BixCheck How-To Guide
Model 110 and Model 115

2023480; Rev. A

By: PND
Ckd: WPG
Date: 5/08/2007

Background

BixCheck is the interface to the Bixby stove that allows you to monitor operation, adjust calibration, and test stove functions. Parameters can be changed while the stove is running, and because they take effect immediately, the stove can be adjusted for best performance to compensate for changes in fuel, venting, altitude, or other parameters that will naturally be different from those in which the stove was developed and tested.

This help file is for use with BixCheck version 5.x. Most of the information is applicable to previous versions, however, the format of the graphics has changed and new information has been added.

BixCheck System Requirements

Operating system:
BixCheck runs on Microsoft Windows operating systems.
Windows XP and Windows 2000 seem to work properly.
Windows NT has not been tested, although it may work.
At this time, Windows 95, Windows 98 and Windows ME systems do not display the colors properly, although the program will still be functional.

Memory:
BixCheck is a single program of less than 500K at this time. Its runtime memory is approximately 5MB. If using the data log functionality, the hard drive memory required is 4 MB per day.

Interface:
BixCheck requires a custom cable supplied by Bixby Energy (P/N 2013324) to interface with a PC. Built-in serial ports, USB to RS-232 converters, and expansion card serial ports have been tested and found to work. Note that in some cases, USB to RS-232 converters are difficult to install or don't work properly. The newer devices generally seem to work better.
USB to RS-232 converters from http://www.easysync-ltd.com/ work well.

Display:
BixCheck uses a number of small windows to implement the interface. This allows for extensive flexibility to work with displays of any size.

The minimum system tested is an 80486 / 33 MHz with 16 MB of RAM and a 640 x 480 display running Windows 95.

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Installing BixCheck

Copy the BixCheck file to a directory of your choice by right-clicking on the file and selecting “copy.” Then access the desired directory using Windows Explorer, right-click on the desired directory, and select “paste.”

Starting BixCheck

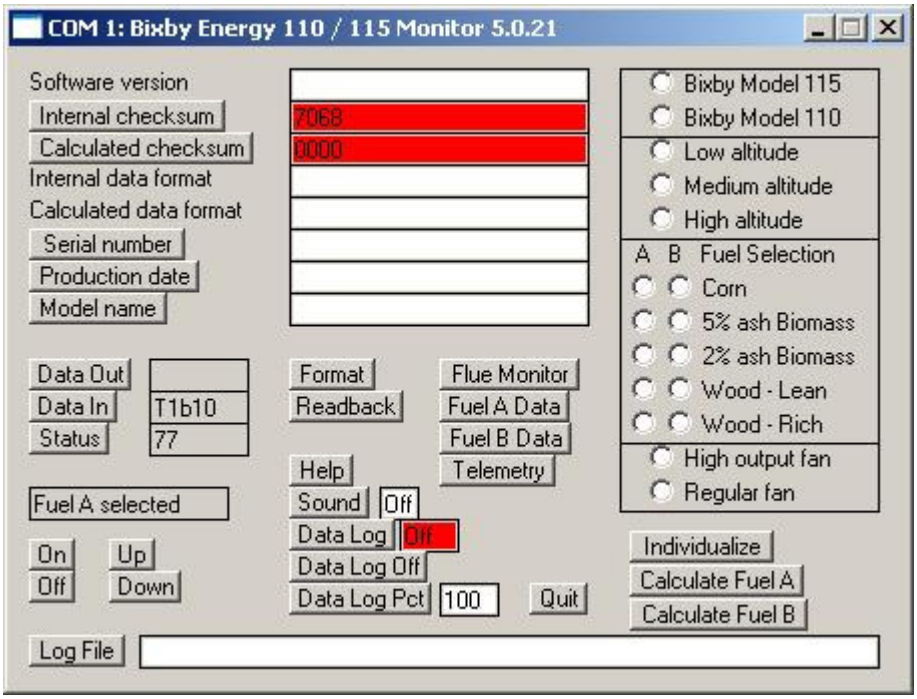
When you run the BixCheck program, you get the following screen:

Select the serial port to which the stove is connected. The ports available at that time are listed. If another program is using the port the stove is connected to, you will need to quit that program, quit BixCheck, and then restart BixCheck to get access to the serial port.

Notice: If you are unable to get communication with the stove, and everything else seems correct, reset the stove by leaving it unplugged for 30 seconds, plug it in, and retry BixCheck.

Monitor

Select the “Monitor” button on the startup window. You will see something similar to the following window:



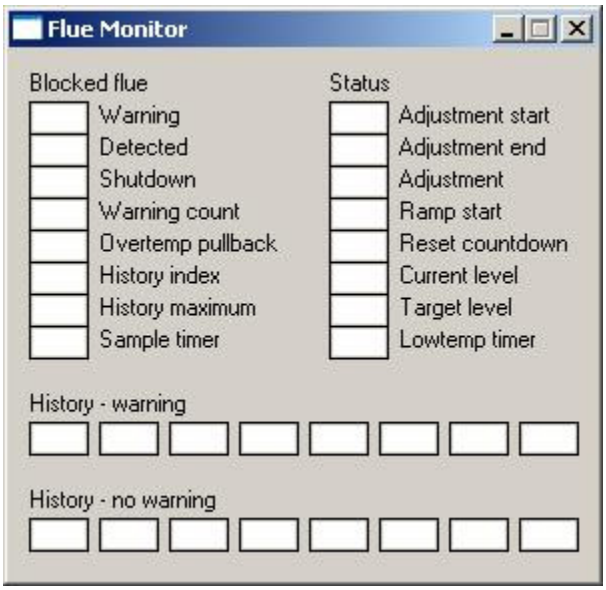
Fuel Calibration

Stove operation is controlled by calibration parameters that characterize the fuel. These parameters are set in the "Fuel A Data" and "Fuel B Data" windows. Additional stove individualization parameters such as production date and serial number are set in the Monitor window.

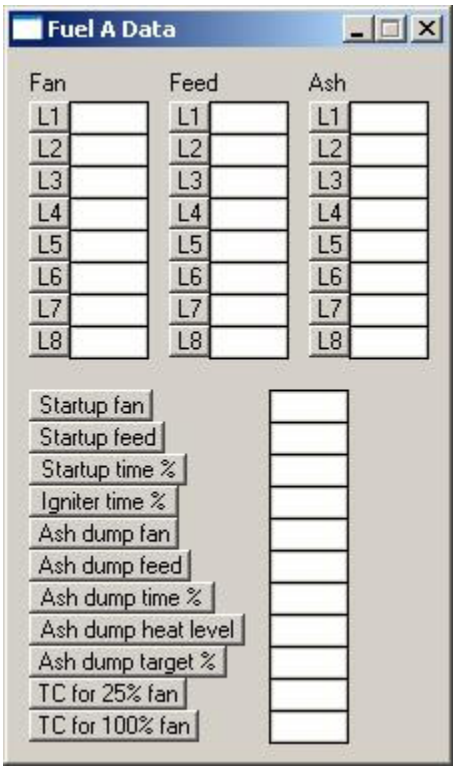
Utility Windows

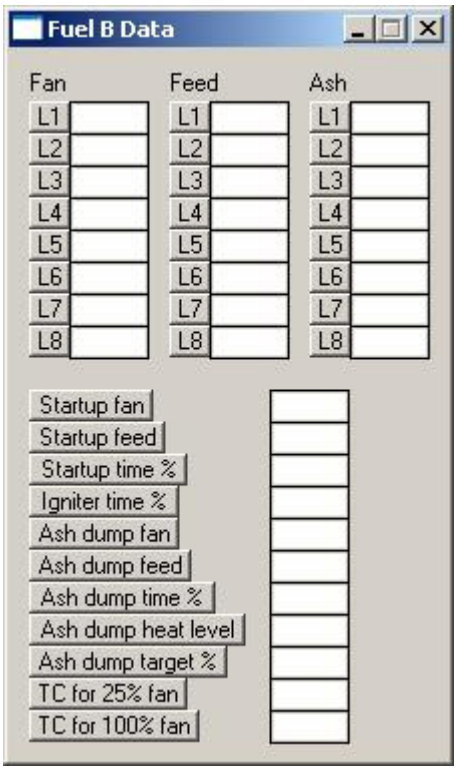
Open up the utility windows by selecting the "Flue Monitor", "Fuel A Data", "Fuel B Data", and "Telemetry" buttons. Arrange the windows so you can see the information easily.

