

User Guide for Babel Buster X2 and IP/XL

Control Solutions' earliest gateways were non-web based, e.g. twisted pair only. User guides many pages long were written about them. Technical support questions seemed to suggest it was too much reading for most. Therefore, when we came out with web based gateways, we thought it would be a good idea to put the user guide online within the device itself. With online documentation available, we thought hard copy was unnecessary and wasteful, so gateways like Babel Buster X2 and IP/XL had no printed user guide.

The user guide information can still be found in the web pages within the gateways themselves and there never was a formal printed user guide for either the X2 or IP/XL. From time to time, we created supplemental online user guides intended to augment the pages found in the device itself. Configuring LonWorks is one topic that had extra web pages at csimn.com; however, some years after the X2 and IP/XL were discontinued, those pages got removed from our web site. That content has been recovered and reprinted here.

The Babel Buster IP/XL did not have the information in this document replicated for that model in part because it is largely the same. The only difference between configuring X2 and IP/XL is that on X2 you reference Modbus registers and on IP/XL you reference BACnet objects. But the LonWorks part is all the same.

Use of the XIF to CSV conversion utility is optional. If you choose to use that utility, it is still available in the Legacy section of our Library page. There are two versions, one for X2 and one for IP/XL.

Configuring the Babel Buster X2

The primary function of X2 is mapping LonWorks network variables to Modbus registers, and do this without "binding" or network management on the LonWorks side. In the short series of pages that follows, we will look at the sequence of actions required to "learn" a LonWorks device and map some of its data.

When you first log into Babel Buster X2, the home or index page that appears will look like the image below. Start by clicking the I/O Devices tab. You will be asked for a user name and password. As shipped, the default user name is "system" and its password is "admin".



Model BBX2-LOH
av2.81b nv1.2

Quick Help

NOTE: The LonWorks interface has been rewritten as of July 2008 to provide support for structured SNVT's. The upgrade includes a requirement to re-program the Neuron Chip, and its application has a different program interface. This means you must have LonMaker in order to do a field upgrade to v2.81 or higher from v2.57 or lower. The discussion on pages that follow apply to the new v2.81 interface.

The default page that comes up when you click on the I/O Devices tab is the LonWorks LON data tab. This page will display nothing until at least one device is configured into X2.

Click on the LON Devices tab next.

Babel Buster X2

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I/O Devices | IP Network | System | Advanced

LonWorks

LON Data | **LON Devices** | LON Variables

This page displays configuration of network variables in devices accessed via the LonWorks network.

Showing 1 to 1 of 0

Update < Prev Next >

Device 1 Name: < Prev Dev Next Dev >

NV #	SNVT Type	NV Name	Data	Status
0	Undefined	None	-	---

The LON Devices page shows a list of all of the presently known devices. When first configuring the X2, this page will start with an empty list.

The devices are numbered. The device number is a link to detailed information about that device. Click on the number one next.

This page displays configuration of network variables in devices accessed via the LonWorks network.

Gateway active. Update < Prev Next >

Device No.	Device Name	Neuron ID	Program ID	Status
1		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
2		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
3		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
4		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
5		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
6		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
7		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
8		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
9		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
10		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
11		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
12		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
13		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
14		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---
15		00-00-00-00-00-00	00:00:00:00:00:00:00:00	---

Device

My Domain Length My Domain ID My Subnet # My Node #

The LON Device expands out to the detail shown below when a device number is clicked. At first this page is also empty. You will go through a series of 4 steps to get the page populated as shown below. In this example, we are "learning" about an AddMe II.

Step 1: Click the "Get Service Pin" button. Node status will show "Waiting for service pin." Now press the service button (or install button) on the device you want to learn. Click the Update button, and status will return to "ok" if the message was received. In addition, Neuron ID and Program ID will now have non-zero numbers. (If you don't have physical access to the device but do know its Neuron ID, you can type it into the list on the LON Devices page.)

