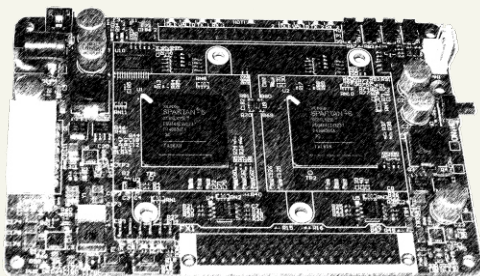


Lancelot

Heavy Duty Spartan 6 Development Board
Bitcoin Mining Device



User Manual

USER MANUAL

LANCELOT

SPARTAN 6 DEVELOPMENT BOARD

BITCOIN MINING DEVICE

Terms and conditions	3
Warranty	4
Parts identification	5
Installation Guide	7
Bitcoin Mining	9
Specifications	11
About us	12
Contact details	12

Terms and Conditions - General

This is a legal agreement between you, the user, and Black Arrow Limited (we, our, us). This agreement covers all hardware and software that is distributed with our products, for which there is no separate license agreement.

By opening or breaking the seal of the package, using our products, installing or downloading the software, or using our products and/or the software that has been preloaded or is embedded in our products, you agree to be bound by the terms of this agreement.

TO THE MAXIMUM EXTENT PERMITTED BY THE APPLICABLE LAW, UNDER NO CIRCUMSTANCES SHALL BLACK ARROW OR ANY OF ITS LICENSORS BE RESPONSIBLE FOR ANY DATA TRANSFERRED TO AND FROM OUR PRODUCTS, FOR ITS USAGE, FOR ANY LOSS OF DATA OR INCOME OR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES HOWSOEVER CAUSED.

You must understand that you, and not us, is responsible for all data transferred to and from our products and for their usage. We are not responsible for anything you do with our products. You must not use our products in any way that will, or is likely to breach any law. You must not use our products for any fraudulent purposes, or in connection with a criminal offence or other unlawful activity.

You must not use our products to obtain any information without the owner's knowledge or approval. You must not send, use or reuse any material that is illegal, offensive, abusive, indecent, defamatory, obscene or menacing; or in breach of copyright, trademark, confidence, privacy or any other right; or is otherwise injurious to third parties; or objectionable; or which consists of or contains software viruses, political campaigning, commercial solicitation, chain letters, mass mailings or any "spam". You and your applications of our products must not cause annoyance, inconvenience or needless anxiety. You will safeguard the use and distribution of our products and make any effort to prevent illegal use from occurring.

This license is effective until terminated. It will terminate upon the conditions set forth above or if you fail to comply with any of its terms. Upon termination, you agree that the Hardware, Software and accompanying materials, and all copies thereof, will be destroyed. This agreement is governed by the laws of United Kingdom, People's Republic of China, Hong Kong and British Virgin Islands.

Each provision of this agreement is severable. If a provision is found to be unenforceable, this finding does not affect the enforceability of the remaining provisions, terms, or conditions of this agreement.

This agreement is binding on successors and assigns.

You agree and we agree to waive, to the maximum extent permitted by law, any right to a jury trial with respect to any dispute and all disputes will be resolved through binding arbitration. Because this waiver may not be effective in some jurisdictions, this waiver may not apply to you. You acknowledge that you have read this agreement, that you understand it, that you agree to be bound by its terms, and that this is the complete and exclusive statement of the agreement between you and us regarding the Hardware and Software.

Terms and Conditions - Warranty

We warrant that all of our products are free from defects in material and workmanship under normal use and service for a period of sixty (30) days for OEM products and one (1) year for all other products unless otherwise stated. This period is counted from the date of the shipment. Our option, any device returned for warranty work and found to be defective by us.

To repair the device under warranty, the customer has to complete this form first: <http://www.blackarrowsoftware.com/repairs.html>. We will then e-mail an RMA number, the shipping address and instructions. The product will then have to be returned by the customer to the specified address (to our factory or facility). We will, without charge, repair or replace at our option, any product returned for warranty work and found to be defective by us.

If we will find that the returned product is defective and falls within the terms of this warranty, we will ship free of charge the product, back to the customer with a postal or courier service at our own discretion. We will also credit to the customer's account with us, the amount he/she paid for shipping, but not exceeding 50USD. This credit can only be used for paying other orders with us and has no other cash value.

