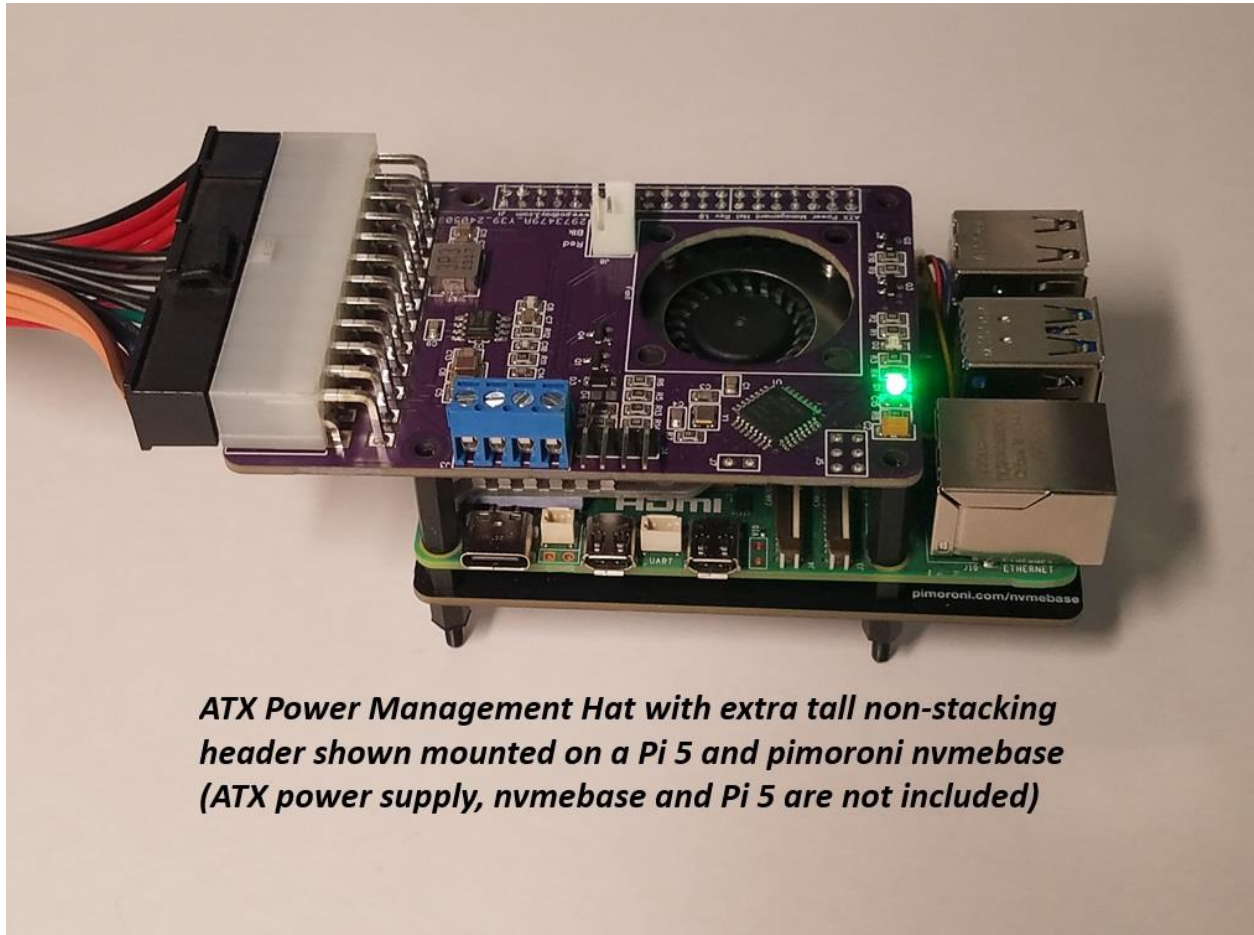


pod bay 3



ATX Power Management Hat for Raspberry Pi Revision 1.0 User Manual

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Overview

Congratulations on your purchase of the ATX Power Management Hat for Raspberry Pi!

Please read this entire manual before using to ensure you receive maximum benefit from this board while protecting your investment in your Raspberry Pi.

The ATX Power Management Hat is available in two configurations: the ATX 20/24 Pin and the FDD/SATA. The ATX 20/24 Pin configuration is intended for applications where you are controlling only one Pi or, as a parent in a parent/child (cluster) environment. The FDD/SATA configuration is intended to be used only as a child in a parent/child (cluster) environment. Please refer to the section, “Using the ATX Power Management Hat in a Parent/Child Environment” for more information about the FDD/SATA configuration.

While reading this document, please refer to the graphic below on the following pages. Documentation refers to both configurations of the ATX Power Management Hat unless otherwise specified.

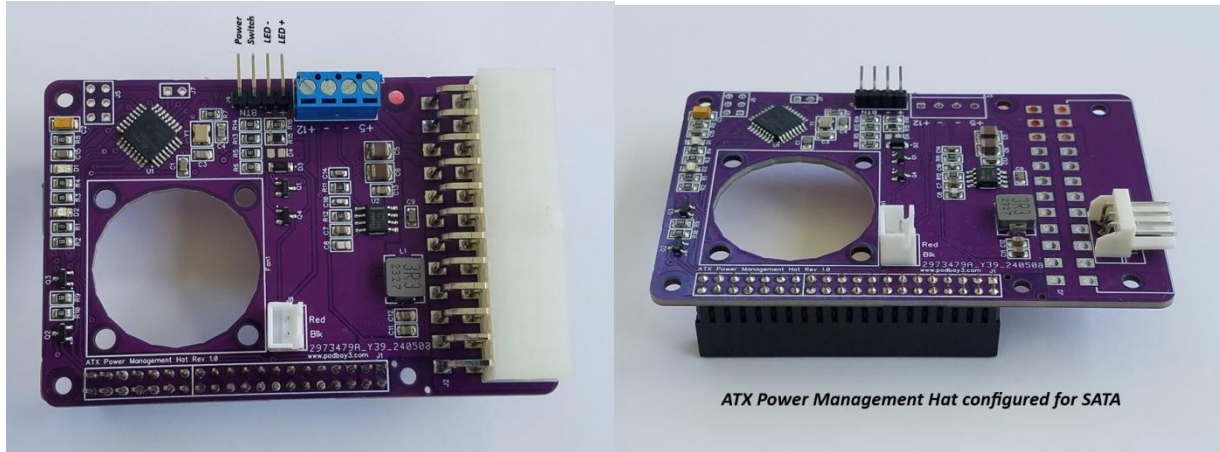


Figure 1 - ATX Power Management Hat (ATX 20/24 Pin and FDD/SATA Configurations)

