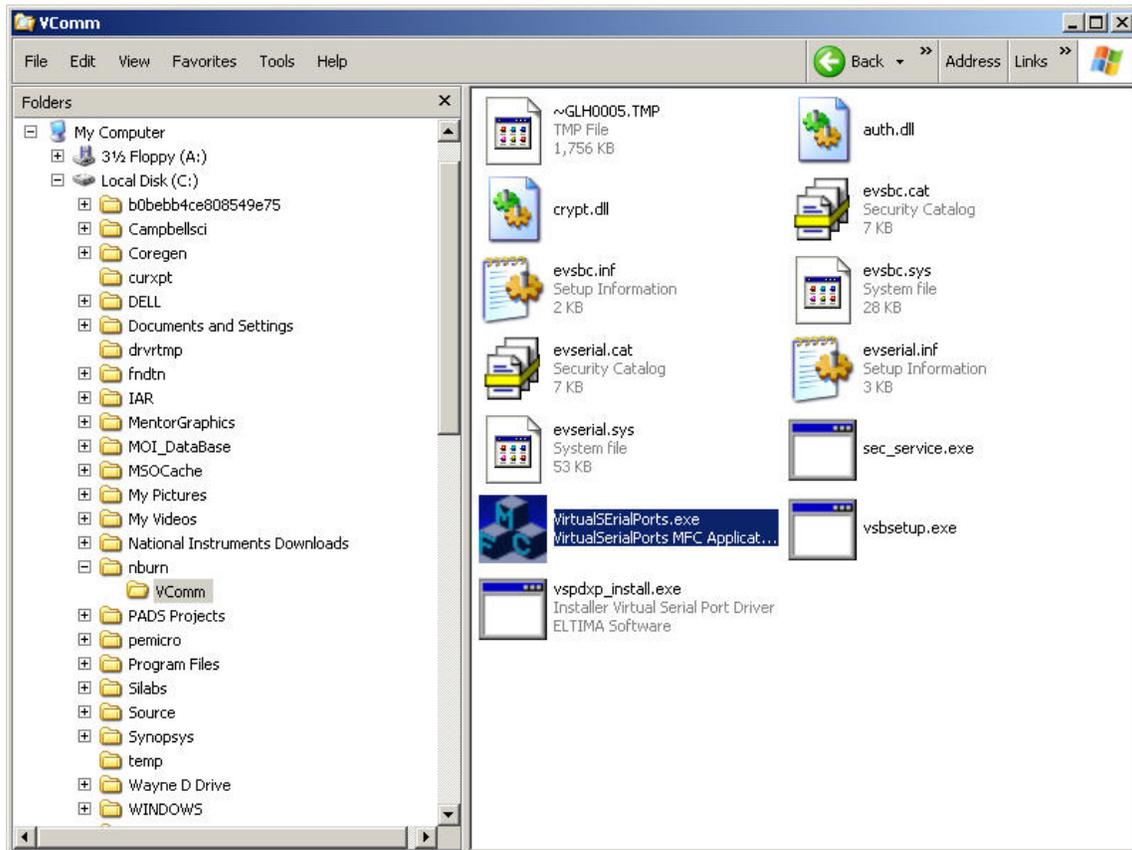




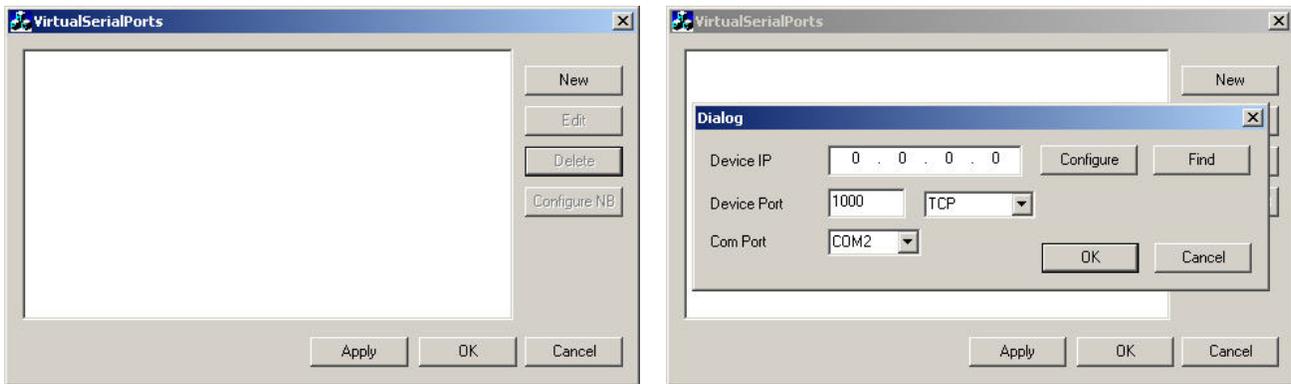
2. When the Installation Complete screen is displayed, click the Finish button. You will need to restart your computer before the drivers will be ready to use.

