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ATLANTIS MiSTer FPGA PC Case
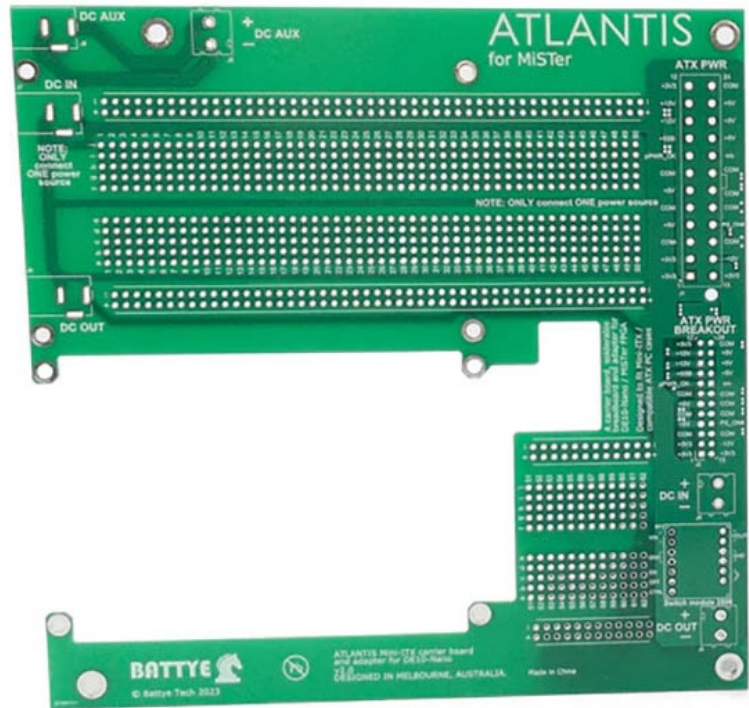
ATLANTIS MiSTer FPGA PC Case User Guide

Contents

ATLANTIS

ATLANTIS MiSTer FPGA PC Case

Product Specifications

- **Product Name:** ATLANTIS for MiSTer
- **Compatibility:** MiSTer FPGA boards
- **Power Input:** DC jack or ATX connector
- **Power Output:** DC power pigtail

Product Usage Instructions

ATLANTIS for MiSTer:
ATLANTIS for MiSTer simplifies powering your MiSTer FPGA using a PC case power button for power on/off.

Options for Bare ATLANTIS Boards:

- Solder a DC jack to J7, Pololu 2808 module to M1, and a terminal block to J3.
- Solder an ATX connector to J1, Pololu 2808 module to M1, and a terminal block to J3.

Pre-Assembled ATLANTIS for MiSTer:

- Connect PC case jumpers to the Switch module using the header pins toward the edge of the ATLANTIS.
- The external DC supply connects to J6, and the internal DC cable from J3 connects to the DE10-Nano.

Side by Side MiSTer Boards within ATLANTIS:

- Use M3 bolts and nuts for a side by side MiSTer FPGA and IO board setup.
- An example installation includes using 8x 20mm or 25mm M3 bolts with nuts for securing the boards in place.

FAQ

- **What power options are available for ATLANTIS for MiSTer?**

  You can use a DC jack or an ATX connector for power input, with the output being a DC power pigtail.

- **How do I connect the PC case jumpers to the Switch module in the pre-assembled ATLANTIS?**

  Use the header pins located towards the edge of the ATLANTIS to connect the PC case jumpers to the Switch module.

INTRODUCTION

- Please follow any recommended setup steps carefully and contact us before proceeding if you have any questions or concerns.

- For technical support you can also:
  - reply to your purchase order confirmation email.
  - send a message through our website contact form.
  - post a help request on our private Discord server "Support" channel.

- Request a link to join the ATLANTIS private Discord server by replying to your purchase order confirmation email.

ATLANTIS FOR MISTER

ATLANTIS for MiSTer is intended to simplify powering your MiSTer FPGA by utilising a PC case power button for power on/off.
Some options for bare ATLANTIS boards would include (See Figure 1):

- Powering from an external DC plug

  Soldering a DC jack to J7, Pololu 2808 module to M1 and a terminal block to J3; outputting power via a DC power pigtail into your MiSTer whenever the PC case triggers the 2808 switch.

- Powering from an internal ATX PSU 5V standby source
  - Soldering an ATX connector to J1, Pololu 2808 module to M1 and a terminal block to J3; outputting power via a DC power pigtail into your MiSTer whenever the PC case triggers the 2808 switch.
  - The ATX +5Vsb is connected by default to the Pololu Vin and many modern ATX power supplies will carry 3-4A on this line; sufficient to power most MiSTer setups

- For more advanced users

  Power input as per either of the above but outputting power via a DC lead directly soldered from along M1 DC out to the DE10-Nano DC input – resulting in a relatively clutter free system.

