1. Features:



- 5V to 24V Power Supply Input Range
  - 12V Automotive Optimized
  - Auto-Shutdown
  - Ultra low power in sleep mode
- iOS, Android, and Desktop App
- 2 Power Output Switches (12V)
  - Up to 3.5A per Output
- 8 Voltage Input Triggers
  - 5V to 24V Compatible Inputs
  - Assign functions in software
- Up to 6 LED Output Data Channels
  - Control up to 6 Separate LED strings or any type. ~1200 LEDs Total
- Audio Line-Level Input
  - LEDs triggered from music
- Compatible with many addressable LED standards
  - WS2811/WS2812/SK6812, etc
  - RGB,RGBW, etc
- External Connectivity
  - WIFI
  - CANBus
- Automotive Rated Components
- Compact Robust Enclosure:
  - Water-Resistant IP67 Rated
  - 5.26” x 4.58” x 1.43”
- Designed, Assembled & Tested in USA

2. Applications:

- Aftermarket Automotive Lighting
- Outdoor LED Displays
- Multi-Channel Interactive Art Installation

3. Description:

The GlowCraft LED controller by Current Electric Labs is a versatile and powerful device for creating stunning addressable LED creations.

GlowCraft is a compact and robust device that can natively control up to about 6000 addressable LED pixels. With 6 separate data output channels, your system can simultaneously mix and match any of the popular standards, such as WS2811/WS2812/SK6812/etc with both RGB and RGBW. The 8 user assignable 5-24V input channels can be used to interface with standard automotive triggers like Brake, Turn Signal, Reverse, etc or buttons and switches for real time interactive functionality. Trigger functionality can be extended by using the built-in CANBus interface, and multiple GlowCraft controllers can be synchronized to create a distributed network of GlowCraft controllers..

With both iOS and Android app support you can connect to your GlowCraft, trigger show modes, and work on your lights on the go. The GlowCraft Designer Desktop app makes setup easy.

The GlowCraft controller uses automotive standard DTM connectors and has a wide input voltage range of 5V to 24V, making it suitable for various power sources, specifically targeting 12V automotive systems. The ultra low current during sleep mode of only 0.4mA won't drain your battery, and the internal 12V supply monitor can alert you if your battery is getting low. GlowCraft has two built-in switchable 12V power outputs that can drive up to 3.5A per output to conveniently provide pass-through 12V power for use as battery saver enable or driving light 12V loads. The 12V power outputs are internally protected against short circuits and can be controlled through show animators to dynamically switch loads within your shows.

Primary connectivity with the GlowCraft Controller is through a standard WIFI connection and web browser. Additional connectivity options include CANBus.

Designed to withstand harsh environments, the housing comes standard with IP67 water-resistance and automotive rated components and industry standard DTM automotive connectors. Pre-assembled pig-tail connector mates are available. Whether you want to create a dazzling light show for your car, home, or stage, the GlowCraft Controller is the perfect device for you.

4. PRODUCT DISCLAIMER:

IMPORTANT — READ BEFORE INSTALLATION OR USE

USE THIS PRODUCT WITH EXTREME CAUTION. MISUSE AND/OR IMPROPER INSTALLATION CAN CAUSE SIGNIFICANT DAMAGE TO YOUR VEHICLE AND PROPERTY BELONGING TO YOU OR OTHERS, AS WELL AS PERSONAL INJURY OR DEATH.

4.1. INTENDED USE

This product is intended exclusively for lawful aftermarket automotive applications.

4.2. RESTRICTED OPERATIONAL MODES

Certain operational modes and features, including but not limited to color-changing effects, strobe or flashing patterns, and high-intensity auxiliary outputs, are strictly intended for off-road, track, racing, or show use only, or where expressly permitted by applicable law.

4.3. OEM & Regulatory Disclaimer

This product is not OEM-approved by any vehicle manufacturer. This product is not certified, approved, or warranted for compliance with DOT, FMVSS, SAE, or any other applicable on-road vehicle lighting regulations in any jurisdiction.

4.4. USER RESPONSIBILITY AND ASSUMPTION OF RISK

The user is solely responsible and assumes all risk for ensuring that the purchase, installation, and use of this product comply with all applicable federal, state, and local laws and regulations, which vary by jurisdiction.

4.5. NO RELIANCE

The user acknowledges that they are not relying on any representation, statement, or omission by Current Electric Labs regarding legality, safety, performance, installation results,

compatibility, or behavior of the product, including but not limited to marketing materials, documentation, installation guidance, software, or firmware, and assumes all responsibility for determining appropriate use and installation.

INSTALLATION SAFETY NOTICE: Installation of this product requires knowledge of automotive electrical systems. While this product undergoes rigorous internal testing and quality assurance processes, vehicle electrical architectures vary widely and improper installation can result in damage to the vehicle or product. It is the user's sole responsibility to have a thorough understanding of automotive electrical systems and to ensure that the installation, connection, and operation of this product comply with all applicable safety guidelines, standards, regulations, and vehicle manufacturer requirements. Any modifications to a vehicle's electrical system should be performed only by individuals possessing the necessary skills, knowledge, and expertise, or by a qualified professional automotive installer familiar with the specific vehicle system. All installation guidance provided by Current Electric Labs is for informational purposes only and does not guarantee safe or correct installation in all vehicle configurations.

This product is intended exclusively for non-critical and non-safety-related aftermarket applications. It is not approved, certified, or warranted for use in safety-critical automotive systems, including but not limited to braking, steering, signaling, powertrain, or any other system or application where product failure could result in personal injury, death, or significant property damage. USERS ARE STRICTLY PROHIBITED FROM DEPLOYING THIS PRODUCT IN ANY SAFETY-CRITICAL OR LIFE-SAFETY APPLICATION.

4.6 SOFTWARE / FIRMWARE

This product may include embedded software, firmware, or other digital control logic that governs product operation and behavior. All such software and firmware are provided on an “as is” basis and may be updated, modified, or replaced by Current Electric Labs at any time without notice.

Current Electric Labs does not warrant that software or firmware will operate without interruption, error, or defect, or that operation will be compatible with all vehicle electrical systems, aftermarket equipment, or third-party applications. Operating behavior may vary depending on installation conditions, vehicle architecture, power quality, environmental conditions, and system configuration.

Software and firmware behavior, including but not limited to timing, mode selection, output state, and response to inputs or commands, is not guaranteed to be identical across all installations or operating conditions. The user assumes all responsibility for verifying proper system behavior following installation, configuration, or updates.

Current Electric Labs shall not be liable for any damages, vehicle effects, or system behavior resulting from software or firmware operation, updates, failures, or malfunctions.

By purchasing, installing, or using this product, the user acknowledges and accepts all limitations described herein and agrees to use this product solely for its intended aftermarket purpose.

Current Electric Labs and its affiliates, shareholders, directors, officers, agents, representatives, successors, and assigns (collectively, the “CEL Parties”) expressly disclaim any and all responsibility for any damage, injury, loss, cost, expense, or claim arising from or related to the installation, operation, use, misuse, malfunction, failure, or inability to use this product.

Under no circumstances shall any CEL Party be liable to you or any other person or entity for any damages of any amount or character, including without limitation any general, indirect, special, incidental, exemplary, consequential, or punitive damages arising out of, related to, or in connection with the installation, operation, use, misuse, malfunction, failure, or inability to use any CEL product.

In no event shall any CEL Party be liable for lost or corrupted data, lost profits, lost revenues, loss of use, diminution in value, or loss of other intangibles, whether arising in contract, tort (including negligence), or otherwise, regardless of whether such damages were foreseeable and whether or not the CEL Parties were advised of the possibility of such damages.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages. In such jurisdictions, the above limitations shall apply to the maximum extent permitted by law.

5. Product Warranty:

This product is covered by the Current Electric Labs Limited Warranty. Warranty coverage, exclusions, claim procedures, return policies, and other terms are available at www.current-labs.com/glowcraft/warranty.

By purchasing, installing, or using this product, the customer agrees that the warranty and return policies in effect at the time of purchase shall govern the transaction.