Features

- Features soft shutdown and reboot of the Raspberry Pi to minimize disk file corruption
- Works with most inexpensive off the shelf ATX desktop supplies using 20 or 24 pin ATX connectors
- On board DC – DC converter provides an ample 5.1 VDC at 6 amps to back power the Pi through the GPIO pins
- Compatible with all model ‘A’ and model ‘B’ versions of Raspberry Pi 3, Pi 4, and Pi5

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- The ATX 20/24 Pin Configuration kit provides screw terminals (J3) to break out +12 VDC and +5 VDC from the PSU for user projects. The screw terminals are rated for 3.0 amps
- Supports a 2 wire 12 VDC fan for adjustable air flow
- Includes configurable watchdog timer to power cycle the Raspberry Pi in case of operating system freeze
- Includes configurable power management to automatically restart the Raspberry Pi after a power failure
- Includes low voltage shutdown for the +12 VDC PSU rail
- Board conforms to the Standard Raspberry Pi Foundation's footprint

Installing the ATX Power Management Hat for Raspberry Pi

The purpose of the ATX Power Management Hat is to back power your Raspberry Pi from an ATX style desktop power supply. **Therefore, you must not plug the Raspberry Pi into any other power supply while the ATX Power Management Hat is installed otherwise damage to your Raspberry Pi WILL occur.**

You will install the ATX Power Management Hat in this order:

1. Unbox the Raspberry Pi. Assemble those components and install the latest operating system per the given instructions.
2. Use a recommended power supply to verify that the OS boots up properly.
3. Download and install recommended operating system updates.
4. Enable I2C through the operating system Configuration Panel.
5. Shutdown the operating system from the main menu.
6. Disconnect power supply.
7. Mount the ATX Power Management Hat to the GPIO header on the Raspberry Pi with the supplied mounting kit:
 - a. If you're using the extra tall header, note that there are four washers. These are used as spacers to give the standoffs their proper height.
 - b. Connect the ATX Power Management Hat to the ATX power supply, power LED and power button.
 - c. Turn on the ATX power supply. You should notice that the power and Boot Ok LEDs flash in quick succession. This indicates that the ATX Power Management Hat is now ready to use.
8. Turn on power to the Raspberry Pi by depressing the power button. Allow the Raspberry Pi to boot up. The ATX Power Management Hat will now be waiting for a signal from the Raspberry Pi that it has booted up.
9. Run "`sudo i2cdetect -y 1`" in the command window to verify that the ATX Power Management Hat is found at the default address of 0x5A on the I2C bus.

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10. Edit system configuration files for the Raspberry Pi to properly communicate to the ATX Power Management Hat
11. Install the required boot script on to the Raspberry Pi. When you install the boot script, the service that listens for the ATX Power Management Hat will start up and notify the ATX Power Management Hat that the Pi has booted up. The Boot Ok LED should now illuminate.
12. Reboot by typing `sudo reboot` in the command window. Alternatively, depress the power button for a half a second then release. When the Raspberry Pi reboots, the Boot Ok LED will now illuminate and the ATX Power Management Hat will be waiting for a power down request.

Edit System Configuration Files

You will need to edit a couple of system configuration files for the ATX Power Management Hat to work properly with the Raspberry Pi. Additionally, you will need to load an alternative Python GPIO library if you're using the Pi 5 and/ or if you have the Bookworm version of Raspbian installed. The Python scripts will not run otherwise.

1. Open a command window and `'cd /boot/firmware/'`
2. Edit the config.txt file:
 - a. `sudo nano config.txt`
 - b. Scroll all the way down to the end of the file and add the following lines exactly as they are written. The first line tells the Operating System to drop the power off pin to low when the Pi is totally shut down. The second line disables the OS warning you will get if you're not using Raspberry Pi sanctioned power supply:
`dtoverlay=gpio-poweroff,active_low`
`usb_max_current_enable=1`
 - c. Type 'ctrl x' then 'Y' to save and exit the editor.
3. If this is a Raspberry Pi 5, then edit rpi-eeeprom-config. You will need to take care in editing this file as it affects the Pi's eeprom:
 - a. `rpi-eeeprom-config -edit`
 - b. Scroll to the bottom of the file and add the following to ensure the Pi will supply 5 amps through the USB ports:
`PSU_MAX_CURRENT=5000`
4. If this is a Raspberry Pi 5 and/or the OS is Bookworm (or more recent) then you will need to remove the existing Python GPIO library and replace it so the Python scripts will run.
 - a. Remove the existing library:
`sudo apt-get remove python3-rpi.gpio`
 - b. Disable a flag that prevents pip3 from installing a new library. This is done by renaming a file:
`sudo mv /usr/lib/python3.11/EXTERNALLY-MANAGED`
`/usr/lib/python3.11/EXTERNALLY-MANAGED.old`

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- c. Install the replacement library:

```
sudo pip3 install rpi-lgpio
```

5. Reboot the Pi. This should now cause the 'Boot OK' led to go steady green:

```
sudo reboot
```

Installing the ATX Power Management Hat Boot Script

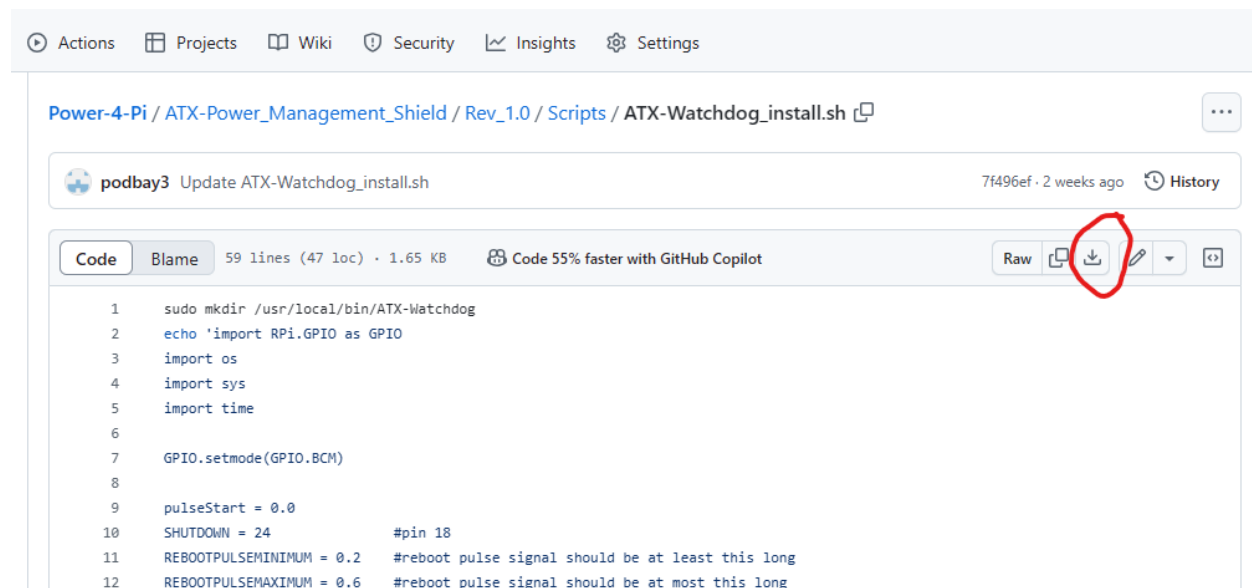
You will find the necessary boot install script, 'ATX-Watchdog_install.sh' at:

[https://github.com/podbay3/Power-4-Pi/tree/main/ATX-Power Management Shield/Rev 1.0/Scripts](https://github.com/podbay3/Power-4-Pi/tree/main/ATX-Power%20Management%20Shield/Rev%201.0/Scripts)

This script assumes that you are running a version of Linux that is compatible to Raspbian. ATX-Watchdog_install.sh installs a service on the Raspberry Pi to monitor the 'Shutdown' signal from the ATX Power Management Hat to either initiate a shutdown or reboot of the Pi depending on the length of the shutdown pulse received.

Please note that this service requires the use of GPIO 5 (pin 18, 'Shutdown'). This pin was selected because it does not conflict with special use pins such as I2C, SPI or UART pins.

To install the script, refer to the below graphic and follow these instructions: (recommended to have ATX Power Management Hat mounted on the GPIO header. Otherwise the Raspberry Pi may automatically shut down after reboot):



1. Open up a browser window and navigate [https://github.com/podbay3/Power-4-Pi/tree/main/ATX-Power Management Shield/Rev 1.0/Scripts/ATX-Watchdog_install.sh](https://github.com/podbay3/Power-4-Pi/tree/main/ATX-Power%20Management%20Shield/Rev%201.0/Scripts/ATX-Watchdog_install.sh).

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2. Click on the download button circled in red. The script will now copy to your downloads folder.
3. Open a command window and navigate to the downloads folder.
4. Run `bash ATX-Watchdog_install.sh`. The script will now install itself onto your Raspberry Pi and start.
5. `sudo reboot`.

Operating Modes

Turning on the ATX Power Supply:

Turning on/plugging in the ATX power supply will supply a trickle voltage to the microcontroller on the ATX Power Management Hat. The ATX Power Management Hat will flash the power and Boot Ok LEDs in rapid succession to indicate the board is powered up and functioning.

Power up the Raspberry Pi:

Depressing the power switch when the Raspberry Pi is turned off will initiate the power up sequence. The power indicator LED pulsates slowly until the Raspberry Pi has booted. The Boot Ok LED and the power LED will go steady on.

Reboot:

Depressing the power switch for greater than a half a second and less than three seconds while the Raspberry Pi is on will initiate a reboot of the Raspberry Pi. The power LED dims and the shutdown LED pulses once to signal the Raspberry Pi to reboot. When the Raspberry Pi starts to reboot, it sends a command to the ATX Power Management Hat to turn off the Boot Ok LED. The power LED will then pulsate until the Raspberry Pi has rebooted and the ATX Power Management Hat receives the Boot OK command. The power and Boot Ok LEDs will then go steady on.

Shutdown:

Depressing the power switch for over three seconds while the Raspberry Pi is on will initiate a shutdown of the Raspberry Pi. The power LED dims and the shutdown LED goes steady on to signal the Raspberry Pi to shut down. When the Raspberry Pi shuts down, it sends a command to the ATX Power Management Hat to turn off the Boot Ok LED. The ATX Power Management Hat will then wait a long enough period of time for the Raspberry Pi to perform a clean shutdown before turning off power to the Raspberry Pi.

Hard Shutdown:

In the event that the Raspberry Pi has frozen and is not responsive to commands from the ATX Power Management Hat or user interaction, you may force the ATX Power Management Hat to power off the Raspberry Pi. Depressing the power switch for greater than ten seconds will power off the Raspberry Pi.

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Command Line or Application Forced Shutdown:

The ATX Power Management Hat has the ability to detect when a shutdown or reboot is initiated from the Raspberry Pi. When the user selects “Shutdown” or “Reboot” from the “Logout” menu, for example, the Raspberry Pi sends a command to the ATX Power Management Hat to turn off the Boot Ok LED and to wait a configurable amount of time. While it’s waiting, the power LED will pulsate. If the Raspberry Pi successfully reboots, it will command the ATX Power Management Hat to turn on the Boot Ok LED. If the Raspberry Pi does not reboot, for example the user initiated a shutdown, then the ATX Power Management Hat powers off the Raspberry Pi.

Fan Management

By default, whenever the Raspberry Pi is powered up, Fan 1 will turn on at 100% duty cycle (full on). Additionally, the fan and PWM out are controlled in tandem by sending commands to PWM. You can adjust these defaults as you need. Please refer to the section, “Controlling the Fans for Temperature Management” for more detailed instructions.

Power Management (Optional)

The power management option directs how the ATX Power Management Hat responds to power failure. In the event the power fails, the default mode of the ATX Power Management Hat is keep the Raspberry Pi powered off. Optionally, you can configure the ATX Power Management Hat to power on the Raspberry Pi after a power failure. Please refer to the section, “Programming the ATX Power Management Hat” for more detailed instructions.

Watchdog Timer (Optional)

The ATX Power Management Hat has the option of power cycling the Raspberry Pi in the event the Raspberry Pi freezes for some reason and can no longer communicate with the ATX Power Management Hat. Please refer to the section, “Enabling the Watchdog Timer” for more detailed instructions on how to configure the watchdog timer.

Reset Default Values

You may, at any time, reset all edited default parameters to their original values. There are two ways to do this:

1. Execute the Reset Default Values command (0x80) on the ATX Power Management Hat. See the section, “Programming the ATX Power Management Hat”.
2. Perform a hard reset upon powering up the ATX power supply.

To perform a hard reset, you first need to power off the ATX power supply and allow its capacitors to fully drain. This may take a few minutes.

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Before powering up the ATX power supply, depress and hold down the power button. Turn on the power supply. The Boot Ok LED should give one long pulse. This indicates that you can now reset the ATX Power Management Hat to its original values.