Compatible parts:

- ATX connector

  TE Connectivity AMP Connectors 1-1775099-3 or similar

- DC jack

  Cliff electronics DC10A 224959 or similar

- 2pin terminal block 5mm

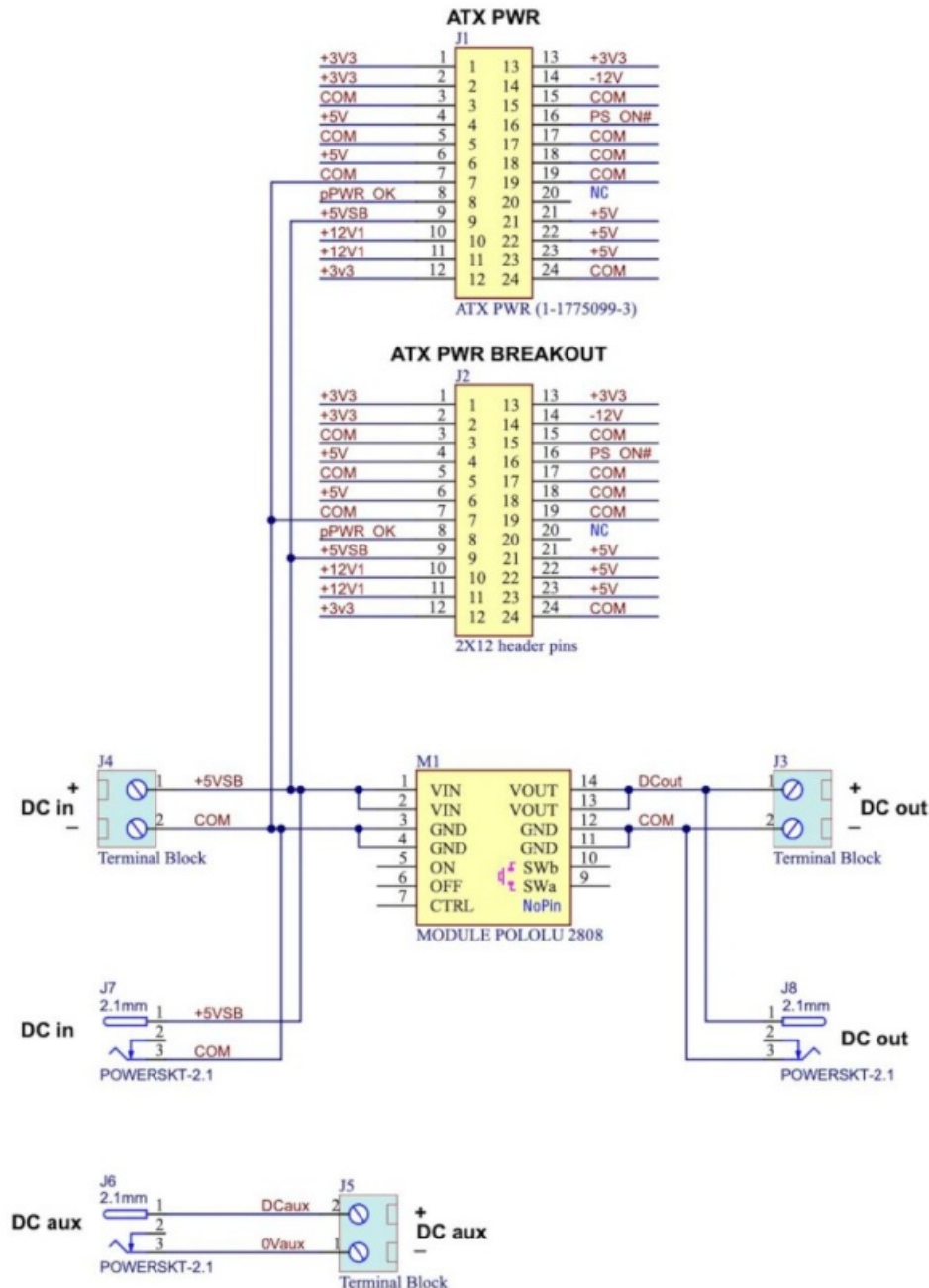- Pololu mini pushbutton module 2808 LV

Figure 1

PRE-ASSEMBLED ATLANTIS FOR MISTER

- Before proceeding, decide whether you will power your MiSTer from your usual DE10-Nano DC power supply or with an internal PC case ATX supply. If you decide on the latter, ensure your ATX supply has a current rating of at least 2A on the 5V standby line (usually displayed on a printed table on the ATX power supply casing). Some MiSTer setups may require a higher current rating – in general 3A is more than adequate for most setups.
- If you intend to power from an external DC supply with a barrel connector, such as an original DE10-Nano power supply; you must first connect the DC AUX to ATX harness (Figure 2). Ensure the orientation is correct with mating of the latch on the ATX header. This arrangement is intended to reduce the risk of users accidentally connecting both an external DC supply and internal ATX supply simultaneously.
