



**NON FINITE**  
**ELECTRONICS**

# RGB Backlight installation guide

## Overview:

This backlight is fitted with two RGB LEDs. RGB stands for the colours that the LEDs can do: Red, Green and Blue. Using combinations of colours the backlight can create up to 7 different colours: Red, Green, Blue, Yellow, Purple, Light blue and White. This guide will show you how to install the backlight and set it up so that you can choose which of the colours you would like you have. Later on there will be more advanced tutorials showing how you can use a microprocessor to do even more colours and various other things that the backlight can be used for.

## What the kit includes:

- 1 x dual LED RGB backlight panel
- 3 x 1k resistors
- 1 x pre cut polarizing filter

Note: Make sure you have all the parts before beginning the installation.

## Tools and parts needed:

- Fine tipped soldering iron
- Solder
- Fine gauge wire (around 30AWG is best)
- DMG or Pocket Gameboy
- Triwing screwdriver
- Small Philips screwdriver
- Hot glue gun
- Small razor blade
- Small cutters

## Getting started:

First take your triwing screwdriver and undo the 6 screws on the back of the gameboy. There are two under the battery cover. Don't force the gameboy apart, if you have all 6 screws fully undone then the gameboy should come apart easily.

Now that the gameboy is apart you will see a white ribbon cable holding the front of the gameboy to the back. Carefully pull the ribbon cable down towards the bottom of the gameboy so that it is released from the socket on the back half of the gameboy.

Once you have the front half of the gameboy separated from the back you can begin to undo the 10 philips screws that hold in the circuit board.

Note: It is a good idea to find a small pot or plastic bag to hold all the screws so that they don't go missing.

This next bit can be a bit difficult, you have to lift the circuit board out of the front half of the gameboy. Keep the gameboy face down so that the buttons don't fall out, and carefully try to lift the circuit board out. Try to lift it vertically and evenly so as not to bend it or break off any of the plastic posts that it sits on. You will find that the screen is actually stuck down and will need a little bit of force to remove. Sometimes twisting the plastic part of the gameboy slightly helps to loosen the screen.

Now you should have the circuit board free from the plastic part, turn it over so that you can see the screen. You will see two screws in about the middle of the board, they go through the brown ribbon cable at the bottom of the screen. Undo these two screws.

Next you need to remove the white plastic frame that the screen sits in. To do this turn the screen over again where you will see white clips that go though the circuit board, push them with your screwdriver to make them pop out of place.

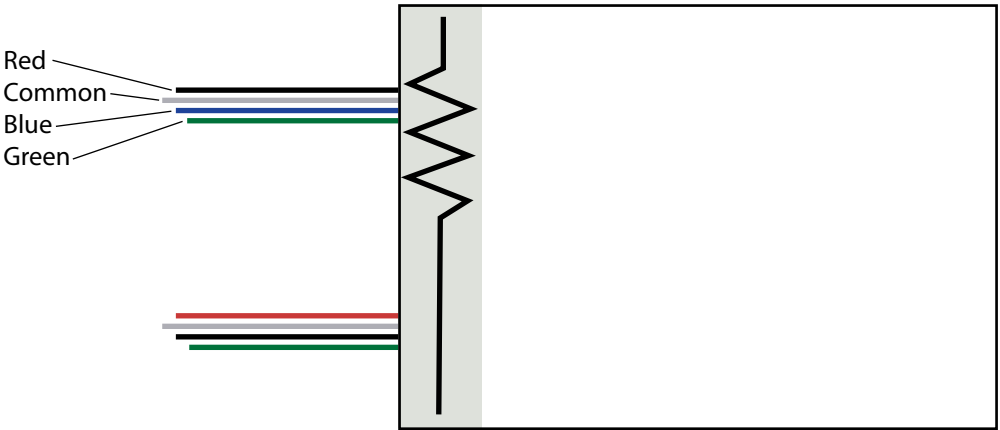
Once all the plastic clips have been unclipped you can start to lift the screen up, be very careful as the screen is delicate. Push the screen out from the plastic frame by lifting the plastic frame up with the screen and pushing the screen out from the back.

Use the small cutters you cut the plastic frame so it can be removed, you won’t need it because the backlight will act as a support. Be careful not to cut the ribbon cables going to the screen itself.

This is probably the hardest part of installing the backlight, you need to remove the rear polarising layer from the screen. The screen has two polarising layers on it, one on the front and one on the back DON’T remove the front layer; you need to remove the one on the back that has a foil layer stuck to it. Lift up the screen slightly making sure the bottom right corner of the screen doesn’t scratch the circuit board too much and damage the tracks, then using the razor carefully lift the polarizing layer from the back of the screen. On some gameboys the layer comes away easily, but on others it takes a bit more work and can leave behind some glue. If the glue is left behind just use some alcohol cleaner and your finger to rub it off.

Note: be very careful when handling the screen, the ribbon cables can be easily damaged and the sharp glass corners can easily damage the circuit board. Try to avoid getting too much dust and finger prints on the screen, and if you do, wipe them off with a lint free cloth.

