



1940 UNION ST. STE. 32  
OAKLAND, CA  
94607

# C.H.I.P. User Manual

*Next Thing Co.*

*Product: Linux Computer*

*Model: HELLA1337*



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## Compliance Statement

**FCC ID: 2AF9F-HELLA1337**

**IC: 20863-HELLA1337**

### **FCC**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### **Industry Canada**

This device complies with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions:

1. This device may not cause harmful interference;
2. This device must accept any interference received, including interference that may cause undesired operation of the device.

Cet appareil est conforme à Industrie Canada une licence standard RSS exonérés (s). Son fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne doit pas provoquer d'interférences
2. Cet appareil doit accepter toute interférence reçue, y compris les interférences pouvant provoquer un fonctionnement indésirable de l'appareil.

### **Information to User**

CAUTION: Changes or modifications not expressly approved for compliance could void your authority to operate this equipment.

Label Instruction:

The outside of final products that contain this module must be labelled with "Contains FCC ID: 2AF9F-HELLA1337" and "Contains IC: 20863-HELLA1337".

## Start CHIP. Boot CHIP.

First things first. Let's boot CHIP into the CHIP Operating System and do some computer things! Add some power, turn on the wireless network, and even connect a bluetooth keyboard to get rid of those annoying cables.

### Power Up

The single most important thing to using any electronic device is getting electricity to the right places. We're going to cover how to turn CHIP "on". This might seem so straightforward that it doesn't deserve several paragraphs, but CHIP is pretty clever, so there's actually a few things worth knowing.

#### What's It Need?

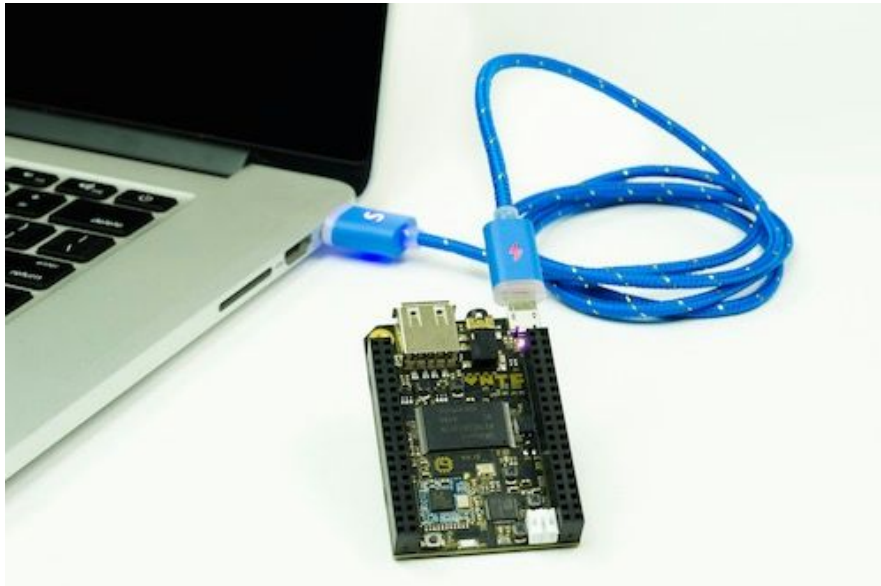
In general, CHIP is powered by a 5-volt source like a USB port or phone charger, and draws about 300mA peak (at boot time), runs on around 100mA, and rests with around 80mA with the processor totally unloaded. This may be more than you need to know if you just want to plug it in to the wall, but, as you build projects with CHIP, you'll be happy to know there's a lot of ways to get the electricity flowing.

#### How Do I Know CHIP Is On?

CHIP is silent. It doesn't take much energy, so it's not very hot. It has no discernible smell. As a result, many of your senses are not great indicators that it is working. There are two LEDs next to the USB micro connector. When CHIP is on, you should see the PWR LED light up nice and bright.