Release the power button.

If you do nothing, the Boot Ok LED will flash quickly after ten seconds. You can now use the ATX Power Management Hat as before without having changed any values.

If you depress the power button, the Boot Ok LED will flash quickly in two sequences. The default values will have been restored and you can now proceed to use the ATX Power Management Hat.

Assembling the ATX Power Management Hat Kit for Raspberry Pi

If you opted to purchase the kit, then you will need to do some assembly. Fortunately, there are only a handful of components to assemble. Additionally, we assume that you already have some experience assembling kits and soldering parts. If not, we strongly encourage you to practice soldering skills on high quality perf boards first. There are several Youtube videos on how to solder.

Regardless of your soldering skills, here are some things to consider:

1. Please use a soldering iron of sufficient wattage. A 40 watt pencil tip soldering iron will work. A hot iron will minimize cold solder joints and solder bridging between pins.
2. It helps to clean the pads where you will be soldering with rubbing alcohol. This will help produce better solder joints.
3. Double and triple check your solder joints so that you are not creating solder bridges between pins, especially on the power connectors. Also, ensure that solder joints have a 'fillet'. See below:



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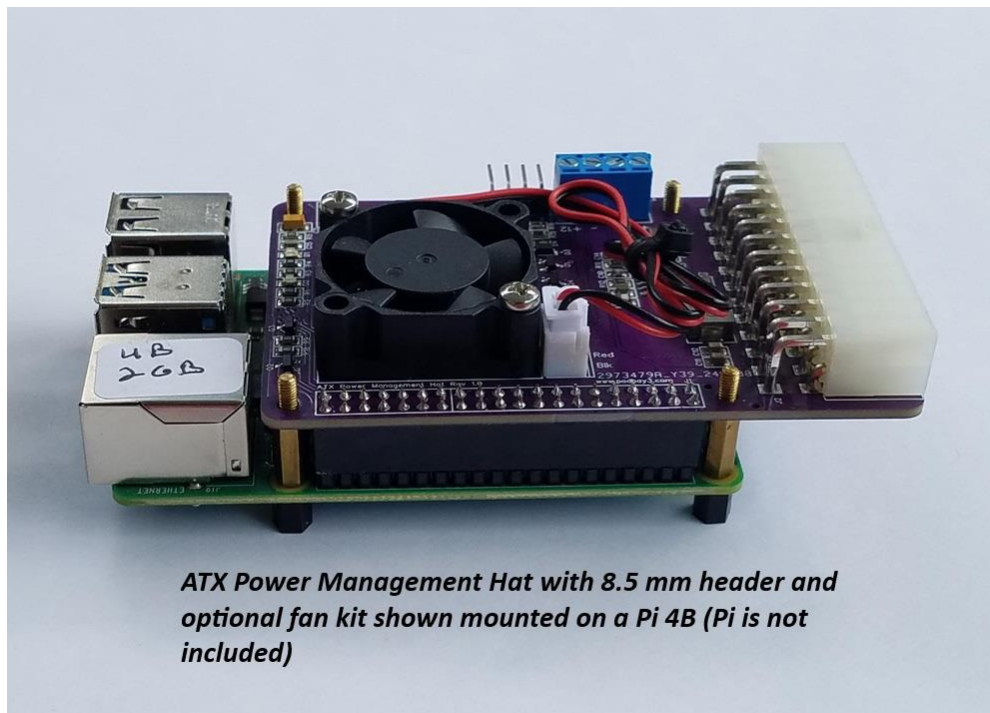
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4. When you have completed soldering, it is worth the effort to clean the board again to removed solder and flux residual. This will ensure a long life for your board. If don't already have some sort of flux remover, then try using rubbing alcohol and an old tooth brush.

The following order of assembly is recommended:

1. Test fit the header, J1 on the 40 pin GPIO header before soldering to ensure proper fit. Don't solder just yet.
2. Solder J4 – the header for the power button and LED.
3. Solder J6 (FDD/SATA configuration only) – FDD/SATA cable.
4. Solder J1. Make sure that it is “upside down” i.e. with the female portion of the socket under the board so that it can mate with the GPIO header. For best results, make sure the socket is snug against the board and perpendicular to the board.
5. Solder J8 – Fan 1. Ensure the open notched portion of the connector faces toward the fan. This is required to provide correct polarity for any fan plugged into this connector. See the orientation in the picture below.
6. Solder J3 (ATX 20/24 Pin configuration only) – break out voltages.
7. Solder J2 (ATX 20/24 Pin configuration only) – ATX Cable.



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Do it Yourself Kit:

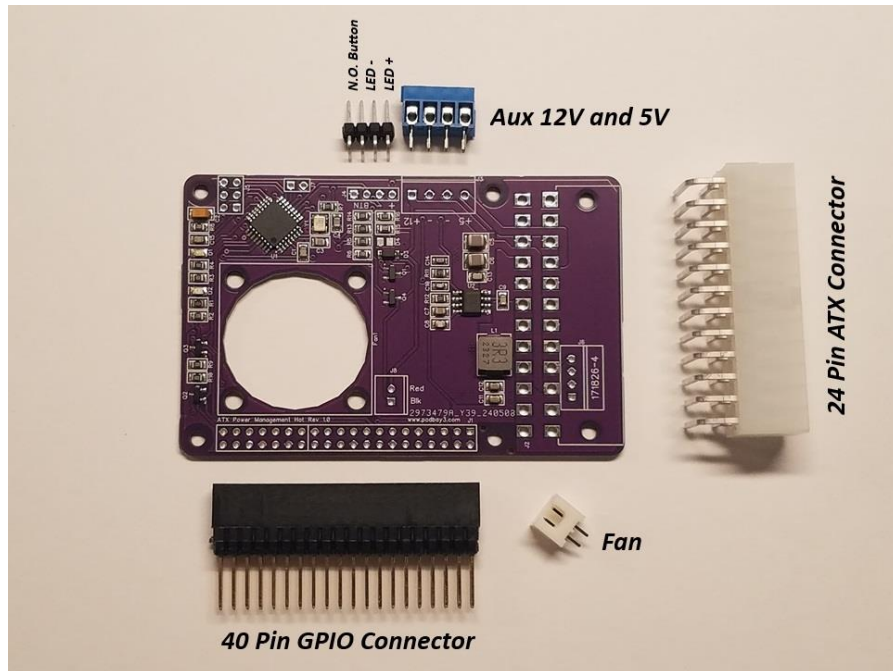


Figure 2: Parts Included in ATX 20/24 Pin Configuration Kit

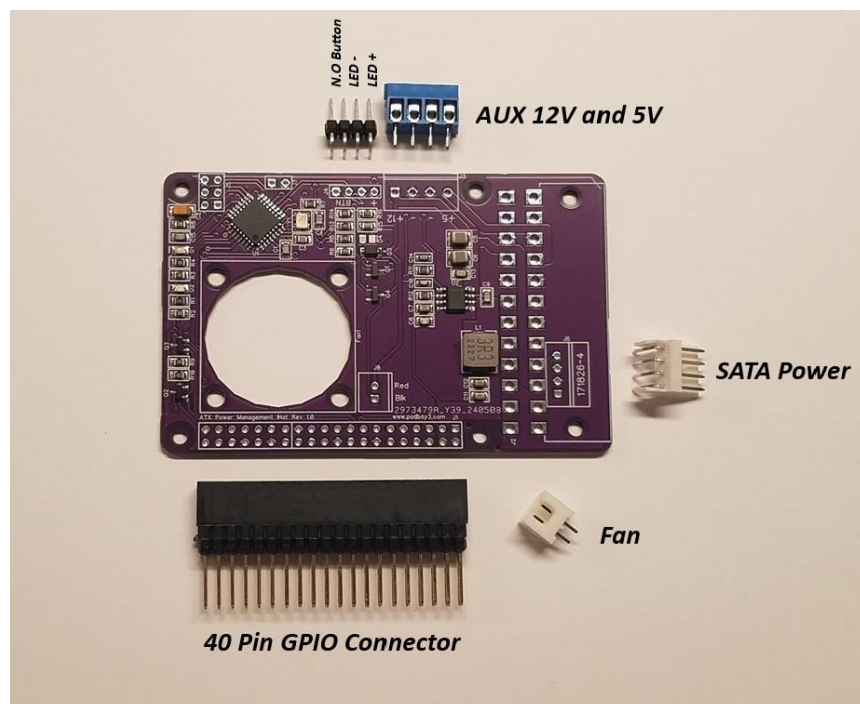


Figure 3: Parts included in FDD/SATA Configuration Kit

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Registers and Commands:

The ATX Power Management Hat comes out of the box with the watchdog and power management disabled. Additionally, Fan 1 is set to 100% on. The various shut down and reboot delays are preset to handle most situations.

However, in the event you wish to change or read any of the preset values, you can do so by accessing the registers on the ATX Power Management Hat over I2C. Additionally, you can send commands to the ATX Power Management Hat to perform some operations. This is how the shutdown and watchdog services communicate with the ATX Power Management Hat.

Descriptions of the registers and commands are below:

Programmable Default Values (read/write)

Register	Address	Default Value	Notes
Fan Management	0x30	0x20	See description Below
Shutdown Delay	0x31	5 Secs (0x05)	0 – 255 Seconds
Remote Shutdown Delay	0x32	30 Secs (0x1E)	0 – 255 Seconds
Unassigned	0x33	N/A	N/A
Power Management	0x34	0x00	See description Below
Watchdog Timer	0x35	0x00	See description Below
Watchdog Timer Delay	0x36	120 Secs (0x78)	0 – 255 Seconds. Watchdog is disabled if set to 0
Unassigned	0x37	N/A	N/A
Watchdog Timer Power Cycle Delay	0x38	10 Secs (0x0A)	0 – 255 Seconds, 0 is not recommended
I2C Address	0x39	0x5A	
Power Up Delay	0x3A	2 Secs 0x02	0 – 255 Seconds

Register 0x30 - Fan Management

Bit	7	6	5	4	3	2	1	0
	FAN_MGT_M0	-	FAN_1_PRESET			PWM		
Default	0	0	100			0		

Fan Management

FAN_MGT_M0	
0	Control Fan and PWM Separately
1	Control Fan and PWM in Tandem

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PWM_PRESET	
000	Off
001	25% Duty Cycle
010	50% Duty Cycle
011	75% Duty Cycle
1xx	100% Duty Cycle

FAN_1_PRESET	
000	Fan Off
001	Fan 25% Duty Cycle
010	Fan 50% Duty Cycle
011	Fan 75% Duty Cycle
1xx	Fan 100% Duty Cycle

By default, Fan 1 is preset to be fully on while the PWM out is off. Fan 1 and PWM are not controlled in tandem. To control the fan and PWM out together in tandem, set the FAN_MGT_M0 bit to one.

Register 0x31 – Shutdown Delay:

When the power button is depressed for over three seconds, the ATX Power Management Hat sends a shutdown signal to the Raspberry Pi. This causes the Raspberry Pi to start its shutdown process and send a command to the ATX Power Management Hat to extinguish the Boot Ok LED. When the Boot Ok LED is extinguished, the ATX Power Management Hat will wait the ‘Shutdown Delay’ in seconds before powering off the Raspberry Pi.

Register 0x32 – Remote Shutdown Delay:

When the user initiates either a shutdown or reboot from the operating system, the Raspberry Pi will signal The ATX Power Management Hat that it has shut down and that power can be turned off. The Boot Ok LED will then extinguish. The ATX Power Management Hat then waits up to the remote shutdown delay in seconds before removing power from the Raspberry Pi. If the Raspberry Pi reboots and the Boot Ok LED illuminates before this delay has expired then power to the Pi is maintained.

Register Address 0x34 - Power Management

Bit	7	6	5	4	3	2	1	0
	PWR_MGT_M7	-	-	-	-	-	PWR_MGT_M1	PWR_MGT_M0
Default	0	0	0	0	0	0	0	0

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Power Management Mode

PWR_MGT_M1	PWR_MGT_M0	
x	0	Disable power up after power failure.
0	1	Enable power up after power failure. Restore power to the Raspberry Pi after power failure if the Raspberry Pi was powered before power failure. If the Raspberry Pi was not powered, then do nothing.
1	1	Enable power up after power failure. Always restore power to the Raspberry Pi after failure. Use this mode when configuring the ATX Power Management Hat for SATA.

By default, power management is disabled on the ATX Power Management Hat. To enable this feature, write a value of one to bit 0 (PWR_MGT_M0) to this register. See above table for behavior of the ATX Power Management Hat after restoration of power.

Low Voltage Shutdown

PWR_MGT_M7	
0	Disable low voltage shutdown.
1	Enable low voltage shutdown. When enabled, the ATX Power Management Hat will send a shutdown command to the Raspberry Pi to initiate a controlled shutdown when the 12 VDC PSU rail drops below 9 VDC +/- 10%.

