



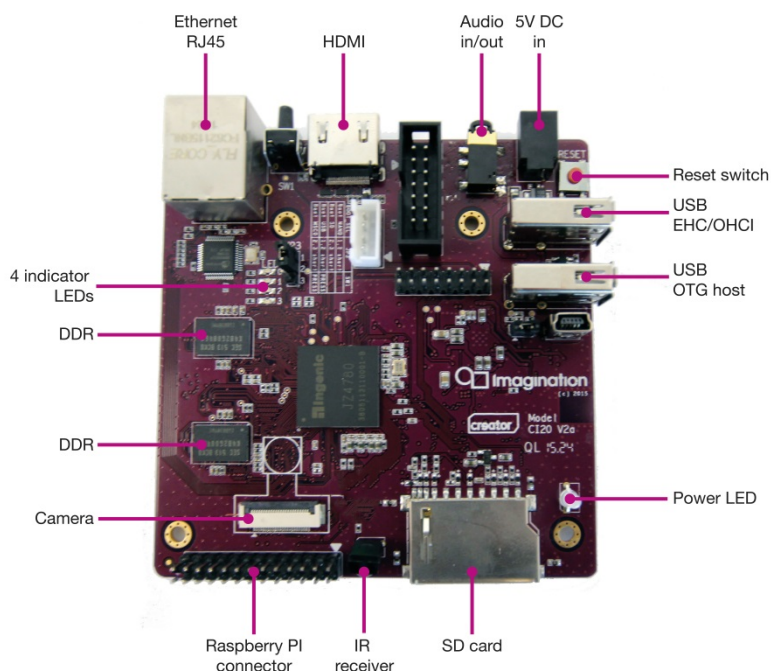
# Creator Ci20 quick start guide

Creator Ci20 is a high performance, fully featured development board for Linux and Android that can help you create applications for fast growing markets such as IoT, wearables, mobile and gaming. The first of a family of boards, Creator Ci20 includes two essential ultra-low power technologies from Imagination; a dual-core MIPS32 CPU (central processing unit) and a PowerVR SGX540 GPU (graphics processor).

Creator Ci20 comes preloaded with Debian 7 and can be upgraded to Debian 8. Creator Ci20 also supports other Linux distributions (including Gentoo and Yocto).

Creator Ci20 also runs the latest version of Android 5.0 Lollipop, based on the Android Open Source Project (AOSP) and features a full set of wireless connectivity options.

## Overview



## Features

- 1.2GHz dual MIPS32 processor XBurst
- Integrated communications – Wi-Fi 802.11b/g/n, Bluetooth 4.0 and Fast Ethernet
- Integrated graphics - PowerVR SGX540 GPU offering full support for OpenGL 2.1 and OpenGL ES 2.0
- Dedicated video hardware for low power 1080p decoding
- Memory 8GB Nand, 1GB DDR3 DRAM

## Benefits

- Easy to use single board computer
- Supports Linux and Android
- RPi expansion
- Wireless connectivity

## Applications

- Smart appliances
- Connected cameras
- Multimedia streaming
- Retail kiosks
- Remote device control

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## Getting started

### Powering on

Your new Creator Ci20 microcomputer has been pre-configured to run Debian 7 out of the box. Before powering on, please connect your mouse and keyboard to the USB port(s) and a screen via HDMI.

### Installing and running apps

#### Linux

Connect Creator Ci20 to the internet. You can connect Creator Ci20 to the internet using an Ethernet cable or Wi-Fi. If you want to use Wi-Fi, click the Wi-Fi icon on the bottom right of your computer's screen and select the Wi-Fi that you want to connect to from the list of available access points. Enter the password of your Wi-Fi if required.

Open a console (right click anywhere on the desktop and select 'Open Terminal Here').

Change current privileges to root by typing in the following commands:

- `su root` (when prompted for the password, enter 'ci20')
- `apt-get update`

Here are some apps you can install:

- `apt-get install openarena`
- `apt-get install chromium-bsu`
- `apt-get install teeworlds`
- `apt-get install freedoom`
- `apt-get install hardinfo`

You can then launch OpenArena, Chromium B.S.U., Teeworlds and Freedoom from the Games section in your Applications Menu.

HardInfo is a system information and cross-platform benchmarking tool for Linux; you can run it by typing 'hardinfo' in an open terminal; scroll down to the bottom of the window for a suite of CPU benchmarks.