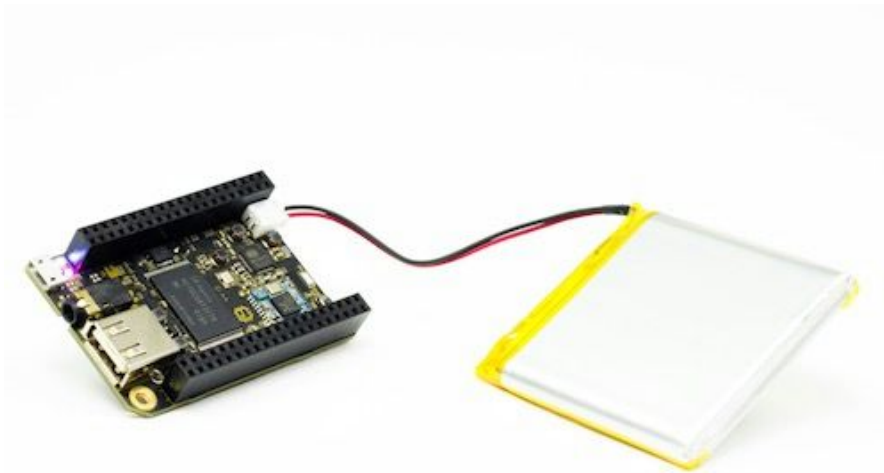
#### Power From The Wall

The CHIP's microUSB connector is used to provide power from most any USB power source. USB wall-wart adapters are probably littered all over your house. If for some reason you don't have one, you can buy one any electronics retailer. Just plug a USB-A-to-microUSB-B cable (that's the same cable most phones, tablets, and whatnot use to charge) into the wall-wart and CHIP, and you'll see the PWR LED light up. This CHIP is using the power from a computer's USB port:



### Power From A Battery

CHIP can also be battery powered. Specifically, any single cell (1S) 3.7V Lithium Polymer (LiPo) battery with a 2-pin JST-PH 2.0mm end can be connected to the JST-PH socket.



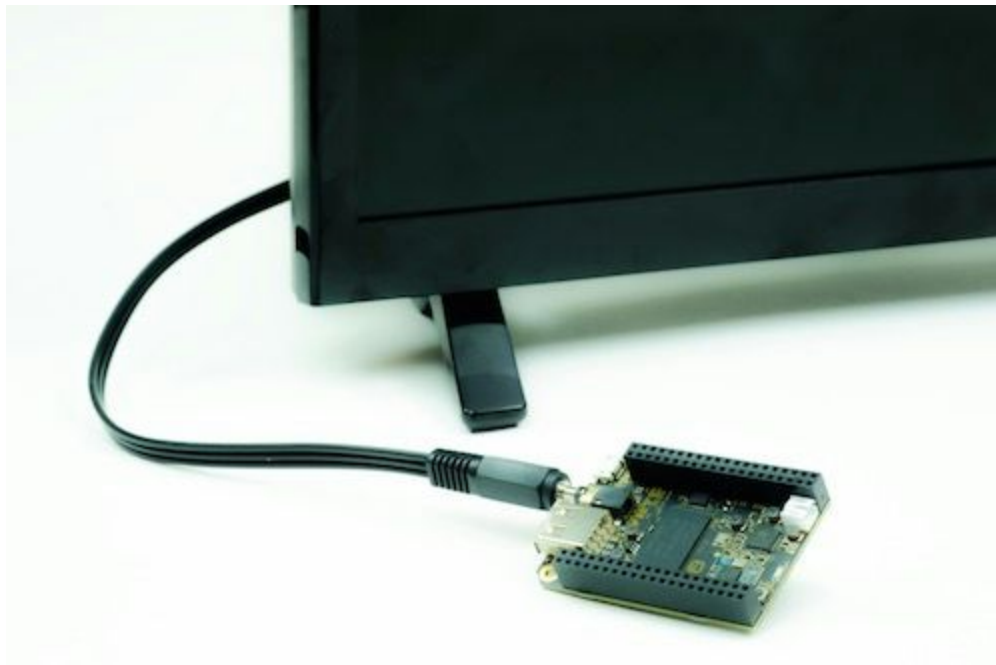
The JST can only plug it in one way: if you are having a hard time lining things up, turn it around! Needless to say, do not force the battery connector into the socket if something doesn't feel right!

