

BixCheck How-To Guide Model 110 and Model 115

2023480; Rev. A

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:

Bixby Energy 110 / 115 Control 5.0.21	
Monitor 5.0	About
Checkout 5.0	COM1 COM3
Downloader 1.4	

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:

COM 1: Bixby Energy	110 / 115 Monitor 5.0.21	
Software version Internal checksum Calculated checksum Internal data format Calculated data format Serial number Production date Model name		C Bixby Model 115 C Bixby Model 110 C Low altitude C Medium altitude C High altitude A B Fuel Selection C C Corn
Data Out Data In Status Fuel A selected	Format Flue Monitor Readback Fuel A Data Fuel B Data Help Telemetry Sound Off	C C 5% ash Biomass C C 2% ash Biomass C C Wood - Lean C C Wood - Rich C High output fan C Regular fan
On Up Off Down	Data Log Off Data Log Off Data Log Pct 100 Quit	Individualize Calculate Fuel A Calculate Fuel B

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

Flue Monitor	
Blocked flue Warning Detected Shutdown Warning count Overtemp pullback History index	Status Adjustment start Adjustment end Adjustment Ramp start Reset countdown Current level
History maximum Sample timer History - warning History - no warning	Target level Lowtemp timer

Fuel A Data, Fuel B Data

Fuel A Data			×
Fan	Feed	Ash	
L1	L1] L1	
L2	L2	L2	
L3	L3	L3	
L4	L4	L4	
L5	L5	<u>L5</u>	
L6	L6	L6	
L7	L7	<u>L7</u>	
_L8	<u>L8</u>	<u>L8</u>	
Startup far Startup fee Startup tim Igniter time Ash dump Ash dump Ash dump Ash dump TC for 25% TC for 100	time % heat level tanget %		

Fuel B Data		
Fan	Feed	Ash
L1	<u>L1</u>	
L2	L2	
L3	<u>L3</u>	L3
L4	<u>L4</u>	L4
L5		L5
LG	L6	
<u>L7</u>	<u>L7</u>	
<u>L8</u>		
Startup Startup Igniter t Ash dur Ash dur Ash dur Ash dur Ash dur TC for 2 TC for 1	fan feed time % mp fan mp feed mp time % mp heat level mp target % 5% fan 00% fan	

Telemetry

	Telemetry	
2	Temperature	
2	Thermocouple	
2	Fan potentiometer	
2	Feed potentiometer	
2	Exhaust fan speed	
2	Exhaust fan phase	
2	Convection fan level	
V	Display LED	
2	Igniter state	
2	Current heat level	
V	Target heat level	
V	State control	
V	Ash level	
	Ash target	
	Feed on time	
	Feed off time	
	Feed cycle time	
N	IIC status	
M	Alarm status	
M	Flag status	
M	Igniter current	· · · · · · · · · · · · · · · · · · ·
M	Firedoor timer	
M	Ash drawer timer	
M	Exhaust fan target	
M	Drop limit	
M	Feed cycle table	
M	Feed cycle cal	
M	Time to ash dump	

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.

Fuel A Data		🔤 Fuel B Data	
Fan Feed L1 70 L1 100 L2 70 L2 103 L3 70 L3 106 L4 70 L4 109 L5 70 L5 112 L6 70 L6 115 L7 70 L7 118 L8 70 L8 121	Ash L1 14 L2 14 L3 14 L4 14 L5 14 L6 14 L7 14 L8 14	Fan Feed L1 91 L1 100 L2 88 L2 100 L3 85 L3 100 L4 82 L4 100 L5 79 L5 100 L6 76 L6 100 L7 73 L7 100 L8 70 L8 100	Ash <u>L1 9</u> <u>L2 9</u> <u>L3 9</u> <u>L4 9</u> <u>L5 9</u> <u>L6 9</u> <u>L7 9</u> <u>L8 9</u>
Startup fan Startup feed Startup time % Igniter time % Ash dump fan Ash dump feed Ash dump teed Ash dump heat level Ash dump heat level Ash dump target % TC for 25% fan TC for 100% fan	70 100 100 100 70 100 100 4 100 50 170	Startup fan Startup feed Startup time % Igniter time % Ash dump fan Ash dump feed Ash dump time % Ash dump heat level Ash dump harget % TC for 25% fan TC for 100% fan	80 150 75 80 85 100 4 100 50 170

