

[Ещё](#)[Следующий блог»](#)[Создать блог](#) [Войти](#)

EmerythHacks

Am I a hacker yet?

Tuesday, May 28, 2013

The Retina saga continues

Thank you all for your interest in my Retina-DP adapter. I'm still working on it. I doubt I can make it a commercial product, but I hope I can at least make a design that is easy and cheap to reproduce.

For the next prototype I have designed a very simple two-sided PCB - just a DP connector and panel connector, with backlight lines brought out on a pin header (to be able to test different backlight solutions) and resistor footprints for the simplest possible backlight driving. I designed the PCB in Kicad and had it manufactured by **Smart Prototyping**.

Switching over to Kicad from Eagle was a major pain, but after a few days of cursing I got used to it. :)

The PCB and Smart Prototyping review

This was my first time ordering PCBs from Smart Prototyping and I'm very satisfied with the results.

Their prices are basically the same as those of Itead and Seeed, but they offer some interesting services, such as cheap stencils.

The order was shipped 8 days after placement, and shipping via HK registered mail took only 5 days!

The boards came out fine, the design was within safe specs - 8 mil traces with 10 mil spacing.

Two surprising things happened: first of all, I have received 11 boards for the price of 10! Secondly, they have fixed my silkscreen for me - I had left resistor names between the pads (that's where Kicad put them by default), and somebody moved them to the side so they don't get covered by the resistors.

This was fine for me, since they actually helped, but someone else might have been upset that they messed with the gerbers.

Here are some shots of the boards:

About me

Emeryth

Hi, my name is Andrzej. I play around with embedded stuff for fun and sometimes for money.

[View my complete profile](#)

Things I like

[Warsaw Hackerspace](#)

[EEWeb Toolbox](#)

[Hak5](#)

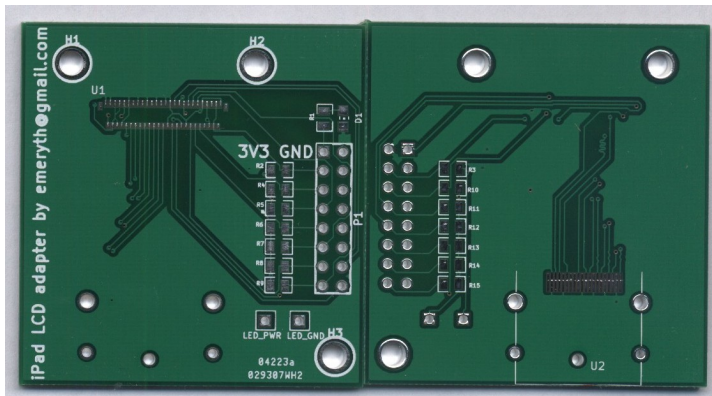
[Hack a Day](#)

[Dangerous Prototypes](#)

Followers

Blog Archive

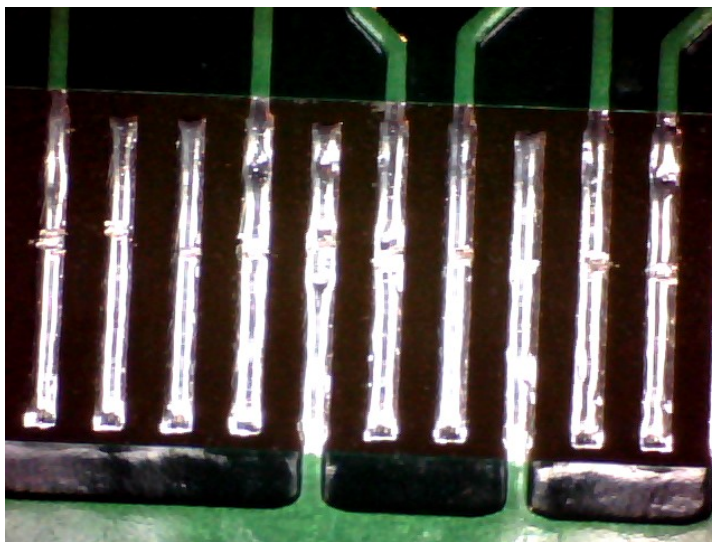
- ▼ 2013 (4)
 - ▼ May (1)
 - [The Retina saga continues](#)
 - April (1)
 - March (1)
 - January (1)



