Basics about LEDs on Arcaze-Modules

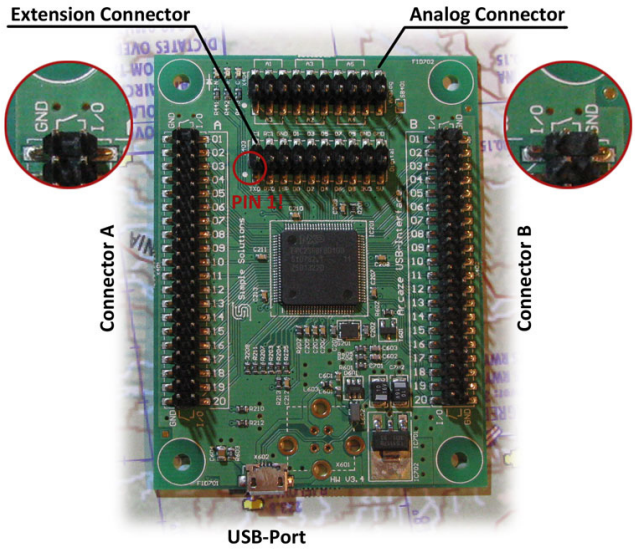
15.11.2015

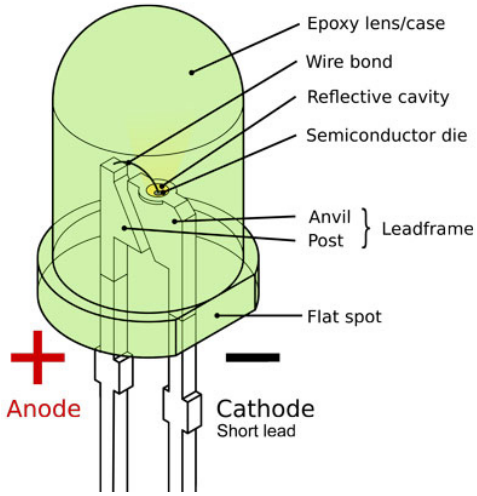
1) LEDs connected to the Arcaze-USB-Module

The easiest option is to connect your LED with the Arcaze-USB-Module itself.

Note: You have to use low-current LEDs with the Arcaze-USB module as other LEDs won't work properly.

If the LED will be directly visible in the cockpit, that's a perfect choice.





Notice *the different Layout of the two connectors (A and B) on the USB-Module.*
Always connect the cathode with the outer pin!

The manufacturer won't guarantee LEDs will work properly without a suitable pre-resistor. That said, we have used LEDs without pre-resistor and have not had any problems to date.

