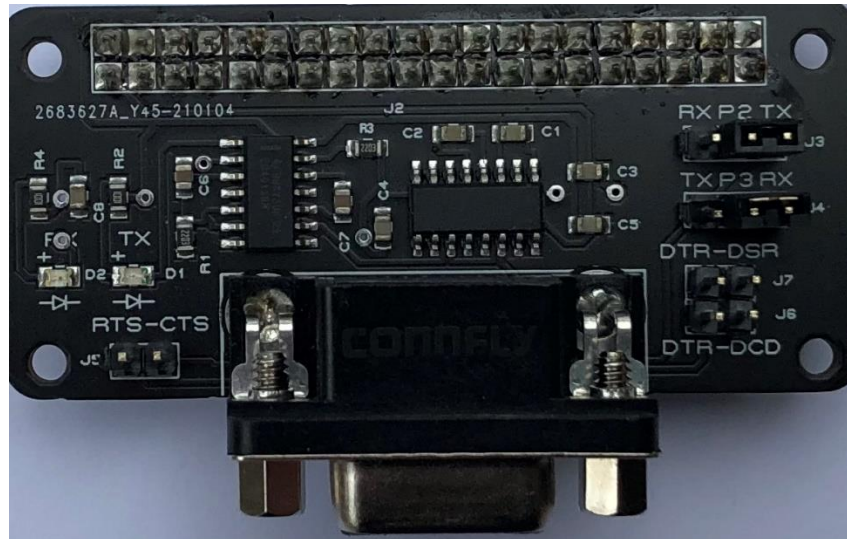


# Raspberry Pi RS232 Hat



## Raspberry Pi RS232 Hat Features

- Level Translation to RS232 Levels
- TX & RX LED Indicators
- DB9 Female connector to allow quick connection to USB to serial converters.
- Jumper selectable handshaking RTS-CTS, DTR-DSR, DTR to DCD
- Pin Swappable TX/RX connections to allow for use of straight through cables or crossover cables.

The raspberry pi RS232 hat board is designed to allow a raspberry pi to communicate from its internal Uart with other devices at RS232 line levels, typical applications include.

