

Converging Systems Class 2 (low voltage) wiring Overview

FLLA Wiring and System Topology Design

Overview:

Converging Systems has a full range of Linear LED elements referred to as **Flexible Linear Lighting Arrays** (FLLA). These are available as monochrome (various color temperatures), as well as tri-colored/RGB, and full color/tunable white derivatives. All FLLA SKUs come with two factory attached leader cable (one on each end of each factory shipped 5m (16.4') roll) See [Figure 1](#) for the factory attachment configuration and [Figure 2](#) for the flying leads that exist at the end of each leader cable. From time-to-time dealers need to either shorten the strips or extend the strips. In addition to good summary information on how to connect FLLA devices to ILC-xx0 controllers, additional information is provided on all other Class 2 wiring requirements for a recommended systems configuration within this document.

Attachment point for each "leader cable)



Figure 1

Flying lead from each attached leader cable



Figure 2

Cutting FLLA strips. Generally, every 4 inches is a cut point indicated by bright copper pads (2, 4 or 5 pads at every cut point). A decision is needed to be made where on that copper pad the precise cut will be made.

If the downstream piece will need to be reused. It is important to cut it exactly in the middle of the copper pad.

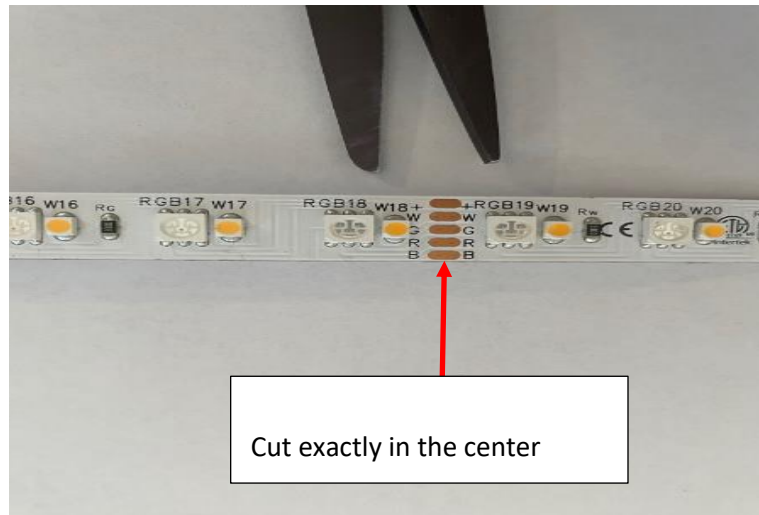


Figure 3

If the downstream piece will be discarded. In order to ease soldering, you can leave as much of the pad intact and just cut at the tail end of the pad,

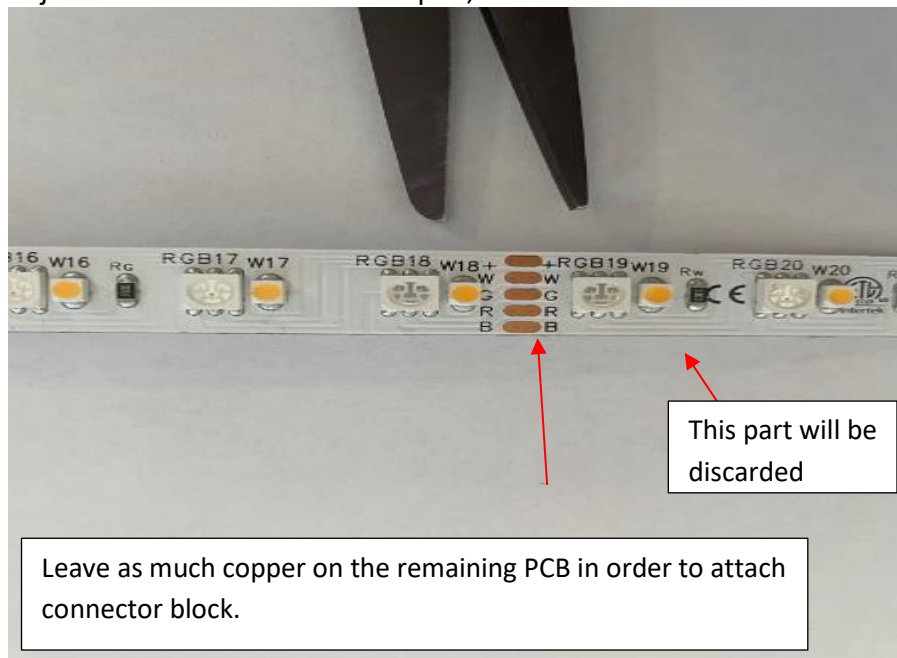


Figure 4

Soldering Connector Blocks. See figure below. Prepare the bare copper with solder flux and carefully solder the FLLA Extension Header Module (**EHM**) onto the exposed copper pads. The concept is that after the **EHM** is soldered to the bare pads, and extension cable can be easily plugged in and removed without impacting the newly prepared FLLA strip with EHM already soldered.