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6. Connections:

6.1 Connector Pinoutv

Main Connector = DTM13-12PA-12PB-R008



Main System Power Connections:

Description	Signal Name	Direction	Type	Pin #
Main System Power + ("+12V Positive") (4)	MSP+	Input	Power	7
Main System Power Ground ("12V Ground") (4)	MSPG	Input	Power	6

Data Channels & Switched Power Outputs:

Description	Signal Name	Direction	Type	Pin #
Data Output Channel 1	D1	Output	Signal	9
Data Output Channel 2	D2	Output	Signal	10
Data Output Channel 4	D4	Output	Signal	3
Data Output Channel 3	D3	Output	Signal	4
Data Output Channel 5	D5	Output	Signal	5
Data Output Channel 6	D6	Output	Signal	8
Switched 12V Output 1 (3)	SW1_OUT	Output	Power	11
Switched 12V Output 2 (3)	SW2_OUT	Output	Power	12
Data/SWx Ground	OUT_GND	Output	Ground	1
Data/SWx Ground	OUT_GND	Output	Ground	2

Trigger Inputs:

Description	Signal Name	Direction	Type	Pin #
User Input 1 (1)	IN1	Input	Signal	13
User Input 2 (1)	IN2	Input	Signal	14

User Input 3 (1)	IN3	Input	Signal	15
User Input 4 (1)	IN4	Input	Signal	16
User Input 5 (1)	IN5	Input	Signal	17
User Input 6 (1)	IN6	Input	Signal	18
User Input 7 (1)	IN7	Input	Signal	19
User Input 8 (1)	IN8	Input	Signal	20

CANBus / Audio:

Description	Signal Name	Direction	Type	Pin #
CANBus High (2)	CANH		Signal	22
CANBus Low (2)	CANL		Signal	23
Line-Level Audio Input	LLAudio	Input	Signal	21
CANBus/Audio Ground (2)	C/A_GND		Signal	24

Notes:

1) User Input functions are set through software configuration.
2) For best signal integrity, use shielded three conductor cabling with ground and a twisted pair for CANH/CANL.
3) Switched outputs are unregulated and pass whatever voltage is applied to PS+. Not guaranteed to be 12V.
4) Main System Power Supply voltage range can be 5V-24V (See Electrical Specifications)

6.2 Connector Mates

Qty	Location	Color	Key Type	Part Number
1	Connector Pins 1 to 12	Grey	A	DTM06-12SA
1	Connector Pins 13 to 24	Black	B	DTM06-12SB

6.3 Connector Accessories

Type	Description	Size	Part Number
Wedgelock (1)	Pin Retainer		WM-12S
Pins	Crimp(3)	14-16 AWG (2)	1062-20-062
Pins	Crimp(3)	16-22 AWG (2)	1062-20-0222

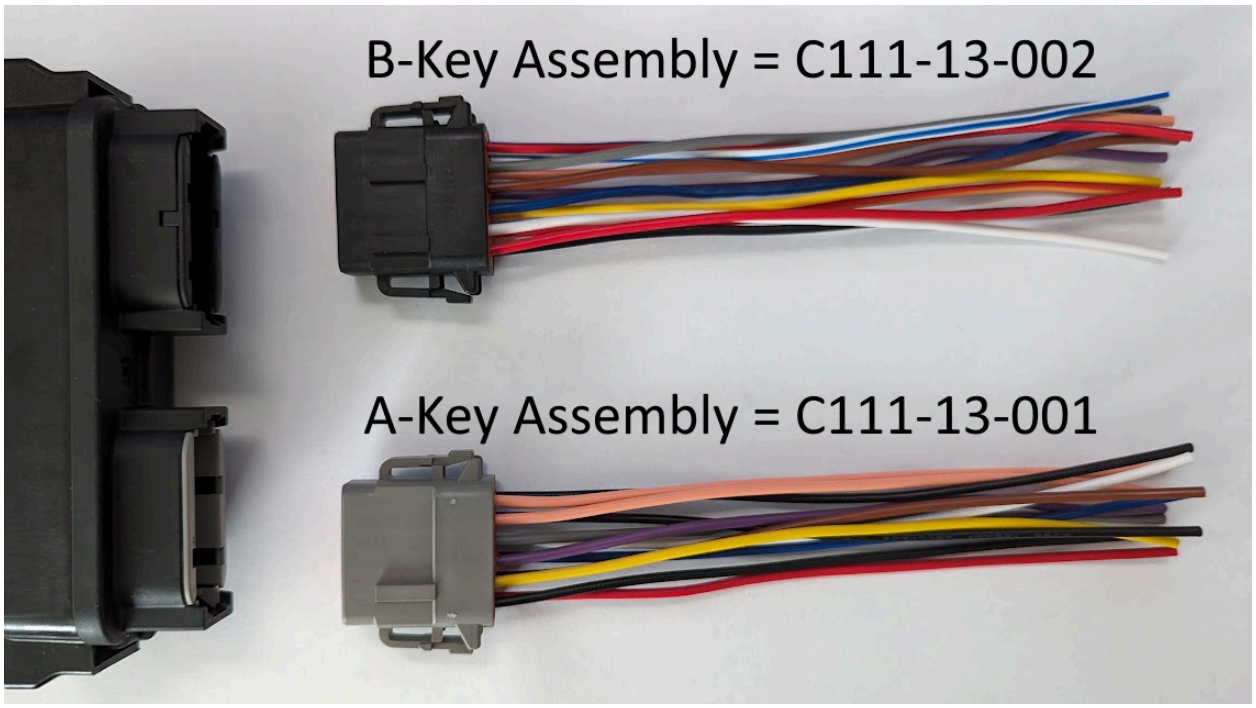
Notes:

1) One Wedgelock required per connector mate
2) Select pins based on wire gauge used (Signal vs Power). Total of 24 pins required for both mates.
3) Crimper tool recommendation = iCrimp SN-2549

6.4 Pre-Made Cable Assemblies

Available for purchase from Current Labs.

A-Key Assembly (Grey) = C111-13-001
B-Key Assembly (Black) = C111-13-002

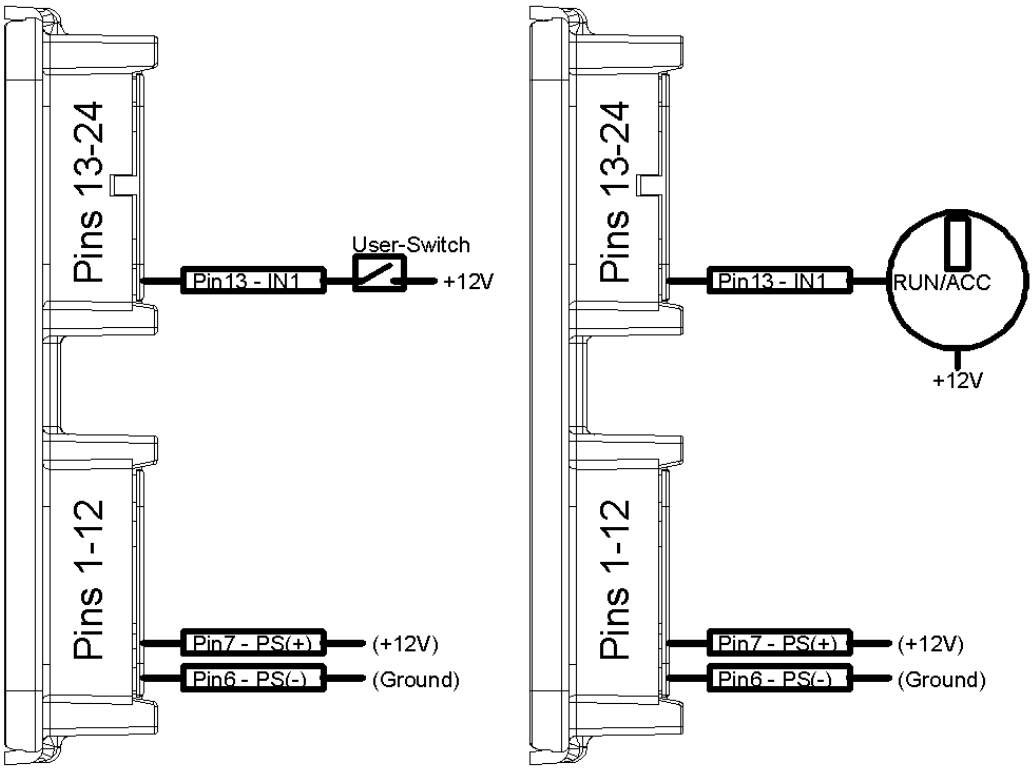


7. Getting Started

7.1 Powering Up The GlowCraft Controller

No one wants to find that they can't start their vehicle because their lights have drained the battery. The GlowCraft LED Controller is designed to limit power draw on your battery system, especially when your system is off. To facilitate this, in addition to applying +12V and ground to the power supply inputs, at least one of the User Input Signals (IN1-IN8) must be pulled high to initially enable the controller. Because all of the User Inputs are electrically identical, any input can be used to enable the controller. As long as at least one input is pulled high the controller will wake up from its sleep mode. The User Inputs have a wide voltage range, so any signal from 5-24V can be used here. You need to determine under what conditions you want your GlowCraft controller to be active and use an input that is also active in those conditions.

