



HT6xx/PA96x/PA982/RH767 Programming Manual

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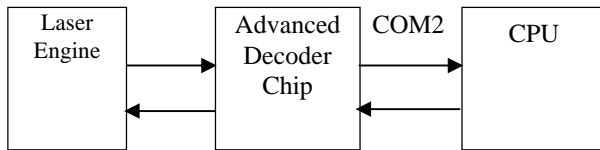
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1 Introduction

1.1 How to download data from scanner

The major difference between the HT6xx/PA96x/PA982 and a standard HPC/PalmPC is barcode input capability. The WinCE Reference Manual contains no information regarding barcode input. This section will introduce the programming structure of the barcode sub-system and the programming utility library for the HT6xx/PA96x/PA982. Inside the HT6xx/PA96x/PA982 there is an advanced decoding chip to control SE900 laser engine and to handle barcode decoding. Below is system diagram for the HT6xx/PA96x/PA982 barcode:



According to the above diagram, the HT6xx/PA96x/PA982 communicates with Decoder Chip by mean of serial port COM2. Its communication parameter is fixed on 38400,N,8,1. Normally, the Decoder Chip is in sleep mode when COM2 is not activated. When COM2 is activated, the Decoder Chip will start working, and it will decode the barcode “signal” from the laser engine when the trigger key is pressed. After decoding, barcode data and its symbology type will be sent directly to HT6xx/PA96x/PA982.

Many programmers find it difficult to control the Decoder Chip via programming language alone, especially if they are not familiar with barcode and serial port controls. Because of this, Unitech provides the following utility library and program for the user or application programmer to control the Decoder Chip:

1. Application program “Scan2Key.exe” is a useful application program that can read input data from the laser scanner and then directly input the data into HT6XX/PA96x/PA982’s keyboard buffer. “Scan2Key.exe” makes barcode data input simple, and can be especially valuable to those programmers not familiar with COM port programming. User program simply reads the barcode data from the keyboard. For barcode symbologies setting, you can run **Scanner Setting** from **Control Panel** to define all of supporting symbologies and delimiter.

2. Utility library:

For programming control, HT6xx/PA96x/PA982 provides USI.DLL to let user control scanner input, symbologies setting and profile controlling. Please refer to 2 for detail API lists.

USI.DLL is Unitech’s new scanner function library on HT6xx/PA96x/PA982. For backward compatible issue, Unitech still provide Scanner3.DLL and ScanKey3.DLL for existing PT930/PT930SA user to port their software into HT6xx/PA96x/PA982, but several APIs on Scanner3.DLL and ScanKey3.DLL have already been removed on HT6xx/PA96x/PA982. User can refer to 0 and 5 for detail supporting API.

1.2 COM definition for HT6xx/PA96x/PA982/RH767

General:

| | |
|-------|---------------------------------------|
| COM 1 | Physical full RS232 port (ActiveSync) |
| COM 2 | Scanner (Hamster) or RFID reader |
| COM 3 | IrComm |
| COM 4 | USB client |
| COM 5 | IrDA or Bluetooth |
| COM 6 | Reserve |
| COM 7 | Bluetooth Printer |
| COM 8 | Bluetooth Modem |
| COM 9 | Bluetooth ActiveSync |

PA968:

| | |
|-------|----------------------------------|
| COM 0 | USB modem |
| COM 1 | Bluetooth |
| COM 2 | Scanner (Hamster) or RFID reader |
| COM 3 | Reserve |
| COM 4 | Reserve |
| COM 5 | GPS |
| COM 6 | Reserve |
| COM 7 | Bluetooth Printer |
| COM 8 | Bluetooth Modem |
| COM 9 | Bluetooth ActiveSync |

HT680:

| | |
|-------|----------------------|
| COM 1 | Bluetooth |
| COM 2 | Scanner (Hamster) |
| COM 3 | Reserve |
| COM 4 | USB Client |
| COM 5 | Reserve |
| COM 6 | GPRS |
| COM 7 | Bluetooth Printer |
| COM 8 | Bluetooth Modem |
| COM 9 | Bluetooth ActiveSync |

1.3 Useful Sample program

You can get useful sample program for VC, C# and VB.NET from below URL

HT6xx series

- C# http://w3.tw.ute.com/pub/cs/software/Sample_Program/HT660/c_sharp/c_sharp_sample.zip
- Vb.net http://w3.tw.ute.com/pub/CS/software/Sample_Program/HT660/VB.NET/VB.NET_sample.zip
- C++ http://w3.tw.ute.com/pub/CS/software/Sample_Program/HT660/evc/evc_sample.zip

PA96x/PA982 series

- C# http://w3.tw.ute.com/pub/cs/software/Sample_Program/PA962/c_sharp/c_sharp_sample.zip
- Vb.net http://w3.tw.ute.com/pub/CS/software/Sample_Program/PA962/VB.NET/VB.NET_sample.zip
- C++ http://w3.tw.ute.com/pub/CS/software/Sample_Program/PA962/evc/evc_sample.zip

1.4 Get SDK from Unitech?

You can get SDK from below URL

| | |
|-----------|---|
| HT660 | SDK http://w3.tw.ute.com/pub/cs/sdk/ht660/HT660SDK.zip |
| HT680 | SDK http://w3.tw.ute.com/pub/cs/sdk/HT680/HT680SDK.zip |
| PA962/963 | SDK http://w3.tw.ute.com/pub/cs/sdk/pa962/pa962sdk.zip |
| PA966/967 | SDK http://w3.tw.ute.com/pub/cs/sdk/pa966/pa966sdk.zip |
| PA968 | SDK http://w3.tw.ute.com/pub/cs/sdk/pa968/pa968sdk.zip |
| PA982 | SDK http://w3.tw.ute.com/pub/cs/sdk/pa982/Pa982SDK.zip |
| RH767 | SDK http://w3.tw.ute.com/pub/cs/sdk/RH767/RH767_CE5_SDK.zip |

2 USI.DLL – Unitech Scanner Interface DLL

2.1 Register the application to the USI DLL

Function Description:

Register the application to the USI DLL, so that the DLL can communicate with the application. It will also open and initial scanner port (COM2, for example) and set the scanner to the working mode. The application should call USI_Unregister to unregister from the DLL after done with the scanner.

Function call:

```
BOOL USI_Register(HWND hwnd, UINT msgID);
```

Parameter: (input)

hwnd: Handle of the window to which USI DLL will send messages to report all activities, including error messages, scan data ready, etc.

msgID: Specifies the message to be posted. DLL will post messages by calling: PostMessage(hwnd, msgID, msg, param).

The window procedure will receive custom message about msgID and wParam parameter can be one of the followings:

SM_ERROR_SYS: Indicates a system error, which is caused by a call to the system function. Param contains the error code from GetLastError().

SM_ERROR Indicates an error. Param contains the cause of error, which can be on of followings:

| | |
|-----------------------------|---|
| SERR_INVALID_HWND: | Invalid window handle. |
| SERR_INVALID_MSGID: | msgID cannot be 0. |
| SERR_OPEN_SCANNER: | Open or initial scanner port failed. |
| SERR_CHECKSUM: | Checksum error in received packet. |
| SERR_DATALOST: | New scan data is lost because data buffer is not empty. |
| SERR_BUFFEROVERFLOW: | Data buffer overflow. The default size is 4K bytes. |

SM_REPLY Indicates received a reply. All the responses from the scanner except the scan data will be notified by this message.

SM_DATAREADY Indicates that scan data is successfully decoded and ready to retrieve.

SM_ACK Indicates received a ACK.

SM_NAK Indicates received a NAK.

SM_NOREAD Indicates received a No-Read packet.

Note: Scanner port settings are defined in registry as described below:

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Unitech America Inc.\Scanner\Settings]
"COMPORT"="COM2:"
"BAUDRATE"="38400"
"STOPBITS"="1"
"PARITY"="None"
```

"CHECKPARITY"="1"

Return:

BOOL: TRUE : OK
FALSE : Failure

2.2 Unregister the application from the USI.DLL

Function Description:

Unregister the application from the DLL. It will close the scanner port, and by default it will disable the scanner.

Function call:

`void USI_Unregister();`

Return code:

None

2.3 Enable / Disable Scanner

Function Description:

To start or stop USI function. This function is useful for application to temporarily stop scanner function if it is only need keypad input or keep clear input buffer.

Function call:

`BOOL USI_EnableScan(BOOL bStatus);`

Parameter: (input)

bStatus: TRUE : Enable Scanner
FALSE : Disable Scanner

Return:

BOOL : TRUE : OK
FALSE : Failure

2.4 Reset Scanner

Function Description:

Set the scanner to the working mode, and reset the communication control.

Function call:

`BOOL USI_Reset();`

Return:

Always TRUE

2.5 Get error code

Function Description:

Returns the error code (SERR_***).

Function call:

`DWORD USI_GetError();`

Return:

Returns the error code (SERR_***), which has been described in USI_Register function.

2.6 Returns the system error code

Function Description:

Returns the system error code, which is returned by GetLastError. It will also return the description of the error in buffer if it is not NULL.

Function call:

```
DWORD USI_GetLastSysError(LPTSTR buffer, int len);
```

Parameter: (output)

buffer: LPTSTR: Data buffer for error message
len: int: Length of error message.

Return:

Returns the system error code, which is returned by system function GetLastError. It will also return the description of the error in buffer retrieved by system function FormatMessage if it is not NULL.

For a complete list of error codes, refer to the SDK header file WINERROR.H.

2.7 Get scan data

Function Description:

Retrieves the scan data into the buffer. Returns the length of characters. It also returns the barcode type if type is not NULL. Return 0 means that the buffer is too short to hold the data.

USI_GetData should be called when SM_DATAREADY message is received. Or call USI_ResetData to discard the data. Both of them will reset the data buffer so that next scan data can come in.

If the data buffer is not empty and a new scan data occurs, it will be discarded and an error message SM_ERROR with code of SERR_DATALOST will be sent.

Function call:

```
UINT USI_GetData(LPBYTE buffer, UINT len, UINT* type);
```

Parameter: (input)

len : UINT: Len specifies the maximum length of the buffer.

Parameter: (output)

buffer: LPBYTE: Data buffer for storing scanned data
type: UINT: barcode type which is defined on USI.H.

Please refer to below list

```
BCT_CODE_39           // Code 39
BCT_CODABAR           // CodaBar
BCT_CODE_128          // Code 128
BCT_INTERLEAVED_2OF5 // Interleaves 2 of 5
BCT_CODE_93           // Code 93
BCT_UPC_A             // UPC A
BCT_UPC_A_2SUPPS     // UPC A with 2 Supps
BCT_UPC_A_5SUPPS     // UPC A with 5 Supps
BCT_UPC_E             // UPC E
BCT_UPC_E0_2SUPPS    // UPC E with 2 Supps
BCT_UPC_E0_5SUPPS    // UPC E with 5 Supps
BCT_EAN_8             // EAN 8
BCT_EAN_8_2SUPPS     // EAN 8 with 2 Supps
BCT_EAN_8_5SUPPS     // EAN 8 with 5 Supps
BCT_EAN_13           // EAN 13
BCT_EAN_13_2SUPPS    // EAN 13 with 2 Supps
BCT_EAN_13_5SUPPS    // EAN 13 with 5 Supps
BCT_MSI_PLESSEY      // MSI Plessey
```

-

```

BCT_EAN_128           // EAN 128
BCT_UPC_E1           // UPC E1
BCT_UPC_E1_2SUPPS   // UPC E1 with 2 Supps
BCT_UPC_E1_5SUPPS   // UPC E1 with 5 Supps
BCT_TRIOPTIC_CODE_39 // TRIOPTIC CODE 39
BCT_BOOKLAND_EAN    // Bookland EAN
BCT_COUPON_CODE     // Coupon Code
BCT_STANDARD_2OF5   // Standard 2 of 5
BCT_CODE_11_TELPEN // Code 11 Telpen
BCT_CODE_32         // Code 32
BCT_DELTA_CODE      // Delta Code
BCT_LABEL_CODE      // Label Code IV & V
BCT_PLESSEY_CODE    // Plessey Code
BCT_TOSHIBA_CODE    // Toshiba Code China Postal Code / Matrix 2 of 5

```

Return:

UINT: Data length

2.8 Get length of scanned data

Function Description:

Returns the data length of the scan data. When allocate the memory to hold the scan data, add at least one additional byte for string terminator.

Function call:

UINT USI_GetDataLength();

Return:

UNIT: data length

2.9 Get Symbology name

Function Description:

Returns the barcode name of the type.

Function call:

LPCTSTR USI_GetBarcodeName(UINT type, LPBYTE buffer, UINT len);

Parameter: (input)

type: UINT : barcode type. (refer to 0 for type definition)
buffer: LPBYTE : Please refer to below table

| Type | Buffer |
|----------------------|----------------------|
| BCT_CODE_39 | Code 39 |
| BCT_CODABAR | Codabar |
| BCT_CODE_128 | Code 128 |
| BCT_INTERLEAVED_2OF5 | Interleaved 2 of 5 |
| BCT_CODE_93 | Code 93 |
| BCT_UPC_A | UPC A |
| BCT_UPC_A_2SUPPS | UPC A with 2 Supps. |
| BCT_UPC_A_5SUPPS | UPC A with 5 Supps. |
| BCT_UPC_E0 | UPC E |
| BCT_UPC_E0_2SUPPS | UPC E with 2 Supps. |
| BCT_UPC_E0_5SUPPS | UPC E with 5 Supps. |
| BCT_EAN_8 | EAN 8 |
| BCT_EAN_8_2SUPPS | EAN 8 with 2 Supps. |
| BCT_EAN_8_5SUPPS | EAN 8 with 5 Supps. |
| BCT_EAN_13 | EAN 13 |
| BCT_EAN_13_2SUPPS | EAN 13 with 2 Supps. |

| | |
|----------------------|--|
| BCT_EAN_13_5SUPPS | EAN 13 with 5 Supps. |
| BCT_MSI_PLESSEY | MSI Plessey |
| BCT_EAN_128 | EAN 128 |
| BCT_TRIOPTIC_CODE_39 | Trioptic Code 39 |
| BCT_BOOKLAND_EAN | Bookland EAN |
| BCT_COUPON_CODE | Coupon Code |
| BCT_STANDARD_2OF5 | Standard 2 of 5 |
| BCT_CODE_11_TELPEN | Code 11 or Telpen |
| BCT_CODE_32 | Code 32 (Pharmacy Code) |
| BCT_DELTA_CODE | Delta Code |
| BCT_LABEL_CODE | Label Code IV & V |
| BCT_PLESSEY_CODE | Plessey Code |
| BCT_TOSHIBA_CODE | Toshiba Code (China Postal Code), Matrix 25 |

len: **UINT** : length of string on the 2nd parameter buffer

Return:

TRUE: if it found name for the barcode type,
FALSE: if not (type may be wrong)

2.10 Clear scan data system buffer

Function Description:

Reset the data buffer so that next new scan data can come in.

Function call:

```
void USI_ResetData();
```

2.11 Good read indicator

Function Description:

Inform a good receiving of scan data, this will play a sound (wave file scanok.wav) and light the LED lasting for 1 second.

Function call:

```
void USI_ReadOK();
```

Note:

USI will call the function GoodReadLEDOn function exported by the DLL defined in the registry described below (UPI300.DLL is an example) to turn on and off the LED. If the DLL is not defined or the function is not found, USI will bypass the call of GoodReadLEDOn.

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Unitech America Inc.\Scanner\Settings]  
"DILLEDCONTROL"="UPI300.DLL"
```

The function prototype of GoodReadLEDOn is:
VOID WINAPI GoodReadLEDOn(BOOL fon);
Turn on when fon is TRUE, and turn off when fon is FALSE.

2.12 Wait for acknowledgement of the last sent command

Function Description:

Wait for acknowledgement of the last sent command until timeout. It is useful when a serial of commands needs to be sent at a time. Before call USI_SendCommand, call USI_WaitForSendEchoTO to make sure that the previous command is done.

Function call:

```
BOOL USI_WaitForSendEchoTO(DWORD timeout);
```

Parameter: (input)

timeout: DWORD : Specifies the timeout in millisecond.

Return:

Returns FALSE if timeout.

2.13 Save setting to profiles

Function Description:

Save current settings of scanner so that the settings will be persistent when the unit get power off and on again.

Function call:

```
BOOL USI_SaveCurrentSettings();
```

Return :

TRUE: Success,
FALSE: Fail

2.14 Save scanner setting into specified file

Function Description:

Save the current settings to file. The file takes "*.USI" as extension name.

Function call:

BOOL USI_SaveSettingsToFile(LPCTSTR filename)

Parameter: (input)

filename : **LPCTSTR**: file name for setting profile

Return:

TRUE: Success,
FALSE: Fail

2.15 Change scanner setting from specified setting profile

Function Description:

Load and activate the settings from file.

Function call:

BOOL USI_LoadSettingsFromFile(LPCTSTR filename, **BOOL** formulaOnly);

Parameter: (input)

filename: **LPCTSTR** : name of scanner setting profile (*.USI)
formulaOnly: **BOOL**: if TRUE, only data editing formulas are load. The other settings remain unchanged

Return:

TRUE: Success,
FALSE: Fail

2.16 Automatically enable scanner beam with pressing trigger key

Function Description:

Start auto scanning. Scan engine will be automatically triggered on.