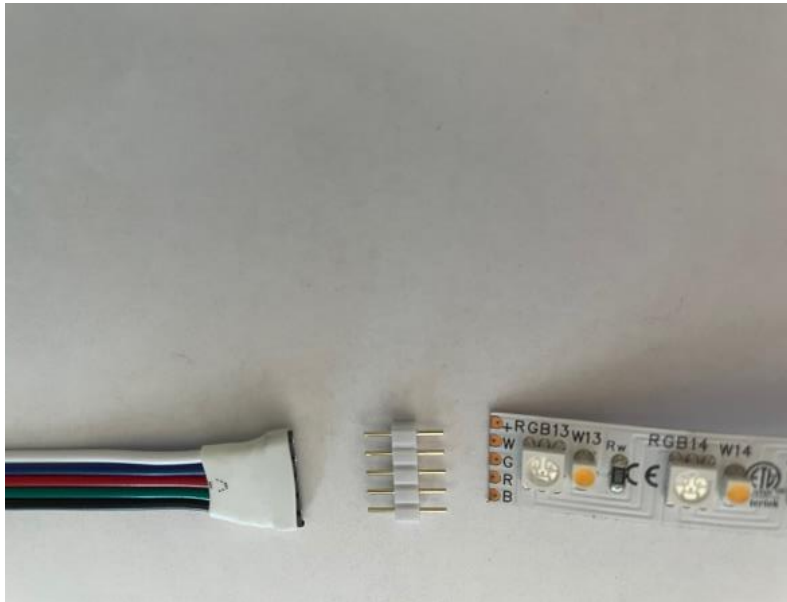


Figure 5

Once soldered to the FLLA PCB, the **EHM** will physically be attached as per the below figure.

Note: the Extension Cable may have different color codes than the FLLA strip. Commonly, the following Extension Cable may be supplied for RGBW FLLA strips. Pay attention to color codes below.

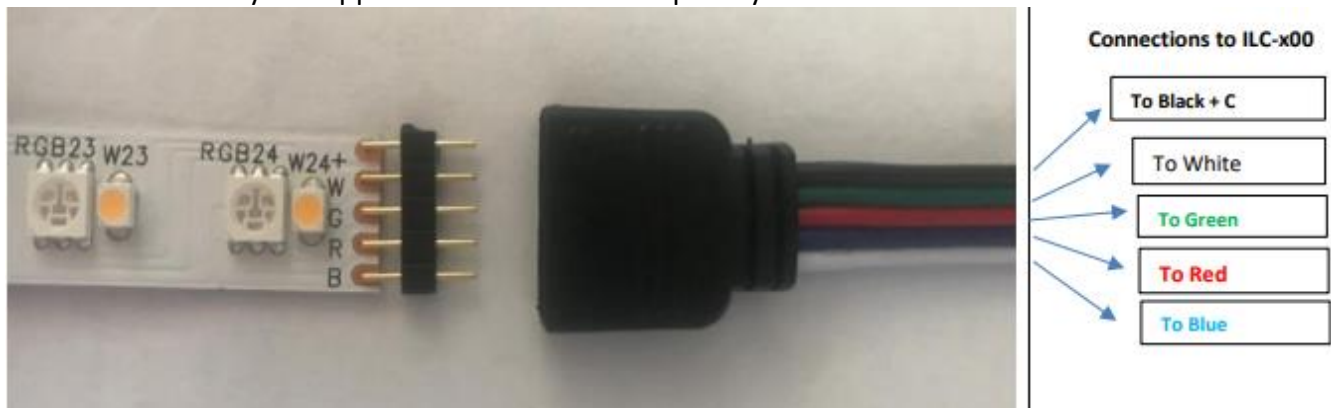


Figure 6

Note: The leader cables that come with the FLLA RGBW linear strips have color codes on the wires that exactly match the relevant colors that are controlled by each wire. These colors and their use are as follows: -Black (common + anode typically 24vdc) -White (negative/cathode white) -Green (negative/cathode green) -Red (negative/cathode red) -Blue (negative/cathode blue) In the event that you need to cut a FLLA cable and provide a non-factory attached leader cable, you may receive a leader cable that has color wires from the male plug that do

not match the ordering of the copper pads on the FLLA strip. You can use the provided leader cable but when connecting the flying leads of the leader cable running to your ILC-x00 controller, simply obey the marking on the PCB rather than the colors on the flying leads on most supplied leader cables. The remapping table below can be used to print out and connect to the flying leads if desired to avoid any miswirings.

Corner Issues. Several solutions exist for 90 degree and other types of corners.

