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An Open Source 8-Bit Computer to Save the World

Jul 16, 2010 By [Miguel Hernandez \(/users/miguel-hernandez\)](#) 188 people like this.

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At a recent [local LUG \(http://sgvlug.org\)](http://sgvlug.org) I regularly attend, [Braddock Gaskill \(http://braddock.com\)](http://braddock.com) gave a wonderful presentation on an open source 8-bit computer he had created. This was his first public debut of the device and every person in attendance was enthralled. Later, we met over coffee since I wanted to let him know (and ask if it was ok) that I thought his device would make for a great piece for [Linux Journal \(http://linuxjournal.com\)](http://linuxjournal.com). [Braddock \(http://braddock.com\)](http://braddock.com) agreed and we started to chat about both the Humane Reader & Humane PC.

The goal of the [project \(http://humaneinfo.com\)](http://humaneinfo.com) was to create an extendable, hackable 8-bit general computing platform, designed for both hobbyists and developing nations, that can be displayed on televisions. The Humane Reader can be used as an ebook reader and comes with a 2GB SD card where you can put about 5000 ebooks or, roughly, the entire contents of [Wikipedia \(http://wikipedia.org\)](http://wikipedia.org). This allows anyone to bring a 5000 book library or all of Wikipedia into a home or school that does not have access to internet content. One of the main features he wanted was hackability. The screen is displayed in typical shell fashion. There is a keyboard, which is optional, since it has a four-button controller that allows you to go left or right on the numbers/letters display for selection. One of the coolest tidbits about the device is that the number/letter selection interface is actually using the [Morse code sequence \(http://en.wikipedia.org/wiki/Morse_code\)](http://en.wikipedia.org/wiki/Morse_code) - so all the amateur radio fans are going to love this device even more. What's even more amazing is that [Braddock \(http://braddock.com\)](http://braddock.com) is shooting for a price point of \$20US for the Humane Reader! There is also the Humane PC which allows you to hack on a smaller scale which uses an 8-bit microcomputer. Both the Humane Reader and Humane PC are based on open source software and hardware.

The [project's \(http://humaneinfo.com\)](http://humaneinfo.com) design requirements included needing NTSC/PAL output, an SD card interface (w/FAT file system), a cheap input interface (buttons) and a micro-usb adapter for power (there is also an optional keyboard). The AVR ecosystem is built using [Arduino \(http://en.wikipedia.org/wiki/Arduino\)](http://en.wikipedia.org/wiki/Arduino). The Arduino platform provided access to a wide variety of extensions ("shields") and its software provides an educationally-oriented "easy" IDE. It also has an excellent community around it which provide tutorials, forums, documentation, etc. Hence, Arduino provided Shields, IDE and was software-compatible. The [project \(http://humaneinfo.com\)](http://humaneinfo.com) chose a FAT file system so that you could dump data directly onto the device from the PC and he implemented a solution for improved [seek times \(http://en.wikipedia.org/wiki/Disk_seek\)](http://en.wikipedia.org/wiki/Disk_seek) on the device. [Braddock \(http://braddock.com\)](http://braddock.com) wanted the device powered through USB for several reasons - 1/3 of the world owns a cell phone, Micro-USB is the worldwide cell phone charger standard (which means it allows him to keep his costs low). [Braddock \(http://braddock.com\)](http://braddock.com) took the Micro-USB 5v power connector and had to convert it to 3.3v.

This is a wonderful [project \(http://humaneinfo.com\)](http://humaneinfo.com) that could, potentially, have far-reaching and positive effects on the global community. For those of us who believe in open source and open standards as a vehicle for having a positive impact on our world, this is a great marriage. You could do many things with the device (as

explained above). Not unlike so many other great open source projects, assistance is welcomed. [Braddock](http://braddock.com) (<http://braddock.com>) is looking for help in various areas- testing on older televisions (as long as they have composite video out), could use contacts with NGOs and usability testing on the keyboard/controller. You can read all about the project, view presentation slides and see a video of the presentation taken while at [SGVLUG](http://sgvlug.org) (<http://sgvlug.org>) at the [Humane Informatics website](http://humaneinfo.com) (<http://humaneinfo.com>).



Attachment	Size
Humane PC screenshot (http://www.linuxjournal.com/files/linuxjournal.com/ufiles/HumanePC.jpg)	52.61 KB

Miguel Hernandez is the Founder & Head Geek at the OpenMindz Group, an IT consulting and web development firm in Los Angeles, California.