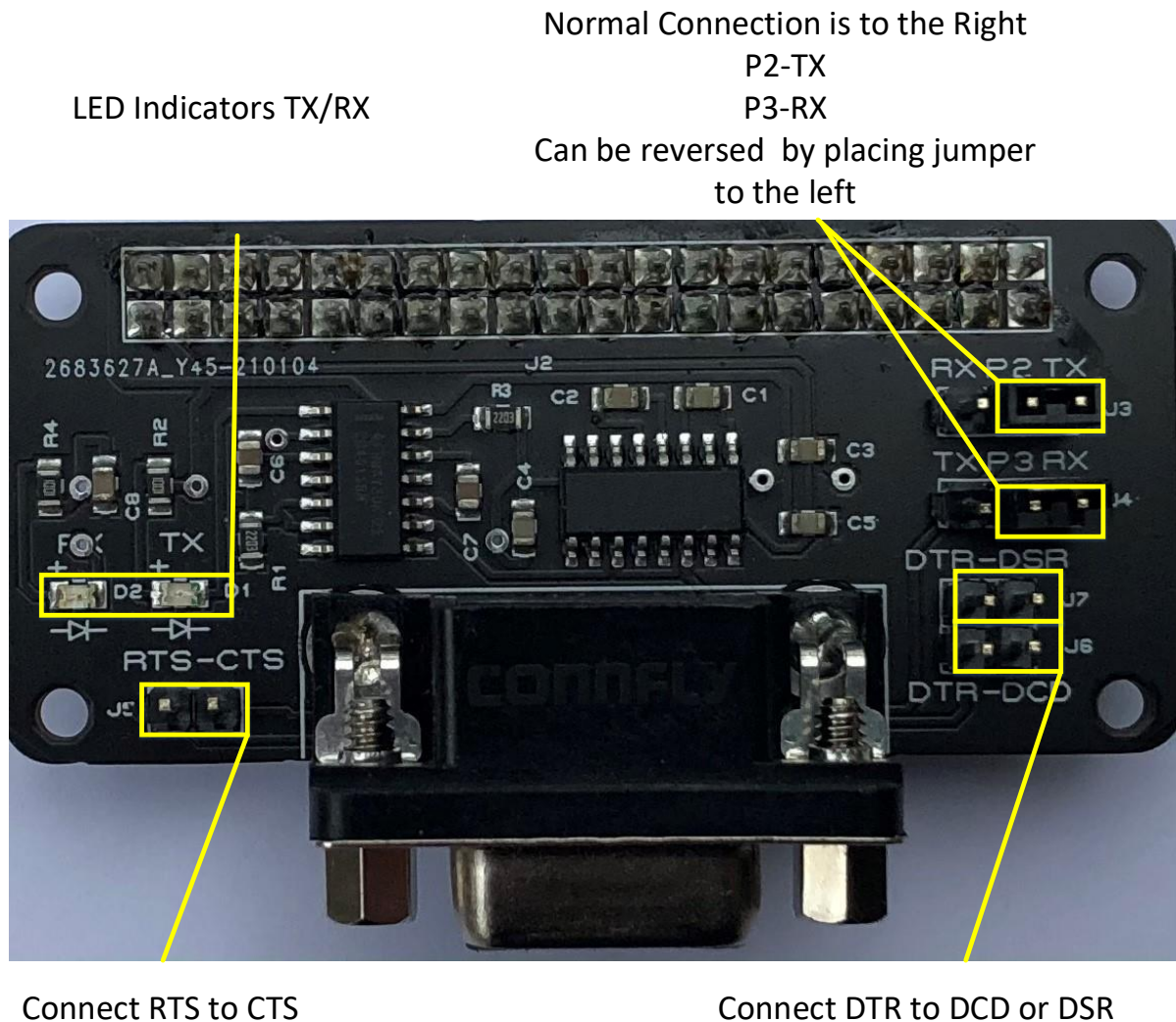
- Connecting a Raspberry pi to a PC via RS232
- Using the Raspberry pi as a terminal device
- Communicating with RS232 peripherals

The hat uses a MAX3232E transceiver to translate from logic levels to RS232 line levels and can support data rates up to 115 KbpS

## **TX/RX Indicators**

The RS232 hat contains two LED indicators to indicate TX and RX, these are driven through a monostable to give a visual indication even when single data packets are sent.

## Quick Jumper Setting Diagram



*Figure 1 Jumper Connections RS232 Hat*

As a default setting the Pin 2 is connected by a jumper to TX and the Pin 3 is connected to RX, this should enable the Raspberry pi to communicate with a PC using a USB to serial connector.

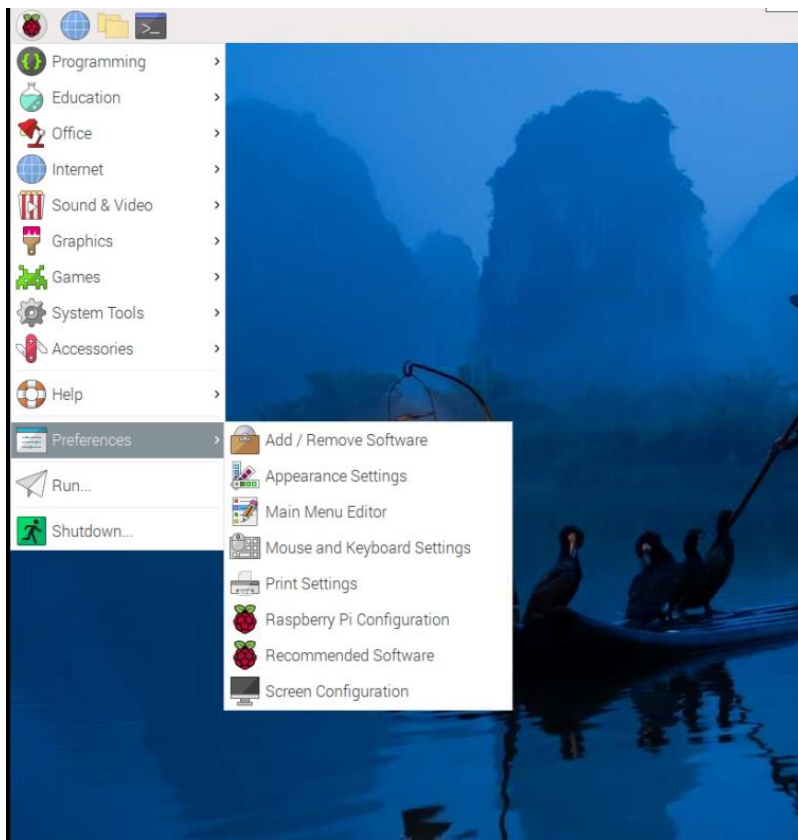
If connections are needed for Handshaking control then they can be made using jumpers on J5-J7