This can be accomplished in many ways in the vehicle. Some examples are: Using the accessory or run positions of the key switch or push to start system or using a dedicated "enable" toggle switch.



Because any input will wake up the controller and it will stay active until the set timeout delay even if that input goes inactive, if your brake switch is connected to an input then the controller will wake up and start your brake show even if no other inputs were already active. Same thing for turn signals/flashers.

7.2 Setup Using GlowCraft Designer Desktop App

This is the recommended method for getting connected and set up with your new controller.

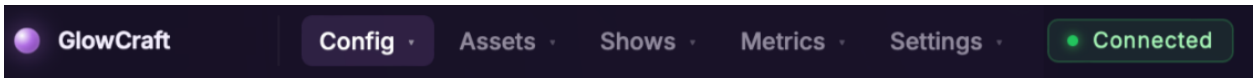
Install the Desktop App from the following link:
https://current-labs.com/glowcraft/downloads#designer
Once the GlowCraft Controller is powered up (section 6.1), follow the instructions in the app to discover, connect, and set up your controller.

7.3 Connecting Over Wifi - Access Point (AP) Mode

You can also manually connect to the controller without the desktop app. Once the GlowCraft Controller is powered up, have your device (laptop, desktop, tablet, mobile) scan for new wireless networks. A new network with an SSID name resembling "GlowCraft aabbccddeeff" should appear. The second section is the unique network MAC address of your controller. For example: The above SSID has a MAC address of "aa:bb:cc:dd:ee:ff". You may want to make note of that address as it may be helpful later to uniquely identify your controller.

Once you have discovered the controller's Wifi network, use your device to connect. **The default password for a new GlowCraft controller is "currentla".**

Once connected, open a web browser and navigate to the following address "http://4.3.2.1". From here you can fully configure your controller. We recommend you at a minimum change the wireless password to prevent unauthorized access.
Note: The top right corner of the web interface has a connection status icon. The controller is only connected when the icon is green as shown here:



7.4 Connecting Over Wifi - Device Mode

After initially connecting to the GlowCraft Controller in AP mode as described above, you can optionally configure the controller to automatically connect directly to your home WIFI network as a device. In this mode, your controller will get an IP address from your WIFI router and be accessible just like any other device on your network. Note that the GlowCraft Designer desktop app makes this process significantly easier through the help of a connection wizard.
To use this mode do the following:

1) Connect as normal in AP Mode and write down the AP SSID (MAC Address) of your controller. You may need this number to identify the device on your network later.
2) Navigate to the Settings page, and uncheck the "Act as Access Point" box.
3) Enter the SSID of your home WIFI network
4) Enter the password of your home WIFI network.
5) Click the SAVE button.

The GlowCraft Controller will then reboot and attempt to connect to your WIFI network. If successful, then your device will now be on your network and you can navigate to its new IP

address in your web browser. If the connection with your home WIFI was not successful then the controller will revert back to AP mode and you should soon see the SSID WIFI network reappear if you scan for networks.

If your GlowCraft controller is out of range of your home wifi for too long it will try to reconnect in device mode for only a short time and will then revert back to AP mode so you can still connect directly while on-the-go. When you get back home it will try to use your home WIFI again after a power cycle.

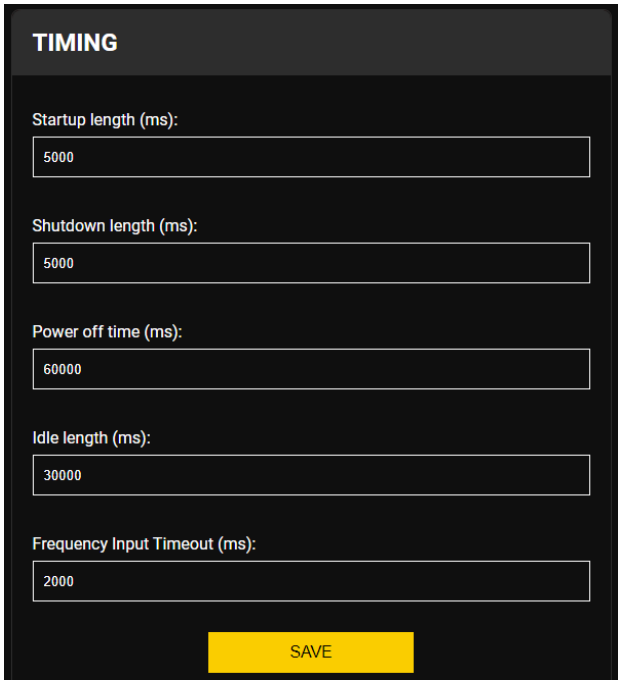
7.4.1 Finding the Controller IP Address in WIFI Device Mode

If your controller successfully connected to your home WIFI network. Here is a list of methods to identify the IP address it was assigned. Unfortunately based on system and network configurations these methods may or may not always work:

1) Use the app (Android or iOS): Open the app and scan for devices. If your GlowCraft is within range and powered up it will advertise both it's MAC address and IP address.
2) Use the network hostname: In your web browser navigate to the following address "http://glowcraft".
3) Check your Router's DHCP assignments: Open the interface for your wireless router. There should be a section where it shows you what devices are connected to your network. Match the GlowCraft MAC address you recorded earlier with the list of devices. Use your web browser to navigate to the IP address associated with the MAC.
4) Use the "arp -a" command (Both Windows and Mac): From a command prompt, type the following "arp -a". This will return a list of devices on your network. Match the MAC address for your controller that you recorded earlier, and use a browser to navigate to the associated IP address.

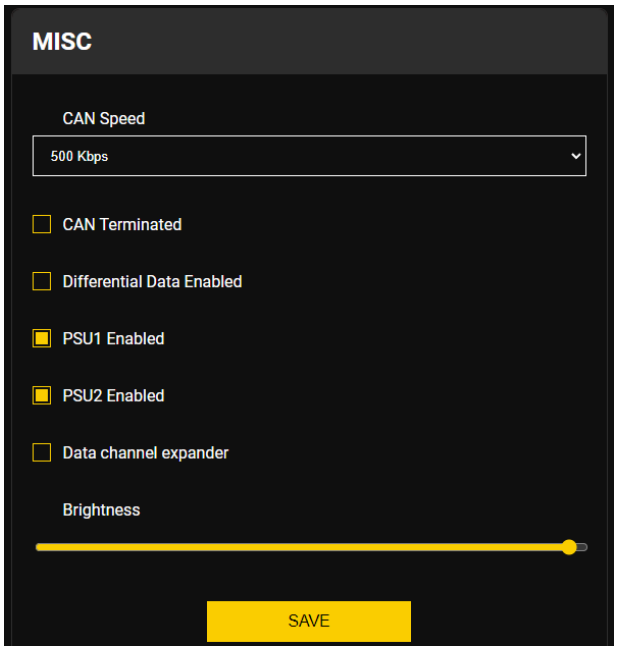
7.5 Power-Off Time Delay

When there are no longer any User Input signals pulled high, the GlowCraft Controller will start its internal timer countdown to enter sleep mode. This time is set through software on the "Settings" page and can be programmed to any value, with the default being 60 seconds. If you want your controller to never go to sleep, you can set this delay to a very large number. Once the controller does enter sleep mode, one of the User Inputs must again be pulled high to wake it back up. The total time from all User Inputs going inactive to the device entering sleep mode is (Shutdown Length) + (Idle Length) + (Power Off Time).



7.6 Enabling the SW1OUT and SW2OUT 12V Power Output Switches

The internal SW1OUT and SW2OUT 12V power output switches are **ENABLED** by default and will be active when the controller is powered up. These switched outputs can be de-selected to not be enabled by default and can be later switched dynamically in shows with an animator.

