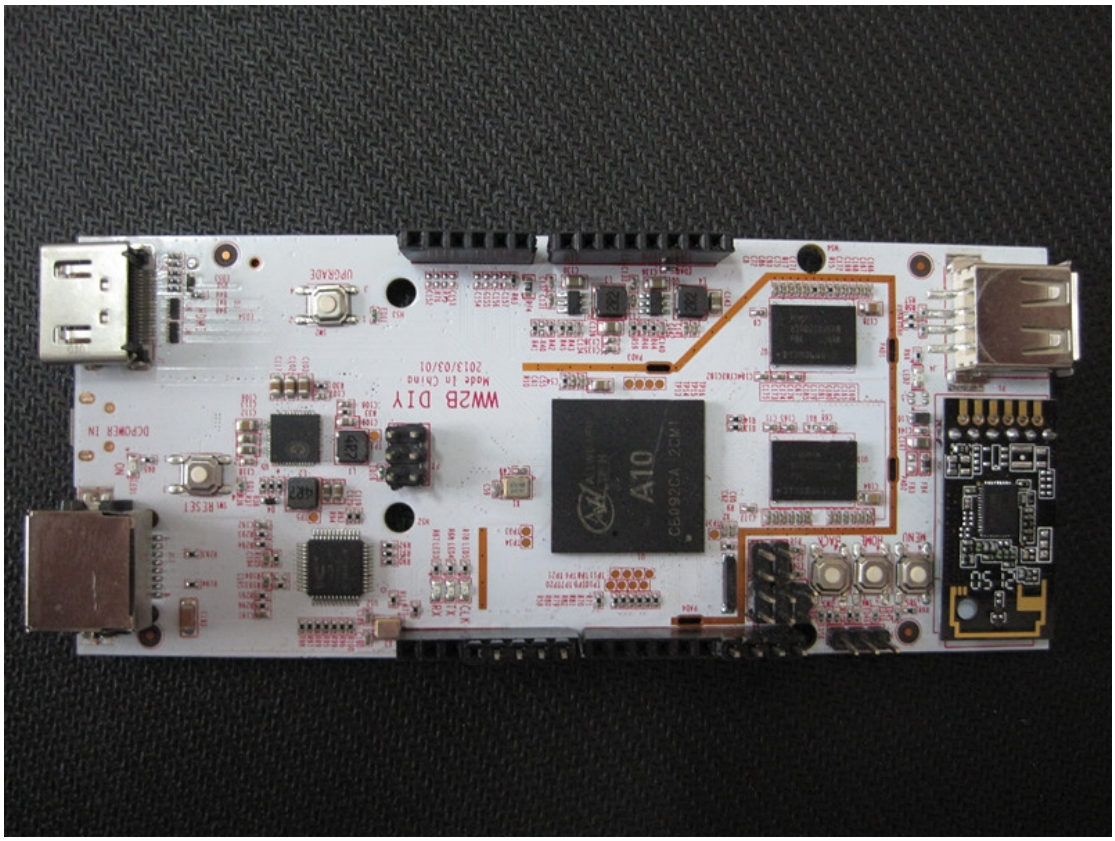
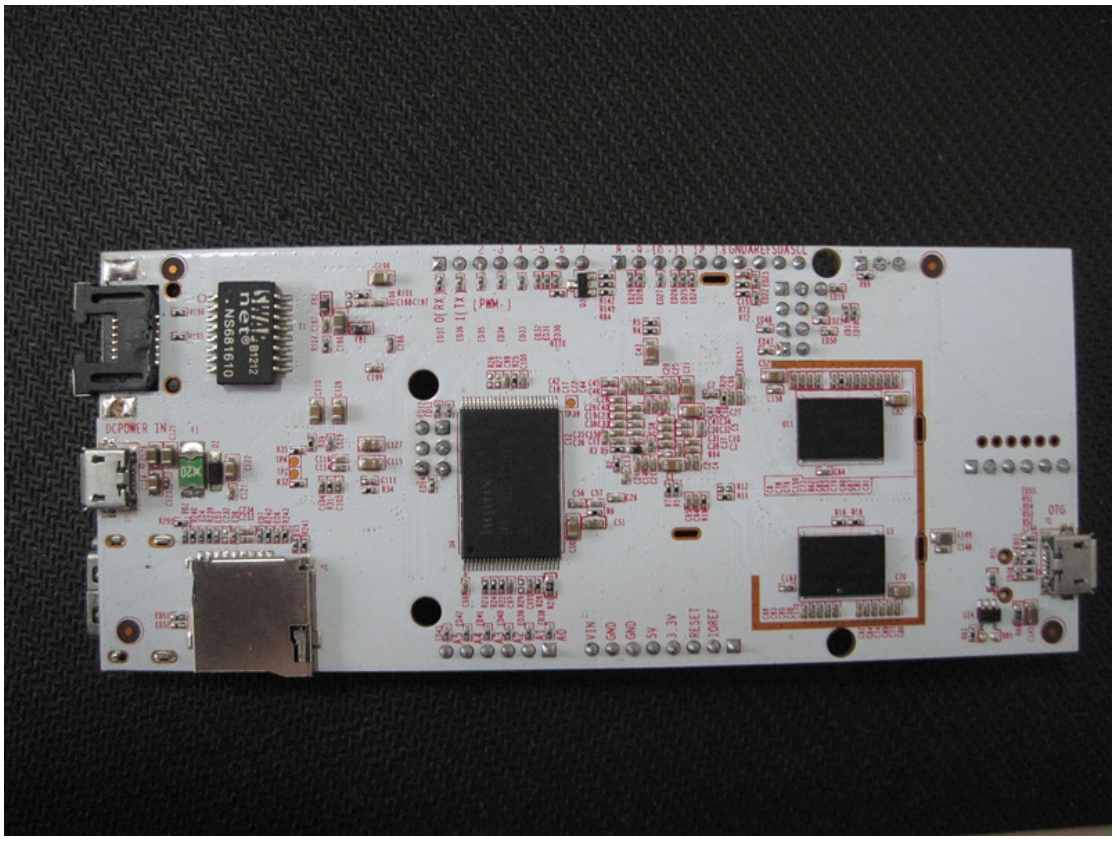
pcDuino V2