## Jumper Settings

| TX-RX Direction setting |  |
|-------------------------|--|
| Jumper                  | Function   |
| J3                      | Connects Pin 2 on the DB9 connector to either RX or TX to allow for different cable types the normal position is for Pin 2 to be connected to TX |
| J4                      | Connects Pin 3 on the DB9 connector to either RX or TX to allow for different cable types the normal position is for Pin 3 to be connected to RX |
| Handshaking Control     |  |
| J5                      | Connect J5 to connect RTS to CTS at the DB9 connector used if hardware handshaking is needed.  |
| J6                      | Connect J6 to connect DCD to DTR at the DB9 connector  |
| J7                      | Connect J7 to connect DSR to DTR at the DB9 connector  |

## Accessing the RS232 Port on the Raspberry Pi

On the Raspberry pi the Serial port needs to be enabled in the configuration application. This can be found by going to the main menu and going to preferences then click on Raspberry Pi Configuration.



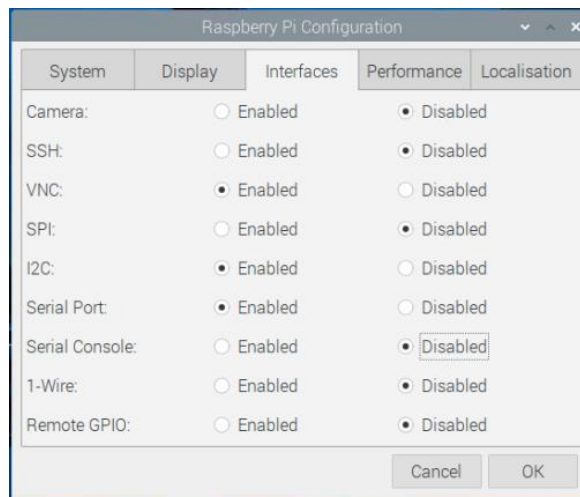
*Figure 2 Finding the Configuration Utility in Raspbian Buster*

This should open the configuration application below.



*Figure 3 Raspberry Pi Configuration*

Click on the Interfaces Tab and ensure the serial port is Enabled



*Figure 4 Select Serial Port to Enabled*

If you want to use the serial console that should be enabled, however in this example it will be left disabled so the serial port can be accessed from a terminal program. The raspberry pi now needs to be restarted.

