

Lynx's PassMe Construction and Use Reference Manual

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Chapter 1

Lynx's PassMe Construction and Use Instructions

1.1 Requirements for Building and Using a PassMe

1.1.1 Hardware Needed to Run Your Own Code

- Nintendo DS (Obviously)
- Nintendo DS cart (Now, any cart will work)
- GBA Flash Cart

1.1.2 Tools Required to Build and Program PassMe

- Soldering Iron
- Flux (I use a flux pen, it works very well)
- 3v power supply
- Multimeter
- Grinder (Dremel or equal)

1.1.3 Parts List: What To Order

1.1.3.1 Required Parts for PassMe

Quantity	Part	Part Number	Source	Unit Price
1	XC9572XL (CPLD)	122-1265-ND	http://www.digikey.com/	\$3.09
1	3 in. sq. Custom PCB	http://www.dspassme.com/files/PassMeGerber1.4.zip	http://www.sparkfun.com	\$7.50
1	1" x 3" sticker or tape		Walmart, Office Depot, etc.	

1.1.3.2 Optional Parts for PassMe

NOTE: New CPLD Code no longer makes use of LEDS!!!

These parts are not strictly required for the PassMe to work. They are primarily for debugging your circuit as you are building it. The ones I make for sale do not include these additional parts, because I program the CPLD and test it before shipping the unit and know that the unit is working.

All of these parts are available at www.digikey.com. Pricing and product numbers were accurate as of 7 March 2005.

Quantity	Part	Digi-Key Part Number	Unit Price
2	220 Ohm Resistor	RHM220JCT-ND	\$0.074
1	Green LED	160-1169-1-ND	\$0.11
1	Red LED	160-1167-1-ND	\$0.11

1.1.4 Required Parts for Programming

- 1 - Parallel Cable
- 1 - 4.7K resistor
- 1 - 6 pin header (Or equivalent)

1.1.5 Ordering the Parts

So, go to <http://www.sparkfun.com> . Select "Custom PCBs" on the menu. Scroll down to the bottom and enter "3" in the Quantity box and select "Add to Cart".



Figure 1.1: Quantity box

Now "Checkout" and follow directions to process the order.

Next, you will need to e-mail the Gerber and Drill files to the e-mail address listed on the Custom PCBs order page.

Next, we need to order the CPLD so go to <http://www.digikey.com/> . In the search box at the top, type in 122-1265-ND. Enter 1 for the Quantity and click "Add to Order". Click "Finish Order" and follow order processing instructions.

Index	Quantity	Part Number	Description	Customer Reference	Backorder Quantity	Unit Price USD	Extended Price USD
1	1	122-1265-ND IC	CPLD 72 MCELL C-TEMP 44-VQFP		0	3.09000	\$3.09
Subtotal							\$3.09
Handling							\$5.00
Shipping							unknown
Sales Tax							unknown
Total							unknown

Figure 1.2: Digikey Order Page

Now, we wait for the parts to arrive.

Once they arrive, continue with **PassMe Construction**(p. 4).

1.2 PassMe Construction

1.2.1 Grinding your PCB

Due to not being sure how precise the machines cutting the PCBs would be, there is a little extra around the sides that need to be ground off. Here is what the original PCB will look like when you receive it.

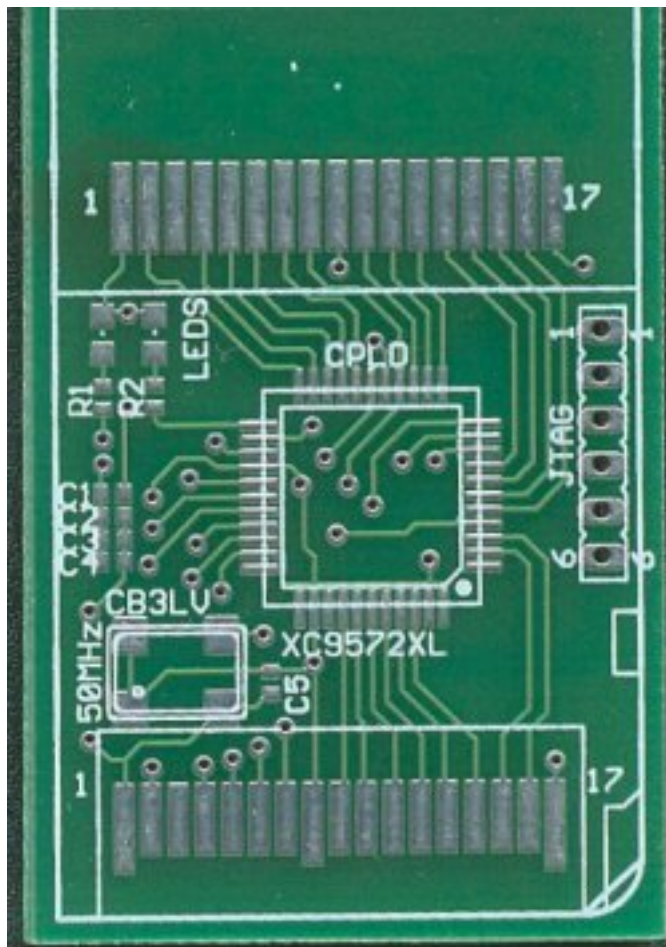


Figure 1.3: Original PCB

Using a dremel with a grinding bit or, in my case, I used a grinder for working with metal, remove the extra PCB around the outside and test fit the card in your DS.