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:

Fu	iel A Da	ita			1	- 🗆
Fan		Fee	d		Ash	
L1	75	L1	100		L1	14
L2	75	L2	103		L2	14
L3	75	L3	106		L3	14
L4	75	L4	109		L4	14
L5	75	L5	112		L5	14
L6	75	L6	115		L6	14
L7	70	L7	118	1	L7	14
L8	70	_L8	121	1	L8	14
Sta Sta Igr Asl Asl Asl Asl Asl TC	artup feer artup time h dump f h dump f h dump t h dump t h dump t for 25%	d an eed ime % heat le arget %	J vel] š	10 10 10 10 10 10 10 10 10 10 10 10 10 1	,)0)0)0)0)0)0	
TC	for 100%	s fan		17	, 70	

Fuel A	Data	
Fan	Feed	Ash
L1 75	L1 100	L1 14
L2 75	L2 103	L2 14
L3 75	L3 106	L3 14
L4 75	L4 109	L4 14
L5 75	L5 112	L5 14
L6 75	L6 115	L6 14
L7 70	L7 118	L7 14
L8 70	L8 121	L8 14

Startup fan	70
Startup feed	100
Startup time %	100
Igniter time %	100
Ash dump fan	70
Ash dump feed	100
Ash dump time %	100
Ash dump heat level	4
Ash dump target %	100
TC for 25% fan	50
TC for 100% fan	170

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	VVVV	Configuration memory checksum calculated by the monitor; press the button
checksum	ΧΧΧΧ	to force a local recalculation
Internal data	VV	The detabase version used by the stove software
format	ХХ	The database version used by the slove software
Calculated data	VV	The database version used by the monitor; must match the stove database
format	XX	version
Serial number Text	Toxt	An 8 text character serial number; press the button to send and override the
	ΤΕΧΙ	data
Draduction data menuderuru		The production date in the format of mmddyyyy; automatically set by the
r iouucion date	mmuuyyyy	Calculate button; press the button to send and override the data
Model nome	Text	A 16 text character machine description; automatically set by the Calculate
woder name		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.

Fan		Fee	d		Ash	
L1	70	L1	100	-	L1	14
L2	70	L2	103	- 6	L2	14
L3	70	L3	106	-	L3	14
L4	70	L4	109	-	L4	14
L5	70	L5	112	- 1	L5	14
L6	70	L6	115	-	L6	14
L7	70	L7	118	-	L7	14
L8	70	L8	121	-	L8	14
Jua	timp i www	- C - C - C - C - C - C - C - C - C - C		110	~	
Sta Ign Ash Ash	rtup time iter time i dump fa i dump fa i dump ti	2 % % m ed me %	1	10 10 70 10	10 10 10 10 10	
Sta Ign Ash Ash Ash	rtup time iter time i dump fa i dump fa i dump ti i dump h	% % an me % me %	J vel j	10 10 70 10 10	IO IO IO IO	
Sta Ign Ash Ash Ash Ash	iter time iter time dump fa dump ti dump ti dump ta	an eed me % eat le	vel	10 10 70 10 10 4		
Sta Ign Ash Ash Ash Ash Ash TC	iter time iter time dump fa dump fa dump ti dump ta for 25% f	an eat le anget %	 vel	10 10 70 10 10 10 4 10 50		

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	_ 🗆 🗙
Telemetry Temperature Thermocouple Fan potentiometer Exhaust fan speed Exhaust fan phase Convection fan level Display LED Ioniter state	24 C, 75 F 10 125: -0.6 % 125: -0.6 % 139: 3336 RPM 55: 6.5 us 25 % 67: L B good
 Igniter state Current heat level Target heat level State control Ash level Ash target Feed on time Feed off time Feed cycle time IlC status 	67: L R good 1 30: Starting 56 16000 930: 7.75 s 496: 4.13 s 1426: 11.88 s 04
 Alarm status Flag status Igniter current Firedoor timer Ash drawer timer Exhaust fan target Drop limit Feed cycle table Feed cycle cal Time to ash dump 	00 88 0 0 0 68: 1632 RPM 33 1440: 12.00 s 1434: 11.95 s 03:50

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.