What's really great is that if you plug into a charger and plug in a battery, the battery will charge - all the power management is on CHIP itself. Roughly, it takes about four to six hours to charge a 3000 mAh LiPo battery from a 5V 1A power source. Also, our delightful little Power Management IC, the AXP209, handles pass-through power, so while on and charging a battery, CHIP is basically running on a un-interrupted power supply - If charge power fails, CHIP seamlessly switches onto battery power without shutting off.

## Connecting Accessories

### Monitor

In the spirit of keeping things small, CHIP packs all the audio and video into a small TRRS (Tip-Ring-Ring-Sleeve) connector. Built-in video output is restricted to standard composite video resolution of 640x480. (Higher resolutions can be achieved with the upcoming VGA and DVI output accessories.)



Here's what the other end of the cable looks like, attached to a monitor with stereo audio inputs (red and white) and the composite video plug, moved so you can see the label on the monitor:



#### About the TRRS Connector

CHIP comes with a 1/8" (3.5mm) Tip-Ring-Ring-Sleeve (TRRS) jack, capable of carrying stereo audio, and either composite video out, or microphone in.



This is a fairly common port, but there are a few different arrangements of the conductors, so not all cables are equal. Fortunately, CHIP uses the same conductor arrangement as Pi, Zune, and iPod audio/video cables, so the most common “mini to RCA A/V” cables should work just fine.

Some cables will route signals a bit differently, using the Red RCA cable for Video instead of Yellow. If video out isn’t working through the yellow cable, see if red works. If not, your cable may be a version that’s arranged in a way that it just won’t work with CHIP:

- yellow : video
- red : stereo audio right channel
- white : stereo audio left channel

The conductors on the TRRS plug are arranged like this:



If you want to learn even more about TRRS connectors and the general lack of standardization with them, [this page](#) has even more details.

## NTSC or PAL

The composite video format is NTSC by default. If you need to hook up to a monitor that only uses a PAL signal, you’ll need to change that at u-boot time. First, connect to CHIP with a [UART cable](#). Then power up CHIP, and press a key on the keyboard to boot into u-boot mode to change the environment variable manually.

```
printenv video-mode
setenv video-mode (mode data)
```



```
saveenv
reset
```

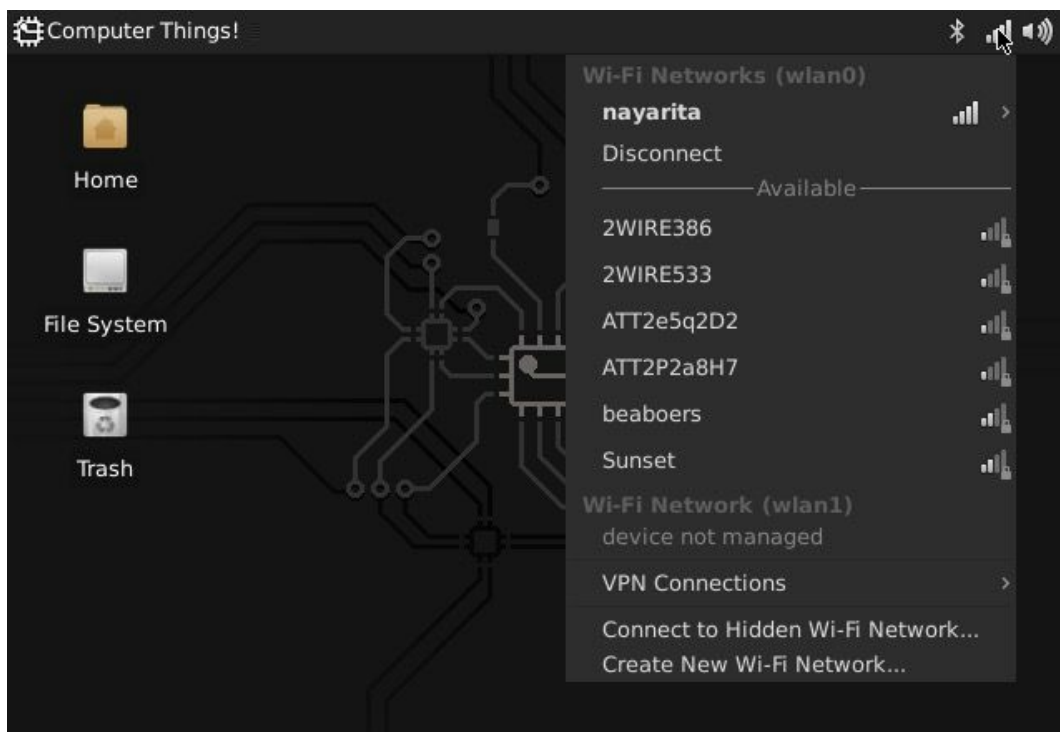
where *mode data* can be, for NTSC and PAL respectively:

```
setenv video-mode
sunxi:640x480-24@60,monitor=composite-ntsc,overscan_x=40,overscan_y=20
```