This warranty will not apply to any of our products which should have been:

- Repaired or altered (except by us)
- Tampered with or the seal case has been broken (if applicable)
- Poured onto glue or any other kind of liquids / substances
- Subjected to misuse, negligence, or accident.

In no case shall our liability exceed the purchase price. The mentioned provisions do not extend the original warranty period of any product which either been repaired or replaced by us. The user is solely responsible for determining if the product is usable in his or her application.

We will not cover, under any circumstances, any customs or customs processing charges. Any such charges will be billed to the customer.

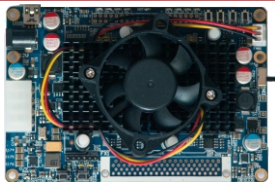
If a product has been returned for warranty repair and it is found to be in working order, we will charge a revision fee (usually 80 USD unless otherwise stated) and the shipping fees to return it back to the customer; in this case we will not cover the customer's shipping fees.

Our details

Please consult this web page: <http://www.blackarrowsoftware.com>

Parts identification

Lancelot



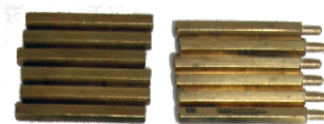
Lancelot Development Board

USB Cable



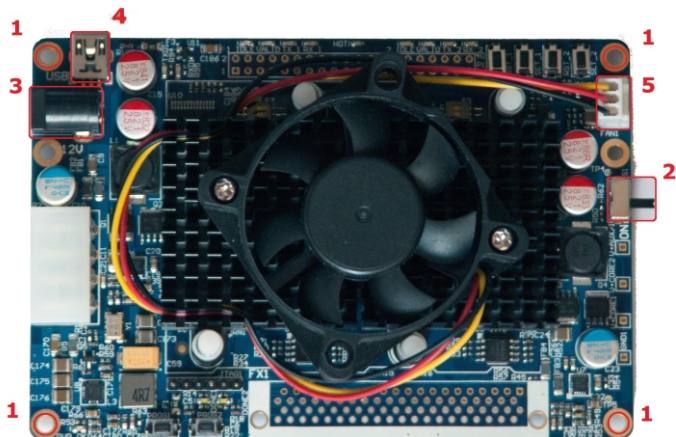
A standard USB to Mini USB cable

Metal Pins



Metal pins used to stack up multiple boards

General View



1. Metal pins holes
2. ON/OFF switch
3. Power cable plug
4. USB plug
5. Fan cable plug

This product is delivered with embedded Bitcoin mining firmware. The user can start mining Bitcoins with minimal effort. No programming or Verilog code compilation is required.



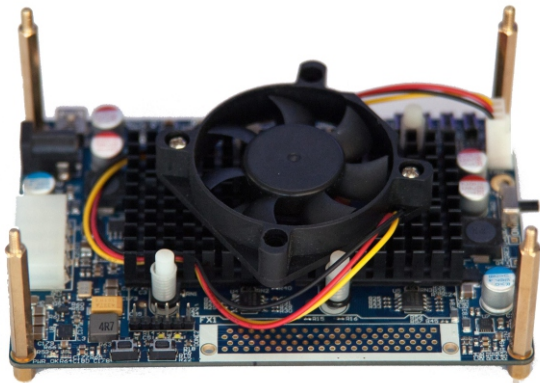
RoHS
COMPLIANT
2002/96/EC



Installation Guide

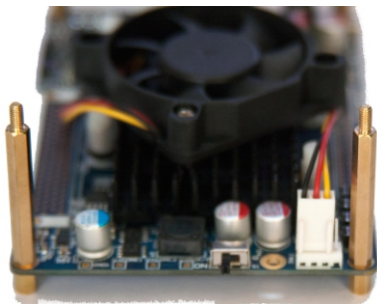
Step 1: Mount the metal pins

The metal pins must be assembled on the holes noted with 1 on the general view of the Lancelot. Multiple Lancelot boards can be stacked up using these pins.