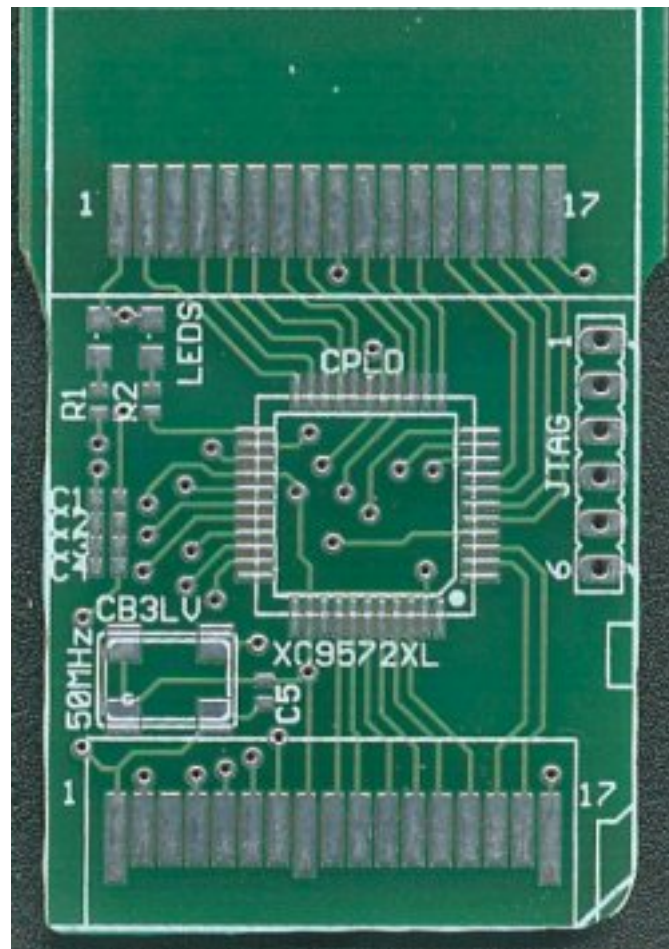


Figure 1.4: Ground PCB

1.2.2 Building your PassMe

1.2.2.1 The Bare Minimum

So, if you're the type of person that is happy with doing just the bare minimum, here is what you need to do.

Liberal­ly apply flux to all 44 pads. Lay CPLD on pads and make sure they all line up with the dot on the CPLD in the same position as the dot on the PCB.

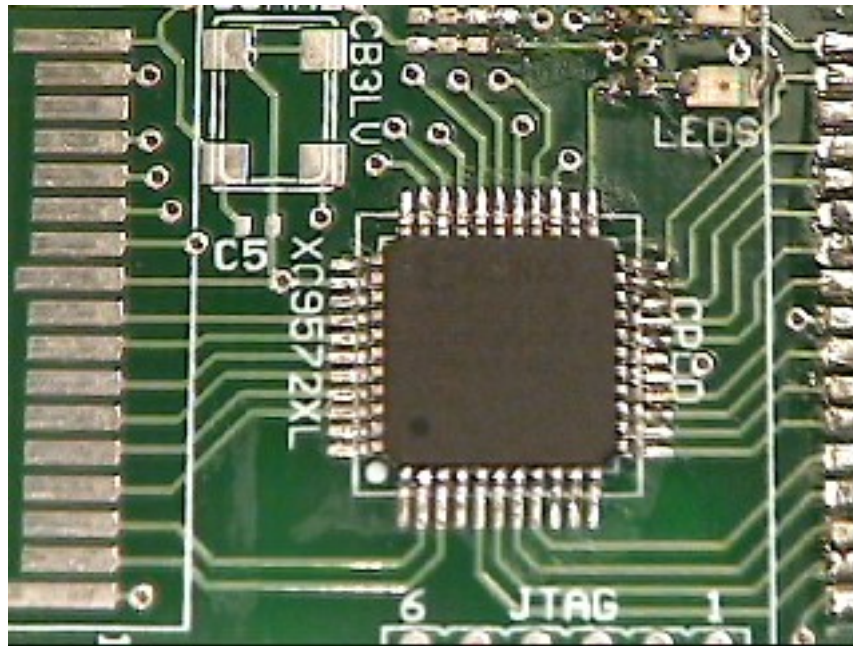


Figure 1.5: CPLD

This will be a perfect fit. Now, do not apply any solder to your iron. The custom PCB from Sparkfun.com has been dipped and has solder on it. So when you touch your soldering iron to the CPLD pin and pad, the solder will "flow" to the pin on the CPLD. This only takes a fraction of a second, so don't let the iron hang out on there. We don't want to overheat anything. Now, do this for the rest of the pins.

