

# XR5-T 板子 (Pace Scientific)

溫度 sensor

# 控制方式

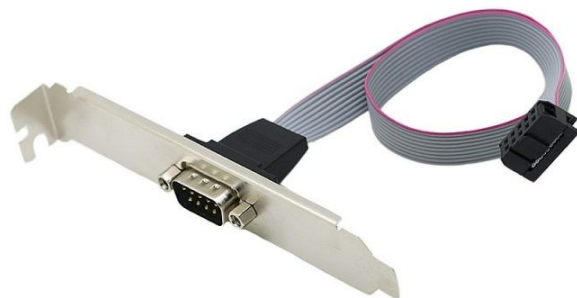
- XR5 Data Loggers( 硬體 )
  - 搭配一般市面上賣的 usb to rs232 訊號轉換器
    - Log XR5 Software ( 賴飛 )
      - failed ( 可能不支援硬體或得用 Pace Scientific 他們家的 USB-A Serial Adapter 才行 )
    - 終端機程式 ( 劉奕 )
      - O.K.( 不過是文字介面 )
  - 搭配官方的 USB-A Serial Adpater (Pace)
    - 目前手邊沒有硬體
  - 搭配真正的 com port( 不用透過 usb 來轉 )
    - 可以通，但依舊只能透過文字介面，無法使用官方的軟體
- 無法打通官方的 Log XR5 軟體和 XR5-T 板子間的溝通
  - 目前結論是軟體應該只支援 XR5-SE 硬體，不支援舊型的 XR5-T 板子

Other USB to Serial Adapters may work with the XR5, but Pace provides support only for the USB-A Serial Adapter. Some USB to Serial Adapters fail to work with any device that has a 3-wire communications interface (like the XR5 and some GPS devices).

# COM port 相關板子

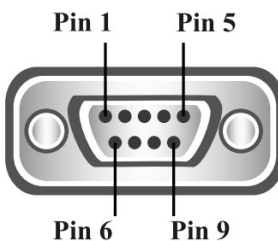


USB to RS-232 訊號轉換器



Pin 1	DCD
Pin 2	RXD
Pin 3	TXD
Pin 4	DTR
Pin 5	GND
Pin 6	DSR
Pin 7	RTS
Pin 8	CTS
Pin 9	RI

RS232 Pinout (9 Pin Male)

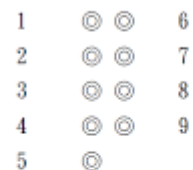


目前使用中  
(終端機文字模式)

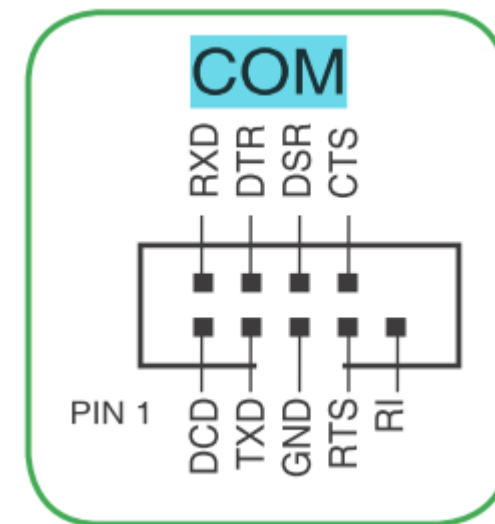
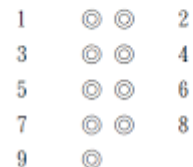
不透過 USB 轉 RS232，直接使用 COM port 依舊無法打通 Log XR5 Log 軟體

一般排 PIN 可分為 A\_TYPE 及 B\_TYPE 兩種.