Step 2: Click the "Auto Config" button. This will reconfigure the device to be on the same domain and subnet as X2 and also assign the next sequential node number. You find the X2's domain and subnet at the bottom of the devices page (click Previous below). If you want to set an explicit subnet and node, enter the values and click "Set Config".

WARNING: Using "Set Config" or "Auto Config" will break any network connections previously put there by a system integrator. If you are adding X2 to a managed network, you must install the X2 as a node on that network to force X2 onto the existing domain, then ONLY use "Get Config" to cause X2 to learn where the devices are.

Step 3: Click the "Get XIF from Device" button. This process will take a minute or two. (Note: Devices having more than the standard set of 62 network variables are not currently supported by Babel Buster X2.) During the import, the status will indicate "Importing XIF", and will indicate "XIF Import Done" when finished. Click the Update button to refresh this status.

The purpose of the XIF import is to "learn" what network variables are in the LonWorks device. If you wish to preconfigure an X2 without being connected to the LonWorks device, you can upload its XIF file if you have that.

NOTE: The X2 is not able to import the XIF form a device which has structured network variables. If the status comes back "Cannot import XIF" you will need to obtain the XIF file and upload it to the X2.

You may also use the external (free) utility from Control Solutions that converts the XIF to a CSV file, then upload the CSV file instead. The advantage of using the CSV is that you can insert as many rows as needed to read structured UNVT's.

Step 4: (optional) Enter a name for this device and click Update to register it. Once everything has been entered and/or learned, be sure to go to the System->Setup->Config File page and click the Save button.

Once you have done these steps and successfully imported the XIF, click on the LON Variables tab. (The NV count will be nonzero once the XIF import is done.)

The screenshot shows the Babel Buster X2 web interface. The top navigation bar includes tabs for 'I/O Devices', 'IP Network', 'System', and 'Advanced'. Under 'I/O Devices', there are sub-tabs for 'LonWorks', 'LON Data', 'LON Devices', and 'LON Variables'. The 'LON Variables' tab is active, displaying configuration for 'Device 1: WattNode Plus'. The 'Node Status' is 'Importing XIF'. Configuration fields include 'Neuron ID: 00-15-14-00-94-00', 'Program ID: 80:00:22:15:00:0a:04:02', 'NV Count: 0', 'Domain Length: 0', 'Domain ID', 'Subnet #: 0', and 'Node #: 0'. Buttons for 'Update', '< Prev', 'Next >', 'Get Service Pin', 'Wink', 'Get XIF from Device', 'Cancel', 'Reset', 'Get Config', 'Set Config', and 'Auto Config' are visible. A file management section at the bottom shows 'Directory: RAM0', radio buttons for 'XIF' (selected) and 'csv', and buttons for '< Apply', 'Load File', and 'Delete File'. Below this is an 'Upload XIF File from PC' section with an 'Upload' button, a text input field, and a 'Browse...' button.

The LON Variables page lists the network variables found in the device just learned. Initially all of the check boxes will be unchecked, and the register number boxes will be empty (contain zero). This is where you choose which variables you will map to which local registers.

Start by clicking the check boxes to select the variables you want mapped. You may then click the "Auto Allocate" button to have X2 pick registers for you. It will pick floating point or integer registers based on what the variable type is inside the LonWorks device. You can select registers manually if desired.

Once you have completed these steps, the variables are now mapped. Our over simplified example below shows that we are only going to retrieve a single phase of volts, plus frequency, from a WattNode Plus. Assuming the device is connected, you are now polling for data. Click on the LON Data tab to go look at the data.



I/O Devices
IP Network
System
Advanced

LonWorks

LON Data
LON Devices
LON Variables

This page displays configuration of network variables in devices accessed via the LonWorks network.