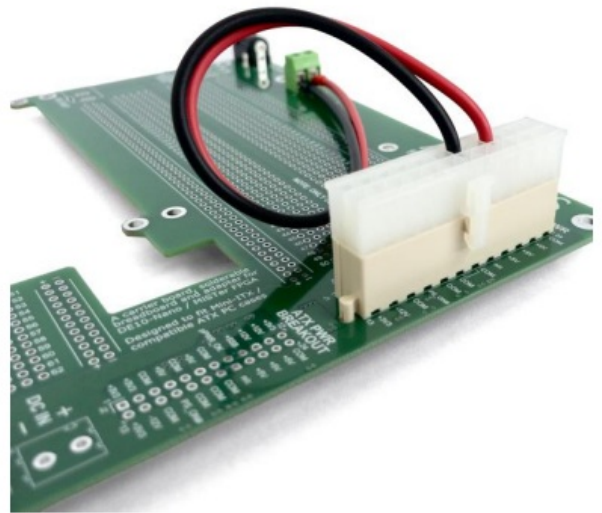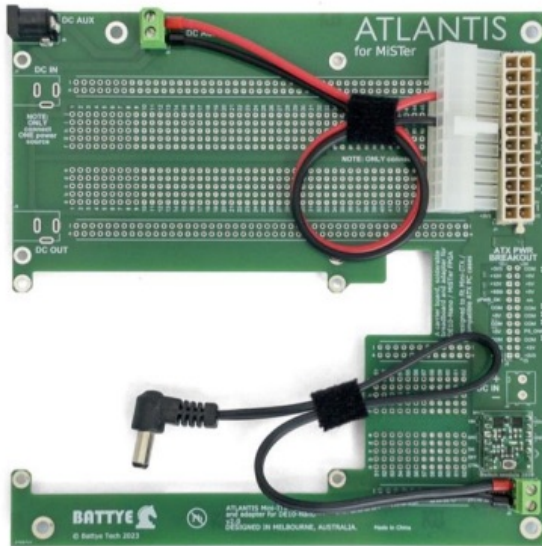- NEVER connect more than one power supply to the ATLANTIS board.

Figure 2

- If you purchased a backplate, unscrew the DC cable from the terminal block labelled J3 using a 3mm flat head screwdriver (Figure 3). Feed the cable through the backplate. It is usually easier to install the ATLANTIS board inside your PC case before mounting the backplate and reconnecting the DC cable. Ensure you reconnect the cable with the red end connected to + and the black end connected to – in the terminal block. Note that when looking at an ATLANTIS board from above, with the label text oriented correctly, all red leads sit above the black leads (Figure 4).
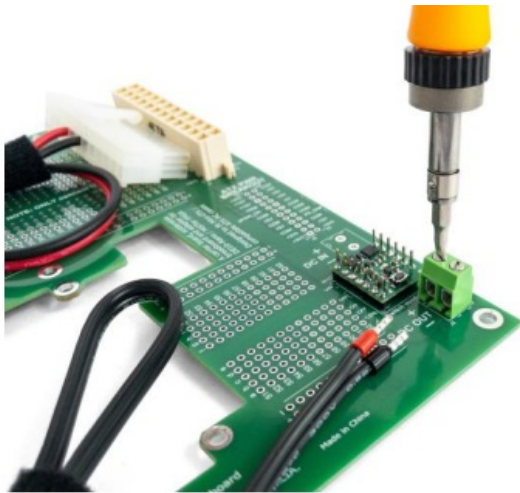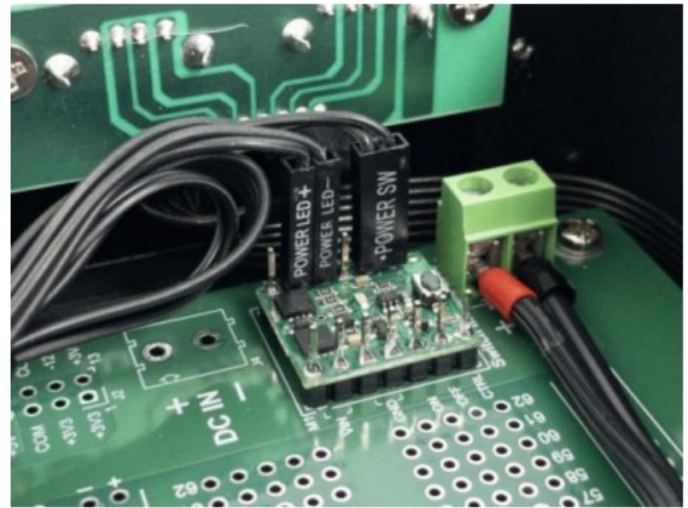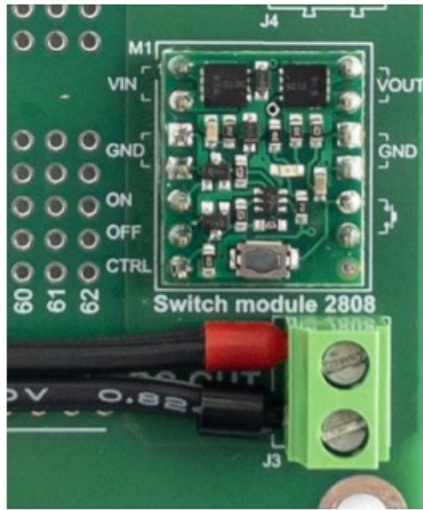

Figure 3

Figure 4

- Connect PC case jumpers to the Switch module using the header pins toward the edge of the ATLANTIS (Figure 4).
    1. Use either VOUT pin for a case LED light + and a GND pin for the – lead * SEE NOTE BELOW
    2. Use the two pins next to the button symbol for the PC case power switch.
       The jumpers may be made more secure with adhesive tape or hot glue, if required.