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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).

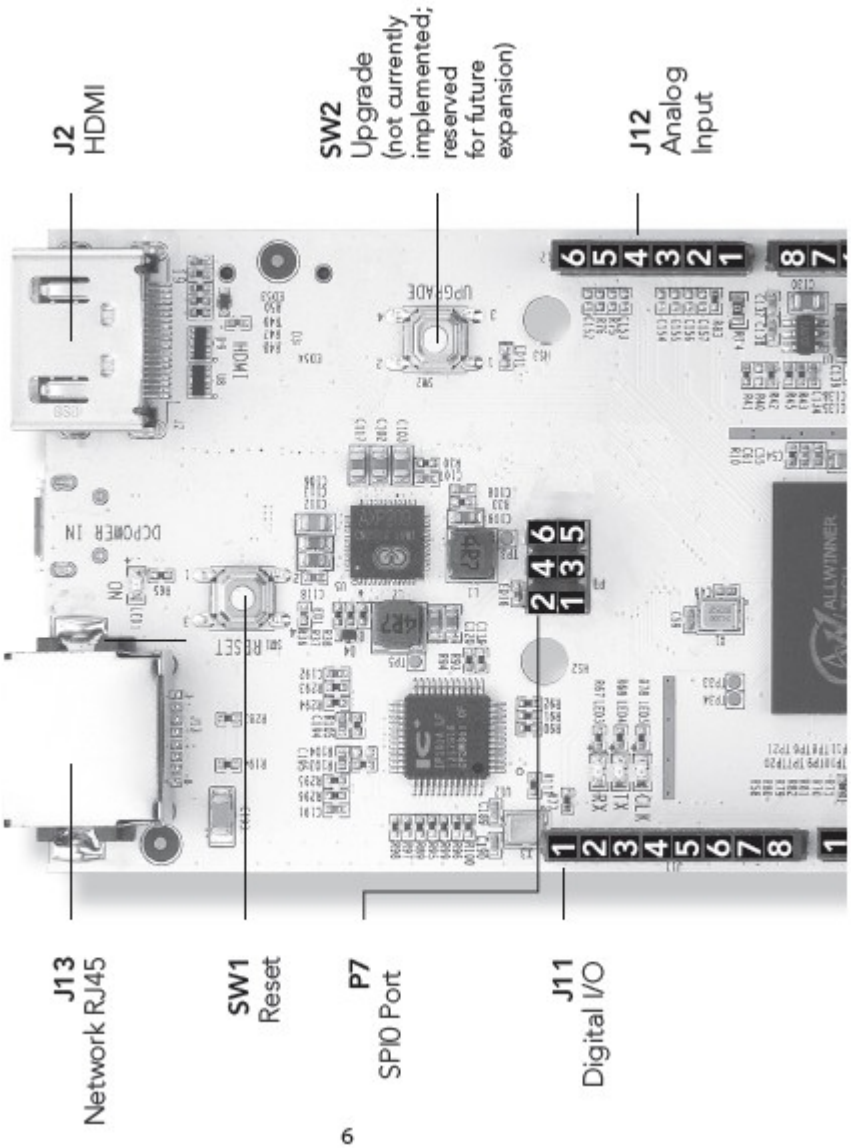
Note: *Your Single-Board Computer is shipped in protective anti-static packaging. The board must not be subjected to high electrostatic potentials. A grounding strap or similar protective device should be used when handling the board.*5

