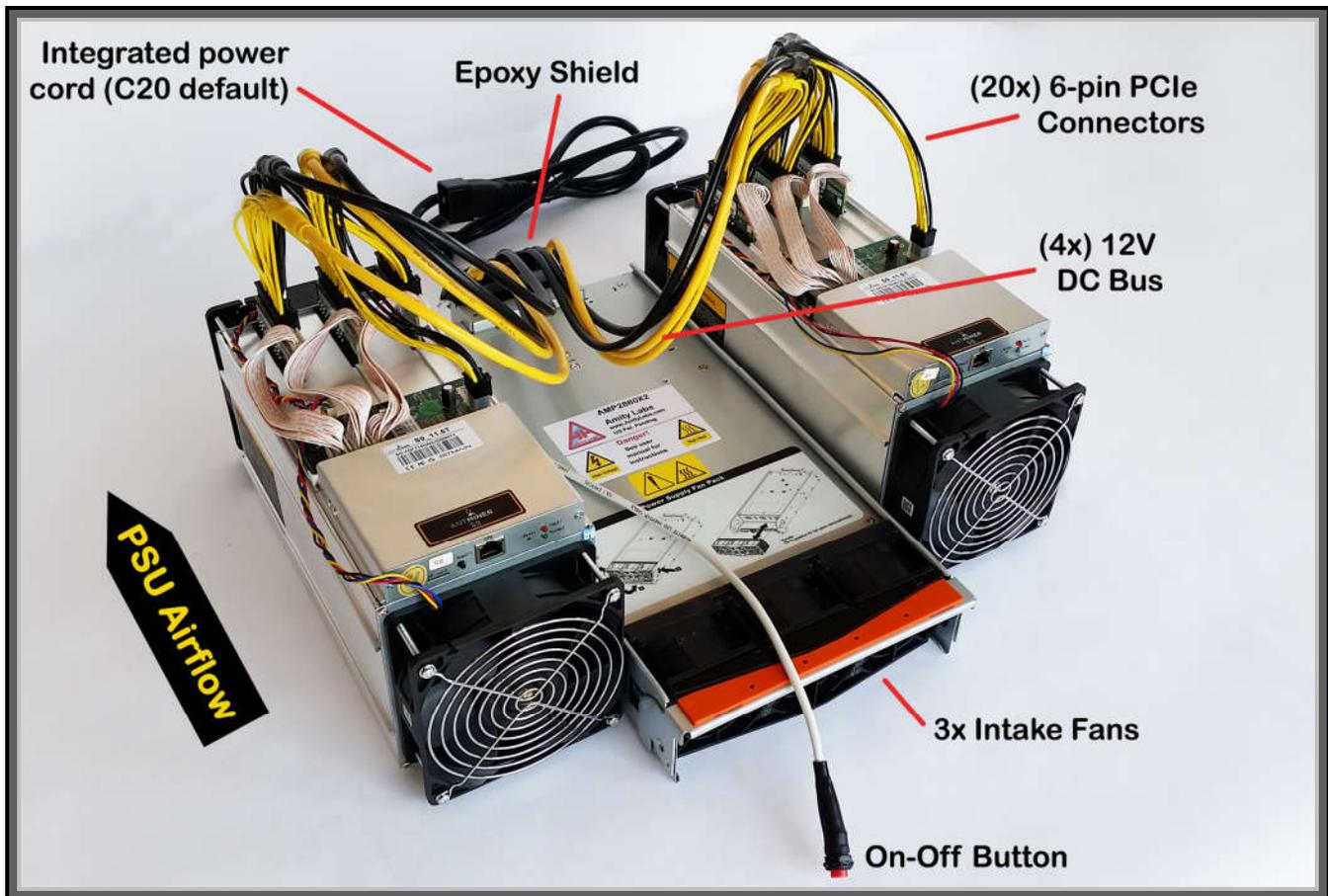


# AMP2880X2

## 2880 Watt Cryptocurrency Mining PSU for Two Antminer S9 / D3 / L3+ / S7 or equivalent

### User Guide

rev. 201707e



**WARNING:** Bitcoin miners and related equipment are not consumer appliances! The operation of such high-power, high-voltage electrical equipment creates risks of fire or electrocution. These risks can be reduced by proper operation, but not completely eliminated. Please read and follow carefully the enclosed instructions to reduce these operating risks.

Because this is a custom modification of an existing device, no representation or guarantee is made as to the safety or the regulatory compliance of this device.

