

ET-CONV10/RS232 HAT

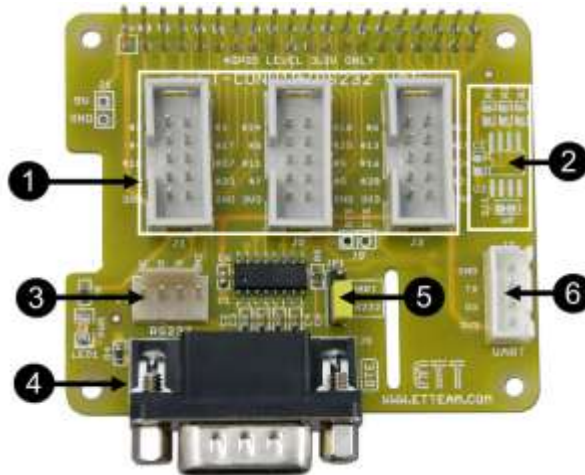


Board **ET-CONV10/RS232 HAT** is specifically designed for use with Board Raspberry Pi; it can be connected with INTERFACE Boards of ETT that use Connector as IDC10 type such as Board ET-OPTO RELAY4.

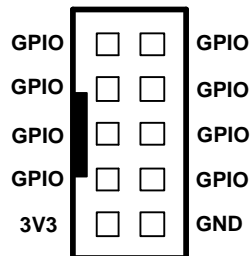
SPECIFICATIONS of Board ET-CONV10/RS232 HAT

- Be compatible with Board Raspberry Pi Model A+, Raspberry Pi Model B+, Raspberry Pi 2 Model B
- Have connectible area of Circuit ID EEPROM (OPTION)
- Have 3-Connector 24-BIT IDC10 (Level 3.3V) that arranges PIN according to ETT Standard
- Have Circuit Line Driver to convert level of Signal Logic from Board Raspberry Pi to be RS232 for Port Communication; there are both Connector DB9 MALE Standard(DTE) and Connector 4PINS (ETT Standard)
- Have Connector UART (Level 3.3V)
- Use Connector as long leg type, it piles boards up as required
- PCB size: 6.5 x 5.6 cm.

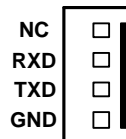
COMPOSITION of Board ET-CONV10/RS232 HAT



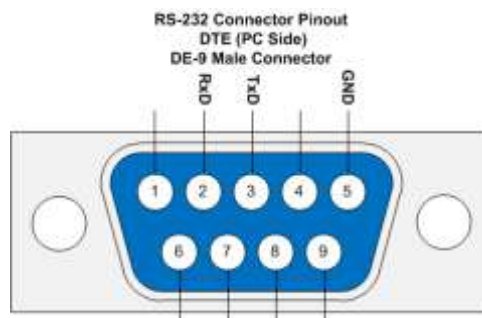
- No.1** Connector IDC10 (J1,J2,J3) is arranged according to ETT Standard (PIN GPIOs of Board Raspberry Pi use 3.3V; it is not allowed to supply INPUT Voltage higher than 3.3V because the board maybe damaged).



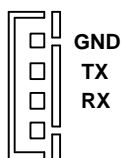
- No.2:** It is Connectible area of Circuit ID EEPROM (OPTION).
- No.3:** It is Connector RS232 as 4PINS (ETT Standard) is arranged as follows;



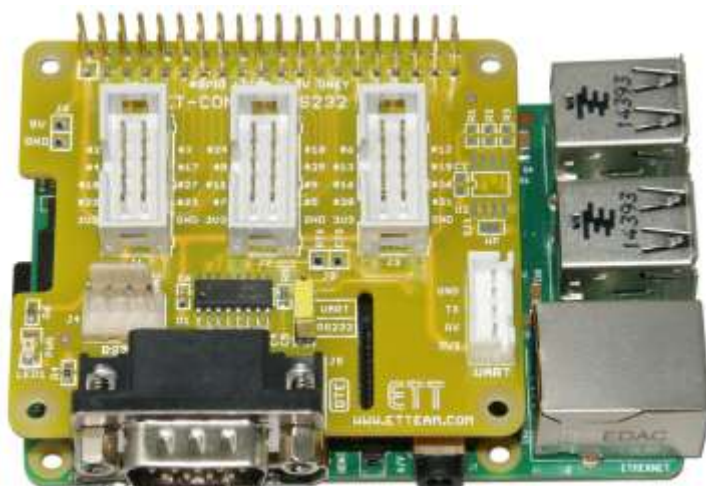
- No.4:** Connector RS232 as DB9 MALE Standard(DTE)is arranged as follows;