System Features

System on a Chip (SoC)		AllWinner 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, I2C, SPI, Power
perating System		Ubuntu

Single-Board Computer Configuration

Pin



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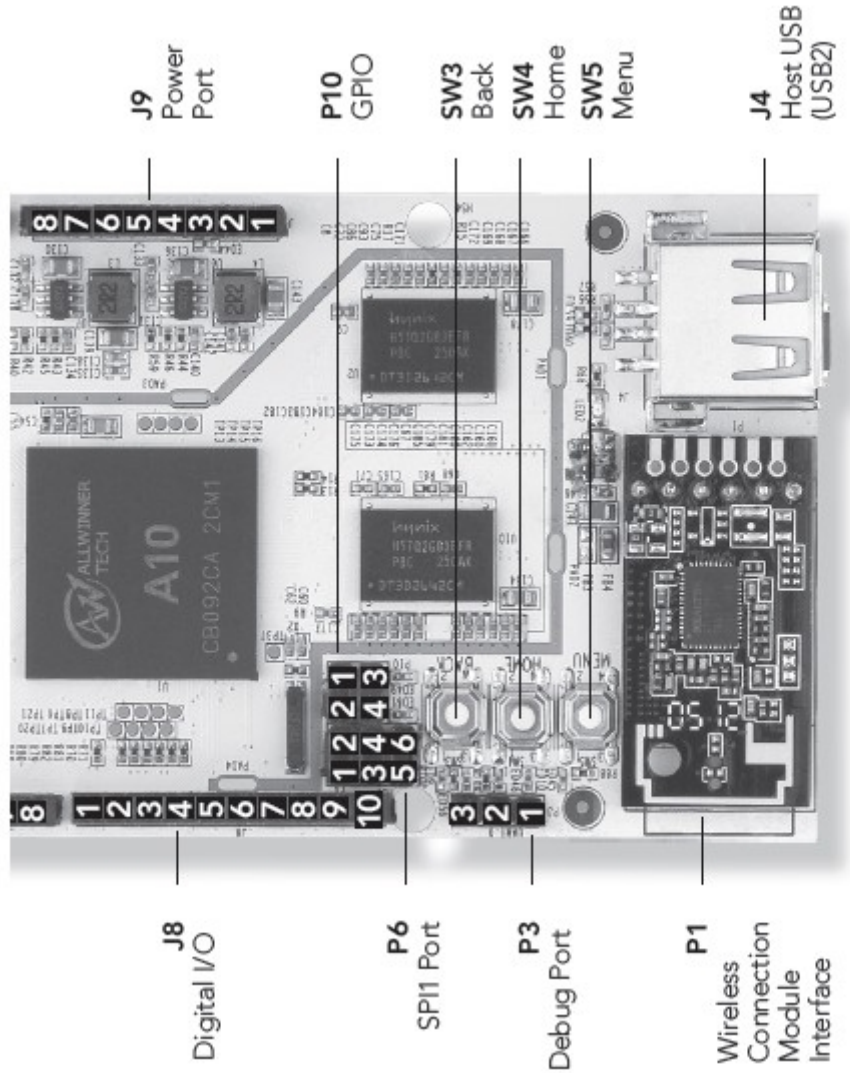
J9
Power
Port
P10
GPIO
SW3
Back
SW4
Home
SW5
Menu
J4
Host USB
(USB2)
J8
Digital I/O
P6
SPI1 Port
P3
Debug Port
P1
Wireless
Connection
Module
Interface

Assignments

J11

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)

J8

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	$+5V_{IN}$

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)

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.

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

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

ADC	Analog-digital converter
CPU	Central processing unit
DDR	Double Data Rate, Type 3. SDRAM configuration with high bandwidth
ESD	Electrostatic discharge
Linux	An open source operating system
GB	Gigabyte. Capacity in bytes. $1\times10_9$ Bytes
GHz	Gigahertz. Frequency in hertz. $1\times10_9$ hertz
GPIO	General purpose input/output. A digital port that can be selected by the user to function as either an input or an output.
GPU	Graphics processing unit
HDMI	High-Definition Multimedia Interface
I_2C	Inter-Integrated Circuit, generically referred to as “two-wire interface” (TWI)
I/O	Input/Output
MB	Megabyte. Capacity in bytes. $1\times10_6$ bytes
Flash NAND Memory	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).
PC	Personal computer
PWM	Pulse-width modulation
RoHS	Restriction of Hazardous Substances Directive (EU)
SDHC	Secure Digital High-Capacity memory card
SDRAM	Synchronous dynamic random access memory
SoC	System on a chip
SPI	Serial Peripheral Interface
Ubuntu	An open source operating system
UART	Universal Asynchronous Receiver/Transmitter. A serial communication port.
USB	Universal Serial Bus
VDC	Volts of direct current