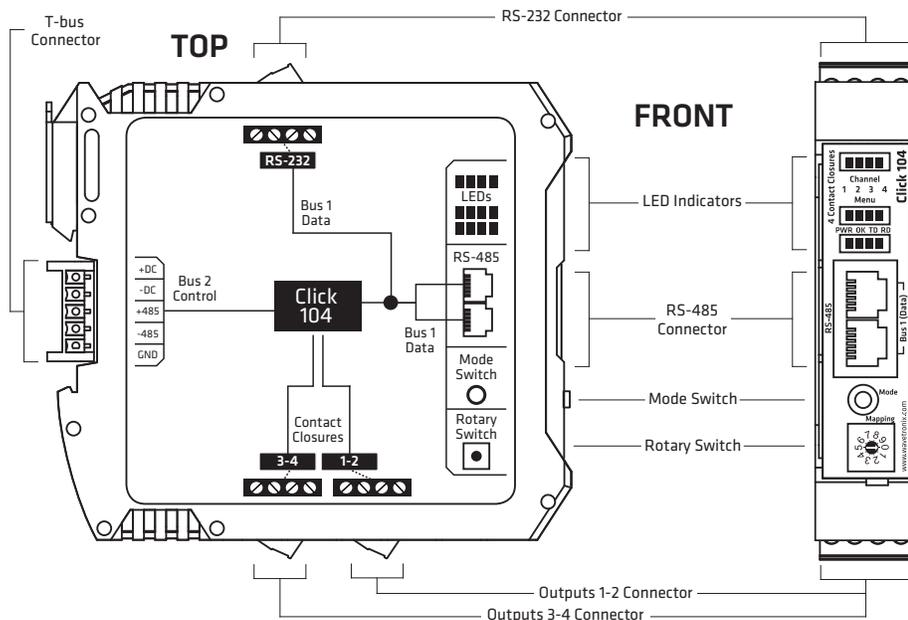


The Click 104 is a 4-channel contact closure module for use with sensors that use Z4 protocol: HD, Advance, and Matrix. It mounts on a DIN rail for power and communication.



Physical Features

The Click 104 has the following physical features.



Communication Ports

The Click 104 has two independent serial communications buses. Bus 1, also referred to as the data bus, should be used to report vehicle data; its associated communication ports consist of two RJ-11 jacks, for RS-485, on the faceplate and one screw terminal, for RS-232, on the top of the device.

Bus 2, also referred to as the control bus, should be used for configuration. Its associated communication port is a 5-position connector, located on the back of the Click 104, that plugs into a T-bus connector and provides power

and RS-485 communication to the device. It also passes RS-485 communication from the Click 104 to all other devices on the T-bus.

Contact Closure Outputs

The contact closure outputs should be wired to a controller, data logger, or BIU (Bus Interface Unit) using the pluggable screw terminals on the bottom of the Click 104. There are two screw terminal blocks; the one closer to the faceplate has outputs 1 and 2, and the farther one has outputs 3 and 4. Each output consists of two terminals, one + and one –.

The screw terminal connectors can also be unplugged from the Click 104 allowing you to pre-wire the Click 104 before final installation.

Rotary Switch

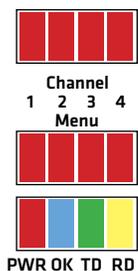
On the faceplate of the device is a rotary switch, numbered 0–9. This switch, which can be twisted by inserting a small screwdriver into the arrow slot, is used to configure channels.

Mode Switch

The faceplate of the Click 104 features a push-button labeled **Mode Switch**, which is used to cycle through and select menu and configuration options.

LEDs

The faceplate of the Click 104 has three banks of LEDs. The top bank is used for detection indication, the second bank menu indication, and the third for menu indication as well as operation states.



The Channel LEDs are detection indicators; they consist of four red LEDs numbered 1–4, each representing a channel (see the figure above). An illuminated LED indicates that the associated contact is being closed (this can mean either a vehicle detection or fail-safe mode, which will be discussed later in this document). These indicators are dedicated to detection and have no other display purposes.