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## Connecting Your PSU For The First Time

- Inspect the PSU for shipping damage. The most vulnerable areas are (a) crush damage to power cord at the “stem” where it enters the PSU, (b) breakage of the little black plastic tabs on the PCIe connectors, and (c) bent pins on the power cord plug. If there is apparent crush damage to any component, please contact us before any use.
- Connect the PSU to your miners first, before plugging it into the AC mains. The PSU **must not be energized** while you connect or disconnect your miners. As noted in the Bitmain manuals, connecting an energized power supply to miners may damage them.
  - Please make sure every PCIe connector is inserted with the proper polarity and the black tabs are securely engaged. If a tab has broken off during shipment, you can still use this PCIe connector, but carefully verify it is inserted in the right polarity – since the tabs are the main mechanism that ensures this. Inserting connectors in the wrong polarity may damage your equipment.
  - Please make sure all PCIe sockets on the miners are connected. With some miners, you may have leftover PCIe connectors (e.g. 1 per D3/L3+, 3 per R4...etc) – just leave them open. One connector on two of the DC buses is slightly longer than the rest, and may be used to power the controller single PCIe socket.
  - All PCIe connectors are electrically equivalent. Ideally, they should be plugged in a manner that balances the electrical output as evenly as possible. This is easy with recent 9-10 connector Antminers which fill all x4 DC buses from the PSU. If using a single miner, please use DC buses from the left and right side – instead of same side. Please refer to the DC Output section below if using a “non-typical miner” or contact us.
- Verify that your setup meets the criteria in the “AC Supply” and “DC Output” sections, and that it conforms to the layout recommendations in the “Continued Operation” section.
- Ensure that the PSU power button is not in the pressed down ON position, and connect the PSU to the AC mains. You should hear a slight click. The green AC OK LED should turn on.
- Press the PSU power button. Your miner fans should start spinning (it takes several minutes for most miners to fully boot up and start hashing). The green DC OK LED in front of the PSU should turn on. Some builds also feature a lighted power button that indicates operating status.
- If there is a problem at this stage, power down the equipment and disconnect from AC mains. Verify your setup and contact us for advice – rather than trying different fixes.

## Continued Operations

- Place miners and PSUs on **non-flammable surfaces** only, and away from flammable items such as curtains, carpets, clothing, chemical containers...etc. Do not place directly on wood or plastic shelving. Miners and their accessories are not consumer devices that can be installed anywhere and left forgotten.
- Managing airflow is the key to successful mining operations! Here are some tips about making sure your miners run cool and work reliably.

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- Do not leave your miner running in an enclosed space! Each miner is equivalent to a space heater, and will quickly **overheat** the average room if doors/windows are shut.
- Re-ingestion of hot miner exhaust is the #1 cause of equipment failure. If your miners sit on an open shelf, this will happen even if the room temperature seems normal (the miners will create a locally recirculating air current).
- If you have more than a few miners, it is essential that you evacuate the miner exhaust out of your mining area and to the outside. This is best accomplished by setting up your miners in a partitioned chamber with separate “cold” (intake) and “hot” (exhaust) “rooms”, and venting the hot room to the exterior with fans. The eBay dryer ducts can be also used for venting the miners provided they are not too long or sharply bent.
- Blowing air on the miners with fans or A/C units will not work if the miner exhaust is not separated from the intake. The airflow “dipole” created by each miner in open air is much stronger than the effect of most outside fans or deflectors you might use.
- The typical Antminer will require up to 200 cfm venting capacity. You may not need it all the time, but you will definitely need it on hot days.
- The ability of your setup to cool itself depends also on ambient temperature. When ambient temperature exceeds a certain level, it is best to shut down and wait for cooler weather. This ambient temperature level will depend on your setup and location. It is better to not mine for few days than to lose it all – for example, our mine shuts down when the exterior temperature exceeds 95 degrees F.
- Do not block the intake of miners and PSUs, and plan for unexpected ways in which blockage may happen in your environment (e.g. loose sheets of paper, closing doors). Likewise, try to anticipate environmental conditions (e.g. storm gusts) which may interfere with the airflow in your mining setup or expose it to water.
- Ambient air intake to miners and PSU should be clean of contaminants such as dust, pollen, bugs, garage metal shavings, salt spray, storm sleet or finely powdered snow...etc. Such contaminants will deposit on the circuit boards and heat sinks, forming a damaging gunk that can lead to failure or electrical shorts. Large mines use arrays of furnace filters to condition the intake air and avoid such hazards.
- The direction of airflow on this PSU is from front with LED to the venting grille in the back. The PSU should be oriented along the direction of principal airflow in your mining setup. PSU fan will run automatically if temperature requires it. Do not block the PSU intake and exhaust areas, or remove the fans.
- This PSU can be installed on its side, or vertically, and/or in contact with the miner. Make sure the miner hot exhaust is not directed into the PSU intake.
- Disconnect AC at outlet when the PSU is off for extended periods of time. Do not open this PSU! The internal converter voltages can exceed 600V and **are lethal**.
- Pull/hold plugs and connectors by their bodies – not by wiring. Periodically inspect all your AC wiring, plugs, outlets, and other circuit components for signs of overheating and damage. Replace damaged/suspicious components immediately.
- Keep miners and PSUs far **away from the reach of children or pets**. Be careful to avoid thin metal objects from poking into the metal grille in the back of the unit. The grille protects internal high-voltage components from the outside while allowing for heat to ventilate. You

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risk a serious electric shock or short circuit if you reach inside the grille with a sharp metal object such as a screwdriver or a bare wire. Do not mine in, or place any mining equipment in wet interior locations, or in any exposed exterior locations.