Showing to 34 of 40 Update < Prev Next >

Device Name: Default Update Time: < Prev Dev Next Dev >

NV Index	NV Type	NV Name	Remote Direction	Map	Local Register #	Update Time
19	SNVT_pwr_fact_f	nvoPF_2	nvo	<input type="checkbox"/>	0	15.0
20	SNVT_pover_f	nvoReacPvrSum	nvo	<input type="checkbox"/>	0	15.0
21	SNVT_power_f	nvoReacPvr_0	nvo	<input type="checkbox"/>	0	15.0
22	SNVT_power_f	nvoReacPvr_1	nvo	<input type="checkbox"/>	0	15.0
23	SNVT_power_f	nvoReacPvr_2	nvo	<input type="checkbox"/>	0	15.0
24	SNVT_elapsed_tm	nciReacUpdT	nvi	<input type="checkbox"/>	0	15.0
25	SNVT_elec_vhr_f	nvoReacEngySum	nvo	<input type="checkbox"/>	0	15.0
26	SNVT_volt_f	nvoVolts_0	nvo	<input checked="" type="checkbox"/>	1001	15.0
27	SNVT_volt_f	nvoVolts_1	nvo	<input type="checkbox"/>	0	15.0
28	SNVT_volt_f	nvoVolts_2	nvo	<input type="checkbox"/>	0	15.0
29	SNVT_amp_f	nvoCurrent_0	nvo	<input type="checkbox"/>	0	15.0
30	SNVT_amp_f	nvoCurrent_1	nvo	<input type="checkbox"/>	0	15.0
31	SNVT_amp_f	nvoCurrent_2	nvo	<input type="checkbox"/>	0	15.0
32	SNVT_freq_f	nvoFreq	nvo	<input checked="" type="checkbox"/>	1003	15.0
33	SNVT_power_f	nvoDemand	nvo	<input type="checkbox"/>	0	15.0

Clear and Allocate
First Int Reg
First Float Reg
Map All
Map None
Auto Allocate

We return to the LON Data page, and this time it should mean something. The data is listed on this page according to network variable position in the respective LonWorks device. Assuming you see data as illustrated in the first screen shot below, you will also see the data shown in the second screen shot, which you get to by clicking the System tab.

I/O Devices
IP Network
System
Advanced

LonWorks

LON Data
LON Devices
LON Variables

This page displays configuration of network variables in devices accessed via the LonWorks network.

Showing to 34 of 40

Device Name: WattNode Plus

NV #	SNVT Type	NV Name	Data	Status
19	SNVT_pvr_fact_f	nvoPF_2	---	---
20	SNVT_power_f	nvoReacPvrSum	---	---
21	SNVT_power_f	nvoReacPvr_0	---	---
22	SNVT_power_f	nvoReacPvr_1	---	---
23	SNVT_power_f	nvoReacPvr_2	---	---
24	SNVT_elapsed_tm	nciReacUpdT	---	---
25	SNVT_elec_whr_f	nvoReacEngySum	---	---
26	SNVT_volt_f	nvoVolts_0	120.2160	Ok
27	SNVT_volt_f	nvoVolts_1	---	---
28	SNVT_volt_f	nvoVolts_2	---	---
29	SNVT_amp_f	nvoCurrent_0	---	---
30	SNVT_amp_f	nvoCurrent_1	---	---
31	SNVT_amp_f	nvoCurrent_2	---	---
32	SNVT_freq_f	nvoFreq	59.97897	Ok
33	SNVT_power_f	nvoDemand	---	---

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I/O Devices | IP Network | **System** | Advanced

Data | Action Rules | Setup

Local Registers | **Thresholds** | Trend Data | MIB View

This page displays data as presently found in the local registers maintained by this device.

Showing registers from

Local Register #	Register Name	Hex	Update	Register Data	Unsigned	Register Type	Default Data	Server Timeout (s)
01001	LON1:mvoVolts_0	<input type="checkbox"/>	<input type="checkbox"/>	119.8004	<input type="checkbox"/>	Flt	0.0	0.0
01003	LON1:mvoFreq	<input type="checkbox"/>	<input type="checkbox"/>	59.97093	<input type="checkbox"/>	Flt	0.0	0.0
01005		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01007		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01009		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01011		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01013		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01015		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01017		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01019		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01021		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01023		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01025		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01027		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01029		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0
01031		<input type="checkbox"/>	<input type="checkbox"/>	0.0	<input type="checkbox"/>	Flt	0.0	0.0

You should now save your configuration, which will include the device and network variable mapping information. Go to the Config File page and click Save.