Flu	e Monitor				
Block	ed flue	Statu	s		
0	Warning	128	Adjustment start		
0	Detected	128	Adjustment end		
0	Shutdown	0	Adjustment		
0	Warning count	131	Ramp start		
0	Overtemp pullback	0	Reset countdown		
3	History index		Current level		
125	History maximum		Target level		
1	Sample timer	0	Lowtemp timer		
History - warning					
History - no warning 116 116 113 125 121 118 118 117					

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	0 ~ 255	The temperature history table when in normal running mode. One sample is added for
warning		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.

COM 1: Bixby Energy	110 / 115 Monitor 5.0.21	
Software version Internal checksum Calculated checksum Internal data format Calculated data format Serial number Production date Model name	02.06.00.21 b367 b367 05 05 6327 03302007 Bixby Model 115	C Bixby Model 115 C Bixby Model 110 C Low altitude C Medium altitude C High altitude A B Fuel Selection C C Corn
Data Out ARFF Data In T2000 Status 16 Fuel A selected	Format Flue Monitor Readback Fuel A Data Fuel B Data Help Telemetry Sound Off	C C 5% ash Biomass C C 2% ash Biomass C C Wood - Lean C C Wood - Rich C High output fan C Regular fan
On Up Off Down	Data Log Off Data Log Pct 100 Quit	Individualize Calculate Fuel A Calculate Fuel B



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

Use this I	Log File?			×
?	The Bixby Log file: BixLog_6327_01.txt already exists. YE5 = Overwri	ite file, NO = S <u>N</u> o	5kip over, CANCEL = Skip	o to end of count

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".

COM 1: Bixby Energy	110 / 115 Monitor 5.0.21	
Software version Internal checksum Calculated checksum Internal data format Calculated data format Serial number Production date Model name	02.06.00.21 b368 b368 05 05 6327 04262007 Bixby Model 115	C Bixby Model 115 C Bixby Model 110 C Low altitude C Medium altitude C High altitude A B Fuel Selection C Corn
Data Out ARFF Data In T0635 Status 96 Fuel A selected On Up Off Down	Format Flue Monitor Readback Fuel A Data Fuel B Data Help Telemetry Sound Off Uata Log Off Data Log Off Data Log Pct 100 Quit	C C 2% ash Biomass C C 2% ash Biomass C C Wood - Lean C Wood - Rich C High output fan C Regular fan Individualize Calculate Fuel A Calculate Fuel B
Log File C:\BixbySoftwa	are\BixLog_6327_04.txt	