The menu indicator LEDs include two rows of LEDs (see the figure above). The lower row contains Level 1 indicators, while the upper row contains Level 2 indicators. Each level consists of four LEDs numbered 1–4 (left to right). Level 1 LEDs (the multicolored row) display which menu item is active. These Level 1 LEDs are dual-purpose, each indicating both menu selection as well as a normal operation state when not in Menu mode. The normal operation state functions include:

- **Red (PWR)** – Indicates the presence of power to the device.
- **Blue (OK)** – Indicates proper system operation; it extinguishes during fail-safe mode.
- **Green (TD)** – Indicates serial communication transmit data (from the Click 104) on either bus 1 (data) or bus 2 (control).
- **Yellow (RD)** – Indicates serial communication receive data (to the Click 104) on either bus 1 (data) or bus 2 (control).

Level 2 LEDs display configuration options for the menu items selected via the level 1 LEDs. All level 2 LEDs are red. These LEDs are dedicated to menu operation, and are extinguished when the menu is not active.

Installation

1. Mount the Click 104 on a DIN rail over a T-bus connector. This connects the device's control bus (bus 2) to the installation's shared communication bus; you can connect your computer to another device on this shared bus, such as the Click 305 USB converter, to access the Click 104 to configure it using Click Supervisor. Mounting the Click 104 on the T-bus also connects it to the power source.
2. Send detection data to the data bus (bus 1) in one of two ways. If you're using a SmartSensor Advance or Matrix, and therefore a Click 222 or 223, connect it to the Click 104 by connecting jumper cables from the RJ-11 jacks on the faceplate of the Click 222 or 223 to the RJ-11 jacks on the faceplate of the Click 104.

If you're using a SmartSensor HD, first set the sensor to push data on the RS-232 port. Then connect wires between the TD and RD screw terminals on the protected side of the Click 200 to the TD and RD screw terminals on the Click 104.
3. If needed, daisy-chain multiple Click 104 devices together by utilizing both RJ-11 jacks on each device's faceplate.

Contact Closure Outputs

Part of installing the device is wiring its contact closure outputs to the traffic controller (or data logger or other device). It's recommended, however, that you not do this until the device is done being configured, to avoid sending any incorrect contact closures to the controller

There are four contact closure outputs, for the four channels the Click 104 can handle. Each output has two screw terminals, one + and one -. The + terminals are for data, while the - are ground, or common. Each - terminal is isolated from all the other grounds; if your installation requires a common ground for each contact closure output, you'll need to tie together the wires from those four terminals yourself.

Fail-safe Mode

The Click 104 receives datagrams from the connected SmartSensor. These datagrams must be mapped to device outputs, as will be discussed later in this document. If the Click 104 does not receive a datagram describing the device's channels for ten seconds, the device will enter fail-safe mode. In fail-safe mode, all outputs will assert a detection condition and will continue to do so until the device receives a datagram that updates the state of its configured channels. See the knowledge base article *0514 Installing and Using Click Supervisor* for more information on how to change the amount of time that must elapse without the device receiving a pertinent datagram before the device enters fail-safe mode.

Configuration

The Click 104 can be configured in three ways: the rotary switch (which can only change one parameter), the front panel menu, and Click Supervisor.

These three configuration methods can configure different sets of parameters; some of these parameters can be set using multiple configuration methods, and some of them can only be set using one particular method. The table below lists how each parameter may be accessed and configured.

	Rotary Switch	Front Panel Menu	Click Supervisor
Baud Rate	No	Yes	Yes
Channel Input Map	Yes	Yes	Yes
Autobaud	No	Yes	No
Reset to Default	No	Yes	Yes
Description	No	No	Yes
Location	No	No	Yes
Device ID	No	No	Yes
Fail-safe Settings	No	No	Yes
To use this configuration option:	Hardware mode	Software mode	Software mode

Configuration Modes

The final row on the table above refers to configuration modes. Hardware mode means a particular parameter is set by the rotary switch; Software mode means that parameter is set by either the front panel menu or Click Supervisor. However, this is only applicable for channel input mapping, since that is the only parameter that can be set by the rotary switch.

