VLX Series - Programming Quickstart Guide

Protocol v1.0.5 and greater - Full protocol guide available at http://portal.auroramultimedia.com

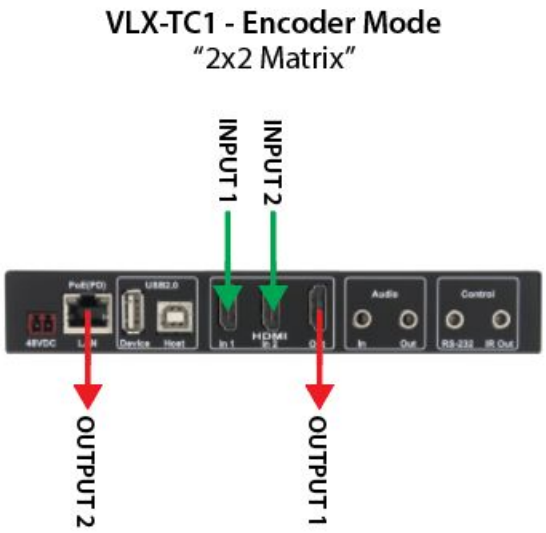
Purpose

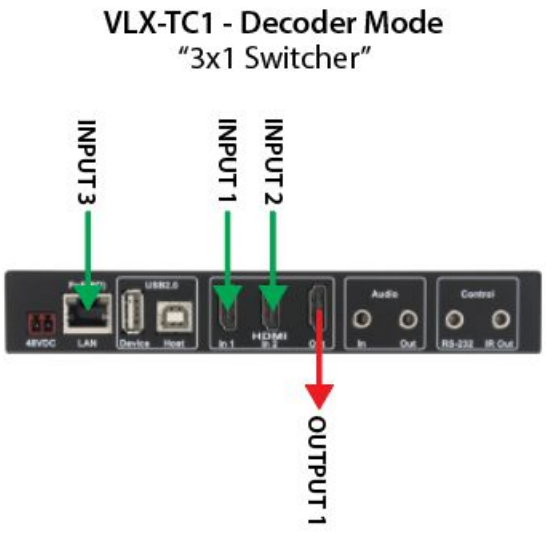
This document provides a quick introduction to controlling the Aurora VLX Series AV over IP transceivers. It will explain the most commonly used commands for routing video and utilizing the serial and IR ports on the VLX, as well as video wall configuration. This document is not intended to replace the full protocol guide, you should review all available commands in that document.

General Notes

All commands sent to control a VLX must be followed with a carriage return (hexadecimal 0D). In this document, we will refer to a carriage return as follows: `<cr>`

Each VLX unit has 2 HDMI input ports and 1 HDMI output port. These are always available and active, regardless of whether the unit is in encoder or decoder mode. Encoders have an additional stream output, and the decoders have an additional stream input. Think of a single encoder as a 2x2 matrix switcher, and a single decoder as a 3x1 switcher.





As a system, VLX performs the same essential routing functionality as a matrix switcher (plus so much more), but without the constraint of a fixed number of inputs and outputs, and without a centralized architecture.

VLX Video Control Commands

Routing commands (and all other VLX control commands) are sent via a Telnet connection to the VLX unit that you are controlling, port **6970**. Further details on the Telnet connection and the response from the VLX can be found in the full protocol guide.

There are 3 main commands that pertain to video/audio routing on the VLX:

- Set Local Display Source

Command	`set local_display_source {"IN_PORT1" | "IN_PORT2" | "STREAM"}<cr>`
Applies to	Encoders and Decoders (Note: the `STREAM` parameter only applies to decoders)
Description	This command selects the source for the HDMI output of the device. For an encoder, the available options are HDMI inputs 1 and 2 (parameters `IN_PORT1` and `IN_PORT2`, respectively). For a decoder, the available options are HDMI inputs 1 and 2, and also the streaming input (parameters `IN_PORT1`, `IN_PORT2`, and `STREAM`, respectively). In order for the streaming input to show video, you must also join an active stream. See the `JOIN` command below
Parameters	**`IN_PORT1`** selects HDMI in 1 as the source for HDMI out **`IN_PORT2`** selects HDMI in 2 as the source for HDMI out **`STREAM`** selects the stream input as the source for HDMI out (decoder only)

Example(s)	`set local_display_source IN_PORT1<cr>`
	`set local_display_source IN_PORT2<cr>`
	`set local_display_source STREAM<cr>`

