iTE SDK

RS485模組開發指南

V0.9

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ITE Tech. Inc. Tel: 886-2-29126889
Marketing Department Fax: 886-2-2910-2551, 886-2-2910-2552
7F, No.233-1, Baociao Rd., Sindian City,
Taipei County 23145, Taiwan, ROC

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修訂記錄

修訂日期	修訂說明	頁次
2014/10/31	初建版本 V0.1	
2015/01/29	版本 V0.2 新增GPIO Pin設定	
2015/05/26	版本 V0.8 新增RS485_1與Software Uart 功能設定	
2015/06/24	版本 V0.9 新增奇偶檢查設定	

目錄

1. 前言

1.1 編寫目的

介紹RS485 模組之功能, 說明RS485模組相關的API之操作及使用.

1.2 適用範圍

RS485通常用來作為智能家居或是工控等應用。RS485使用差動傳輸,所以擁有抗雜訊能力強，傳輸距離較遠與傳輸速率快的優點，因為RS485使用半雙工網路(同一時間內只能傳送或接收)，只需二條線可以達成1對多甚至是多對多通訊)，故可利用RS485介面方便地建立起設備網路。

1.3 適用人員

軟體應用程式，驅動程式開發者

2. RS485模組介紹

2.1 Description

智能家居領域中經常用到RS485 serial bus。以下將介紹在IT9079的SDK中，RS485相關應用的API與使用方式。

2.2 RS485 模組

ITP RS485 driver相關程式放在”\sdk\driver\itp\itp_ RS485.c”
ITP DRIVER是依據POSIX規範實作的API，可以使用OPEN/READ/WRITE/IOCTL等函式對I/O DEVICE進行如讀寫檔案般的操作。以下是基於這種規範所實做的RS485 ITP API。

2.2.1 IOCTL (RS485初始化與重置)

DEVICE ID : ITP_DEVICE_RS485_0 (參考“sdk\include\ite\itp.h”)
ITP_DEVICE_RS485_1

RS485 device 註冊

```
itpRegisterDevice(ITP_DEVICE_RS485_0, &itpDeviceRS485_0);
itpRegisterDevice(ITP_DEVICE_RS485_1, &itpDeviceRS485_1);
```

使用此函式可以將RS485 device註冊到ITP的driver中，使用者可以透過ioctl/rerad/write等函式來操作RS485的功能。本函式已經含在ITP driver的初始化過程當中(參考 “sdk\driver\itp_init_openrtos.c”)，所以一般不必再執行此註冊函式。

RS485 device的初始化

```
/**
 * Device ioctl method (controls device operating parameters).
 *
 * @param file File descriptor referring to an open device.
 * @param request Selects the control function to be performed.
 * @param ptr Additional information that is needed by this specific device to perform the requested function.
 * @param info Device custom data.
 * @return Upon successful completion, it shall return a value other than -1 that depends upon the device control function. Otherwise, it shall return -1 and set errno to indicate the error.
 */
int (*ioctl)(int file, unsigned long request, void* ptr, void* info);

ioctl(ITP_DEVICE_RS485, ITP_IOCTL_INIT, (void*)baud_rate);
```