Function call:

BOOL USI_StartAutoScan(DWORD interval);

Parameter: (input)

interval: **DWORD**: Specifies the interval in milli-second

Return:

TRUE: Success,
FALSE: Fail

Note:

USI will call the function SetScannerOn function exported by the DLL defined in the registry described below (UPI300.DLL is an example) to start and stop the scanner. If the DLL is not defined or the function is not found, then auto scanning is not available.

```
[HKEY_LOCAL_MACHINE\SOFTWARE\Unitech America Inc.\Scanner\Settings]  
"DLLSCANNERCONTROL"="UPI300.DLL"
```

The function prototype of SetScannerOn is:
VOID WINAPI SetScannerOn(BOOL fon);
Start when fon is TRUE, and stop when fon is FALSE.

2.17 Stop auto scanning function

Function Description:

Stop auto scanning

Function call:

```
void USI_StopAutoScan();
```

2.18 Check if auto scanning is enable

Function Description:

Check if auto scanning function is enabled or not

Function call:

```
BOOL USI_IsAutoScanning()
```

Return:

| | | |
|-------|--------|----------------------------|
| BOOL: | TRUE: | auto-scanning is running |
| | FALSE: | auto-scanning is disabled. |

2.19 Check if Scan2Key.exe program is running or not

Function Description:

Test whether Scan2Key application is running at background. (It doesn't mean Scan2Key is routing scanner input to keyboard, please call [S2K_IsEnabled\(\)](#) to check if routing function is enable or not)

Function call:

```
HWND S2K_IsLoaded();
```

Return:

| | |
|-----------|--|
| NULL: | Scan2Key is not running |
| Non-NULL: | Indicates scan2key is running. It actually returns window handle for scan2key, but it is for internal use – send messages. |

2.20 Test if Scan2Key is enabled

Function Description:

Test whether Scan2Key is enabled. Scan2Key routes scanning input from scanner to keypad buffer, so that barcode data can be input as like from keystrokes on keypad.

Function call:

```
BOOL S2K_IsEnabled();
```

Return:

| | |
|--------|----------|
| TRUE: | Enabled. |
| FALSE: | Disabled |

2.24 Only send single command decoding chip

Function Description:

Send command to decoder chip. This is a variation of command `HAM_SendCommand`. It sends following command to Hamster: (note, only two bytes without BCC)

Esc, 0x80+cmd

Function call:

`BOOL HAM_SendCommand1(BYTE cmd);`

Parameter: (input)

cmd: BYTE: command

Return:

TRUE = indicates the command has been successfully sent to queue to output.

2.25 Send command to decoding chip

Function Description:

Send command to decoder chip. This is a variation of command `HAM_SendCommand`. It will read a number of parameters and packet them as in following format and send it to decoder chip.

Esc, parameter1, parameter2, ..., BCC

The total number of parameters is specified by first parameter num.

Function call:

`BOOL HAM_SendCommand2(BYTE num, BYTE parameter1, ...);`

Parameter: (input)

num: BYTE: number of total parameters
parameter~~x~~ BYTE: Parameter

Return:

TRUE = indicates the command has been successfully sent to queue to output.

2.26 2D imager supporting for PA966/967

2D supporting API is described on individual document. Please get it from http://w3.tw.ute.com/pub/cs/manual/WinCE_programming_manual/2D_Engine_SDK.pdf

3 Control command for decoder chip (Hamser: 1D only)

Important: This chapter describes low level command for scanner control function. If you already USI to do scanner programming, you don't need to care about this chapter. In general, it is not suggested to use level command to control scanner, because there are timing issue on serial communication programming , and it is always need communication expert to do that and it is hard to explain it on document.

When Host prepare to send a command to hamster, it must first check CTS, if CTS is high, then Host must set the RTS to high then clear RTS to low to wake up the Hamster.

| Special Command for control | | |
|-----------------------------|------------------|---|
| command | Format | Comment |
| Control | Esc,80H+SOH(01H) | Let Hamster enter slaving status. At this status Hamster just receives commands and executes it until it receives Release command or timeout (about 10s). Otherwise, the timeout is about 1s as the interval of commands. |
| Release | Esc,80H+EOT(04H) | Let Hamster exit from slaving status. |
| Execute/ Enquiry | Esc,80H+ENQ(05H) | Let Hamster execute the previous saved command and check hamster if there is a result of previous executed command to send to Host. If previous saved command have already executed and no result to send, hamster do not reply until there is a result. If Host receive a result but the BCC is wrong, it can re-send ENQ to re-send result again. |
| ACK | Esc,80H+ACK(06H) | It is from Hamster to Host. If Hamster receive a command and this command do not need send message back, Hamster reply the ACK. |
| NAK | Esc,80H+NAK(15H) | It is from Hamster to Host. Hamster require the Host to re-send command again, normally when received a wrong BCC, it can send the NAK. The Hamster sends back NAK whenever it receives a no sense command. |

COMMAND FROM HOST TO HMASTER

Command format: Esc, Lh, Ll, n, m, S1, ..., Si, BCC

Here: **Esc** is Escape code (H'1B)

Lh/Ll is command's length when the Lh.b7 is 0, Lh is high byte, Ll is low byte, count from n to BCC. When Lh.b7=1 it is a two bytes special command.

n is command ID

m is operation: Normally for setting commands the 0 means setting, 1 default, 2 read current setting, 3 special operation. When m=1 or 2, the S1 should be 0 for bits or one character setting. If the setting is a string, like pre_ambule, the read or default command should not contain any Si byte. The special meaning in a command please refers the command definition.

Si is setting/read data.

BCC: it equals to XOR of all the bytes before the BCC.

Conventions: S1.bj means the number j bit of byte S1.

The expression 1~64:2 means that the number is between 1 and 64, the default is 2.

Notice: Any interval in a command transmit can not exceed 1 second.

| Command | Format | Comment |
|------------------------|--------------------|--|
| Initial/ Warm start | Esc,0,2,0,BCC | Hamster initializes the ports and flags according to the setting in RAM. |
| Default | Esc,0,2,1,BCC | Reset setting in RAM and initialize |
| Mpu_idle | Esc,0,4,2,m,S1,BCC | S1 is 0~3:0 is sleep mode,1 is watch mode, 2 is standby mode. |
| Beep | Esc,0,4,3,m,S1,BCC | S1 0 none,1 low,2 medium,3 high,4 |

| | | |
|---|---|--|
| | | low/high,5high/low |
| block delay | Esc,0,4,4,m,S1,BCC | S1 is 0 10ms,1 50ms,2 100ms,3 500ms,4 1s,5 3s |
| char delay | Esc,0,4,5,m,S1,BCC | S1 is 0 none,1 1ms,2 5ms,3 10ms,4 20ms,5 50ms |
| Function_code | Esc,0,4,6,m,S1,BCC No meaning for you | S1 is 0 off,1_on |
| Capslock | Esc,0,4,7,m,S1,BCC No meaning for you | S1 is 0_auto trace,1 lower case,2 upper case |
| Language | Esc,0,4,8,m,S1,BCC No meaning for you | S1 is 0_U.S.,1 U.K.,2 Swiss,3 Swedish, 4 Spanish,5 Norwegian,6 Italian,7 German,8 French,9 Alt Key Mode,A Danish |
| Baud_rate | Esc,0,4,0D,m,S1,BCC No meaning for you | S1 is 0 300,1 600,2 1200,3 2400,4 4800, 5 9600,6 19200,7 38400 |
| Parity | Esc,0,4,0E,m,S1,BCC No meaning for you | S1 is 0 EVEN,1 ODD,2 MARK,3 SPACE,4_NONE |
| Data_bits | Esc,0,4,0F,m,S1,BCC No meaning for you | S1 is 0 7,1_8BIT |
| Handshake | Esc,0,4,10,m,S1,BCC No meaning for you | S1 is 0_IGNORE,1 RTS ENABLE AT POWERUP,2 RTS ENABLE IN COMMUNICATION |
| Ack_nak | Esc,0,4,11,m,S1,BCC No meaning for you | S1 is 0_OFF,1 ON |
| BCC_char | Esc,0,4,12,m,S1,BCC No meaning for you | S1 is 0_OFF,1 ON |
| Data_direction | Esc,0,4,13,m,S1,BCC No meaning for you | S1 is =0 SEND TO HOST,1 SEND TO HOST AND TERMINAL,2 SEND TO TERMINAL |
| Time_out | Esc,0,4,14,m,S1,BCC No meaning for you | S1 is 0_1S,1 3S,2 10S,3 UNLIMITED |
| Terminator | Esc,0,4,15,m,S1,BCC | S1 is B1B0=0_ENTER(CR/LF),1 FIELD EXIT(CR),2 RETURN(LF),3_NONE |
| Code id | Esc,0,4,16,m,S1,BCC | S1 is 0 OFF,1 ON |
| Verification | Esc,0,4,17,m,S1,BCC | S1 is 0 OFF,1~7 1 to 7 times verification |
| Scan_mode | Esc,0,4,18,m,S1,BCC | S1 is 0 TRIGGER MODE,1 FLASH MODE,2 MULTISCAN MODE,3 ONE PRESS ONE SCAN,4~7 reserved |
| Label type | Esc,0,4,19,m,S1,BCC | S1 is 0 POSITIVE,1 POSITIVE AND NEGATIVE |
| Aim fuction | Esc,0,4,1a,m,S1,BCC | S1 is 0 DISABLE,1 ENABLE |
| Scan_pre_data | Esc,0,L,1b,m,S1,...Si,BCC | Si can be 1 to 8 CHARACTERS |
| Scan_post_data | Esc,0,L,1c,m,S1,...Si,BCC | Si can be 1 to 8 CHARACTERS |
| Define_code39f | Esc,0,4,1d,m,S1,BCC | define Code 39 full ASCII ID:Here S1 is 1 CHARACTER |
| Define_code39s | Esc,0,4,1e,m,S1,BCC | define Code 39 standard ID:Here S1 is 1 CHARACTER |
| Define_EAN13 | Esc,0,4,1f,m,S1,BCC | define EAN13 ID:Here S1 is 1 CHARACTER |
| Define UPCA | Esc,0,4,20,m,S1,BCC | define UPC A ID: Here S1 is 1 CHARACTER |
| Define EAN8 | Esc,0,4,21,m,S1,BCC | define EAN8 ID:Here S1 is 1 CHARACTER |
| Define UPCE | Esc,0,4,22,m,S1,BCC | define UPC E ID:Here S1 is 1 CHARACTER |
| Define I25 | Esc,0,4,23,m,S1,BCC | define I25 ID:Here S1 is 1 CHARACTER |
| Define CDB | Esc,0,4,24,m,S1,BCC | define Codabar ID:Here S1 is 1 CHARACTER |
| Define C128 | Esc,0,4,25,m,S1,BCC | define Code128 ID:Here S1 is 1 CHARACTER |
| Define C93 | Esc,0,4,26,m,S1,BCC | define Code93 ID:Here S1 is 1 CHARACTER |
| Define S25 | Esc,0,4,27,m,S1,BCC | define S25 ID:Here S1 is 1 CHARACTER |
| Define MSI | Esc,0,4,28,m,S1,BCC | define MSI ID:Here S1 is 1 CHARACTER |
| Define C11 | Esc,0,4,29,m,S1,BCC | define Code11 ID:Here S1 is 1 CHARACTER |
| Define C32 | Esc,0,4,2a,m,S1,BCC | define Code32 ID:Here S1 is 1 CHARACTER |
| Define_DELTA | Esc,0,4,2b,m,S1,BCC | define Delta ID:Here S1 is 1 CHARACTER |
| Define_LABEL | Esc,0,4,2c,m,S1,BCC | define Label code ID:Here S1 is 1 CHARACTER |
| Define_PLESSEY | Esc,0,4,2d,m,S1,BCC | define Plessey ID:Here S1 is 1 CHARACTER |
| Define_TELEPEN | Esc,0,4,2e,m,S1,BCC | define Telepen ID:Here S1 is 1 CHARACTER |
| Define_TOSHIBA /Matrix 25, China Postal | Esc,0,4,2f,m,S1,BCC | define Toshiba ID:Here S1 is 1 CHARACTER |
| Define_EAN128 | Esc,0,4,30,m,S1,BCC | define EAN128 ID:Here S1 is 1 CHARACTER;IF H'FF, THEN USE "]C1" |
| Mterminator | Esc,0,4,31,m,S1,BCC No meaning for you | Here S1 is 0_ENTER,1 NONE |
| Sentinal | Esc,0,4,32,m,S1,BCC No meaning for you | S1 is 0 not send,1 send |
| Track_selection | Esc,0,4,33,m,S1,BCC No meaning for you | Here S1 is =0 ALL TRACKS,1 TRACK1 AND TRACK2,2 TRACK1 AND TRACK3,3 TRACK2 AND TRACK3,4 TRACK1,5 TRACK2,6 TRACK3 |

| | | |
|-------------------|---|--|
| T2_account_only | Esc,0,4,34,m,S1,BCC No meaning for you | S1 is 0_NO,1 YES |
| Separator | Esc,0,4,35,m,S1,BCC No meaning for you | S1 is 1 CHARACTER |
| Must_have_data | Esc,0,4,36,m,S1,BCC No meaning for you | S1 is 0 YES,1_NO |
| Track1_sequence | Esc,0,L,37,m,S1,...Si,BCC No meaning for you | Si can be 1 to 16 CHARACTERS |
| Track2_sequence | Esc,0,L,38,m,S1,...Si,BCC No meaning for you | Si can be 1 to 8 CHARACTERS |
| Code39_set | Esc,0,4,39,m,S1,BCC | S1.B0 is for Code39_enable,S1.B1 is for Code39_standard,S1.B3B2 for Code39_cd,S1.B4 Code39_ss |
| Code39_enable | Esc,0,4,3a,m,S1,BCC | S1 is 0 disable,1 enable |
| Code39_sandard | Esc,0,4,3b,m,S1,BCC | S1 is 0 full ASCII,1 standard |
| Code39_cd: | Esc,0,4,3c,m,S1,BCC | S1 is 0 calculate&send,1 calculate¬ send,2 not calculate |
| Code39_ss | Esc,0,4,3d,m,S1,BCC | Here S1 is 0 SS send,1 SS not send |
| Code39_min | Esc,0,4,3e,m,S1,BCC | S1 is 0~48:0 (min<=data len) |
| Code39_max | Esc,0,4,3f,m,S1,BCC | S1 is 0~48:48 (data len<=max) |
| I2of5_set | Esc,0,4,40,m,S1,BCC | S1 is S1.B0 is for I2of5_enable,S1.B1 is for I2of5_fixlength,S1.B3B2 is for I2of5_cd,S1.B5B4 is for I2of5_ss |
| I2of5_enable | Esc,0,4,41,m,S1,BCC | S1 is =0 disable,1 enable |
| I2of5_fixlength | Esc,0,4,42,m,S1,BCC | S1 is =0 on,1 off (record first 3 record len) |
| I2of5_cd | Esc,0,4,43,m,S1,BCC | S1 is =0 calculate&send,1 calculate¬ send,2 no calculation |
| I2of5_ss | Esc,0,4,44,m,S1,BCC | S1 is 0 first digit suppressed,1 last digit suppressed,2 not suppressed |
| I25_min | Esc,0,4,45,m,S1,BCC | S1 is 2~64:10 (min<=data len) |
| I25_max | Esc,0,4,46,m,S1,BCC | S1 is 2~64:64 (data len<=max) |
| S2of5_set | Esc,0,4,47,m,S1,BCC | S1 is S1.b0 is for S2of5_enable,S1.b1 is for S2of5_fixlength,S1.b3b2 is for S2of5_cd |
| S2of5_enable | Esc,0,4,48,m,S1,BCC | S1 is 0 disable,1 enable |
| S2of5_fixlength | Esc,0,4,49,m,S1,BCC | S1 is 0 on,1 off (record first 3 record len) |
| S2of5_cd | Esc,0,4,4a,m,S1,BCC | S1 is 0 calculate&send,1 calculate¬ send, 2 not calculate |
| S25_min | Esc,0,4,4b,m,S1,BCC | S1 is 1~48:4 (min<=data len) |
| S25_max | Esc,0,4,4c,m,S1,BCC | S1 is 1~48:48 (data len<=max) |
| Code32_set | Esc,0,4,4d,m,S1,BCC | S1 is S1.b0 is for Code32_enable,S1.b1 is for Code32_sc,S1.b2 is for Code32_lc |
| Code32_enable | Esc,0,4,4e,m,S1,BCC | S1 is 0 disable,1 enable |
| Code32_sc | Esc,0,4,4f,m,S1,BCC | S1 is 0 leading char send,1 not send |
| Code32_lc | Esc,0,4,50,m,S1,BCC | S1 is 0 tailing char send,1 not send |
| Telepen | Esc,0,4,51,m,S1,BCC | S1 is S1.b0 is for Telepen_enable,S1.b1 is for Telepen_charset |
| Telepen_enable | Esc,0,4,52,m,S1,BCC | S1 is 0 disable,1 enable |
| Telepen_charset | Esc,0,4,53,m,S1,BCC | S1 is 0 standard,1 numeric |
| Ean128 | Esc,0,4,54,m,S1,BCC | S1 is S1.b0 is for Ean128_id, S1.b1 is for Ean128_id |
| Ean128_enable | Esc,0,4,55,m,S1,BCC | S1 is 0 disable,1 enable |
| Ean128_id | Esc,0,4,56,m,S1,BCC | S1 is 0 ID disable,1 ID enable |
| Ean128_func1 | Esc,0,4,57,m,S1,BCC | S1 is 1 char |
| Code128 | Esc,0,4,58,m,S1,BCC | S1 is 0 disable,1 enable |
| Code128_min | Esc,0,4,59,m,S1,BCC | S1 is 1~64:1 (min<=data len) |
| Code128_max | Esc,0,4,5a,m,S1,BCC | S1 is 1~64:64 (data len<=max) |
| Msi_pleasey | Esc,0,4,5b,m,S1,BCC | S1 is S1.b0 is for Msi_p_enable,S1.b1 is for Msi_pleasey_cd, S1.b3b2 is for Msi p cdmode |
| Msi_p_enable | Esc,0,4,5c,m,S1,BCC | S1 is 0_disable,1 enable |
| Msi_pleasey_cd | Esc,0,4,5d,m,S1,BCC | S1 is 0 check digit send,1 not send |
| Msi_p_cdmode | Esc,0,4,5e,m,S1,BCC | S1 is 0 check digit double module 10,1 check digit module 11 plus 10,2 check digit single module 10 |
| Msi_pleasey_min | Esc,0,4,5f,m,S1,BCC | S1 is 1~64:1 (min<=data len) |
| Msi_pleasey_max | Esc,0,4,60,m,S1,BCC | S1 is 1~64:64 (data len<=max) |
| Code93 | Esc,0,4,61,m,S1,BCC | S1 is 0 disable,1_enable |