- Set Stream Source

Command	`set stream_source {"IN_PORT1" | "IN_PORT2"}<cr>`
Applies to	Encoders
Description	This command selects the source for the streaming output of the device. The available options are HDMI inputs 1 and 2 (parameters `IN_PORT1` and `IN_PORT2`, respectively).
Parameters	**`IN_PORT1`** selects HDMI in 1 as the source for stream out (VGA for Wall Plate) **`IN_PORT2`** selects HDMI in 2 as the source for stream out
Example(s)	`set stream_source IN_PORT1<cr>` `set stream_source IN_PORT2<cr>`

- Join

Command	`join HDMI {device_id} ["display"]<cr>`
Applies to	Decoders
Description	This command is used to subscribe one or more VLX decoder units to a specific VLX encoder stream. For video to display, the appropriate HDMI input must be selected as the stream source on the encoder (see *Set Stream Source* above). Also, the streaming input on the decoder must be selected as the local display source (see *Set Local Display Source* above, also see **`display`** parameter below).
Parameters	**`device_id`** the VLX device ID (see below for details) **`display`** optional argument. If this argument is specified the decoder will automatically select the local display source as STREAM
Example(s)	`join HDMI vlx-series-enc-1234 display<cr>`

The **`device_id`** parameter is comprised of the following parts:

1	2	3
[host-name]	"-enc-"	[host-id]

1) [host-name] is a user-definable string that can be set in the VLX web pages
    a) vlx-series is the default value
2) "-enc-" is a fixed string that is appended to the host name
    a) -enc- is the default value for an encoder
    b) -dec- is the default value for a decoder (decoder IDs do not pertain to the join command)
3) [host-id] is a user definable 4 digit number that can be set in the VLX web pages
    a) The last 4 digits of the VLX serial number are the default value
    b) A benefit to keeping the default value is it makes identifying a physical unit simpler, based on its serial number
    c) Another good option is to set the last 4 digits to the last octet of the unit IP address (example, IP 192.168.1.38 > ID 0038)

Example - a factory default encoder ending in serial number 1234 would have the following **`device_id`**:

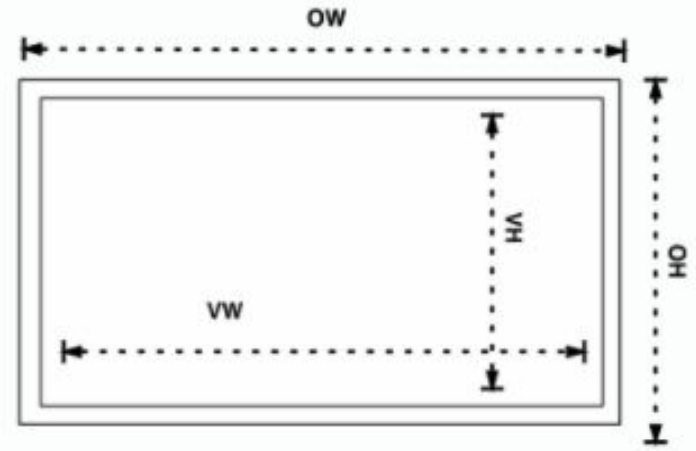
`vlx-series-enc-1234`

- Set Video Wall

Command	`set vwall {"ENABLE" | "DISABLE"} {wall_size: max_row max_col} {position_index: row_id col_id} {bezel: view_width overall_width view_height overall_height}<cr>`
Applies to	Decoders
Description	This command sets the display mode and video output parameters of a decoder in video wall configuration.
Parameters	The first argument must be one of the following strings. • **ENABLE** • **DISABLE** If first argument is **DISABLE**, then the rest of the arguments must not be specified. **wall_size** specifies video wall size. • **max_row** is total no of rows. It can take values from 1 to 8. • **max_col** is total no of columns. It can take values from 1 to 16 **position_index** specifies the position of decoder in video wall configuration • **row_id** is the index of row in which decoder is located. This value can vary from 1 to max_row. • **col_id** is the index of column in which decoder is located. This value can vary from 1 to max_col. **bezel** specifies bezel and gap compensation in millimeters. View height should be smaller than over all height and view width should be smaller than overall width. If bezel and gap compensation is not to be specified all the four arguments should be set to 1. **Bezel Param Order (see graphic below - VW OW VH OH):** `<Video Width> <Overall Width> <Video Height> <Overall Height>`