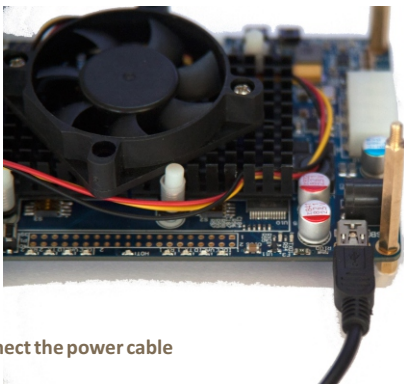
Step 2: Check cooler's power cable

Ensure that the cable of the fan is mounted properly. The black wire must be on the left, as in the picture below.



Step 3: Connect USB cable

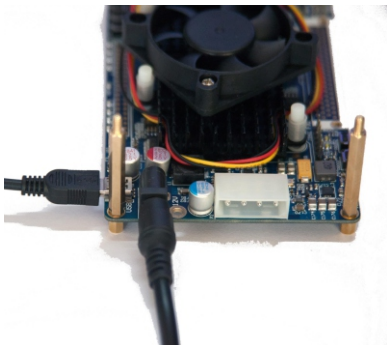
Connect the mini USB end of the cable to USB plug on the board (4). Connect the other end of the cable to the computer or USB Hub. Notice that computer will not found any new hardware when the board is power OFF.



Step 4: Connect the power cable

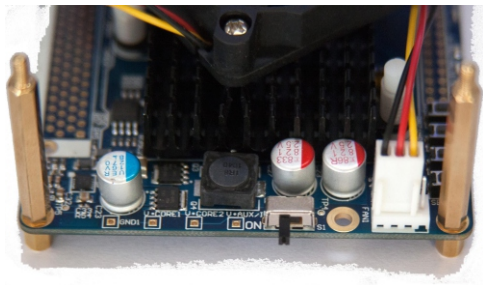
To power up the Lancelot board you need as 12 Volt power supply (not provided) with a minimum output of 2.5 Amperes (30 Watt). The positive polarity is in the center of the connector.

Plug one part of the power cable to the board (3) as in the picture.



Step 5: Turn on the board

Slide the power switch (5) in the ON position as int the picture below. The fan will start to operate, and the white LED (DONE1 and DONE2) will light up.



Bitcoin Mining

1. Download the FTDI driver from <http://www.ftdichip.com/Drivers/VCP.htm> (use the "Virtual COM Port Drivers")
2. Open your device manager, and record the COM port number of your device.
3. Download the latest version of cgminer: <http://ck.kolivas.org/apps/cgminer/>
4. Start the cgminer program from command prompt. The following is an example:

```
cgminer --icarus-timing 2.5 -G -o http://mining.eligius.st:8337  
-u 18pCbUSjzrvxCXgSBipsgTZWa6Sw41aQSo -p 123 -S com6
```



This example is using com6 and our bitcoin address.

Replace com6 with the information at step 2

Replace the 18pCbUSjzrvxCXgSBipsgTZWa6Sw41aQSo with your bitcoin address

You should now see cgminer mining.