Both sides of the board

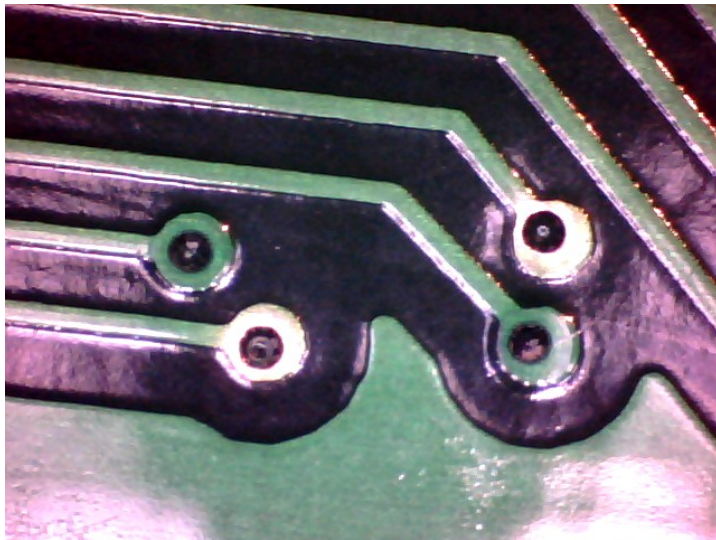


Silkscreen, 1mm height

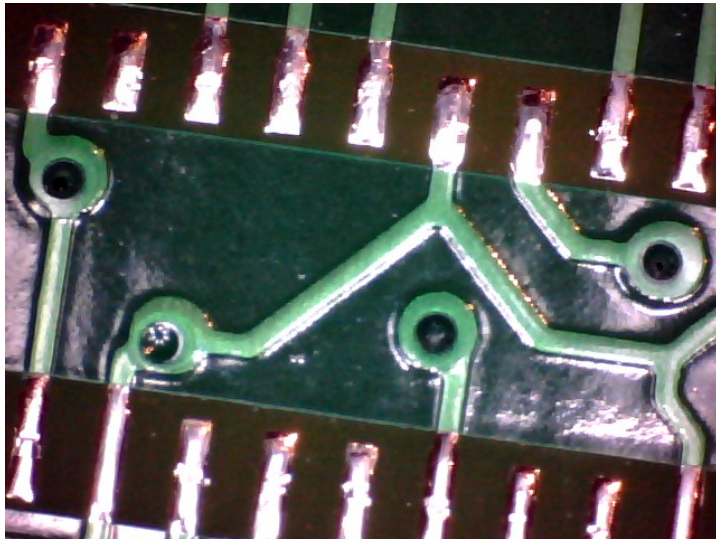


The DP connector pins have less spacing than the recommended 10 mil, but still came out fine

- ▶ 2012 (2)
- ▶ 2011 (3)
- ▶ 2010 (4)

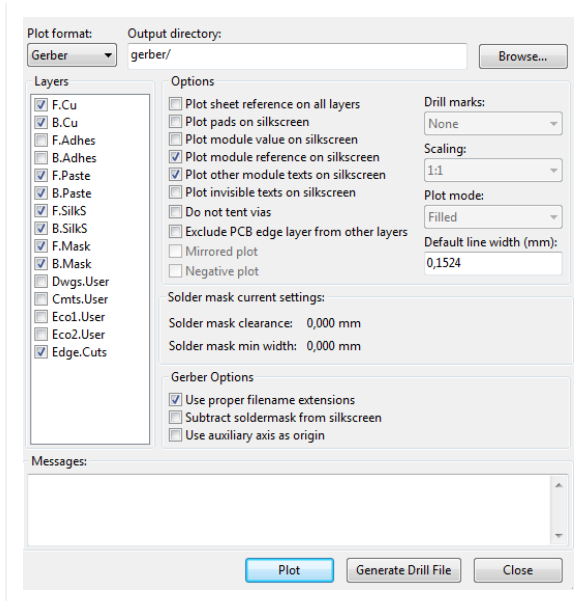


Some vias (12 mil drill, 18 mil diameter)