NOTES ON CONNECTING LEDs

- Before connecting any case LED leads to the Pololu module, ensure an appropriate resistor is present for that particular LED. On many PC panel LED circuits; an appropriate resistor will be incorporated on the LED driver board. This is the case with the TX06 and M06 PC cases where a resistor is built in and the leads can be directly connected to the Pololu without issue.
- However, if the wires directly connect to an LED without an intervening circuit board then you will need to add your own in line resistor. The selection will partly depend on the colour and type of LED you intend to utilise but online calculators are available if you're uncertain, or alternatively you can use a trial and error approach. **CAUTION** Directly connected an LED to the circuit will likely blow the LED.

Figure 5

- The external DC supply connects to J6 and the internal DC cable from J3 connects to the DE10-Nano.

SIDE BY SIDE MiSTer BOARDS WITHIN ATLANTIS

- A combination of M3 bolts and nuts can be used for a side by side MiSTer FPGA and IO board (or other DE10-Nano sized accessory board such as the ATLANTIS Raspberry Pi mount adapter) setup. Not all fasteners shown will be necessary, depending on the board arrangement you choose. Nylon, steel or a combination of fastener materials may be used.

Figure 6

- An example of one fastener installation is shown in Figure 7. This arrangement allows a DE10-Nano and accessory board to be secured side by side in a PC case. The ATLANTIS Thin Mini ITX backplate is intended to support this layout; ie the DE10-Nano is elevated one M3 nut depth above the ATLANTIS board and the IO board is elevated one M3 nut plus a 10mm spacer above the ATLANTIS board.
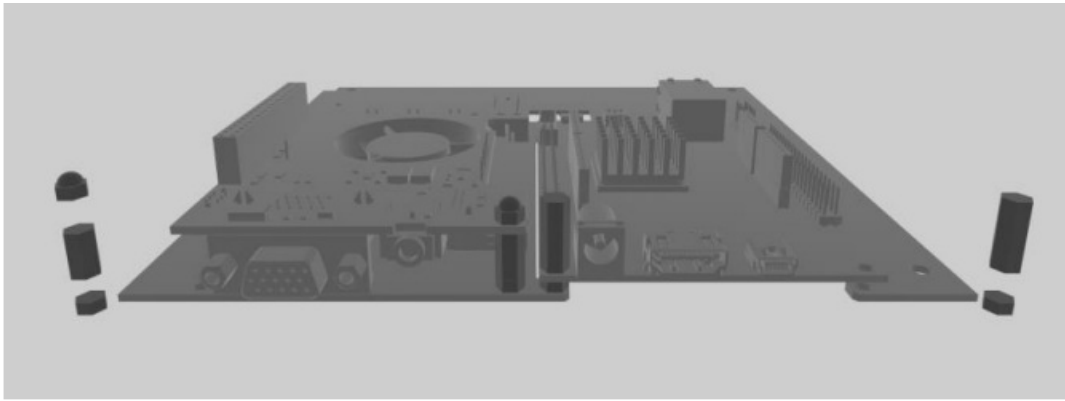
Figure 7

- Using 8x 20mm or 25mm M3 bolts for example; start with one M3 nut on top of the ATLANTIS to secure each bolt in position. On the IO board side, a 10mm hex spacer is fastened on top of this nut. By placing a nut below each MiSTer board, easy removal of either board from within the PC case is possible, while the ATLANTIS remains in place.
- Prepare your MiSTer plus or minus IO board. If connecting an Analog IO board with a GPIO ribbon cable, ensure the orientation of the cable such that the wires mate with the correct matching pins and ensure the connectors align with ALL pins as shown above (Figure 8). Note that the cable cannot be twisted and each specific pin on the DE10-Nano must be connected to the corresponding pin on the IO board.
- Cap nuts or other nuts can then go on top to secure each board in place (a 15mm threaded M3 hex spacer has been used on the DE10-Nano side in this example).
- If you intend to utilize the ATLANTIS fan and disk mount; 25mm M3 bolts are recommended on the DE10-Nano side with 12mm spacers above the initial M3 nut and then the fan and disk mount secured with an M3 cap nut.
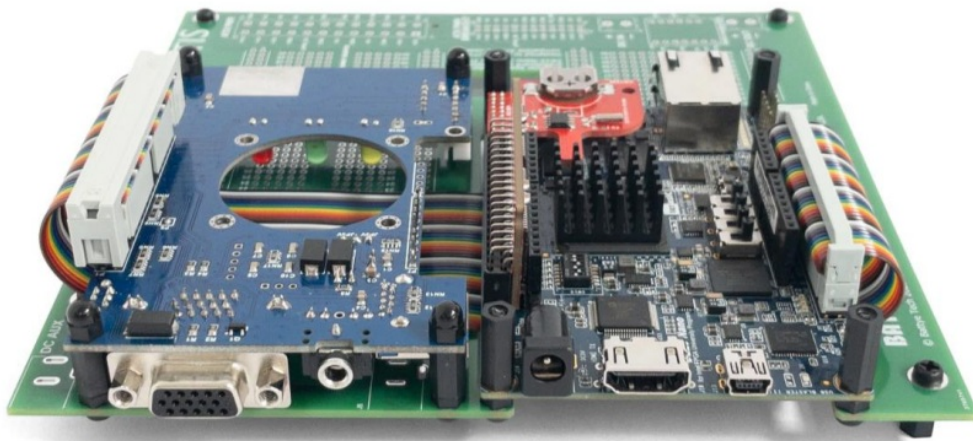

Figure 8

BACKPLATES FOR ATLANTIS FOR MISTER

- The ATLANTIS for MiSTer backplates provide a degree of physical protection for the contents of your PC case as well as making a neat finish.