baud_rate: 輸入參數為baud rate值。

RS485 device的重置

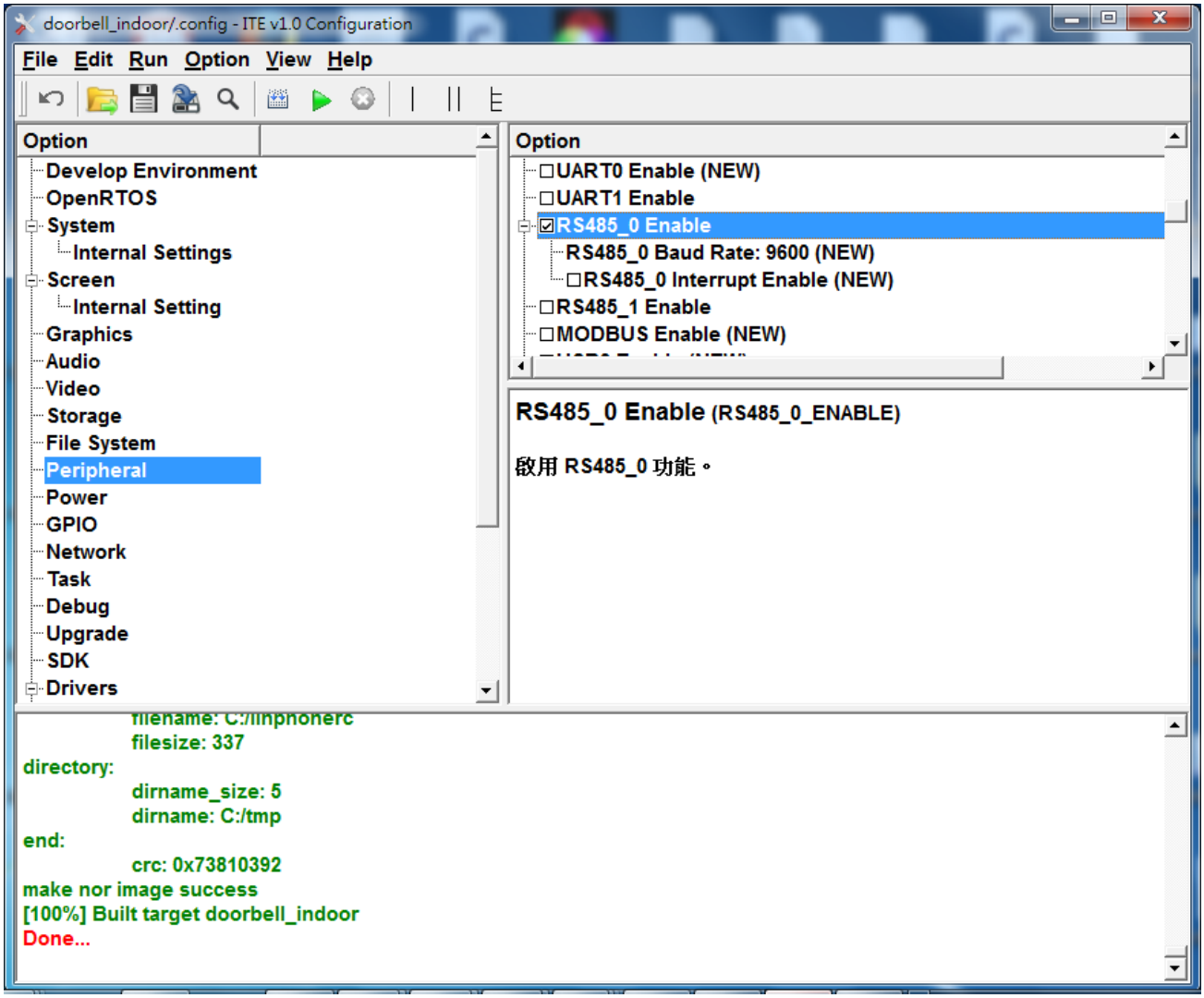
```
ioctl(ITP_DEVICE_RS485, ITP_IOCTL_RESET, (void*)baud_rate);
```