## Android

**Note:** Booting Android takes a few minutes

Connect Creator Ci20 to the internet. You can connect Creator Ci20 to the internet using an Ethernet cable or Wi-Fi. If you want to use Wi-Fi, go to 'Settings' > 'Wi-Fi' and turn on wireless. Select the Wi-Fi that you want to connect to from the list of available access points. Enter the password of your Wi-Fi if required.

Here are some apps you can install:

- ES File Explorer
- OpenArena
- Gods Rush
- Pure Connect
- Set Orientation (selecting *Landscape* will ensure that your screen always stays in the correct position)

## Flashing from the SD card

You can re-flash Creator Ci20 at any time to boot a fresh copy of the operating system of your choice. The re-flashing procedure is very simple; you will need:

- Hardware:
  - Creator Ci20
  - An SD card (4 GB or higher)
- Various software packages depending on your OS of choice (see below)
- The latest version of Android or Linux:
  - Android 5.1 Lollipop
  - Debian 8

If you have any questions, please use our forums (see the last page for more information).

## Linux

- Open a terminal.
- To determine the device name of the SD card, run 'lsblk' which will list all block devices. Then insert the SD card, wait a few seconds, and run 'lsblk' again. A new device plus any partitions should appear compared to the original list, the SD card will be the new top level device.

*Please make sure that you have the right device name to avoid overwriting other partitions.*

- Unmount all partitions on the SD card. If the device name were 'sdx', this would be done with:  
'umount /dev/sdx\*'
- Write the image file with the following (replacing sdx with the correct device name):  
'dd if=nand\_2015\_09\_09.img of=/dev/sdx bs=8M'
- When it completes (note that 'dd' will give no progress indication), run:  
'sync'
- Power off Creator Ci20 and move the JP3 selector from 1-2 to 2-3. The JP3 pin can be found right next to the Ethernet port.
- Insert the SD card in Creator Ci20.
- Power on Creator Ci20.
  - The LED will go from red to blue (ie., the flashing process has started);
  - Wait for ~10 minutes for the LED light to go back to red (ie., the flashing process has completed).
- Power off Creator Ci20, remove the SD card and move the JP3 pin back to its original position (1-2).
- Power on Creator Ci20; the newly flashed operating system will start running.

## Windows

- Insert the SD card in your PC.
- Run 'SDFormatter' and format the SD card.
- Run 'Win32DiskImager' and select one of the two image files listed and the corresponding drive letter for the SD card. If you don't have a built-in SD card slot on your PC or if it doesn't show up in the drop-down list, use a USB adapter instead.
- Click 'Write' and wait for the process to complete.
- Power off Creator Ci20 and move the JP3 selector from 1-2 to 2-3. The JP3 pin can be found right next to the Ethernet port.
- Insert the SD card in Creator Ci20.
- Power on Creator Ci20:
  - The LED will go from red to blue (ie., the flashing process has started);
  - Wait for ~10 minutes for the LED light to go back to red (ie., the flashing process has completed).
- Power off Creator Ci20, remove the SD card and move the JP3 pin back to its original position (1-2).
- Power on Creator Ci20; the newly flashed operating system will start running.

## OS X

- Open a terminal (/Applications/Utilities/Terminal.app).
- Insert the SD card into your computer and list the block devices on your system by running:  
'diskutil list'
- Using diskutil's output, identify the device name for the SD card by finding the entry which matches your SD card's partition name and size. The device name is in the format '/dev/diskX', where X represents a random number.

*Please make sure that you have the right device name to avoid overwriting other partitions.*

- Unmount the mounted partitions on the SD card:  
'diskutil unmountDisk /dev/diskX'
- Write the new image to the SD card (it might take a while to finish):  
'sudo dd if=debian6-20130815.img of=/dev/diskX bs=8m'
- When it completes (note that 'dd' will give no progress indication), run:  
'sync'
- Insert the SD card into Creator Ci20.
- Power on Creator Ci20.
  - The LED will go from red to blue (ie., the flashing process has started);
  - Wait for ~10 minutes for the LED light to go back to red (ie., the flashing process has completed).
- Power off Creator Ci20, remove the SD card and move the JP3 pin back to its original position (1-2).
- Power on Creator Ci20; the newly flashed operating system will start running.