The position of the rotary switch determines whether the device is in Hardware or Software mode:

- If the switch is set to 0, the device is in Software mode. This means that all parameters are set by the front panel menu or Click Supervisor.
- If the switch is set to any other number, the device is in Hardware mode, meaning that the channel input mapping is set by the rotary switch. If this is set, you will not be able to change the channel input mapping any other way; in Click Supervisor the option will be grayed out, and the front panel menu will only allow to view, not change, this setting. However, even when the rotary switch is set in Hardware mode, you will still be able to configure all other parameters (besides channel input mapping) using the front panel menu and Click Supervisor.

Note. *If any non-switch setting—that is, those that aren't set by the rotary switch—has been set using both the front panel menu and Click Supervisor, whichever configuration was set most recently will take precedence.*

Rotary Switch

The rotary switch is located on the lower part of the faceplate and can be used to change the channel input mapping. Remember that if you use this switch to set the channel input mapping, you won't be able to use the software or the front panel menu to change this particular parameter (although you will still be able to use them to change other parameters).

Channel input mapping is the process of telling the device which incoming data channels should be mapped to which outgoing channels. As mentioned earlier, the Click 104 receives serial datagrams from a sensor to which it is connected. These datagrams can contain many channels of detection data. Because the devices have fewer output channels than there are possible input datagram channels received from the sensor, you must use the channel input map to map the desired inputs to outputs. The Click 104 has four output channels; if you need more than this, you'll need to use multiple devices daisy-chained together.

As shown in the table below, the outputs are mapped sequentially—that is, they can only be mapped in numerically ordered groups of four (1–4, 5–8, etc.). If you set the switch to 3, for 9–12, then input 9 would be mapped to output 1, input 10 would be mapped to output 2, input 11 would be mapped to output 3, and input 12 would be mapped to output 4.

Switch	Channels
0	Software mode
1	1–4
2	5–8
3	9–12
4	13–16
5	17–20
6	21–24
7	25–28
8	29–32
9	33–36

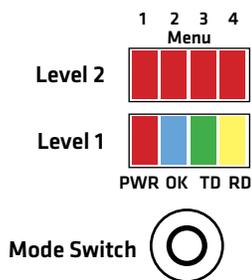
To set the switch, insert a small screwdriver into the slot and twist until the arrow is pointed at the desired number.

Front Panel Menu

The front panel of the device features a push-button and three banks of LEDs for on-device configuration and monitoring. The first bank of LEDs, labeled Channel, displays the state of the contact closure outputs and is described in the Physical Features section.

The two lower banks of LEDs, labeled Menu, and the push-button, labeled **Mode Switch**, are used for navigating through Menu mode. This section will cover how to use the menu to configure the Click 104.

The lower bank of LEDs will be referred to as Level 1 and is used in selecting menu options. The upper bank will be referred to as Level 2 and is used in configuring the menu options. Level 2 LEDs only light up when a menu selection is made using the Level 1 LEDs.



Note. The LEDs in the lower bank also function as activity/status indicators. These functions, outlined in the Physical Features section of this document, are only executed when the device is not in Menu mode. In this case, the upper bank of LEDs (Level 2) remains off.

Navigating through the Menu

The mode switch push-button is used to enter Menu mode. To use the menu:

1. Press and hold the mode switch to enter Menu mode. The Level 1 LEDs will start to light up to indicate that the device is cycling through all menu options (specifics on these menu options, and which LEDs and LED combinations represent them, will be covered later in this section).
2. Release the mode switch when you reach the desired menu option. (Pressing and holding again will resume cycling through menu options.)
3. Quickly press and release the mode switch to select the current menu option. Once it's selected, the Level 2 LEDs will start to let you configure the options for the selected menu option.

4. Press and hold the mode switch to cycle through the submenu. The Level 2 LEDs will light to indicate that the device is cycling through all configuration options (specifics on these configuration options, and which LEDs and LED combinations represent them, will be covered later in this section).
5. Release the mode switch once the desired configuration option is reached.
6. Quickly press and release the mode switch to select the current configuration option. The device will exit Menu mode, and either the selected function will run or the selected configuration will be set and saved to the device.