When you are complete, now we test each pin on the CPLD to make sure we have a connection from the CPLD to the PCB. So, set your multimeter to test for shorts or diodes. Then, put one lead on pin 1 of the CPLD and the other lead on the farthest part of the pad that it touches. This will confirm that your CPLD is connected. Do that for each pin.

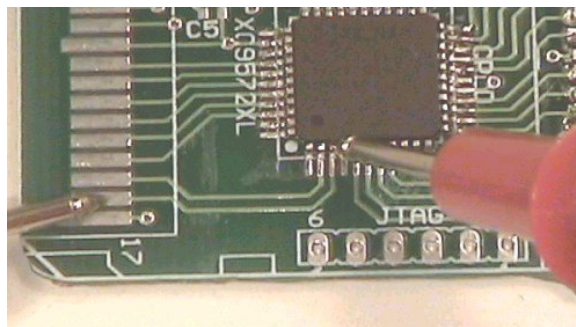


Figure 1.6: Testing Pin 3 on CPLD

Now, when soldering the PCI Pins on, I would solder two or three, and then test fit the cart, to make sure everything is lining up fine. After soldering all the PCI pins on, I would test from the cart to the PCB connection to make sure the pins were making contact with the cart. If not, remove the cart and gently press down on the pin(s) to bend them down.

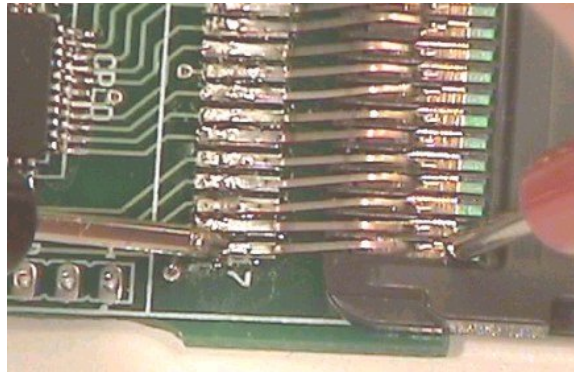


Figure 1.7: Testing Cart to PCB

Finish your PassMe by applying a 1" x 3" sticker, or tape to the back of the PCB. This will keep the bottom contacts from shorting out inside the DS and causing damage.

1.2.3 Adding Flair

NOTE: New CPLD Code no longer makes use of LEDS!!!

For those of us that would like to express ourself, and go beyond the bare minimum can add flair by putting on the 2 LEDs and 2 Resistors. Now, keep in mind that **THESE ARE NOT NEEDED!** And, I will tell you right now. Get ready for some frustration. The resistors are MICRO sized. Like the width of a hair! And I don't mean a rabbit. They have no problem sticking to just about EVERYTHING but the PCB after they have touched the flux.

Anyway, add flux to the pads on the PCB. Now, place the resistor on the PCB between the pads labeled R1. Try to hold the resistor down in place and quickly touch the end with the soldering iron. Now, continue holding the resistor in place and quickly touch the other side as well. Repeat for R2.

The LEDs are a little "harder", and if you touch them for to long, the pads will melt off. That would be bad (and believe me, I know). I found it easier to have the LEDs a little to the sides when soldering as the pads on the PCB and the LEDs are the exact same distance. And unless you can solder UNDER the LED, it's a little difficult to solder.

Now, on to **jtag Construction**(p. 8).

1.3 jtag Construction

1.3.1 Building your JTAG Cable

Information for this design obtained from <http://warmcat.com/milksop/cheaptag.html>

Note that we use a different orientation for the header!!

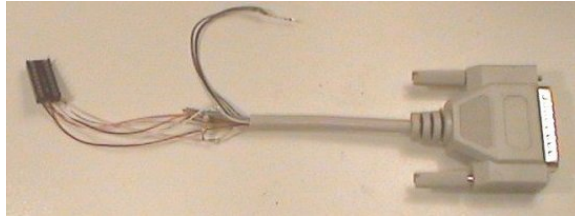


Figure 1.8: CheapTag

Jump down to wiring the header if you are following the instructions on the URL above.

So take your parallel cable and cut it down to about 8 - 10 inches long from the DB25 connector that will connect to your parallel port. Now, strip about 5 inches of the main insulator away. Strip the end of each wire and grab your multimeter again. Put one lead onto a wire and drag the other lead along the DB25 connector till you find it.

Now, strip a little section away toward the DB25 connector on the wires of pin **13** and **15**. Now tin the wires by applying solder to the wires. Cut down the leads on the 4.7k resistor and solder it between those pins. Now, strip back wires **8**, **11**, and **12**, and wrap them together and solder them. Cover with tape if it makes you feel better.