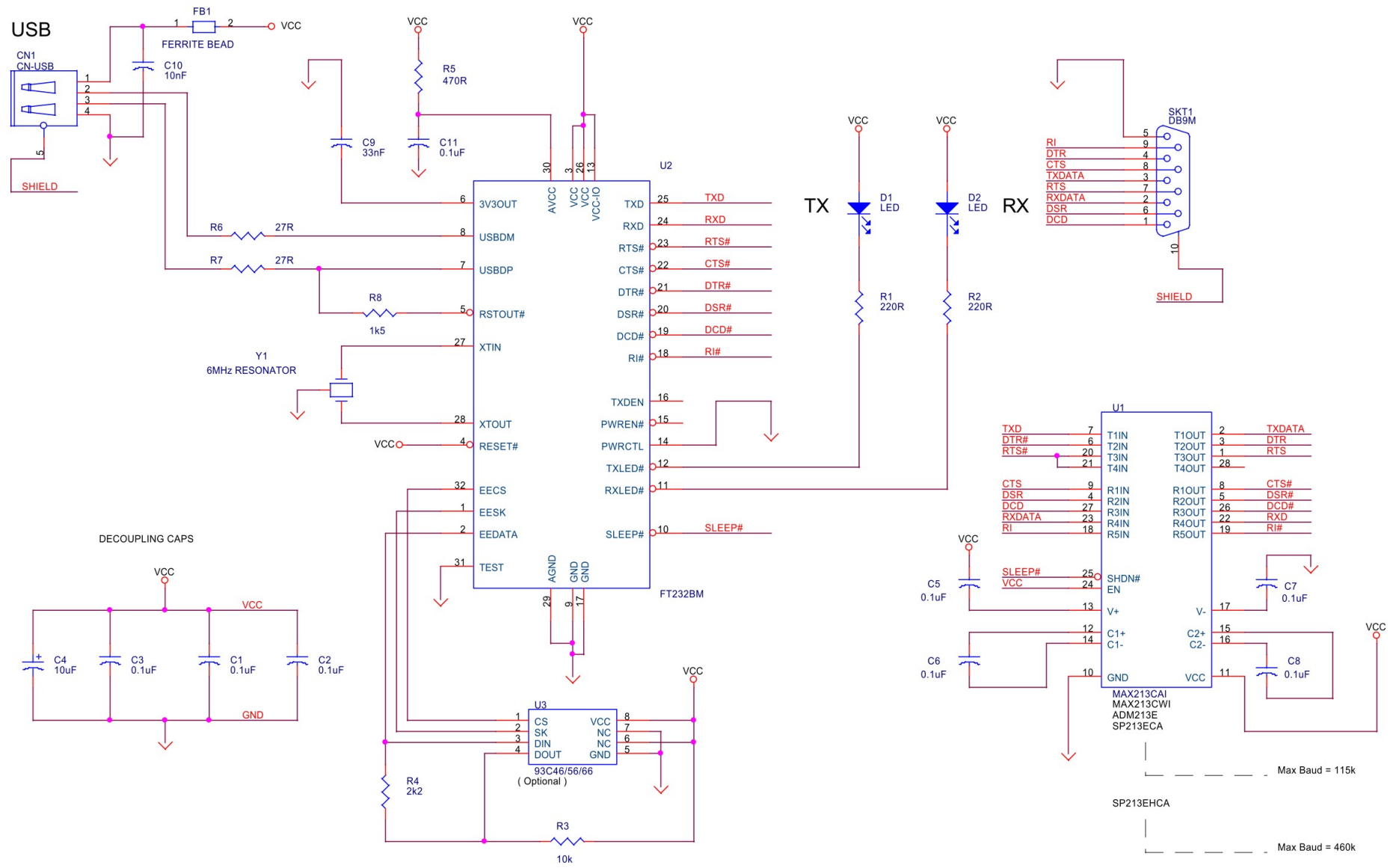
A\_TYPE : ( COM1A, COM2A, COM1RA, COM2RA )



B\_TYPE : ( COM1B, COM2B )