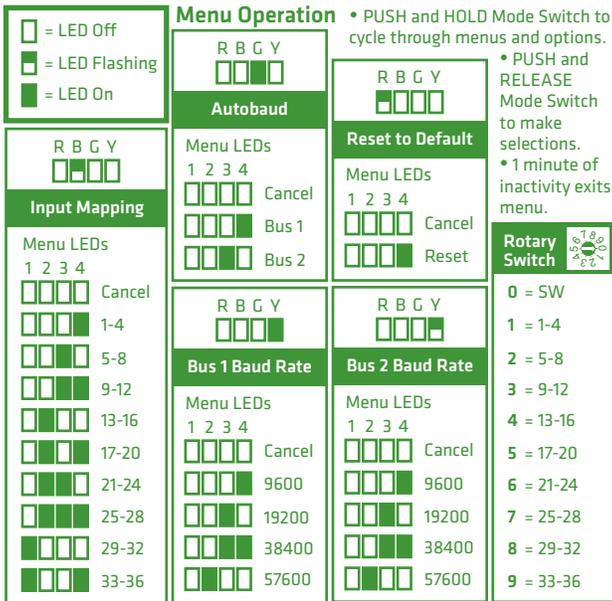
For example, the following table illustrates an example of how the mode switch and menu indicator LEDs are used in configuring the Click 104—in this case, how to autobaud bus 2.

Mode Switch Action	Display	State
None		Normal operation
Press and hold		Channel map menu option displayed
Continue holding		Autobaud menu option displayed
Release		Autobaud menu option displayed
Press and release		Autobaud menu selected and first configuration parameter displayed (bus 1 autobaud)
Press and hold		Second configuration parameter displayed (bus 2 autobaud)
Release		Second configuration parameter displayed
Press and release		Configuration parameter selected; autobaud commences (will show intermediate LED states); autobaud finishes and normal operation resumes

Inactivity of one minute on the mode switch will exit menu mode.

Front Panel Menu Options

The following figure documents the menu and configuration options available from the front panel menu. This label is also printed on the side of the device.



The menu options are displayed on the Level 1 LEDs (multicolored) and the configuration parameters are displayed on the Level 2 LEDs (all red).

Channel Input Map

The first configuration parameter that comes up when you're cycling through the front panel menu is the channel input map. To select this parameter, release the push-button when the blue LED flashes.

Note. *This parameter can also be changed using the rotary switch or Click Supervisor.*

As mentioned earlier, the Click 104 devices receive serial datagrams from a SmartSensor. These datagrams can contain many channels of detection data.

Because the devices have fewer output channels than there are possible input datagram channels received from the sensor, you must use the channel input map to map the desired inputs to outputs. The Click 104 has four outputs and therefore must be mapped to four inputs; if you need more than four channels, you'll need to use multiple devices daisy-chained together.

As shown in the table below, the outputs are mapped sequentially—that is, they can only be mapped in numerically ordered groups of four (1–4, 5–8, etc.). If you set the switch to 3, for 9–12, then input 9 would be mapped to output 1, input 10 would be mapped to output 2, input 11 would be mapped to output 3, and input 12 would be mapped to output 4.

Level 1 LEDs		Input Mapping
		Cancel and exit menu
		Channels 1–4
		Channels 5–8
		Channels 9–12
Level 2 LEDs		Channels 13–16
		Channels 17–20
		Channels 21–24
		Channels 25–28
		Channels 29–32
		Channels 33–36
		LED off
		LED on

See the earlier Navigating through the Menu and the Menu Operation Example sections for how to configure this parameter.

Because this parameter can also be set by the rotary switch, you may need to ensure that the switch is set to **0**; if it's not, the front panel menu will be able to display but not change the channel input mapping.

Autobaud

The second option that comes up when you're cycling through the front panel menu is the autobaud function. To select this option, release the push-button when the green LED comes on solid.

Note. *The autobaud function can only be accessed here, on the front panel menu.*

This function initiates an autobaud on the communication buses (you will select which bus to autobaud on the Level 2 LEDs). An autobaud will stop data reporting on the selected port and attempt to communicate with the SmartSensor at all supported baud rates.

Level 1 LEDs		Autobaud
		Cancel and exit menu
Level 2 LEDs		Autobaud on bus 1
		Autobaud on bus 2
		LED off
		LED on

See the earlier Navigating through the Menu and the Menu Operation Example sections for how to configure this parameter.