Configuring the Virtual Com Port for the BAM Unit:

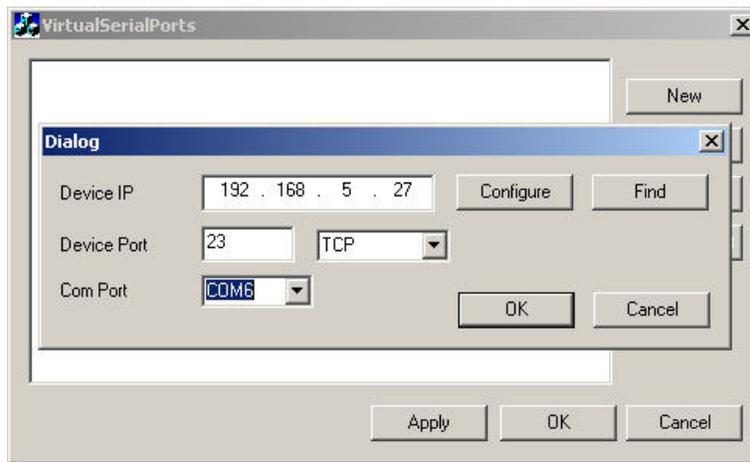
1. Open your My Computer folder and navigate to the **C:\nburn\VComm** folder. Double click the **VirtualSERIALPorts.exe** file:



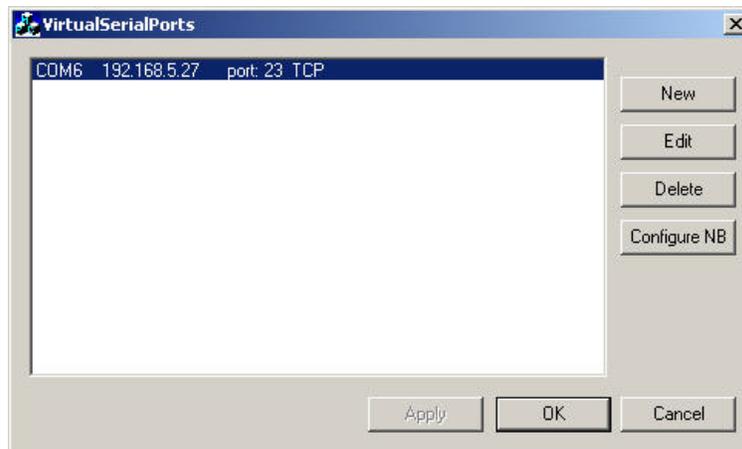
2. The configuration window will appear as shown below. Click the New button.