Example(s)	`set vwall ENABLE wall_size: 3 3 position_index: 1 2 bezel: 1600 1602 900 902<cr>`
	
	`set vwall ENABLE wall_size: 2 2 position_index: 1 1 bezel: 1 1 1 1<cr>`
	
	`set vwall DISABLE<cr>`

NOTE: To assist with video wall setup, there is a simple utility available at the link below that will generate the Telnet command strings to control your VLX video wall from a control system:
http://auroramm.com/tools/vlx/videowall/



Receiving Feedback from the VLX

VLX supports feedback via 2 methods - polling and push.

Polling supports a variety of feedback responses using the GET command. For more information on the GET command and responses, please see the full protocol guide available at: http://portal.auroramultimedia.com

Push notifications will send data back to any connected Telnet client on port 6970 when certain events are triggered. The table below shows the types of events, and sample data

Sense Detect	`{"status":"EVENT","device_id":"vlx-series-dec-0018","event_type":"sense_detect","event_details":{"port":"IN_PORT1","value":"plugged"}}`
	
	`{"status":"EVENT","device_id":"vlx-series-dec-0018","event_type":"sense_detect","event_details":{"port":"IN_PORT2","value":"unplugged"}}`

Hotplug Detect	`{"status":"EVENT","device_id":"vlx-series-dec-0018","event_type":"hotplug_detect","event_details":{"port":"OUT_PORT1","value":"plugged"}}`
	
	`{"status":"EVENT","device_id":"vlx-series-enc-0004","event_type":"hotplug_detect","event_details":{"port":"OUT_PORT1","value":"unplugged"}}`

Source Switch	`{"status":"EVENT","device_id":"vlx-series-enc-0004","event_type":"source_switch","event_details":{"source_type":"local_dsiplay","value":"IN_PORT1"}}`
	
	`{"status":"EVENT","device_id":"vlx-series-dec-0018","event_type":"source_switch","event_details":{"source_type":"stream","value":"IN_PORT1"}}`

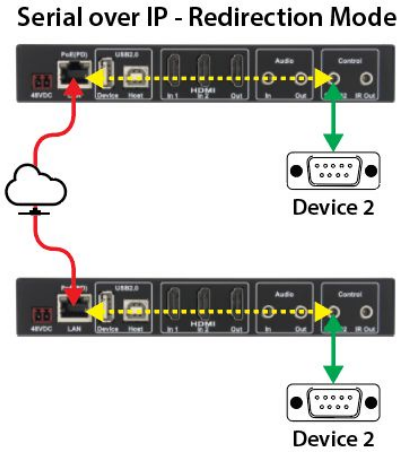
Sending and Receiving RS-232 Data from the VLX Serial Port

There are 2 operation modes of Serial over IP on the VLX, redirection mode and Telnet mode:

NOTE: *Prior to using Serial over IP, it must first be enabled, see next page.*

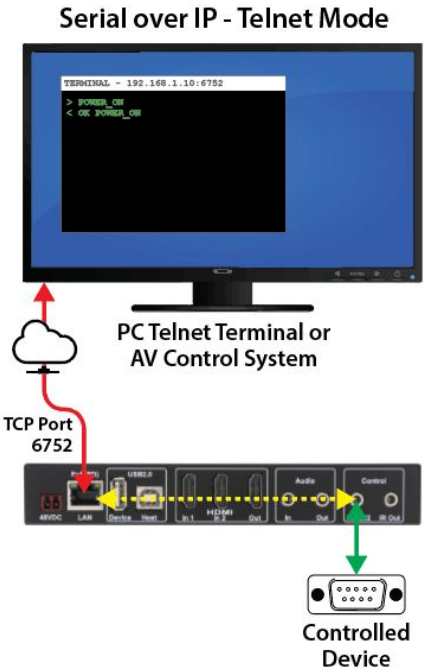
Redirection Mode

This mode allows you to link VLX serial ports over IP, allowing serial data received on one VLX unit to transmit from the serial port on another VLX unit. This can be routed independently from video and audio, the serial redirection is configured using the web setup pages of the VLX.