此函式是重置RS485 DEVICE，其中輸入參數為baud rate值。

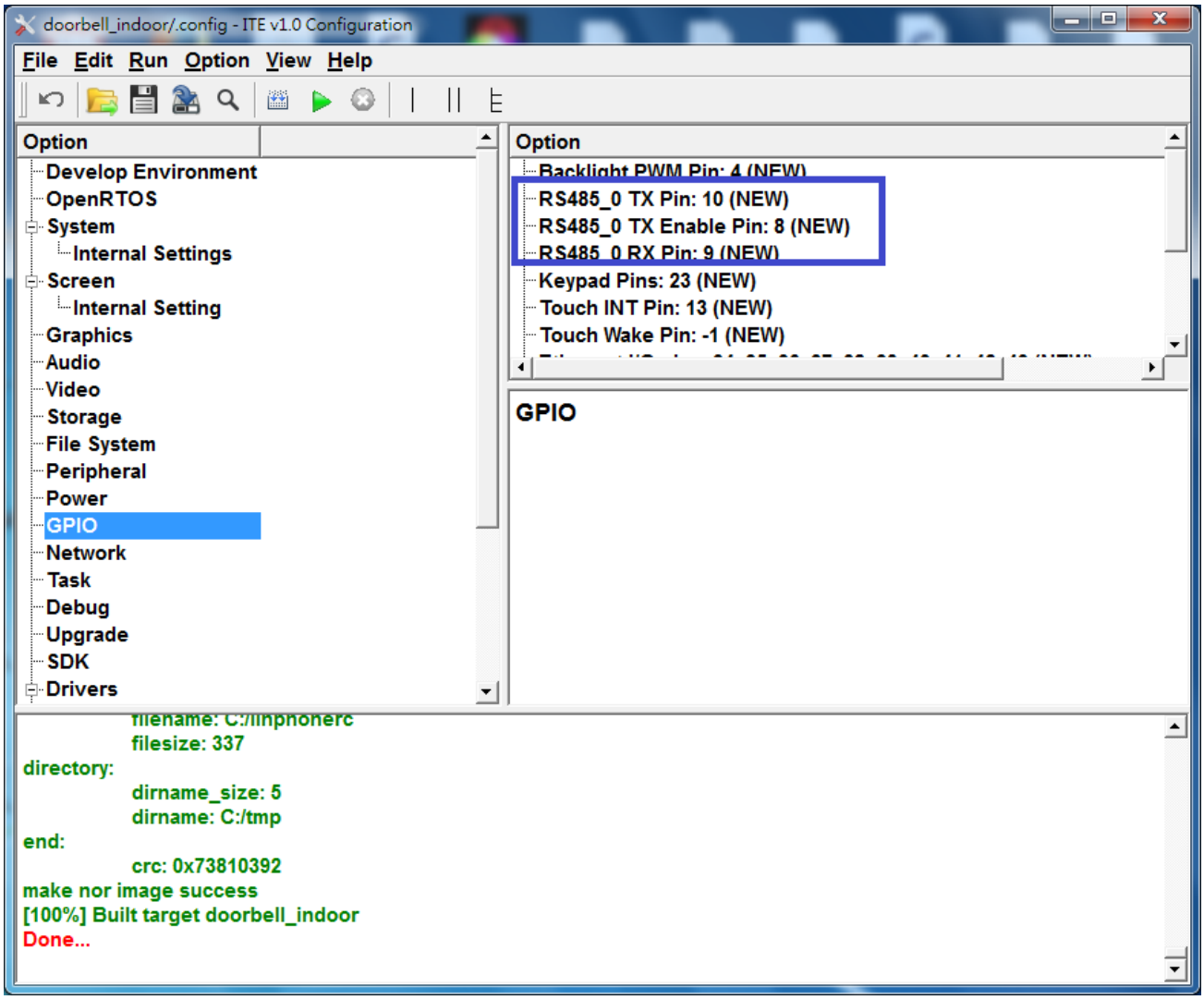
3. 軟件配置說明

3.1 RS485_0參數設定 (KConfig)

To set Kconfig Depend on necessary of project application