Figure 9

- Plan which ports you will require and remove the cover plates; either gently twist the cover plates to snap the small joints holding them in place (Figure 10) or use narrow side cutters. Any residual plastic fray can be carefully flattened off with a side cutter or craft knife if desired.

Figure 10

- If you purchased a Pre-assembled ATLANTIS for MiSTer, follow the installation instructions for the board first (See PRE-ASSEMBLED ATLANTIS FOR MISTER).
- Feed any cables you intend to use through the backplate before installing the backplate in the PC (Figure 11).

Figure 11

- L-shaped tabs are included with the backplate kit and secured with an M3 6mm bolt and M3 nut. Tighten the nut just enough to permit rotation of the L-shaped tab. Insert the backplate with the tab rotated so there is no protrusion beyond the boundary of the backplate; once inserted, rotate to maximum extension.
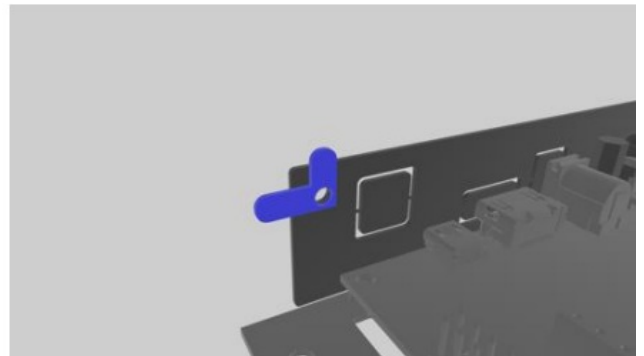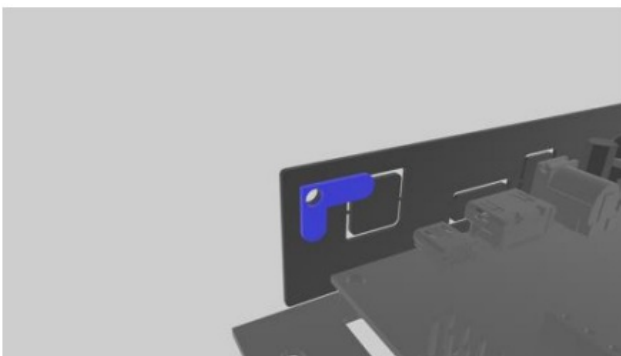

Figure 12

- The backplate is held in place by rotating the tabs on the inside of the PC case (Figure 12). The wall of the PC case is slotted between the tab and the backplate.

ATLANTIS BUNDLES

- ATLANTIS for MiSTer bundles include parts to aid in the installation of your DE10-Nano and MiSTer accessories within a PC case.
- PRE-INSTALLATION NOTES (FOR SKELETOS AND UNASSEMBLED BUNDLES):
- Before installing the ATLANTIS in your PC case, ensure all fasteners that insert from underneath the ATLANTIS board are secured.
- The bolts that secure the DE10-Nano and accessory board may be pre-installed. The USB hub may have been separated from the mount for shipping.
- To fix the USB hub onto the hub mount plate:
    1. Place 4x 25mm M3 bolts into the top of the USB hub to keep the corners aligned (Figure 13).
    2. Run the micro-USB cable underneath the hub stack.

3. Align the USB hub corner holes with the hub mount plate corner holes.

4. Secure the M3 bolts into the 8mm threaded hex spacers underneath the corresponding corners of the mount plate (Figure 13).
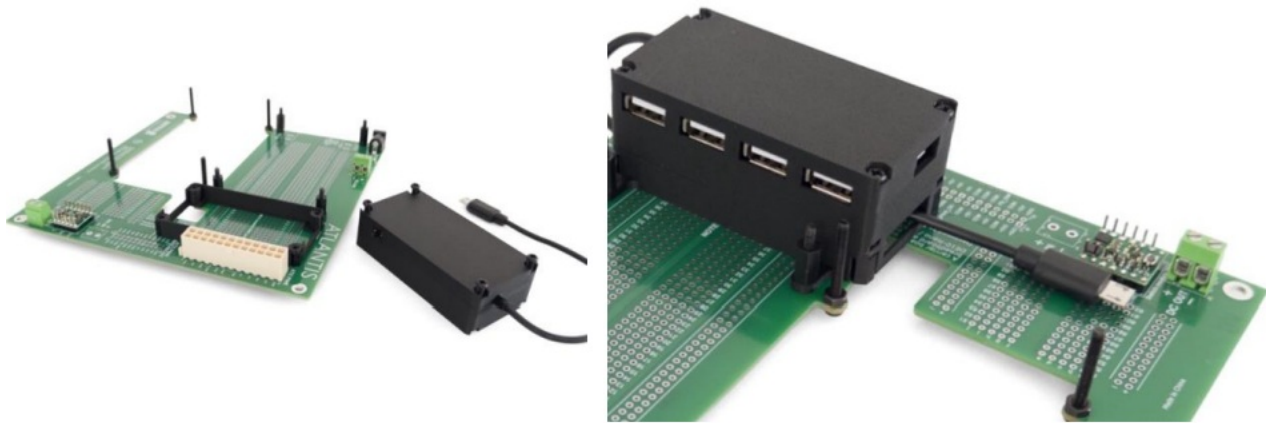