Flue Monitor

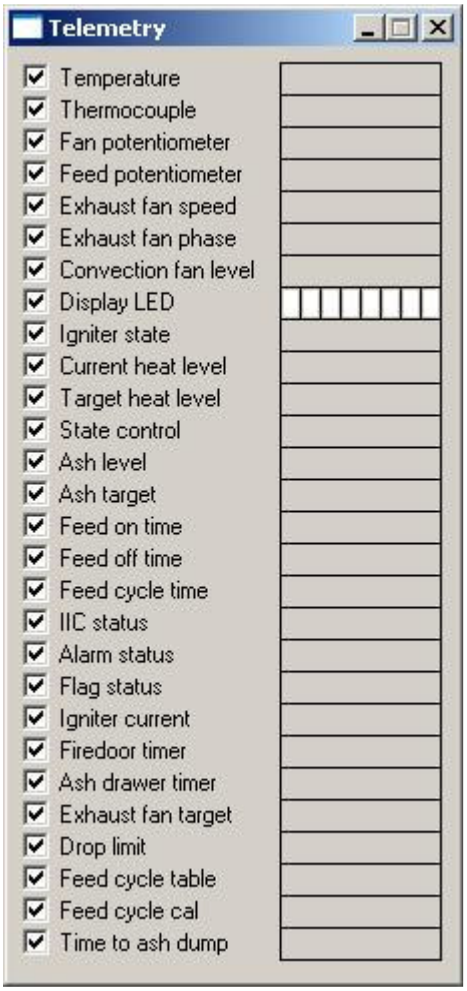


Fuel A Data, Fuel B Data



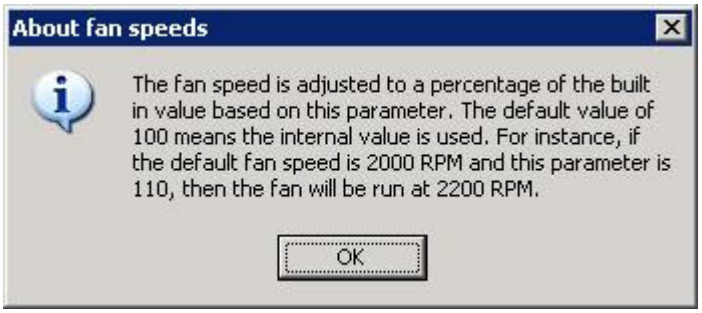


Telemetry



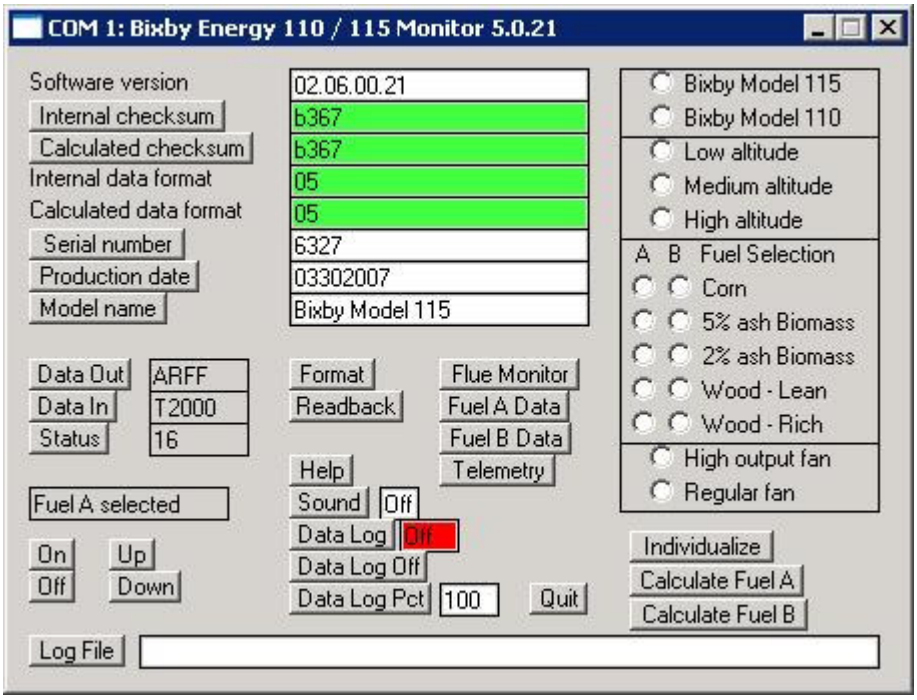
Help

You can get a help message for most buttons that are displayed on these windows. Start by selecting the “Help” button and then select the button for which you want help. Here is a selection of various help buttons.

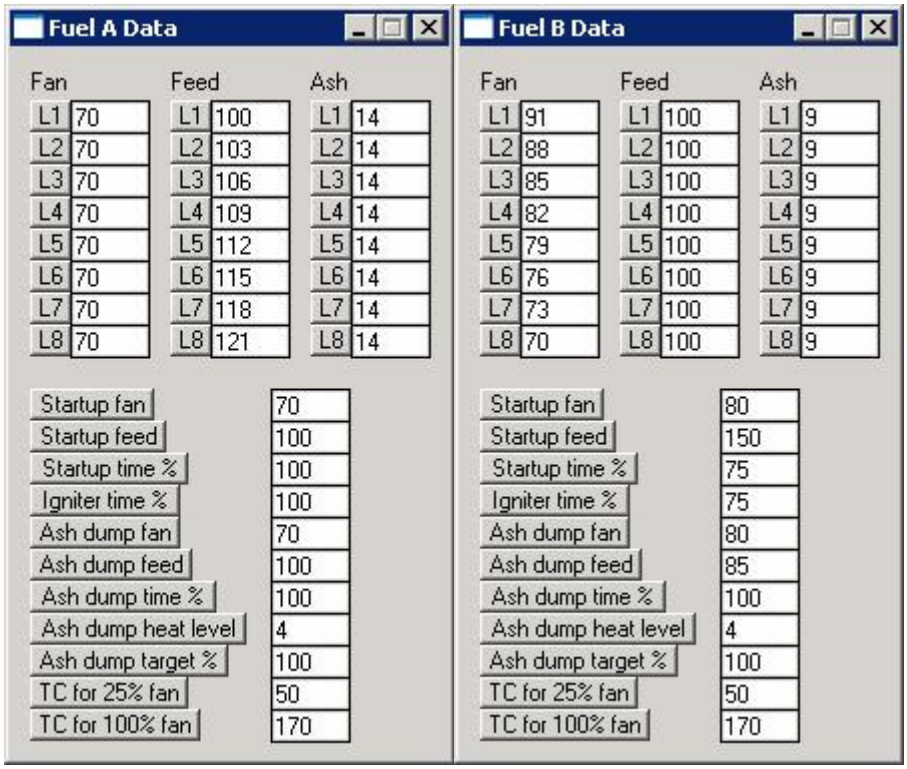


Readback

Read the stored calibration data back by selecting the "Readback" button. Any of the utility windows can be opened or closed at any time with no loss of data. The windows will now have data that looks something like this:

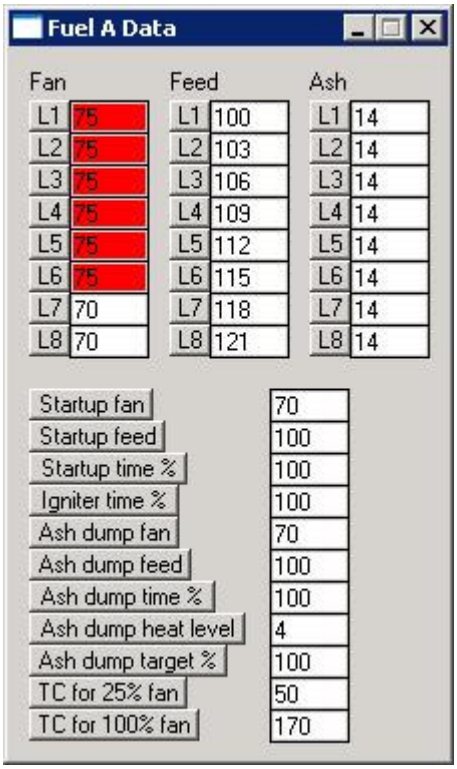


Note that the "Internal checksum" and "Calculated checksum" numbers need to match. Additionally the "Internal data format" and "Calculated data format" numbers need to match to be sure that the stove is using the calibration data.

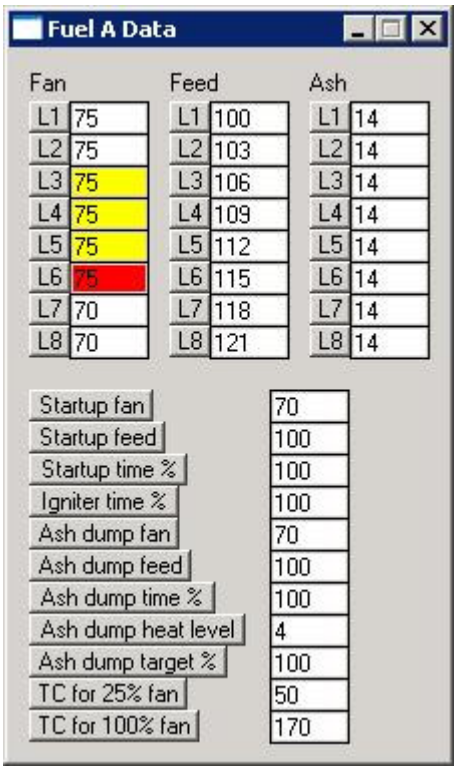


Note that the actual data may be different based on any special adjustments that were already made to the stove or due to changes in the default data table over time.

Modifying and Sending Individual Calibration Data



Modifying:
Most data items can be recalibrated individually. There is usually no need to go through the rather extensive initialization process which is described later. For instance, if you find that the stove is running rich at the preset settings for level 1 through level 6 and you would like to increase the combustion air, you could type in new values like this:



Sending:
Left-click on the button next to each of the new data inputs. As the data is sent down it will change from red to yellow to white. For instance, as the data is sent down you will see something like:

Individualization Data

These parameters contain information that characterizes software, database, serial number, and other settings that do not modify how the stove operates when burning.

Parameter	Data	Meaning
Software version	xxxx	Software version; 4 hex characters
Internal checksum	xxxx	Configuration memory checksum calculated by the stove; press the button to force an internal recalculation
Calculated checksum	xxxx	Configuration memory checksum calculated by the monitor; press the button to force a local recalculation
Internal data format	xx	The database version used by the stove software
Calculated data format	xx	The database version used by the monitor; must match the stove database version
Serial number	Text	An 8 text character serial number; press the button to send and override the data
Production date	mmddyyyy	The production date in the format of mmddyyyy; automatically set by the Calculate button; press the button to send and override the data
Model name	Text	A 16 text character machine description; automatically set by the Calculate button; press the button to send and override the data

Calibration Data

These parameters contain information that characterizes the how the stove operates when it is burning. It is very important to note that the user defined operational parameters will not be utilized by the stove if the checksums and data formats do not match.

Fan Speed Adjustments

These are user adjustments to the fan speeds for each of the 8 heat levels.

Selection	Range	Meaning
Level 1 Fan	0 ~ 255	Percentage of default setting
Level 2 Fan	0 ~ 255	Percentage of default setting
Level 3 Fan	0 ~ 255	Percentage of default setting
Level 4 Fan	0 ~ 255	Percentage of default setting
Level 5 Fan	0 ~ 255	Percentage of default setting
Level 6 Fan	0 ~ 255	Percentage of default setting
Level 7 Fan	0 ~ 255	Percentage of default setting
Level 8 Fan	0 ~ 255	Percentage of default setting

Feed Rate Adjustments

These are user adjustments to the feed rates for each of the 8 heat levels.

Selection	Range	Meaning
Level 1 Feed	0 ~ 255	Percentage of default setting
Level 2 Feed	0 ~ 255	Percentage of default setting
Level 3 Feed	0 ~ 255	Percentage of default setting
Level 4 Feed	0 ~ 255	Percentage of default setting
Level 5 Feed	0 ~ 255	Percentage of default setting
Level 6 Feed	0 ~ 255	Percentage of default setting
Level 7 Feed	0 ~ 255	Percentage of default setting
Level 8 Feed	0 ~ 255	Percentage of default setting

Ash Content Adjustments

These are user adjustments to the ash content of the fuel for each of the 8 heat levels. These amounts are added to the ash content counter for each fuel feed. When the ash content counter reaches the ash target level, the ash dump process will commence.