Below is an example of how should cgminer look like with 20 Lancelot devices mining:

```

root@blackarrow: ~
cgminer version 3.1.0 - Started: [2013-05-17 00:45:08]
-----
(5s):8.032G (avg):7.977Gh/s | A:1901 R:2 HW:1 U:58.0/m WU:110.5/m
ST: 2 SS: 1 NB: 3 LW: 5915 GF: 0 RF: 0
Connected to pool.itzod.ru diff 2 with stratum as user blackarrow_0
Block: 0081218438bf7cd9... Diff:11.2M Started: [00:55:10] Best share: 2.92K
-----
[P]ool management [S]ettings [D]isplay options [Q]uit
ICA 0: | 397.6M/399.4Mh/s | A: 96 R:0 HW:0 U: 2.93/m
ICA 1: | 399.1M/399.5Mh/s | A: 98 R:0 HW:0 U: 2.99/m
ICA 2: | 399.3M/400.1Mh/s | A: 81 R:0 HW:0 U: 2.47/m
ICA 3: | 398.7M/399.1Mh/s | A:103 R:1 HW:1 U: 3.14/m
ICA 4: | 398.1M/399.9Mh/s | A:116 R:0 HW:0 U: 3.54/m
ICA 5: | 399.1M/399.3Mh/s | A:102 R:0 HW:0 U: 3.11/m
ICA 6: | 399.5M/399.9Mh/s | A: 93 R:0 HW:0 U: 2.84/m
ICA 7: | 399.7M/398.7Mh/s | A: 85 R:0 HW:0 U: 2.59/m
ICA 8: | 399.6M/398.6Mh/s | A: 96 R:0 HW:0 U: 2.93/m
ICA 9: | 398.3M/399.4Mh/s | A: 96 R:0 HW:0 U: 2.93/m
ICA 10: | 399.2M/399.0Mh/s | A: 90 R:0 HW:0 U: 2.74/m
ICA 11: | 397.5M/399.6Mh/s | A: 83 R:0 HW:0 U: 2.53/m
ICA 12: | 399.3M/399.3Mh/s | A: 86 R:0 HW:0 U: 2.62/m
ICA 13: | 399.6M/398.8Mh/s | A:107 R:0 HW:0 U: 3.26/m
ICA 14: | 399.3M/400.2Mh/s | A: 96 R:1 HW:0 U: 2.93/m
ICA 15: | 399.5M/400.0Mh/s | A:102 R:0 HW:0 U: 3.11/m
ICA 16: | 399.4M/399.9Mh/s | A: 90 R:0 HW:0 U: 2.74/m
ICA 17: | 398.1M/399.0Mh/s | A: 95 R:0 HW:0 U: 2.90/m
ICA 18: | 399.5M/400.1Mh/s | A: 92 R:0 HW:0 U: 2.80/m
ICA 19: | 394.8M/399.4Mh/s | A: 96 R:0 HW:0 U: 2.93/m
-----
[2013-05-17 01:17:48] Accepted 567cf0e9 Diff 2/2 ICA 18 pool 0
[2013-05-17 01:17:48] Accepted 3399f06b Diff 4/2 ICA 15 pool 0
[2013-05-17 01:17:50] Accepted 1ce098cc Diff 8/2 ICA 19 pool 0
[2013-05-17 01:17:51] Accepted 4fd5c53d Diff 3/2 ICA 12 pool 0
[2013-05-17 01:17:51] Accepted 354835b4 Diff 4/2 ICA 8 pool 0
[2013-05-17 01:17:53] Accepted 5f1b58ee Diff 2/2 ICA 17 pool 0
[2013-05-17 01:17:53] Accepted 74e8f626 Diff 2/2 ICA 17 pool 0
[2013-05-17 01:17:55] Accepted 6bcfe6da Diff 2/2 ICA 12 pool 0
[2013-05-17 01:17:55] Accepted 43fb8595 Diff 3/2 ICA 19 pool 0
[2013-05-17 01:17:56] Accepted 27e84b07 Diff 6/2 ICA 9 pool 0
[2013-05-17 01:17:58] Accepted 23195c1a Diff 7/2 ICA 4 pool 0
[2013-05-17 01:17:59] Accepted 7dbc3adb Diff 2/2 ICA 14 pool 0

```



In the previous example we started mining in a shared pool called eligius.st. To mine independently or using another pool, you will need to use different parameters.

Specifications

Architecture

2 x Xilinx FPGA XC6SLX150 (speed grade -3, -3N or -2)

Bitcoin Mining Speed

400 Megahashes per second

Power

Voltage: 12 Volts

Current: 2.2 Amperes

Consumption: 26.5 Watts

Connector: Molex, positive in center of the connector

Other features:

- Board temperature monitoring.
- PWM fan control and speed monitoring.
- standard 6 or 9CM low speed(1200RPM) fan.
- MCU friendly port for development.
- 64 GPIOs for general purpose application. plus 8LEDs, 8Switches, 4 push buttons, 24 internal connections.
- 100 CM² PCB size.
- both 2.5/5.5mm power plug and D-type Molex power connector.
- 6-layer PCB with 2OZ copper for enhance cooling. special layout design for lower the FPGA core temperature.
- USB port for communication.
- ROHS.
- compatible with present icarus bitstream
- core power module can provide 14A(25A peak) for each FPGA VCCINT, and io power module can provide 6A for VCCIO and VCCAUX (share by 2 FPGAs), all continuous output.
- 2 milliOHM MOSFET
- Open Source

About us

BlackArrow is an ambitious software and hardware developing company.

We are a young but robust team of highly experienced and passionate professionals who spare no expense or effort to achieve perfection. We have designed, developed and delivered successful projects across different platforms.

Contact details

sales@blackarrowsoftware.com

<http://www.blackarrowsoftware.com>