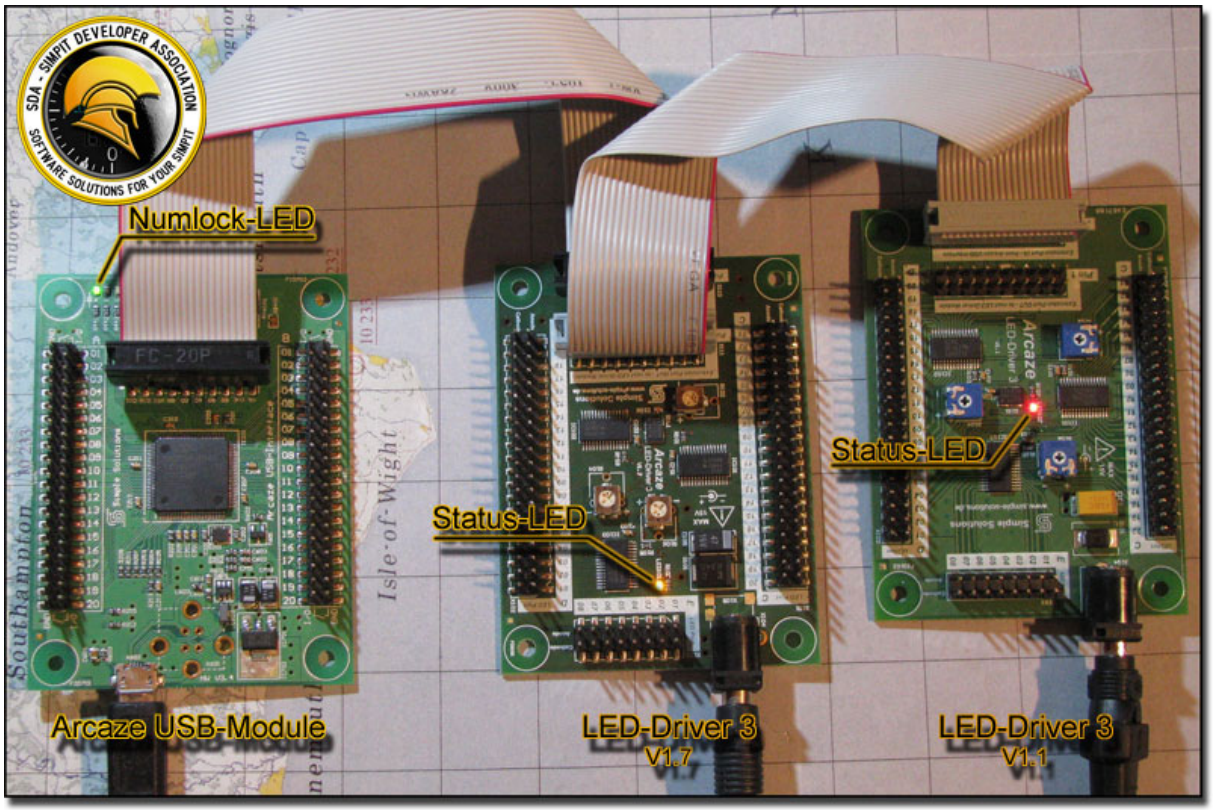
Of course this way is very handy, especially for LEDs with higher quantity.
But to ensure long lasting simpit happiness please install a pre-resistor for each LED!

They are pretty cheap and you can easily find an online-calculator helping you select the correct resistance.

2) Using Arcaze-LED-Modules (LED-Driver-Extension-Card)

Most LEDs in our simpits are hidden behind printed paper to emulate status lights.
In this case a low-current-LED normally doesn't have enough brightness.
Some of these LEDs surprisingly can't be recognized in complete darkness behind one layer of normal printer paper!

Best option in this case is to use a LED-Driver.
There are no pre-resistors needed if you connect your LEDs via a LED-Driver.



By using a LED-Driver you can use all kind of 'normal' LEDs, exept for "high-power LEDs", which may present a problem.

Fortunately we doesn't need a flood light in our simpit. And there is no reason to control the ambient illumination via the arcaze-system.
(Normally the requirement of ambient illumination in the sim and in RL isn't simultaneously.)

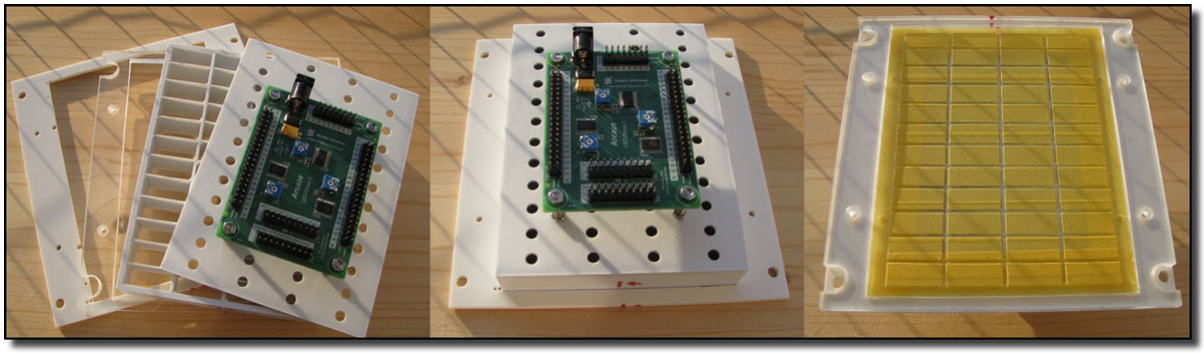
But if you have to control some sort of electric consumers, take a look to the chapter "**5) The Arcaze-PowerDriver**"