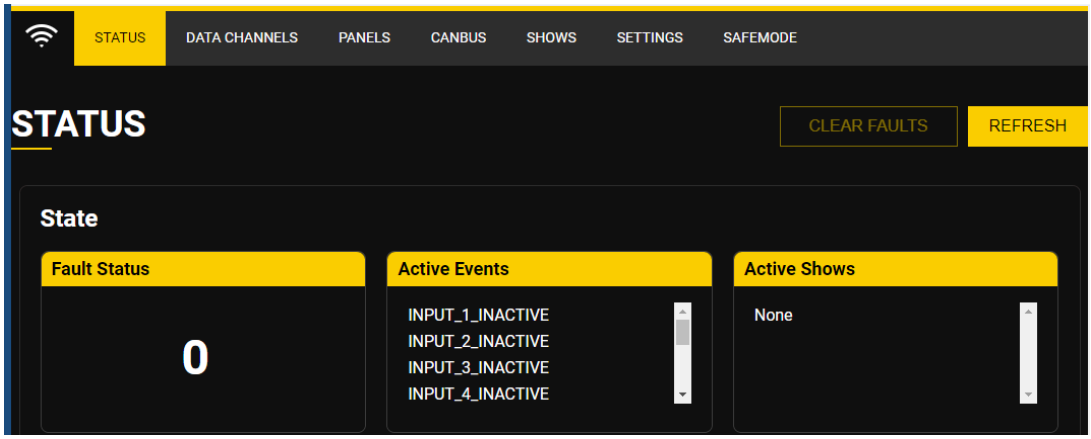


7.6.1 Over-Current Fault on the SW1OUT and SW2OUT Switch Outputs

In the condition that more than 3.5A is drawn from one of the switched power outputs, an over-current fault condition will exist and the controller will automatically protect itself by disabling that power switch output. The “Fault Status” will be listed on the “Status” page of the software interface. Anything other than “0” there signifies a fault condition. There are two ways the user can reset this fault condition:

1) Power cycle the controller by removing 12V power supply power, waiting about 10 seconds and reapplying 12V power supply power.

2) Use the “Clear Faults” button on the “Status” page.



7.6.2 Over-Current Troubleshooting:

If you are using the internal SW1OUT/SW2OUT power switches and your LEDs are not turning on, work through these checks to narrow down problems with over-current:

1) Check the “Fault Status”. If the status is anything other than 0, there is a fault condition that will disable the power supply outputs. Your LEDs won’t light while there is a fault on the SWxOUT Output they are connected to, or being enabled by.
2) Click the “Clear Faults” button in the software interface. If the fault status immediately returns to a faulted value, then a persistent fault condition may be present and needs to be addressed (short, excessive load, etc).
3) Check the power supply output for short circuits, which will show up as over-current faults.
4) Confirm the devices connected to the power switch channel will only be drawing 3.5A maximum. Here is an example based on the WS2815 12V LED data sheet:

LED Characteristics

	Ref. Value
Quiescent Current	2.1mA
RGB Channel Constant Current	15mA

From this, each LED pixel will use 15mA for R, G, and B color, for a total of ((15mA * 3) + 2.1mA) = 47.1mA at full brightness white color. This means that with a total of 3.5A, the SWxOUT outputs can each power about 75 WS2815 LEDs at worst case full brightness.

Significantly more than that would cause an overcurrent fault and would need to be powered by an external power supply.

7.7 Factory Reset

The following procedure will reset a GlowCraft controller to the factory settings.
NOTE! This will erase ALL settings including panel, show, and data channel configurations. Make sure you routinely save your configuration to files.
To initiate a factory reset:

1) With the Pin7 12V power supply to the controller disconnected, apply 12V to ALL 8 User Inputs at once (IN1 to IN8). All inputs must be pulled up before you power up the controller. Then apply the 12V power supply to Pin7 to start the process.
2) Wait for about 10 seconds. The device will boot into "SAFEMODE" and the safemode wifi access point should appear. Connect to that "SAFEMODE" access point using your OS wifi selection.
   The SAFEMODE wifi accesspoint password is "safemode" (one word, lower case).
   Once the safeboot access point is visible, you can disconnect all but one 12V inputs.
3) Use a web browser to navigate to http://4.3.2.1 . From the safemode web interface, click "Factory Reset", which will begin the factory reset process.
4) Once Factory Reset process has completed, power cycle the controller. The controller should now be back in the factory reset state and should come up in WIFI AP mode with a network SSID resembling "GlowCraft aabbccddeeff".

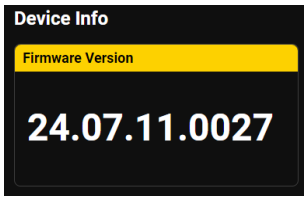
7.8 Firmware Updates ("SAFEMODE")

We take our software systems seriously here at Current Labs and are committed to both adding new features and fixing issues with our GlowCraft LED controllers. Because of this, we will be providing software updates that can be applied to the controllers. Here is the step by step process for updating a GlowCraft Controller's firmware:

1) Download the latest firmware file from the following link. You will need this file downloaded on your device to complete the update process : https://current-labs.com/glowcraft/downloads
2) Connect to your GlowCraft Controller through the web interface.
3) Save a backup of your configurations. While the firmware update process does not normally erase or overwrite settings on the controller, it's a good idea to have a backup copy of your data. Navigate to the "Settings" page and download all the files as a backup.
4) Navigate to the "Safemode" page and click the "REBOOT" button to enter firmware update safe mode. This process will restart the GlowCraft controller and it will come back on with a new WIFI network named "SAFEMODE".
5) On your device, refresh the WIFI networks until the SSID "SAFEMODE" appears. Connect to this network. **The password in SAFEMODE is "safemode".**
6) On your web browser, navigate to http://4.3.2.1 . You can then use the "Choose File" dialog to select the firmware .BIN file you downloaded in step 1, and click "UPDATE" to

start the firmware update process. The process may take a minute, during which the window will read “Uploading, Please wait…“
Once complete the device will reboot into normal operating mode. If you are running in AP mode, check your WIFI networks list for the SSID you assigned and reconnect. If you are running in WIFI device mode, your controller will automatically reconnect to your network.

7) You can confirm your GlowCraft Controller has the correct firmware version by navigating to the “Status” page and checking the “Firmware Version” under “Device Info”



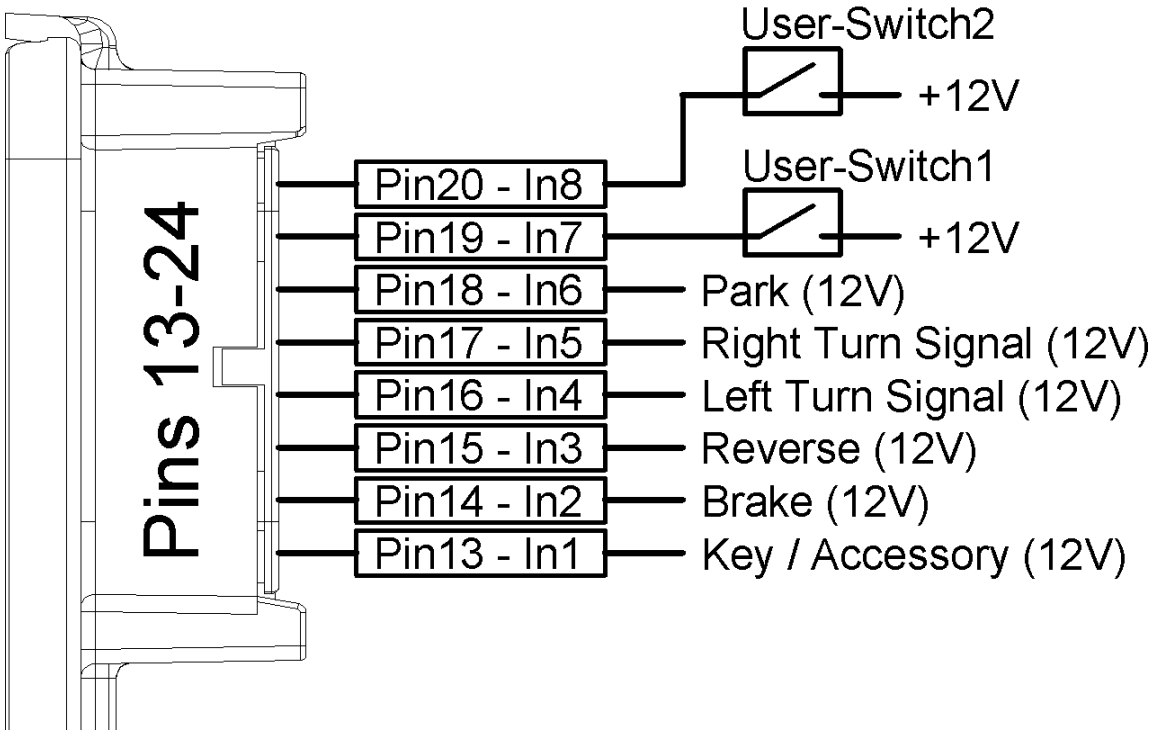
8. System Wiring Examples:

Every system is different, but these basic wiring examples should make a good starting point. Automotive electrical systems, in particular, pose some interesting problems. While the chassis is often used as a system-wide ground, this is non-ideal for applications that have to carry large amounts of high speed data such as this. When possible, run appropriately sized (power, ground, and data) wires as closely together as you can and separate from the chassis. One recommended option is to create a “Star” ground point somewhere close to the GlowCraft LED controller that will be used to wire the grounds for all LED strips.