The screenshot displays the Babel Buster X2 web interface. At the top, the logo "Babel Buster X2" is on the left, and "CONTROL SOLUTIONS, INC. MINNESOTA" is on the right. Below the header is a navigation menu with tabs for "I/O Devices", "IP Network", "System" (which is highlighted), and "Advanced". Under the "System" tab, there are sub-tabs for "Data", "Action Rules", and "Setup". The "Config File" sub-tab is selected, showing a "Network" sub-tab. Below the navigation is a text box stating: "This page allows you to manage configuration files." The main content area is divided into two sections. The first section, titled "Store configuration to Flash file selected from directory, or to new file if checked.", contains several controls: a "Load" button, a "Local file directory" dropdown menu set to "BootConfig.xml" with a "View" button and a "Delete" button, a "Save" button, a "Save as:" checkbox with an empty text input field, a "Boot" button, a "Boot configuration" text input field containing "BootConfig.xml", a "Go Offline" button, a "Confirm" checkbox, and a "Restart" button. The second section, titled "Upload Configuration File", contains an "Upload" button, an empty text input field, and a "Browse..." button. Below this section is a note: "Upload only moves a file from your PC to this device. Select the file from the above list and click Load to reconfigure from this file."

When you return to the X2 after a restart, or after reloading the configuration file by clicking Load on the page above, you will now only see those variables that have been mapped for a given device as illustrated in the examples below. If you want to retrieve the entire variable list to map additional variables not originally included, you will need to re-import the XIF file.

Babel Buster X2
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I/O Devices | IP Network | System | Advanced

LonWorks

LON Data | LON Devices | LON Variables

This page displays configuration of network variables in devices accessed via the LonWorks network.

Showing 1 to 2 of 2

Update < Prev Next >

Device 1 Name: WattNode Plus < Prev Dev Next Dev >

NV #	SNVT Type	NV Name	Data	Status
26	SNVT_volt_f	nvoVolts_0	121.0414	ok
32	SNVT_freq_f	nvoFreq	59.99707	ok

Babel Buster X2
CONTROL SOLUTIONS, INC.
MINNESOTA

I/O Devices | IP Network | System | Advanced

LonWorks

LON Data | LON Devices | LON Variables

This page displays configuration of network variables in devices accessed via the LonWorks network.

Showing 1 to 2 of 2

Update < Prev Next >

Device 1 Name: WattNode Plus Default Update Time: 15.0 < Prev Dev Next Dev >

NV Index	NV Type	NV Name	Remote Direction	Map	Local Register #	Update Time
26	SNVT_volt_f	nvoVolts_0	nvo	<input checked="" type="checkbox"/>	1001	15.0
32	SNVT_freq_f	nvoFreq	nvo	<input checked="" type="checkbox"/>	1003	15.0

Clear and Allocate 0 First Int Reg 1 First Float Reg 1001 Map All Map None Auto Allocate

Version v2.81 of the Babel Buster X2 supports structured SNVT's. When an XIF file is imported which includes structures, the total "NV count" is really a count of data fields in the NV's. The example below, showing a Trane chiller, has a total of 119 data fields that can potentially be mapped to Modbus registers.

The screenshot displays the Babel Buster X2 web interface. At the top, the logo for Babel Buster X2 and CONTROL SOLUTIONS, INC. MINNESOTA is visible. Below the logo is a navigation menu with tabs for I/O Devices, IP Network, System, and Advanced. Under I/O Devices, there are sub-tabs for LonWorks, LON Data, LON Devices, and LON Variables. The LON Variables tab is currently selected.

A descriptive text states: "This page displays configuration of network variables in devices accessed via the LonWorks network."