Register Address 0x35 - Watchdog Timer

Bit	7	6	5	4	3	2	1	0
	WD_TMR	Maximum Reboot Attempts						
Default	0	0						

WD_TMR	
0	Watchdog Timer Disabled
1	Watchdog Timer Enabled

By default, the watchdog timer is disabled. To enable the watchdog timer, write the value 0x80 to this register. If you wish for the Raspberry Pi to make multiple attempts to reboot, then set the number of desired attempts in bits 0 – 6. The range is 0 – 127 attempts. So, for example if you wish to make a maximum of two reboot attempts, the value you would write would be 0x82.

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Register Address 0x36 - Watchdog Timer Delay

When the watchdog timer is enabled, the ATX Power Management Hat waits up to the value of this register in seconds before power cycling the Raspberry Pi if no keep-alive command (0x82) is received.

Register Address 0x38 - Watchdog Timer Power Cycle Delay

In the event that the watchdog timer expired and the ATX Power Management Hat power cycles the Raspberry Pi, the watchdog timer power cycle delay is the period of time, in seconds, that the ATX Power Management Hat waits between removing power from the Pi and restoring power. This delay allows any devices that are attached to the Pi or the ATX power supply to fully reset before power is restored.

Register Address 0x39 - I2C Address Register

I2C must be enabled on the Raspberry Pi. Enter `sudo i2cdetect -y 1` in a command window to verify that the ATX Power Management Hat is present at the correct address. Changes to this address will require updating the address values in the installed services.

Commands

Process	Address	Read	Write
Reset Default Values	0x80	Read block of current default values	Any value: reset factory defaults
Reserved	0x81	Returns 0xff	
Ping Watchdog Timer Keep Alive	0x82	Returns 0xff	Any Value: reset watchdog timer
Reserved	0x83	Returns 0xff	
Set PWM	0x84	Read current value of register	Write new PWM speed: 0% - 100% duty cycle
Set Fan 1 Speed	0x85	Read current value of register	Write new fan speed: 0% - 100% duty cycle
Read PSU 12 Volt Rail RAW Value	0x86	Read current raw value of PSU 12 volt rail voltage. Returns 0 – 1023 in 2 bytes (high byte, low byte). To calculate actual voltage: $V_{calc} = 12 \times ((V_{raw} \times 1.1) / 1024)$	N/A
Read PSU 12 Volt Rail Calculated Value	0x87	Read current calculated value of the 12 volt rail of the PSU in 2 bytes. High byte is the integer part and the low byte is the decimal part	N/A

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Although the mechanism is the same, executing commands is different than reading/writing values to the registers. When you execute commands on the ATX Power Management Hat, you are performing the functions defined in the table above.

Use `i2cget -y 1 0x5a` (command address) to read a single byte. For example, `i2cget -y 1 0x5a 0x85` will read the value of the fan speed.

Use `i2ctransfer -y 1 w1@0x5a r0x02`. For example, `i2ctransfer -y 1 w1@0x5a 0x86 r0x02` will return the two byte value of the raw voltage of the 12 volt rail.

Programming the ATX Power Management Hat

In most cases you should be able to use the ATX Power Management Hat out of the box without changing any of its operating parameters. If you do need to change something, it's just a matter of using the i2c-tools with in a command window. Here are a few examples:

To read the assigned i2c address of the board: `i2cget -y 1 0x5a 0x39`.

To write change the value of the Shutdown Delay from 5 seconds to 10: `i2cset -y 1 0x5a 0x0a`.

To read the block of 16 default values for the board: `i2ctransfer -y 1 w1@0x5a 0x80 r0x0f`

Please google i2c-tools for more information.

Enabling the Watchdog Timer

To enable the watchdog timer, you will need to do the following:

1. Install the Keep Alive service. This service will send a Keep Alive command to the ATX Power Management Hat at regular intervals to ensure power to the Raspberry Pi. If the Raspberry Pi freezes and the ATX Power Management Hat don't receive the Keep Alive command, then the ATX Power Management Hat will power cycle the Raspberry Pi.
2. Enable the watchdog timer.

Installing the Keep Alive service is done much the same way as downloading and executing the original install script.

1. In your browser, navigate to:
https://github.com/podbay3/Power-4-Pi/blob/main/ATX-Power_Management_Shield/Rev_1.0/Scripts/ATX-Watchdog_Keep_Alive_install.sh
2. Click the download button. This copies the script to your downloads folder.
3. Open a command window and navigate to your downloads folder.

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4. Run `bash ATX-Watchdog_Keep_Alive_install.sh`
5. Enable the watchdog timer by setting bit 7 (WD_TMR) of register 0x35: `i2cset -y 1 0x5a 0x35 0x80`
6. `sudo reboot`.

Controlling the Fans for Temperature Management

The ATX Power Management Hat has the ability to control a 2 wire 12 VDC fan (Fan 1). The fan may be controlled in tandem with PWM out. When running the fan and PWM out in tandem, the speed for both is controlled by commands sent to address 0x84 (PWM); commands sent to address 0x85 (Fan 1) are ignored.

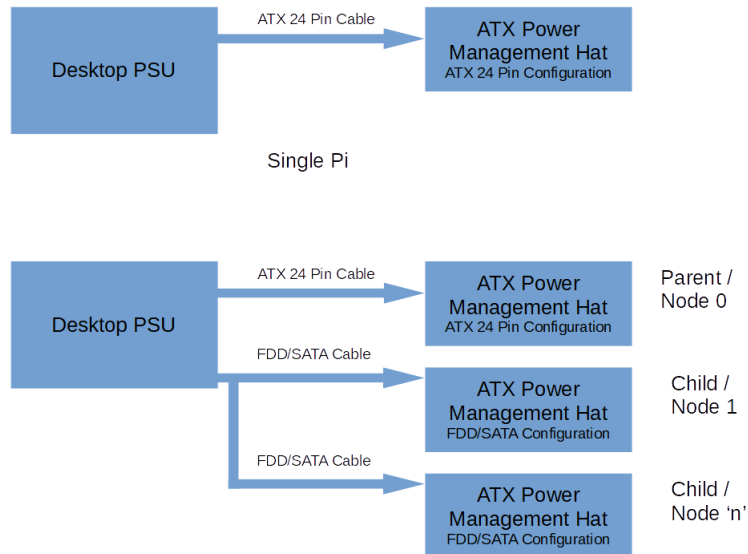
The script for monitoring the CPU temperature and controlling the fan is installed the same way as for the initial install script.