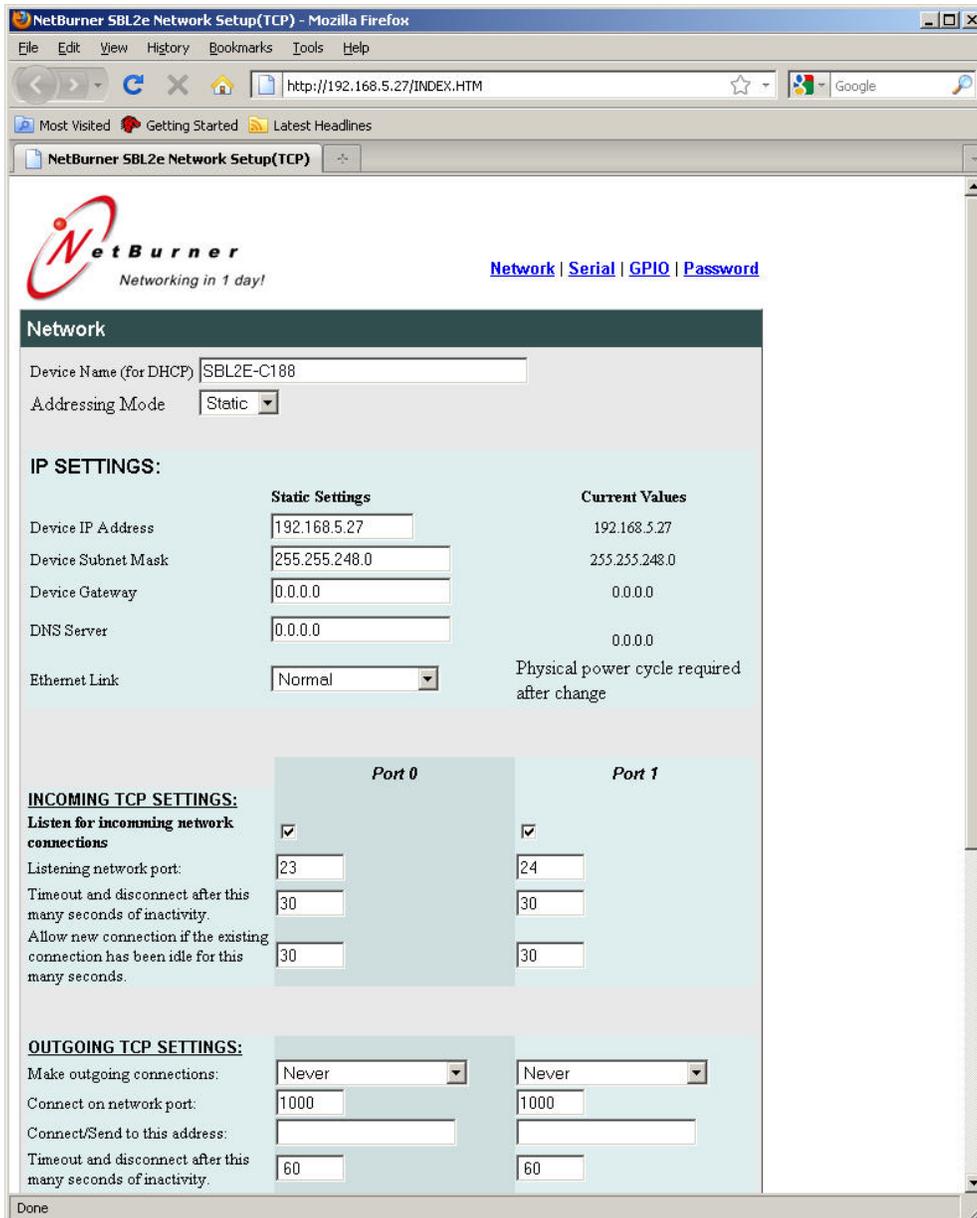
3. Type in the IP address you assigned earlier to the BAM unit. Set the Device Port to 23 and chose a Com Port from the drop down window as shown below. Click the OK button, then the Apply button:



4. Click on the IP line (in this example the “COM6 192.168.5.27” line) and click the Configure NB button to test the connection.



- Your internet browser will open and show you a similar screen to the one below. This completes the virtual com port drivers. Remember this BAM unit will always be accessed by the Com Port you chose in step 3. Click the close button on the browser and the VirtualSerialPort program window.



7 Installing a BX-965 Upgrade Kit Onto an Existing BAM

The BX-965 Report Processor is supplied as a factory-installed item in most cases. However, the BX-965 is also available as a field-installable upgrade kit, and is a simple upgrade for many existing BAM-1020 units.

Standard BAM-1020 units built before March 2011 will require a new instrument back panel sheet metal kit with the extra holes for the new data ports. This comes with the new circuit board pre-installed, and replaces the existing back panel on the BAM-1020. A jumper ribbon cable splices the new board into the existing BAM-1020 CPU data bus. Instructions are below.

All standard BAM-1020 units built after March 2011 already have the correct back panel sheet metal and circuit board installed, and only need a plug-in daughter board installed onto the inside of the back panel circuit board to add Report Processor functionality. The Ethernet bulkhead connector also comes standard with all BX-965 Report Processor kits built after March 2011, but is not hardware compatible with BX-965 units built earlier.

Installation of the New Back Panel Assembly:

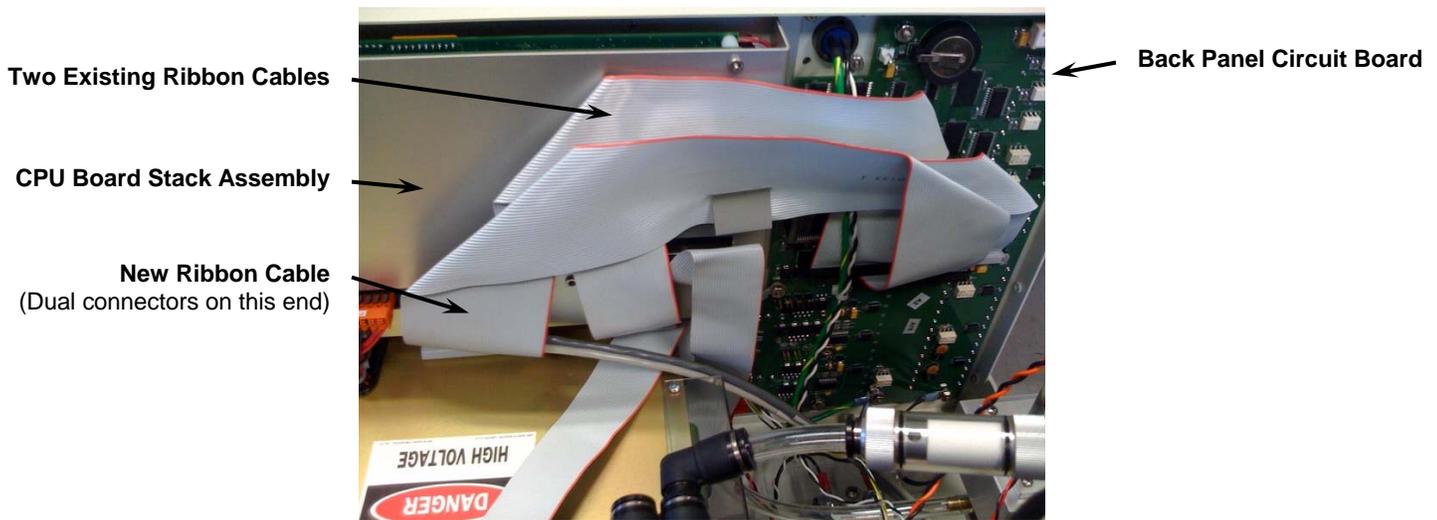
If your BAM-1020 was built before March 2011, you may be supplied with an BX-596 upgrade kit which required replacing the entire back panel of the BAM-1020. Use the following steps to install the kit:

1. Remove the BAM-1020 main case cover (10 screws) and set aside. Remove the four flat-head screws at the bottom back corners of the BAM-1020 case to unfasten the back panel assembly. Removing these screws first will make disconnecting the harnesses from the back panel easier.
2. Note the position of the various cables, harnesses and tubing connections to the back panel on the inside of the BAM-1020. Unplug the two large ribbon cables from the back panel terminal board. Leave them plugged into the CPU board stack. Remove the four screws that fasten the CPU board stack assembly to the inside of the BAM-1020 back panel. There is no need to further disassemble the CPU board stack.
3. Remove the ground harnesses, Smart Inlet Heater harness, pump tubing, and filter temp/RH sensor harnesses from the existing back panel assembly. The back panel assembly should now be completely removed.
4. There is a short ribbon cable jumper between the two circuit boards of the CPU stack, on the bottom edge. This must be replaced with the new long ribbon cable jumper supplied with the BX-965 upgrade kit. Unplug the small cable and replace it with the end of the new longer cable which has two connectors. The other end of the new ribbon cable will go to the new back panel circuit board. Attach the CPU board stack assembly to the inside of the new back panel assembly with four screws.
5. Reinstall the Smart Heater harness, pump tubing bulkhead fitting, filter temp/RH harnesses, and ground harnesses to the new back panel assembly. Connect the two existing ribbon cables and the new ribbon cable to the back panel board. Route as shown. Reinstall the four screws that fasten the back panel to the BAM.
6. Update the BAM-1020 firmware, then test the filter sensors, Smart Heater, and REPORT serial functions before reinstalling the BAM case cover. See firmware notes below.

Firmware Upgrades:

The firmware in the BAM-1020 will usually need to be upgraded after the Report Processor back panel is installed. Connect the BAM-1020 RS-232 port to a PC and flash update the firmware through the RS-232 serial port per the instructions supplied, or replace the EEPROM chip in the BAM 3230 CPU board if a new physical chip is supplied with the upgrade kit.

Note: The BX-965 back panel board has it's own firmware program, with it's own revision series, separate from the BAM-1020 main CPU firmware. The two firmwares must be compatible with each other for proper operation. The BAM-1020 CPU firmware can only be flash updated through the "RS-232" port, while the BX-965 Report Processor firmware can only be flash upgraded through the "REPORT" port. The BX-965 kit comes with the latest Report Processor firmware preloaded. If either firmware is updated in the future, it may be necessary to update both. Contact technical service for details.



Inside View of the BAM-1020 Back Panel Assembly