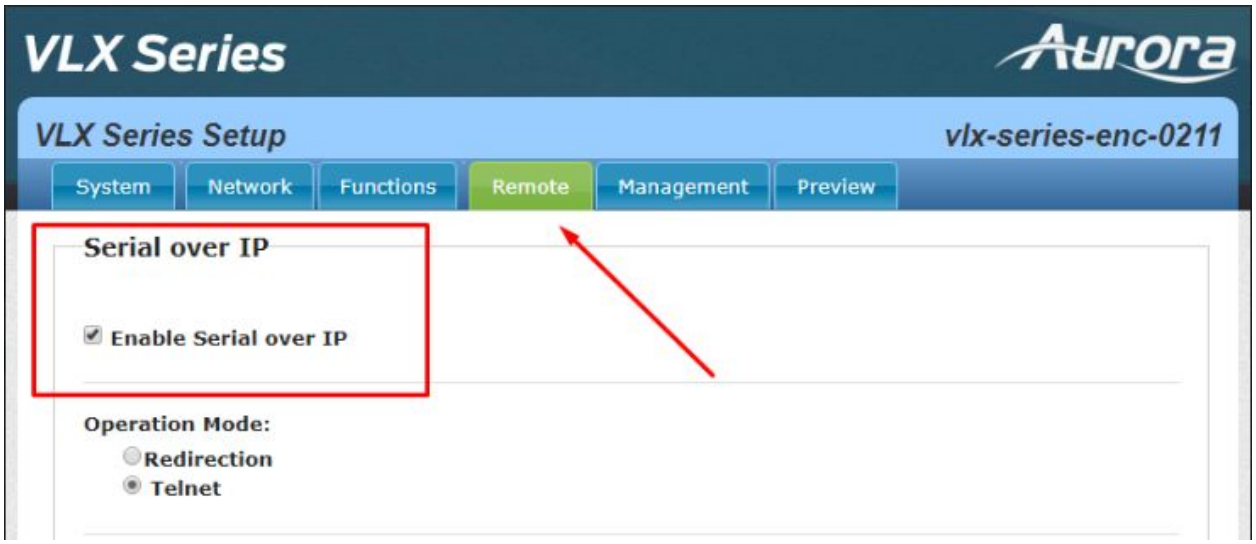


Telnet Mode

Sending and receiving RS-232 data from a VLX transceiver is a simple as opening a Telnet connection to port **6752**. This could be done from a computer Telnet client (such as Putty or Hercules), or from an AV control system. Once connected, any data transmitted to the VLX via Telnet will transmit out the VLX serial port. Likewise, any data received on the VLX serial port will show as received data in your Telnet client.



Serial data being sent via 6752 follows standard formatting. Examples:
Hello World%0d (For Aurora QX Series controllers)
Hello World\x0d (For Crestron)

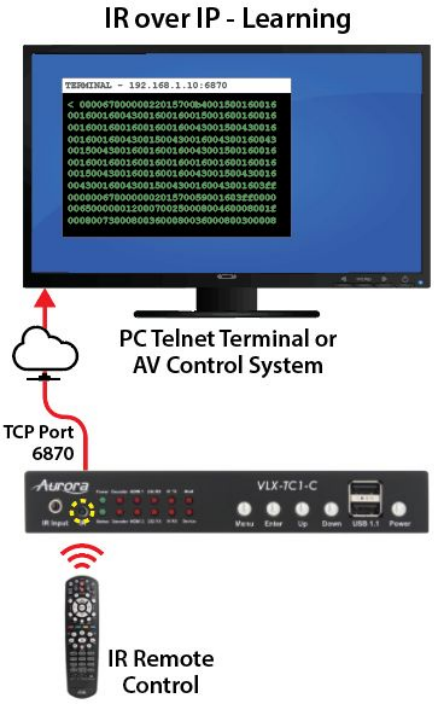


NOTE: *Prior to using Serial over IP, it must first be enabled on each VLX unit, either programmatically or by using the web setup pages. You will also need to set the operation mode and port baud rate settings. See the VLX User's Guide and the full VLX Protocol Guide for additional information.*

Sending and Receiving IR Data from the VLX IR Port

Much like the serial port, the VLX uses a Telnet connection to send data directly to the VLX IR port, and to receive data from the VLX IR receiver. To send and receive data, connect via Telnet to port **6870**. IR data is transmitted and received in the Philips Pronto format.