1. In your browser, navigate to:
https://github.com/podbay3/Power-4-Pi/blob/main/ATX-Power_Management_Shield/Rev_1.0/Scripts/ATX-Watchdog_Fan_Control_install.sh
2. Click the download button. This copies the script to your downloads folder.
3. Open a command window and navigate to your downloads folder.
4. Run `bash ATX-Watchdog_Keep_Fan_Control_install.sh`
5. `sudo reboot`

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Using the ATX Power Management Hat in a Parent/Child Cluster Environment



The ATX Power Management Hat can be used in a parent/child environment where an ATX 20/24 Pin configured ATX Power Management Hat can power up/down and reboot one or more child FDD/SATA ATX Power Management Hats. To accomplish this, do the following:

1. Plug the parent ATX Power Management Hat into the ATX Cable and run the install script(s) normally as described in this manual.
2. Plug each child ATX Power Management Hat into the mating FDD/SATA cable (J6 on the board layout). The FDD/SATA cable provides the necessary 5 VDC and 12 VDC. The 5 VDC powers the on-board microcontroller and the 12 VDC back powers the Raspberry Pi via the DC – DC converter.
3. Power up the ATX PSU. The power and boot ok LEDs for the parent will flash in rapid succession.
4. Turn on the Parent Raspberry Pi with the power button on the ATX Power Management Hat. The power and boot ok LEDs for each of the children will flash in rapid succession.
5. Run the install scripts on each of the child Raspberry Pis.
6. Program the power management register for each of the child to always turn on when power is applied. This value is 0x03. Now, whenever the parent is turned on, the child Raspberry Pis will boot up also.

At this point each child Raspberry Pi can be powered up/down and rebooted just like the parent. Please note that there is no soft shutdown for the child Raspberry Pi's.

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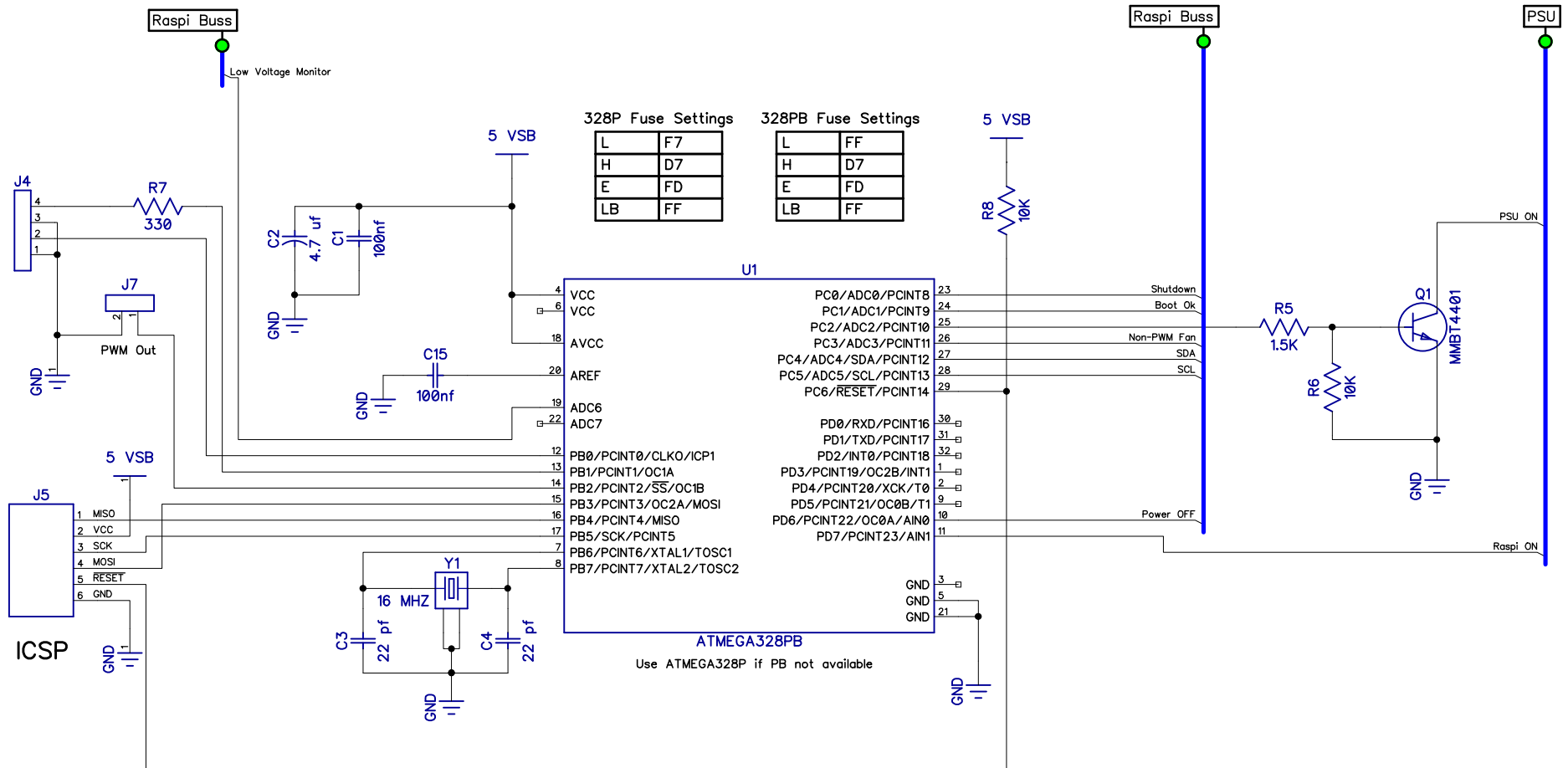
Warranty

Unassembled kits are warranted for the parts only as home assembly cannot be controlled. However, if you do find yourself with a non-working board and have exhausted all attempts to fix the issue, then the board may be exchanged for a new kit at a discounted price.

Product that has failed for non-warranted reasons may be exchanged for new or equivalent functionality at a discounted price. Please email us at info@podbay3.com for more details.