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Some DVD players used to be (</content/open-source-8-bit-computer-save-world#comment-353930>)

Submitted by Anonymous (not verified) on Jul 19, 2010.

Some DVD players used to be sold for \$30. They have a video out, a processor good enough to display shiny menus and user interfaces, all kind of multimedia playback facilities, and the developed world is throwing away truckloads of those in favor of blu-ray readers or whatever. Wouldn't it just make more sense to develop open firmwares for such devices and turn them into wikipedia readers - instead of wasting resources building a new platform which appears to be more limited? Or at least reuse the same kind of chips that powered those things in the first place? I have the feeling that there are already many devices in the \$20-\$30 price range (MP4 players? cellphones?) with more computing power than this project.

**noods head** (</content/open-source-8-bit-computer-save-world#comment-354124>)

Submitted by traeg (not verified) on Jul 26, 2010.

a blu-ray player ISNOT 30 dollars unless you live in a place where the cost of living is sooooo low. even then a blu-ray player is not 30 dollars and dvd/blu-ray players do not display pdf, or websites. nor or they hackable. this is a opensource project and as far as cellphones. maybe where these devices are going they most likely dont have cell phone towers, limited power and not that many tv in the whole town. not to mention no internet so this project may seem like a waste of resources to like they say "opinions are like assholes, everybody has them".

**Great points** (</content/open-source-8-bit-computer-save-world#comment-354128>)Submitted by [Miguel Hernandez](/users/miguel-herandez) (</users/miguel-herandez>) on Jul 26, 2010.

Great points, traeg. Just one slight clarification: it seems the anonymous poster is saying that dvd players are \$30 which (which they can be).

Agreed, though, that this open source project had its eyes on areas where there might be limited internet connectivity. Though there's no reason that folks around the world can't use it for hackability or as a cool little device to play with & showoff to fellow geeky friends. I know I plan to buy one as soon as they become available.

Thank you for posting!

Miguel Hernandez is the Founder & Head Geek at the OpenMindz Group, an IT consulting and web development firm in Los Angeles, California.

([users/miguel-herandez](/users/miguel-herandez))**Wonderful idea, as is the Humane.** (</content/open-source-8-bit-computer-save-world#comment-353938>)

Submitted by Anonymous (not verified) on Jul 20, 2010.

Wonderful idea, as is the Humane. Let me dovetail with this. Companies are disposing of thousands of computers a month. They are complete and can be easily re-furbished (purge the disk and re-load software) for pennies. Why not use these and keep them out of the landfills?

**Morse Code is user friendly?** (</content/open-source-8-bit-computer-save-world#comment-353913>)

Submitted by Anonymous on Jul 19, 2010.

Morse Code is user friendly?

**Great little project.** (</content/open-source-8-bit-computer-save-world#comment-353909>)Submitted by [GuruSantiago](http://www.ElectronicsIsFun.com) (<http://www.ElectronicsIsFun.com>) (not verified) on Jul 18, 2010.

I really like the idea and it make for a good entry for someone starting out.

Thank You,
GuruSantiago

Want to learn more about electronics?

The GuruSantiago can help. Checkout his videos here:



<http://www.youtube.com/user/ElectronicsIsFun>
And follow him on twitter @ElectronicsFun

Something Similar (</content/open-source-8-bit-computer-save-world#comment-353905>)

Submitted by Ayoub (not verified) on Jul 18, 2010.

Hi,
Amazing work, thank you for sharing.
Something similar which is also inspirational is being done by Derek Lomas.
Basically the project utilizes ten dollar 8-bit computers for which they develop open-source educational games. You can see Derek's excellent presentation on the subject here: <http://bit.ly/3QMnDX>



Hmm (</content/open-source-8-bit-computer-save-world#comment-353902>)

Submitted by Anonymous (not verified) on Jul 18, 2010.

Great idea but is it possible that a cell phone could do this too with appropriate connectivity and hackability? Ie a cell phone is much more powerful and without an expensive account could have more utility for those of limited means. Not a criticism, just a thought.



a cell phone wouldnt be much (</content/open-source-8-bit-computer-save-world#comment-354125>)

Submitted by traeg (not verified) on Jul 26, 2010.

a cell phone wouldnt be much use since, believe it or not, some places dont have cell towers for cell phones to connect to. that would be kinda good tho. taking a cellphone chip adding av outputs on it soldering a sd reader on it along with a onboard 2gb minisd card already onboard. erasing the os and putting linux on it. it could be possible if you can find a opensource hardware cellphone otherwise your just gonna get sued.