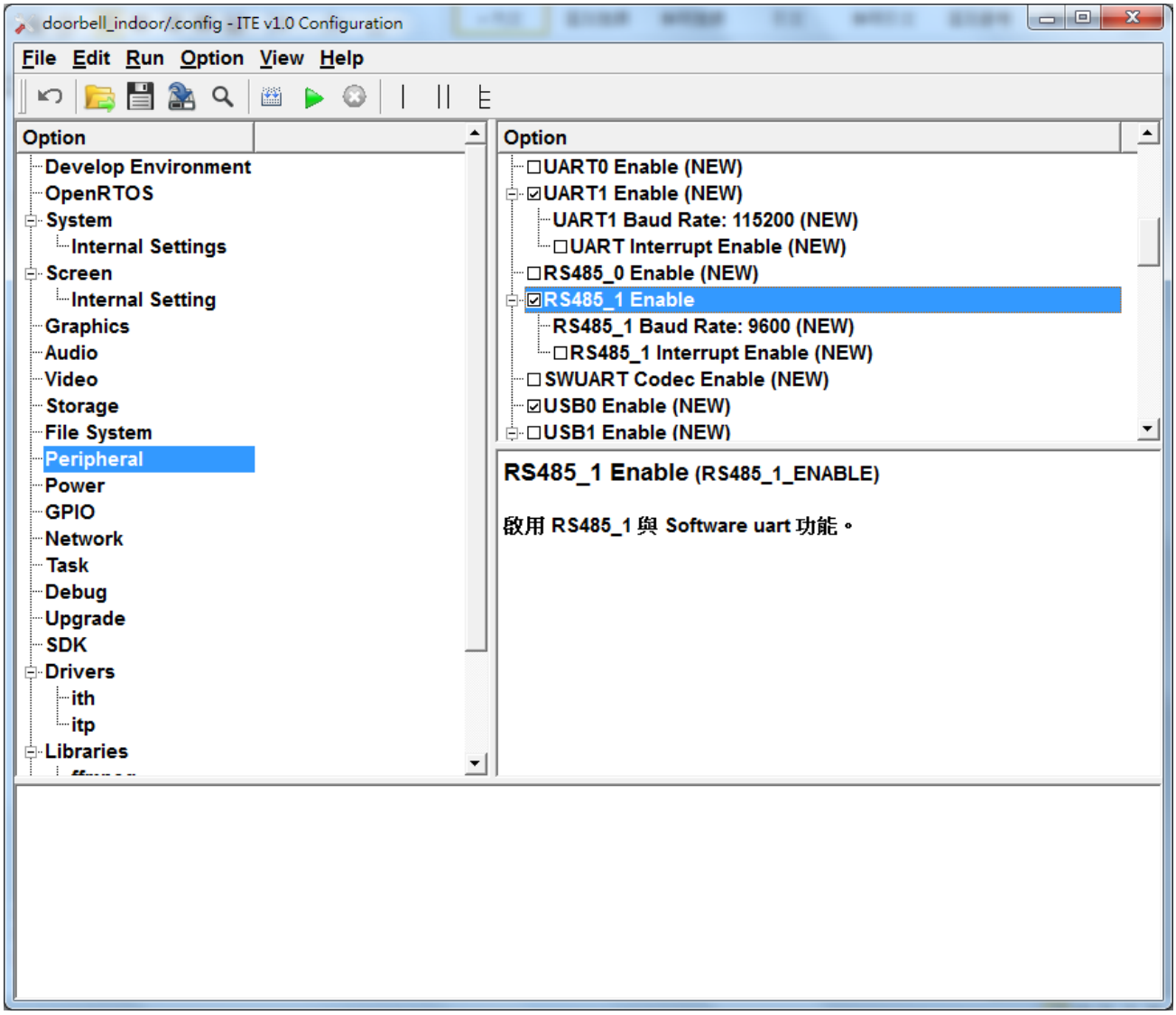
RS485_0 Enable: To enable RS485_0 module.
RS485_0 Baud Rate :To set the Baud Rate of RS485_0 (default 9600bps)。
※Don't enable UART1 and RS485_0 at the same time.