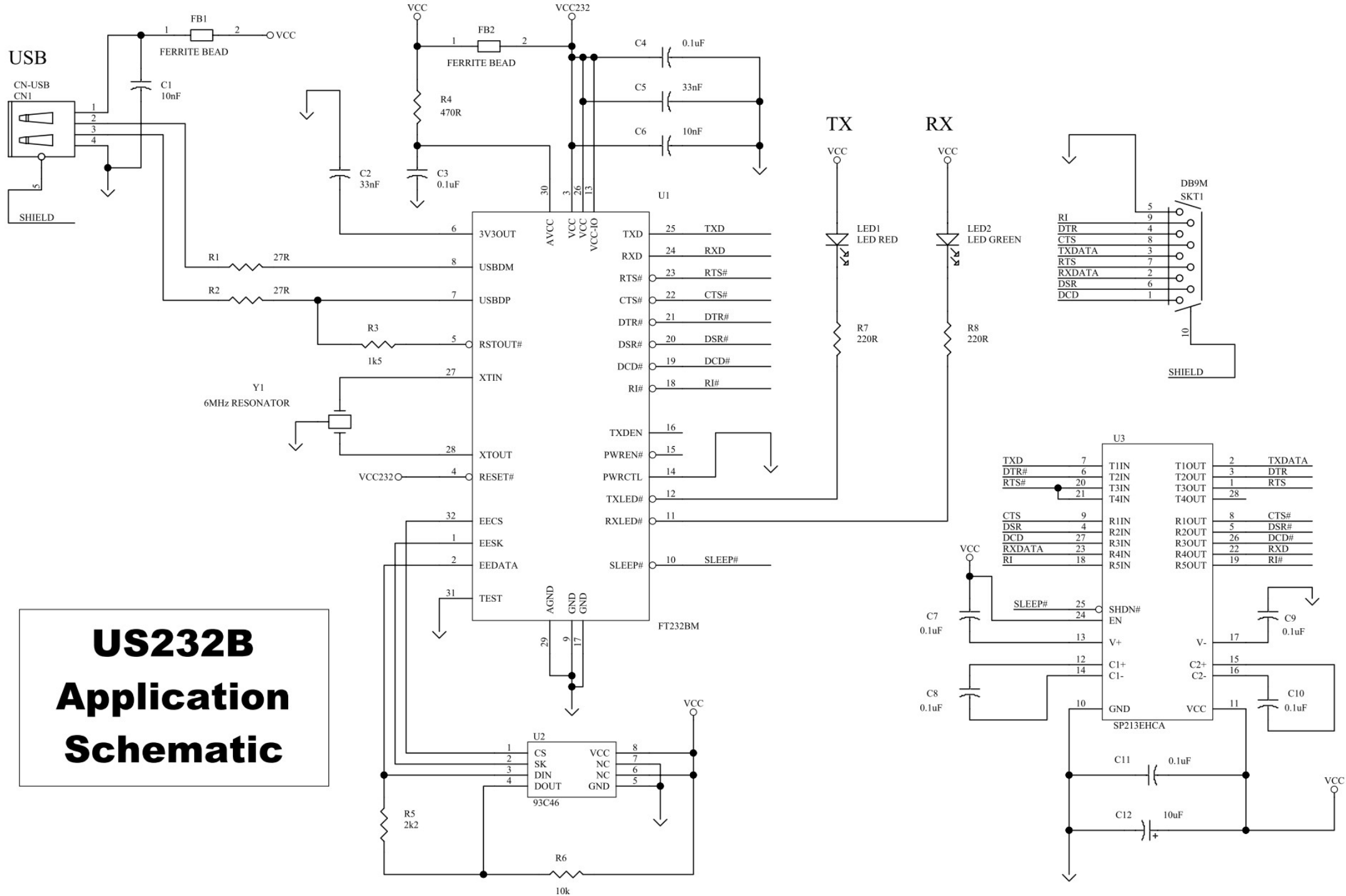


主機板接腳 B\_TYPE  
(ASUS PRIME B360M-K)