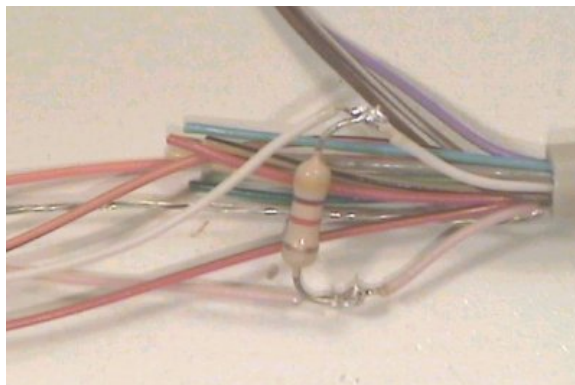
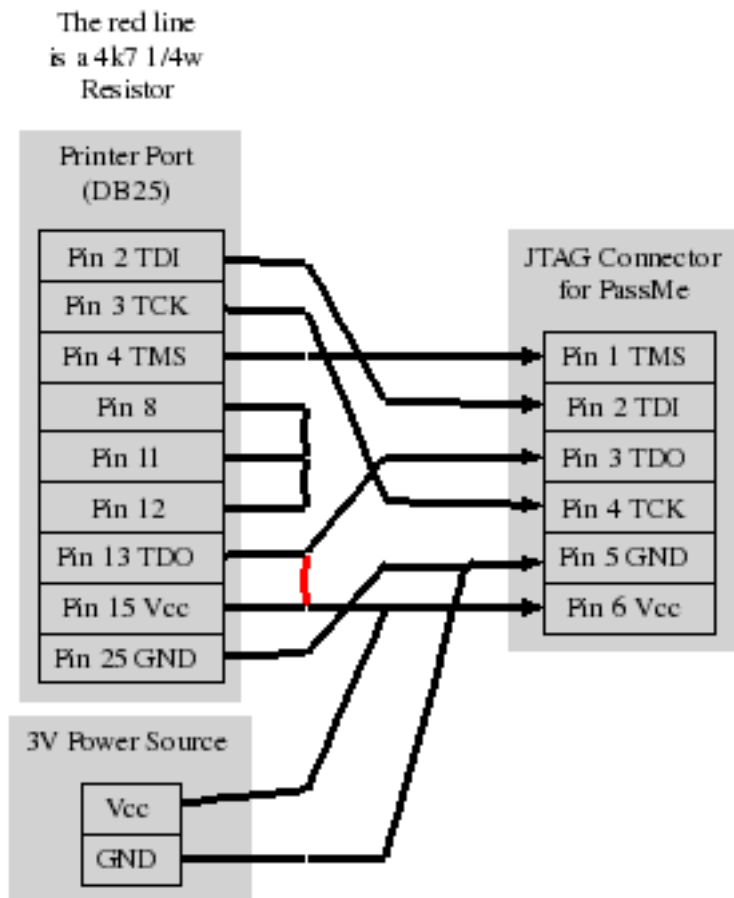


Figure 1.9: CheapTag Resistor

Now, for the header wiring:



Now all of the parts are ready, so it's time to **Programming the CPLD**(p.10)

1.4 Programming the CPLD

Go to Xilinx web site and register so you can download their free ISE WebPACK software for programming the CPLD

http://www.xilinx.com/products/design_resources/design_tool/index.htm

The code for the CPLD can be found at (New code from DarkFader):

<http://www.dspassme.com/files/PassMeCPLD1.4b.zip>

So, now we need to launch iMPACT. You will be prompted with the screen below:

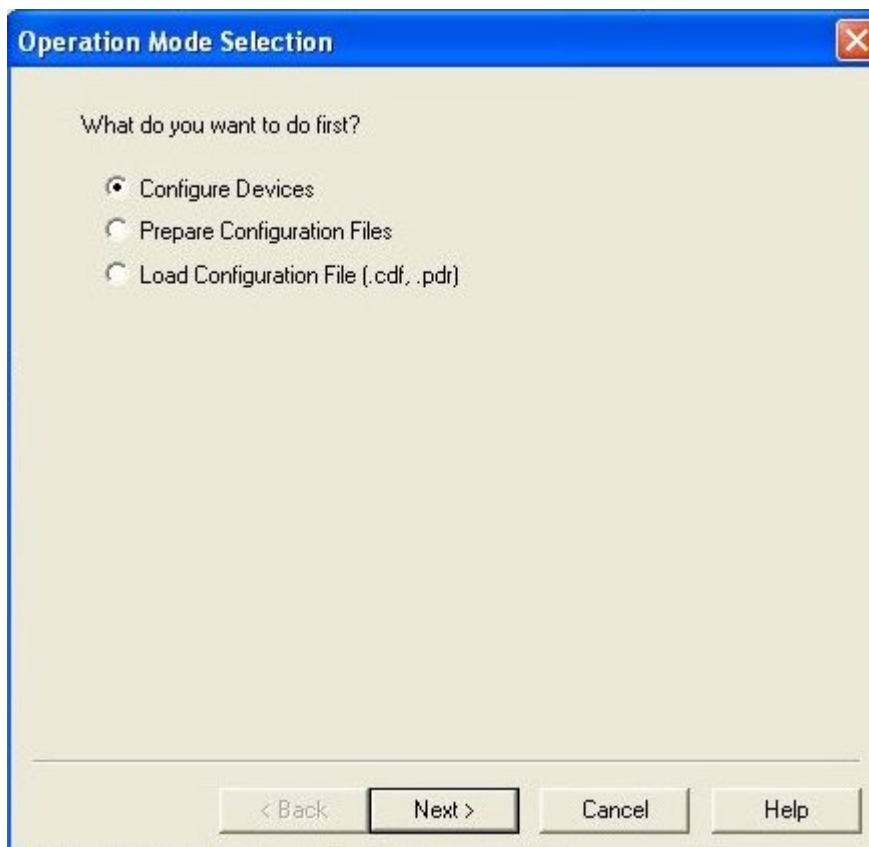


Figure 1.10: iMPACT Mode Selection

Click cancel.

Next, right-click in the black white space at the top, and select "Add Xilinx Device from the list.



Figure 1.11: Add Xilinx Device

Select the `cpldpass.jed` file from the `PassMeCPLDxx.zip` file listed above:

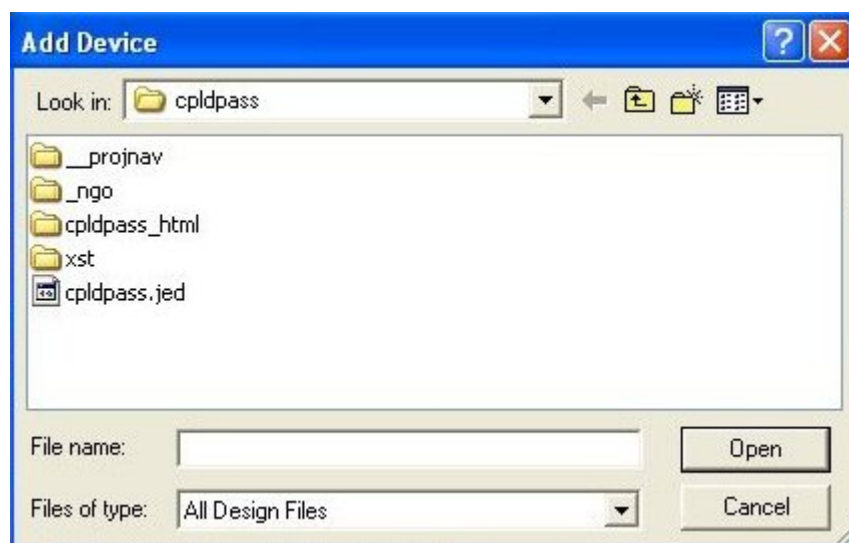


Figure 1.12: Add Device

You should see the following screen:

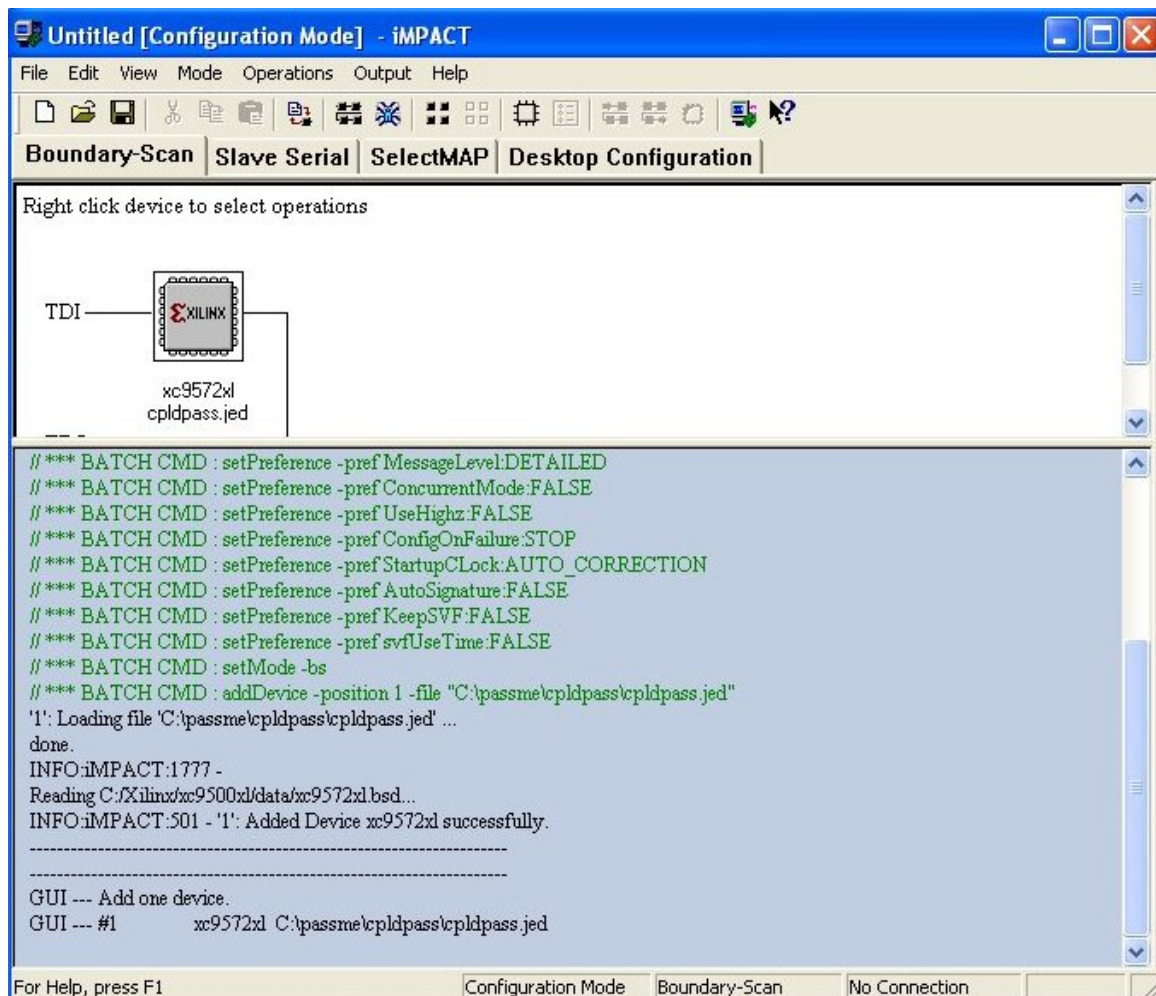


Figure 1.13: PassMe Code Loaded

Now, just right-click on the device, and select "Program..."

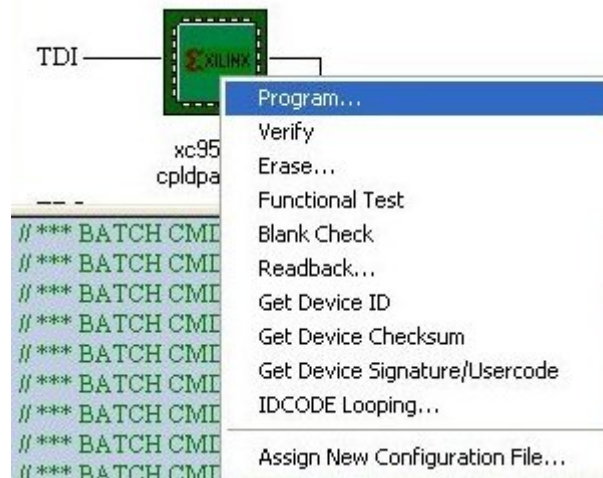


Figure 1.14: Programming the CPLD

You'll get the following screen. Be sure to also check "Verify" from the list, and select OK:

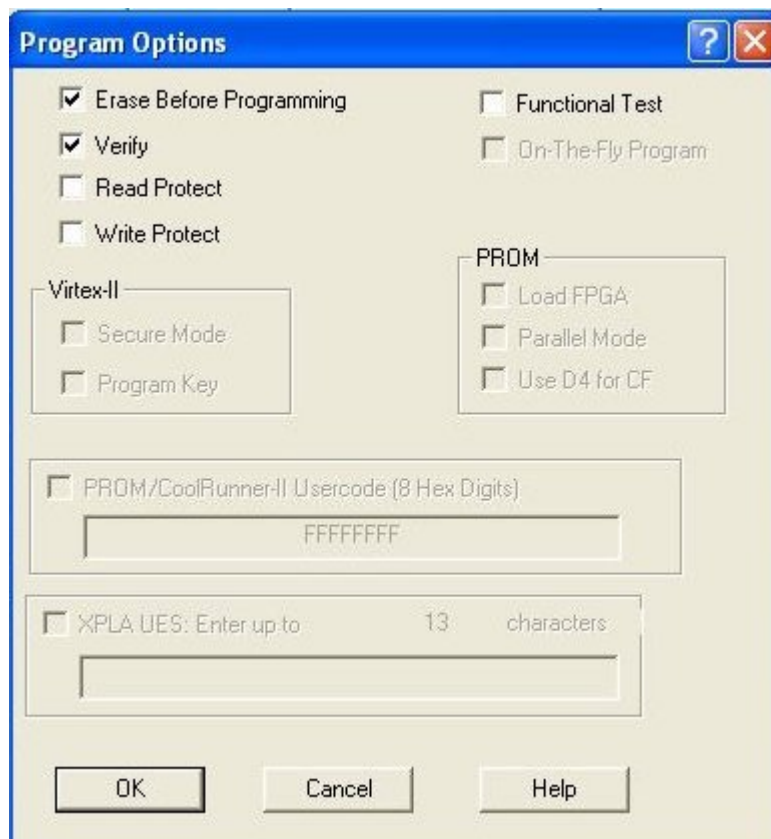


Figure 1.15: Program Options

Now you should see:



Figure 1.16: Executing command...