Selection	Range	Meaning
Level 1 Ash	0 ~ 255	The count added to the ash level counter for each fuel feed
Level 2 Ash	0 ~ 255	The count added to the ash level counter for each fuel feed
Level 3 Ash	0 ~ 255	The count added to the ash level counter for each fuel feed
Level 4 Ash	0 ~ 255	The count added to the ash level counter for each fuel feed
Level 5 Ash	0 ~ 255	The count added to the ash level counter for each fuel feed
Level 6 Ash	0 ~ 255	The count added to the ash level counter for each fuel feed
Level 7 Ash	0 ~ 255	The count added to the ash level counter for each fuel feed
Level 8 Ash	0 ~ 255	The count added to the ash level counter for each fuel feed

Startup / Ash Dump Adjustments

These are user adjustments to the fan speeds and feed rates for the startup and ash dump processes to compensate for different fuels or other operating conditions.

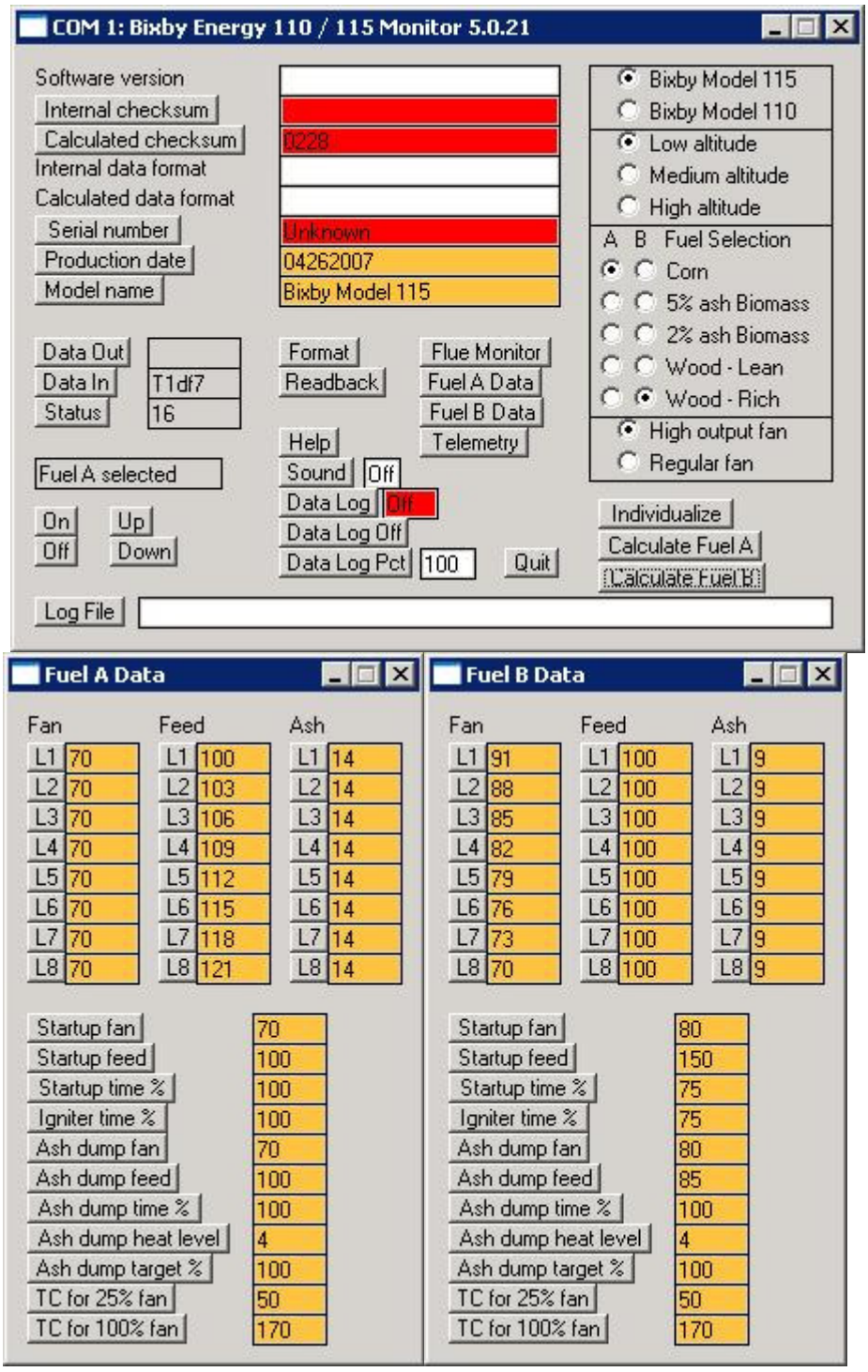
Selection	Range	Meaning
Startup fan	0 ~ 255	Percentage of default setting
Startup feed	0 ~ 255	Percentage of default setting
Startup time %	0 ~ 255	Percentage of default setting, of only part of the startup process
Igniter time %	0 ~ 255	Percentage of default setting, however other factors also adjust the igniter on time
Ash dump fan	0 ~ 255	Percentage of default setting
Ash dump feed	0 ~ 255	Percentage of default setting
Ash dump time %	0 ~ 255	Percentage of default setting, of only part of the ash dump process
Ash dump heat level	0 ~ 8	The heat level, from 1 to 8, at which to perform the ash dump. If set to 0, use the current level
Ash dump target %	0 ~ 100	A factor to adjust the size of the clinker. Example: if set to 25, it will dump 4 times as often
TC for 25% fan	0 ~ 510	The temperature at which to operate the fan at 25%, in degrees C. Linearly interpolated
TC for 100% fan	0 ~ 510	The temperature at which to operate the fan at 100%, in degrees C. Linearly interpolated

Monitor Initialization

Individualize / Calculate

Default or custom configuration data can be generated and sent at any time. Start by selecting the model. Then select the “Individualize”, “Calculate Fuel A”, and “Calculate Fuel B” buttons.

Notice that, compared to the “Readback” version, the monitor screen now several radio buttons checked. Enter the serial number of the stove in the “Serial number” box. At this point, you can adjust the fuel settings. For instance, if you wanted wood pellets as fuel A and corn as fuel B, select “Wood” in the A column and select “Corn” in the B column. Calculate the new values with the “Calculate Fuel A” and “Calculate Fuel B” buttons.

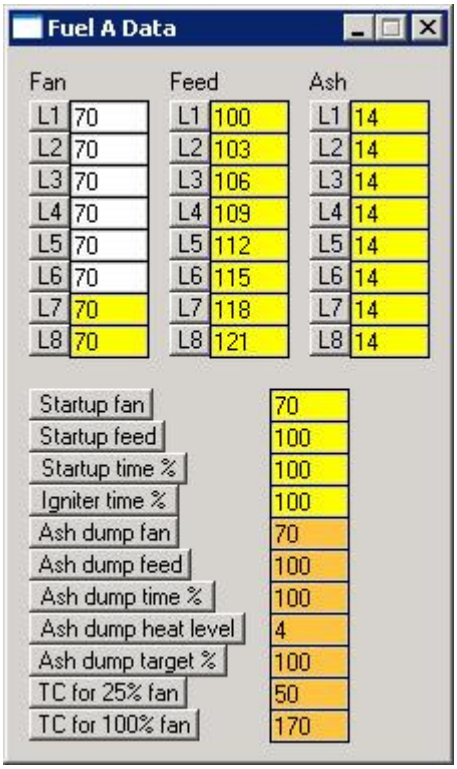


Format

To reformat the stove memory and send the new data, select the "Format" button. You will get the following message:

Important: Formatting overrides all factory pre-set data and should only be performed when necessary. Individual Calibration Data should be used when minor adjustments are to be made to the fuel table settings. The format process determines the "Calculated Data Format" value. If a software update is made that changes the "Calculated Data Format" value, a different version of BixCheck may need to be used.

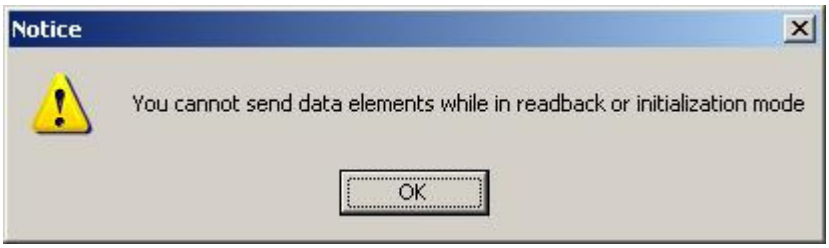
Select "Yes" and the format process will start. As the data is sent down, the boxes will turn yellow, and when the data is read back from the stove to verify it the box will turn white. For example, a window might look like this during the process:



Data Protection Error Messages

The valid range for data in the calibration fields is 0 to 255. If data is out of that range or contains letters, then the data is not sent. If this occurs as part of initialization, no subsequent calibration data is sent to the stove. Enter a value in the proper range and try again.

Operations such as Readback, Initialize, Calculate, and Individual Calibration Data sending are interlocked to make sure that only one operation can happen at a time. This prevents unexpected operation. If you get messages such as these, then wait until the operation has completed.



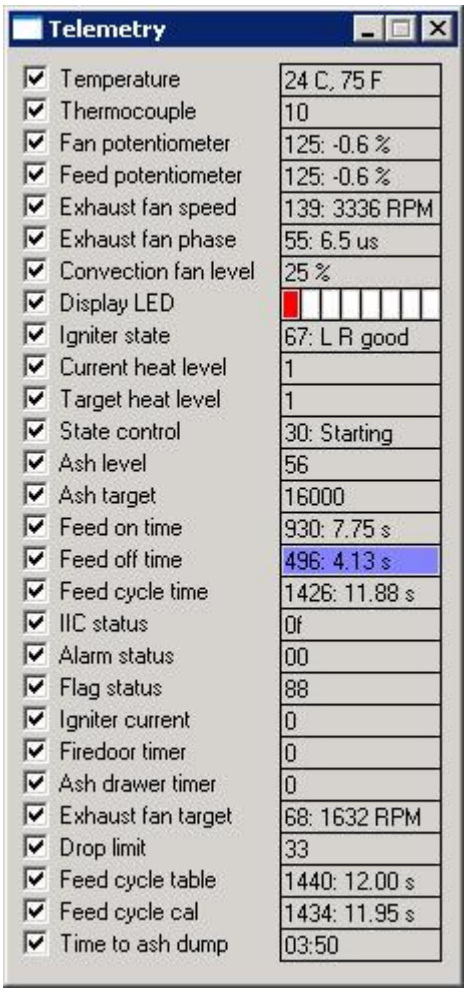
Sound

The sound selection button switches between quiet mode and sound mode. When enabled, operations that transmit and receive data will make assorted sounds. If one uses this, over time the patterns help to determine if the data link is operating properly.