The main content area shows configuration for "Device 2" (Trane LC-C) with a "Node Status: Ok". Navigation buttons include "Update", "< Prev", and "Next >".

Configuration fields include:

- Neuron ID: 00-00-00-00-00-00
- Program ID: 80:00:2a:50:28:03:04:08
- NV Count: 119
- Domain Length: 0
- Domain ID: [empty]
- Subnet #: 0
- Node #: 0

Action buttons include: "Get Service Pin", "Wink", "Get XIF from Device", "Cancel", "Reset", "Get Config", "Set Config", and "Auto Config".

At the bottom, there is a file management section:

- Directory: RAM0 (dropdown)
- File format: XIF, csv
- Buttons: < Apply, Load File, LCI-C:XIF (dropdown), Delete File
- Section: Upload XIF File from PC
- Buttons: Upload, [input field], Browse...

Structured SNVT's will show up as a series of Raw NV's, consisting of the various fields of the structure broken down into their component parts. The item at NV index 31 in the example below is a SNVT_chlr_status type variable.



[I/O Devices](#)
[IP Network](#)
[System](#)
[Advanced](#)

[LonWorks](#)

[LON Data](#)
[LON Devices](#)
[LON Variables](#)

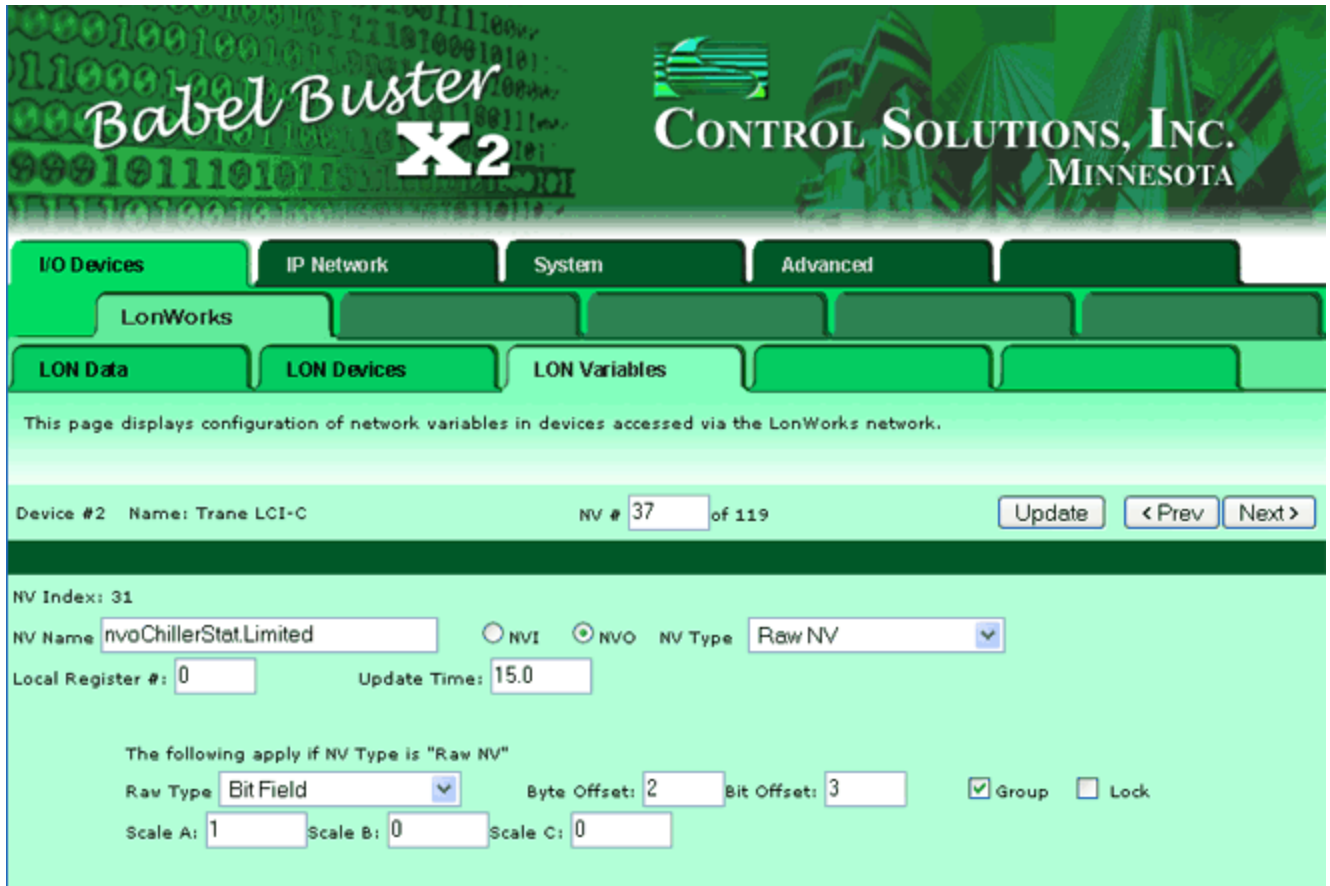
This page displays configuration of network variables in devices accessed via the LonWorks network.