## Starting Minicom

In order to start minicom open a terminal window and type

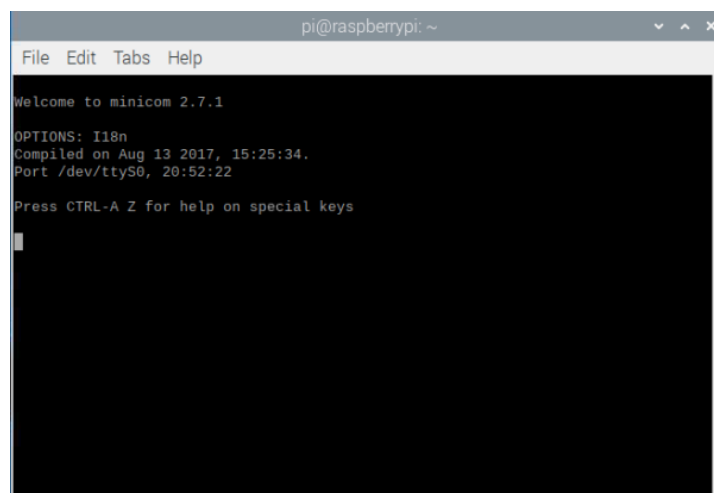
If using a Raspberry pi 4

**`sudo minicom -b 9600 -o -D /dev/ttyS0`**

If using a Raspberry pi 3 or earlier

**`minicom -b 115200 -o -D /dev/ttyACM0`**

The number is the baud rate, so set to the rate required. A screen like below should appear



*Figure 5 Minicom Main Screen*

In minicom press CNTL A Z to pull up the command summary

```

pi@raspberrypi: ~
File Edit Tabs Help

Welcome to minicom 2.7.1
-----
| Minicom Command Summary |
|-----|
| Commands can be called by CTRL-A <key> |
|-----|
| Main Functions          | Other Functions        |
|-----|-----|
| Press |
| Dialing directory..D   | run script (Go)....G   | Clear Screen.....C   |
| Send files.....S      | Receive files.....R   | cOnfigure Minicom..O   |
| comm Parameters...P   | Add linefeed.....A   | Suspend minicom....J   |
| Capture on/off....L   | Hangup.....H         | eXit and reset.....X   |
| send break.....F      | initialize Modem...M   | Quit with no reset.Q   |
| Terminal settings..T  | run Kermit.....K     | Cursor key mode....I   |
| lineWrap on/off....W  | local Echo on/off..E   | Help screen.....Z     |
| Paste file.....Y      | Timestamp toggle...N   | scroll Back.....B     |
| Add Carriage Ret...U  |                         |                         |
|                         |                         |                         |
| Select function or press Enter for none. |
|-----|
| CTRL-A Z for help | 9600 8N1 | NOR | Minicom 2.7.1 | VT102 | Offline | ttyS0

```

Figure 6 Command menu Minicom

And press O and serial port setup to get to the configuration screen below and press F to deselect hardware flow control, it should now be ready to use the terminal program.

```

pi@raspberrypi: ~
File Edit Tabs Help

Welcome to minicom 2.7.1
-----
| OPTI-- |
| Comp | A - Serial Device      : /dev/ttyS0 |
| Port | B - Lockfile Location  : /var/lock  |
|      | C - Callin Program     :             |
| Pres | D - Callout Program    :             |
|      | E - Bps/Par/Bits       : 9600 8N1  |
|      | F - Hardware Flow Control : Yes   |
|      | G - Software Flow Control : No     |
|      |                         |
| Change which setting? |
|-----|
| Screen and keyboard  |
| Save setup as dfl    |
| Save setup as..      |
| Exit                 |
|-----|
| CTRL-A Z for help | 9600 8N1 | NOR | Minicom 2.7.1 | VT102 | Offline | ttyS0