And.. finish with this!

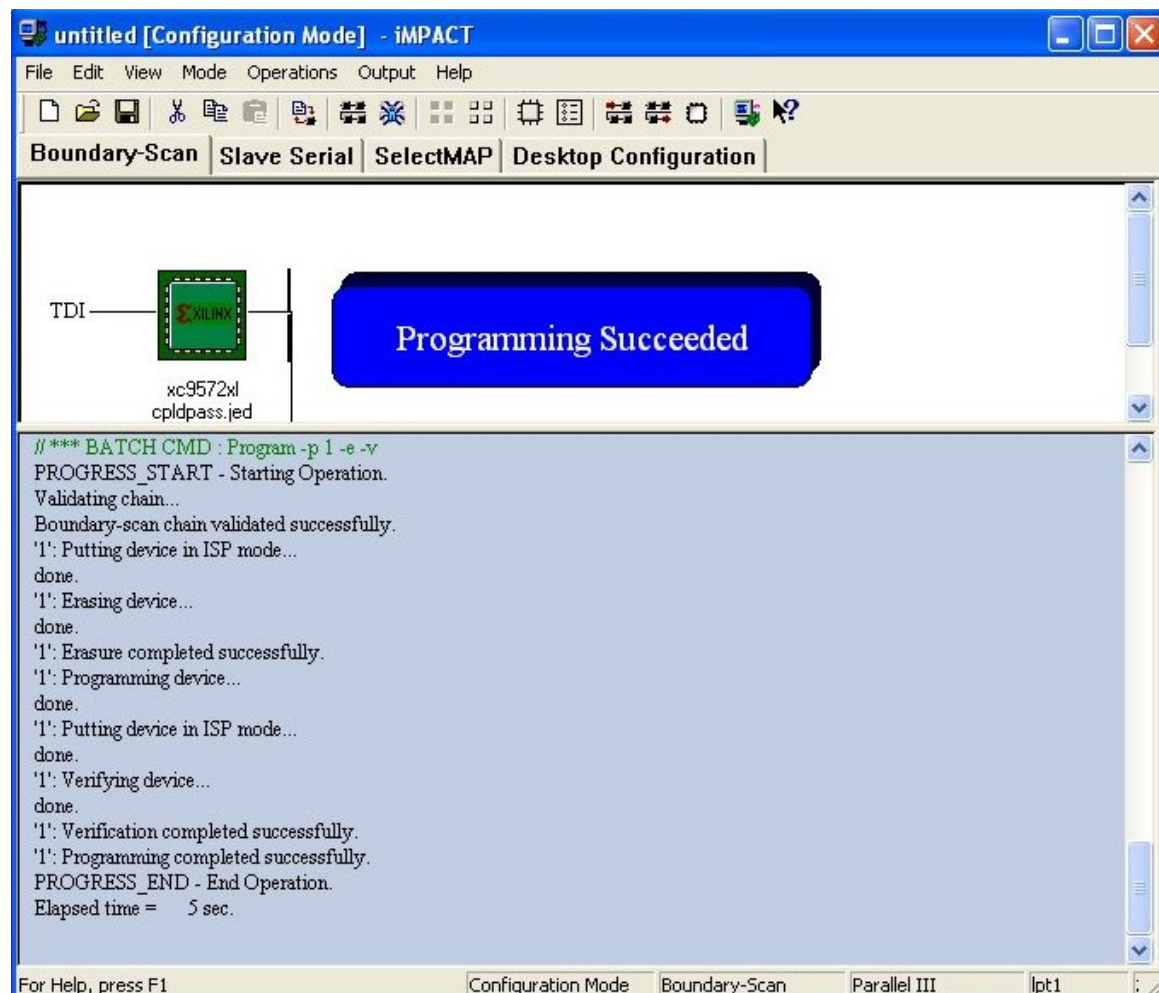


Figure 1.17: Programming Succeeded!

Finally, everything is ready. When purchasing a PassMe from www.dspassme.com, the PassMe unit that will arrive will be in this state, ready for you to go straight to the next section. Onward to **Using the PassMe**(p. 15).

1.5 Using the PassMe

1.5.1 Testing a Demo!

Go to one of the following sites and download a demo:

Author	Demo Location
Joat	http://www.bottledlight.com/ds/
Dovoto	http://www.drunkencoders.com/ds/

More sites listed here: <http://www.dspassme.com/links.shtml>

Now, make sure you are downloading the passthrough version of the demo/game. It should be a name.ds.gba file.

