

This is based on the official Raspberry Pi spec to be able to call an extension board a HAT.  
<https://github.com/raspberrypi/hats/blob/master/designguide.md>

## 40-Pin HAT Connector

40HAT	J3		
1	P3V3	2	P5V_HAT
3	BCM2	4	P5V_HAT
5	BCM3	6	GND
7	BCM4	8	BCM14
9	GND	10	BCM15
11	BCM17	12	PCM_CLK
13	BCM27	14	GND
15	BCM22	16	GND
17	P3V3	18	INT_U8
19	BCM10	20	GND
21	SPI_MISO	22	INT_U9
23	SPI_CLK	24	SPI_CS_U8
25	GND	26	SPI_CS_U9
27	ID_SDA	28	ID_SCL
29	BCM5	30	GND
31	BCM6	32	PWM0
33	BCM13	34	GND
35	BCM19	36	GND
37	BCM26	38	GND
39	GND	40	PCM_DATA

## HAT ID-EEPROM

The HAT spec requires this EEPROM with system information to be in place in order to be called a HAT. It is set up as write protected (WP pin held high) and can be enabled for writing by placing a jumper on J9 or by bridging TP1.

## Mounting Holes

## PWM Connectors

## 5V Powered HAT Protection

This is the recommended 5V rail protection for a HAT with power going to the Pi.  
 See <https://github.com/raspberrypi/hats/blob/master/designguide.md>  
 #back-powering-the-pi-via-the-j8-gpio-header

## Panel Power Switching

## Audio DAC

The System-Clock SCK is generated with a PLL internally. Alternatively one can add 2 extra Oscillatory to enhance the frequency stability. They are controlled by GPIO 3/6 from the Linux-Driver.

## Audio Connector

## Power Input

The Hat is powered from an external Power-Supply Block that providesat least 5V 3A and 30V 500mA. The 5V is used to backpower the Pi.

## Panel Input & Protection

All Inputs are equipped with 3.3V ESD Suppression Diodes and series resistors for ESD and inductive coupled Transients to support the the long cable runs and close high-current solenoids and incandescent bulbs.  
 All Inputs als

## GPIO Port Extender

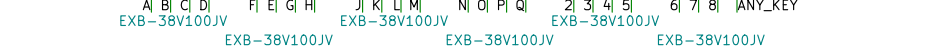
The MCP23S17 (SPI 16bit Port Extender) is used to drive and read from the Panel-I/Os and to drive the Panel-Power FETs. This device supports an Address-Based selection mode: only the Chip-Select is used for both chips; The Interrupt-Mirror-Feature is used, to only have one Interrupt for all 4 Banks.

Sheet: /		
File: pi-hat.sch		
Title: Raspberry Pi HAT		
Size: A3	Date:	Rev: B
KiCad E.D.A. kicad 5.1.5-52549c584ubuntu19.10.1		Id: 1/1

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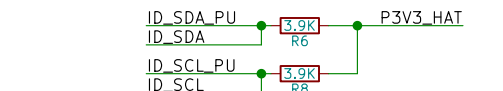


This is the recommended 5V rail protection for a HAT with power going to the Pi.  
See <https://github.com/raspberrypi/hats/blob/master/designguide.md#back-powering-the-pi-via-the-i8-gpio-header>



PCM_FS	35	BCM19	BCM16	36	X
	37	BCM26	BCM20	38	✓

The HAT spec requires this EEPROM with system information to be in place in order to be called a HAT. It is set up as write protected (WP pin held high) and can be enabled for writing by placing a jumper on J9 or by bridging TP4.

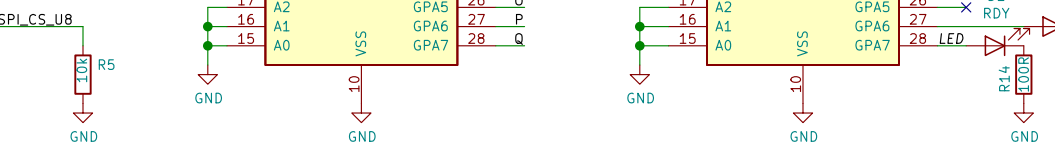


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## GPIO Port Extender

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H1  
3mm\_Mounting\_Hole

H2  
3mm\_Mounting\_Hole

H3  
3mm\_Mounting\_Hole

H4  
3mm\_Mounting\_Hole