## AC Supply Specification:

- 200-240V 16Amp **grounded** C19 outlet (or equivalent)
- 12 Amp PDU C19 socket is ok ((please make sure you don't exceed overall PDU rating, and please make sure you check out the PDU socket periodically for overheating)
- Circuit and breaker for one PSU should be rated preferably at 20 amps
- If you re-wire the plug (minimum 20 amp plug recommended) please remember the wiring for regular domestic single-phase circuits should be hot-hot-**ground**.
- We highly recommend installing **surge protection** at the electrical panel and internet hookup. When multiple switching power supplies are on the same AC circuit, a tripping breaker or accidental disconnect may generate large EMF pulses that can damage equipment.

## DC Output Specification:

- Core output: 2880 Watts.
- Universal harness comprising x4 common-rail 12V DC buses with 5x PCI-e connectors each for a total of x20 PCI-e connectors. All PCIe connectors are electrically equivalent, which gives you a lot of freedom on how to distribute them across miners. One connector is slightly longer than the rest to remind you to connect it to the controller PCIe socket (but you don't have to use this one in particular, since all are electrically equivalent).
- Each PCI-e connector can supply 200 Watt (18 Amps @ 12V). Each DC bus can supply 720 Watt (60 Amps @12V). The following Antminer loads are typical for the AMP2880X2
  - 2x S9/S7
  - 2xT9 from the 11.5 TH/s batches (watch out for overload)
  - 2x D3/L3+/R4 (x1 or x3 spare PCI-e connectors left per miner).
  - 4x L3 (1x DC bus per L3 with 16 AWG splitter)
  - The AMP880X2 will **not** power 2xT9 from batches higher than 11.5 TH/s
- The AMP2880X2 can power other miners or 12VDC loads, provided you don't exceed (a) the rated current per connector and per bus, (b) the overall core rating of 2880 Watts, (c) the internal PSU rail rating of 100A for each "root" of the DC buses, and (c) your input AC ratings. In such applications, distribute the PCIe connectors on the load in a manner that balances the load as evenly as possible across all x4 DC buses. Here are some typical examples of using the AMP2880X2 to power different loads:
  - 2x Avalon A741 – use all x4 DC buses, watch out for overload / overheating
  - 2x SP20/A6 – use all x4 DC buses (2x buses per SP20, not x1 bus per miner)
  - 4x S5 – use one DC bus per miner
- When estimating currents and power, remember that Power (W) = Current (A) \* Voltage (V) and verify your estimates with a meter if possible. In some locations, the AC line voltage can

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be as low as 200V and this may result in higher than expected currents. Feel free to contact us if you are uncertain or you want to power an unfamiliar load with this PSU.

- Never connect lines from different power supplies to the same load (i.e. hash card).

## **Troubleshooting and Warranty:**

- First time use problems: Prior to shipping, this unit has been tested in a known good environment. If you experience problems at first install, it is more probable that a local environment factor is the source of problems, such as:
  - No 200-240V at outlet. Please check your breakers and wiring. If using a PDU, check breakers and indicator lights for proper connection. This PSU will not run on triple-phase circuits where the line voltage exceeds 267V. It may also not run correctly on inverter circuits that are unable to provide a clean enough sine wave input.
  - Error in miner connection. Please make sure all PCI-e connectors on each machine are fully engaged and inserted in the proper polarity (see “black tab” note above).
  - Faulty miner hash card. In some cases, hash cards with faulty capacitors may look as short circuits or DC overloads to the PSU control logic. In that case, the PSU will turn on but quickly report a DC fault (yellow light).
  - If the problem persists, contact us for return/diagnostics.
- Long-term runtime problems:
  - A hard reset will sometimes “cure” electrical faults. To do a hard reset, disconnect the PSU from the AC outlet, and let it rest for 10 minutes or so.
  - Yellow AC light: The PSU will likely need replacement. AC failures are usually the result of surges (e.g. breakers tripping) or power line “garbage”.
  - Yellow DC light: Check miners for electrical connection problems. Do a hard reset. If the problem persists, the PSU will need replacement.
  - AC light is green, but the DC light remains dark. Check for faulty or damaged power button or leads. Mechanical damage or contact corrosion in the on/off switch will make your PSU unable to engage its DC circuitry. Click the switch several times to clean up/engage the contacts. Contact us for the possibility of additional on-site fixes.
  - The typical attrition rate of this power supply in normal bitcoin mine environments is about 5% per year. If you experience a significantly higher problem rate, check your AC line for surges/voltage spikes (which may be caused by nearby motors, welders or other large inductive loads). Verify your environment for the typical risk factors of (a) high temperature, (b) dust and insects, (c) humidity and aerosols.
- Warranty:
  - 60-day warranty from date of delivery covering DOA and failure under normal use.
  - Defective unit will be replaced at no charge, or money back.
  - Defective unit should be returned to us upon receiving the replacement
  - Warranty is void if the damage is due to misuse (excessive load, high operating temperature, AC surges from tripping breakers or power line, water damage)