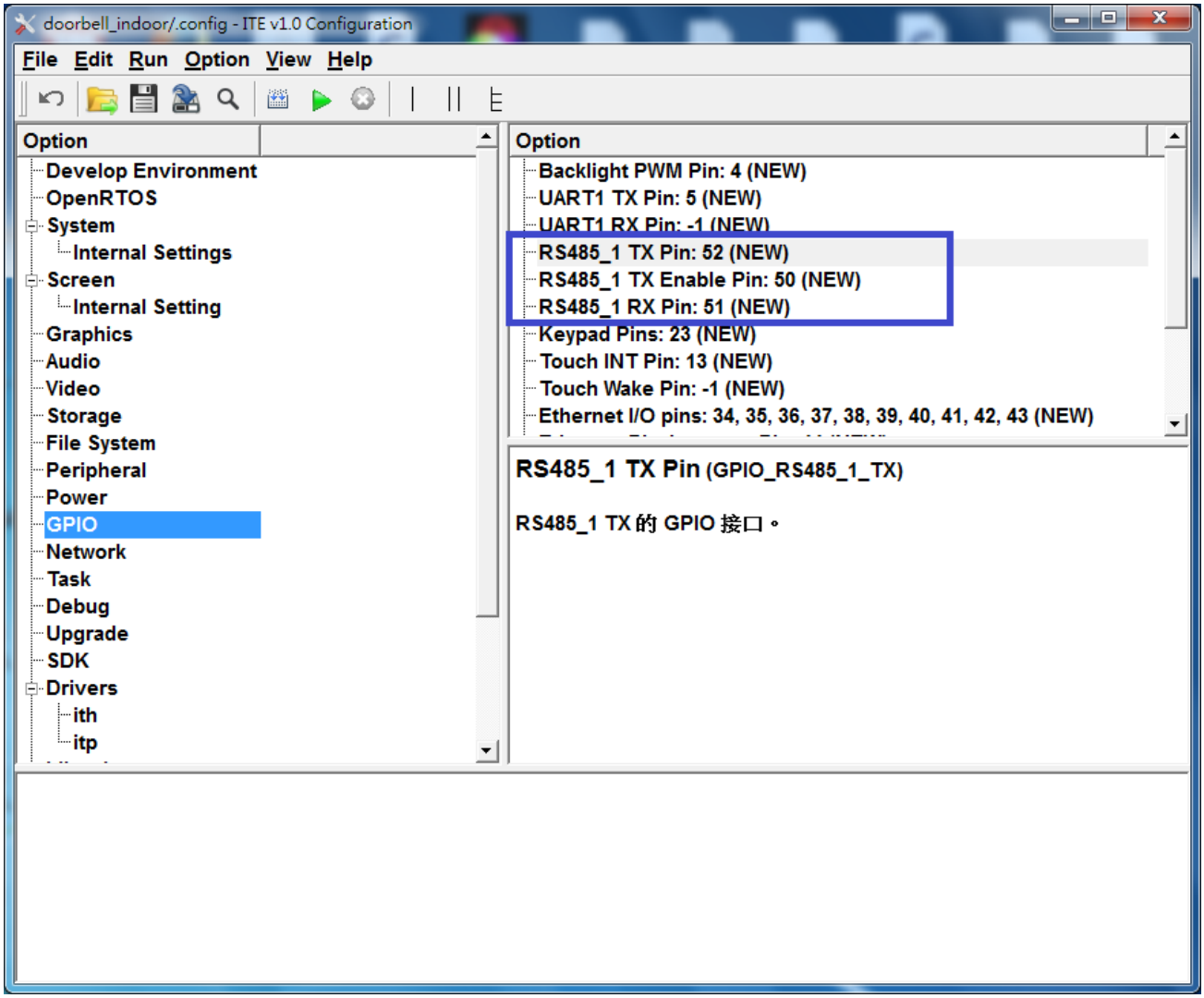
Set RS485_0 TX pin for Write, R485_0 TX Enable pin for Write Enable, and RS485_0 RX pin for Read.

3.2 RS485_1參數設定 (KConfig)

To set Kconfig Depend on necessary of project application



RS485_1 Enable: To enable RS485_1 module.
RS485_1 Baud Rate :To set the Baud Rate of RS485_1 (default 9600bps)。
※It can enable Hardware UART1 and RS485_1(with Software Uart) at the same time.



Set RS485_1 TX pin for Write, R485_1 TX Enable pin for Write Enable, and RS485_1 RX pin for Read.