The developed world needs this as well. (</content/open-source-8-bit-computer-save-world#comment-353900>)

Submitted by Alsaf (not verified) on Jul 18, 2010.

As most of the developed world, particularly where I come from the UK, are facing enormous cuts in public services due to having to cut government budget deficits. Devices like this could help make the money that governments have to spend on public services go that wee bit further.



Memories (</content/open-source-8-bit-computer-save-world#comment-353898>)

Submitted by AJSB (not verified) on Jul 18, 2010.

This reminds me my 1st computer...no, not a ZX81....it was a TIMEX-Sinclair TS-1000...same as a ZX81 but with a "upgraded" RAM to an amazing 2KB !!!...and i managed to write programs to it :)
Aaaahhh, good old days where every single BYTE of RAM was valuable...
Gonna check this project...



My ZX81 arrived as a number (</content/open-source-8-bit-computer-save-world#comment-353984>)

Submitted by JohnHM (not verified) on Jul 21, 2010.

My ZX81 arrived as a number of pieces that I had to solder together. It had 1k of RAM, but one could purchase a 16k RAMpack to obtain immense power ;-) I also bought a proper keyboard to replace the flat one provided. The output was to a TV, so I picked up a second-hand 10" screen to use as a dedicated monitor. The whole lot, including a cassette recorder to load code from tape, I shoe-horned into a DIY wood and formica box, with pitched sloping top to present the screen and keyboard at the correct angle for eyes and fingers and 16? individual wires soldered to the bus so I could lay the RAMpack flat.



I still wake up panicked in the middle of the night when I remember I dispatched the whole lot to the landfill in 2001. What would it fetch on eBay today?

Wonderful (</content/open-source-8-bit-computer-save-world#comment-353895>)

Submitted by JBang (not verified) on Jul 17, 2010.

As I've heard before... Super Fuck Yeah!!!



Well now... (</content/open-source-8-bit-computer-save-world#comment-353896>)

Submitted by [JShuford \(/users/jshuford\)](#) on Jul 17, 2010.

It probably isn't necessary to use that kind of language to communicate your emotions!

jshuford@gmail.com



[\(/users/jshuford\)](#)

[speaking of cheep hardware. \(/content/open-source-8-bit-computer-save-world#comment-353892\)](#)

Submitted by in [ÇÇÇÇP, Us R Toys \(not verified\)](#) on Jul 17, 2010.

speaking of cheep hardware, is there any interface for some the junk electronics sold at All yer wal R blong to us?



[no analog modem? \(/content/open-source-8-bit-computer-save-world#comment-353891\)](#)

Submitted by [larry ellison, minister of world domination, bwaha.org \(not verified\)](#) on Jul 17, 2010.

how are we going to hook this up to our arduino horde botnet?



[Open Source for Global Health - \(/content/open-source-8-bit-computer-save-world#comment-353870\)](#)

Submitted by [heatherlagarde \(/users/heatherlagarde\)](#) on Jul 16, 2010.

This could be SO valuable for local health workers in Africa - we'd be very interested in looking at testing it in the field for IntraHealth and the IntraHealth OPEN initiative.



[\(/users/heatherlagarde\)](#)

I will contact Braddock Gaskill - thanks so much for writing about this.

-Heather LaGarde
IntraHealth OPEN

[This is awesome! \(/content/open-source-8-bit-computer-save-world#comment-353880\)](#)

Submitted by [Miguel Hernandez \(/users/miguel-herandez\)](#) on Jul 17, 2010.

I've long said that if you create something, when it's placed in the hands of others, it's amazing the uses that folks come up with. I'm super duper glad to hear this, Heather! And might I add, props to you on being involved in such a world-changing project.



[\(/users/miguel-herandez\)](#)

Please do keep us posted on the progress of your endeavor as well as the IntraHealth OPEN project.

Miguel Hernandez is the Founder & Head Geek at the OpenMindz Group, an IT consulting and web development firm in Los Angeles, California.