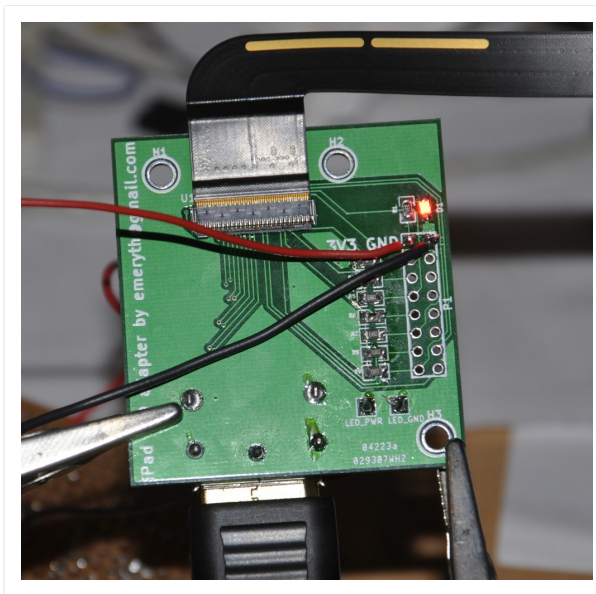
Some more vias

If someone is wondering, here are my settings for generating gerbers in Kicad:



You have to draw the board outline on the Edge.Cuts layer and then rename the resulting .gbr file to .gml

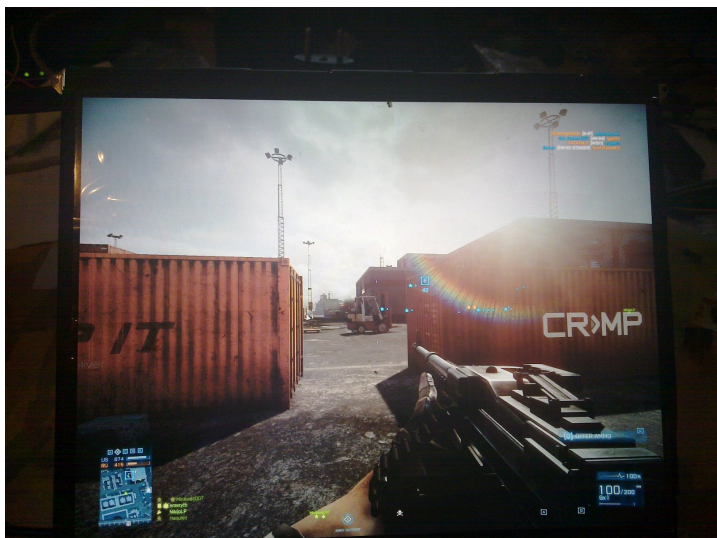
Results



Soldered and connected

The board works fine, it's obviously much better than the previous one.

Here's a picture of Battlefield 3 running at native resolution:



I will work some more on the design, try to add some backlight control and switching regulators

My goal is to create the cheapest possible board for this, I think it can be done for less than \$40.

I don't have the money to invest in the production of this thing, but I think I'll just release the design when I'm done and maybe sell a couple of hand made boards.

In the meantime, I can part with some of the PCBs from this batch, if anyone's interested in soldering their own adapter. Sorry, I'm all out.

The design files of this board (in Kicad format) are on GitHub:

https://github.com/Emeryth/iPad3_lcd

The board uses a Molex 502250-5191 connector for the panel FPC, and a MC34467 DisplayPort socket.

Posted by **Emeryth** at 3:11 AM

 +5 Recommend this on Google

52 comments:



Henry Millican May 29, 2013 at 9:21 AM

Hi Andrzej, congrats on the updated board!

How well did the soldering of the FPC connector go? I see you omitted solder mask between the pins.

I did up a board of my own, inspired by your last post and the simplicity of the embedded DisplayPort connection on the screen.

<http://i.imgur.com/2mxRlfz.png> is the eagle render, and <http://i.imgur.com/YxEdhvE.jpg> are the produced boards. These haven't been built yet, waiting on a few parts (slow postal service as always). I noticed a couple small mistakes on my board but it should work as intended. I plan to eventually do another revision if people are interested. These boards cost \$17 each in parts + pcb to

produce. I am using several sample chips to save costs on this prototype run.