Now your gameboy is ready to be backlit but first you need to prepare your backlight. If you look at your backlight, you will see that it has the Nonfinite logo on one side. This is the front and should be facing you when you install it. You will also see that unlike other backlights this backlight has 8 pins. The 8 pins are in two groups of 4; each group of 4 is for one of the LEDs. If you look at this diagram you can see what each pin does:



The LEDs use a common Anode, which means there is one pin for that supplies power to the 3 different colours. This is called the “common” pin in the diagram. This is the pin that you must supply with 5v+ from the gameboy. The other 3 pins need a resistor each and then are attached to ground depending on what colour you want. But there are two LEDs so first of all cut the excess length off the pins using your cutters. Leave about 4mm left. Now take your soldering iron and solder and “tin” each of the 8 legs. This means put a small amount of solder on the legs so that the wires will have a strong

connection. Next take 4 wires and cut them so they are about the right length to join one of the top pins to the bottom pins (about 4cm should do.) Strip each wire at both ends using the cutters and tin the wires in the same way you did with the backlight pins. Then one by one, solder the wires to the pins. Start with the top pin of the top LED and solder it to the top pin of the bottom LED. Repeat this with all 4 pins.

Now you have the LEDs joined together so they will both light up the same colour. You could have them lighting different colours but this is not recommended as the colour of the backlight effects the contrast and having two different colours would mean part of the screen was in contrast while the other part was not.

Wire 4 more wires to one of the LEDs on the back light. Make the wires long (about the length of the gameboy) and if possible colour code them so you know which wire does what. The other ends of the wires will be wired in to the back half of the gameboy so we will do that later when putting the gameboy back together.

Next you have to slide the backlight in behind the screen, the Nonfinite logo should be on the left. It is at this point that you should remove the clear plastic film that is protecting the front of the backlight. After this point try to avoid touching the backlight to keep it clean.

Between the backlight and the screen you will need to slide in the polarizer. You have two options with this, if you insert it and the screen goes black (very dark blue) then this means the screen will be inverted when you use it. If you then rotate the filter layer by 90 degrees you will see it returns to the more normal greeny yellow colour that the screen used to be. This will mean the screen behaves as it used to. Some people find that inverting the screen is easier to look at for a long time.

You now have all the layers in place, the backlight, then the polarizing layer and finally the screen itself. Arrange the whole lot so that the active area of the backlight (not the part with the Nonfinite logo, shown in grey on the diagram) and the polarising layer line up with the screen properly. This is the part where you need your hot glue gun; once you are happy that everything is lined up, put a small bit of glue onto each corner of the screen just so that it is held to the circuit board. Use one hand to hold the screen in place until the glue is dry.

Note: the tip of the glue gun gets very hot, don’t touch it directly against the ribbon cables as this could damage them.

Once you are happy that the screen is securely held in place you can start putting the gameboy back together. Make sure the wires you wired to the backlight are out of the way and place the circuit board back into the plastic shell of the game-boy. Check that the buttons are in the right places too and that the rubber pads are sitting correctly. You have to put back all 10 screws.

Note: the screws must only go in holes that are marked with a white circle around them. The two at the top are normally spaced by the plastic frame around the screen, so don’t do these ones up so tight. As a rule if the screw is starting to make the circuit board bend then it is too tight.

Next it is time to start wiring the backlight in to the gameboy. Have the front half of the gameboy lying face down on the left side of the back half.

First wire the Common wire to the 5v+ supply of the gameboy. This can be found by looking at the back half of the game-boy. There is a small circuit board down the left hand side with 4 wires coming out of it, 3 green and one red. They are soldered to the main circuit board in the back half of the gameboy in the bottom left corner, you will see 4 solder points. Solder the common wire to the bottom solder point.

Next you have your 3 colour wires to wire in. these wires will each need a resistor. Like you did with the pins on the backlight, cut down the pins on the resistors, then tin them and solder them to the wires. The resistors can be either way round.

Now for your colour options:

- Just the red, gives you red
- Just the green gives you green
- Just the blue gives you blue
- Red and green gives you yellow
- Red and blue gives you purple
- Green and blue gives you light blue
- All three gives you white

Once you have decided which colour you are going to use, you have to solder the other end of the resistors to ground. There are many ground points on the gameboy but one of the easiest to find is in the bottom right corner of the back circuit board, there is a solder point for the battery. Solder the combination of wires to that point to get the colour you want. Any unused wires should be taped up in case you want to change the colours later.

It's a good idea to test the backlight at this time, so put some batteries in the gameboy and switch it on. If the screen lights up then you have done everything right. All that is left is to put the gameboy back together.

Re insert the white ribbon cable into the back half of the gameboy carefully. Don't bend it too much because they can break inside. Then put the two halves of the gameboy back together, making sure none of your new wires are going to get trapped.

Put in the 6 triwing screws and you are done!