3.3 MACRO參數定義

Refer to the “sdk\include\ite\itp.h”

```
/**
 * Device types.
 */
typedef enum
{
    // Standard IO devices
    ITP_DEVICE_STD          = (0 << ITP_DEVICE_BIT),    ///< Standard IO
    ITP_DEVICE_SOCKET       = (1 << ITP_DEVICE_BIT),    ///< LWIP socket

    // File system devices
    ITP_DEVICE_FS           = (2 << ITP_DEVICE_BIT),    ///< File systems
    ITP_DEVICE_FAT          = (2 << ITP_DEVICE_BIT),    ///< FAT file system
    ITP_DEVICE_NTFS         = (3 << ITP_DEVICE_BIT),    ///< NTFS file system

    // Custom devices
    ITP_DEVICE_CUSTOM       = (4 << ITP_DEVICE_BIT),    ///< Custom devices
    ITP_DEVICE_PRINTBUF     = (5 << ITP_DEVICE_BIT),    ///< Print buffer
    ITP_DEVICE_SWUART       = (6 << ITP_DEVICE_BIT),    ///< Software UART
    ITP_DEVICE_UART0        = (7 << ITP_DEVICE_BIT),    ///< UART0
    ITP_DEVICE_UART1        = (8 << ITP_DEVICE_BIT),    ///< UART1
    ITP_DEVICE_LCDCONSOLE   = (9 << ITP_DEVICE_BIT),    ///< LCD console
    ITP_DEVICE_OSDCONSOLE   = (10 << ITP_DEVICE_BIT),   ///< OSD console
    ITP_DEVICE_SCREEN       = (11 << ITP_DEVICE_BIT),   ///< Screen
    ITP_DEVICE_I2C          = (12 << ITP_DEVICE_BIT),   ///< I2C
    ITP_DEVICE_SPI          = (13 << ITP_DEVICE_BIT),   ///< SPI
    ITP_DEVICE_IR           = (14 << ITP_DEVICE_BIT),   ///< IR
    ITP_DEVICE_NAND         = (15 << ITP_DEVICE_BIT),   ///< NAND
    ITP_DEVICE_NOR          = (16 << ITP_DEVICE_BIT),   ///< NOR
    ITP_DEVICE_SD0          = (17 << ITP_DEVICE_BIT),   ///< SD0
    ITP_DEVICE_SD1          = (18 << ITP_DEVICE_BIT),   ///< SD1
    ITP_DEVICE_USBDFSG      = (19 << ITP_DEVICE_BIT),   ///< USB acts as a USB Mass Storage device
    ITP_DEVICE_CARD         = (20 << ITP_DEVICE_BIT),   ///< Card
    ITP_DEVICE_DRIVE        = (21 << ITP_DEVICE_BIT),   ///< Drive
    ITP_DEVICE_KEYPAD       = (22 << ITP_DEVICE_BIT),   ///< Keypad
    ITP_DEVICE_POWER        = (23 << ITP_DEVICE_BIT),   ///< Power
    ITP_DEVICE_GSENSOR      = (24 << ITP_DEVICE_BIT),   ///< G-Sensor
    ITP_DEVICE_HEADSET      = (25 << ITP_DEVICE_BIT),   ///< Headset
    ITP_DEVICE_AMPLIFIER    = (26 << ITP_DEVICE_BIT),   ///< Audio amplifier
    ITP_DEVICE_STC          = (27 << ITP_DEVICE_BIT),   ///< STC
    ITP_DEVICE_DECOMPRESS   = (28 << ITP_DEVICE_BIT),   ///< Decompress
    ITP_DEVICE_CODEC        = (29 << ITP_DEVICE_BIT),   ///< Audio codec
    ITP_DEVICE_ETHERNET     = (30 << ITP_DEVICE_BIT),   ///< Ethernet
    ITP_DEVICE_WIFI         = (31 << ITP_DEVICE_BIT),   ///< WiFi
    ITP_DEVICE_FILE         = (32 << ITP_DEVICE_BIT),   ///< File
    ITP_DEVICE_DEMOD        = (33 << ITP_DEVICE_BIT),   ///< Demod
```

```
    ITP_DEVICE_WATCHDOG     = (34 << ITP_DEVICE_BIT),   ///< Watch Dog
    ITP_DEVICE_NETCONSOLE   = (35 << ITP_DEVICE_BIT),   ///< Network console
    ITP_DEVICE_USB          = (36 << ITP_DEVICE_BIT),   ///< USB
    ITP_DEVICE_DPU          = (37 << ITP_DEVICE_BIT),   ///< DPU (encryption/decryption)
    ITP_DEVICE_XD           = (38 << ITP_DEVICE_BIT),   ///< XD
    ITP_DEVICE_LED          = (39 << ITP_DEVICE_BIT),   ///< LED
    ITP_DEVICE_SWITCH       = (40 << ITP_DEVICE_BIT),   ///< Switch
    ITP_DEVICE_TUNER        = (41 << ITP_DEVICE_BIT),   ///< Tuner
    ITP_DEVICE_STNLCD       = (42 << ITP_DEVICE_BIT),   ///< STN LCD
    ITP_DEVICE_USBMOUSE         = (43 << ITP_DEVICE_BIT),    ///< USB Mouse
    ITP_DEVICE_USBKBD           = (44 << ITP_DEVICE_BIT),    ///< USB Keyboard
    ITP_DEVICE_RTC          = (45 << ITP_DEVICE_BIT),  ///< RTC
    ITP_DEVICE_BACKLIGHT        =  (46 << ITP_DEVICE_BIT),   ///< Backlight
    ITP_DEVICE_GPIO_EXTENDER    =  (47 << ITP_DEVICE_BIT),   ///< GPIO Extender
    ITP_DEVICE_RS485_0          =  (48 << ITP_DEVICE_BIT),   ///< RS485
    ITP_DEVICE_RS485_1          =  (49 << ITP_DEVICE_BIT),   ///< RS485

    ITP_DEVICE_LAST
} ITPDeviceType;
```