- **No. 5** This Jumper chooses if it connects with Pin UART of Board Raspberry Pi via Circuit Line Driver RS232. If connected via Connector RS232, please set Jumper JP1 to the position of RS232; but, if connected via Connector UART (J7), please set Jumper JP1 to the position of UART instead.
- **No. 6** It is Connector UART TTL 3.3V to connect with Microcontroller directly without connected via Circuit Line Driver RS232, it arranges PIN as follows;



How to connect Board ET-CONV10/RS232 HAT



Example program is written by Python Language to test Pin GPIO (gpio.py)

```

import RPi.GPIO as GPIO
import time
# Use GPIO references
GPIO.setmode(GPIO.BCM)
# Disable warnings
GPIO.setwarnings(False)

leds = [2,3,4,17,18,27,22,23,24,10,9,25,11,8,7,5,6,12,13,19,16,26,20,21]

for i in leds:
    GPIO.setup(i, GPIO.OUT)          # Set up all gpio as output
    GPIO.output(i, True)             # All gpio on

print "Test Led"
print "Press CTRL-C to exit"

try:
    while True:
        for i in leds:
            GPIO.output(i, False)
            time.sleep(0.5)
            GPIO.output(i, True)
            time.sleep(0.5)

except KeyboardInterrupt:
    # Reset GPIO settings
    GPIO.cleanup()

```

How to use and test PORT RS232

Normally, when it connected ET-CONV10/RS232 HAT with Board Raspberry Pi, connected RS232 with computer, opened Program Terminal and setup Baud Rate as 115200 completely, user will see much text in step of booting up and user can log in to enter Board Raspberry Pi.

```

COM3:115200baud - Tera Term VT
File Edit Setup Control Window Help
[ 2.858090] usb 1-1: New USB device found, idVendor=0424, idProduct=9514
[ 2.866470] usb 1-1: New USB device strings: Mfr=0, Product=0, SerialNumber=0
[ 2.876184] hub 1-1:1.0: USB hub found
[ 2.881758] hub 1-1:1.0: 5 ports detected
[ 3.167839] usb 1-1.1: new high-speed USB device number 3 using dwc_otg
[ 3.288080] usb 1-1.1: New USB device found, idVendor=0424, idProduct=ec00
[ 3.296712] usb 1-1.1: New USB device strings: Mfr=0, Product=0, SerialNumber=0
[ 3.308623] smsc95xx v1.0.4
[ 3.371789] smsc95xx 1-1.1:1.0 eth0: register 'smsc95xx' at usb-bcn2708_usb-1.1, smsc95xx USB 2.0 Ethernet, b8:27:eb:21:fd:ae
[ 3.578066] EXT4-fs (mmcblk0p2): recovery complete
[ 3.662379] EXT4-fs (mmcblk0p2): mounted filesystem with ordered data mode. Opts: (null)
[ 3.674032] VFAT: Mounted root (ext4 filesystem) readonly on device 179:2.
[ 3.683712] devtmpfs: mounted
[ 3.689183] Freeing unused kernel memory: 384K (80754000 - 807b4000)
[ 4.705531] udevd[174]: starting version 175
[ 6.919551] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
[ 7.261476] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)

Raspbian GNU/Linux 7 raspberrypi ttyAMA0
raspberrypi login: █

```

If it requires communicating to other boards by Port RS232, it has to disable this function from displaying text; please log in to enter Board Raspberry Pi and then use following Command;

```
sudo nano /boot/cmdline.txt
```

User will see following text;

```
dwc_otg.lpm_enable=0 console=ttyAMA0,115200 console=tty1 root=/dev/mmcblk0p2 rootfstype=ext4 elevator=deadline rootwait
```

Please delete the text **console=ttyAMA0,115200**, the result will be

```
dwc_otg.lpm_enable=0 console=tty1 root=/dev/mmcblk0p2 rootfstype=ext4 elevator=deadline rootwait
```

Save file *cmdline.txt* that has already been revised; next, edit file */etc/inittab*, it does not display any text of log in by the following Command

```
sudo nano /etc/inittab
```

Next, please find following text

```
T0:23:respawn:/sbin/getty -L ttyAMA0 115200 vt100
```

Add hash sign(#) in front of the preferable text that user requires disabling, it will be

```
#T0:23:respawn:/sbin/getty -L ttyAMA0 115200 vt100
```

Next, save file that has already been revised and re-boot up Board Raspberry Pi.