Next, I'm not sure if this is needed, or if you can make the ds.gba the first file on your flash cart for it to work, but if you wipe your flash cart, and **ONLY** load the ds.gba file, it should work.

Write the demo to your flash cart, pop it into your DS, toss your PassMe with your DS Cart inserted, and boot up! The DS Demo should start.

If not, On to **Troubleshooting**(p. 16).

1.6 Troubleshooting

So, after all of this, your PassMe isn't working. Here is a troubleshooting guide to determine what is causing the problem:

1.6.1 Troubleshooting Starting Place

- You are having problems building the PassMe. Go to **Problems Building the PassMe**(p.16).
- You are having problems using the PassMe. Go to **Problems Booting**(p.16).

1.6.2 Problems Building the PassMe

Programming the CPLD Failed:

1. Use a multimeter to test connections. For details, see **Testing Pin 3 on CPLD**(p. 6)
2. Apply flux and resolder the pins on the CPLD.

1.6.3 Problems Booting

You've flashed your GBA Cart and inserted it into the NDS. You've also put the PassMe into the NDS with a DS Cart inserted into the passme. When you turn on your NDS, what do you see?



NDS Boots to GBA Screen(p. 17)



Nintendo Logo is Pixelated(p. 17)



NDS Screens Both White(p. 17)

1.6.4 NDS Boots to GBA Screen

1. Check to make sure PCI pins are making contact with DS cart. For details, see **Testing Cart to PCB**(p. 6)

1.6.5 Nintendo Logo is Pixelated

1. Check to make sure PCI pins are making contact with DS cart. For details, see **Testing Cart to PCB**(p. 6). I'm not sure which pin, but I have seen this as well, and checking the connections seems to fix it.

1.6.6 NDS Screens Both White

This is actually good, this means that PassMe is working, you just need to figure out why it won't run DS code from your flash cart.

- Is your linker listed on the **Tested Flash Carts**(p. 19) page as "Works fine?" If so, go to **NDS Screens Still Both White**(p. 18). If not, you can still go to this section. If you're still having problems, you're best bet is to go to IRC #dsdev channel and inform the community of the following details:
 1. Linker hardware/software you are using.
 2. Source of PassMe (www.dspassme.com / www.natrium42.com / www.kraln.com / other / home built.)
 3. Version of VHDL code used if known.
 4. Demo being tested.
 5. Let them know that you've followed this troubleshooting guide. Include any odd behavior by the NDS while following the guide. It will help the troubleshooting process.

1.6.7 NDS Screens Still Both White

1. Try erasing your flash cart and only loading the name.ds.gba file. (Not the .bin file, those are only for emulators.)
2. Try a demo that is known to be working.

On to **Tested Flash Carts**(p. 19).

1.7 Tested Flash Carts

1.7.1 Flash Carts that have been tested with PassMe!

Note: SuperCard and Play Yan DO NOT work with PassMe

Cart	Experience
GBA Movie Player Version 2	Out of the box, no! But, after updating the firmware, it can now be used with a PassMe to run Homebrew NDS roms. Go Here for installation instructions.
Visoly Xtreme Linker + 256	1) Using Configuration Menu... need to make sure that menu is not written for a single file 2) Must use Write to Cart tab, and not Drag+Drop into CartView
XG1 128 Mbit	Uncheck "Use Loader" in menu.
EZ-Flash II Power Star EZ-Cart 512mb	From the menus verify that the card manager app won't load a multiboot loader or try to remove intros.
EZ-Flash II Power Star 256mb	From the menus verify that the card manager app won't load a multiboot loader or try to remove intros.
EZF-Advance 128mb	Uncheck Multirom under Options.
X-Rom 512	Disable the Menu.
Magic Flash 256	Was a bit tricky. I found out that the flash card was a copy of "PowerFlash" (or something like that). So it's a bit of a hack :(First you need the MagicFlash software. Remove all roms from the cart, and rebuild the menu. Then get "FuzzyPro" software (the PowerFlash stuff), and write the .ds.gba rom straight to the card. This writes straight to the start of GBA memory, and overwrites the MagicFlash menu. However, if you want to rewrite the card, you have to re-run the MagicFlash software and rebuild the menu (for some reason?!?). Then you can copy the .ds.gba across using FuzzyPro again
EZ-Flash 3 1gb	DarkFader and Davr to the rescue. Get a working loader Here .
EZF-Advance III 256mb	Works fine.
Flash2Advance 256mb	Works fine.
Flash2Advance Ultra 256mb	Works fine.
Flash Advance 2 128mb	Works fine.
Extreme Flash Advance 512mb	Works fine.
Extreme Flash Advance 256mb	Works fine.
Visoly Flash Advance Pro 256mb	Works fine.
Visoly Parelell Port 128mb	Need to hack case to fit into DS, but works fine.
G6 Flash 1Gb 2nd Generation	Works fine.
Visoly Extreme 64mb	Works fine.