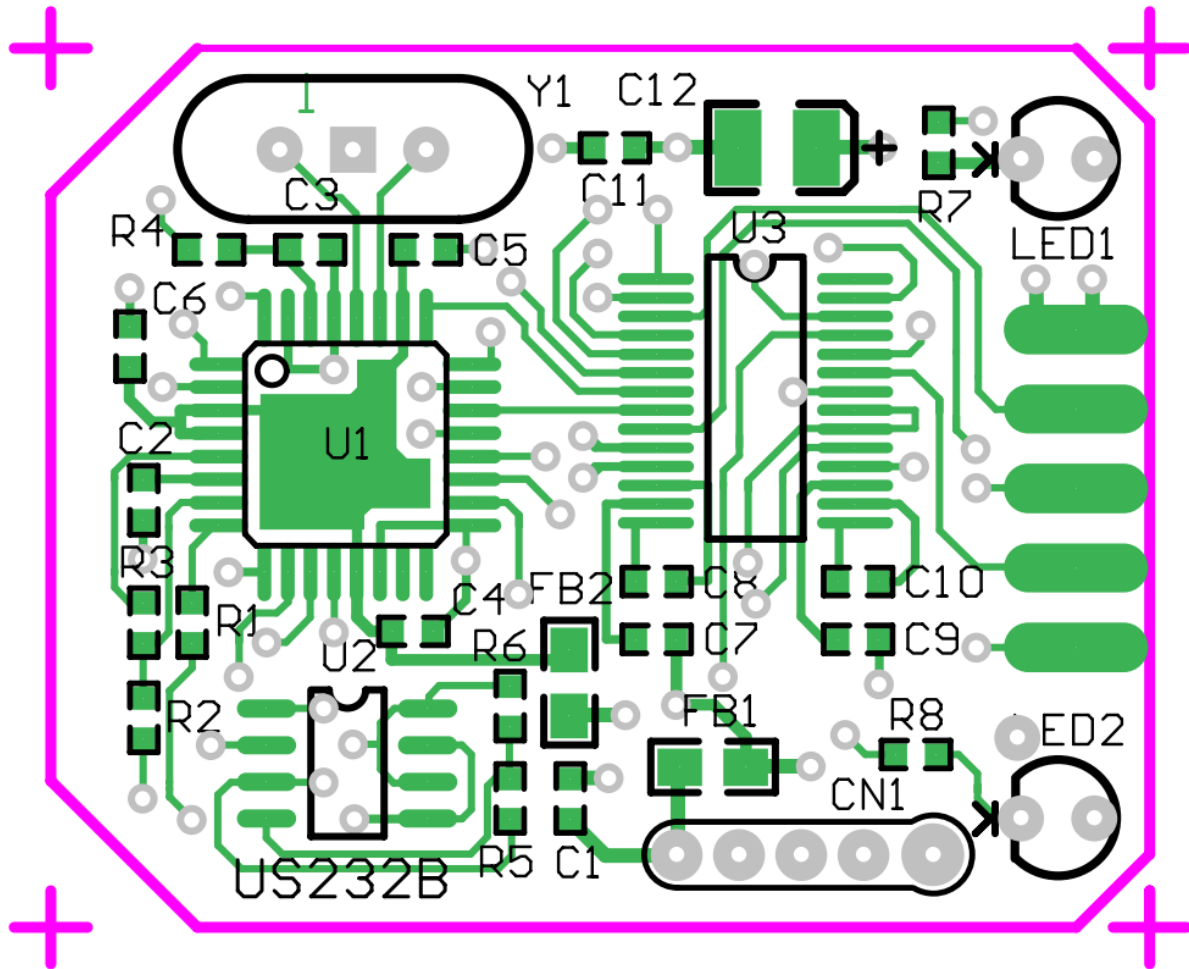
FT232B APPLICATION SCHEMATIC  
 USB <=> RS232 SERIAL CONVERTER ( 300 to 115k/460k baud )