Showing to 44 of 119

Device Name: Default Update Time:

NV Index	NV Type	NV Name	Remote Direction	Map	Local Register #	Update Time
29	SNVT_temp_p	nvoLvgCndWTemp	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
30	SNVT_str_ascii	nvoAlarmDescr	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
31	Raw NV	nvoChillerStat.RunMode	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
31	Raw NV	nvoChillerStat.HvacStatu	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
31	Raw NV	nvoChillerStat.InAlarm	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
31	Raw NV	nvoChillerStat.RunEnable	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
31	Raw NV	nvoChillerStat.Local	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
31	Raw NV	nvoChillerStat.Limited	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
31	Raw NV	nvoChillerStat.ChwFlow	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
31	Raw NV	nvoChillerStat.CondwFlow@	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
32	SNVT_obj_request	nviRequest	nvi	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
33	SNVT_obj_status	nvoStatus	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
34	Raw NV	nviTraneVar2	nvi	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
35	Raw NV	nvoTraneVar9	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>
36	Raw NV	nvoStatusOutputs.Bit_0	nvo	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="15.0"/>

You may click on the NV index, which is a link, to look at the details of any NV on the list above. Clicking on the instance of "31" in front of "nvoChillerStat.Limited" brings us to the page shown below. The Group check box means this entry in the list is a member of a structure that must be read along with its other members.



XIF to CSV conversion

An alternative to manipulating NV to register mapping via the web interface is to convert the XIF to a CSV file, then use your standard spread sheet software to manipulate the spread sheet. Once you have done all of the necessary editing of the CSV file, you can upload that to the X2 in place of an XIF file.

To begin with, you need to obtain a copy of the XIF file for the LonWorks device you are going to integrate. If you do not have a copy, you can export it from the device itself using the Nodeutil.exe tool available for free download at www.echelon.com.

The first step is to convert the XIF file to a CSV file. The purpose of this intermediate step is to allow you to review the mapping in "bulk" form using Excel or equivalent spread sheet program.

Open a command prompt (start->Programs->Accessories->Command Prompt) and type in this command:

```
xif2csvX2 mynode.xif
```

where "mynode.xif" is the XIF file for your LonWorks device. If the XIF file is not in the same directory as the program, you will need to provide the full path. The program will create a new file named <file>.csv where <file> is the name of the original file excluding suffix. In the above example, we would get mynode.csv.

At this point, you should open the csv file and make any changes you want. The file will look like the example below if the XIF for WattNode Plus is processed. Editing this CSV file can be an in-depth exercise, and is described here.

CSV File Editing

Do you need to do any editing?

Note the Y or N under the Enable column. If "Y", this object will be included. If "N", this object will be excluded. Certain things found in a LonWorks device are not suitable for mapping to a BACnet object, such as nvoFileDirectory commonly found in most devices (it is a pointer to LonWorks configuration properties, and these are not accessible from BACnet.)