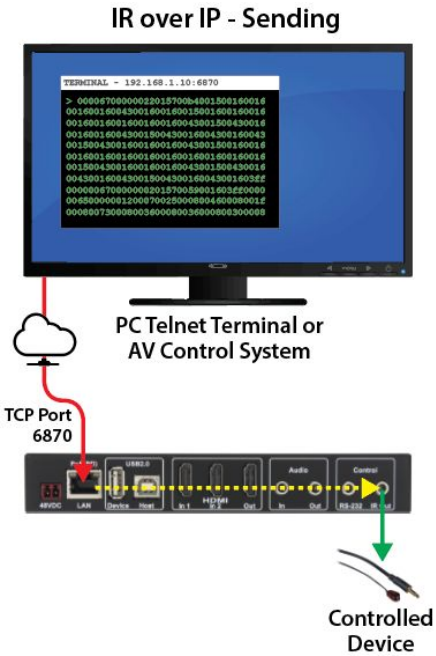
For more details, see this **KB article**.



Receiving IR Data from an IR Remote

Open a Telnet client on your PC and connect to the VLX IP, port 6870. Aim the remote at the IR receiver window on the front of the VLX unit. Quickly tap the IR button you want to learn, you should see the received hexadecimal data in your terminal window. Copy the received data, and store for later.

NOTE: Any carriage return/line feed (0x0D/0x0A) observed in the incoming data in your Telnet terminal program needs to be included when sending IR commands from the terminal or from an external control system. Also, all IR commands are terminated with a carriage return + line feed.



Sending IR Commands

To send IR commands, copy the previously stored data strings into your Telnet terminal and send them to the VLX IP, port 6870. The previously learned command should transmit out the connected IR emitter.

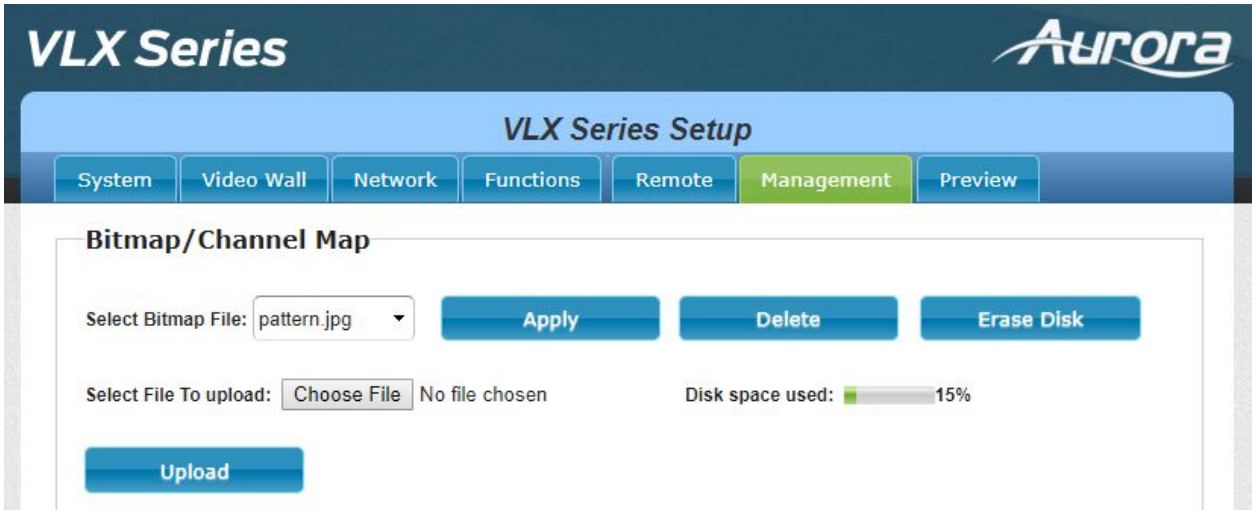
Using Custom ‘No Signal’ Graphics

The VLX contains a ‘No Signal’ image, which will display when the input signal is lost. This graphic can be replaced with a custom graphic. This feature is often used to include the client and/or integrator logo on the VLX when no signal is present.

To create a custom graphic, use a graphic editing tool to create a JPEG image. The image resolutions will typically either be 1920x1080px (1080p), or 3840x2160px (UHD 4K).

Once saved in JPEG format, navigate to the *Management* tab on the web setup page of the VLX decoder. Under *Bitmap/Channel Map*, press the *Choose file* button, then select and upload your custom graphic. Once uploaded, select the new file from the *Select Bitmap File* dropdown menu, and press apply. On this page, you can also delete files, view the disk space used, and erase the bitmap/channel map storage disk.