A future version of my board would be 4 layer and use different chips for the backlight control, but the cost would be under \$30.

If anyone has any questions you shoot me an email at henry@tehserv.net. I will be posting more information on my site rmmod.net soon, including my schematics and brd files.

Reply

Replies



Emeryth May 30, 2013 at 6:25 PM

Your comment was classified as spam, try using less links and dollar signs ;)

Soldering the molex connector went smooth with a regular iron, it was certainly easier than on a home-made PCB.

But the lack of solder mask was not in my design, they must have done it when they messed with the gerbers.

You've got a nice board there yourself.

Better get it ready for mass production, because you will be swimming in requests for eyefinity kits :)

Reply

Anonymous May 29, 2013 at 2:41 PM

Wow, thanks a lot, I might try it myself since I have a broken Ipad but the screen still works.

Reply

Anonymous May 29, 2013 at 10:05 PM

How did you manage to solder the molex connector by hand? Also, OSHPark does services for mini boards for about \$10 for 3 four layerboards of that size.

Reply

Replies



Emeryth May 30, 2013 at 3:07 PM

I soldered the molex connector using a regular soldering iron with lots of flux and a desoldering braid for backup.

The pins of the connector stick out a little from under the plastic, just enough to touch them with the tip, also the plastic is heat-resistant, so it won't melt during soldering.

Anonymous June 1, 2013 at 10:52 PM

I've been trying to solder this connector for an hour now and no dice, I've been trying for far too long and I'm getting frustrated... if you are looking to sell a assembled board I would buy it off ya.



Henry Millican June 11, 2013 at 1:49 PM

Got any solder paste?

if you do, you could dab it on the pins or pads for the connector, and hit it with a hot air gun, frying pan, or toaster oven.

If not, all I can recommend is lots of flux like Emeryth said.

Reply



Thomas Grigal May 30, 2013 at 4:00 PM

Great project! I'm stoked for the possibilities of screens imbedded in my bar at home. Will this drive the iPad 1 lcd?

Reply

Replies



Emeryth June 2, 2013 at 12:07 AM

Nope, only the iPad3 retina panel - LP097QX1-SPA1.



Vegar Hatlevik June 22, 2015 at 12:03 PM

How about the iPad mini 2 retina panel? Seems to me that that panel should have an eDP interface as well in order to be able to drive the high resolution, but I have no docs on that. The iPad3 retina panel is just a little too large for my project.

Reply



Darien May 30, 2013 at 10:43 PM

Cool, I'd be interested in the new design with the backlight control. What is the process for getting one of the spare PCBs you have right now, if I want something to play with in the meantime?

Reply

Replies



Emeryth June 2, 2013 at 12:22 AM

Just send me an email with your mailing address.
I'll send you one for free.

Octavian Constantin Tudora February 26, 2014 at 2:47 PM



Hello can you send me one spare part ? I can pay via paypal. I will like to use to build a projector. Is not need for back lighting resistors or controller.

Reply



John Byron Hanby, IV June 1, 2013 at 4:01 PM

can you hook this up to like a dvd player or other 1920x1080 device and show how it acts? Thanks!

Reply

Replies



Emeryth June 2, 2013 at 12:12 AM

You can only connect it to a DisplayPort source.
It does support lower resolutions, it just scales the image like any other LCD panel.

I can't take any more pictures right now, I gave the panel to my friend who commissioned this project.

Anonymous June 21, 2013 at 2:00 AM

what about using an HDMI to mini-DP adapter?
http://www.pccasegear.com/index.php?main_page=product_info&products_id=14692&cPath=625&utm_source=googlebase&utm_medium=cse&utm_campaign=export_feed&gclid=CID2x-Dr87cCFcZapgodc3QAow#googlebase

Anonymous June 21, 2013 at 6:23 PM

Unfortunately you can't do that, HDMI doesn't support the DP format... DP will support the HDMI format. If you want to convert to HDMI from DP you need some conversion electronics.

:S Yeah I know, I wish it would be that simple.