| | | |
|-----------------------|--------------------------------|--|
| Code93 min | Esc,0,4,62,m,S1,BCC | S1 is 1~48:1 (min<=data len) |
| Code93 max | Esc,0,4,63,m,S1,BCC | S1 is 1~48:48 (data len<=max) |
| Code11 | Esc,0,4,64,m,S1,BCC | S1 is S1.b0 is for Code11_enable,S1.b1 is for Code11 cdnumber,S1.b2 Code11 cdsend |
| Code11_enable | Esc,0,4,65,m,S1,BCC | S1 is 0 disable, 1 enable |
| Code11_cdnumber | Esc,0,4,66,m,S1,BCC | S1 is 0 one check digit,1 two check digits |
| Code11_cdsend | Esc,0,4,67,m,S1,BCC | S1 is 0 check digit send,1 not send |
| Code11 min | Esc,0,4,68,m,S1,BCC | S1 is 1~48:1 (min<=data len) |
| Code11 max | Esc,0,4,69,m,S1,BCC | S1 is 1~48:48 (data len<=max) |
| Codabar_set | Esc,0,4,6a,m,S1,BCC | S1 is S1.b0 is for Codabar_enable, S1.b1 is for Codabar_ss, S1.b3b2 is for Codabar_cd, S1.b4 is for Codabar CLSI |
| Codabar_enable | Esc,0,4,6b,m,S1,BCC | S1 is 0 disable,1 enable |
| Codabar_ss | Esc,0,4,6c,m,S1,BCC | S1 is 0 start&stop char send,1 not send |
| Codabar_cd | Esc,0,4,6d,m,S1,BCC | S1 is 0 check digit calculate&send,1 check digit calculate but not send,2_check digit not calculate |
| Codabar_CLSI | Esc,0,4,6e,m,S1,BCC | S1 is 0 CLSI format on,1 off |
| Codabar min | Esc,0,4,6f,m,S1,BCC | S1 is 3~48:3 (min<=data len) |
| Codabar max | Esc,0,4,70,m,S1,BCC | S1 is 3~48:48 |
| Label_code | Esc,0,4,71,m,S1,BCC | S1 is S1.b0 is for Label_c_enable,S1.b1 is for Label code cd |
| Label_c_enable | Esc,0,4,72,m,S1,BCC | S1 is 0 disable,1 enable |
| Label_code_cd | Esc,0,4,73,m,S1,BCC | S1 is 0 check digit send,1 not send |
| Upc_a_set | Esc,0,4,74,m,S1,BCC | S1 is S1.b0 is for Upc_a_enable,S1.b1 is for Upc a ld,S1.b2 is for Upc a cd |
| Upc_a_enable | Esc,0,4,75,m,S1,BCC | S1 is 0 disable,1 enable |
| Upc a ld | Esc,0,4,76,m,S1,BCC | S1 is 0 leading digit send,1 not send |
| Upc a cd | Esc,0,4,77,m,S1,BCC | S1 is 0 check digit send,1 not send |
| Upc_e_set | Esc,0,4,78,m,S1,BCC | S1 is S1.b1 is for Upc_e_enable,S1.b2 is for Upc_e_ld,S1.b3 is for Upc_e_cd,S1.b4 is for Upc e expand,S1.b0 is for Upc e nsc |
| Upc_e_enable | Esc,0,4,79,m,S1,BCC | S1 is 0 disable,1 enable |
| Upc e ld | Esc,0,4,7a,m,S1,BCC | S1 is 0 leading digit send,1 not send |
| Upc e cd | Esc,0,4,7b,m,S1,BCC | S1 is 0 check digit send,1 not send |
| Upc_e_expand | Esc,0,4,7c,m,S1,BCC | S1 is 0 zero expansion on,1 off |
| Upc e nsc | Esc,0,4,7d,m,S1,BCC | S1 is 0 disable,1 enable |
| Ean_13_set | Esc,0,4,7e,m,S1,BCC | S1 is S1.b0 is for Ean_13_enable,S1.b1 is for Ean_13 ld,S1.b2 is for Ean_13_cd,S1.b3 is for Ean_13 bookland |
| Ean_13_enable | Esc,0,4,7f,m,S1,BCC | S1 is 0 disable,1 enable |
| Ean_13 ld | Esc,0,4,80,m,S1,BCC | S1 is 0 leading digit send,1 not send |
| Ean_13 cd | Esc,0,4,81,m,S1,BCC | S1 is 0 check digit send,1 not send |
| Ean_13_bookland | Esc,0,4,82,m,S1,BCC | S1 is 0 bookland EAN enable,1 disable |
| Ean_8_set | Esc,0,4,83,m,S1,BCC | S1 is S1.b0 is for Ean_8_enable,S1.b1 is for Ean_8 ld,S1.b2 is for Ean_8 cd |
| Ean_8_enable | Esc,0,4,84,m,S1,BCC | S1 is 0 disable,1 enable |
| Ean_8 ld | Esc,0,4,85,m,S1,BCC | S1 is 0 leading digit send,1 not send |
| Ean_8 cd | Esc,0,4,86,m,S1,BCC | S1 is 0 check digit send,1 not send |
| Supplement_set | Esc,0,4,87,m,S1,BCC | S1 is S1.b0 is for Supplement_two, s1.b1 is for Supplement_five,S1.b2 is for Supplement mh, S1.b3 is for supplement ssi. |
| Supplement_two | Esc,0,4,88,m,S1,BCC | S1 is 0 off,1 on |
| Supplement_five | Esc,0,4,89,m,S1,BCC | S1 is 0 off,1 on |
| Supplement_mh | Esc,0,4,8a,m,S1,BCC | S1 is 0 transmit if present,1 must present |
| Supplement_ssi | Esc,0,4,8b,m,S1,BCC | S1 is 0 Space been inserted, 1_Space not been inserted |
| Delta_code_set | Esc,0,4,8c,m,S1,BCC | S1 is S1.b0 is for Delta c_enable,S1.b1 is for Delta code cdc,S1.b2 is for Delta code cds |
| Delta_c_enable | Esc,0,4,8d,m,S1,BCC | S1 is 0 disable,1 enable |
| Delta_code_cdc | Esc,0,4,8e,m,S1,BCC | S1 is 0 check digit calculate,1 not calculate |
| Delta_code_cds | Esc,0,4,8f,m,S1,BCC | S1 is =0 check digit send,1 not send |
| Get version | Esc,0,3,90,2,BCC | Get firmware version. |
| DumpSetting | Esc,Lh,Ll,91,m,S1.. .Si,BCC | Lh/Ll is command length. Si is in the range of s1 to S255.m=0 is download setting, m=1 is |

| | | |
|---|---------------------------------|---|
| | | <p>reset the setting area into FF. m=2 is upload setting. Actually you just need the format as bellow: Download: Esc,1,02,91,0,s1,...,s255,BCC Upload: Esc,0,3,91,2,BCC</p> |
| EAN128Brace Remove | Esc,0,4,92,m,S1,BCC | S1 is =0_disable,1 enable (Remove the brace) |
| AimingTime | Esc,0,4,93,m,S1,BCC | S1 is =0 0.5s,1 1s,2 1.5s 3 2s |
| | | |
| Exchange data | Esc,Lh,Ll,a3,S1,S2,....,Sn, BCC | <ul style="list-style-type: none"> Expect Acknowledge (Esc,80H+ACK(06H)) Exchange the data between the host and the ICC. Expected return after issuing Execute/Enquiry command are: Esc,Lh,Ll,0xa3,AH,data,BCC Here: AH=0 Success =1 Timeout =2 No card present data: Response data and status word |
| <p>Note: Hamster save these commands to buffer and do not execute until it receives an Execute command (Esc,ENQ). Hamster execute the command after receive an "Esc,ENQ" then send back a reply. The Max. Length of data is 264. The m and the reply define as following:</p> | | |
| | | |
| | | |
| | | |

| DATA TO HOST FROM HAMSTER | | | | | |
|--|--------------------------------|-------------|-------------|-------------|-------------|
| Data format: Code_number,Lh,Ll,string | | | | | |
| Here: The Lh/Ll is string length, Lh is high byte, Ll is low byte, The string length is excluded the Code_number and Lh/Ll. The string contains the Code ID, pre_amble, scanned_data,post_amble, and terminator. Code_number is equal to following number plus H'80. | | | | | |
| 0 Code 39 full ASCII | 1 Code 39 standard or EDP Code | 2 EAN 13 | 3 UPC A | | |
| 4 EAN 8 | 5 UPC E | 6 I25 | 7 Codabar | 8 Code 128 | 9 Code 93 |
| 10 S25 | 11 MSI | 12 EAN 128 | 13 Code 32 | 14 Delta | 15 Label |
| 16 Plessey | 17 Code 11 | 18 Toshiba | 19 reserved | 20 Track 1 | 21 Track 2 |
| 22 Track 3 | 23 More than 1 track | 24 reserved | 25 RS232 | 26 reserved | 27 reserved |
| 28 reserved | 29 reserved | 30 reserved | 31 reserved | 32 reserved | 33 reserved |

4 Scanner3.DLL – Backward compatible API for PT930/PT930S’s Scanner3.dll

“Scanner3.lib” and “scanner3.h” are necessary files for VC programming to compile application. You can find it from standard LIB and INCLUDE folder after installed SDK.

4.1 Enable Decoder

Function Description:

This function will open COM2 port, create a thread to get any barcode input from Decoder Chip, and then store input data in the system buffer. Application can use function call **PT_GetBarcode()** to get input data from the system buffer.

Function call:

```
INT PT_EnableBarcode(VOID);
```

Return code:

=1 Create new thread fail
=2 Cannot re-enable
=3 Cannot open COM2
=4 Upload parameter from Hamster fail
=0 OK

4.2 Disable Decoder

Function Description:

This function will close COM2 port and then remove thread which is created by **PT_EnableBarcode()**

Function call:

```
VOID PT_DisableBarcode( VOID );
```

4.3 Check barcode input

Function Description:

This function is used to check whether there is available barcode data on system buffer which is successfully decoded by decoder chip.

Function call:

```
BOOL PT_CheckBarcode( VOID );
```

Return code:

TRUE = There is input data on system buffer.
FALSE = There is no data on system buffer.

4.4 Read barcode data

Function Description:

Get input barcode data and its type from system buffer.

Function call:

```
BOOL PT_GetBarcode( TCHAR *szBarcodeBuffer,TCHAR *cType);
```

Parameter: (output)

szBarcodeBuffer : string buffer for storing input data

cType : Type of Input data

| | |
|------|--------------|
| =00H | Full Code 39 |
| =01H | STD Code 39 |
| =02H | EAN-13 |
| =03H | UPC-A |
| =04H | EAN-8 |
| =05H | UPC-E |
| =06H | I-25 |
| =07H | CODABAR |
| =08H | Code 128 |
| =09H | Code 93 |
| =0Ah | STD 25 |
| =0BH | MSI |
| =0CH | EAN-128 |
| =0DH | Code 32 |
| =0EH | DELTA |
| =0FH | LABEL |
| =10H | PLESSEY |
| =11H | Code 11 |
| =12H | TOSHIBA |

Return code:

TRUE = There is barcode input

FALSE = No Barcode Input

4.5 Get DLL version no

Function description:

This function is used to get DLL version no.

Function call:

```
INT PT_DllVersion(void);
```

Return :

Integer

4.6 Reset all symbologies to default

Function Description:

This function call will reset decoder chip's symbologies setting to system default value

Function call for VC:

```
int PT_SetToDefault (VOID)
```

Function call for VB:

```
PT_SetToDefault
```

5 ***ScanKey3.DLL – Backward compatible API for PT930/PT930S's ScanKey3.dll***

In Technical Binder CD, you can get this file from folder \Programming\scankey. In this folder can also find extra 3 files.

"Scankey3.lib" Used for VC programming
"Scankey3.h" Used for VC programming

5.1 ***Enable Decoder***

Function Description:

This function will open COM2 port, create a thread to get any barcode input from Decoder Chip, and then send scanner data to keyboard buffer. User application can get input data just like standard keyboard input.

Function call for VC:

int PT_EnableBarToKey(VOID)

Return code:

=1 Create new thread fail
=2 Can not re-enable
=3 Can not open COM2
=4 Upload parameter from Hamster fail
=0 OK

5.2 ***Disable Decoder***

Function Description:

This function will close COM2 port and then remove thread which is created by **PT_EnableBarToKey()**

Function call for VC:

VOID PT_DisableBarToKey (VOID)

5.3 ***Get DLL version no***

Function description:

This function is used to get DLL version number.

Function call for VC:

int PT_Version(void);

Return :

Integer

5.4 ***Disable laser trigger key***

Function Description:

This function only stop trigger key to activate laser beam, so COM2 port is still open. This function call is useful when some fields is only allow keyboard input.

Function call for VC:

int PT_StopScan (VOID)

5.5 ***Enable laser trigger key***

Function Description:

This function only stop trigger key to activate laser beam, so COM2 port is still open. This function call is useful when some fields is only allow keyboard input..

Function call for VC:

int PT_StartScan (VOID)

5.6 Reset all symbologies to default

Function Description:

This function call will reset decoder chip's symbologies setting to system default value

Function call for VC:

int PT_SetToDefault (VOID)

Function call for VB:

PT_SetToDefault

6 **UnitechAPI.DLL**

In HT6XX/PA96x/PA982, Unitech create UnitechAPI.DLL to provide some special function call which are different from standard Microsoft API. For example, RS232 is defined as host communication port with PC via ActiveSync, so it will automatically invoke ActiveSync program to do communication with PC when RS232 cable is plugged into HT6XX/PA96x/PA982. However, it will make RS232 port useless if user want to connect HT6XX/PA96x/PA982 with any device with RS232 interface. RS232Event.DLL provides function call for user to disable ActiveSync function over RS232 port to let user directly control RS232 port.

Unitech also provide several function to enable/disable several system icon and task bar. For WinCE system, it just like Windows OS platform, user can directly tap "Start" button from task bar to setup terminal or execute any application on WinCE terminal, so it mean that operator can change, modify or delete any setting. If system developer don't want operator to do any extra operation beside application, Unitech provide function call to provides ability to disable/enable task bar, keyboard and etc.

You can get demo program from HT6XX/PA96x/PA982 technical binder zip files from \programming\UnitechAPI

6.1 **Disable ActiveSync**

Function Description:

After called this function, HT6XX/PA96x/PA982 will not automatically execute ActiveSync program("repllog.exe") when user plug RS232 cable into HT6XX/PA96x/PA982.

Function call:

BOOL RS232EventEnable (VOID);

Return code:

=TRUE OK
=FALSE Fail

6.2 **Enable ActiveSync**

Function Description:

After called this function, HT6XX/PA96x/PA982 will automatically execute ActiveSync program ("repllog.exe") again when user plug RS232 cable into HT6XX/PA96x/PA982.

Function call:

BOOL RS232EventEnable (LPTSTR);

Parameter (Input):

String buffer and content should be "REPLLOG.EXE". If user assign other program, it will invoke user defined program rather than "REPLLOG.EXE"

Return code:

=1 OK
=2 File not found

6.3 **Suspend**

Function Description:

After called this function, HT6XX/PA96x/PA982 will automatically suspend itself.

Function call:

void Suspend (void);

6.4 **Disable TaskBar**

Function Description:

This function will hide "TaskBar" and it doesn't like "Auto Hide" function which is set from **Start → Settings → TaskBar**. "TaskBar" can not be show again when tap button of LCD screen. It need to execute "Enable_TaskBar()" to enable it again

Function call:

BOOL DisableTaskbar (VOID);

Return code:

=TRUE OK
=FALSE Fail

6.5 **Enable TaskBar**

Function Description:

This function will show "TaskBar" again after "Disable_TaskBar()" was executed to hide taskbar.

Function call:

BOOL EnableTaskbar (VOID);

Return code:

=TRUE OK
=FALSE Fail

6.6 **Disable Desktop**

Function Description:

This function will hide all icons on desktop, it mean that any short-cut or files cannot be accessed or executed.