With the **LED-Driver 2**, you have the option to affect the brightness of your LEDs in 3 Groups, using the three onboard potentiometers.

With the Arcaze **LED-Driver 3** you can further adjust the brightness of each single LED via software.

That's the difference – nothing else matters. Just choose the module that will do the best job in your pit.

For my warning-light-panel with 48 lights (A-10 style) the Led-Driver 2 was the perfect choice.



The additional value of the version 3 is not significant, but it provide a nice option to dim a single LED in your field of vision to avoid problems during real life night-operations.

You have to use an external power supply for the LED-Driver with not more than 15 Volts DC. From experience a 12 Volt DC power supply do this job very well.
If you using an USB-Hub with a powerful power supply a USB-power-cable could also be an option.

Be sure to check the LED-Driver Board reference for the right polarity of the jack!

Note: *You can connect multiple extension-modules to each Arcaze-USB-Module, but it's not possible to use different type of extension-modules on one Arcaze-USB-Module. Also LED-Driver 2 and LED-Driver 3 can't be combined!*

You don't have to activate the LED-Driver. Just connect the extension-board to your Arcaze-USB-Module and the power-supply.
After connection, a SMD-LED on the LED-Driver will glow *. If you initialize the LED-Driver (described later) the LED will go out.

**This SMD-LED is a holdover from the original purpose of the LED-Driver. Most likely this LED will be removed on future versions of the LED-Driver.*

3) Software the connection to your simulator

Flightsims listed below are Arcaze-ready via freeware-tools right now.

- **MS Flightsimseries / P3D / X-Plane** => "MobiFlight Project" by [DocMoebiuz]
  http://www.mobiflight.de/download.html

- **Falcon BMS** => "BMS Cockpit" developed by [Joker] *from the 47th DragonFighters*
  https://www.dropbox.com/s/99jve5tux5wosco/BMSCockpit_v2.3.0.zip

- **DCS-Series** => DCS Arcaze Connector "D.A.C." by [H-J-P] and [McMicha] *from SDA*
  https://github.com/s-d-a

With other Simulations you can use LEDs in a more basic way. For maximum support of LEDs and 7-segment displays programming is necessary.

Main functions of the Arcaze-USB-Modules (***Keyboard and Gamepad / Joystick***) are not limited of course.
Even a simple setup for PS4 was tested successfully.

For using our D.A.C. check our Quick-Start-Guide to set all options correctly.
https://github.com/s-d-a/DAC/blob/master/Quick_Start_Guide_DAC_ENG.pdf

4) Troubleshooting

You have connected all things as described?
Made a new record in D.A.C. with the Help of the Quick-Start-Guide?
But unfortunately your LED won't glow?

OK - let us try to find the problem.