Reply



\$ June 3, 2013 at 12:32 PM

I'd definitely buy one of these if anybody offers them for an acceptable price :)

Reply



John Byron Hanby, IV June 4, 2013 at 1:52 AM

2 questions...

What did you use as power, and what voltage and amperage?

Did you solder a Displayport female header to the board, or just cut the wire, and is the board's current design compatible with a header?

Thanks!

Reply

Replies



Emeryth June 4, 2013 at 1:59 AM

You need 3.3V (at about 400mA) for the panel and 20V (at about 200mA) for the backlight.

For example, I'm using a 5V/2A power supply connected to a 3.3V linear regulator and a 20V step-up switching regulator.

This board has a footprint for a MC34467 DisplayPort socket, no cable cutting is required.



John Byron Hanby, IV June 11, 2013 at 9:11 PM

Thanks for the info! Was wondering if you could give a list of components mentioned above, and a diagram of the layout? Tried to find what I needed on my own, however feeling more and more like I'm going to fry it all to hell when the board gets here, and that would be sad =(.

Thanks so much!

Reply

Anonymous June 9, 2013 at 5:14 PM

If I'm interested in buying more than a dozen, how many can you make at what price? And how many does it cost to ship them to The Netherlands?

Reply

Replies



Emeryth June 10, 2013 at 11:56 PM

I'm sorry, I'm unable to manufacture any at the moment.

Reply

Anonymous June 11, 2013 at 9:21 AM

... someone produced:

<http://dp2retina.rozsnyo.com/>

Reply

Replies

Anonymous June 11, 2013 at 8:18 PM

I prefer this board. Simple, Cheap and it does exactly what I want. Thanks Emeryth!

Anonymous June 11, 2013 at 8:20 PM

Thanks for the link though. :)

Reply



Keith Wakeham June 12, 2013 at 6:59 PM

I wonder if Apple is using the same eDP interface inside their retina laptops. I'd love to get my hands on a 13" or 15" retina display. Great work Emery

Reply

Replies



John Byron Hanby, IV June 12, 2013 at 9:18 PM

Had the same thought, however was unable to find any displays.



Keith Wakeham June 12, 2013 at 11:54 PM

laptopscreens.com has them, but they aren't cheap. 250 dollar minimum on retina 15", and 400 for retina 13". The ipad one is the most cost effective.



Octavian Constantin Tudora February 26, 2014 at 2:32 PM

LCD SCREEN FOR GOOGLE CHROMEBOOK has 40 pins connector it may be compatible with LVDS cables. The pins are larger than at the IPAD3 LCD

model: LP129QE1 SPA1

interface eDP

Price:

US \$64.99(ebay) 28 to 50 USD (alibaba)

Resolution (Pixels): 2560 x 1700



Octavian Constantin Tudora February 27, 2014 at 3:08 PM

This LCD is a good candidate instead mac retina display!

Almost the same resolution at a fraction of the price!

The price is almost the same with the Ipad 3-4 LCD but better resolution and more convenient dimensions for watching videos and films. This post is for you Keith Wakeham. 28 USD instead of 400 USD for almost the same performing LCD. 12.9" instead of 13" is not noticeable.

Tyberius Prime March 13, 2014 at 11:27 AM

I can only find that display for 130 USD on Aliexpress? (I do see the 65 USD on ebay though).

Reply



jayk June 14, 2013 at 9:53 PM

Is it possible to purchase the LCD panel in a 13 or 15" retina display macbook pro and create monitors out of them? I'd love to take 2 15" MBPr display panels and turn them into monitors. Thoughts/

Reply

Replies



Henry Millican June 15, 2013 at 12:06 AM

Possible? Probably.

The issue is the lack of a datasheet on those displays.
Another thing is that they ship without a FPC cable like the one on the iPad display. These FPC cables are very expensive to manufacturer.
If you buy one of the whole rMBP screen assemblies I imagine you could use that FPC cable.

I'm going to pick up one of those assemblies and start testing soon.
Based on the pin count it seems they are embedded DisplayPort as well. I would need to determine which pins are the signals, and then the power and connections for the backlight.

Reply

tath June 18, 2013 at 10:17 AM

I think you could easily roll to kickstarter with this.