Figure 13

For thin or low-profile PC cases:
Components that are secured from above the ATLANTIS, such as the DE10-Nano and accessory boards, will generally be easier to install after the ATLANTIS is inside the PC case. In addition, keeping the DC AUX to ATX harness disconnected, until the ATLANTIS board is secured inside a thin PC case, will allow for a bit more headroom and make inserting the board into the case easier.

INSTALLATION
Note: It is usually easier to install your MiSTer system while the ATLANTIS board is inside but loose within the PC case – this permits better access to the rear mount points which may otherwise be hidden underneath the case frame.

- **STEP 1**

  FOR MIKROS AND MEGA BUNDLES

  1. Open the PC case by removing the two screws from the upper rear edge – the lid slides back and up.

  2. Remove the four ITX/ATX mounting screws (Figure 14) that fix the ATLANTIS board to the PC case – this will allow the ATLANTIS board to be gently pushed toward the front side of the case for accessing all DE10-Nano mount points (which might otherwise be obstructed by the chassis frame).
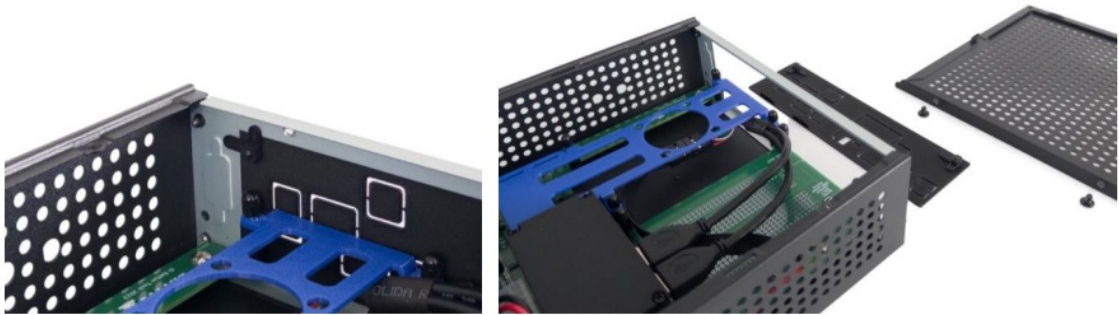
Figure 14

Figure 15

Figure 16

- **FOR ALL BUNDLES**

Before installing your MiSTer system, remove the following parts and place them safely aside.

1. Unscrew the DC power cable lead from the terminal block labelled J3 using a 3mm flat head screwdriver (Figure 3, page 6).

2. Turn the backplate tabs and remove the backplate (Figure 15) along with the DC power cable.

3. Remove 8x cap nuts from the M3 mount bolts (Figure 16).

4. Remove the ATLANTIS fan and disk mount plate

5. Remove 4x 12mm round spacers from the DE10-Nano side

- **STEP 2**

  Prepare your MiSTer plus or minus IO board. If connecting an Analog IO board with the included GPIO ribbon cable, ensure the orientation of the cable is such that the wires mate with the correct matching pins and ensure the connectors align with ALL pins (Figure 8, page 9). Note that the cable cannot be twisted and each specific pin on the DE10-Nano must be connected to the corresponding pin on the IO board, as if the boards were stacked.

  Note: Connect a USB 3.0 extension to the User Port if intending to utilize a USB SNAC adapter before inserting your MiSTer setup into the PC case (APPENDIX A).

- **STEP 3**

  Connect the USB hub micro-USB cable to the DE10-Nano. Carefully lower and insert the DE10-Nano/MiSTer boards onto the M3 mount bolts (Figure 17).

Figure 17

- **STEP 4**

  - Select a backplate. Feed the DC power cable lead through an appropriate port on the backplate and connect to the terminal block at J3.

