

PC3x

PC3x Introduction

This board is intended to work as closely as possible to the Pico Computer 3, designed by Peter Mather, and fit into the same enclosure (although the panel layouts are different). That board is fully surface mount and is difficult, if not impossible, for most home constructors to copy. It is normally purchased ready assembled from JLCPCB, but is subject to a minimum order quantity of assembled boards.

The aim of this project was to produce a design that could be built relatively easily from readily available components. There are only five surface mount components: the Boot button, the hub switch, the 3V3 regulator, the Wi-Fi module and the Qwiic connector. The latter two may not be required by some constructors.

There are two versions of this board:

PC3x uses the Pimoroni PGA2350B module.

PC3x WS uses the Waveshare CORE 2350B module

There are no other differences. **Note that although the physical connector is identical they are NOT pin compatible and using the wrong module in a board may cause permanent damage.**

NOTE: NEITHER THE PC3x WS VERSION NOR THE RM2 Wi-Fi MODULE HAVE BEEN TESTED AT THE TIME OF WRITING.

Revisions

V1.0

First released on forum.

V1.1

GND pins on USB-A connectors are now connected. They were floating on V1.0.

The rear panel has been rearranged to accept a wider microUSB module without needing to file it and to give better mechanical support for the I2S module. The original rear plate is incompatible.

Connector clearance holes for U2 enlarged to allow module to sit flat more easily.

Power button given 2mm more projection.

FS1 reduced to 200mA This still allows a total of 400mA to be drawn from the USB sockets before foldback current limiting to approximately 200mA.

R7 changed to through-hole type to allow easier retro-fitting.

R8 changed to through-hole to standardise on a single format.

C10 changed to through-hole to standardise on a single format.

Option for Debug connector added.

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PC3x Bill of Materials

PCB Custom

C1	10u	electrolytic capacitor
C2	10u	electrolytic capacitor
C3	100n	Ceramic cap
C4	100n	Ceramic cap
C5	100n	Ceramic cap
C6	100n	Ceramic cap
C7	100n	Ceramic cap
C8	100n	Ceramic cap
C9	22u T	tantalum capaxitor
C10	100n	Ceramic cap
C11	10u	electrolytic capacitor
C12	100n	Ceramic cap

D1	1N5818	1A Schottky diode
D2	1N5818	1A Schottky diode
D3	BAT41	Schottky signal diode
D4	LED	3mm red LED
D5	LED	3mm red LED
D6	LED	3mm red LED

FS1 0.20A RXE020

H1-H4	2x8	0.1in female socket header
H5	4-way	long pin 0.1in female socket header
H6	6-way	long pin 0.1in female socket header
H7	4-way	0.1in male pin header
H8	6-way	0.1in male pin header
H9	2x15	right angle 0.1in male pin header
H10	1x4	2mm header
H11	1x4	2mm header
H12	1x4	2mm header
H13	1x4	2mm header
H14	1x4	2mm header

I prefer to use the 2mm snap-off gold plated turned pin headers and sockets for H1-H4 and H10-H14, although the insertion force for H1-H4 is high.

JP1 3-way 0.1in male pin header with jumper

R1	2R2	resistor
R2	1K8	resistor
R3	1K	resistor
R4	1K	resistor
R5	6K8	resistor

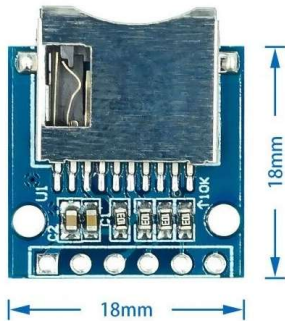
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R6	6K8	resistor
R7	470R	resistor
R8	10K	resistor
S1	PS22F03	button with A03 cap
S2	B3F-315n	Horizontal 6x6 tactile switch c/w B32cap
S3	BOOT	3nn x 6mm SMD tactile switch
S4	USB HUB	MSS22D18 SMD slide switch – AE
SK1	micro USB	breakout module TLZWLA
SK2	USB-A	FCI 73725-0110BLF (RS 771-0048)
SK3	USB-A	FCI 73725-0110BLF (RS 771-0048)
SK4	USB-A	FCI 73725-0110BLF (RS 771-0048)
SK5	USB-A	FCI 73725-0110BLF (RS 771-0048)
SK6	SYSTEM I2C	vertical QWIIC connector JSI SH1.0 vertical
U1	CP2102	USB-C to TTL converter - 3V3
U2	HDMI	Adafruit DVI breakout module
U3	Standard version:	PGA2350B Pimoroni module
	Waveshare version:	Waveshare CORE 2350B
U4	micro SD	Micro SD card module inc. filter
U5	RM2	Raspberry Pi Wi-Fi module
U6	RTC	RTC module with battery and RAM
U7	FE1.1SX4	USB hub module
U8	AMS1117-3V3	voltage regulator
No ref.		I2S audio module (see picture)
Enclosure	Hammond RM2015S	

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Apart from U2 these were sourced from AliExpress.

SK1 was from seller TLZWLA. The ones that arrived do not match either the photos or the drawing in their advertisement! The version 1.1 board should accept either those shown or the ones supplied.