a) Find the correct Arcaze-USB-Module

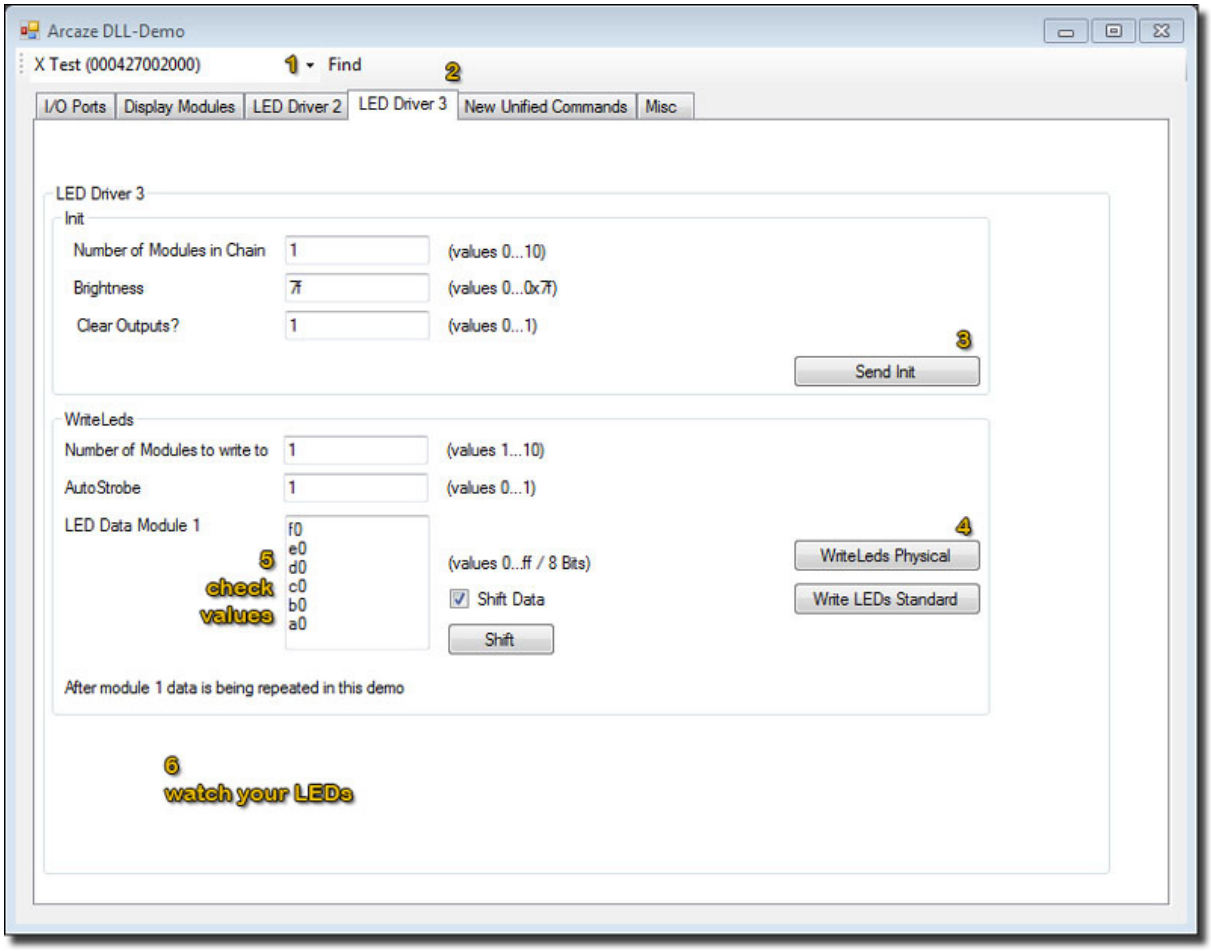
Best way to avoid confusion in choosing the correct Arcaze-USB-Module is to temporary disconnect all other Arcaze-USB-Modules.
Ensure only the one / relevant USB-Module is connected to your computer.
Check the three SMD-LEDs on this USB-Module (Numlock /Capslock/Scrollock) corresponding to the LEDs on your Keyboard. Hit the Numlock-Key on your Keyboard a couple of times to find them on the Arcaze-USB-Module.
Is the Numlock-LED on the correct USB-Module answering to your keyboard action?
If so, Great – so we made the first part.

b) The Arcaze Demo-Tool

Now we have to check your primary installation without D.A.C.
A good way to do this, is using the Arcaze-Demo tool from the SDK.

http://simple-solutions.de/forum/download/file.php?id=436&sid=250aae6571ea7ab6bbbac0d5c0ba78bd

Detailed Informations to the Demo Tool can found at:
http://wiki.simple-solutions.de/index.php?title=en/products/Arcaze/Arcaze-USB/Arcaze-USB_SDK/Feature_Report_Protocol



(1) After starting the demo-tool, hit the [**Find**]-button, or choose the USB-Module from the **dropdown**.