Runtime Operation

Telemetry

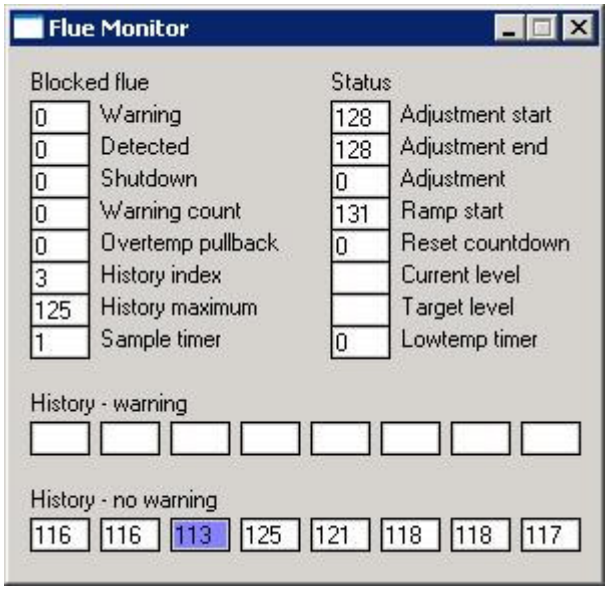
The telemetry window provides a method to observe the system operating data. This is a typical telemetry display. The telemetry section receives a number of current operating parameters from the stove.



Telemetry Definition Table

Parameter	Range	Meaning
Temperature	Degrees C, F	Ambient air temperature measured on the control board
Thermocouple	Degrees C, F	The exhaust temperature; no calibrated units
Fan potentiometer	0 ~ 255; +/- 30%	Unprocessed reading; percentage to adjust the exhaust fan speed
Feed potentiometer	0 ~ 255; +/- 30%	Unprocessed reading; percentage to adjust the feed rate
Exhaust fan speed	0 ~ 3600; RPM	Measured exhaust fan motor speed in RPM
Exhaust fan phase	0 ~ 255: time	An internal control parameter for the exhaust fan
Convection fan level	0 ~ 100	The power level to the convection fan (%)
Display LED		Graphical indication of the LEDs. Example: Heat level 3
Igniter state	0 ~ 255: status	An internal variable that tracks the igniters
Current heat level	1 ~ 8	Current operational heat level
Target heat level	1 ~ 8	Heat level setting from front panel
State control	00 ~ FF: status	An internal variable representing the operating state 1x Shutdown, cooling down 2x Shutdown, off 30 Starting up; temperature rise not detected 31 Starting up; temperature rise detected 4x Operating at heat level x+1 5x Ramping to level x+1 6x Ramping to level x+1 in ash dump mode. Ash dump will happen.
Ash level	0 ~ 65535	The current ash level
Ash target	0 ~ 65535	The ash level target at which to initiate the ash dump cycle
Feed on time	0 ~ 65535: time	Current feed on time in units of 1/120 second: time in seconds
Feed off time	0 ~ 65535: time	Current feed off time in units of 1/120 second: time in seconds
Feed cycle time	0 ~ 65535: time	Current feed cycle time in units of 1/120 second: time in seconds
IIC status	0 ~ FF	Status of serial memory
Alarm status	0 ~ FF	Status of internal alarms
Flag status	0 ~ FF	Status of internal flags
Igniter current	0 ~ 255	The instantaneous reading on igniter current; no calibrated units
Firedoor timer	0 ~ 255	Time the fire door was open, in units of 1/3 second
Ash drawer timer	0 ~ 255	Time the ash drawer was open, in units of 5 1/3 seconds
Exhaust fan target	0 ~ 3600; RPM	Target exhaust fan motor speed in RPM
Drop limit	0 ~ 255	The amount the thermocouple can drop before the blocked flue happens
Feed cycle table	0 ~ 65535: time	The base table value for the feed cycle time
Feed cycle cal	0 ~ 65535: time	The adjusted feed cycle time after the fuel calibration calculations
Time to ash dump	0 ~ 100	Approximate time to the next ash dump, in hours:minutes

Flue Monitor



The main purpose of the flue monitor is to detect a blocked flue occurrence. Blocked flue is characterized by a sudden blockage of the exhaust vent. Because the exhaust is drawn out by a fan, a change in the area of the venting will result in a change in air flow. A reduction in air flow will result in a quick drop in exhaust temperature. If the temperature drops by more than some amount in the history table, then it goes into blocked flue warning mode. If the temperature rises by more than a predefined amount, it comes out of blocked flue mode; otherwise the stove performs a blocked flue shutdown.

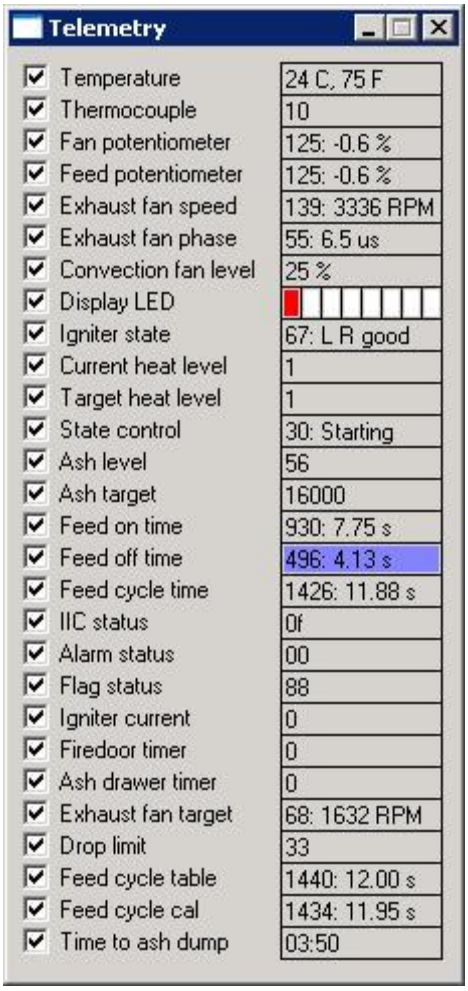
In a blocked flue shutdown, the burn pot is emptied once, and the plates move to the dump position. It does not attempt a restart automatically. The convection fan and exhaust fan will continue to run while the stove is warm. The warning lights at this time are #2 and #3. Should this occur, the stove, venting, and end cap must be thoroughly inspected and cleaned if necessary. However, common causes of a blocked flue shutdown (#2 and #3 LED's) are running out of fuel or the fire going out due to operating in too lean a condition.

Parameter	Range	Meaning
Blocked flue		
Warning	0 ~ 1	1 if a potential blocked flue was detected
Detected	0 ~ 1	1 if the blocked flue was detected
Shutdown	0 ~ 1	1 when the shutdown process is complete
Warning count	0 ~ 255	1 is added for each blocked flue warning
Overtemp pullback	0 ~ 1	1 if in overtemp pullback mode
History index	0 ~ 7	The index of the last item added to the history table
History maximum	0 ~ 1023	The maximum temperature in the history table
Sample timer	0 ~ 255	A timer to the next sample
Status		
Adjustment start	0 ~ 255	When ramping through heat levels, this is the thermocouple value at the beginning of the ramp
Adjustment end	0 ~ 255	When ramping through heat levels, this is the thermocouple value at the end of the ramp
Adjustment	0 ~ 255	This is the difference between the adjustment end and the adjustment start that is added to all elements in the history table to compensate for the heat output change that occurs
Ramp start	0 ~ 1023	The starting temperature during a ramp process
Reset countdown	0 ~ 255	If non-zero, the history is being reset and is not active
Current level	0 ~ 7	The current operating heat level; one less than the actual level
Target level	0 ~ 7	The current target heat level; one less than the actual level
Lowtemp timer	0 ~ 255	A timer that keeps track of how long the stove has run too cool
History – no warning	0 ~ 255	The temperature history table when in normal running mode. One sample is added for each fuel feed
History – warning	0 ~ 255	The temperature history table when in blocked flue test mode

Data Log

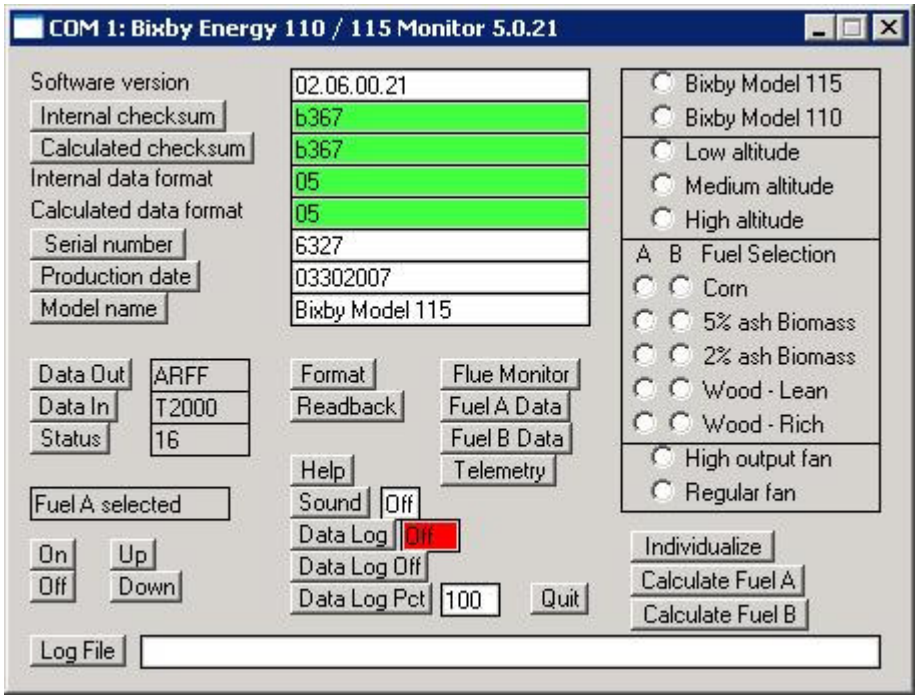
BixCheck can store data received through the Telemetry process to a file for review later. This allows for long term testing and diagnosis of stove performance.