If you do not need the network variable listed, replace Y with N. If you believe you want a variable that defaulted to N, determine whether you can appropriately interpret that value as a BACnet object before changing it to Y. DO NOT change NVindex or Direction. A mismatch here will cause unpredictable results, including failure to communicate.

All scalar network variable types will have their conversion recognized automatically by Babel Buster X2. The term "scalar" means it is a single data element, such as integer, floating point, enumeration, etc. Some network variables are structures, meaning a single "network variable" contains several data elements. These structures are mapped to multiple Modbus registers and require explicit interpretation using the fields in the 7 columns following the SNVTindex (which is set to 0 for a structure). More detail about this follows below.

The NV name is taken from the XIF file, and this will be shown as the register name in the Babel Buster X2. You may change this to any name that is meaningful to you, and it may be up to 40 characters in length.

Line	SPID	NVindex	Direction	SNVTime	RawType	Offset	BitOffset	Scale_A	Scale_B	Scale_C	Group	Lock	NVname
1	80:00:22:15:00:0A:04:02												
2													
3		0	NVI	92		0	0	0	0	0	0	0	0 nviRequest
4		1	NVO	93		0	0	0	0	0	0	0	0 nvoStatus
5		2	NVI	84		0	0	0	0	0	0	0	0 nviTimeSet
6		3	NVI	8		0	0	0	0	0	0	0	0 nviCalSel
7		4	NVI	57		0	0	0	0	0	0	0	0 nviCal
8		5	NVO	57		0	0	0	0	0	0	0	0 nvoPowerSum
9		6	NVO	57		0	0	0	0	0	0	0	0 nvoPower_0
10		7	NVO	57		0	0	0	0	0	0	0	0 nvoPower_1
11		8	NVO	57		0	0	0	0	0	0	0	0 nvoPower_2
12		9	NVI	48		0	0	0	0	0	0	0	0 nciCtAmps_f
13		10	NVI	87		0	0	0	0	0	0	0	0 nciPwrUpdtT
14		11	NVO	68		0	0	0	0	0	0	0	0 nvoEnergySum
15		12	NVO	68		0	0	0	0	0	0	0	0 nvoEnergy_0
16		13	NVO	68		0	0	0	0	0	0	0	0 nvoEnergy_1
17		14	NVO	68		0	0	0	0	0	0	0	0 nvoEnergy_2
18		15	NVI	87		0	0	0	0	0	0	0	0 nciEngyUpdtT
19		16	NVO	99		0	0	0	0	0	0	0	0 nvoPFavg
20		17	NVO	99		0	0	0	0	0	0	0	0 nvoPF_0
21		18	NVO	99		0	0	0	0	0	0	0	0 nvoPF_1
22		19	NVO	99		0	0	0	0	0	0	0	0 nvoPF_2
23		20	NVO	57		0	0	0	0	0	0	0	0 nvoReacPwrSum
24		21	NVO	57		0	0	0	0	0	0	0	0 nvoReacPwr_0
25		22	NVO	57		0	0	0	0	0	0	0	0 nvoReacPwr_1
26		23	NVO	57		0	0	0	0	0	0	0	0 nvoReacPwr_2
27		24	NVI	87		0	0	0	0	0	0	0	0 nciReacUpdtT
28		25	NVO	68		0	0	0	0	0	0	0	0 nvoReacEngySum
29		26	NVO	66		0	0	0	0	0	0	0	0 nvoVolts_0
30		27	NVO	66		0	0	0	0	0	0	0	0 nvoVolts_1
31		28	NVO	66		0	0	0	0	0	0	0	0 nvoVolts_2
32		29	NVO	48		0	0	0	0	0	0	0	0 nvoCurrent_0
33		30	NVO	48		0	0	0	0	0	0	0	0 nvoCurrent_1
34		31	NVO	48		0	0	0	0	0	0	0	0 nvoCurrent_2
35		32	NVO	75		0	0	0	0	0	0	0	0 nvoFreq
36		33	NVO	57		0	0	0	0	0	0	0	0 nvoDemand
37		34	NVO	57		0	0	0	0	0	0	0	0 nvoPkDemand
38		35	NVO	84		0	0	0	0	0	0	0	0 nvoPeakDemT
39		36	NVI	8		0	0	0	0	0	0	0	0 nviLogRequest
40		37	NVO	36		0	0	0	0	0	0	0	0 nvoLogData
41		38	NVI	8		0	0	0	0	0	0	0	0 nciDemPerMins
42		39	NVI	8		0	0	0	0	0	0	0	0 nciDemSubints
43													
44													