Function call:

BOOL DisableDesktop (VOID);

Return code:

=TRUE OK
=FALSE Fail

6.7 **Enable Desktop**

Function Description:

This function will show all icons which had already showed on desktop before executed DisableDesktop().

Function call:

BOOL EnableDesktop (VOID);

Return code:

=TRUE OK
=FALSE Fail

6.8 Disable toolbar on windows explorer

Function Description:

This function will hide windows explorer's toolbar

Function call:

BOOL DisableExploreToolbar (VOID);

Return code:

=TRUE OK
=FALSE Fail

6.9 Enable toolbar on windows explorer

Function Description:

This function will enable windows explorer's toolbar again

Function call:

BOOL EnableExploreToolbar (VOID);

Return code:

=TRUE OK
=FALSE Fail

6.10 Disable Connection

Function Description:

This function will disable the specify connection in "Settings\Network and Dial-up Connections".

Function call:

BOOL DisableConnection (LPTSTR);

Parameter (Input):

Specify the connection name in parameter.

Return code:

=TRUE Success
=FAULE Fail

6.11 Enable Connection

Function Description:

This function will enable the specify connection in "Settings\Network and Dial-up Connections".

Function call:

BOOL EnableConnection (LPTSTR);

Parameter (Input):

Specify the connection name in parameter.

Return code:

=TRUE Success
=FAULE Fail

7 **SysIOAPI.DLL**

This DLL provide hardware relative API for user to control scanner, LED, back-light and PC card slot. API functions are provided through DLL to assist programmer to write application for HT6XX/PA96x/PA982. Two files are essential and provided in SDK, SysIOAPI.LIB and SysIOAPI.H.

7.1 **Keypad Related Functions**

7.1.1 **Get CAPS lock status** *(This function call is reserved for OS using, it is not suggested to be used on application if you are not fully understand OS operation behavior)*

Function Description:

To check if CAPS is lock or unlock

Function call:

BOOL GetCapsLock(void)

Return code:

| | | |
|-------|--------|-------------|
| BOOL: | TRUE: | CAPS lock |
| | FALSE: | CAPS unlock |

7.1.2 **Get SHIFT status** *(This function call is reserved for OS using, it is not suggested to be used on application if you are not fully understand OS operation behavior)*

Function Description:

To check if SHIFT key is lock or not

Function call:

BOOL GetShift(void)

Return code:

| | |
|--------|--------------|
| TRUE: | Shift lock |
| FALSE: | Shift unlock |

7.1.3 **Get keypad type** *(This function call is reserved for OS using, it is not suggested to be used on application if you are not fully understand OS operation behavior)*

Function Description:

HT680/PA962/PA982 only have 22 keys configuration, PA96x will have two keypad type, 22 keys and 36 keys. In HT660, there is only 36 keys configuration. The following function returns current keypad type.

Function call:

int GetKeypadType(void)

Return code:

0 = no keypad
1 = 22-key keypad (For HT680/PA962/PA966/PA982 using)
2 = 36-key keypad (For PA966/HT660 using)

7.1.4 Disable/enable power button

Function Description:

To enable / disable power button

Function call:

void DisablePowerButton(BOOL)

Parameter (Input)

TRUE = Disable power button.

FALSE = Enable power button.

7.1.5 Set keypad utility input mode

Function Description:

In terminal, there is a utility to emulate full alpha key input, called GetVK. The input mode can be switched by pressing "alpha" key, or by following function.

Function call:

void SetGetVKWorkingMode(int)

Parameter (input)

For HT660 :

0 = normal

1 = lower case.

2 = upper case.

For HT680/PA96x/PA982

0 = hide the selection window.

1 = show lower case selection window.

2 = show upper case selection window.

7.1.6 Get keypad utility input mode (For HT660 only)

Function Description:

This function is used to check alpha key input mode.

Function call:

BYTE GetAlphaKeyWorkingMode(void);

Return code:

0 = normal .

1 = lower case.

2 = upper case.

7.1.7 Check Alpha key is pressing (For HT680/PA96x/PA982 only)

Function Description:

This function is used to check if alpha key is pressed or not.

Function call:

BOOL GetKeypadAlphaStatus(void);

Return code:

TRUE = Alpha key is pressed.

FALSE = Alpha key is released.

7.1.8 Check Function key status (For HT680/PA968 only)

Function Description:

This function is used to check if function key is enabled or not.

Function call:

```
BOOL GetFnKeyStatus(void);
```

Return code:

TRUE = Function key is enabled.

FALSE = Function key is enabled.

7.1.9 Enable/Disable Function key (For HT680/PA968 only)

Function Description:

This function is used to enabled/disable function key.

Function call:

```
void SetFnKeyDisable(BOOL bOff);
```

Return code:

TRUE = Disable function key.

FALSE = Enable function key.

7.2 Scanner Related Functions

To save power, the decoder IC is disabled when scanner is not in use. It can be enabled through USI functions. Following functions are meaningful only if decode IC is enabled.

7.2.1 Enable/Disable Scanner trigger key

Function Description:

This function enables/disables trigger keys.

Function call:

void EnableScannerTrigger(BOOL fOn)

Parameter (Input)

fON: BOOL: TRUE = enable trigger keys.
 FALSE = disable trigger keys.

7.2.2 Turn on/off Scan Engine

Function Description:

This function emulates trigger keys to turn scan engine on or off. It functions even if trigger keys are disabled.

Function call:

void SetScannerOn(BOOL fON)

Parameter(Input)

fON: BOOL: TRUE = turn scan engine on.
 FALSE = turn scan engine off.

7.2.3 Get Trigger keys Status

Function Description:

This function returns enable/disable status of trigger keys.

Function call:

BOOL GetScannerTrigger(void)

Return code:

TRUE = trigger keys are enabled.
FALSE = trigger keys are disabled.

7.2.4 Get Scanner Status

Function Description:

This function returns the status of scan engine, or trigger key.

Function call:

BOOL GetScannerStatus(void)

Return code:

TRUE = scan engine is on, or trigger key is pressed.
FALSE = scan engine is off, or trigger key is released.

7.2.5 Control trigger key's key event. (FOR PA96x/PA982 Only)

Function Description:

This function is used to inform system if necessary to generate key event for trigger key.

Function call:

```
void EnableTriggerKeyEvent(BOOL fON)
```

Parameter(Input)

fON: BOOL: TRUE = Enable key event.
 False = Don't generate key event.

Note:

Trigger key activity will generate an event named TEXT("KeybdTriggerChangeEvent"). Fast, repeated event generation may cause some trouble for AP. By passing FALSE to this function can prevent upcoming event generation.

7.2.6 Check Trigger key is pressing

Function Description:

This function is used to check if left or right trigger key is pressed or not.

Function call:

```
BOOL TriggerKeyStatus( int key);
```

Parameter(Input)

key: int: LEFT_TRIGGER_KEY : left trigger key
 RIGHT_TRIGGER_KEY : right trigger key.

Return code:

TRUE = trigger is pressed.
FALSE = trigger is released.

Example:

```
#define kKeybdTriggerEventName            TEXT("KeybdTriggerChangeEvent")
#define kKeybdAlphaKeyEventName         TEXT("KBDAlphaKeyChangeEvent")
#define LEFT_TRIGGER_KEY    1
#define RIGHT_TRIGGER_KEY  2

gKeyEvents[0] = CreateEvent(NULL, TRUE, FALSE, kKeybdTriggerEventName);
gKeyEvents[1] = CreateEvent(NULL, TRUE, FALSE, kKeybdAlphaKeyEventName);

while (1)
{
    WaitForMultipleObjects(2, gKeyEvents, FALSE, INFINITE);

    TriggerKeyStatus(LEFT_TRIGGER_KEY);
    TriggerKeyStatus(RIGHT_TRIGGER_KEY);
}
```

7.3 **LED related function**

Function Description:

There are two LEDs above the screen of HT6XX/PA96x/PA982, red and green LEDs. Only the green LED can be controlled by programmer.

Function call:

```
void GoodReadLEDOn(BOOL fON)
```

Parameter(Input)

fON: BOOL: TRUE = turn on LED.
 FALSE = turn off green LED.

7.4 **Backlight related function**

There are two backlight controls, screen backlight and keypad backlight. They are controlled separately. For screen backlight, you can adjust brightness of backlight also.

7.4.1 Screen Backlight Control

Function Description:

This function turns screen backlight on or off.

Function call:

```
void BacklightOn(BOOL fON)
```

Parameter(Input)

fON: BOOL: TRUE = turn on screen backlight.
 FALSE= turn off backlight.

7.4.2 Get Screen Backlight Status

Function Description:

This function returns the status of screen backlight.

Function call:

```
BOOL GetBacklightStatus(void)
```

Return code:

TRUE = screen backlight is on.
FALSE = screen backlight is off.

7.4.3 Keypad Backlight Control (For HT680/PA96x/PA982 only)

Function Description:

This function turns keypad backlight on or off.

Function call:

```
void KeypadLightOn(BOOL fON)
```

Parameter(Input)

fON: BOOL: TRUE = turn on keypad backlight.
 FALSE = turn off backlight.

7.4.4 Get Keypad Backlight Status **(For HT680/PA966/PA962/PA982 only)**

Function Description:

This function returns the status of keypad backlight.

Function call:

BOOL GetKeypadLightStatus(void)

Return code:

TRUE = keypad backlight is on.

FALSE = keypad backlight is off.

7.4.5 Screen Backlight Brightness Control

Function Description:

This function adjusts screen backlight brightness.

Function call:

void BrightnessUp(BOOL fup)

Parameters(Input)

Fup: BOOL: TRUE = adjust one step up.
 FALSE = adjust one step down.

7.5 SD slot related functions **(For HT680/Pa968 Only)**

7.5.1 Inquire SD slot status

Function Description:

This function returns SD slot enable/disable status.

Function call:

BOOL GetSDStatus()

Return code:

TRUE = Slot is enabled.

FALSE = Slot is disabled.

7.5.2 Enable/Disable SD Slot

Function Description:

This function enables/disables SD slot.

Function call:

void EnableSDSlot(BOOL bEnable);

Parameters(Input)

bEnable: BOOL: TRUE = Enable slot.
 FALSE = Disable slot.

7.6 Enable/Disable Vibration **(For HT680/PA968 Only)**

Function Description:

This function enables/disables vibration.

Function call:

void VibrationOn(BOOL bEnable);

Parameters(Input)

bEnable: BOOL: TRUE = On.
 FALSE = Off.

7.8.2 Enable/Disable PCMCIA or CF slot

Function Description:

This function enables/disables PCMCIA or CF slot. PA96x/PA982 assigns physical slot 0 to CF and slot1 to PCMCIA, which is reversed compared with previous products. The following function is kept for compatible reason. It takes the same uSocket value as previous products, but reversed internally.

Function call:

```
void EnablePCMCIASlot(UINT uSocket, BOOL bEnable)
```

Parameters(Input)

| | | |
|-----------|-------|---|
| uSocket: | UINT: | 0 = PCMCIA slot. <i>(PA962/PA966/PA982 only)</i> 1 = Compact flash slot. |
| bEnable : | BOOL: | TRUE = enable specified slot. FALSE = disable specified slot. |

7.8.3 Enable/Disable IO slots

Function Description:

This function enables/disables IO slots. It is recommended to use with function GetPCMCIASlotID() for platform independent reason.

Function call:

```
void EnablePCMCIASlot1(UINT uSocket, BOOL bEnable)
```

Parameters(Input)

| | | |
|-----------|-------|--|
| uSocket: | UINT: | slot to be applied. |
| bEnable : | BOOL: | TRUE = enable specified slot. FALSE = disable specified slot. |

Example

```
To disable PCMCIA slot and enable CF slot,  
#define PCMCIA_SOCKET 0 (PA966/PA962/PA982 only)  
#define CF_SOCKET 1  
EnablePCMCIASlot1(GetPCMCIASlotID(PCMCIA_SLOT),FALSE);  
EnablePCMCIASlot1(GetPCMCIASlotID(CF_SLOT),TRUE);
```

7.8.4 Inquire PCMCIA/CF slot status

Function Description:

This function returns PCMCIA/CF slot enable/disable status. Terminal assigns physical slot 0 to CF and slot1 to PCMCIA, which is reversed compared with previous products. The following function is kept for compatible reason. It takes the same uSocket value as previous products, but reversed internally.

Function call:

```
BOOL GetPCMCIAStatus(UINT uSocket)
```

Parameters(Input)

| | | |
|----------|-------|---|
| uSocket: | UINT: | 0 = PCMCIA slot. <i>(PA966/PA962/PA982 only)</i> 1 = Compact flash slot. |
|----------|-------|---|

Return

| | | |
|-----------|-------|---|
| bEnable : | BOOL: | TRUE = Slot is enabled. FALSE = Slot is disable. |
|-----------|-------|---|

7.8.5 Inquire IO slot status

Function Description:

This function returns slot enable/disable status. It is recommended to use with function GetPCMCIASlotID() for platform independent reason.

Function call:

```
BOOL GetPCMCIAStatus1(UINT uSocket)
```

Parameters(Input)

| | | |
|----------|-------|---------------------|
| uSocket: | UINT: | slot to be applied. |
|----------|-------|---------------------|

Return

| | | |
|-----------|-------|---|
| bEnable : | BOOL: | TRUE = specified slot is enabled. FALSE = specified slot is disable. |
|-----------|-------|---|

Example

```
To check PCMCIA slot status,  
#define PCMCIA_SOCKET      0 (PA966/PA962/PA982 only)  
#define CF_SOCKET          1  
  
if (GetPCMCIAStatus1(GetPCMCIASlotID(PCMCIA_SLOT)))  
{  
}
```

7.8.6 Disable PCMCIA/CF slot when resume

Function Description:

This function will disable the specified slot after resume even though that slot is enabled before suspend.

Function call:

```
void DisablePCMCIAUponResume( UINT uSocket, BOOL bDisable);
```

Parameters(Input)

| | | |
|-----------|-------|--|
| uSocket: | UINT: | 1 = physical socket 1 0 = for physical socket 0 |
| bDisable: | BOOL: | TRUE disable on resume FALSE enable on resume |

7.9 Check battery type

Function Description:

Check if HT6xx/PA96x/PA982 is installed smart battery and battery ID.

Function call:

```
BYTE GetSmartBatteryID(void);
```

Return

| | |
|-------|---------------------|
| 0 | : Not Smart Battery |
| Other | : Smart battery it |

7.10 Enable/Disable LCD screen

Function Description:

Turn on / off LCD screen

Function call:

```
void PowerOnColorLCD(BOOL fON)
```

Parameters(Input)

| | | |
|------|-------|------------------------------|
| fON: | BOOL: | TRUE = Power on LCD screen |
| | | FALSE = Power off LCD screen |

8 BlueTooth relative API - BTAPI.DLL

This DLL provide BlueTooth relative API. Two files are essential and provided in SDK, BTAPI.LIB and BTAPI.H.

8.1 Enable/Disable Bluetooth Power status

Function Description:

Enable Bluetooth Module Power ON/OFF

Function call:

void BT_PowerEnable (BOOL bEnable)

Parameter (Input)

bON: BOOL: TRUE = Enable
 FALSE = Disable

8.2 Get BT Power status

Function Description:

Get Bluetooth Module Power Status

Function call:

BYTE BT_PowerStatus (void)

Return code:

BYTE: 1 = Bluetooth Module is Power ON
 0 = Bluetooth Module is Power OFF

8.3 DLL Version

Function Description:

Get BTAPI.dll Version

Function call:

DWORD BT_DllVersion (void)

Return code:

DWORD: Version number

9 ***RH767 HF reader***

To programming RH767 HF reader, it needs C++ library. Please get it from below URL.
http://w3.adc.unitech.com.tw/pub/cs/SDK/RH767/RFID_SDK.zip

And get the sample program from the link.

http://w3.tw.ute.com/pub/cs/software/RFID/HF/RFID_HF.zip

9.1 ***General Function***

9.1.1 ***Get library version***

Function Description:

To get the library version.

Function Call:

```
INT32 RDINTsys_GetAPIVersionString (LPWSTR strVersion);
```

Parameter:

strVersion: Get the library version.

Return code:

Please refer to section 9.5.

9.1.2 ***Connect to RFID reader***

Function Description:

To create a connection with the reader before control it.

Function Call:

```
INT32 RDINTsys_OpenReader (BYTE u8COMPort , UINT32 u32Baudrate , CONST LPTSTR  
strAccessCode , BYTE u1SecurityMode , UINT32 u32OpenDelayMs , PUINT32 pu32Baudrate)
```

Parameter:

| | |
|-----------------|--|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u32Baudrate: | The reader's baud rate and the default is 19200.It supports 9600, 19200, 38400 and 115200. |
| strAccessCode: | The reader's access code, default is "00000000" |
| u1SecurityMode: | To set use security mode or not. TURN_ON : Open. TURN_OFF : Close. |
| u32OpenDelayMs: | The delay time for wait reader initial, we suggest this value is 700. |
| pu32Baudrate: | Receive the current reader's baud rate, if it is NULL then it will not receive the value. |

Return code:

Please refer to section 9.5.

9.1.3 ***Close Reader***

Function Description:

To finish controlling the reader.

Function Call:

```
INT32 RDINTsys_CloseReader (BYTE u8COMPort);
```

Parameter:

u8COMPort: The reader's COM port number (1 – 255)

Return code:

Please refer to chapter 9.5.

