



PD-64

User Manual

Author: Vittorio Pascucci

If you wish to get in touch with the developer, please join the SPL [Discord](#) server.

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Figure 1. PD-64

The PD-64 is a plug & play, compact replacement for the original Commodore-64 power supply. The PD-64 features high efficiency switching converters and is powered by a USB-PD wall adapter (not included). What sets the PD-64 apart from other similar switching power supplies is the fact that it delivers not only DC supply voltage (5VDC/2A), but also a true, galvanically insulated AC supply (9VAC/1A, 50/60Hz), thus accurately replicating the original PSU.

The PD-64 features extensive circuit protection on both DC and AC output supplies (electronic fuses, overvoltage and overcurrent protection, thermal shutdown). Both supplies are digitally regulated ensuring the computer is always fed with stable and safe power.



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1. PD-64 Overview

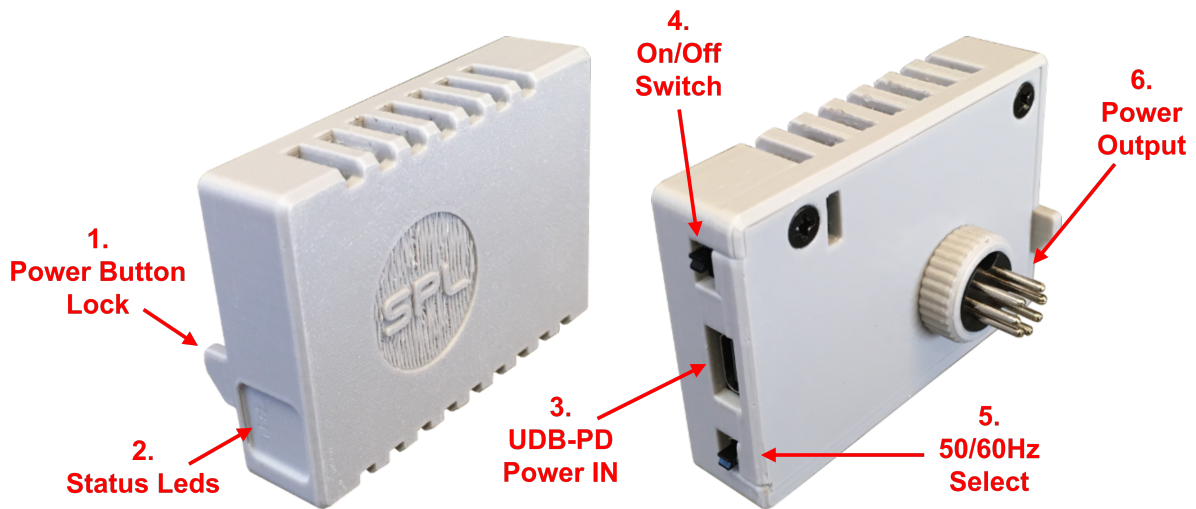


Figure 2. PD-64 Overview

Identifier	Name	Description
1	Power Button Lock	The PD-64 performs a controlled power-up procedure, necessary to limit the inrush current into the C64 and thus avoid tripping its own protections (fuses, overcurrent protection). Turning on the PD-64 and then the C64 would result in the PD-64 cutting off power immediately. For this reason, plugging in the PD-64 forces the On/Off switch in the ON position, and from this point on the computer is switched On and Off directly from the On/Off switch of the PD-64 itself (see item 4)
2	Status Leds	These leds indicate the status of the output power (see Section 4)
3	USB-PD Power IN (USB-C connector)	USB-PD is a power-delivery protocol that can deliver higher voltage and power compared to regular USB (up to 20vDC/5A, 100w max power). The PD-64 requires a USB-PD adapter capable of delivering 12vDC with at least 2A (~24w), which is common with modern USB-C phone chargers. The PD-64 will not activate the 9vAC output if it is not able to negotiate 12vDC input from the USB-PD adapter.
4	On/Off Switch	While plugged in, the On/Off switch of the PD-64 replaces the On/Off switch of the C64
5	50/60Hz Select	The frequency of the 9vAC output can be selected between 50Hz (PAL) and 60Hz (NTSC). This is necessary to accurately drive the TOD (time-of-day) clock within the C64. Selecting the wrong frequency has no safety implications and may only result in a slightly faster or slower TOD clock, which is anyway a rarely used feature. (Switch down → 50Hz, Switch up → 60Hz)
6	Power Output	DIN-7 male connector plugs directly into the C64 female connector. The additional pins to the 4 found on the original power supply are not connected and are left in place to provide better stability.

2. Specifications & Safety

The PD-64 is compatible with all motherboard revisions of the Commodore-64 and Commodore-64c, including all modern variants and reissues that can normally be powered with the original Commodore power supply.