## Technical specifications

Feature	Description
SoC	Ingenic JZ4780
CPU	Dual 1.2GHz XBurst MIPS32 little endian
Caches	32kl + 32kD per core, 512K shared L2
RAM	1Gbyte DDR3
NAND	8 Gbyte
SD card	1x full size slot + 1x slot via secondary expansion header
USB	1x USB otg + 1x USB host
Ethernet	1x 10/100Mbps using Davicom DM9000C controller over 8-bit interface
Wi-Fi	IW8103 Wi-Fi + BT4, built in ceramic aerial
GPU	PowerVR SGX540
Video	Hardware video decoder up to 1080p 60Hz
Display	HDMI, up to 2k resolution
Camera	ITU645 dedicated connector
GPIO	25 available on headers
SPI	2 ports on primary & secondary expansion header, with 4 chip selects
I2C	1 port on primary expansion header
ADC	7 inputs on secondary expansion header, including 5-wire touch and battery monitoring functions
UART	1 on dedicated UART header, 2 via primary expansion header
Audio	Audio in and out via 3.5mm 4-wire connector
JTAG	Standard 14-pin MIPS EJTAG header
Transport stream interface	Via secondary expansion header
Power	5V via 4mm (shield) x 1.7mm (pin) centre positive connector (power cable supplied)
Size	Approximately 100 x 92mm
Activity LEDs	4 Activity LEDs
Reset button	System reset

## Connector types

Connector	Schematic name	Details
Power	MK5	4mm shield x 1.7mm pin 5V centre positive
HDMI	J3	Full size HDMI out, including audio support
USB A connector (left)	J24	Paralleled with the mini OTG connector (note, they are not separate ports - do not plug into both at once)
USB A connector (right)	J23	From the EHCI host controller block
USB mini-OTG connector	J8	Paralleled with the full size A connector next to it.
OTG VBUS jumper	JP2	Selects VBUS enabling on OTG port to enable master or slave functionality
Ethernet	J11	Standard RJ45 connector, with built in link and activity lights
Audio	J9	3.5mm 4-pin (stereo out and mic in), with auto-sense chip to handle both OMTP and CTIA headsets
Button	SW1	Boot time selector (see boot selector table). Can also be read from software as GPIO. Note: This is not a reset button.
Reset button (V2 only)	RESET	System reset
Boot mode selector	JP3	Used to choose auto-boot from NAND or SD card slot.
SD card	J13	Full size SD card slot, can be used for storage and/or direct boot
Camera	J6	24-pin DVP camera connector
IR	U15	Infrared receiver
LED	D5	Bi-colour status LED (red/blue), wired to USB power enable line
4 Activity LEDs (V2 only)	LED0/1/2/3	Red activity LEDs available via <code>/sys/class/leds/</code>
UART	J57	Dedicated 4-pin UART header
Primary expansion connector	JP4	26-pin (2 x 13) 'RPI compatible' 0.1" pitch expansion connector, carrying power, UART, SynchronousSerial, I2C and GPIO functions.
Secondary expansion header	J5	Carries 5V and 3.3V power out, transport stream, ADC, GPIO, SynchronousSerial (SPI) and MSC (SD card) functions
EJTAG	J58	Standard MIPS 14 pin EJTAG connector



## Power

The power connector is a 5V 4mm (shield) x 1.7mm (pin) centre positive connector. Maximum input voltage 5V.

**Note:** Creator Ci20's power connection is identical to the original Sony PSP, so you can also use power cables from the Sony PSP to power Creator Ci20.

State	Current draw @ 5V
Suspended	30 mA
Idle (no devices plugged in, Wi-Fi off)	210 mA
Maximum usage (Ethernet, Wi-Fi, SD card, CPU, GPU all stressed)	750 - 800 mA

## Current draw

State	Current draw @ 5V
HDMI	Trace
Wi-Fi - in use	100 mA
Wi-Fi - idle	Trace with spikes of around 40 mA
Ethernet - in use	150 mA
Ethernet - idle	120 mA
CPU + Memory - in use (compared to idle)	90 mA
SD card - writing	90 mA
SD card - reading	60 mA

## Where to find more information (Links)

### More documentation

You can find detailed documentation, including user guides, full hardware schematics and more by visiting our dedicated eLinux page for Creator Ci20.

### Troubleshooting guide

[http://elinux.org/Ci20\\_Troubleshooting](http://elinux.org/Ci20_Troubleshooting)

### Creator Ci20 forums and community

Imagination <http://community.imgtec.com/platforms/creator-Ci20/>

Google groups <https://groups.google.com/forum/#!forum/mips-creator-Ci20>

### Projects

You can find several getting started projects on the eLinux Creator Ci20 page:

[http://elinux.org/Ci20\\_Projects](http://elinux.org/Ci20_Projects)

### FlowCloud

Getting your Creator Ci20 connected to the cloud:

<http://flow.imgtec.com/developers/help/Ci20/setup>

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