(2) Switch to the [**LED-Driver 2/3**] Tab

(3) Click [**Send Init**]

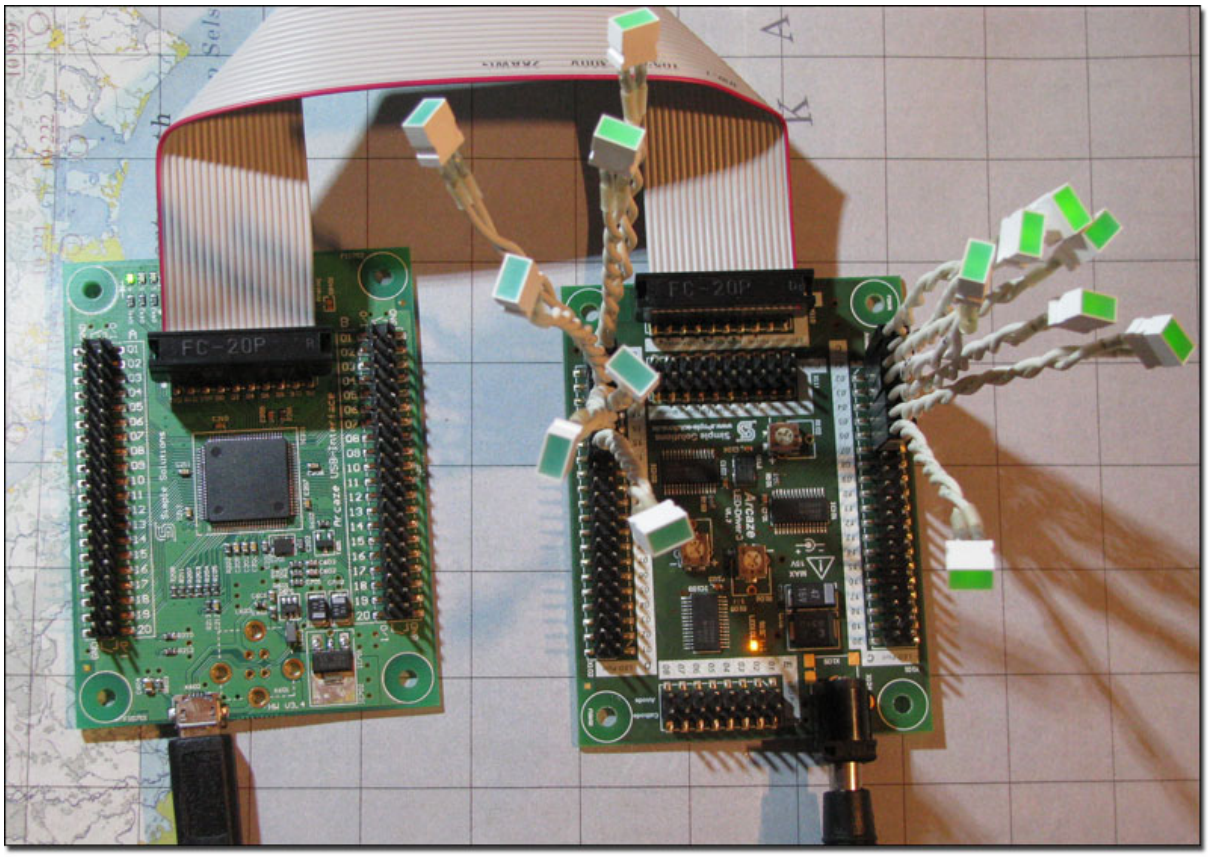
(4) Click [**Write LEDs Physical**] several times

(5) After each click the values in the [**LED Data Module Box**] will change.