8.1 Standard Automotive Inputs - Voltage Triggers:

All Inputs are electrically identical and their function can be selected through the software interface. The connections shown here are only given as an example. The inputs are internally pulled to ground with a high value resistor and must have a voltage applied to them to activate (see Hardware Circuit Interfacing section for more detail). Because these are signal inputs and not power inputs, less than 1mA at 12V will flow into the controller so smaller wire gauges can be used and fuses are not required.

Because all inputs are 5-24V compliant, many sources throughout the vehicle can be connected such as door switches, window switches, etc.

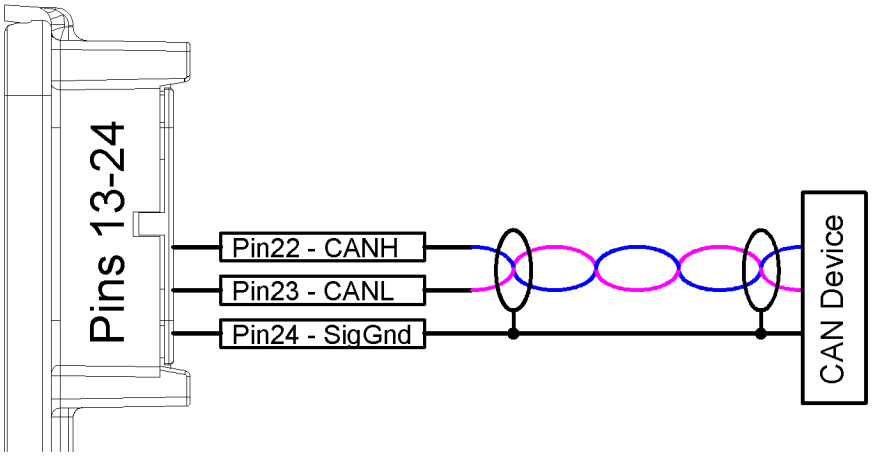


Note: If CANbus triggers are used for some of the vehicle functions such as turn signals and reverse, then those inputs shown here can be used for additional voltage triggers such as more user-switches or buttons.

8.1.1 CANBus Connections:

CANBus connections carry high speed data and require special cabling considerations. Use only high quality shielded twisted pair cables rated for CANBus data. For an inexpensive CANBus cable option, use standard Ethernet cable (Cat5, Cat6, etc). Use one twisted pair for CANH and CANL, and any other wire for signal ground.

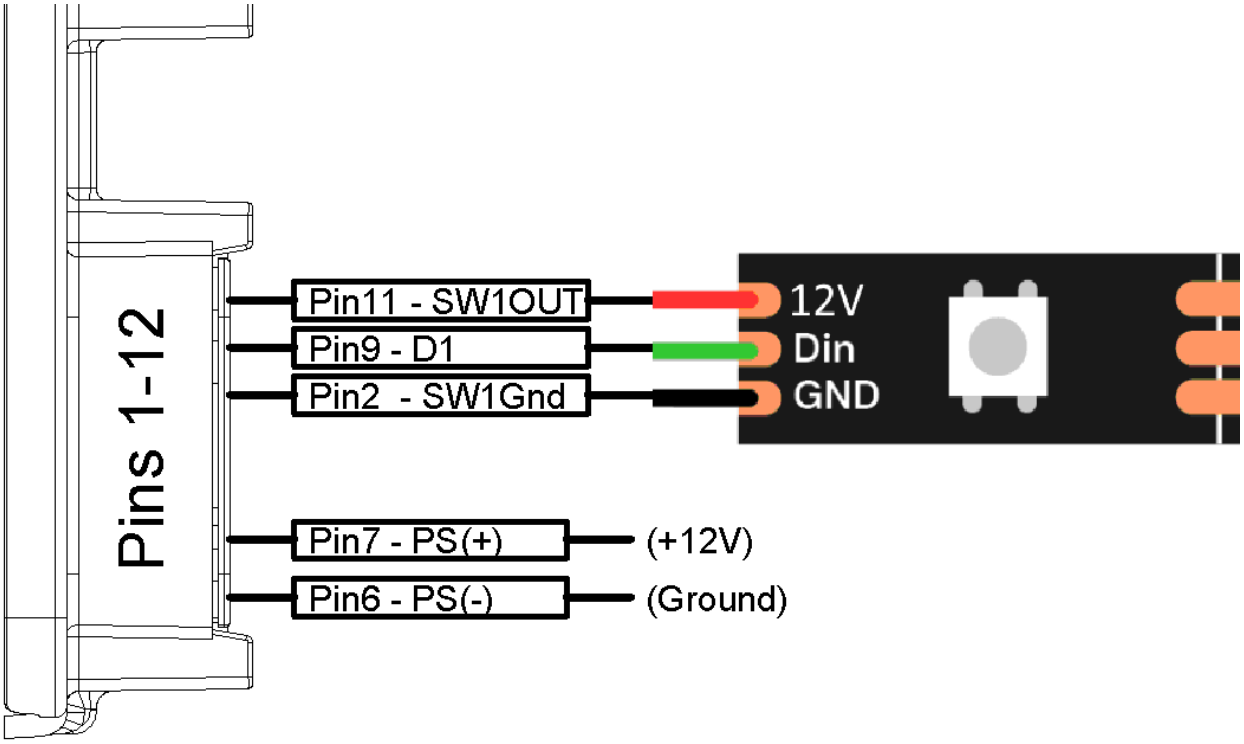
The GlowCraft has internal software selectable CANBus termination. Enable internal termination if the controller is the last device on an otherwise unterminated CANBus.



Note: While CANBus is using a two-wire differential type signaling, ground referencing the shield at both ends can often increase signal quality, especially if the devices on both ends are mounted to the chassis.

8.2 LED Strip 12V: Powered Directly by Controller:

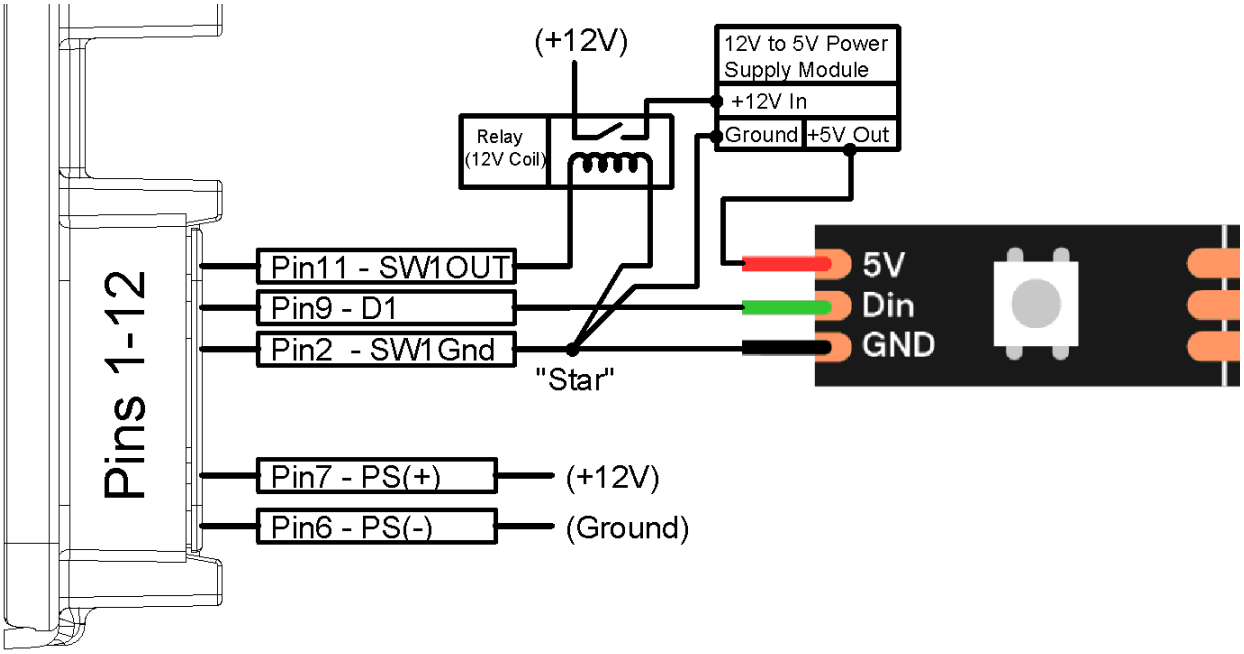
The GlowCraft Controller's two internal SW1OUT and SW2OUT power switch outputs can drive up to 3.5A each. If the controller input voltage is 12V and 12V LEDs are being used, this configuration can power 12V LEDs without the need for any external switches or relays up to 3.5A per channel. If more than 3.5A is drawn (either intentionally or accidentally like a short), the resulting fault condition can be reset through the software interface without having to replace any fuses. SW1OUT and Data1 are shown here for example. Either power switch, and any Data Channel can be used together. As long as the total current draw is not exceeded, the SW1OUT and SW2OUT outputs can power multiple LED strips each, and also can be run in parallel for almost 7A together to power one thing.



