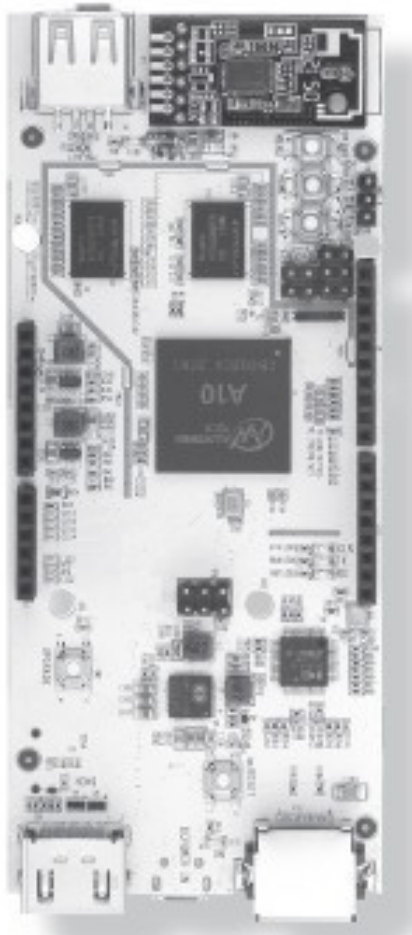


# pcDuino V2



*Thank you for purchasing your Single-Board Computer from **LinkSprite**. Please read this user's guide before setting up and using your new Single-Board Computer.*

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## Board Overview

You can use the Single-Board Computer with various open-source projects, but you can do much more.

The Single-Board Computer features a fully functional operating system (OS) that can simultaneously run multiple processes, giving you a much more robust and versatile experience than a dedicated microprocessor board.

The Single-Board Computer provides several ports so you can quickly and easily set up a monitor, keyboard, and mouse to create a complete computing solution.

The **HDMI** port lets you connect to any HDTV or monitor with an HDMI port.

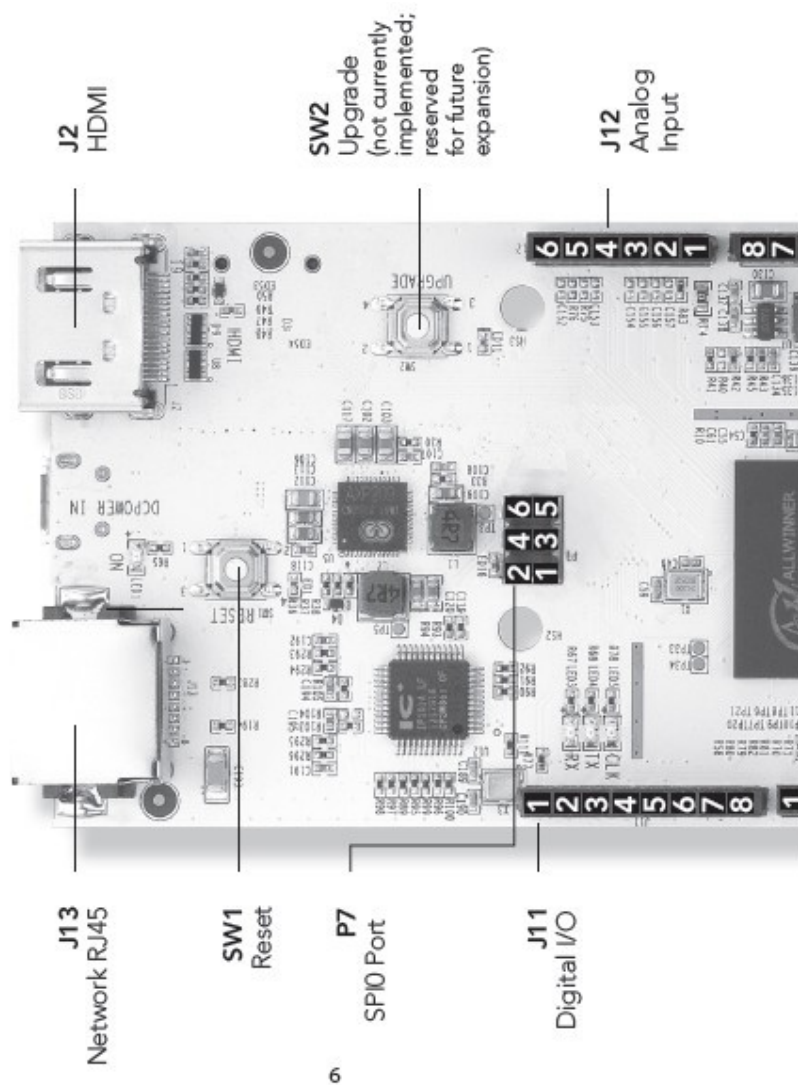
The **USB A** port lets you connect USB peripherals. For example, you can use a USB hub to connect a keyboard, mouse, and other USB devices. The **Micro USB** port provides additional connectivity.