Line 1: Program ID for this device. There can be only one SPID in the CSV file and it must be on line 1. If you intend to map multiple devices in a single gateway, create one CSV per device.

Line 2: Comment line with labels, skipped (line 2 skipped regardless of content).

Lines 3-N: One or more lines per network variable mapping the variables to BACnet objects. Each line represents one BACnet object whose type is shown in the first column.

Column 1 (NV index): This is the network variable index as defined by LonWorks protocol, and will be found in the XIF file or manufacturer's documentation. You will have no need to edit this column unless creating a device manually.

Column 2 (Direction): The direction here refers to direction as defined at the remote LonWorks node. NVO is network variable output, meaning we can read this data. NVI is network variable input, meaning we can write this data. Direction will be found in the XIF file and MUST NOT be changed. Communication failure will result if direction is incorrect.

Column 3 (SNVT index): This is the Standard Network Variable Type as published in LonWorks standards. Manufacturer defined network variables will translate to SNVT index zero and must be interpreted as raw data. If a Manufacturer defined NV type is really a renamed standard type, you can enter the standard type code here. (Note: You can download a pdf file containing a complete definition of all network variable types at www.lonmark.org. You WILL need this document to do anything more than the default mapping created for you by xif2csvX2.exe. Due to copyright restrictions, we cannot provide it for you.)

Column 4 (Raw type): When parsing a structured variable into multiple Modbus registers, this field specifies the raw data type found in the respective field of the structure. These are the enumerated NVT_CAT types (found in the enumeration section of the pdf document mentioned above).

Column 5 (Offset): Structured variables are multiple bytes in length. This column provides the byte offset from the first byte of the structure where this field or object is found.

Column 6 (Bit offset): Some structured variables treat individual bits as data elements, and often there is a set of multiple bits in such a structure. The Offset column is used to access the correct byte. The Bit offset is used to specify which bit this object refers to. Bit offsets are 0..7 bit positions from the left (MSB of byte). To reiterate, a bit offset of 0 will result in a byte mask of 0x80. Keep in mind that LonWorks SNVT bit structure definitions identify "bit 1" as the left most bit.

Columns 7, 8, 9 (Scale): These are the scale factors A, B, and C whose usage is as defined for standard network variable types (see note about pdf file available above).

Column 10 (Group): This column flags the respective line as being a member of a "group" or structured network variable. When the group flag is set, the gateway sees that it needs to process multiple maps to arrive at a complete network variable for transmission on the LonWorks network. This is especially important when writing a network variable to a LonWorks device - all fields must be transmitted together.

Column 11 (Lock): This flag is only used in conjunction with the Group flag. When multiple Modbus registers are mapped to a single network variable that will be written to the LonWorks device, you have the option of that variable being updated when any member of the structure is written from Modbus (default). You also have the option of causing the entire structure to be updated ONLY when a certain member of the structure is updated. Set the Lock field to 1 to indicate which member of a group is the Lock field. The structure will

only be written when this single Lock field is updated. This allows all Modbus registers to be updated before the Lock object to result in a completely synchronous update. Do not set more than one Lock field per group as this will defeat the purpose.

Column 12 (NV name): Originally taken from the XIF file, this can be edited to your liking, and shows up as the Modbus register name stored in the gateway.