9.1.4 Select Card type

Function Description:

This API change the reader working type with different card type and this should be called before read the card.

Function Call:

INT32 RDINT_WorkingType (BYTE u8COMPort, BYTE u8Type);

Parameter:

| | |
|------------|--|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Type: | WT_ISO14443_TypeA WT_ISO14443_TypeB WT_ISO15693 WT_SR176_SRIX4K |

Return code:

Please refer to section 9.5.

9.1.5 Get Reader Information

Function Description:

Get the reader's serial number and firmware version.

Function Call:

INT32 RDINTv2_ReaderInfo (BYTE u8COMPort, LPBYTE pu8SerialNum, LPBYTE pu8FirmwareVer);

Parameter:

| | |
|-----------------|--|
| u8COMPort: | The reader's COM port number (1 – 255) |
| pu8SerialNum: | Get reader's serial number (Length: READER_SERIAL_LEN) |
| pu8FirmwareVer: | Get reader's firmware version (Length: FIRMWARE_VER_LEN) |

Return code:

Please refer to section 9.5.

9.1.6 Antenna Control

Function Description:

Enable/Disable antenna to save power.

Function Call:

INT32 RDINTv2_AntennaControl (BYTE u8COMPort, BYTE u8Select);

Parameter:

| | |
|------------|---|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Select: | ANTENNA_ON Open the antenna ANTENNA_OFF Close the antenna AUTO_POWER_LOW Auto turn to low power mode. POWER_LOW Manually turn to low power mode. |

Return code:

Please refer to section 9.5.

9.2 ISO-15693

9.2.1 Inventory

Function Description:

Set the card to StayQuiet mode and return the card ID.

Function Call:

INT32 RDINT_ISO15693Inventory(BYTE u8COMPort, BYTE u8Flag, BYTE u8Afi, BYTE u8MaskLen, LPBYTE pu8Mask, LPBYTE pu8Dsfid, LPBYTE pu8Uid);

Parameter:

| | |
|------------|---|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| u8Afi: | Application Family Identifier parameter, please refer to ISO15693 document |
| u8MaskLen: | The mask length indicates the number of significant bits of the mask value. It can have any value between 0 and 60 when 16 slots are used and any value between 0 and 64 when 1 slot is used. LSB shall be transmitted first. |
| pu8Mask: | The mask value is contained in an integer number of bytes. LSB shall be transmitted first. |
| pu8Dsfid: | The Data Storage Format Identifier parameter, please refer to ISO15693 document. |
| pu8Uid: | The point of the buffer which to receive the tag ID. |

Return code:

Please refer to section 9.5.

9.2.2 Set StayQuiet Mode

Function Description:

Set the card to StayQuiet mode.

Function Call:

INT32 RDINT_ISO15693StayQuiet(BYTE u8COMPort, BYTE u8Flag, LPBYTE pu8Uid);

Parameter:

| | |
|------------|---|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contain the tag ID. |

Return code:

Please refer to section 9.5.

9.2.3 Set Select Mode

Function Description:

Set the card to Select mode.

Function Call:

INT32 RDINT_ISO15693Select(BYTE u8COMPort, BYTE u8Flag, LPBYTE pu8Uid);

Parameter:

| | |
|------------|---|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contains the tag ID. |

Return code:

Please refer to section 9.5.

9.2.4 Set Ready Mode

Function Description:

Set the card to Ready mode for StayQuiet or Select mode.

Function Call:

INT32 RDINT_ISO15693Reset2Ready(BYTE u8COMPort, BYTE u8Flag, LPBYTE pu8Uid);

Parameter:

| | |
|------------|---|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contains the tag ID. |

Return code:

Please refer to section 9.5.

9.2.5 Read The Block Data form ISO15693 Tag

Function Description:

Read the block data from the specific ISO15693 tag.

Function Call:

INT32 RDINT_ISO15693Read(BYTE u8COMPort, BYTE u8Flag, LPBYTE pu8Uid, BYTE u8BlockStart, BYTE u8BlockCount, LPBYTE pu8Data);

Parameter:

| | |
|---------------|---|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contains the tag ID. |
| u8BlockStart: | The first block which you want to read(ex : 0, 1, 2...). |
| u8BlockCount: | The number of blocks which you want to read. |
| pu8Data: | The point of the buffer which receive the block data. |

Return code:

Please refer to section 9.5.

9.2.6 Write The Block Data to ISO15693 Tag

Function Description:

Write the block data to the specific ISO15693 tag.

Function Call:

INT32 RDINT_ISO15693Write(BYTE u8COMPort, BYTE u8Flag, LPBYTE pu8Uid, BYTE u8Block, LPBYTE pu8Data);

Parameter:

| | |
|------------|---|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contains the tag ID. |
| u8Block: | The block which you want to write(ex : 0, 1, 2...). |
| pu8Data: | The point of the buffer which contains the data. |

Return code:

Please refer to section 9.5.

9.2.7 ISO15693 Lock Block

Function Description:

Lock the block on ISO15693 tag.

Function Call:

INT32 RDINT_ISO15693LockBlock(BYTE u8COMPport, BYTE u8Flag, LPBYTE pu8Uid, BYTE u8Block);

Parameter:

| | |
|-------------|---|
| u8COMPport: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contains the tag ID. |
| u8Block: | The block which you want to write(ex : 0, 1, 2...). |

Return code:

Please refer to section 9.5.

9.2.8 Write AFI to ISO15693 Tag

Function Description:

Write AFI to the specific ISO15693 tag.

Function Call:

INT32 RDINT_ISO15693WriteAfi(BYTE u8COMPport, BYTE u8Flag, LPBYTE pu8Uid, BYTE u8AfiValue);

Parameter:

| | |
|-------------|---|
| u8COMPport: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contains the tag ID. |
| u8AfiValue: | The value of AFI and about this value please refer to ISO15693 document. |

Return code:

Please refer to section 9.5.

9.2.9 ISO15693 Lock AFI

Function Description:

Lock the AFI on ISO15693 tag.

Function Call:

INT32 RDINT_ISO15693LockAfi(BYTE u8COMPport, BYTE u8Flag, LPBYTE pu8Uid);

Parameter:

| | |
|-------------|---|
| u8COMPport: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contains the tag ID. |

Return code:

Please refer to section 9.5.

9.2.10 **Write DSFID to ISO15693 Tag**

Function Description:

Write DSFID to the specific ISO15693 tag.

Function Call:

INT32 RDINT_ISO15693WriteDsfid(BYTE u8COMPort, BYTE u8Flag, LPBYTE pu8Uid, BYTE u8DsfidValue);

Parameter:

| | |
|---------------|---|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contains the tag ID. |
| u8DsfidValue: | The value of DSFID and about this value please refer to ISO15693 document. |

Return code:

Please refer to section 9.5.

9.2.11 **ISO15693 Lock DSFID**

Function Description:

Lock the DSFID on ISO15693 tag.

Function Call:

INT32 RDINT_ISO15693LockDsfid(BYTE u8COMPort, BYTE u8Flag, LPBYTE pu8Uid);

Parameter:

| | |
|------------|---|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Flag: | It specifies the actions to be performed by the VICC and whether corresponding fields are present or not. |
| pu8Uid: | The point of the buffer which contains the tag ID. |

Return code:

Please refer to section 9.5.

9.2.12 **Get Data From Reader**

Function Description:

Get the data from the reader's buffer.

Function Call:

INT32 RDINT_GetReturnDataArray (BYTE u8COMPort, BYTE u8Indx, BYTE u8Offset, LPBYTE pu8Data);

Parameter:

| | |
|------------|--|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u8Indx: | The start index of pu8Data. |
| u8Offset: | The data's length which get from ISO15693AutoInventory4Antennas |
| pu8Data: | The point which will receive the data from reader. The front four bytes mean which antenna get how many tags, the others are the data. |

Return code:

Please refer to section 9.5.

9.3 ISO-14443A

9.3.1 Write Default Key

Function Description:

Write the default key to reader.

Function Call:

```
INT32 RDINT_WriteDefaultKey(BYTE u8COMPport, BYTE u8DefaultKeyIdx, LPBYTE  
pu8DefaultKey);
```

Parameter:

| | |
|------------------|--|
| u8COMPport: | The reader's COM port number (1 – 255) |
| u8DefaultKeyIdx: | The default key index in the reader |
| pu8DefaultKey: | The point of the buffer which contain key. |

Return code:

Please refer to section 9.5.

9.3.2 ISO-14443A Open Card

Function Description:

Lock the ISO-14443A tag and get the tag ID. After select card type, user should call this API before control the ISO-14443A tag.

Function Call:

```
INT32 RDINT_OpenCard(BYTE u8COMPport, BYTE u1AutoFind, LPBYTE pu8Uid, LPBYTE  
pu8Atqa, LPBYTE pu8Sak);
```

Parameter:

| | |
|-------------|--|
| u8COMPport: | The reader's COM port number (1 – 255) |
| u1AutoFind: | Auto search card. TURN_ON TURN_OFF |
| pu8Uid: | Receive the tag ID. |
| pu8Atqa: | Return the ATQA card type. ATQA_MIFAEER_S50 ATQA_MIFAEER_S70 ATQA_ULTRA_LIGHT |
| pu8Sak: | Return the SAK card type. SAK_ISO14443_3 SAK_ISO14443_4 |

Return code:

Please refer to section 9.5.

9.3.3 ISO-14443A Close Card

Function Description:

Unlock the ISO-14443A tag. After control the ISO-14443A tag, user should call this API to unlock the tag.

Function Call:

INT32 RDINT_CloseCard(BYTE u8COMPort);

Parameter:

u8COMPort: The reader's COM port number (1 – 255)

Return code:

Please refer to section 9.5.

9.3.4 ISO-14443A Read Block Data

Function Description:

Read the specify block data.

Function Call:

INT32 RDINT_ReadMifareOneBlock(BYTE u8COMPort, BYTE u1KeyType, BYTE u1DefaultKey, BYTE u8DefaultKeyIdx, BYTE u8Block, LPBYTE pu8Key, LPBYTE pu8Data);

Parameter:

u8COMPort: The reader's COM port number (1 – 255)
u1KeyType: The private key type.
 CARD_KEY_A
 CARD_KEY_B
u1DefaultKey: Use the default password in the reader.
 TURN_ON
 TURN_OFF
u8DefaultKeyIdx: The index of the default key which in the reader.
u8Block: The block which you want to read (Ex : 0, 1, 2...).
pu8Key: The user defines key value.
pu8Data: Receive the data.

Return code:

Please refer to section 9.5.

9.3.5 ISO-14443A Read Sector Data

Function Description:

Read the specify sector data.

Function Call:

INT32 RDINT_ReadMifareOneSector(BYTE u8COMPort, BYTE u1KeyType, BYTE u1DefaultKey, BYTE u8DefaultKeyIdx, BYTE u8Sector, LPBYTE pu8Key, LPBYTE pu8Data);

Parameter:

| | |
|------------------|--|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u1KeyType: | The private key type. CARD_KEY_A CARD_KEY_B |
| u1DefaultKey: | Use the default password in the reader. TURN_ON TURN_OFF |
| u8DefaultKeyIdx: | The index of the default key which in the reader. |
| u8Sector: | The sector which you want to read (Ex: 0, 1, 2...). |
| pu8Key: | The user defines key value. |
| pu8Data: | Receive the data. |

Return code:

Please refer to section 9.5.

9.3.6 ISO-14443A Write Block Data

Function Description:

Write data to the specify block.

Function Call:

INT32 RDINT_WriteMifareOneBlock(BYTE u8COMPort, BYTE u1KeyType, BYTE u1DefaultKey, BYTE u8DefaultKeyIdx, BYTE u8Block, LPBYTE pu8Key, LPBYTE pu8Data);

Parameter:

| | |
|------------------|--|
| u8COMPort: | The reader's COM port number (1 – 255) |
| u1KeyType: | The private key type. CARD_KEY_A CARD_KEY_B |
| u1DefaultKey: | Use the default password in the reader. TURN_ON TURN_OFF |
| u8DefaultKeyIdx: | The index of the default key which in the reader. |
| u8Block: | The block which you want to read (Ex: 0, 1, 2...). |
| pu8Key: | The user defines key value. |
| pu8Data: | The data which user wants to write. |

Return code:

Please refer to section 9.5.

9.3.7 ISO-14443A Inventory

Function Description:

Read ISO-14443A Tag.

Function Call:

INT32 RDINT_MifareAutoRequest4Antennas(BYTE u8COMPport, LPBYTE pu8GRLCS);

Parameter:

u8COMPport: The reader's COM port number (1 – 255)
pu8GRLCS: Receive the read data's length which in the reader's buffer.

Return code:

Please refer to section 9.5.

9.4 ISO-14443B

9.4.1 Select ST Card

Function Description:

Select ST card.

Function Call:

INT32 RDINT_STCardSelect(BYTE u8COMPport, LPBYTE pu8IDNum);

Parameter:

u8COMPport: The reader's COM port number (1 – 255)
pu8IDNum: The card data.

Return code:

Please refer to section 9.5.

9.4.2 Release ST Card

Function Description:

Release ST card.

Function Call:

INT32 RDINT_STCardIntoDeactive(BYTE u8COMPport);

Parameter:

u8COMPport: The reader's COM port number (1 – 255)

Return code:

Please refer to section 9.5.

9.4.3 Read SR176 Card's Block Data

Function Description:

Read the block from specify SR176 card.

Function Call:

INT32 RDINT_SR176ReadBlock(BYTE u8COMPport, BYTE u8BlkNo, LPBYTE pu8Data);

Parameter:

u8COMPport: The reader's COM port number (1 – 255)
u8BlkNo: The block number which user wants to read (Ex: 0, 1, 2...).
pu8Data: Receive the data.

Return code:

Please refer to section 9.5.

9.4.4 Write SR176 Card's Block Data

Function Description:

Write data to specify SR176 card's block.

Function Call:

INT32 RDINT_SR176WriteBlock(BYTE u8COMPort, BYTE u8BlkNo, LPBYTE pu8Data);

Parameter:

u8COMPort: The reader's COM port number (1 – 255)
u8BlkNo: The block number which user wants to read (Ex: 0, 1, 2...).
pu8Data: The data which user wants to write to the block.

Return code:

Please refer to section 9.5.

9.4.5 Lock SR176 Block

Function Description:

Lock the specify block on SR176 card.

Function Call:

INT32 RDINT_SR176LockBlock(BYTE u8COMPort, BYTE u8BlkNo);

Parameter:

u8COMPort: The reader's COM port number (1 – 255)
u8BlkNo: The block number which user wants to lock (Ex: 0, 1, 2...).

Return code:

Please refer to section 9.5.

9.4.6 Read SR176 Card's Block Data

Function Description:

Read the block from specify SR176 card.

Function Call:

INT32 RDINT_SR176ReadBlock (BYTE u8COMPort, BYTE u8BlkNo, LPBYTE pu8Data);

Parameter:

u8COMPort: The reader's COM port number (1 – 255)
u8BlkNo: The block number which user wants to read (Ex: 0, 1, 2...).
pu8Data: Receive the data.

Return code:

Please refer to section 9.5.

9.4.7 Write SR176 Card's Block Data

Function Description:

Write data to specify SR176 card's block.

Function Call:

INT32 RDINT_SR176WriteBlock(BYTE u8COMPort, BYTE u8BlkNo, LPBYTE pu8Data);

Parameter:

u8COMPort: The reader's COM port number (1 – 255)
u8BlkNo: The block number which user wants to read (Ex: 0, 1, 2...).
pu8Data: The data which user wants to write to the block.

Return code:

Please refer to section 9.5.

9.4.8 Authenticate SRIX4K Card

Function Description:

Authenticate the specify SRIX4K card.

Function Call:

INT32 RDINT_SRIX4KAuth(BYTE u8COMPort, LPBYTE pu8Auth);

Parameter:

u8COMPort: The reader's COM port number (1 – 255)
pu8Auth: The authentication data.

Return code:

Please refer to section 9.5.

9.4.9 Read SRIX4K Card ID

Function Description:

Read the SRIX4K card ID.

Function Call:

INT32 RDINT_SRIX4KReadUID(BYTE u8COMPort, LPBYTE pu8Uid);

Parameter:

u8COMPort: The reader's COM port number (1 – 255)
pu8Uid: Receive the card ID.

Return code:

Please refer to section 9.5.