Type HC (hard corner). See figure below. An [EHM](#) can be soldered to the two pieces that will plug into the HD.



Figure 7

Type FC (flexible corner). For situations where the HC will not work (lengths are wrong, angles are wrong, use the FC instead. Consult the factory for availability here.



Figure 8

DIN Housings/Suggested Installation for Consolidated Operation (everything in one box). Converging Systems is a big fan of DIN Mounting boxes. This may give you some ideas of how your installation might look (for larger installations).

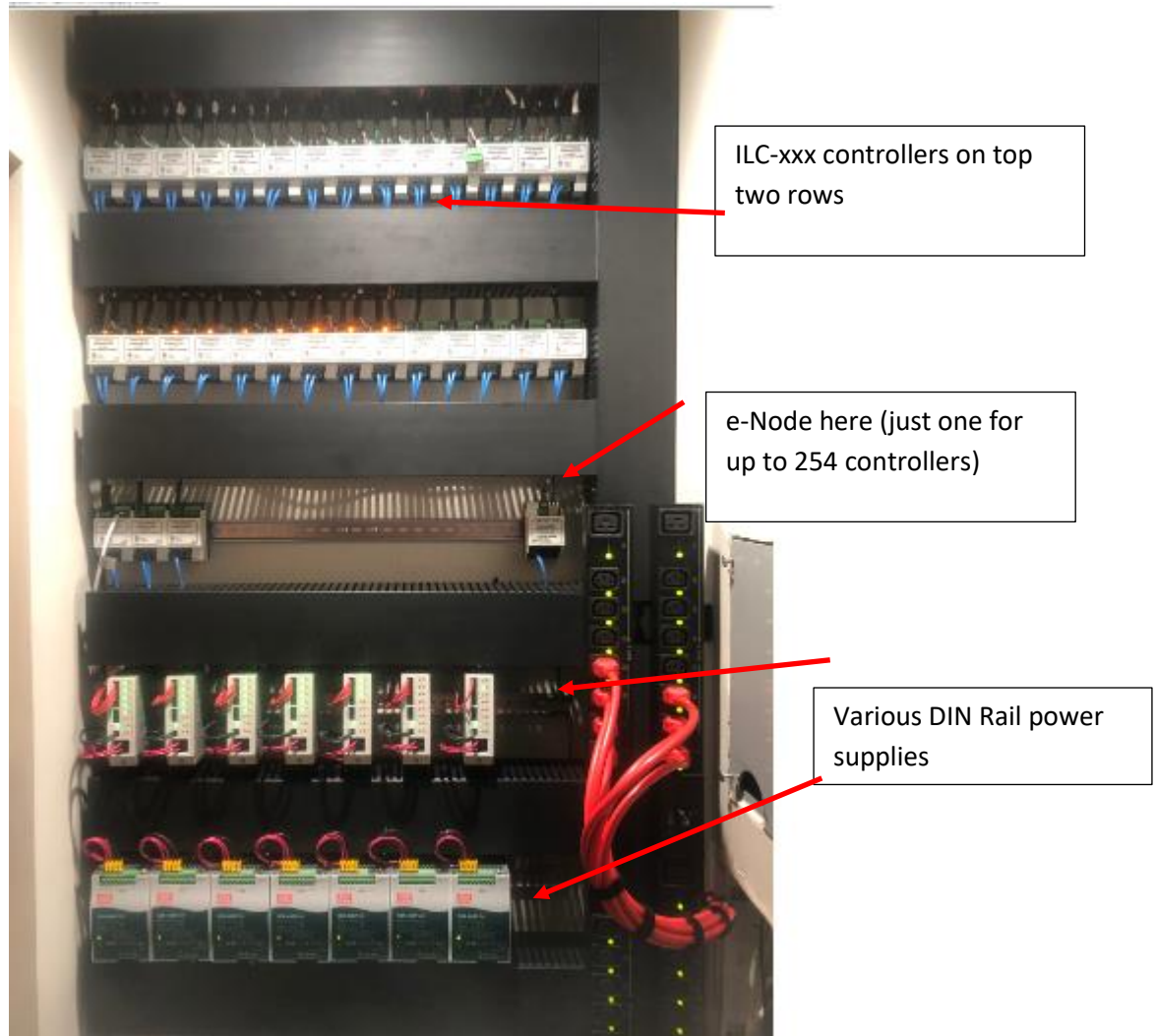


Figure 9

Distributed Configuration (controllers spread out around the systems—closer to the load). There may be situations where the wire runs to the FLLA strips may be too long or there is not the option for a centralized DIN mounting box. In this case controllers can be distributed where needed (up to 4000 feet from the location of the e-Node). The following image may give you some good ideas for how your installation might look here.