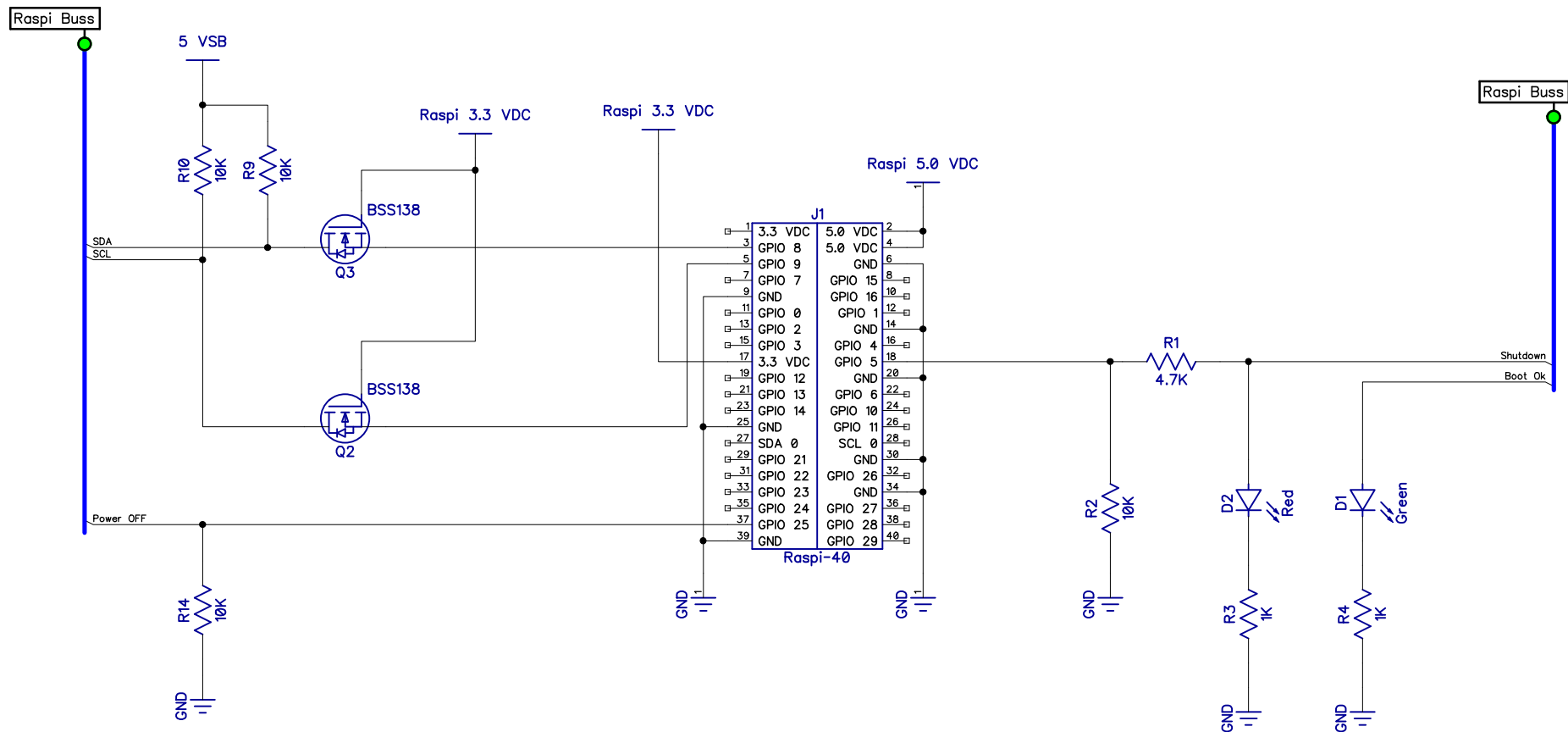
Exceptions

The customer assumes all risks in the usage of this product. Any damage occurring to the customer's Raspberry Pi or other systems connected to or controlled by this product is solely the responsibility of the customer.

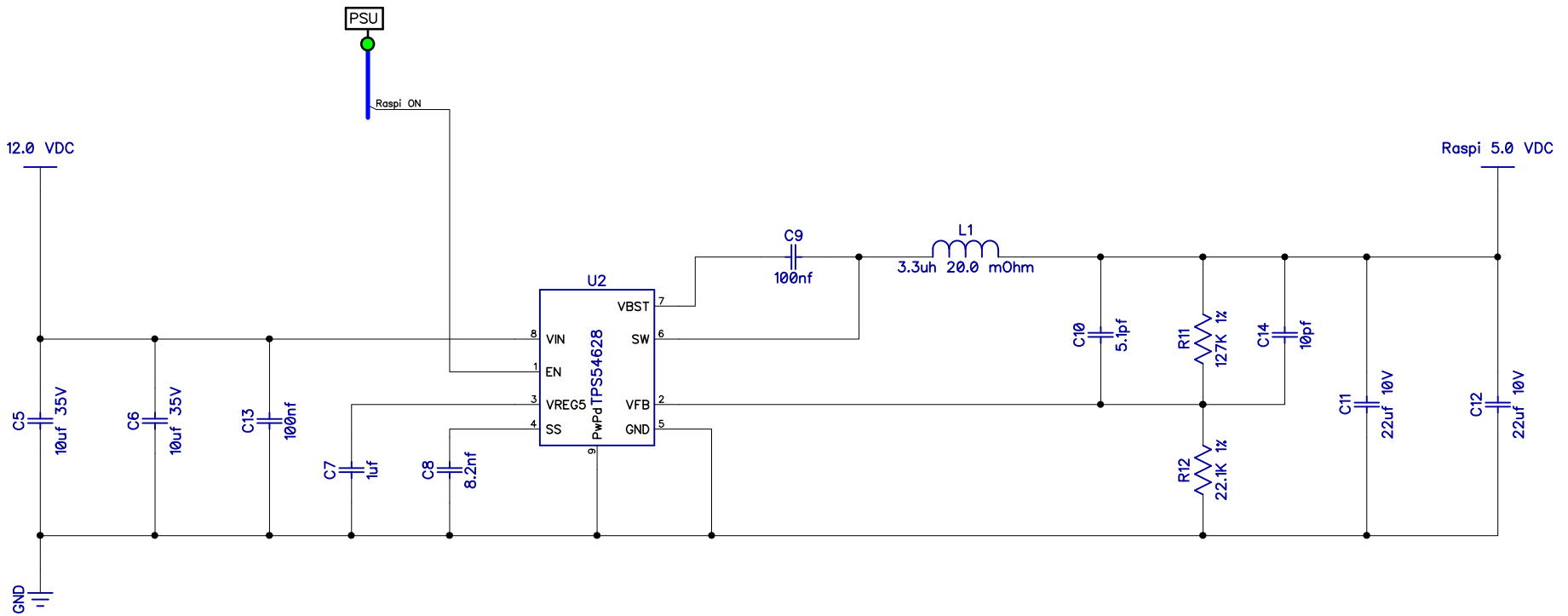


ATX Power Management Hat

Size	Number Copyright 2024 Pod Bay 3	Rev 1.0
Date: 08/18/2024	Thomas Tibbetts	
Filename	Atmega	



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Date: 08/18/2024		Thomas Tibbetts
Filename		Raspi Bus



ATX Power Management Hat

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Filename	Raspi PSU	