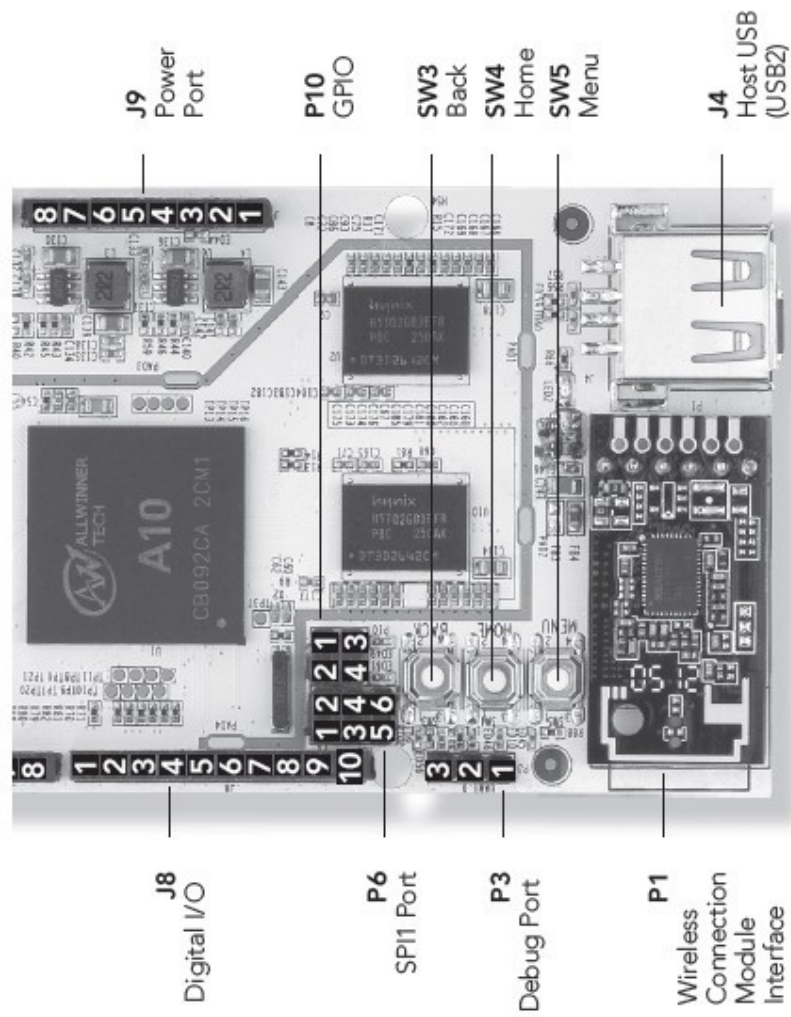
The **MicroSD** slot provides an easy way to add additional memory (up to 32 GB).