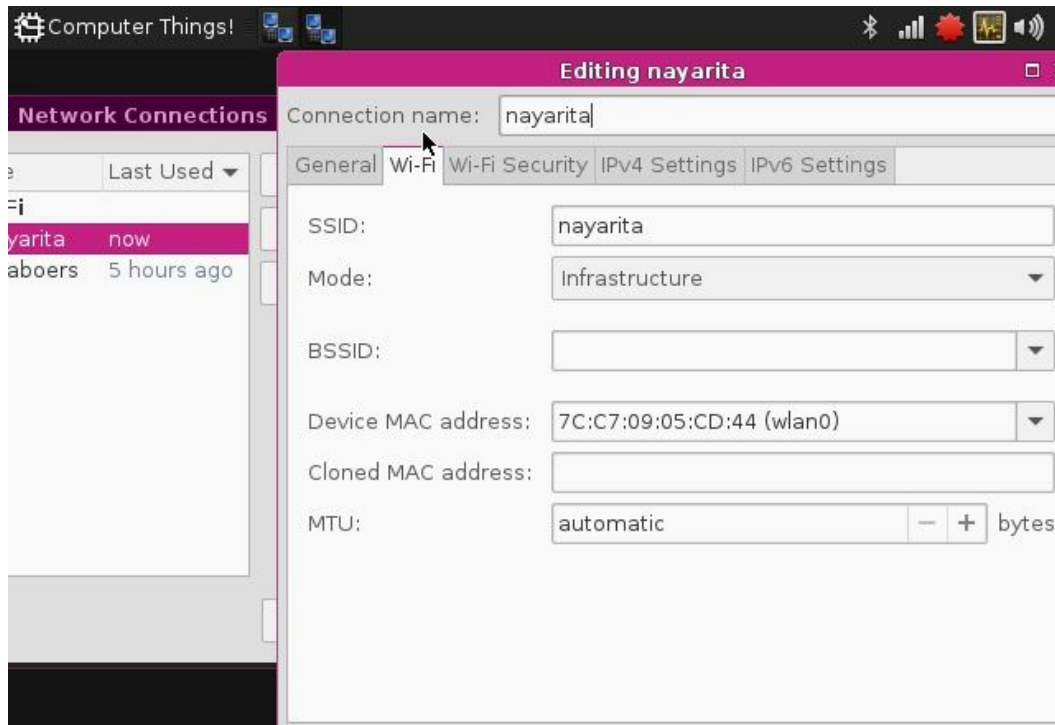
```
setenv video-mode
sunxi:720x576-24@50,monitor=composite-pal,overscan_x=40,overscan_y=20
```

## Connect To WiFi

Connecting to a WiFi network is easy using the WiFi icon the top right system tray. Just select a network to initiate a connection. If the network requires a password you'll be prompted for it.



If you need more control and information over your network connection, use the Settings->Network Connections panel to show your connections. Double click on a connection to bring up the connection editor:



## Connect C.H.I.P. to WiFi from commandline

```
# nmcli device wifi list
*  SSID      MODE  CHAN  RATE      SIGNAL  BARS  SECURITY
   Network1  Infra 11    54 Mbit/s  100     ████  --
   Network2  Infra 6     54 Mbit/s  30      █     WPA1 WPA2
   Network3  Infra 10    54 Mbit/s  44      ███    WPA1 WPA2

# nmcli device wifi connect 'Network2' password '(your wifi password)'
```