[As above ..".My first \(/content/open-source-8-bit-computer-save-world#comment-353848\)](#)

Submitted by [harryx \(not verified\)](#) on Jul 16, 2010.

As above ..".My first computer was a Z80-based Sinclair ZX-81" I remember constructing it from a kit ...my manual dexterity with the small components and a 20 watt soldering iron leave something to be desired , I still would like to give this project a try ... Downloaded the file but there isn't any doc file



An interesting article

harry H retired

[Which file did you download? \(/content/open-source-8-bit-computer-save-world#comment-353860\)](#)

Submitted by [Miguel Hernandez \(/users/miguel-herandez\)](#) on Jul 16, 2010.

Hello Harry. Which file did you download? The humane-20100408.tgz file has a readme.txt in the root that gives a nice breakdown of what's in the subfolders. The /hardware /mechanical subfolder has a pdf in it with the entire list of the hardware order - in case you'd like to buy the parts & build it yourself. I guess that's kind of like building it from a kit.



[\(/users/miguel-herandez\)](#)

Personally, I'm with ya on the whole lack of manual dexterity thing. ;)

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[no docs directory](#) (/content/open-source-8-bit-computer-save-world#comment-353897)

Submitted by bill (not verified) on Jul 17, 2010.

I just downloaded humane-20100408.tgz and it contains the following:

```
README.txt
/hardware
/releases
/software
```

What happened to /doc and /attic?



[/doc](#) (/content/open-source-8-bit-computer-save-world#comment-353927)

Submitted by [Braddock Gaskill - HI](#) (<http://humaneinfo.com>) (not verified) on Jul 19, 2010.

I removed /doc from the tarball because what little documentation it had was out of date.

The README.txt should get someone started, but anyone who seriously wants to participate should contact me directly and I can get them up to speed. Obviously we need more docs, a repo, mailing list, etc - I'm just getting the project set up for collaboration, but wanted to get an initial tarball released.

Braddock Gaskill
braddock@braddock.com



[That reminds me of my first computer ...](#) (/content/open-source-8-bit-computer-save-world#comment-353844)

Submitted by Steve Moyer (not verified) on Jul 16, 2010.

My first computer was a Z80-based Sinclair ZX-81. It was under \$100, used a TV set for the display and had a membrane keyboard.

Given the advances in technology since then (1981?), it's great to see that the idea still has merit. If the computer is \$20 and you buy a cheap \$5 USB keyboard along with a \$20 SD card full of books/knowledge you'd have a lot of educational possibilities. Of course, \$45 is still a lot of money in many parts of the world.



[Nations with no online connection](#) (/content/open-source-8-bit-computer-save-world#comment-353861)

Submitted by [Miguel Hernandez](#) (/users/miguel-hernandez) on Jul 16, 2010.

I hear ya but the key is it's providing a solution for developing nations who don't have access to online content. But it will come with a 2GB SD card, though.

Miguel Hernandez is the Founder & Head Geek at the OpenMindz Group, an IT consulting and web development firm in Los Angeles, California.



(/users/miguel-hernandez)

[Way Cool!!!](#) (/content/open-source-8-bit-computer-save-world#comment-353839)

Submitted by [JShuford](#) (/users/jshuford) on Jul 16, 2010.

Thank you :D

I will certainly enjoy making one of these little "bad-boys" myself!

jshuford@gmail.com



(/users/jshuford)

[On second thought...](#) (/content/open-source-8-bit-computer-save-world#comment-353867)

Submitted by [JShuford](#) (/users/jshuford) on Jul 16, 2010.

How difficult would it be to set this up for video play-back of different formats?

jshuford@gmail.com



(/users/jshuford)

[playback of video formats](#) (/content/open-source-8-bit-computer-save-world#comment-353888)

Submitted by Anonymous (not verified) on Jul 17, 2010.

Theres not enough CPU grunt in a small 8bit AVR based unit for video playback.



[Let us know](#) (/content/open-source-8-bit-computer-save-world#comment-353863)

Submitted by [Miguel Hernandez \(/users/miguel-herandez/\)](/users/miguel-herandez/) on Jul 16, 2010.



[\(/users/miguel-herandez/\)](/users/miguel-herandez/)

I know I'd be interested to hear your findings. Thank you for commenting, J.

Miguel Hernandez is the Founder & Head Geek at the OpenMindz Group, an IT consulting and web development firm in Los Angeles, California.

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