**Note:** *Your Single-Board Computer is shipped in protective anti-static packaging. The board must not be subjected to high electrostatic potentials. A grounding strap or similar protective device should be used when handling the board.*

System Features		
System on a Chip (SoC)		All Winner A10
Central Processor (CPU)		1 GHz ARMv7 Cortex A8 Single Core
Graphics Processor (GPU)		Mali 400
SDRAM Memory		1 GB, DDR3-800
Flash Memory		2 GB NAND
Mass Storage	Max	32 GB
	Type	MicroSDHC
Video Output		HDMI Up to 720p, 60 Hz
Network Interface		Ethernet 10/100M via RJ45
Wireless Connectivity		802.11b/g/n
Communications I/O		USB 2.0
Extension Interfaces		ADC, UART, GPIO, PWM, I <sub>2</sub> C, SPI, Power  (via Stackable 0.100" Connection Headers)
Operating System		Ubuntu

## Single-Board Computer Configuration





## Pin Assignments

### J8

1	GPIO8
2	GPIO9/PWM9
3	SPI_SS (Subordinate/Chip Select)/GPIO10/PWM10
4	SPI0_MOSI (Master Output, Subordinate Input)/GPIO11/PWM11
5	SPI0_MISO (Master Input, Subordinate Output)/GPIO12
6	SPI0_CLK (Clock)/GPIO13
7	GND
8	AREF
9	TWI2_SDA (Data)
10	TWI2_SCK (Clock)

### J11

1	GPIO0/UART2 RX
2	GPIO1/UART2 TX
3	GPIO2
4	GPIO3/PWM3
5	GPIO4
6	GPIO5/PWM5
7	GPIO6/PWM6
8	GPIO7

### P6

1	SPI1_MISO (Master Input, Subordinate Output)
2	+5 VDC
3	SPI1_CLK (Clock)
4	SPI1_MOSI (Master Output, Subordinate Input)
5	RESET
6	GND

**J9**

1	(NC)
2	IOREF
3	RESET
4	3.3 VDC output
5	5 VDC output
6	GND
7	GND
8	+5V <sub>IN</sub>

**J12**

1	A0
2	A1
3	A2
4	A3
5	A4
6	A5

**P10**

1	GPIO14
2	GPIO15
3	GPIO16
4	GPIO17

**P3 (Debug Port)**

1	TX (Square Pad)
2	GND
3	RX



## Single-Board Computer Setup

Make USB and HDMI connections before connecting power to the Single-Board Computer. If the board does not recognize your keyboard or mouse, unplug the device and plug it back in.

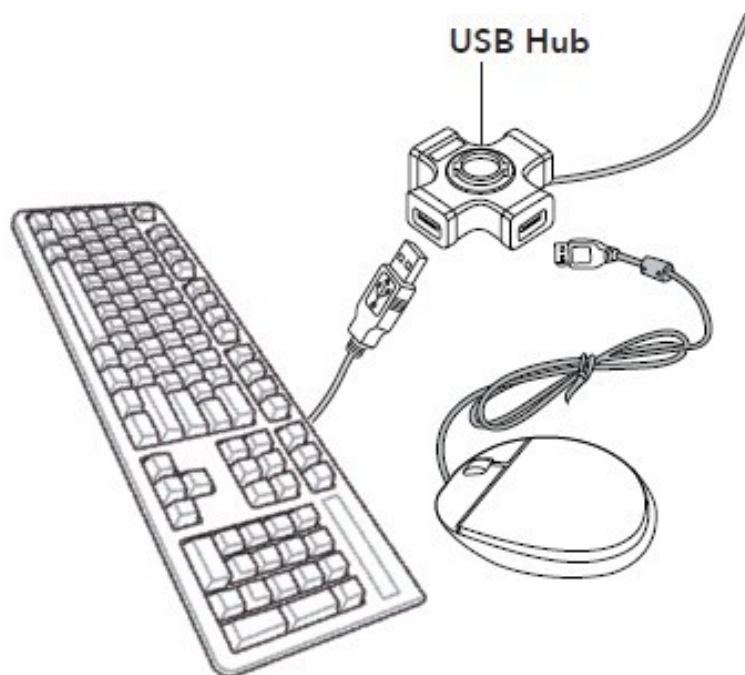
**Note:** To ensure that your Single-Board Computer boots properly, use a short, heavy-gauge USB cable and a power supply that delivers at least 2 A.