- **DO NOT USE THE PD-64 TO POWER ANY COMPUTER OR APPARATUS OTHER THAN THE C64 and C64c**
- If the status leds are not both green, power off the PD-64, unplug it and follow the basic troubleshooting steps described in [Section 4](#).
- During normal operation the PD-64 is supposed to become warm but not hot to the touch (one should be able to rest a hand on the top and side of the enclosure without discomfort).
- The backpanel may become hot to the touch in the area close to the power connector, but should never become warm enough to bend the case.
- If bulging, cracking or deformation of the case and backpanel is observed, especially in the proximity of the power connector, stop using the PD-64 immediately and reach out to the retailer or the developer for advice.

Parameter	Value
Output voltage (5vDC)	4.99V \pm 3% (no load, Ta=20°C)
Output voltage Ripple (5vDC)	200mVpp (typical, 20MHz measurement bandwidth)
Output voltage (9vAC)	\pm 12V \pm 5% (peak, no load, Ta=20°C)
Output voltage Ripple (9vAC)	260mVpp (typical, 20MHz measurement bandwidth)
Output AC frequency	50/60Hz \pm 0.1%
Maximum Continuous Output Current (5vDC)	2A
Maximum Peak Output Current (5vDC)	2.4A \pm 7.5%
Maximum Continuous Output Current (9vAC)	1A (average measured after full-bridge rectifier)
Maximum Peak Output Current (9vAC)	N.D.
Maximum Internal temperature (before thermal shutdown)	70°C (Measured from microcontroller sensor)

3. Choosing the USB-PD Power Adapter

The PD-64 requires a USB-PD power adapter capable of delivering 12vDC with at least 2A (~24w). When choosing the wall adapter look specifically for USB-PD compatibility and verify that 12vDC is present among the available output voltages.

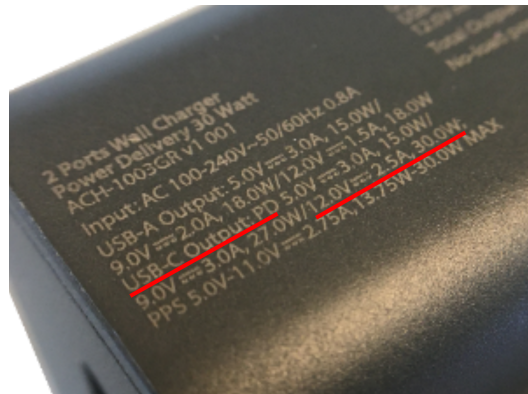




Figure 3. USB-PD Adapter

For the best possible experience utilize a USB-PD adapter from a reputable brand and a USB-C cable capable of carrying at least 3A (commonly available).

Budget USB-PD adapters (even from decent brands) often struggle to provide a stable voltage in the presence of large current spikes. The C64 absorbs rather large current spikes on the 9vAC rail during the leading edge of the AC wave, as it recharges the large on-board capacitors and charge-pumps. This can cause a slight voltage drop on the 12vDC input supply from the USB-PD adapter which, if significant enough, could trigger the PD-64 undervoltage protection mechanism which cuts off power to the 9vAC output. That said, extensive testing with ultra-cheap USB-PD adapters and at maximum total output power only showed a slight deformation of the 9vAC output waveform. No measurable deviation was observed in typical working conditions (when plugged into an actual C64)

4. Status Leds

Led Color	Status
● ●	PD-64 is Off or no voltage is available on the output connector.
● ●	PD-64 is On and both 5vDC and 9vAC are available on the output connector
● ●	PD-64 is On but no 9vAC is available on the output connector. This is most likely due to the USB-PD wall adapter not being able to deliver 12vDC (either not stable enough or not at all). Alternatively this status may be due to the AC fuse tripping and might indicate a shortcircuit within the C64. Unplug the PD-64 from teh C64, power it off and then on again while still unplugged. If the led status does not change this might indicate an incompatible USB-PD adapter or, possibly, a defective PD-64.
● ●	PD-64 is On but no 5vDC is available on the output connector. This is most likely due to the 5vDC fuse tripping and might indicate a shortcircuit within the C64. Unplug the PD-64 from teh C64, power it off and then on again while still unplugged. If the led status does not change this might indicate a defective PD-64.

Led Color	Status
 	PD-64 is On but no 9vAC is available on the output connector. This is due to the AC converter entering overcurrent protection, which might indicate a shortcircuit within the C64 or a capacitive load higher than 2.5mF on the AC rail. This may be due to the presence of particular or defective accessories on the C64's User Port, a defective Datasette or, possibly, a modified power stage with higher than normal capacitance. Unplug the PD-64 from teh C64, power it off and then on again while still unplugged. If the led status does not change this might indicate, a defective PD-64.

5. Disclaimer

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