Selecting Log Parameters



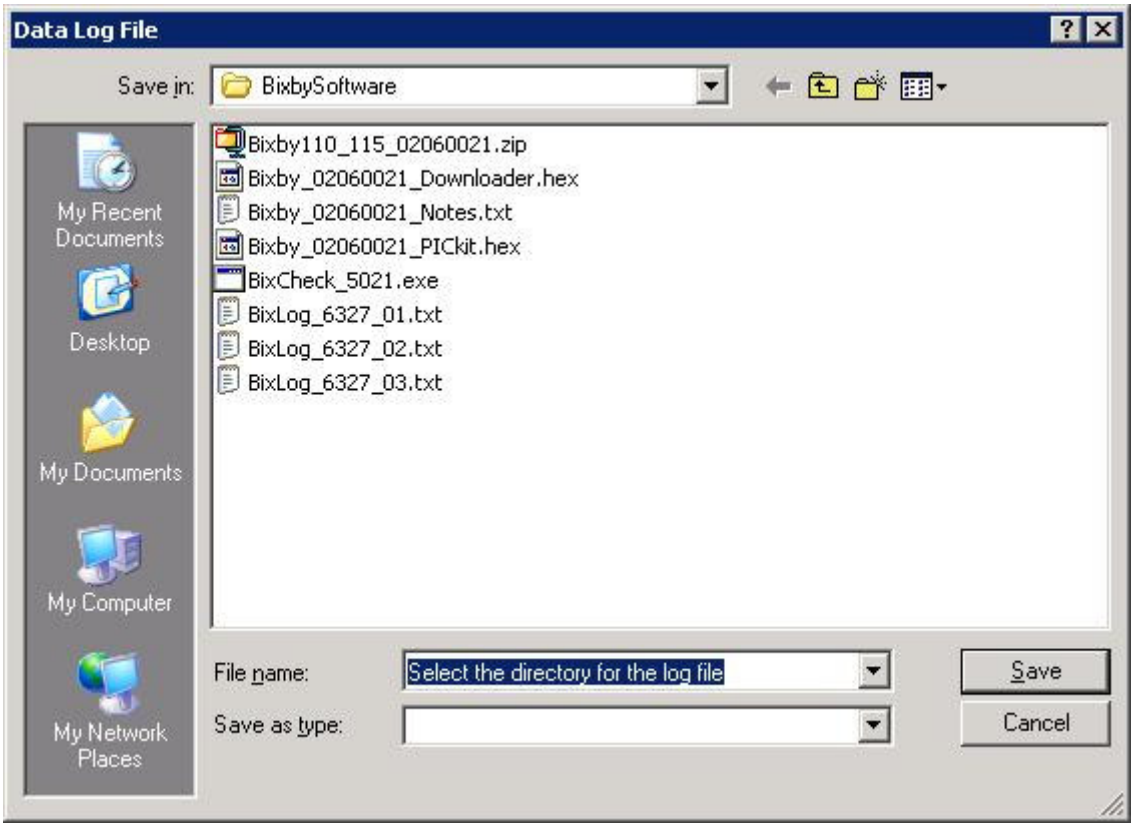
Before you start the log process, open up the Telemetry window. All the items that can be logged are pre-checked. You can uncheck an item to prevent it being logged. This is useful if you know you only need specific data and want to limit the file size.

Selecting the File

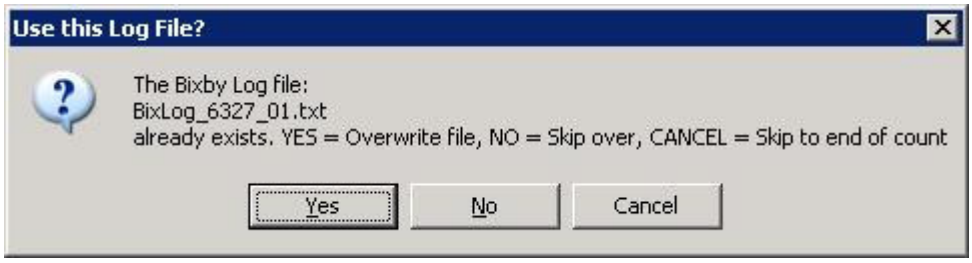


Select the “Log File” button on the BixCheck screen.

Navigate to the directory where you want to store the log file. The file name will be automatically generated based on the model name, the serial number, and the number of log files in that directory. They will be automatically sequenced in case multiple tests are made.



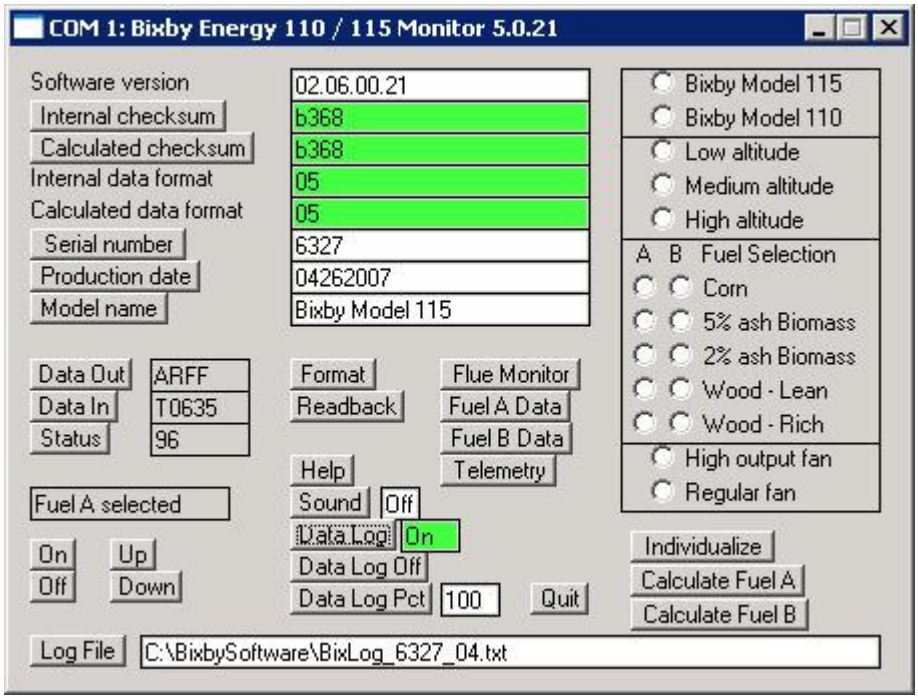
If there are already log files associated with that stove, then you will be asked about how to name the file:



Notice that, in this example, BixLog_6327_01.txt, BixLog_6327_02.txt, and BixLog_6327_03.txt already exist. In this window, if you select “Yes”, then the BixLog_6327_01.txt file will be overwritten with the new file. If you select “No”, you will be asked about if you want to write over the next file in the list, which is BixLog_6327_02.txt. If you select “Cancel”, then the numbering will skip to the end of the list and make a unique file name BixLog_6327_04.txt.

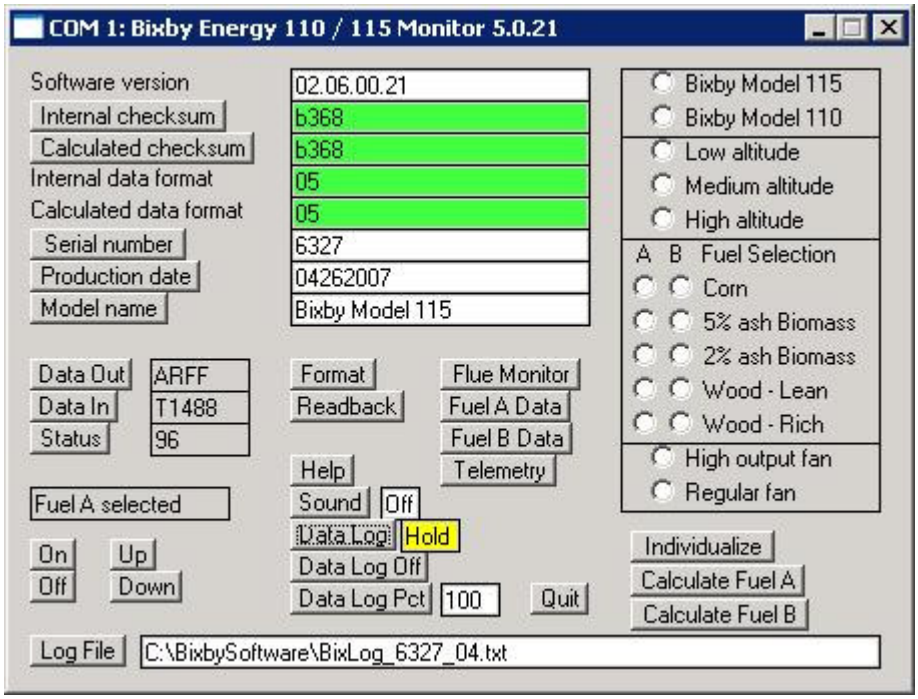
Turning Data Logging On

Once the file is selected, turn on data logging by selecting the “Data Log” button. It is next to a text box that is originally in the “Off” mode. When logging is active, the text box will show “On”.



Turning Data Logging to Hold

You can temporarily set data logging to “Hold” by selecting the button again. Re-enable logging by pressing the button again. It will toggle only between “On” and “Hold”.



Turning Data Logging Off

To turn off data logging and to close the file for use by another application, select the “Data Log Off” button.

Sample Log File

This is a section of a data log file. All the parameters from the Telemetry window can be recorded. In this example, some parameters were deselected.