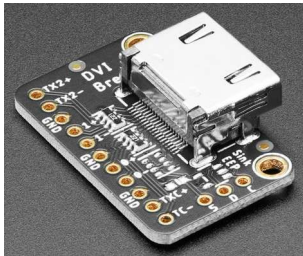


U1



SK1
Ignore Dimensions!

U4



U2



H9 (Typical)



U7

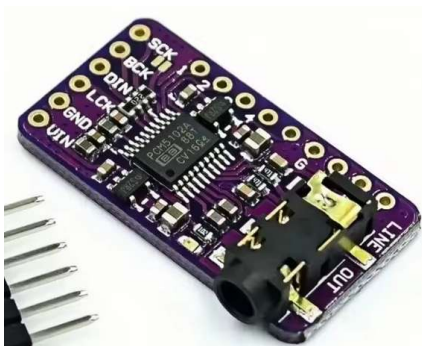


S1



S4

U6



I2S Audio module

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Notes

I found the Qwiic connector to be the most difficult component to mount by far! I recommend that you mount it very early in the construction so that you have plenty of working space. I hand soldered it, putting a bit of flux and solder paste on one of the support pads then sliding it into position to get things started. A hotplate would have been the easy way but this isn't a surface mount design.

When fitting the RTC straighten the pins on the connector and solder a 4-pin header strip into the other end on the same side. It can now be plugged in with the battery holder on top. If you wish to use the RM2015S enclosure then remove the battery holder from the module and mount it separately. Alternatively, the board will fit into the RM2015M unmodified but that case is 50mm high and you would need to sort out your own front and rear panels.

U1, U2, U4 and SK1 should be mounted flat down onto the PCB.

Header pins should be fitted into the I2S module from the same side as the line out jack, so that the group of four solder blobs is on top. H5 and H6 should be spaced up from the board by 3mm.. This lifts the line out jack clear of the Prog connector. A M2.5 x 15mm hex spacer can be mounted to the PCB immediately behind the I2S module to take some of the strain when a jack plug is being inserted.

PCB LEDs: VSYS indicates the 3V3 supply from the micro, not from the regulator. VBUS indicates the 5V supply to the USB sockets (actually from SK4 supply so it comes after FS1).

The centre of the front panel LED should be 3mm above the surface of the PCB.

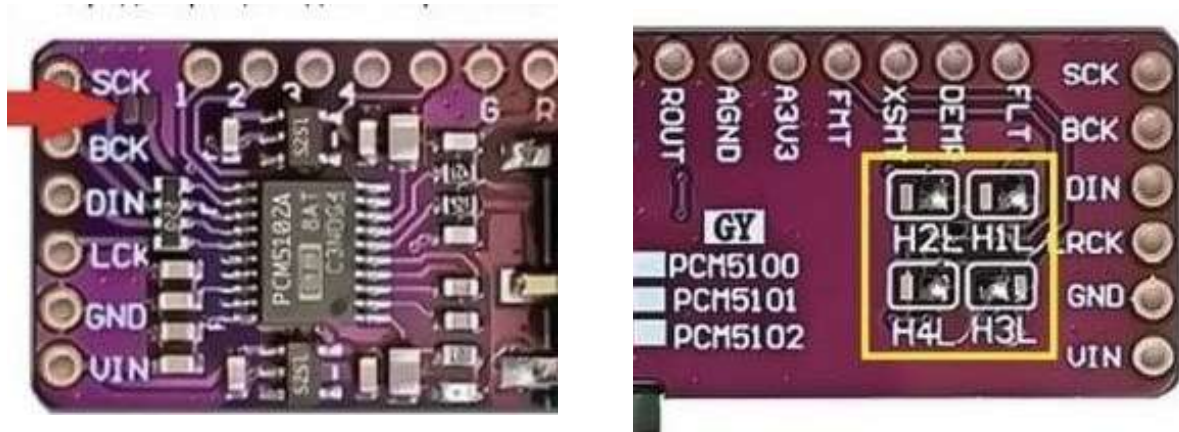
The positions of the holes in the front and back panels assume a PCB thickness of 1.6mm.

Immediately to the right of the MCU there is unmarked space for a 3-pin Debug connector. This is not listed in the Bill of Materials or shown on the schematic as it is probably of no interest to most users. From front to rear the three pins are CLK, DAT, GND as marked on the bottom of the PCB.

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Configuration

The pads on the I2S module have to have solder blob links in these positions



Load the correct MMBasic version as described in the MMBasic manual.

For HDMI with the Wi-Fi module: PicoMiteRP2350HDMIWEB

For HDMI without Wi-Fi: PicoMiteHDMIUSB

For VGA (via an adapter) without Wi-Fi: PicoMiteRP2350VGAUSB

Note that the HDMIWEB version has fewer colours and less display modes. A VGA display cannot currently be used with the WiFi module.

OPTIONS are configured automatically by simply using OPTION RESET PICO COMPUTER 3

Front and rear panel templates

These are full size if the page is printed out at A4. Holes should be cut to the inner, lighter line.