As each baud rate is attempted, the Level 2 LEDs will sequence with a single LED illuminated from LED 1–4.

If the Click 104 is successful in communicating with a SmartSensor, it will display the baud rate found, using the same Level 2 LED pattern used in selecting the baud rate (covered in the Baud Rate section of this document). After a short time of displaying the autobaud results, the menu will return to normal operation with the baud rate setting updated (and stored) to the baud rate detected during the autobaud process.

If the autobaud fails, all four Level 2 LEDs will light up for a few seconds, and then the menu will return to normal operation with the baud rate setting remaining unchanged.

Baud Rate (Bus 1 and 2)

The next two configuration parameters that come up in the front panel menu allow you to manually set the baud rate of the two communication buses. Bus 1 comes up first, with the yellow LED coming on solid, then bus 2, with the yellow LED flashing.

Note. *This parameter can also be changed using Click Supervisor.*

Level 1 LEDs	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	Baud rate for bus 1	
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	Baud rate for bus 2	
Level 2 LEDs	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Cancel and exit menu	
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	9600 bps (default)	
	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	19200 bps	
	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	38400 bps	<input type="checkbox"/> LED off
	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	57600 bps	<input checked="" type="checkbox"/> LED on

See the earlier Navigating through the Menu and the Menu Operation Example sections for how to configure this parameter.

Reset to Default Settings

The final option that comes up in the menu is Reset to Default Settings. To select this function, release the mode switch when the red LED starts flashing.

Note. *Resetting to default settings can also be done using Click Supervisor.*

This function will restore all configuration settings to factory defaults, even those parameters not configured using the front panel menu: baud rate, channel input map, description field, location field, and device ID.

Level 1 LEDs	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Reset to Default Settings	
Level 2 LEDs	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Cancel and exit menu	<input type="checkbox"/> LED off
	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	Reset to default settings	<input checked="" type="checkbox"/> LED on

See the earlier Navigating through the Menu and the Menu Operation Example sections for how to view this parameter.

After the Click 104 has reset to factory defaults, it will check the rotary switch; if it is set to any option besides 0, that channel input mapping will be applied. If resetting to factory defaults doesn't reset the channel input mapping, check the rotary switch to see if it's affecting this setting.

Click Supervisor

Click Supervisor is the only way to configure non-data path type parameters such as the description, location, and device ID. See the knowledge base article *0514 Installing and Using Click Supervisor* for instructions on how to download and install Click Supervisor and how to connect to your device using the software.

Note. *Some of the parameters mentioned below can only be configured in Click Supervisor. Others can be*

configured by the front panel menu and/or the rotary switch. If the rotary switch has been used to configure the channel input mapping, that parameter is considered to be in Hardware mode; it will be grayed out in Click Supervisor, meaning you can view but not change the setting. If you would like to set it using Click Supervisor, you will have to turn the rotary switch to 0.

The Click 104 can be configured using the Expert driver (see the figure below).



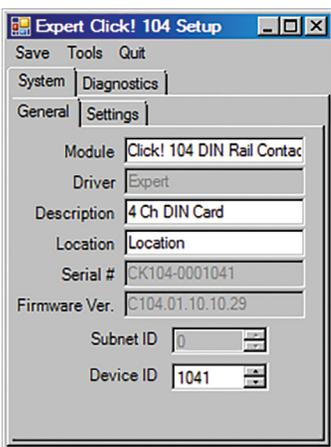
After you have made configuration changes on the driver and saved it to the Click device, the word “current” will appear after it to indicate the driver is currently loaded onto the device.

The Backups option can be used to read configurations that have previously been saved to file.

Expert Driver

The Expert driver contains two tabs, System and Diagnostics; the System tab is then subdivided further.

The System > **General** tab lets you change general information about your device. The tab has the following parameters:

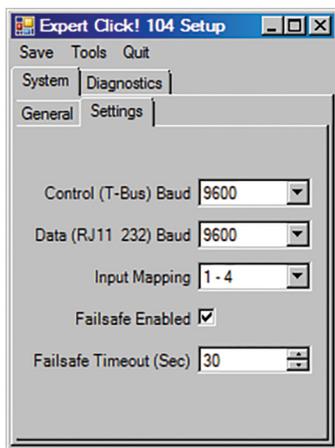


Note. These parameters can only be configured using Click Supervisor.