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 (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	lanited	47	171	109	35	11.42
Tuesday April 24 2007	16:17:12	27	103	109	58	31	lanited	40.17	170	109	34	9.75
Tuesday April 24 2007	16:18:01	27	122	110	70	31	lanited	39.85	0	109	34	9.65
Tuesday April 24 2007	16:18:50	27	89	109	49	31	lanited	45.11	0	109	34	10.91
Tuesday April 24 2007	16:19:40	27	96	109	53	31	lanited	45.13	0	109	34	10.9
Tuesday April 24 2007	16:20:29	27	107	109	60	31	lanited	45.08	0	109	34	10.88
Tuesday April 24 2007	16:21:18	27	115	109	65	31	lanited	44.94	0	109	34	10.83
Tuesday April 24 2007	16:22:07	27	127	110	73	31	lanited	45.19	0	109	34	10.88
Tuesday April 24 2007	16:22:56	27	137	109	79	31	lanited	45.27	0	109	34	10.88
Tuesday April 24 2007	16:23:45	28	143	111	83	31	lanited	44.9	0	109	34	10.78
Tuesday April 24 2007	16:24:35	28	139	110	81	31	lanited	45 44	Ő	109	34	10.9
Tuesday April 24 2007	16:25:24	28	150	109	87	31	lanited	44 94	Ő	109	34	10.77
Tuesday April 24 2007	16:26:13	28	154	109	90	31	lanited	45.07	Ő	109	34	10.79
Tuesday April 24 2007	16:27:02	28	138	76	80	31	lanited	45.06	Ő	73	33	10.76
Tuesday April 24 2007	16:27:51	28	147	103	85	53	Bamping	44 98	Ő	103	32	10.73
Tuesday April 24 2007	16:28:40	28	158	103	92	53	Ramping	39.41	Ő	103	32	9.39
Tuesday April 24 2007	16:29:30	28	158	104	92	53	Ramping	39.63	Ő	103	32	9.43
Tuesday April 24 2007	16:30:19	29	161	106	94	54	Ramping	39.57	Ő	117	34	9.4
Tuesday April 24 2007	16:31:08	29	170	117	100	54	Ramping	33 71	Ő	117	34	7 99
Tuesday April 24 2007	16:31:57	20	170	118	100	54	Ramping	33 78	0	117	34	7.55
Tuesday April 24 2007	16:32:46	20	173	110	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	29.00	0	132	36	6.85
Tuesday April 24 2007	16:35:14	30	194	131	100	55	Ramping	29.00	0	132	35	6.84
Tuesday April 24 2007	16:36:03	30	194	132	100	56	Ramping	20.11	0	147	37	6.85
Tuesday April 24 2007	16:36:52	31	184	13/	100	56	Ramping	25.21	0	147	37	5.05
Tuesday April 24 2007	16:37:41	31	190	134	100	56	Ramping	25.47	0	147	37	5.90
Tuesday April 24 2007	16:38:30	31	190	133	100	56	Ramping	25.40	0	147	37	5.80
Tuesday April 24 2007	16:30:10	31	204	133	100	57	Ramping	23.3	0	162	37	5 20
Tuesday April 24 2007	16:40:00	21	204	100	100	57	Domping	22.77	0	162	44	5.23
Tuesday April 24 2007	16:40:59	21	203	100	100	57	Pamping	22.74	0	162	44	5.21
Tuesday April 24 2007	16:40.30	21	223	100	100	57	Pamping	22.90	0	162	43	5.31
Tuesday April 24 2007	16:42:36	32	215	133	100	47		22.77	0	162		5.23
Tuesday April 24 2007	16:43:25	32	221	132	100	47		22.55	0	162	38	5.27
Tuesday April 24 2007	16:44:14	31	220	133	100	47		22.04	0	162	38	5.24
Tuesday April 24 2007	16:45:03	31	227	133	100	47		22.70	0	162	38	5.21
Tuesday April 24 2007	16:45:52	20	227	100	100	47		22.07	0	162	20	5.16
Tuesday April 24 2007	16:46:40	32	227	100	100	47		22.03	0	162	30	5.10
Tuesday April 24 2007	16:40.42	32	204	102	100	47		22.33	0	162	37	5.07
Tuesday April 24 2007	16.47.31	32	200	100	100	47		22.07	0	162	37	5.13
Tuesday April 24 2007	16:48:20	32	233	132	100	47	Level 8	22.67	0	102	37	5.11
Tuesday April 24 2007	16:49:09	32	240	133	100	47		22.08	0	162	37	5.11
Tuesday April 24 2007	10.49.08	32	243	132	100	47		22.67	0	102	37	5.09
Tuesday April 24 2007	10:50:48	31	241	132	100	47		22.52	0	162	37	5.04
Tuesday April 24 2007	10:51:37	31	243	132	100	47		22.63	0	162	36	5.06
i uesday April 24 2007	10:52:26	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:

Don't press any front panel buttons		Yes/OK	No/NG	Software version Internal checksum Calculated checksum	02.06.00.21 b368 b368	
Interactive Tests O1 Data communication link O2 Checksum verified O3 Data format matched O4 Front panel buttons off O5 Front panel ON button O6 Front panel OFF button O7 Front panel UP button O8 Front panel UP button O9 Front panel DOWN button O9 Front panel LEDs on V 10 Front panel LEDs off	マ 24 0 マ 25 T マ 26 F マ 28 F マ 28 F マ 29 F マ 30 F マ 31 F マ 32 T マ 33 T	Convection fai Thermometer Fan potentiom Fan potentiom Feed potention Feed potention Feed potention Thermocouple Thermostat op	n off eter low eter high eter detent meter low meter high meter detent en	Internal data format off Calculated data format er low Production date er high Model name er detent Operator ID ster high <u>Retest</u> ster detent <u>Debug window</u> h	05 05 6327 04262007 Bixby Model 115	
Image: Weight of the system Image: Weight of the system		Power plug wiring Fuel select switch wood / B Fuel select switch corn / A		Automatic Tests 38 Exhaust fan full power 39 Exhaust fan 1/2 power 40 Exhaust fan off 41 '1' side igniter test 42 '2' side igniter test 43 '1' side igniter check 44 '2' side igniter check 45 Feed motor / sensor		
I 22 Convection fan level 3 I 23 Convection fan level 4					Quit	