Date	Time	Temp C	TC Points	Exh speed c	Convection '	State ctrl	State mode	Feed cycle :	Igniter	Exh target c	TC drop limit	TtAD
Tuesday April 24 2007	16:10:09	27	4	112	25	10	Cooldown	60.21	0	97	33	Undefined: 01
Tuesday April 24 2007	16:11:19	27	5	97	25	30	Starting	60.21	0	97	33	14.76
Tuesday April 24 2007	16:12:09	27	5	97	25	30	Starting	14.98	0	97	33	3.67
Tuesday April 24 2007	16:12:58	27	4	97	25	30	Starting	15.18	0	97	33	3.71
Tuesday April 24 2007	16:13:55	27	4	98	25	30	Starting	37.16	172	97	33	9.06
Tuesday April 24 2007	16:14:45	27	8	98	25	30	Starting	46.44	171	97	33	11.31
Tuesday April 24 2007	16:15:34	27	11	98	25	30	Starting	60.08	171	109	33	14.61
Tuesday April 24 2007	16:16:23	27	77	110	41	31	Ignited	47	171	109	35	11.42
Tuesday April 24 2007	16:17:12	27	103	109	58	31	Ignited	40.17	170	109	34	9.75
Tuesday April 24 2007	16:18:01	27	122	110	70	31	Ignited	39.85	0	109	34	9.65
Tuesday April 24 2007	16:18:50	27	89	109	49	31	Ignited	45.11	0	109	34	10.91
Tuesday April 24 2007	16:19:40	27	96	109	53	31	Ignited	45.13	0	109	34	10.9
Tuesday April 24 2007	16:20:29	27	107	109	60	31	Ignited	45.08	0	109	34	10.88
Tuesday April 24 2007	16:21:18	27	115	109	65	31	Ignited	44.94	0	109	34	10.83
Tuesday April 24 2007	16:22:07	27	127	110	73	31	Ignited	45.19	0	109	34	10.88
Tuesday April 24 2007	16:22:56	27	137	109	79	31	Ignited	45.27	0	109	34	10.88
Tuesday April 24 2007	16:23:45	28	143	111	83	31	Ignited	44.9	0	109	34	10.78
Tuesday April 24 2007	16:24:35	28	139	110	81	31	Ignited	45.44	0	109	34	10.9
Tuesday April 24 2007	16:25:24	28	150	109	87	31	Ignited	44.94	0	109	34	10.77
Tuesday April 24 2007	16:26:13	28	154	109	90	31	Ignited	45.07	0	109	34	10.79
Tuesday April 24 2007	16:27:02	28	138	76	80	31	Ignited	45.06	0	73	33	10.76
Tuesday April 24 2007	16:27:51	28	147	103	85	53	Ramping	44.98	0	103	32	10.73
Tuesday April 24 2007	16:28:40	28	158	103	92	53	Ramping	39.41	0	103	32	9.39
Tuesday April 24 2007	16:29:30	28	158	104	92	53	Ramping	39.63	0	103	32	9.43
Tuesday April 24 2007	16:30:19	29	161	106	94	54	Ramping	39.57	0	117	34	9.4
Tuesday April 24 2007	16:31:08	29	170	117	100	54	Ramping	33.71	0	117	34	7.99
Tuesday April 24 2007	16:31:57	29	173	118	100	54	Ramping	33.78	0	117	34	8
Tuesday April 24 2007	16:32:46	30	177	118	100	54	Ramping	33.78	0	117	34	7.98
Tuesday April 24 2007	16:33:35	30	182	127	100	55	Ramping	28.95	0	132	36	6.83
Tuesday April 24 2007	16:34:25	30	188	132	100	55	Ramping	29.09	0	132	36	6.85
Tuesday April 24 2007	16:35:14	30	194	131	100	55	Ramping	29.11	0	132	35	6.84
Tuesday April 24 2007	16:36:03	30	190	132	100	56	Ramping	29.21	0	147	37	6.85
Tuesday April 24 2007	16:36:52	31	184	134	100	56	Ramping	25.47	0	147	37	5.96
Tuesday April 24 2007	16:37:41	31	190	134	100	56	Ramping	25.48	0	147	37	5.95
Tuesday April 24 2007	16:38:30	31	197	133	100	56	Ramping	25.3	0	147	37	5.89
Tuesday April 24 2007	16:39:19	31	204	133	100	57	Ramping	22.77	0	162	44	5.29
Tuesday April 24 2007	16:40:09	31	209	133	100	57	Ramping	22.74	0	162	44	5.27
Tuesday April 24 2007	16:40:58	31	223	133	100	57	Ramping	22.96	0	162	43	5.31
Tuesday April 24 2007	16:41:47	31	215	133	100	57	Ramping	22.77	0	162	43	5.25
Tuesday April 24 2007	16:42:36	32	221	133	100	47	Level 8	22.95	0	162	38	5.27
Tuesday April 24 2007	16:43:25	32	228	132	100	47	Level 8	22.84	0	162	38	5.24
Tuesday April 24 2007	16:44:14	31	227	133	100	47	Level 8	22.78	0	162	38	5.21
Tuesday April 24 2007	16:45:03	31	227	133	100	47	Level 8	22.67	0	162	38	5.17
Tuesday April 24 2007	16:45:53	32	227	133	100	47	Level 8	22.69	0	162	38	5.16
Tuesday April 24 2007	16:46:42	32	234	132	100	47	Level 8	22.35	0	162	37	5.07
Tuesday April 24 2007	16:47:31	32	233	133	100	47	Level 8	22.67	0	162	37	5.13
Tuesday April 24 2007	16:48:20	32	233	132	100	47	Level 8	22.67	0	162	37	5.11
Tuesday April 24 2007	16:49:09	32	246	133	100	47	Level 8	22.68	0	162	37	5.11
Tuesday April 24 2007	16:49:58	32	243	132	100	47	Level 8	22.67	0	162	37	5.09
Tuesday April 24 2007	16:50:48	31	241	132	100	47	Level 8	22.52	0	162	37	5.04
Tuesday April 24 2007	16:51:37	31	243	132	100	47	Level 8	22.63	0	162	36	5.06
Tuesday April 24 2007	16:52:26	32	244	132	100	47	Level 8	22.9	0	162	36	5.1

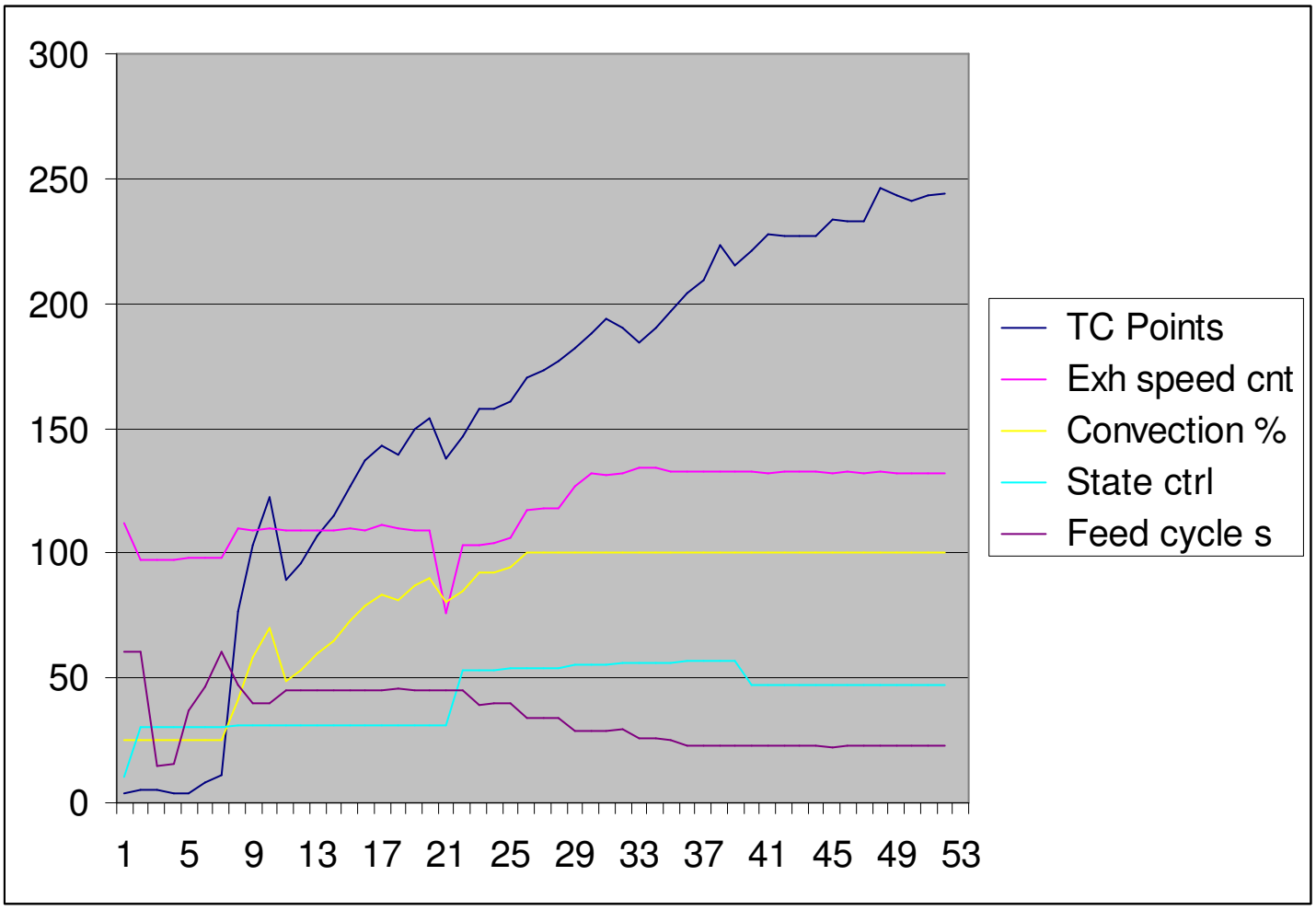
Note: This is how the data should look after it is imported into Excel.

Viewing the Results

A common way to view the file is to use a spreadsheet program such as Microsoft Excel.