NOTE: When the No Signal screen is showing on the screen, there is some small information text in the lower corners which can be helpful for diagnostics. This text is white, and will be overlaid over any graphic. Using a light or white background in this region may make the debug text unreadable.



Channel Mapping

Channel mapping is a feature that allows you to assign VLX streams to a virtual channel, much like a TV tuner. Once enabled, you can use the channel up/down buttons on the Aurora IRC-11 IR remote control, or the Phillips 10054 remote code from a universal remote control to change streams. You can also optionally enable the up/down front panel buttons of the VLX-TC1 to use this feature. This provides a simple and familiar alternative method of control for certain applications.

To use channel mapping, You will need to create a simple CSV file to define the mapping. This can be done using a text editor like Notepad. The file starts with the header row *ChNo,ChName,HostName,HostID.* The second, and subsequent lines will contain the actual definitions of the channels.

- ChNo[1] (channel number) - The virtual channel number of the stream, like a TV tuner
- ChName (channel name) - The virtual name of the stream, as displayed on the OSD
- HostName[2] - The host name of the VLX encoder to be assigned to this virtual channel
- HostID[2] - The host ID of the VLX encoder to be assigned to the virtual channel

[1] Channel numbers must be sequential, starting with 0 (zero).
[2] For more info on host name and host ID, see the 'join command' section above, on page 3.

After you create and save your file, navigate to the *Management* tab on the VLX decoder web setup pages. Under *Bitmap/Channel Map*, press the *Choose file* button, then select and upload your CSV file. Then, press the upload button.

NOTE: When opening or editing the channel mapping CSV file in a spreadsheet editor like Excel, it may format the device IDs as numbers, automatically removing the leading zeros. You must format the HostID column as text to prevent automatic number formatting.

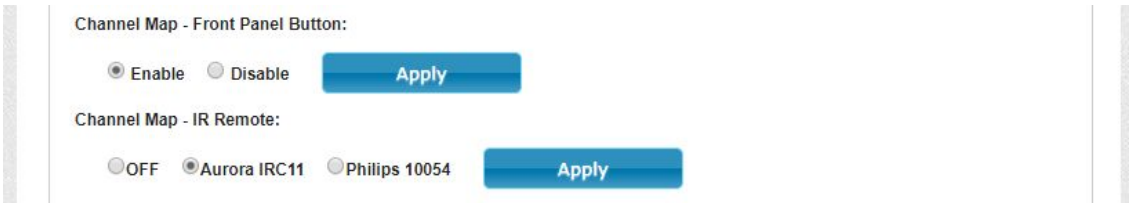
	A	B	C	D
1	ChNo	ChName	HostName	HostID
2	0	Laptop	vlx-series	231
3	1	Desktop	vlx-series	133
4	2	Mac	vlx-series	89

Incorrectly formatted HostID (Excel default)

	A	B	C	D
1	ChNo	ChName	HostName	HostID
2	0	Laptop	vlx-series	0231
3	1	Desktop	vlx-series	0133
4	2	Mac	vlx-series	0089

Correctly formatted HostID (column formatting set to 'text')

To enable channel mapping to the IR remote control buttons and VLX front panel buttons, enable the appropriate options in the web setup pages.



Procedure for Factory Reset

(FW Version >= 3.2.0)

In the rare event that a VLX unit requires factory reset, the following steps should be performed to recover the unit.

1. Reset to factory defaults
After loading the board into secondary, the device should be reset to Factory default by button combination given below.

Steps for resetting the device to factory default: Box version.

- Press and hold Power and Menu button till reboot.

Steps for resetting the device to factory default: Wall Plate

- Press IN2 and STREAM button till LEDs turn on white for a second. Release the buttons once the LED turns on(white).

After resetting the device, the board should boot normally.

2. Low level reset
Steps for Box version devices (VLX-TC1)

- Power off the device.
- Press and hold Power and Down button, then power up the device.
- Hold the key combination for 5 sec.

The host and device LED will keep blinking if the board is successfully booted to secondary.

Steps for Wall Plate devices (VLX-TCW3H, VLX-TCW3V)

- Power off the device.
- Press and hold IN1 and IN2 button, then power up the device.
- Hold the key combination for 5 sec.

The IN1 and IN2 LED will be Red color if the board is successfully booted to secondary.