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

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 1/2 minutes and detected to work
42	'2' side igniter test	The '2' or right igniter was tested for 4 1/2 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

Automatic Tests

Checkout Report

OK

17 Plates in burn position

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 70, 70, 70, 70, Fan Levels A: 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 79, Fan Levels B: 91, 88, 85, 82, 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, Fan Speed Adjustments B: 50, 170 4, 100 Items to check Status Description 01 Data communication link OK OK 02 Checksum verified 03 Data format matched OK 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 14 Ash drawer switch closed OK 15 Plate motor on OK OK 16 Plate motor off

```
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
   30 Feed potentiometer high
OK
   31 Feed potentiometer detent
OK
   32 Thermocouple
OK
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
    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
OK
```

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:

COM 1: Bix	by Energy I	Model 110 / 115 Downloader 1.4	
%	Address	Data	Checksum
Load			Send
Status	Unplug sto	ove, unplug igniters, select 'Use internal firmware' or 'Load' for a new firmware file	
<u>Use inter</u>	nal firmware	Read delay 0 Write delay 0 Retry delay 0 Interleave 0	
Database	0	Old Version 00.00.00	Quit

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.

Stove software .	nex file				?)>
Save jn:	BixbySoftw	are	•	(† 🔁 🖻	* 📰 -
My Recent Documents Desktop My Documents My Computer	Bixby110_11 Bixby_02060 Bixby_02060 Bixby_02060 Bixcheck_50	5_02060021.zip 021_Downloader.hex 021_Notes.txt 021_PICkit.hex 21.exe			
My Network Places	File <u>n</u> ame: Save as <u>t</u> ype:	Bixby_02060021_D	ownloader.hex	2	• <u>S</u> ave Cancel

	COM 1: Bixby Energy Model 110 / 115 Downloader 1.4 % Address Data	Checksum
To initiate the downloader process, select the "Send"	Load C:\BixbySoftware\Bixby_02060021_Downloader.hex Status Select 'Send' to start the download process Use internal firmware Read delay 0 Write delay 0 Retry delay 0 Interleave 0	Send
button:	Database 0 Old Version 00.00.00	Quit

	COM 1: Bixby Energy Model 110 / 115 Downloader 1.4				
	% Address Data	Checksum			
	Load C:\BixbySoftware\Bixby_02060021_Downloader.hex	Send			
	Status Waiting for bootloader: Plug in the stove				
The Downloader is waiting for the	Use internal firmware Read delay 0 Write delay 0 Retry delay 0 Interleave 0				
stove. Plug in the stove now:	Database 0 Old Version 00.00.00.00	Quit			

	COM 1: Bixby Energy Model 110 / 115 Downloader 1.4				
				Checksum	
	15			[8a]	
	Load	C:\BixbySi	oftware\Bixby_02060021_Downloader.hex	Send	
The stove is being	Status	Download	ing new firmware		
reprogrammed	Use inter	nal firmware	Read delay 0 Write delay 0 Retry delay 0 Interleave 0		
	Database	0	Old Version 00.00.00	Quit	

The	COM 1: Bixby Energy Model 110 / 115 Downloader 1.4	
programming process is	% Address Data	Checksum
complete when		
You can now	Load C:\BixbySoftware\Bixby_02060021_Downloader.hex	Send
quit the downloader and	Status Download process completed. Plug the igniters back in	
return to BixCheck.	Use internal firmware Read delay 0 Write delay 0 Retry delay 0 Interleave 0	
	Database 0 Old Version 00.00.00	Quit