(6) **Watch your LEDs** while clicking. Appending to the Pin you have used, many clicks could be necessary.
(IF the values in the [**LED Data Module Box**] reached zero you can stop clicking)

If your setup is correct, the LEDs should start to glow click by click in the order of the pins.

No further Test required. If your LEDs are operating with this tool there is no hardware-problem in your setup and all things are connected properly.



Each LED will be activated first - then with each further click they will be dimmed till the LED is off again.
In the example-picture the LEDs were switched on counterclockwise.
The five left LEDs on the right side are still off. The first LEDs on the left side are already dimmed a bit.

⇨ **If your LEDs don't glow, you have to check your hardware.**
- Are the cathodes connected to the right pin?
- Does the LED-Driver have enough power?
- Is your LED-Driver connected to your Arcaze-USB-Module correct? (HINT: Check Pin1 of the cable!)
- Is the Arcaze-Module connected to the USB-Port?
- Is the USB-Port active?

Note: *It could useful to temporary connect a LED to your LED-Driver directly. So you can detect faults in your peripheral equipment. (Between LED-Driver and the LED)*

Once your LEDs are glowing, you can close the Demo-Tool.

c) Now test D.A.C. again
Try again to use your LEDs in D.A.C.

If your LEDs still won't operate, there is only one reason for the failure at this point in this stage.

⇨ A wrong Pin, wrong Port or wrong Arcaze-USB-Module is selected.

In all other cases the defined LEDs should glow after using the D.A.C.-test-function.

5) The Arcaze-PowerDriver

One way to use the output-capabilities of the Arcaze-Hardware is to activate electric consumers in subject to IDs from DCS.

You have to find a suitable motor or electromagnet and need some crafting skills.
Using this method - light bulbs, motors-witches or locked leavers are no problem.

Use the PowerDriver to avoid the limitations of the other output-options.

Note: *Check the operational-limits of the PowerDriver on the website of the manufacturer:*
http://simple-solutions.de/shop/product_info.php?language=en&products_id=53

To use the PowerDriver with D.A.C. you have to create a new ID for your trigger-event.
⇨ Check the Wiki from McMicha to see how this could be done:
https://github.com/s-d-a/DCS-ExportScripts/wiki/Documentation-in-English

Imagine your trigger should toggle a LED and create your ID in this way.
After this you could add a record in D.A.C. for this "LED". Just using a Pin connected to the Power-Driver.

Note: *In the description of the PowerDriver a full Arcaze-Port is used to connect it.*
Of course you can connect single Pins to the PowerDriver also. If you intend to connect Pins from different Arcaze-Modules, just ensure they are all connected to the same PC, to avoid damaging by balancing currents!
It's not possible to connect the PowerDriver with pins from a LED-Driver directly.
Contact the manufacturer witch circuitry is necessary to use this option.
For sophisticated users this is also possible.

6) Known Issues

- "***Losing control of your PC***"

When you add a new record in the LED-tab and enter by mistake a (wrong) pin connected to a switch, unexpected malfunctions will occur.
If the switch has assigned the key-command [L-Alt]-[R] ****)***, those keys will be sent after activating the test-function.
****)*** e.g. assigned with the Arcaze-Config-Tool.

Note: *It's impossible to open any program using a mouse- left-click while the [ALT]-key is in use!*
You will also not be able to open a file using the [RETURN]-key.
You will always open the context-menu instead.

In this case disconnect every single Arcaze-Module one by one. Check always if the fault key-flow stops. (You have to hit the Key(s) on your Keyboard to send a release-command before!)
After this you can relax and correct the wrong entry.

That's not a program error and can't be avoided by or developer.
The best way to avoid this problem, is to optimize the documentation of your setup.