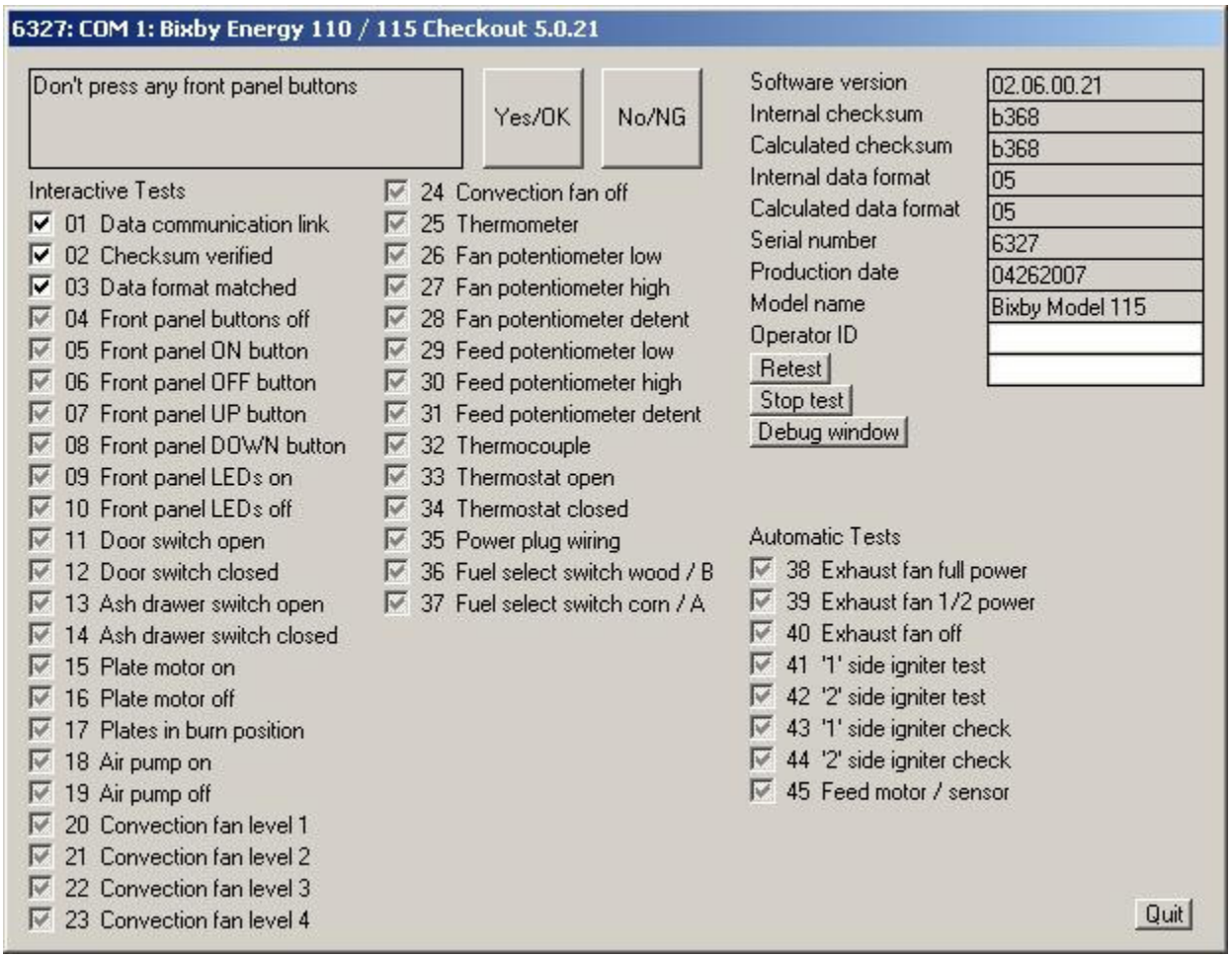
For Excel, start by selecting File->Open. Navigate to the data file. You may need to set the “Files of type” box to “Text Files”. When you open the file, Excel will then use the “Text Import Wizard”. Set the “Original data type” to “Delimited” and select the “Next” button. On the next screen, check the “Comma” box and select the “Finish” button. The file should now be loaded with properly labeled columns.

In Excel, you can select the data to graph. In the sample graph, there are a few items of interest. These are covered in the Telemetry section.



Checkout

The checkout process lets you check each device, switch, motor, and operation of the stove without actually running it. This is useful to help find problems with the stove. Select the “Checkout” button on the startup window. You will typically see the following window:



By this time the first three tests have already been performed; they test the data and communications link. This is a good time to enter the operator ID – this can be whatever you like, although it is typically the tester’s initials. The Operator ID will make its way in to the checkout report, which is described later. There are two kinds of tests, “Interactive” tests and “Automatic” tests. The interactive tests require the operator to do something, such as open and close doors, or to observe that something is happening. Simply follow the instructions. If the process worked or the test is good, select the “Yes/OK” button. If the process failed or the test is not good, select the “No/NG” button. After the interactive tests are completed the automatic tests will proceed on their own. The automatic tests require approximately 10 minutes to complete.

Interactive Tests

Test	Item	Description
01	Data communications link	Communication between the PC and the stove is operational
02	Checksum verified	The data uploaded to the PC matches the checksum
03	Data format matched	The data format matches for the software version
04	Front panel buttons off	No buttons are pressed
05	Front panel ON button	The ON button was exclusively pressed
06	Front panel OFF button	The OFF button was exclusively pressed
07	Front panel UP button	The UP button was exclusively pressed
08	Front panel DOWN button	The DOWN button was exclusively pressed
09	Front panel LEDs on	All LEDs were observed to be on
10	Front panel LEDs off	All LEDs were observed to be off
11	Door switch open	The door switch was detected open
12	Door switch closed	The door switch was detected closed
13	Ash drawer switch open	The ash drawer switch was detected open
14	Ash drawer switch closed	The ash drawer switch was detected closed
15	Plate motor on	The plate motor was observed to be on
16	Plate motor off	The plate motor was observed to be off
17	Plates in burn position	The plates were observed to be in the burn position
18	Air pump on	The air pump was observed to be on
19	Air pump off	The air pump was observed to be off
20	Circulator fan level 1	The circulator fan was observed to be at 25%
21	Circulator fan level 2	The circulator fan was observed to be at 50%
22	Circulator fan level 3	The circulator fan was observed to be at 75%
23	Circulator fan level 4	The circulator fan was observed to be at 100%
24	Circulator fan off	The circulator fan was observed to be off
25	Thermometer	The temperature reported generally matched the observed temperature
26	Fan potentiometer low	The potentiometer was detected to be turned all the way to the left
27	Fan potentiometer high	The potentiometer was detected to be turned all the way to the right
28	Fan potentiometer detent	The potentiometer was detected to be near the middle of the range
29	Feed potentiometer low	The potentiometer was detected to be turned all the way to the left
30	Feed potentiometer high	The potentiometer was detected to be turned all the way to the right
31	Feed potentiometer detent	The potentiometer was detected to be near the middle of the range
32	Thermocouple	The thermocouple was observed to be plugged in
33	Thermostat open	The thermostat was detected to be open; stove in level 1 standby mode
34	Thermostat closed	The thermostat was detected to be closed; stove in regular operation mode
35	Power plug wiring	The wire order on the power inlet socket was observed to be correct
36	Fuel select switch wood / B	The fuel select switch was detected in the fuel B selection position
37	Fuel select switch corn / A	The fuel select switch was detected in the fuel A selection position

Automatic Tests

Test	Item	Description
38	Exhaust fan full power	The fan was turned on to full power and its speed was detected as such
39	Exhaust fan ½ power	The fan was turned on to half power and its speed was detected as such
40	Exhaust fan off	The fan was turned off and its speed was detected as such
41	'1' side igniter test	The '1' or left igniter was tested for 4 ½ minutes and detected to work
42	'2' side igniter test	The '2' or right igniter was tested for 4 ½ minutes and detected to work
43	'2' side igniter check	The '2' or right igniter was checked and detected to work
44	'2' side igniter check	The '2' or right igniter was checked and detected to work
45	Feed motor / sensor	The feed motor and sensor were detected to work

Checkout Report

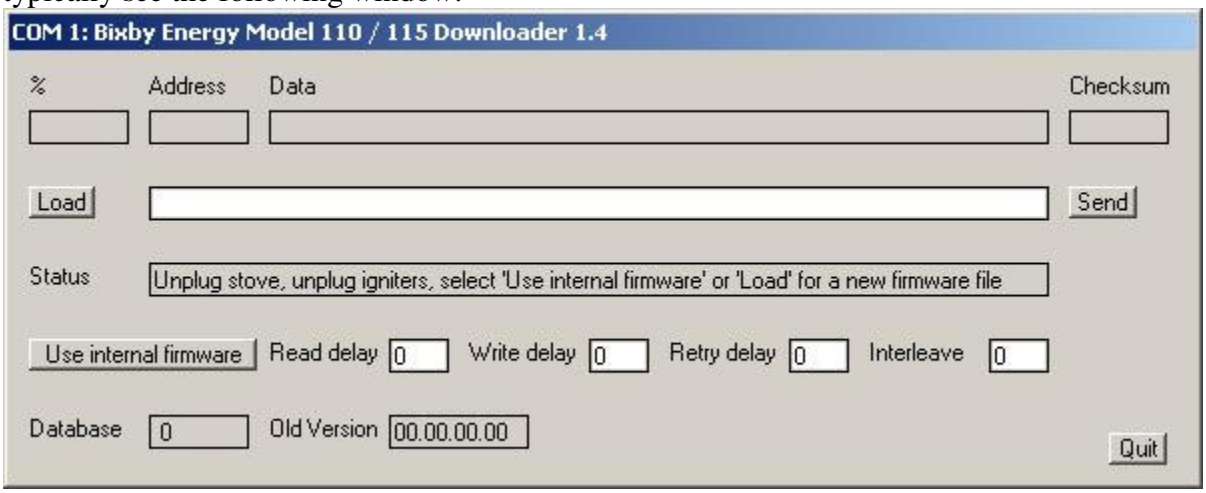
Here is a typical test report generated by Checkout. This contains most of the information that is available from the Monitor window. This can be used to restore the stove back to the original factory calibration in case something happens to it. It contains the results and descriptions of all tests that were performed. An important detail is that if a test fails, a few hints about what to look for are provided.

```
COM 1: Bixby Energy 110 / 115 Checkout 5.0.21
Test Date: Tuesday April 24 2007, 16:06:27
Tested By: PND
Version: 02.06.00.21
Checksum: b368
Data Format: 05
Serial Number: 6327
Production Date: 04262007
Model: Bixby Model 115
Fan Levels  A:  70,  70,  70,  70,  70,  70,
70,  70
Feed Levels A: 100, 103, 106, 109, 112, 115,
118, 121
Ash Levels  A:  14,  14,  14,  14,  14,  14,
14,  14
Startup Adjustments  A:  70, 100, 100, 100
Ash Dump Adjustments A:  70, 100, 100,   4, 100
Fan Speed Adjustments A:  50, 170
Fan Levels  B:  91,  88,  85,  82,  79,  76,
73,  70
Feed Levels B: 100, 100, 100, 100, 100, 100,
100, 100
Ash Levels  B:   9,   9,   9,   9,   9,   9,
9,   9
Startup Adjustments  B:  80, 150,  75,  75
Ash Dump Adjustments B:  80,  85, 100,   4, 100
Fan Speed Adjustments B:  50, 170

Status  Description               Items to check
OK   01 Data communication link
OK   02 Checksum verified
OK   03 Data format matched
OK   04 Front panel buttons off
OK   05 Front panel ON button
OK   06 Front panel OFF button
OK   07 Front panel UP button
OK   08 Front panel DOWN button
OK   09 Front panel LEDs on
OK   10 Front panel LEDs off
OK   11 Door switch open
OK   12 Door switch closed
OK   13 Ash drawer switch open
OK   14 Ash drawer switch closed
OK   15 Plate motor on
OK   16 Plate motor off
OK   17 Plates in burn position
OK   18 Air pump on
OK   19 Air pump off
OK   20 Convection fan level 1
OK   21 Convection fan level 2
OK   22 Convection fan level 3
OK   23 Convection fan level 4
OK   24 Convection fan off
OK   25 Thermometer
OK   26 Fan potentiometer low
OK   27 Fan potentiometer high
OK   28 Fan potentiometer detent
OK   29 Feed potentiometer low
OK   30 Feed potentiometer high
OK   31 Feed potentiometer detent
OK   32 Thermocouple
OK   33 Thermostat open
OK   34 Thermostat closed
OK   35 Power plug wiring
OK   36 Fuel select switch wood / B
OK   37 Fuel select switch corn / A
OK   38 Exhaust fan full power
OK   39 Exhaust fan 1/2 power
OK   40 Exhaust fan off
OK   41 '1' side igniter test
OK   42 '2' side igniter test
OK   43 '1' side igniter check
OK   44 '2' side igniter check
OK   45 Feed motor / sensor

45 Tests OK, 0 Tests failed, 0 Tests not
performed
```