USB to RS232 用到了 FTDI 的 FT232BL IC

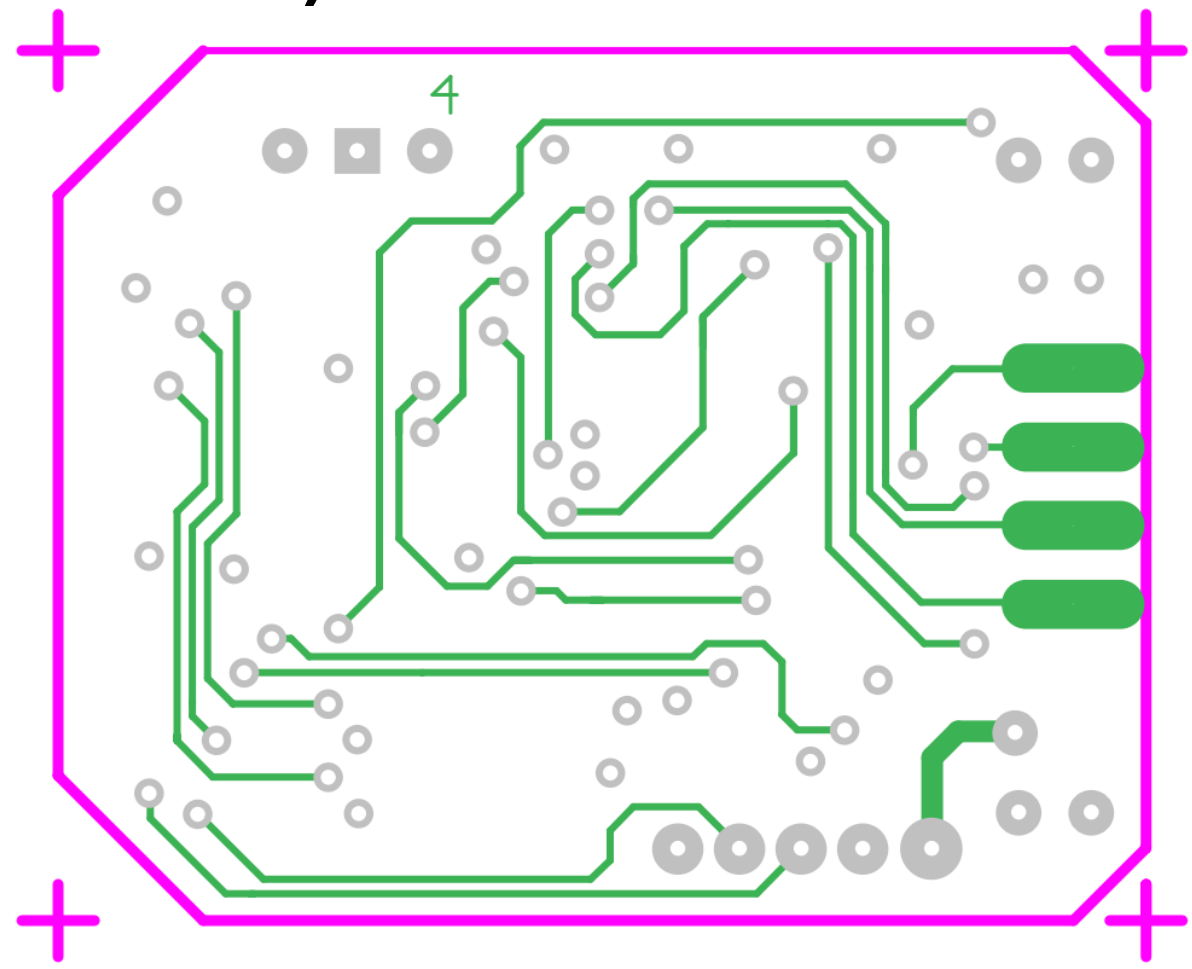


**US232B**  
**Application**  
**Schematic**

# US232B Gerber Files ( 四層板 ? 缺 VCC 和 GND 兩層 )



top



bottom

## “Top Level” Commands

When inactive, the XR5 is normally in the “Top Level” command state. In the “Top Level” state, the XR5 will respond to 3 commands detailed below. All other combination of characters is ignored.

Command	Total characters	Result
text	4	Sends the Text Interface “Main menu”. Sending an Esc character from the Main menu puts the XR5 back into the “top level”.
r	1	Sends a readable text string consisting of the current date and time, and the current scaled value of each active channel. Each value is separated by a comma. The XR5 continues to respond to any “top level” command.
h	1	Enters the LogXR communications protocol. Commands in this mode are binary commands with CRC checksums. Sending an Esc character puts the XR5 back into the “top level”.

(by XR5 Terminal Mode User’s Guide)



## Terminal Mode Limitations

Using the Terminal Mode, a PDA (or computer) may be used to launch a logging session, view readings in Real Time, read current XR5 Status, start/stop logging, and transfer logged data as a binary data file. However, **binary data files must be converted to readable files using Pace LogXR Software.**

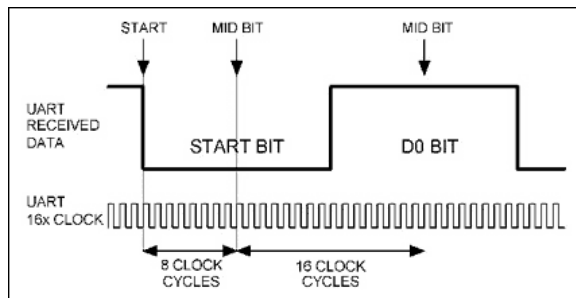
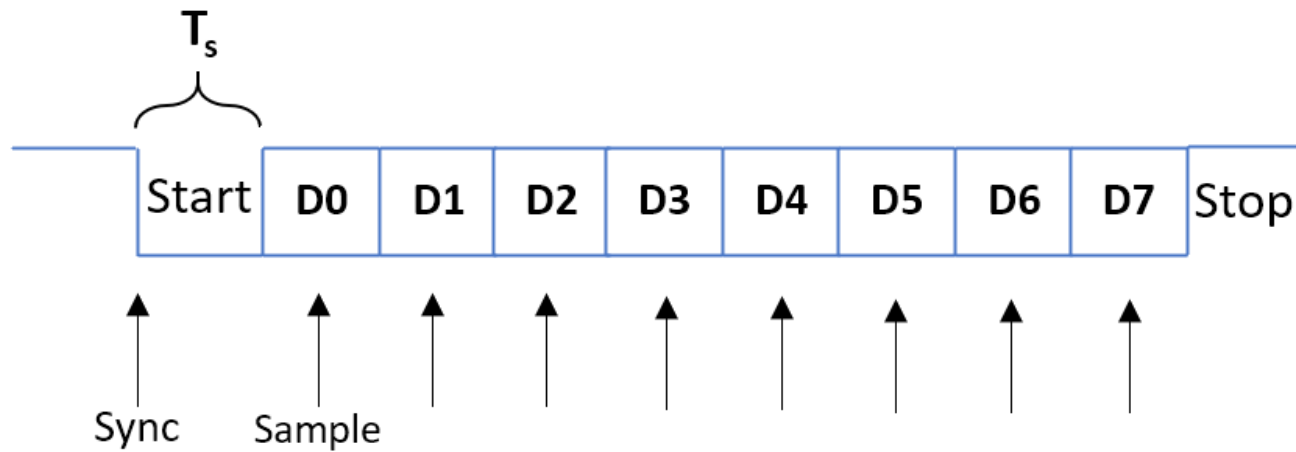
Terminal Mode includes a Real Time selection that sends current sensor values as readable character string at a user selected rate (for example, every 2 seconds). A similar “real time” string may be sent using the “r” command. All linear sensors / transducers and the Pace PT9xx Series Temperature Probes display scaled, readable values. However, **other non-linear 2-wire sensors display either raw A/D values or actual resistance if the channel Type was set to Resistance.** Non-linear 2-wire sensors include the LS100 Light Sensor, the PT510 / PT520 Platinum RTD, and if the XR5 has a millivolt option, all thermocouples.