Reply

Replies

Anonymous August 11, 2013 at 11:01 PM

Second That!



Jean-Philippe Abraham October 17, 2013 at 7:44 PM

The same ! Must do it and I buy instantly 5

Reply



SpringHalo July 3, 2013 at 7:53 AM

Looking good! I just requested a sample of two connectors from MOLEX for this. Do you think it would be feasible to add a 5v -> 20v boost converter so it could be powered via USB or would that be pushing the 1A limit of USB specs? Also, would a simple 555 dimming circuit be easy for light control or should a more complicated current limiting IC be used instead?

Reply



dwight doane July 21, 2013 at 4:39 AM

Ok, so I followed the tutorial on how to get the gerber files from your schematics using this tutorial

<http://hackaday.com/2009/01/15/how-to-prepare-your-eagle-designs-for-manufacture/>

then I put those gerber files in a zip and I just upload those to smart prototyping correct?

would it be possible for you to email me a zip of the gerber files you used?

I would feel better about ordering them if you did

I don't feel confident using the ones I made.

dwight.j.doane@gmail.com

Reply

Anonymous August 3, 2013 at 2:48 AM

<https://plus.google.com/u/0/112526208786662512291/posts/Tdqf4BeLQVk>

Looks like Adafruit will be making some :)

Reply

Anonymous August 24, 2013 at 9:16 PM

You are awesome! Great work! But will this adaptor work with another retina displays with same size and resolution but different manufacturer?

Reply



Karel September 7, 2013 at 11:20 AM

Any idea if you could do the same thing with an iphone screen? Does it also use edisplayport or the LVDS thingy?

Keep up the good work!

Regard,
K.

Reply

Lusheng Xu October 30, 2013 at 4:24 AM



Hi there, you can using smart-prototyping also doing the BOM sourcing and assembling testing. This will save your time and money which is produce in China.

Reply



Octavian Constantin Tudora February 26, 2014 at 12:58 PM

To solder this connector is pain in the ..

I cud not solder it. The PCB tracks are to fragile.

If somebody have an PCB made in a industrial factory let me know.I want to be cheap and easy.I am not enthusiastic for fancy converters for LEDs.

Maybe it is a way to buy already made PCBs with the connectors soldered.

Reply



Octavian Constantin Tudora February 26, 2014 at 2:26 PM

LCD SCREEN FOR GOOGLE CHROMEBOOK has 40 pins connector it may be compatible with LCVD cables.

model: LP129QE1 SPA1

interface eDP

Price:

US \$64.99(ebay) 28 to 50 USD (alibaba)

Resolution (Pixels): 2560 x 1700

Reply

Replies



Tucker Downs April 14, 2014 at 11:48 PM

Any updates on this?

Reply



Gkh August 1, 2014 at 3:04 PM

excellent work.

It was what I have been searching for.

How many will be interested in getting fully assembled board? I need one to my self

catch me on Fagtekniker@gmail.com

Reply



Stan Kanafoski August 7, 2014 at 5:11 PM

Great job, enjoyed reading

stan@digital-play.com

Reply

Daniel S. September 14, 2014 at 6:03 PM

Hey there, it looks awesome and I think u could get this on Kickstarter.

Creating the frame and the board.

Think about it ;) It seems like this is very popular. Hope u read this soon, I would buy a complete pack in an instant.

[Reply](#)



Khoa Do March 14, 2015 at 4:25 AM

thay màn hình ipad 4 giá bao nhiêu mất thời gian bao nhiêu vậy tác giả, có đội lấy liền được không

[Reply](#)



pooja sharma March 29, 2015 at 5:57 AM

minecraft codes for you friends.

minecraft gift code generator online

[Reply](#)



Manish Belwal May 11, 2016 at 8:19 AM

Flexible or flex printed (FPC) boards are Huge demand of market, Pcbfpcboard.com is leading manufacturer China of FPC boards at reliable price with easy delivery.

FPC Board

[Reply](#)

Enter your comment...

Comment as: Google Account

[Publish](#)

[Preview](#)

[Home](#)

[Older Post](#)

[Subscribe to: Post Comments \(Atom\)](#)

Awesome Inc. theme. Powered by Blogger.