Note: The voltage on the SWxOUT switches will be the same voltage used for the GlowCraft input (PS+ on Pin7). There is no regulation on these outputs so if your input voltage is out of range, the lights connected to the SWxOUT ports may experience under or over voltage that would track the GlowCraft input voltage. If you want your lights to have a solid 12V, you need to confirm your Input Voltage is always a solid 12V.

8.3 LED Strip 5V: Switched External 5V Supply:

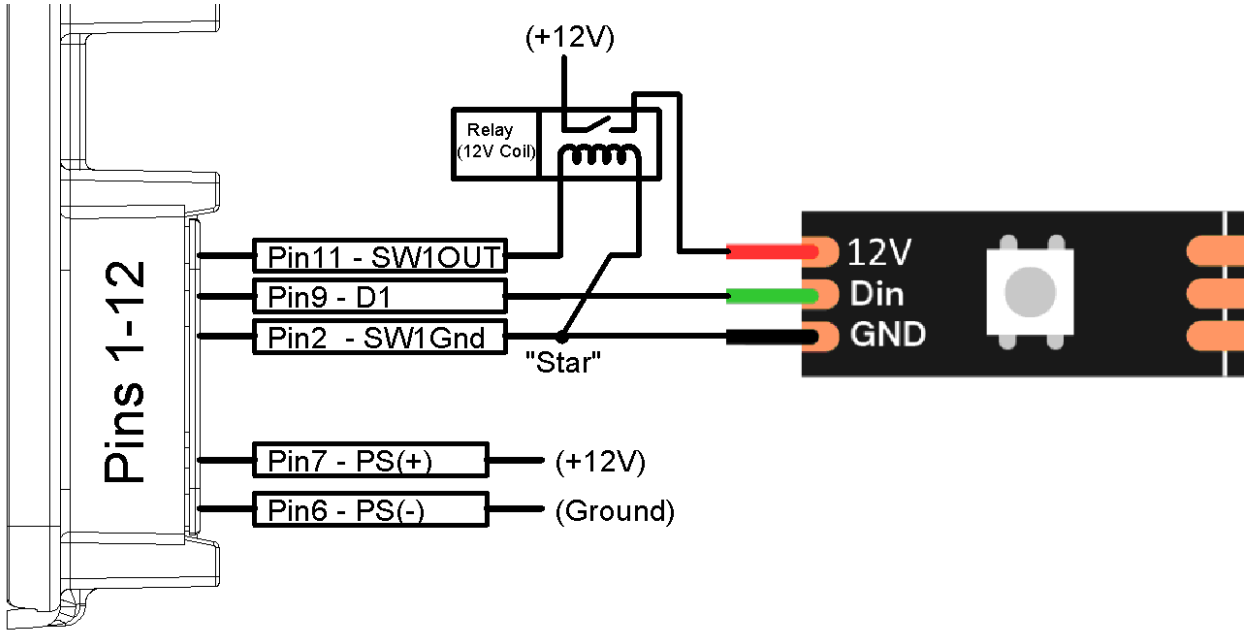
In this configuration, an external 12V-to-5V DC-DC Converter power supply module is used to power the LED strip. Because the power supply module and LEDs consume power even when they are not on[2], a relay with a 12V coil is used to switch power to the module. The GlowCraft controller SWxOUT switch output is used to switch the relay, which ensures the LEDs only consume power when the controller is active. 12V fuse is not shown, but should be added to the relay feed line.



Note:
1) Ground connections for controller, relay, and power supply module are made at a single “star” point near the LED controller. Ground wire and data wire to the LED strips must always be run close together from the controller to the LEDs (don’t run just a single data wire and use the chassis for ground. This could result in data corruption).
2) For example, the WS2813 data sheets list a Quiescent Current of 0.6mA per LED. That means even when they are doing nothing, 1000 of these LEDs will constantly pull 0.6A from your battery. With a standard 48Ah 12V battery, that will drain your battery from full to dead in 80 hours or 3.3 days! Because of this, it is highly recommended to include a power disconnect relay as shown above that is switched by the GlowCraft controller.

8.4 LED Strip 12V: Switched External 12V Supply:

In this configuration an LED strip which operates directly from 12V is being used. Due to the LEDs continuing to draw power even when they are off, an external 12V relay is again used so the GlowCraft controller can switch the power to the strip to prevent battery drain when the system is not active. Also known as “battery saver” operation.



Note: Some caution should be taken when running LED strips directly from the vehicle 12V supply. The 12V system in a vehicle is a notoriously hostile environment for electronics. During normal operation the voltage can vary between about 11V and 15V, but when an alternator is present certain “extreme events” can cause the voltage to go from 6V to over 60V for short periods of time. Even voltages as high as 120V could be seen during an alternator “load dump”. This isn’t including some accidental situations like hooking the voltage up backwards (jumper cable mistake!). An LED strip hooked directly to the 12V system will have essentially no protection from these events.
An external 12V to 5V power supply module acts as a buffers between the “dirty” 12V system and the regulated 5V output to keep your LEDs happy and safe. There is also the issue of what to do with all the extra voltage considering each individual LED only needs about 3.7V to light up. You may have noticed many 12V LED strips work in blocks, with about 3 LEDs all changing color together in groups. This is the strip internally bringing the 12V down to about 4V by going through 3 LEDs in series. While both 5V and 12V LEDs will work with the GlowCraft controller, and it’s hard to deny that 12V strips are more convenient, we still tend to recommend 5V strips for maximum reliability, efficiency, and animation density.

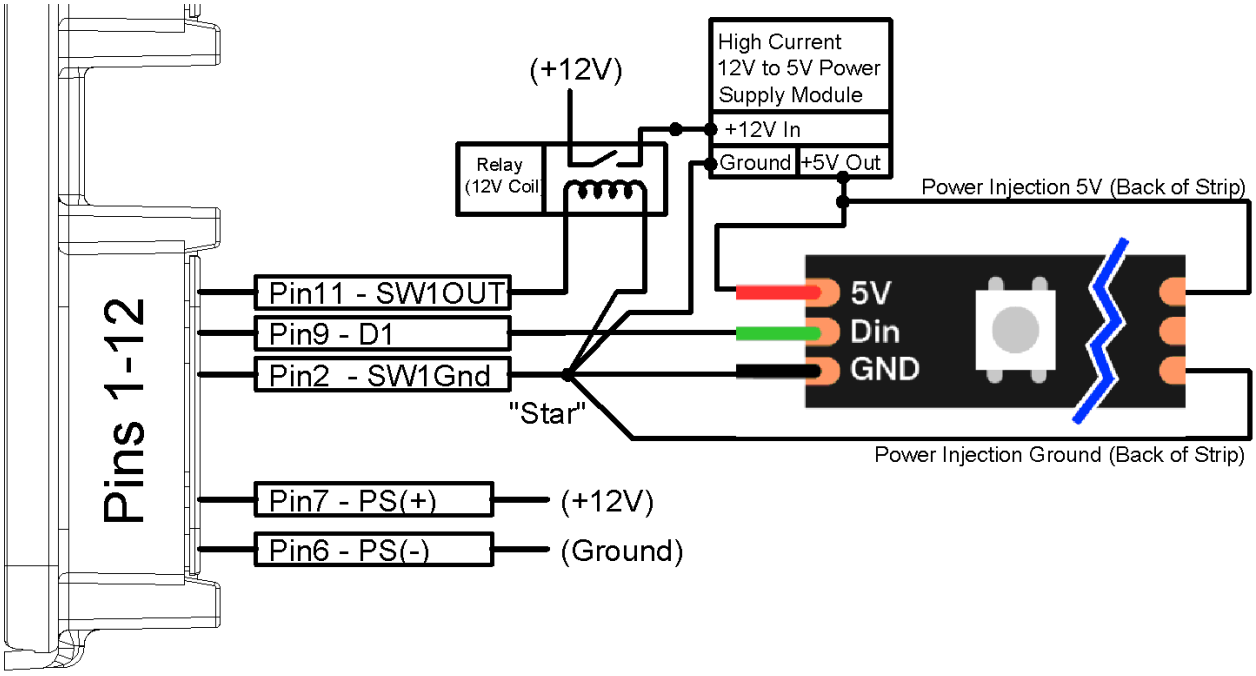
8.5 Long 5V Strips: Re-Powered / Power Injection:

In this configuration a very long strip of 5V LEDs is being used. Because the flexible strip backer that the LEDs are connected to is also acting like the power and ground wires for every LED on the strip and because the thickness of those wires is not very large, longer runs of LEDs will experience a drop in voltage as you go down the strip. It may start as 5V but it will get lower and lower the further down the strip you go.
Eventually a few things may happen.

1) The voltage will drop below about 3.5V (or more) and you will start to see LEDs getting corrupted and stop working.
2) The strip material, cables, and connectors could get excessively hot and be damaged.
3) Small 5V power supply modules could be overloaded from powering too many LEDs.

To deal with this problem it is recommended that for very long strings of LEDs, one larger 5V power supply is used to power inject along the LED string. Appropriate gauge wires must be used through the whole system. One common configuration is shown below where 5V is applied at the beginning of the strip and also power injected into the end of the strip using wires directly from the power supply.

Specific numbers for when to add another power injection point or supply module will depend on the type of LEDs used and other aspects of the system like power supply capacity and connector selections and their specifications. If using an external relay so the GlowCraft controller can reduce sleep mode power consumption (“power saver” operation), be aware not to exceed the relay’s rating if powering multiple modules from one relay.



Note: Care must be taken when adding additional power supply modules without cutting the 5V jumper between LEDs on the strip. Not every power supply module is designed to be added in parallel with another voltage.

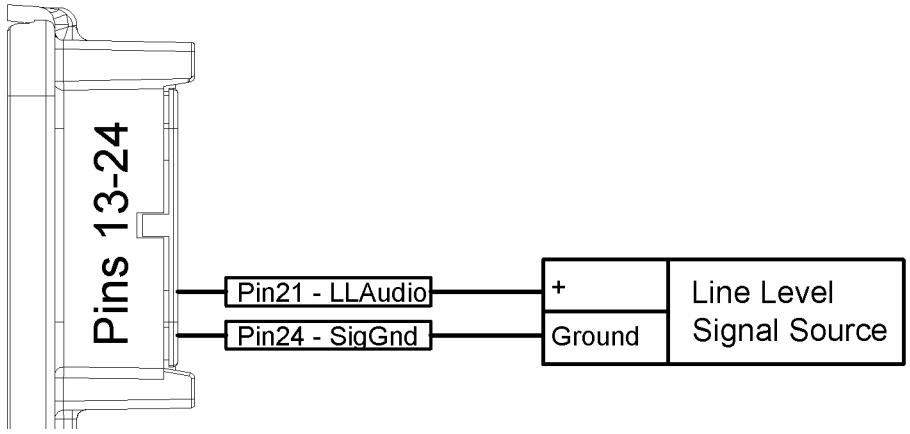
8.6 Data Reliability Over Long Cables

It may be required to run LED strip data cables over very long distances. In this condition, with longer cable runs, the data may become too weak or corrupted to reliably communicate with the LED strips. One solution to this problem is to use Differential Data Signaling with the GlowCraft LED controller. This solution will require additional data drivers and receivers.

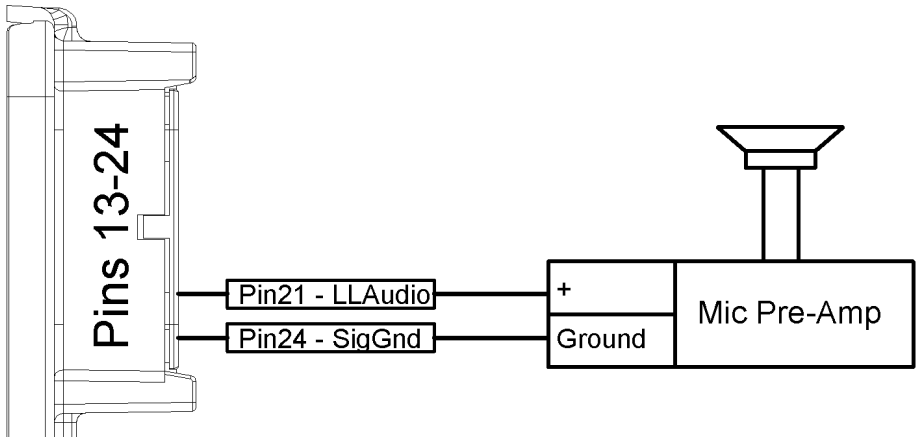
If you think you are having data reliability issues due to longer cables, contact Current Labs for more information about implementing this differential data mode.

8.7 Line Level Audio Input:

The GlowCraft LED controller includes an input for Line-Level Audio signals. You can connect this interface directly to compatible signal sources such as car stereo systems and other music players. The voltage range is about 1.2V peak-peak. Once connected, LED effects can be added to animations that modulate the LEDs based on the music.



A microphone can also be used, but this configuration requires the addition of an external microphone preamp to interface with the GlowCraft Controller.



9. Electrical Specifications:

9.1 Absolute Maximum:

	Min	Max	Units
Power Supply Input Voltage (PS+ to PSGnd)	-28 (1)	28	V
Power Supply Input Current	0	12 (2)	A
Internal Operating Temperature	-20	85	C
LED Power Supply Output Current (SW1OUT, SW2OUT)		3.75(3)	A

Notes:

1) Contains internal reverse polarity protection on Power Supply input.
2) Power Supply input is internally fused at 12A. This fuse is not user serviceable.
3) Short circuit protected at 3.75A.

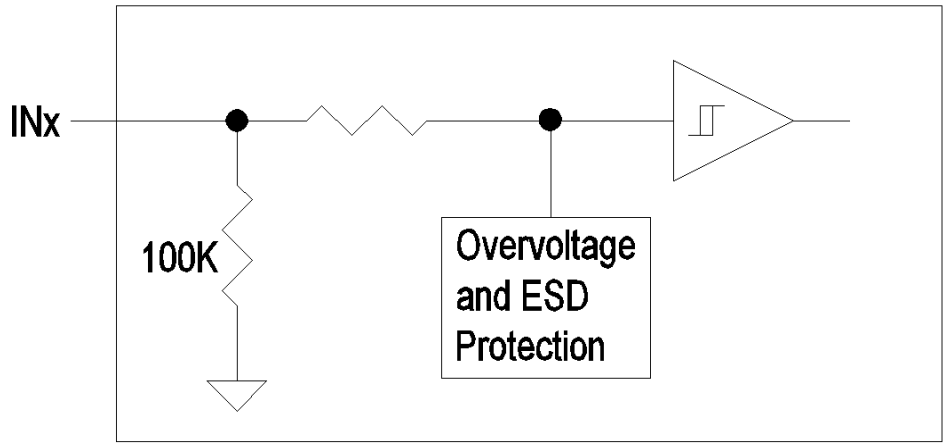
9.2 Recommended Operating Parameters:

	Min	Typ	Max	Units
Power Supply Input Voltage (PS+ to PSGnd)	5	12	24(1)	V
Signal Input Voltage (IN1 … IN8)	0		PS+	V
Power Switch Output Current (SW1OUT, SW2OUT)			3.5	A

Notes:

9.3 Hardware Circuit Interfacing:

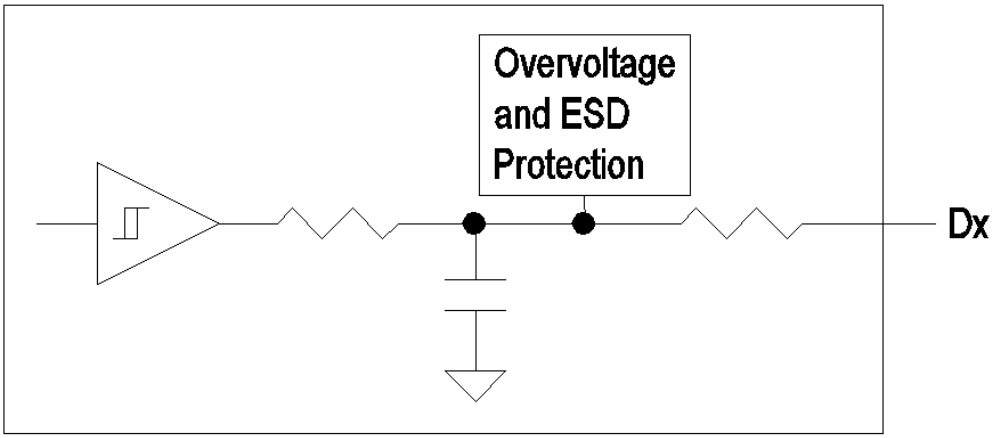
9.3.1 Voltage Input Triggers (IN1 to IN8):



Notes:

1) Contact factory for input pull-up options

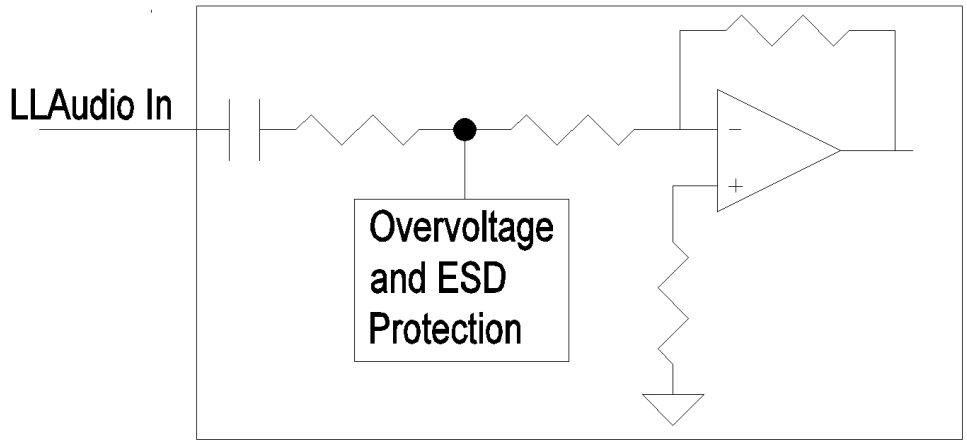
9.3.2 Data Outputs:



Notes:

1) Outputs are short circuit protected
2) Do not apply 12V to the Data Output Pins!

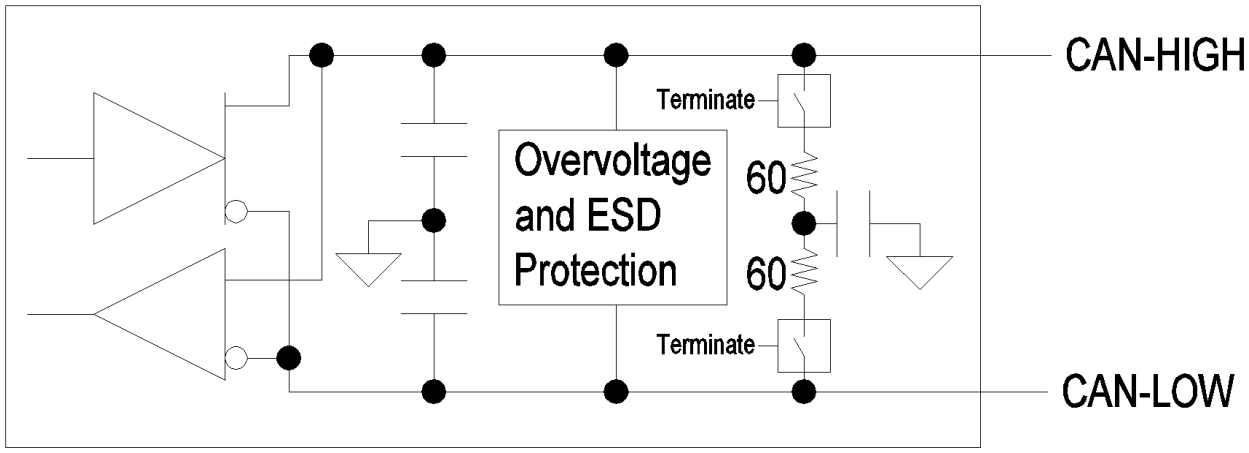
9.3.4 Line Level Audio Interface:



Notes:

1) +/-1.2Vpp Signal Amplitude
2) AC Capacitor Coupled

9.3.5 CANBus

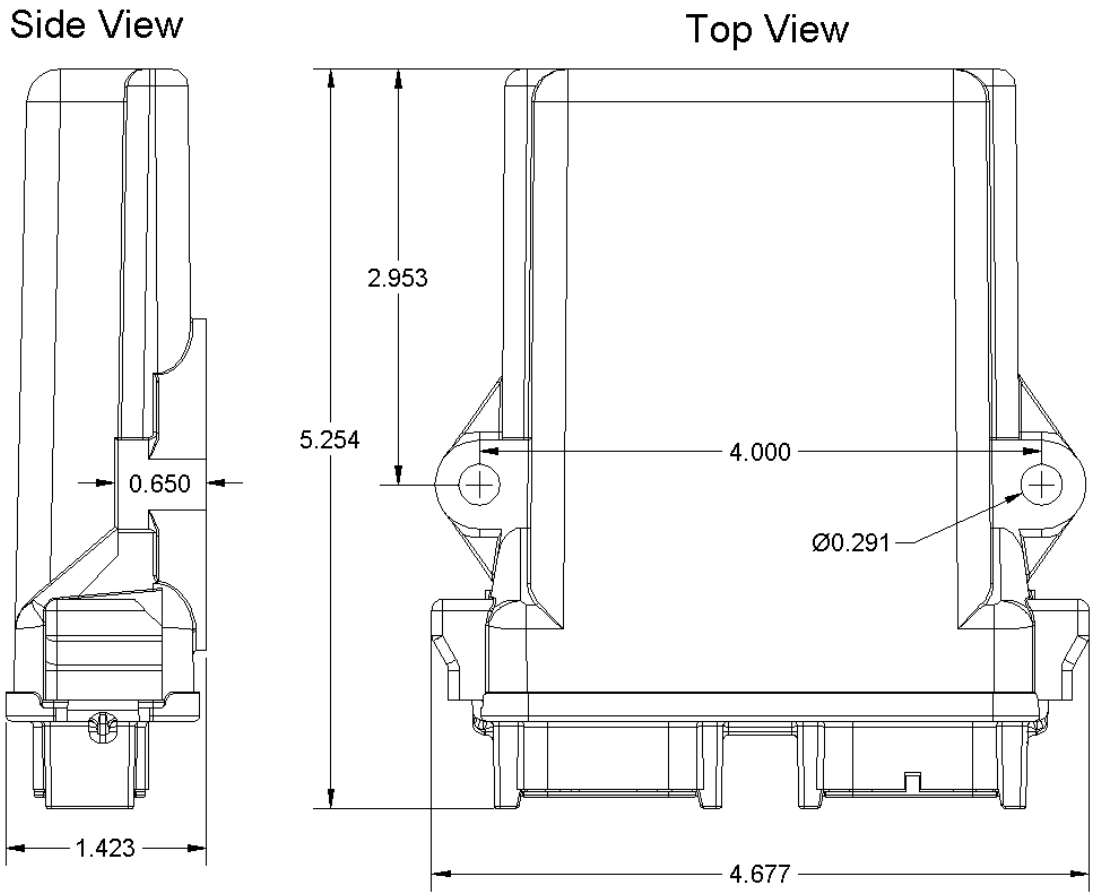


Notes:

1) CANBus termination is selected through software. To enable CAN termination, navigate to the “Settings” page and in the “Misc” section click “CAN Terminated”. This will switch in the standard 120 Ohm (60 + 60) split termination resistors as shown above.

10. Mechanical:

All dimensions in Inches.





11. Document Revisions:

Date	Rev	Revision Notes
June 26, 2024	R1	Initial Revision
October 17,2024	RA	Release
June 1, 2026	RB	12V Switch Output Changes