    Note: For side by side setups we recommend a port for the DC cable which is above the 3.5mm jack of the IO board (Thin backplate) or VGA port (Full size backplate). This location routes the DC cable above the IO board and is easy to navigate with few obstacles (Figure 18).
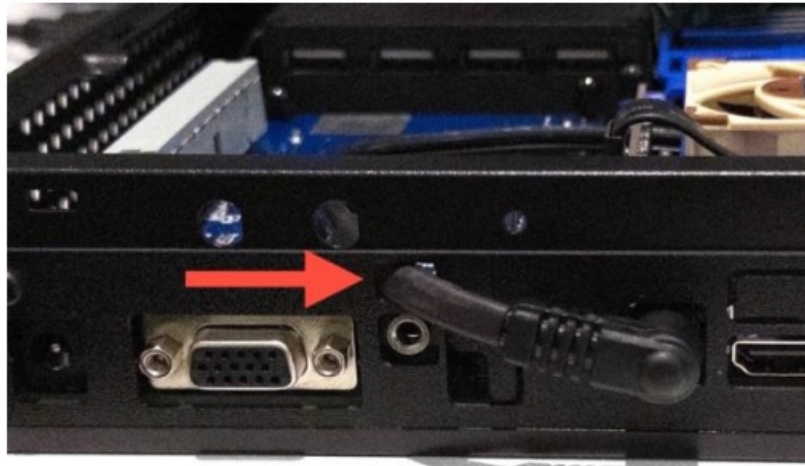
Figure 18

- Another option is the small permanent window to the right of the 3.5mm port (Figure 21) which places the DC cable below the IO board, however, this route is more complex to navigate and may snag on IO board components.

Figure 19

- Ensure you reconnect the DC cable with the red end connected to + and the black end connected to – in the terminal block. Note that when looking at an ATLANTIS board from above, with the label text oriented correctly, all red leads sit above the black leads (Figure 4, page 6).

- **STEP 5**
  - Insert the 4x 12mm round spacers on top of the bolts holding the DE10-Nano and place the fan and disk mount plate on top of these.
  - See APPENDIX A for fan and disk mount examples. A fan, if used, will need to be installed onto the plate before mounting it above the DE10-Nano.
  - Gently secure the DE10-Nano/MiSTer boards in place using the 8x cap nuts and avoiding overtightening.
- **STEP 6**
  - Connect the USB type A to 9pin adapter cables to the hub and internal PC case 9pin connectors.
  - See the latter part of subsection USB HUBS FOR ATLANTIS on page 21 in this guide, for notes on the limitations and safe use of ATLANTIS USB hubs.
  - Connect PC case jumpers to the Pololu Switch module using the header pins toward the edge of the ATLANTIS (Figure 4, page 6).
    1. Use either VOUT pin for a case LED light + and a GND pin for the – lead.

2. Use the two pins next to the button symbol for the PC case power switch.

- **CAUTION FOR SKELETOS BUNDLES**

Refer to the NOTES ON CONNECTING LEDs on page 7 before connecting PC case LEDs to the Pololu module.

Figure 20

- **STEP 7**
    - Secure the backplate by turning the tabs to overlap the case wall (Figure 12, Page 11) and connect the DC power cable lead from through the backplate to the back of the DE10-Nano.
    - Secure the ATLANTIS board down inside the PC case using the 4x ITX/ATX mounting screws.

Figure 21

- **STEP 8**

COMPLETE INTERNAL ATLANTIS POWER CONNECTIONS VIA THE ATX HEADER
    - Connect the DC aux to ATX harness to the ATX header (for MIKROS, MEGA and SKELETOS users powering from an external DE10-Nano compatible DC supply). Refer to Figure 2, page 5.

    OR
    - Connect a suitable ATX power supply (for SKELETOS users powering from an internal PC case ATX supply).
- **STEP 9**

Close the case lid and fasten with the screws provided (Figure 22).

Figure 22

- **STEP 10**

  CONNECT YOUR EXTERNAL POWER SUPPLY

    - If utilising a typical DE10-Nano power supply, connect this to the ATLANTIS DC jack J6 (for MIKROS, MEGA and SKELETOS users powering from an external DE10-Nano compatible DC supply).
      OR
    - If utilising an internal ATX supply, connect power to your PC case (for SKELETOS users powering from an internal PC case ATX supply).
      Connect your USB accessories and monitor.
      Press the front panel PC power button and your ATLANTIS powered MiSTer system will light up and power on!

Figure 23

USB HUBS FOR ATLANTIS

Depending on which model you selected, your USB hub kit may include either;

- A modified USB hub for ATLANTIS, incorporating 9pin headers for internal PC case USB connections as well as a mounting plate for either DE10-Nano location on the ATLANTIS board (Figure 24).
- A standard USB hub for ATLANTIS, incorporating the same circuit board and mounting plate but within a taller enclosure intended to be connected to via dual USB type A to 9pin internal PC case cables.
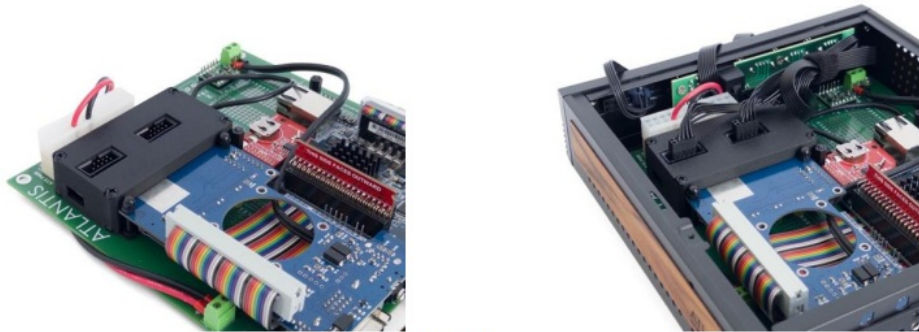
Figure 24

Figure 25

- The modified USB hub can be mounted inverted for easier access to the type A USB ports should daisy chaining or direct access be needed. The standard USB hub can be converted to a modified version using standard 10 pin IDC right angle headers (flip the enclosure to find the pre-printed port holes. Please contact us for further detailed instructions.