9.5 Error Code

| Name | Value | Description |
|--------------------|-------|-------------------------------------|
| LRSUCCESS | 0x00 | Successful completion of request |
| LRSYSTEM | 0x01 | Unknown error |
| LRLASTCARD | 0x02 | Last Card Still Present |
| LRNOCARD | 0x03 | Card is not present |
| LRCTYPE | 0x04 | Card Type error |
| LRPARAM | 0x05 | Request Parameter error |
| LRACCESS | 0x06 | Card access error |
| LRREAD | 0x07 | Card read error |
| LRWRITE | 0x08 | Card write error |
| LRINCR | 0x09 | Purse increment error |
| LRDECR | 0x0a | Purse decrement error |
| LRTRANSFER | 0x0b | Purse value transfer error |
| LRRESTORE | 0x0c | Purse restore error |
| LRPURSE | 0x0d | Purse value corrupt |
| LRMADERR | 0x0e | Card Directory error |
| LRFIXERR | 0x0f | Purse fix error |
| LRFIXED | 0x10 | Purse found corrupt but fixed |
| LRNOTOPEN | 0x11 | Card not open |
| LRNOFILE | 0x12 | File not found |
| LRBADSIZE | 0x13 | Bad file size |
| LRABORTED | 0x14 | Request aborted |
| LRMANYCARD | 0x15 | Too many card present |
| LRFORMAT | 0x16 | Card format error |
| LRCREATE | 0x17 | Card file create error |
| LRDELETE | 0x18 | Card file delete error |
| LRALREADOPEN | 0x19 | Card has been opened already |
| LRALREADCLOSED | 0x1a | Card has been closed already |
| LRMSTRKEYLOAD | 0x1b | Cannot load master keys |
| LRAPPKEYLOAD | 0x1c | Cannot load application |
| LRKEYCARD | 0x1d | Keycard Error |
| LRUNFORMAT | 0x1e | Card has files on it |
| LRNOKBDCHAR | 0x20 | No keyboard character |
| LRNOTIMPL | 0x7f | Function not implemented |
| LRUNKNOWN | 0x80 | Unknown error |
| LRCCRBUSY | 0xbb | Reader is busy |
| LRNOINIT | 0xff | Reader has not been opened |
| LRCRDNOTOPEN | 0xfa | Card has not been opened |
| LRINUSE | 0xfb | Card in use by another applications |
| LRAPPLICERR | 0xfc | API system error |
| LRLINKLOST | 0xfd | Link to Reader has been lost |
| LRBADCOMPORT | 0xfe | COM port cannot be accessed |
| LRNOCRYPTBOX | 0xf8 | Key-Box not found |
| LRBADAPPACCES S | 0xf7 | Invalid Application access code |
| LRNOMAIDFILE | 0xf6 | Cannot open MAID definition |
| LRBOXREAD | 0xf5 | Cannot read from Key-Box |
| LRBOXWRITE | 0xf4 | Cannot write to Key-Box |
| LRBOXNOKEYS | 0xf3 | No of Keys in Box is zero or |
| LRSECURE | 0xf2 | Comms MAC checking failed |
| LRERRSELREADE R | 0xf1 | Cannot change to selected reader |

10 RH767 UHF reader for WJ

To programming RH767 UHF reader, it need C# DLL "MPR DLL.dll". Please get it from below URL.

http://w3.adc.unitech.com.tw/pub/cs/SDK/RH767/RFID_SDK.zip

10.1 Class "MPRReader"

This is the main class instantiated by Applications. Manages a single WJ Multi-Protocol Reader. Provides properties and methods for accessing features of the MPR. Talks to the MPR via an MPRComm object. Generates request frame payloads for MPR API commands. Parses response frame payloads from MPR API commands. Fires events when MPR public properties change.

10.2 The Parameter in MPRReader

- **byte ActiveAntenna**
This parameter to set and get the active antenna on reader and this value should be 0 on RH767.
- **byte TxPower**
This parameter to set and get the current antenna power and this value should between 18-30.
- **int InvUpdateGap**
To set and get the time between two inventories. Please set this value to 0 to get good performance.
- **TimeSpan PersistTime**
How long a tag that has been read will persist in the inventory, without being read, while an inventory is running. If an inventory is stopped, tags do not expire. If a tag is re-read, it will live at least another PersistTime.
- **bool Class0InventoryEnabled**
Whether to perform EPC Class 0 inventories.
- **bool Class1InventoryEnabled**
Whether to perform EPC Class 1 inventories.
- **bool Gen2InventoryEnabled**
Whether to perform EPC UHF Gen2 inventories.
- **bool IsConnected**
To check the connection with reader.
- **bool InvTimerEnabled**
To get or set inventory status.

10.3 The Function in MPRReader

10.3.1 Connect to RFID Reader

Function Description:

To create a connection with the reader before control it.

Function Call:

`bool Connect(string SerialPortName, string BaudRate)`

Parameter:

SerialPortName: The reader's COM port number (COM1: – COM255:)

BaudRate: The baud rate with the reader, the default is "57600"

Return code:

True : Connect success.

False : Connect fail.

10.3.2 Disconnect with RFID Reader

Function Description:

Close the connection and disable inventory with reader.

Function Call:

`void Disconnect()`

10.3.3 Clear All Tags In The Reader

Function Description:

Remove all tags in the buffer of reader.

Function Call:

`void ClearInventory()`

10.3.4 The Event in MPRReader

- **EventHandler InvTimerEnabledChanged**
Fired when manufacturing information is read from the reader.
- **TagEventHandler TagAdded**
Fired when a new tag is added to the inventory.
- **TagEventHandler TagRemoved**
Fired when a tag expires, i.e. hasn't been read for the persist time period.

11 RH767 UHF reader for SkyeTek

This library "Skeydll.dll" is used to control RH767 RFID Reader. Please get it from below URL.

http://w3.adc.unitech.com.tw/pub/cs/SDK/RH767/RFID_SDK.zip

11.1 Connect to RFID reader

Function Description:

To create a connection with the reader before control it.

Function Call:

```
BOOL OpenPort (int nPort, DWORD dwBaudRate);
```

Parameter:

nPort: The reader's COM port number (1 – 255), default is COM2.
dwBaudRate: The baud rate with the reader, the default is "57600"

Return code:

TRUE: Connect success.
FALSE: Connect fail

11.2 Disconnect with RFID reader

Function Description:

Close the connection with reader.

Function Call:

```
void ClosePort ();
```

11.3 Select Tag

Function Description:

To select any type of supported tag.

Function Call:

```
BOOL SelectTags (char *szData, TAG_TYPE *TagType);
```

Parameter:

szData: Receive the Tag ID.
TagType: Return the tag type.

```
typedef enum TAG_TYPE  
{  
    Gen1_Tag = 0,  
    Gen2_Tag = 1,  
    ISO180006B_Tag = 2,  
    Unknow_Tag = 10,  
}TAG_TYPE;
```

Return code:

TRUE: Select tag success.
FALSE: Select tag fail.

11.4 Select Gen2 Tag

Function Description:

To only detect EPC Class1 Gen2 tags.

Function Call:

BOOL SelectGen2Tag (char *szData);

Parameter:

szData: Receive the Tag ID.

Return code:

TRUE: Select tag success.

FALSE: Select tag fail.

11.5 Read Data from Gen2 Tag's Blocks

Function Description:

To read data from Gen2 tag's blocks.

Function Call:

BOOL ReadGen2Block (char *szAddress, int nBlock, char *szData);

Parameter:

szAddress: The start address to read blocks.(For example : To address block #2 of the EPC memory bank, the szAddress is "1002", the "1" specifies the EPC memory bank and "002" specifies the block memory(0x002))

nBlock: The number of blocks which user wants to read.

szData: Receive the block's data.

Return code:

TRUE: Read blocks success.

FALSE: Read blocks fail.

11.6 Write Data to Gen2 Tag's Blocks

Function Description:

To write data to Gen2 tag's blocks.

Function Call:

BOOL WriteGen2Block (char *szAddress, int nBlock, char *szData);

Parameter:

szAddress: The block's address.

nBlock: The number of blocks which user want to write.

szData: The data which user wants to write in the block and 1 block for 2 – bytes data.

Return code:

TRUE: Write block data success.

FALSE: Write block data fail.

11.7 Select ISO18000-6B Tag

Function Description:

To only detect an ISO18000-6B tag.

Function Call:

BOOL SelectISO180006BTags (char *szData);

Parameter:

szData: Receive the Tag ID.

Return code:

TRUE: Select tag success.
FALSE: Select tag fail.

11.8 Read Data from ISO18000-6B Tag's Block

Function Description:

To read the data form ISO18000-6B tag's block.

Function Call:

BOOL ReadISO180006BBlock (char *szAddress, int nBlock, char *szTagID, char *szData);

Parameter:

szAddress: The start address to read blocks.
nBlock: The number of blocks which user wants to read.
szTagID: The tag ID which user wants to read.
szData: Receive the block's data.

Return code:

TRUE: Read block success.
FALSE: Read block fail.

11.9 Write Block Data to ISO18000-6B Tag

Function Description:

To write data to ISO18000-6B tag's block .

Function Call:

BOOL WriteISO180006BBlock (char *szAddress, int nBlock, char *szTagID, char *szData);

Parameter:

szAddress: The start address of the written blocks.
nBlock: The number of blocks which user want to write.
szTagID: The tag ID which user wants to write.
szData: The data which user wants to write in the block and 1 block for 1-byte data.

Return code:

TRUE: Write block data success.
FALSE: Write block data fail.

11.10 Select All Tags of Any Type

Function Description:

Selecting all supported tags in field.

Function Call:

BOOL InventoryTag (int *nIndex);

Parameter:

nIndex: Return the number of tags.

Return code:

TRUE: Select tag success.
FALSE: Select tag fail.

11.11 Get The tags from Command InventoryTag

Function Description:

Get the tags which read by command InventoryTag.

Function Call:

void GetTags(TAG_DATA *TagData);

Parameter:

TagData : The structure of tag information.

```
typedef struct TAG_DATA
{
    char szTag[50];
    TAG_TYPE TagType;
} TAG_DATA;
```

11.12 Send a Tag Password

Function Description:

After assigned an access password to a tag that support passwords, you must send the password to the reader before the reader can execute any other Secure State operations for that tag. This remains a requirement until the password is changed or the password value is reset to zero.

Function Call:

BOOL SendAccessPass (char *szPass);

Parameter:

szPass: The 4 bytes password.

Return code:

TRUE: Send password success.
FALSE: Send password fail.

11.13 Lock Gen2 Tag

Function Description:

Set password protection for the different memory bank of the tag.

Function Call:

BOOL LockGen2Tag (char *szData);

Parameter:

szData: The lock value.

Return code:

TRUE: Lock tag success.
FALSE: Lock tag fail.

11.14 Lock ISO18000-6B Tag

Function Description:

To lock ISO18000-6B blocks. Once the tag blocks have been locked, they cannot be unlocked or written to.

Function Call:

BOOL LockISO180006BTag(char *szTagID, char *szAddress, int nBlock);

Parameter:

szTagID: The tag ID which user wants to lock.
szAddress: The start address to lock.
nBlock: The number of blocks which user wants to lock.

Return code:

TRUE: Lock tag success.
FALSE: Lock tag fail.

11.15 Get Reader's Power Level

Function Description:

To get reader's power level.

Function Call:

BOOL GetPowerLevel(int *nPower);

Parameter:

nPower: Return the power level.

Return code:

TRUE: Get value success.
FALSE: Get value fail.

11.16 Set Reader's Power Level

Function Description:

To set reader's power level.

Function Call:

```
BOOL SetPowerLevel(int nPower, BOOL bSetDefault);
```

Parameter:

nPower: The power level.
bSetDefault: TRUE for set to the value to EEPROM and FALSE for temporary

Return code:

TRUE: Set value success.
FALSE: Set value fail.

11.17 Get the library version

Function Description:

To get SkeyDll.dll version.

Function Call:

```
void GetLibraryVersion(char *szVersion);
```

Parameter:

szVersion: Return the version.

11.18 Get Reader's Frequency

Function Description:

To get reader's frequency.

Function Call:

```
BOOL GetFrequency(FREQUENCY_TYPE nFrequencyType, char *szFrequency);
```

Parameter:

nFrequencyType: The frequency type.

```
typedef enum FREQUENCY_TYPE  
{  
    START_FREQUENCY = 1,  
    STOP_FREQUENCY = 2,  
}FREQUENCY_TYPE;
```

szFrequency: Return the frequency value.

Return code:

TRUE: Get value success.
FALSE: Get value fail.

11.19 Set Reader's Frequency

Function Description:

To set reader's frequency.

Function Call:

BOOL SetFrequency(FREQUENCY_TYPE nFrequencyType, char *szFrequency, BOOL bSetDefault);

Parameter:

nFrequencyType: The frequency type.
szSpacing: The frequency value.
bSetDefault: TRUE for set to the value to EEPROM and FALSE for temporary

Return code:

TRUE: Set value success.
FALSE: Set value fail.

11.20 Get Reader's Hop Channel Spacing

Function Description:

To get reader's hop channel spacing.

Function Call:

BOOL GetHopChannelSpacing(char *szSpacing);

Parameter:

szSpacing: Return the hop channel spacing value.

Return code:

TRUE: Get value success.
FALSE: Get value fail.

11.21 Set Reader's Hop Channel Spacing

Function Description:

To set reader's hop channel spacing.

Function Call:

BOOL SetHopChannelSpacing(char *szSpacing, BOOL bSetDefault);

Parameter:

szSpacing: The hop channel spacing.
bSetDefault: TRUE for set to the value to EEPROM and FALSE for temporary

Return code:

TRUE: Set value success.
FALSE: Set value fail.

11.22 Get Reader's Firmware Version

Function Description:

To get reader's firmware version.

Function Call:

BOOL GetFWVersion (char * szVersion);

Parameter:

szVersion: The reader's firmware version.

Return code:

TRUE: Get firmware version success.
FALSE: Get firmware version fail.

11.23 Get Reader's LBT Setting

Function Description:

To get reader's LBT(listen before talk) setting.

Function Call:

BOOL GetListenBeforeTalk (BOOL *bEnable);

Parameter:

bEnable: The return value to show enable/disable.

Return code:

TRUE: Get LBT setting success.
FALSE: Get LBT setting fail.

11.24 Set Reader's LBT Setting

Function Description:

To set reader's LBT(listen before talk) setting.

Function Call:

BOOL SetListenBeforeTalk(BOOL bEnable, BOOL bSetDefault);

Parameter:

bEnable: The return value to show enable/disable.
bSetDefault: TRUE for set to the value to EEPROM and FALSE for temporary

Return code:

TRUE: Set LBT setting success.
FALSE: Set LBT setting fail.

12 RH767 UHF Reader for Kitty

This library "RFID18K6CReader.dll" is used to control new RH767 RFID Reader. Please get it from below URL.

http://w3.adc.unitech.com.tw/pub/cs/SDK/RH767/Kitty_SDK.zip

12.1 Kitty RFID Reader API Reference

To Build the project copy all header file and RFID186K6CReader.lib to you project folder, and then include rfidstruct.h and RFID18K6CReaderAPI.h to your project.

Steps of how to use RFID reader interface :

1. Initialize the RFID reader interface
2. Open an RFID reader for control
3. Configure RFID reader
such as Operation mode, response data mode, reader's power state, etc.
4. Configure and enable Antenna
5. Execute Tag Access
such as inventory, read, write, etc.
6. Close the RFID reader
7. Shut down the RFID reader interface.

Note : Before the RFID Reader interface can be used, it must be explicitly initialized. And it must be properly shuts down before an application exits in order to release any internally-held resources. If an application fails to shut down the RFID Reader interface, the RFID Reader interface will not be available for other applications, it may necessary to reset the RFID Reader module and/or reboot the device.

12.2 Interface Management

12.2.1 Initializing the RFID Reader Interface

Description:

Allows the RFID Reader Interface to properly initialize any internal data structures and put itself into a well-known ready state. This function must be called before any other RFID Reader Interface function.

Function Call:

```
RFID_STATUS RFIDCreate(char *pszVer);
```

Parameters:

pszVer - A pointer to a character string, contains the version of the RFID Reader Interface.

Returns: RFID_STATUS.

12.2.2 Shutting Down the RFID Reader Interface

Description:

Allows the RFID Reader Interface to properly clean up any internally-held resources. To prevent resource leaks, an application must ensure that RFID Reader is shut down before the application exits

Function Call:

```
RFID_STATUS RFIDDestroy();
```

Returns: RFID_STATUS.

12.3 RFID Reader Configuration

After RFID Reader Interface has been successfully initialized, Developer must open a RFID Reader and then Configure parameters of RFID Reader for the current operation environment. Such as the operation mode, data response format, the power state of RFID Reader and other parameters.

12.3.1 Open RFID Reader

Description:

Open a RFID Reader for control. An application must call `RFIDOpen` this function before control the RFID Reader.

Function Call:

```
RFID_STATUS RFIDOpen(int nRadio = 0);
```

Parameters:

nRadio - Reserved for future use.

Returns: RFID_STATUS.

12.3.2 Close RFID Reader

Description:

Release control of a RFID Reader.

Function Call:

```
RFID_STATUS RFIDClose (int nRadio = 0);
```

Parameters:

nRadio - Reserved for future use.

Returns: RFID_STATUS.

12.3.3 Set the Operation Mode for the RFID Reader

Description:

The RFID Reader module may operate either in continuous or non-continuous mode. **In continuous mode**, when a tag-protocol-operation cycle (i.e. one iteration through all enabled antenna ports) has completed, the RFID Reader module begins a new tag protocol-operation cycle with the first enabled antenna port and continues to do so until the operation is explicitly cancelled by the application. **In non-continuous mode**, only a single tag-protocol-operation cycle is executed upon the RFID radio module.

Function Call:

```
RFID_STATUS RFIDSetOperationMode(RFID_RADIO_OPERATION_MODE mode);
```

Parameters:

mode - The operation mode for the RFID Reader.

Returns: RFID_STATUS.

12.3.4 Get the Operation Mode for the RFID Reader

Description:

Retrieves the operation mode for the RFID Reader.

Function Call:

```
RFID_RADIO_OPERATION_MODE RFIDGetOperationMode();
```

Parameters:

None

Returns: RFID_STATUS.