4. 使用範例

4.1 RS485 使用範例與奇偶檢查使用範例

```
#include "ite/itp.h"

int main(void)
{
        int i;
        uint8_t getstr[8];
        uint8_t sendtr[8] = {0x1, 0x2, 0x3, 0x4, 0x5, 0x6, 0x7, 0x8};
        int len = 0;
        ITHRS485Port RS485_port = ITH_RS485_0;
        ITHRS485Port RS485_port1 = ITH_RS485_1;
        ITHUartParity RS485_UartParity = ITH_UART_ODD;  // Here enter the odd or even or normal
                                                        //parameter.
                                                        // normal :  ITH_UART_NONE
                                                        // odd      :  ITH_UART_ODD
                                                        // even    :  ITH_UART_EVEN

        printf("Start RS485 test!\n");

        ioctl(ITP_DEVICE_RS485_0, ITP_IOCTL_RESET, (void*)&RS485_UartParity);
        ioctl(ITP_DEVICE_RS485_0, ITP_IOCTL_ON, (void*)&RS485_port);

        ioctl(ITP_DEVICE_RS485_1, ITP_IOCTL_RESET, (void*)&RS485_UartParity);
        ioctl(ITP_DEVICE_RS485_1, ITP_IOCTL_ON, (void*)&RS485_port1);

        while(1)
        {
           write(ITP_DEVICE_RS485_0,sendtr,8);
           len = read(ITP_DEVICE_RS485_0,getstr,8);

           if(len > 0)
           {
                printf("RS485_0 read: ");
                for(i = 0; i <len; i++)
                {
                        printf("[%02x]",getstr[i]);
                }
                printf("\n ");
           }

          write(ITP_DEVICE_RS485_1,sendtr,8);
           len = read(ITP_DEVICE_RS485_1,getstr,8);

           if(len > 0)
```

```
        {
          printf("RS485_1 read: ");
          for(i = 0; i <len; i++)
          {
                printf("[%02x]",getstr[i]);
          }
          printf("\n ");
        }


}
```