For use with the Terminal Mode, the XR5 can store a single non-linear scaling table in internal memory. The XR5-SE ships with a 30k thermistor table (for Pace PT9xx Series Temperature Probes) loaded in memory. However, an alternate non-linear sensor table may be loaded into the XR5, to allow a different non-linear sensor to be readable from Terminal Mode. For example, a table for the Pace PT510/PT520 Sensors, or a table for the YSI #44004 Thermistor (2252 ohm) may be loaded into the XR5. These tables and others are available from Pace on request.

(by XR5 Terminal Mode User's Guide)



# Data & Clocks in Universal Asynchronous Receiver Transmitter (UART)



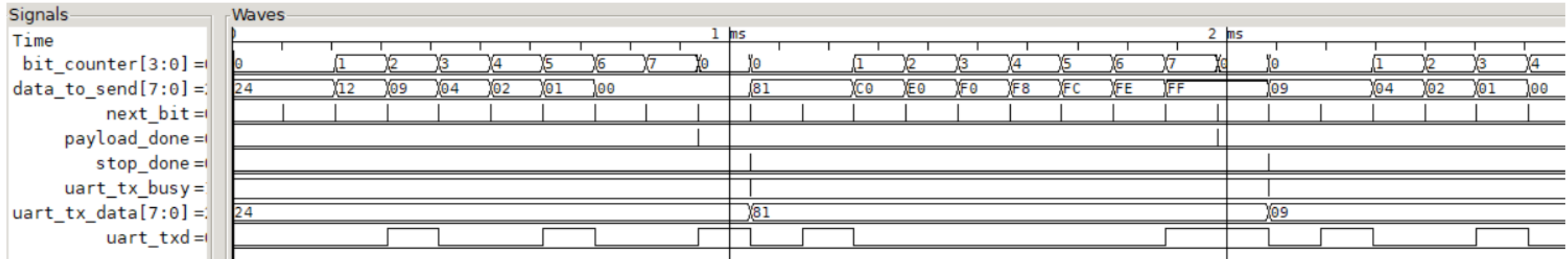
# UART History

- SingleByte FIFO Buffers
  1. 8250(max.9600 bps) was originally shipped with the IBM personal computer
  2. 16450(modified 8250)

<u>COM port (bps)</u>	<u>Characters</u>
2400	4ms
9600	1ms
19200	520us
38400	260us

- MultiByte FIFO Buffers
  1. 16550(16-byte FIFO, max.153,000 bps)
  2. 16650 (32-byte FIFO,max. over 300,000 bps)
  3. 16750(64-byte FIFO)
  4. 16950(128-byte FIFO)

# UART Transmitter Hardware Simulation



(<https://github.com/ben-marshall/uart>)

Data\_to\_send : shift register ( 往右 shift , MSB 不變 )

Next\_bit: 對 shift register 的 LSB 取樣 , 並丟到 TX pin

# UART Receiver Hardware Simulation