Setting	Description
Module	Allows you to enter a name and description of the device.
Driver	Names the driver you are currently working with.

Description	Shows a description of the device being configured. This is only for your information and does not affect the operation of the device.
Location	Displays the location of the device being configured. This is only for your information and does not affect the operation of the device.
Serial Number	Displays the serial number of your device. This information cannot be changed.
Firmware Version	Shows the version of firmware your device currently has installed. If Click Supervisor detects a discrepancy between this version and the most current version it currently has access to, you will be prompted to upgrade when you connect to the device. This information cannot be changed.
Subnet ID	Shows the subnet ID number. This option is currently not available.
Device ID	Gives the ID number of the device being configured, which is used to identify the device when you are connecting to it. By default, this number is the last five digits of the serial number, which can be found under the About tab or on the barcode sticker on the bottom of the device. It is recommended that you do not change this number unless another device on your network has the same ID number.

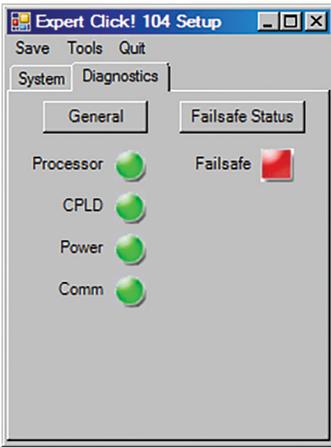
The System > **Settings** tab lets you configure and view many of the parameters that are also available elsewhere on the device. The tab has the following parameters (see the figures below):



Note. These parameters can also be configured using the front panel menu. Also, channel input mapping can be set using the rotary switch; if the rotary switch is set to anything but 0, the input mapping drop-down will appear grayed out on this screen.

Setting	Description
Control (T-Bus) Baud	Lets you change the baud rate, in bps, of the control bus (bus 2).
Data (RJ11 _232) Baud	Lets you change the baud rate, in bps, of the data bus (bus 1).
Input Mapping	Lets you assign input datagram channels received from the sensor to the two or four output channels on the device. The outputs are mapped sequentially—that is, they can only be mapped in numerically ordered groups of four. See Input Mapping in either the Rotary Switch or Front Panel Menu sections in this document for more information.
Failsafe Enabled	Turns on and off fail-safe mode. For more information on what this mode is, see the Fail-safe Mode section earlier in this document.
Failsafe Timeout (Sec)	Lets you select what length of time, in seconds, the device can go without receiving datagrams describing the device’s channels before it goes into fail-safe mode. The default is 10 seconds.

Under the Diagnostics tab, you can run diagnostics on your device (see the figure below).



Click the **General** button to run diagnostics on the items listed below the button. If a problem is detected, the program will display a red square next to the item in question. If no problems are detected, a green circle will appear.

Click **Failsafe Status** to check whether any of the channels are in fail-safe mode. If a fail-safe condition is detected, a red square will be displayed below the button. If no problems are detected, a green circle will appear.

Once you have finished, use the menu bar at the top of the screen to save your settings, return to the Select Driver screen, and more.

- The **Save** menu allows you to save your settings. Select **Save to File** to save your settings to a file. Selecting this will open a directory box, allowing you to name your settings file. This file will always be saved in the Wavetronix folder created when you installed Click Supervisor, under Wavetronix > ClickHome > Drivers > 104 > User. You can also select **Save to Device** to save your settings to your Click 104.

Note. *If you do not save your settings to your Click 104, they will be lost the next time you power the device down.*

- The **Tools** menu contains five options for working with your device. **Reset > System** power cycles your device, while **Reset > Factory Default** restores your device to the settings with which it was shipped. Restore will restore the driver to the settings currently saved on the Click 104, erasing any unsaved changes. **Upgrade** can be used to manually upgrade to the most current firmware for your device. **Hex View** changes the view of certain settings in the driver to hexadecimal.
- Clicking the **Quit** menu exits the driver and returns you to the Click Supervisor main page.

Once you have finished, click **Save** on the menu bar to save your settings.