12.3.5 Set the Response Data's Mode of the RFID Reader

Description:

Allows the application to control the mode of data reporting for tag-access operations. By default, the reporting mode is set to "normal". RFID18K6CReaderAPI.dll only support "Compact" and "Normal" format. **Compact mode** contains the minimum amount of data necessary to return the results of tag-protocol operations to the application; **Normal mode** augments compact mode by interleaving additional status/contextual information in the operation results, so that the application can detect. For example, the start of inventory rounds, when a new antenna is being used etc.

Function Call:

```
RFID_STATUS RFIDSetResponseMode(RFID_RESPONSE_MODE mode);
```

Parameters:

mode - The requested data-reporting mode. Can be "Normal" or "Compact"

Returns: RFID_STATUS.

12.3.6 Get the Response Data's Mode of the RFID Reader

Description:

Retrieve the mode of data reporting for tag-access operations.

Function Call:

```
RFID_STATUS RFIDGetResponseMode(RFID_RESPONSE_MODE *pMode);
```

Parameters:

pMode - A pointer to RFID_RESPONSE_MODE contain the data reporting mode.

Returns: RFID_STATUS.

12.3.7 Set the RFID Reaer's Power State

Description:

Set the RFID Reader module's power state(not to be confused with the antenna RF power).

Function Call:

```
RFID_STATUS RFIDSetPowerState(RFID_RADIO_POWER_STATE state);
```

Parameters:

state - the power state for the RFID Reader module

Returns: RFID_STATUS.

12.3.8 Get the RFID Reader's Power State

Description:

Retrieves the radio module's power state(not to be confused with the antenna RF power).

Function Call:

```
RFID_STATUS RFIDGetPowerState(RFID_RADIO_POWER_STATE *pState);
```

Parameters:

pState - a pointer to RFID_RADIO_POWER_STATE contain the RFID Reader module's power state.

Returns: RFID_STATUS.

12.3.9 Set the RFID Reader's Low-Level Parameter

Description:

Set the low-level configuration parameter for the RFID Reader module. For example the MAC registry value.

Function Call:

```
RFID_STATUS RFIDSetConfigurationParameter(INT16U parameter, INT32U value);
```

Parameters:

parameter – the configuration parameter to set

value – the value to which the configuration parameter will be set.

Returns: RFID_STATUS.

12.3.10 Get the RFID Reader's Low-Level Parameter

Description:

Retrieves a low-level RFID Reader module configuration parameter.

Function Call:

```
RFID_STATUS RFIDGetConfigurationParameter(INT16U parameter, INT32U *pValue);
```

Parameters:

parameter – parameter to retrieve.

pValue – pointer to variable that contain the value of configuration parameter.

Returns: RFID_STATUS.

12.4 Antenna Port Configuration

The RFID Reader module supports active use of one or more logical antenna ports, each mapped to a physical transmit and a physical receive antenna port. An application may retrieve status and configure several parameters. These include: Enable/Disable RFID Reader module, Power Level, Dwell Time, Number of Inventory Cycles, Logical-to-Physical Antenna Port Mapping. Please refer to below function description.

12.4.1 Enabling and Disabling Anennas

Description:

Set the state of a RFID Reader module's antenna port.

Function Call:

```
RFID_STATUS RFIDSetAntennaPortState(INT32 antennaPort,  
RFID_ANTENNA_PORT_STATE state);
```

Parameters:

antennaPort – The logical antenna port to enable or disable.

state – The new state of the logical antenna port.

Returns: RFID_STATUS.

12.4.2 Get the RFID Reader's Antenna-Port Status

Description:

Retrieves the status of a RFID Reader module's antenna port.

Function Call:

```
RFID_STATUS RFIDGetAntennaPortStatus(INT32U antennaPort,  
RFID_ANTENNA_PORT_STATUS *pStatus);
```

Parameters:

antennaPort – the logical antenna port for which status is to be retrieved.

pStatus – pointer to the structure which will contain the antenna port's status. Must not be NULL.

Returns: RFID_STATUS.

12.4.3 Configuring Antenna-Port Parameters

When configuring or retrieving the configuration for logical antenna port, an application has several parameters that it can set/retrieve. See **RFID_ANTENNA_PORT_CONFIG** structure.

Description:

Allows an application to configure several parameters for a single logical antenna port – for example, dwell time, power level. The application should first retrieve the antenna port's current settings and then, update the values in the structure that are to be changed.

Function Call:

```
RFID_STATUS RFIDSetAntennaPortConfiguration(INT32U antennaPort, const  
RFID_ANTENNA_PORT_CONFIG *pConfig);
```

Parameters:

antennaPort – The logical antenna port to cnfigure.

pConfig – A pointer to the structure that contains the antenna-port configuration parameters. Must not be NULL.

Returns: RFID_STATUS.

12.4.4 Retrieving Antenna-Port Configuration

Description:

Retrieve a single logical antenna port's configuration parameters – for example, dwell time, power level, and number of inventory cycles. Even the logical antenna port is disabled.

Function Call:

```
RFID_STATUS RFIDGetAntennaPortConfiguration(INT32U antennaPort,  
RFID_ANTENNA_PORT_CONFIG *pConfig);
```

Parameters:

antennaPort – The logical antenna port to configure.

pConfig – A pointer to a structure that contains the antenna-port configuration parameter.

Returns: RFID_STATUS.

12.5 ISO 18000-6C Tag Access

The interface support the following Tag access operations:

.Inventory

.Read

.Write

.Kill

.Lock

Tag accesses are comprised of three operations:

Specifying Tag-selection Criteria(pre-singulation): An application may require that the tag population be logically partitioned into disjoint groups before issuing an access command. After the tags are partitioned, the specified operation may then be applied to one of the groups. An application may specify tag-selection criteria to perform the tag partitioning before tags are singulated.

Apply post-singulation match mask: After the RFID Reader module has singulated a tag, it can optionally apply an application-supplied post-singulation match mask to the singulated tag's EPC to further filter the singulated tag.

Apply ISO 18000-6C access command: Only tags that match the optionally-supplied selection criteria and post-singulation match mask have the access command applied to them.

Note: when perform tag read, write, kill, lock operation, the RFID Reader module uses only the first enabled logical antenna.

Tag Operation Functions

When the application issues a tag operation (i.e. lventory, read, etc.) to the interface, it also provides a pointer to an application-define callback function. The interface in turn issues the request to the RFID Reader and then returns the operation result via the application-defined callback. Tag operation functions can execute either in Block or Non-block mode. In **Block mode**, the function will waiting for the tag operation to finish and, LPACCESS_STATUS field will contain the operation result. If the timeout lapse this access operation will fail; In **Non-block mode**, this function will return immediately and the operation result will return by the application-defined callback function.

12.5.1 Callback function

LRESULT (CALLBACK* RFIDPROC)(HWND, UINT, WPARAM, LPARAM);

Description:

Application-define callback function.

Parameters:

HWND – The window issue the tag operation.

UNIT – Undefined reserve for future use

WPARAM – Undefined reserve for future use

LPARAM – a pointer to the structure of ACCESS_STATUS which contain the operation result.

Returns: None

12.5.2 Get Antenna's Response Status

Description:

After the tag access operation executed call this function to retrieve the Antenna's status. In **Block mode** call this function follow the tag access function; In **Non-block mode** call this function in application-defined callback function.

Function Call:

```
BOOL RFIDGetAntennaStatus(int nAntenna, LPANTENNA_STATUS  
lpAntennaStatus);
```

Parameters:

nAntenna – Indicate which antenna's status to be retrieve.

lpAntennaStatus –A pointer to the structure of ANTENNA_STATUS that contain the antenna's status.

Returns: True/False

12.5.3 Get Tag Access Response Data

Description:

After the tag access operation executed call this function to retrieve the access response data. In **Block mode**, call this function follow the tag access function; In **Non-block mode** call this function in application-defined callback function.

Function Call:

```
BOOL RFIDGetAccessData(int nAntenna, int nIndex, LPACCESS_DATA  
lpAccessData);
```

Parameters:

nAntenna – Indicate which antenna's access data to be retrieve.

nIndex – Index of the access's data

lpAccessData – A pointer to the structure of ACCESS_DATA that contain the access's data.

Returns: True/False

12.5.4 Set Tag Operation Stop Count

Description:

Set the maximum number of tags to which the tag operation will be applied. If this number is zero, then the operation is applied to all selected tags. If this number is non-zero, the antenna-port dwell time and inventory-round-cycles still apply.(For version 1.0, this field may have a maximum value of 1.).

Function Call:

```
void RFIDSetStopCount(int nStopCount);
```

Parameters:

nStopCount – the maximum number of tag to which tag operation are applied. Default value is zero.

Returns: None

12.5.5 Get Tag Operation Stop Count

Description:

Get the maximum number of tags to which the tag operation will be applied. For more information see "12.5.4 Set Tag Operation Stop Count".

Function Call:

```
int RFIDGetStopCount();
```

Parameters:

None.

Returns: int – the maximum number of tag.

12.5.6 Tag Inventory Operation

Description:

Executes a tag inventory for all tags of interest. If the selection Criteria and post-singulation is specified, tags will be partitioned first.

Function Call:

```
void RFIDInventory(RFID_INVENTORY stInventory, LPACCESS_STATUS  
lpAccessStatus, BOOL bBlock = FALSE, int nTimeout = 3000);
```

Parameters:

stInventory – Inventory operation parameters.
lpAccessStatus - Contain the operation result, use in block mode;
bBlock – Block mode.
nTimeout – Timeout for the access operation, use in block mode.

Returns: None

12.5.7 Tag Read Operation

Description:

Read one or more 16-bit words from any of a tag's memory banks. While a read may be used to retrieve a set of tags EPC data, if the EPC is the only desired data, performing an inventory operation is more efficient. (Read may only be performed on 16-bit word boundaries and for multiples of 16-bit words) if one or more of the memory words specified by the offset/count combination do not exist or are read-locked, the read from the tag fails.

Function Call:

```
void RFIDTagRead(RFID_READ stRead, LPACCESS_STATUS lpAccessStatus,  
BOOL bBlock = FALSE, int nTimeout = 3000);  
void RFIDTagReadEx(RFID_READ_EX stReadEx, LPACCESS_STATUS  
lpAccessStatus, BOOL bBlock = FALSE, int nTimeout = 3000);
```

Parameters:

stRead/stReadEx – read operation parameters
lpAccessStatus - Contain the operation result. Use in block mode;
bBlock - Block mode.
nTimeout - Timeout for the access operation, use in block mode.

Returns: None

12.5.8 Tag Write Operation

Description:

Write one or more 16-bit words to the specified memory bank. (Write could only begin at the specified 16-bit offset. maximum number of 16-bit word to be written is 8).

If wants to write more than eight 16-bit words data to a tag a one time, please use RFIDTagWriteEx.

Function Call:

```
void RFIDTagWrite(RFID_WRITE stWrite, LPACCESS_STATUS lpAccessStatus,  
BOOL bBlock = FALSE, int nTimeout = 3000);  
void RFIDTagWriteEx(RFID_WRITE_EX stWriteEx, LPACCESS_STATUS  
lpAccessStatus, int nTimeout = 3000);
```

Parameters:

stWrite/stWriteEx – write operation parameters
lpAccessStatus - Contain the operation result. Use in block mode;
bBlock - Block mode.
nTimeout - Timeout for the access operation, use in block mode.

Returns: None

12.5.9 Modify EPC Operation

Description:

Modify the target tag's EPC.

Function Call:

```
void RFIDTagWriteEPC(RFID_WRITE_EPC stEPC, LPACCESS_STATUS  
lpAccessStatus, int nTimeout = 3000);
```

Parameters:

stEPC – Contain Modify EPC operation parameters .
lpAccessStatus - Contain the operation result.
nTimeout - Timeout for the access operation.

Returns: None

12.5.10

Tag Kill Operation

Description:

Kill the tags of interest.

Function Call:

```
void RFIDTagKill(RFID_KILL stKill, LPACCESS_STATUS lpAccessStatus, BOOL  
bBlock = FALSE, int nTimeout = 3000);  
void RFIDTagKillEx(RFID_KILL_EX stKillEx, LPACCESS_STATUS lpAccessStatus,  
BOOL bBlock = FALSE, int nTimeout = 3000);
```

Parameters:

stKill/stKillEx – Kill operation parameter.
lpAccessStatus - Contain the operation result. Use in block mode;
bBlock - Block mode.
nTimeout - Timeout for the access operation, use in block mode.

Returns: RFID_STATUS

12.5.11 Tag Lock Operation

Description:

Execute a tag lock(setting a tag's access permissions).

Function Call:

```
void RFIDTagLock(RFID_LOCK stLock, LPACCESS_STATUS lpAccessStatus, BOOL  
bBlock = FALSE, int nTimeout = 3000);  
void RFIDTagLockEx(RFID_LOCK_EX stLockEx, LPACCESS_STATUS  
lpAccessStatus, BOOL bBlock, int nTimeout);
```

Parameters:

stLock/stLockEx – Lock operation parameter.
lpAccessStatus - Contain the operation result. Use in block mode;
bBlock - Block mode.
nTimeout - Timeout for the access operation, use in block mode.

Returns: RFID_STATUS

12.5.12 Tag Pre-singulation Operation

Description:

Configures the tag-selection criteria for the ISO 18000-6C select command, this command should be issued prior to any tag access operation. The tag-selection criteria will stay in effect until the next call of tag-selection criteria.

Function Call:

```
RFID_STATUS RFIDTagSelectCriteria(RFID_SELECT_CRITERIA *pCriteria, int  
*pnCount, BOOL bSet = TRUE);
```

Parameters:

pCriteria – Contain the tag-selection criteria parameters
pnCount – The number of criteria. This value must be between 0 and 8, inclusive.
When set to 0 the tag-selection criteria will be deleted.
bSet – TRUE set the tag-selection criteria parameters;
FALSE retrieve the tag-select criteria parameters.

Returns: RFID_STATUS

12.5.13 Tag Post Singulation Operation

Description:

Configures the post-singulation match criteria to be used by the RFID radio module. An application can use post-singulation to filter tags, based upon all or part of the tag's EPC. The post-singulation match criteria will stay in effect until the next call of post-singulation. (All the tag's access operation will apply to the which has been singulated only.)

Function Call:

```
RFID_STATUS RFIDTagPostSingulation(RFID_POST_SINGULATION *pCriteria, int *pnCount, BOOL bSet = TRUE);
```

Parameters:

pCriteria – Contain post-singulation match criteria parameters.
pnCount – The number of criteria. When set the post-singulation match criteria this value must be 1; When delete the post-singulation match criteria this value must be 0;
bSet – TRUE set the post-singulation parameters;
FALSE retrieve the post-singulation parameters.

Returns: RFID_STATUS

12.5.14 Tag Query Group Operation

Description:

Specifies which tag group will have subsequent access operations applied to it.

Function Call:

```
RFID_STATUS RFIDTagQueryGroup(RFID_18K6C_TAG_GROUP *pGroup, BOOL bSet = TRUE);
```

Parameters:

pGroup – Contain the parameters of specifying the tag group.
bSet – TRUE specify the tag group.
FALSE retrieves the tag group.

Returns: RFID_STATUS

12.5.15 Set Current Singulation Algorithm

Description:

Select the current singulation algorithms. Based upon usage scenarios, different singulation algorithms (i.e. Q-adjustment) may be desired.

Function Call:

```
RFID_STATUS RFIDSingulationAlgorithm(RFID_18K6C_SINGULATION_ALGORITHM *pAlgorithm, BOOL bSet = TRUE);
```

Parameters:

pAlgorithm – The valid singulation algorithms
bSet – TRUE set the current singulation algorithm
FALSE retrieves the current singulation algorithm.

Returns: RFID_STATUS

12.5.16 Specifying Singulation Algorithm Parameters

Description:

Allow the application to configure the settings for a particular singulation algorithm.

Function Call:

```
RFID_STATUS RFIDSingulationAlgorithmParameters(RFID_18K6C_SINGULATION_ALGORITHM algorithm, void *pParms, BOOL bSet = TRUE);
```

Parameters:

algorithm – The singulation algorithm to be configured.
pParms – A pointer to a structure that contains the singulation algorithm parameters.
bSet – Set or Retrieve the specify singulation algorithm parameters.

Returns: RFID_STATUS

12.5.17 Cancelling a Tag Operation

Description:

Stops a currently-executing tag operation on a RFID Reader.

Function Call:

RFID_STATUS RFIDCancelOperation ();

Parameters: None

Returns: RFID_STATUS

12.5.18 Aborting a Tag Operation

Description:

Terminate a tag operation immediately. Any response packet will be discarded.

Function Call:

RFID_STATUS RFIDAbortOperation ();

Parameters: None

Returns: RFID_STATUS

12.5.19 Clear RFID Reader Module's Error State

Description:

Clear the error state for the RFID Reader module MAC firmware.

Function Call:

RFID_STATUS RFIDClearError ();

Parameters: None

Returns: RFID_STATUS

12.5.20 Ability of Hold or Discard the Duplicate Tags

Description:

Hold or discard the duplicate tags when inventory. Call this function before inventory.

Function Call:

RFID_STATUS RFIDEnableDuplicate(BOOL bEnable = TRUE);

Parameters:

bEnable – TRUE hold the duplicate tags.

FALSE discard the duplicate tags

Returns: RFID_STATUS

12.6 Other APIs

12.6.1 Get RFID Reader's Firmware Version

Description:

Get RFID Reader's library and Firmware version.

Function Call:

RFID_STATUS RFID MacGetVersion(char *pszVer);

Parameters:

pszVer - Contains the RFID Reader's library and Firmware version.