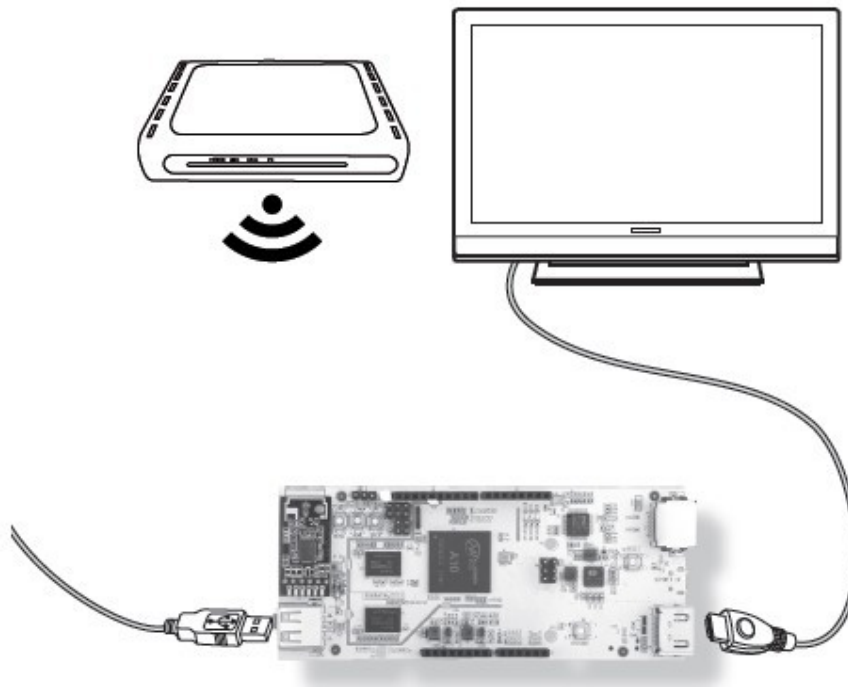
### Required Hardware

- Monitor
- HDMI cable
- USB hub
- Keyboard/Mouse
- DC power (Micro USB)

### Optional Hardware

- MicroSD card for additional memory storage





## Adjusting Screen Settings

In some cases, the Ubuntu desktop may extend beyond the visible area of your monitor.

**To adjust the size of your desktop:**

1. Open LX Terminal.
2. At the command prompt, type: `sudo setwindow 95 1 0 0`
3. Press **Enter**.

**Note:** The “95” parameter sets the percentage of screen size, and the “1” activates auto-center; the remaining values are inactive for auto-center, but are still necessary for the command.<sup>12</sup>

## The Ubuntu Operating System

Your Single-Board Computer is preloaded with the Ubuntu 12.07 operating system. Ubuntu is a robust,

fully functional operating system that provides an open-source productivity suite.

Terminal	Run standard Linux commands Launch GCC to open the C/C++ compiler
File browser	Built-in file manager
Internet browser	Chromium web browser Support for HTML5
Productivity Suite	Document Viewer for PDFs Gnumeric for spreadsheets AbiWord for documents.

If your system asks for an authentication password, the default password is “ubuntu.”

For full support go to [www.ubuntu.com](http://www.ubuntu.com)

## Accessing the Debug Port

If you are a more experienced user, you can communicate with the Single-Board Computer directly by using a USB-to-Logic Level Serial cable to connect the board’s debug port to your computer’s USB drive.