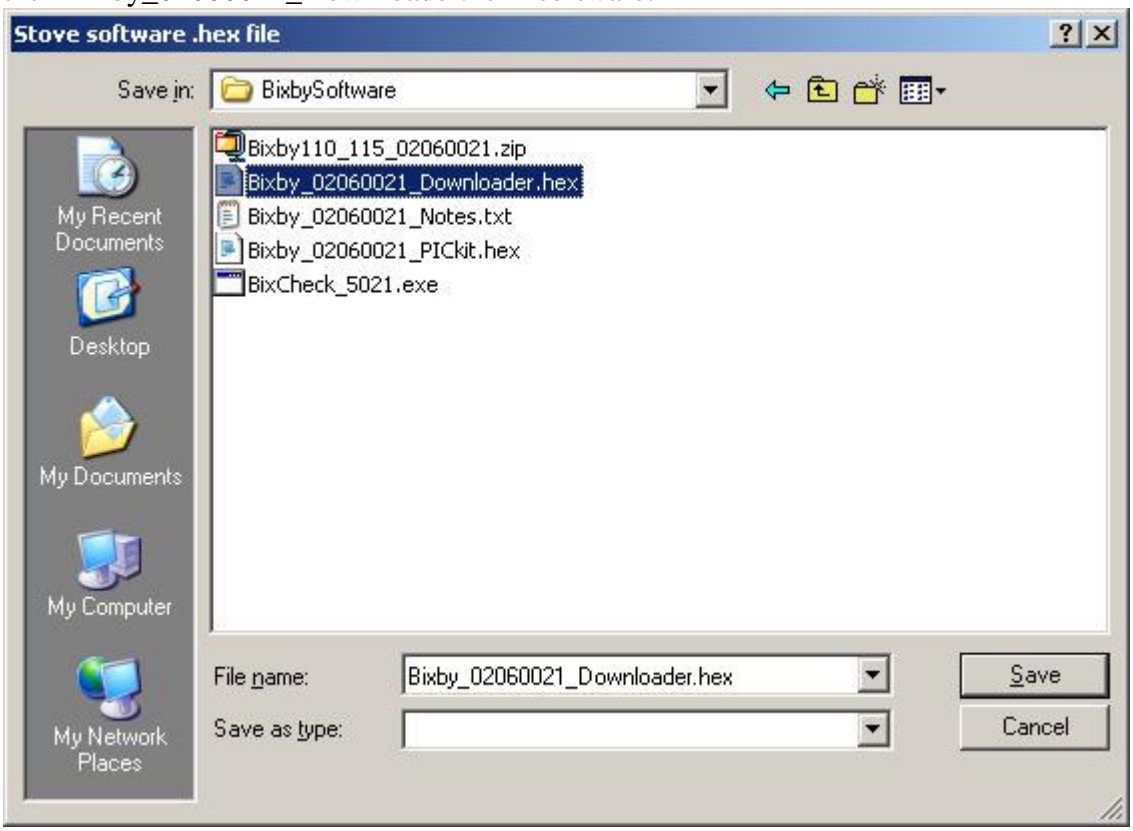
Downloader

In addition to the calibration data, the stove operational software can be also updated. While this process is fairly easy, it is not without risks. If the data transfer link is interrupted while the software is being updated, the stove will become non-functional. However, in this situation, it is possible to attempt the update process again because the update software cannot be damaged. The downloader process is operated from a separate program.

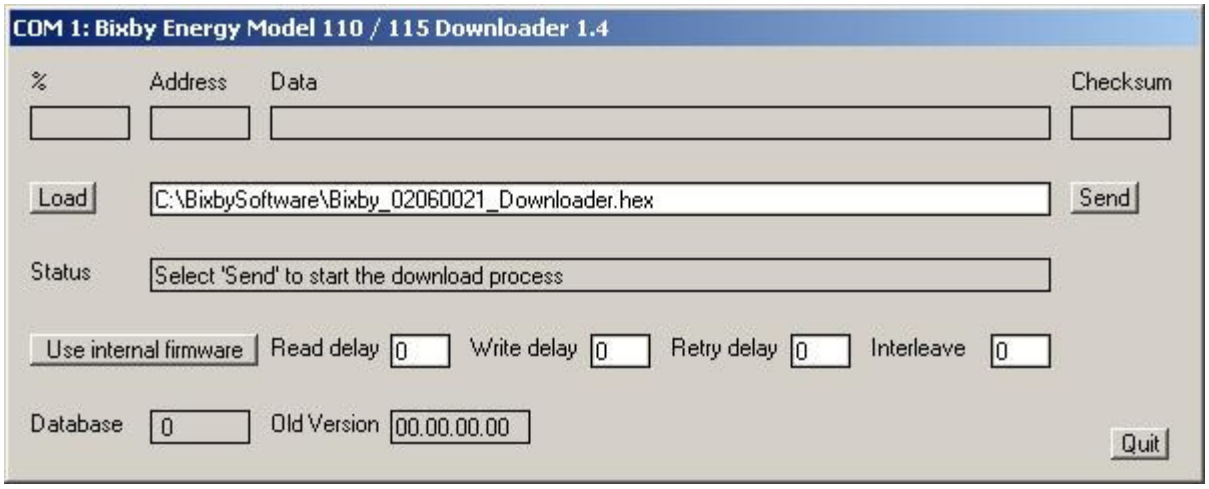
To start the download process, select the “Downloader” button from the initial BixCheck screen. You will typically see the following window:



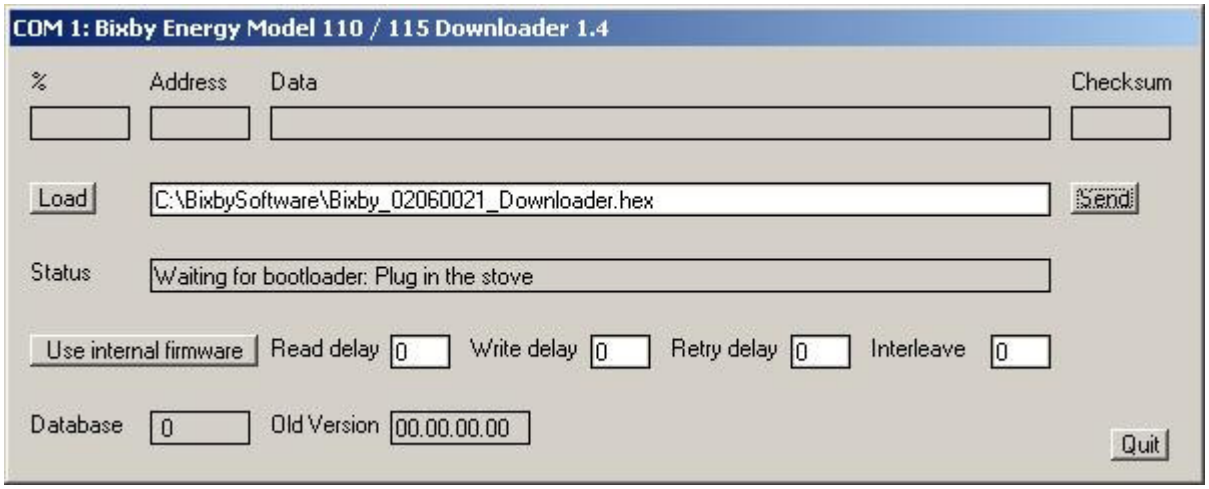
Now load the firmware file. Select the “Browse” button and search for it. Be sure to select the “_Downloader” version of the file. Alternatively, you can select the “Use internal firmware” button to load the internal copy of the “Bixby_02060021_Downloader.hex” software.



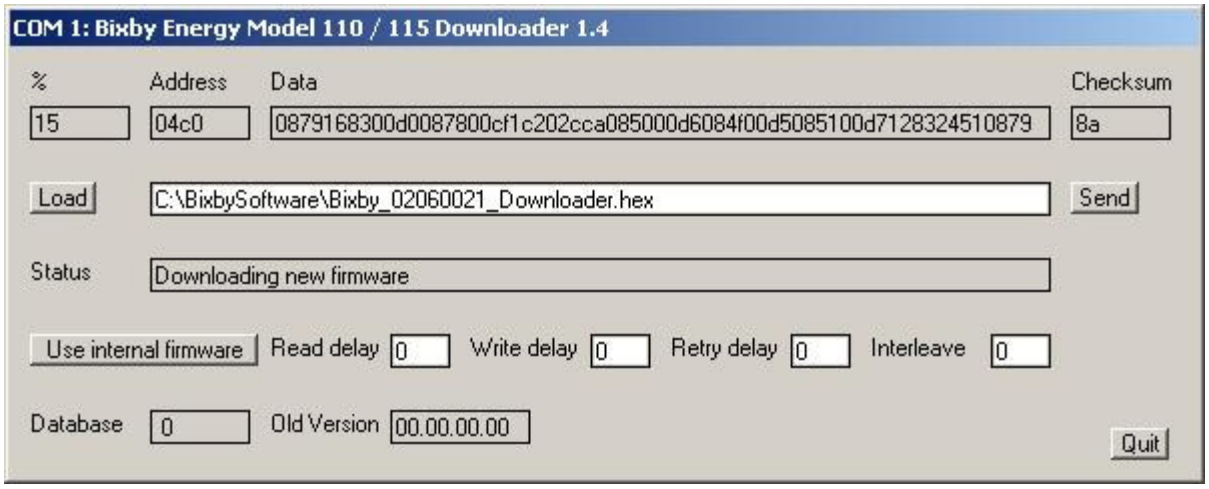
To initiate the downloader process, select the “Send” button:



The Downloader is waiting for the stove. Plug in the stove now:



The stove is being reprogrammed…



The programming process is complete when you see this. You can now quit the downloader and return to BixCheck.