WIP Image

Figure 10

Class 2 Wire Selection (for running output of ILC-xx0 controllers to FLLA devices). The distance to the FLLA devices and the current load of connected FLLA devices determines the gauge of wire to be used between the ILC-xxx controllers and the specific FLLA strips. Consult this link for more information.

https://www.convergingsystems.com/bin/doc/cable_length_DD.pdf

Class 2 Connections from Class 2 wiring to actual ILC-xx0 controllers. Converging Systems manufactures a range of ILC-xx0 controller with output capability for monochrome, bi-white, 3-color and 4-color devices. Please consult the ILC-xx0 Family [document](#) for specific wiring instructions. As an example, however, please find below the wiring for an ILC-400 (for RGBW devices). Here one or more FLLA strips can be attached to this 5-pin connector using the wire specified in the previous section. Since in general the wattage requirements for a 5m FLLA strip are often less than the rated output of an ILC-xx0 controller, additional home runs of wire back to the [below connector](#) are possible to optimize the utilization of each ILC-xx0 controller (and save money). Alternatively, one single run could be provided from the ILC-xx0 controller and then branches could be made to drive FLLA strips (provided that no more than 5m/16.4' of FLLA strips are connected to any single drop point).

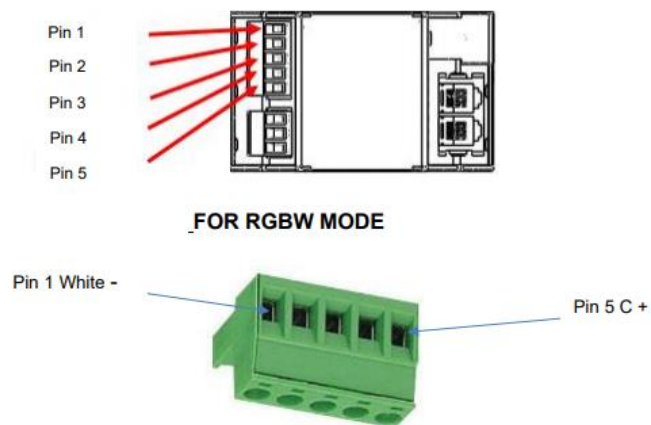


Figure 11

CS-BUS (Communication) Wiring Issues. CS-Bus connections between the e-Node and downstream ILC-xx0 controllers utilize CAT5 or better cabling (with the browns cut). See wiring diagram below.

NOTE: Do not use a 568A or 568B configuration and cut the browns for the twisted pairs will be inconsistent with our requirement.

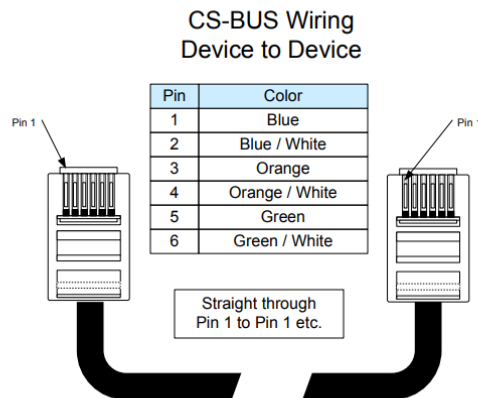


Figure 12

System Wiring Topology. Although there are hundreds of different possibilities for wiring and systems setup, this [Figure](#) below summarizes the above onto one simple drawing.

Legend

Cyan Wires—Network Cat5 or better connecting e-Node to network switch

Red Wires—Class 2 wiring running from power supplies to power input on ILC-xx0 controllers (size the gauge of wire for the amperage draw of the controllers (4.12 amps @24vdc))

Black Wires- [CS-Bus](#) communication wire (Cat5or better)

Green Wires-Class 2 output wires described under [Wire Selection](#).

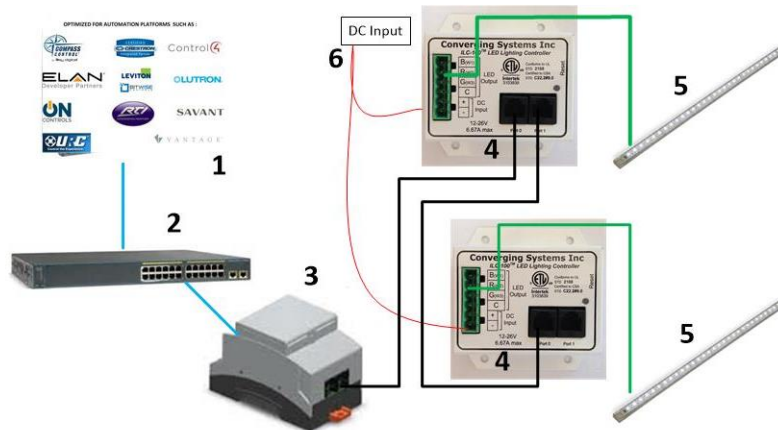


Figure 13