Now, it tests Port RS232 by Program **minicom**; it has to additionally install by following Command (moreover, Board Raspberry Pi must be connected with internet).

```
sudo apt-get install minicom
```

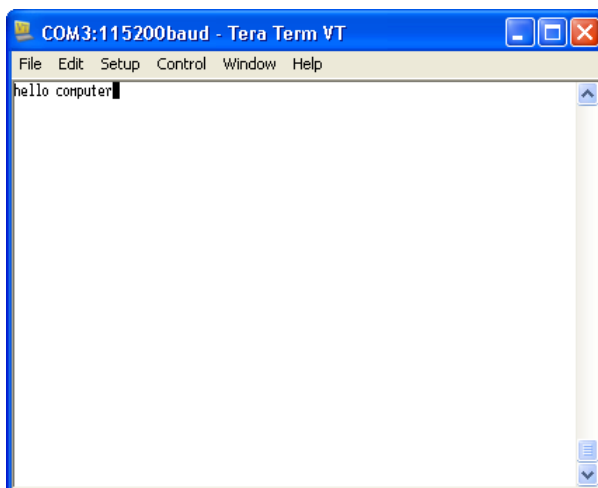
Wait until it installs the program completely; please use the Command to test the communication to Port *ttyAMA0* of Raspberry Pi at Baud Rate 115200.

```
minicom -b 115200 -o -D /dev/ttyAMA0
```

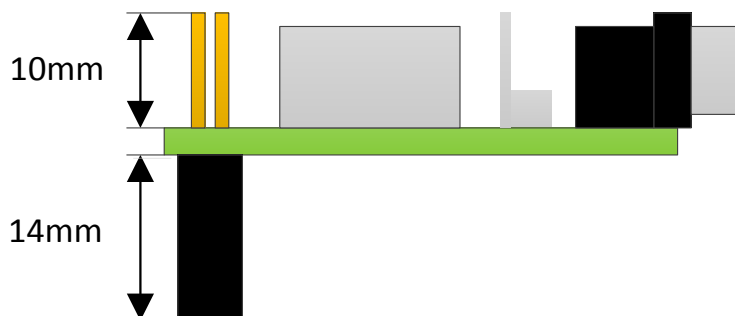
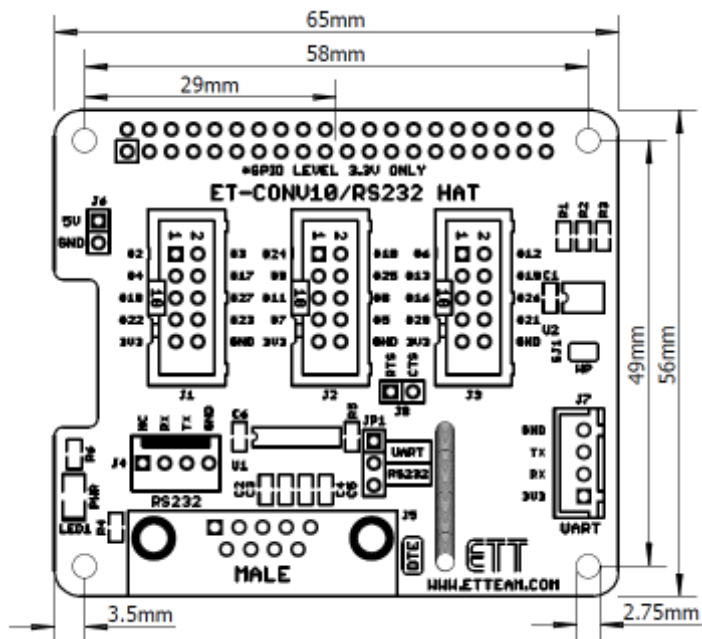
Next, it shows terminal of Program minicom as shown below.



Type any text on Program minicom, user will see the text on the side of RS232 that is connected with computer as shown below; moreover, when type any text on the side of computer, user also see the text on the side of Raspberry Pi.



Dimensions of Board ET-CONV10/RS232 HAT



Circuit of Board ET-CONV10/RS232 HAT