- In general, our MiSTer setup utilises a 5V 3A power source and we find this adequately supplies power to multiple connected USB devices on our four port USB hub, without the need for external power to the hub itself.

- In fact, with this four port USB hub we've simultaneously connected multiple USB gamepads, an optical mouse, RGB keyboard, an active Bluetooth dongle and daisy chained a passive USB hub with additional controllers and an external hard disk – all without the need for additional external USB hub power!

- However, in circumstances where additional power is needed, a 5V supply can be connected to this hub through the Micro-B power input port located on one edge.
  BUT doing this is not without a significant caveat.

- Like many rudimentary USB hubs, the power input on this hub is directly connected to the VCC input line on the other side (which connects to the host device). USB hub manufacturers do this because it simplifies the board design and means the device will function with either host device power input or external power input to the hub.

- The problem is that it exposes the host device to the second external power supply if there is any degree of voltage differential – a phenomenon known as "back-feeding". And while some host devices may incorporate back-feeding protection, the DE10-Nano does not.

- USB hub back-feeding has the potential to damage or destroy your DE10-Nano but this problem can be avoided by;
  - ensuring only one power source is used to power both the DE10-Nano and the hub (ie splitting power from a single source)
    or,
  - physically cutting the VCC wire inside the hub so external hub power can not enter the DE10-Nano.

- This means opening the hub case and cutting the red VCC wire. The hub will no longer function without an external power supply but your DE10-Nano is protected as back-feeding can not occur.
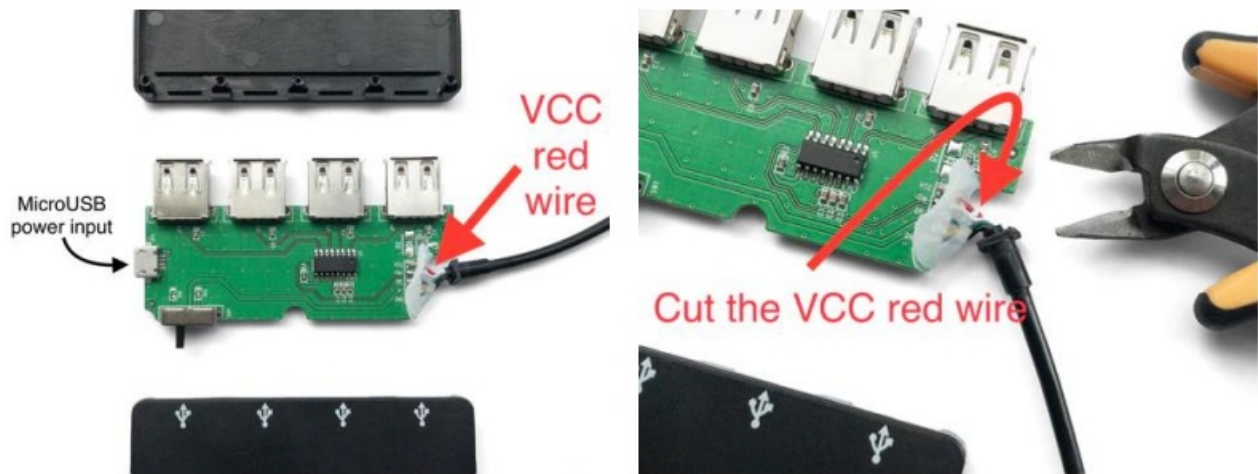
Figure 26

- Snip the VCC wire and secure the end so it does not risk contacting the pad or wire stump (Figure 26). With this step complete your DE10-Nano is safe and you can power the hub from any 5V external input you like.
- Even with closely matched power supplies, any difference has the potential to result in back-feeding which at worst destroys your expensive hardware, or in the best-case results in unwanted unusual behaviour.

APPENDIX A

- The fan mount is designed to support a Noctua 5V fan with the countersunk self-tapping screws provided by Noctua. The fan can be powered from spare header pins on the Pololu module.
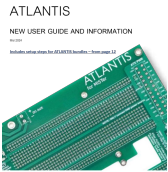

- The User Port is accessible with a USB 3.0 extension cable to a SNAC adapter. The S3A-S4B flat USB 3.0 extension cable has the correct orientation of connectors to fit between the DE10-Nano and IO board. Various lengths are available from suppliers. The 7cm example shown here can be folded to exit the backplate port located above the HDMI port on Thin backplates.

- A 12.7mm external diameter rubber grommet can be inserted into the ethernet cable port for a flush finish.

Documents / Resources

ATLANTIS MiSTer FPGA PC Case [pdf] User Guide
MiSTer FPGA PC Case, MiSTer, FPGA PC Case, Case

References

- **User Manual**