1. Go to the Single-Board Computer website and install the drivers onto your PC.
2. Connect the debug cable to the USB port on your computer and to the board’s debug port (P3). **TX** connects to Pin 1, which has the square pad.
3. On your PC, locate the COM port. For help locating the COM port, refer to your operating system’s online help.
4. After you locate the COM port, access the serial communications package. Verify the following settings:
  - **COM Port:** 8,N,1

- **Baud Rate (Speed):** 115200

- **All Flow Controls:** Off

5. You can now access the board's system level.

## Re-Installing the Operating System

As you consider new projects, you may decide to restore your Single-Board Computer to its original state.

To accomplish this, you may need to re-install the operating system.

**Note:** *Re-installing the Ubuntu operating system will erase all saved data from the Single-Board Computer.*

**To install the operating system:**

1. Disconnect the power to the Single-Board Computer.
2. Insert a MicroSD card that contains a Linux kernel image into the Single-Board Computer's MicroSD card slot.
3. Restore power to the board and wait at least 2 minutes. During this time, the TX light blinks as the Single-Board Computer installs the Linux kernel.
4. When TX stops blinking, disconnect the power to the Single-Board Computer and remove the kernel image MicroSD card.

**Note:** *The Single-Board Computer will always check for a kernel image when power is restored. Do not insert the kernel image SD card in the slot unless you intend to install the entire operating system and erase all data on the board.*

5. Restore power to the board. The RX and TX lights will remain lit for a moment, and then the TX light will begin to blink slowly while the RX light remains lit.

6. Insert a MicroSD card that contains an Ubuntu image. The TX light will begin to blink rapidly. Do NOT remove the Ubuntu image MicroSD card during this process. After the TX light stops flashing rapidly, both the RX and TX lights will blink slowly. This indicates a good image load.
7. Disconnect power to the Single-Board Computer and then remove the Ubuntu image MicroSD card.
8. Restore power to the Single-Board Computer. The operating system will boot up properly, the desktop will appear on your monitor, and the board will be ready to use.

## Glossary

<b>ADC</b>	Analog-digital converter
<b>CPU</b>	Central processing unit
<b>DDR</b>	Double Data Rate, Type 3. SDRAM configuration with high bandwidth
<b>ESD</b>	Electrostatic discharge
<b>Linux</b>	An open source operating system
<b>GB</b>	Gigabyte. Capacity in bytes. $1 \times 10^9$ Bytes
<b>GHz</b>	Gigahertz. Frequency in hertz. $1 \times 10^9$ hertz
<b>GPIO</b>	General purpose input/output. A digital port that can be selected by the user to function as either an input or an output.
<b>GPU</b>	Graphics processing unit
<b>HDMI</b>	High-Definition Multimedia Interface
<b>I<sup>2</sup>C</b>	Inter-Integrated Circuit, generically referred to as “two-wire interface” (TWI)
<b>I/O</b>	Input/Output

<b>MB</b>	Megabyte. Capacity in bytes. $1 \times 10^6$ bytes
<b>Flash NAND Memory</b>	Electronic non-volatile computer storage that can be electrically erased and reprogrammed. NAND-type flash memory may be written and read in blocks (or pages).
<b>PC</b>	Personal computer
<b>PWM</b>	Pulse-width modulation
<b>RoHS</b>	Restriction of Hazardous Substances Directive (EU)
<b>SDHC</b>	Secure Digital High-Capacity memory card
<b>SDRAM</b>	Synchronous dynamic random access memory
<b>SoC</b>	System on a chip
<b>SPI</b>	Serial Peripheral Interface
<b>Ubuntu</b>	An open source operating system
<b>UART</b>	Universal Asynchronous Receiver/Transmitter. A serial communication port.
<b>USB</b>	Universal Serial Bus
<b>VDC</b>	Volts of direct current

## FCC Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult your local RadioShack store or an experienced radio/TV technician for help.

If you cannot eliminate the interference, the FCC requires that you stop using your product. Changes or modifications not expressly approved by RadioShack may cause interference and void the user's authority to operate the equipment.

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.