```

Figure 7 Disable Hardware Flow control



# Schematic

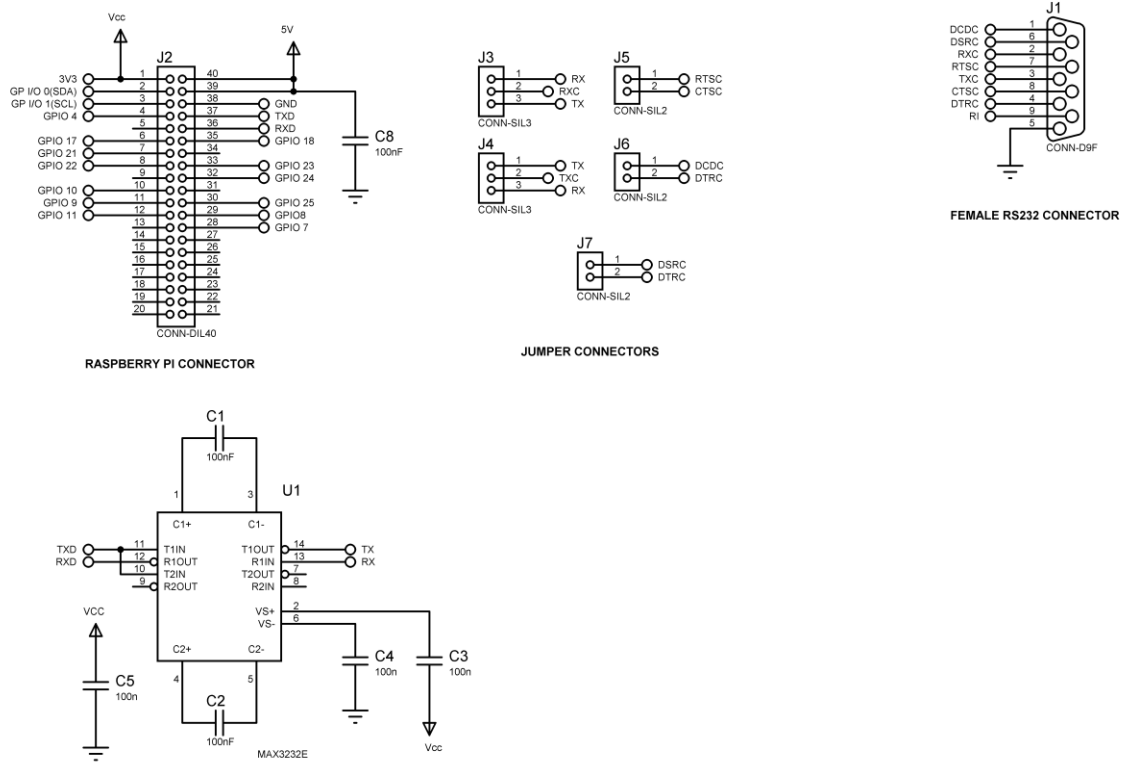


Figure 8 RS232 and Jumper Connections

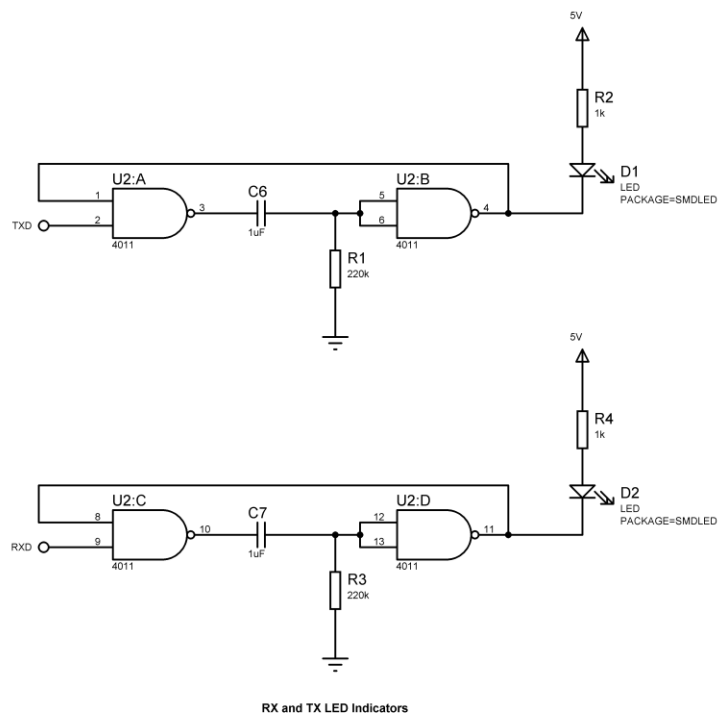


Figure 9 RX & TX Indicator Connections