Returns: RFID_STATUS

12.7 Structure of the Library

12.7.1 RFID ANTENNA PORT CONFIG

Description:

The configuration parameters for a logical antenna port.

Define:

```
typedef struct {  
    INT32U    length;  
    INT32U    powerLevel;  
    INT32U    dwellTime;  
    INT32U    numberInventoryCycles;  
    INT32U    physicalRxPort;  
    INT32U    physicalTxPort;  
    INT32U    antennaSenseThreshold;  
} RFID_ANTENNA_PORT_CONFIG;
```

Fields:

length - The length of the structure in bytes. Must be set to by the application to sizeof(RFID_ANTENNA_PORT_CONFIG)

powerLevel - The power level for the logical antenna port's physical transmit antenna. This value is specified in 0.1 (i.e., 1/10th) dBm. the value must between 0 and 300 and, 280 is The most appropriate value.

dwellTime - The number of milliseconds to spend on this antenna port during a cycle. Zero indicates that antenna usage will be ontrolled by the numberInventoryCycles field.

numberInventoryCycles - The number of inventory rounds to perform with this antenna port. Zero indicates that the antenna usage will be controlled by the dwellTime field.

physicalRxPort - he underlying physical receive antenna port associated with the logical antenna port. Must be between 0 and 3, inclusive.

physicalTxPort - The underlying physical transmit antenna port associated with the logical antenna port. Must be between 0 and 3, inclusive.

antennaSenseThreshold - The measured resistance, specified in ohms.

Note: *In version 1.0 physicalRxPort and physicalTxPort's value must be the same.

*dwellTime and numberInventoryCycles can not both be zero. *length field must be fill with the length of the structure before call the config function.

12.7.2 ACCESS STATUS

Description:

Contain the information of the tag operation result.

Define:

```
typedef struct ACCESS_STATUS_TAG{
    FILETIME ftStartTime;
    FILETIME ftEndTime;
    INT32U   dwResponseMode;
    INT32U   dwOperationMode;
    INT16U   unCommand;
    DWORD    dwErrorCode;
    DWORD    dwStatus;
    INT16U   unAntennas
} ACCESS_STATUS, *LPACCESS_STATUS;
```

Fields:

[ftStartTime](#) – Time of the Tag operation start

[ftEndTime](#) – Time of the Tag operation end

[dwResponseMode](#) – Operation Response data reporting mode can be Compat or Normal.

[dwOperationMode](#) – Working mode of the RFID Reader module can be continuous or non-continuous.

[dwErrorCode](#) – If tag operation failed this field contains the error code. Zero indicates no error.

[dwStatus](#) – Return by the Tag operation function indicate the library status and error codes. Zero indicates no error.

[unAntennas](#) – The amount of antennas.

12.7.3 ANTENNA STATUS

Description:

Contains the information of the antenna that take effect in the tag operation executed.

Define:

```
typedef struct ANTENNA_STATUS_TAG{
    FILETIME ftStartTime;
    FILETIME ftEndTime;
    INT16U   unAntenna;
    DWORD    dwErrorCode;
    DWORD    dwStatus;
    INT16U   unCount
} ANTENNA_STATUS, *LPANTENNA_STATUS;
```

Fields:

[ftStartTime](#) – Time of this antenna start to execute Tag operation.

[ftEndTime](#) – Time of this antenna finish execute Tag operation.

[unAntenna](#) – Antenna No.

[unCount](#) – The number of tag this antenna returns.

12.7.4 ACCESS DATA

Description:

Contain access data of the tag return by the antenna.

Define:

```
typedef struct ACCESS_DATA_TAG{
    INT16U unEPCLength;
    INT16U unRSSI; //The receive signal strength
    BYTE pnEPC[68]; //PC + EPC + CRC
    INT16U unDataLength;
    BYTE pnData[256]; //Access data or access Status
} ACCESS_DATA, *LPACCESS_DATA;
```

Fields:

[unEPCLength](#) – The length of the EPC(include PC and CRC)
[unRSSI](#) – The receive signal strength.
[pnEPC\[68\]](#) – Data of EPC(2 bytes PC + EPC + 2 bytes CRC).
[unDataLength](#) – Access Data length.
[pnData\[256\]](#) – Data retrieve from Tag of write to Tag.

12.7.5 RFID INVENTORY

Description:

Inventory operation parameters.

Define:

```
typedef struct RFID_INVENTORY_TAG {
    HWND hWnd; //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
}RFID_INVENTORY;
```

Fields:

[hWnd](#) – The parent window which issue the Tag operation.
[lpfnStartProc](#) – Application-defined callback function. Thre RFID Reader Interface call this function before execute Tag operation.
[lpfnStopProc](#) – Application-defined callback function. Thre RFID Reader Interface call this function after finished Tag operation.

12.7.6 RFID_READ

Description:

Tag Read Operation parameters.

Define:

```
typedef struct RFID_READ_TAG {
    HWND hWnd;        //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
    RFID_18K6C_MEMORY_BANK bank;
    INT16U offset;
    INT16U count;
    INT32U accessPassword;
}RFID_READ;
```

Fields:

[hWnd](#) - The Parent window which issue the Tag operation.

[lpfnStartProc](#) - Application-defined callback function. The RFID Reader Interface call this function before execute Tag operation.

[lpfnStopProc](#) - Application-defined callback function. The RFID Reader Interface call this function after finished Tag operation.

[bank](#) – The memory bank from which to read.

[offset](#) – The offset of the first 16-bit word to read from the specified memory bank.

[count](#) – The number of 16-bit words to read.(If this value zero and bank is EPC, the read returns the contents of the EPC starting at the 16-bit word specified by offset through the end of the EPC.This value must be in the range 1 to 255, inclusive.)

[accessPassword](#) – The access password for the tags. A value of zero indicates no access password.

12.7.7 RFID_READ_EX

Description:

Tag read extension function's parameter.

Define:

```
typedef struct RFID_READ_EX_TAG {
    HWND hWnd;        //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
    RFID_18K6C_MEMORY_BANK bank;
    INT16U offset;
    INT16U count;
    BYTE accessPassword[8];
}RFID_READ_EX;
```

Fields:

[hWnd](#) - the same as RFID_READ.

[lpfnStartProc](#) – the same as RFID_READ;

[lpfnStopProc](#) – the same as RFID_READ;

[bank](#) – the same as RFID_READ;

[offset](#) – the same as RFID_READ;

[count](#) – the same as RFID_READ;

[accessPassword\[8\]](#) – The access password for the tags. It's 8 bytes' hex char(0-f).

12.7.8 RFID_WRITE

Description:

Tag write operation's parameter.

Define:

```
typedef struct RFID_WRITE_TAG {
    HWND hWnd; //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
    BOOL32 verify;
    INT32U verifyRetryCount;
    RFID_18K6C_MEMORY_BANK bank;
    INT32U accessPassword;
    INT16U offset;
    INT16U count;
    Int16U pnData[8];
}RFID_WRITE;
```

Fields:

hWnd – The parent window which issue the Tag operation.

lpfnStartProc - Application-defined callback function. The RFID Reader Interface call this function before execute Tag operation.

lpfnStopProc - Application-defined callback function. The RFID Reader Interface call this function after finished Tag operation.

verify – A flag that indicates if the data written to the tag should be read back from the tag to verify that it was successfully written. A non-zero value indicates that the tag's memory should be read to verify.

verifyRetryCount – The maximum number of times the write should be retried if the write-verify failure. This value must be between 0 and 7.

accessPassword – The access password for the tags. A value of zero indicates no access password.

bank – The memory bank from which to read.

offset – The offset of the first 16-bit word to read from the specified memory bank.

count – The number of 16-bit words to read.(If this value zero and bank is EPC, the read returns the contents of the EPC starting at the 16-bit word specified by offset through the end of the EPC.This value must be in the range 1 to 8, inclusive.)

pnData[8] – Contains the data to be written to the tag's specified memory bank. The high-order byte of pnData[n] is written to the tag's memory-bank byte at 16-bit offset(offset + n). The low-order byte is write to the next byte.

12.7.9 RFID_WRITE_EX

Description:

Tag write extension function's parameter.

Define:

```
typedef struct RFID_WRITE_EX_TAG {
    HWND hWnd;          //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
    BOOL32 verify;
    INT32U verifyRetryCount;
    BYTE accessPassword[8];          //password is 8 bytes' hex char(0~f)
    BYTE pnEPC[64];
    RFID_18K6C_MEMORY_BANK bank;
    INT16U offset;
    INT16U count;
    Int16U pnData[256];          //data to be written(hex chars)
}RFID_WRITE_EX;
```

Fields:

[hWnd](#) – the same as RFID_WRITE

[lpfnStartProc](#) - the same as RFID_WRITE

[lpfnStopProc](#) - the same as RFID_WRITE

[verify](#) – the same as RFID_WRITE

[verifyRetryCount](#) – the same as RFID_WRITE

[accessPassword\[8\]](#) – The access password for the tags. It's 8 bytes' hex char(0~f)

[pnEPC\[64\]](#) – EPC of the specify tag to be written to. If this parameter is NULL, the data will be written to the tags in the field. Otherwise data will be written to the tag specify by the EPC.

[bank](#) – the same as RFID_WRITE

[offset](#) – the same as RFID_WRITE

[count](#) – the same as RFID_WRITE

[pnData\[256\]](#) – Contains the data to be written to the tag's specified memory bank(HEX chars' string).

12.7.10 RFID_WRITE_EPC

Description:

The structure of Modify a tag's EPC.

Define:

```
typedef struct RFID_WRITE_EPC_TAG {
    HWND hWnd;          //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
    BOOL32 verify;
    INT32U verifyRetryCount;
    BYTE accessPassword[8];
    BYTE pnOldEPC[64];
    INT16U tagType;
    BYTE pnNewEPC[64];
}RFID_WRITE_EPC;
```

Fields:

[hWnd](#) - the same as RFID_WRITE.

[lpfnStartProc](#) – the same as RFID_WRITE

[lpfnStopProc](#) – the same as RFID_WRITE

[verify](#) – the same as RFID_WRITE

[verifyRetryCount](#) – the same as RFID_WRITE

[accessPassword\[8\]](#) – the same as RFID_WRITE_EX

[pnOldEPC\[64\]](#) – the old EPC of the tag to be modify

[tagType](#) – Reserve for future use.

[PnNewEPC\[64\]](#) – the new EPC of the target tag.

12.7.11 RFID_KILL

Description:

The structure of Kill a tag.

Define:

```
typedef struct RFID_KILL_TAG {
    HWND hWnd; //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
    INT32U accessPassword;
    INT32U killPassword;
}RFID_KILL;
```

Fields:

hWnd –The Parent window which issue the Tag operation.

lpfnStartProc – Application-defined callback function. The RFID Reader Interface call this function before execute Tag operation.

lpfnStopProc – Application-defined callback function. The RFID Reader Interface call this function after finished Tag operation.

accessPassword – The access password for the tags. A value of zero indicates no access password.

killPassword – The kill password for the tags. Must not be zero.

12.7.12 RFID_KILL_EX

Description:

Tag Kill extension function's parameter.

Define:

```
typedef struct RFID_KILL_EX_TAG {
    HWND hWnd; //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
    BYTE accessPassword[8]; //password is 8 bytes' hex char(0~f)
    BYTE killPassword[8]; //password is 8 bytes' hex char(0~f)
}RFID_KILL_EX;
```

Fields:

hWnd - the same as RFID_KILL.

lpfnStartProc – the same as RFID_KILL.

lpfnStopProc – the same as RFID_KILL.

accessPassword[8] – The access password for the tags. It's 8 bytes' hex char(0~f).

killPassword[8] – The kill password for the tags. It's 8 bytes' hex char(0~f).

12.7.13 RFID_LOCK

Description:

The structure of Tag locks function.

Define:

```
typedef struct RFID_LOCK_TAG {
    HWND hWnd; //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
    INT32U accessPassword;
    INT32U killPasswordPermissions;
    INT32U accessPasswordPermissions;
    INT32U epcBankPermissions;
    INT32U tidBankPermissions;
    INT32U userBankPermissions;
}RFID_LOCK;
```

Fields:

hWnd –The Parent window which issue the Tag operation.

lpfnStartProc – Application-defined callback function. The RFID Reader Interface call this function before execute Tag operation.

lpfnStopProc – Application-defined callback function. The RFID Reader Interface call this function after finished Tag operation.

accessPassword - Access password for the tags(zero indicates no access password).

killPasswordPermissions - The access permissions for the tag's kill password.

accessPasswordPermissions - The access permissions for the tag's access password.

epcBankPermissions - The access permissions for the tag's EPC memory bank.

tidBankPermissions - The access permissions for the tag's TID memory bank.

userBankPermissions - The access permissions for the tag's USER memory bank.

The access permissions can be set as below:

| Name | Value | Description |
|--------------------|-------|---|
| Allow | 0 | Password permission: Can be read and write. Bank permission: The memory bank is writeable. |
| Always Allow | 1 | Password permission: Can be read and write. Bank permission: The memory bank is writeable. This permission is set permanently. |
| Password protected | 2 | Password permission: Need password to read and write. Bank permission: Need password to write to the memory bank. |
| Always Deny | 3 | Password permission: Can not be read and write. When the kill password permission is set to be this value, the tag can not be killed. Bank permission: The memory bank can not be written. This permission is set permanently. |
| No Change | 4 | The permission should remain unchanged. |

Access permissions' values' Table

12.7.14 RFID_LOCK_EX

Description:

Tag Lock extension function's parameter.

Define:

```
typedef struct RFID_LOCK_EX_TAG {
    HWND hWnd; //Parent window
    RFIDPROC lpfnStartProc;
    RFIDPROC lpfnStopProc;
    BYTE accessPassword[8];
    INT32U killPasswordPermissions;
    INT32U accessPasswordPermissions;
    INT32U epcBankPermissions;
    INT32U tidBankPermissions;
    INT32U userBankPermissions;
}RFID_LOCK_EX;
```

Fields:

[hWnd](#) –The same as RFID_LOCK.

[lpfnStartProc](#) –The same as RFID_LOCK.

[lpfnStopProc](#) –The same as RFID_LOCK..

[accessPassword\[8\]](#) - The access password for the tags. It's 8 bytes' hex char(0~f).

[killPasswordPermissions](#) - The same as RFID_LOCK.

[accessPasswordPermissions](#) - The same as RFID_LOCK.

[epcBankPermissions](#) - The same as RFID_LOCK.

[tidBankPermissions](#) - The same as RFID_LOCK.

[userBankPermissions](#) - The same as RFID_LOCK.

12.7.15 RFID_SELECT_CRITERIA

Description:

The structure of pre-singulation matches criteria.

Define:

```
typedef struct RFID_SELECT_CRITERIA_TAG {
    RFID_18K6C_MEMORY_BANK bank;
    INT32U offset;
    INT32U count;
    INT8U mask[RFID_18K6C_SELECT_MASKBYTE_LEN];
    RFID_18K6C_TARGET target;
    RFID_18K6C_ACTION action;
    BOOL32 enableTruncate;
}RFID_SELECT_CRITERIA
```

Fields:

[bank](#) - The memory bank to match against

[offset](#) - The offset of the first bit to match

[count](#) - The number of bits in the mask

[mask\[RFID_18K6C_SELECT_MASK_BYTE_LEN\]](#) - The bit pattern to match.

[target](#) - What will be affected by the action(S0~S4,SL)

[action](#) - The action which will be performed upon the tag populations (i.e, matching and non-matching) during the selection.

[enableTruncate](#) – Should the EPC be truncated when the tag is singulated? Non-zero value indicate that the EPC is truncated. If enableTruncate is true: bank must be EPC;

Target must be RFID_18K6C_TARGET_SELECTED_FLAG

12.7.16 RFID_POST_SINGULATION

Description:

The structure of post-singulation matches criteria.

Define:

```
typedef struct RFID_POST_SINGULATION_TAG {  
    INT32U offset;  
    INT32U count;  
    INT8U mask[RFID_18K6C_SINGULATION_MASK_BYTE_LEN];  
    BOOL32 match;  
}RFID_POST_SINGULATION;
```

Fields:

offset – offset in bits, from the start of the EPC.

count –The number of bits in the mask. A length of zero causes all EPC to match. If (offset + count) falls beyond the end of the mask, the tag is considered non-matching. (valid values are 0 to 396).

mask[RFID_18K6C_SINGULATION_MASK_BYTE_LEN] – the bit pattern to match. (hex chars).

match – Determines if the associated tag operation will be applied to tags that match the mask or not.

12.8 Error Code

There are two types of error codes. One is returned by RFID Library interface indicates RFID library status and the other is return by the RFID module's firmware contains access operation result.

RFID Library status and error codes:

| <i>Name</i> | <i>Value</i> | |
|--------------------------------------|--------------|---|
| RFID_STATUS_OK | 0 | Success |
| RFID_ERROR_ALREADY_OPEN | -9999 | Attempted to open a radio that is already open |
| RFID_ERROR_BUFFER_TOO_SMALL | -9998 | Buffer supplied is too small |
| RFID_ERROR_FAILURE | -9997 | General failure |
| RFID_ERROR_DRIVER_LOAD | -9996 | Failed to load radio bus driver |
| RFID_ERROR_DRIVER_MISMATCH | -9995 | Library cannot use version of radio bus driver present on system |
| RFID_ERROR_EMULATION_MODE | -9994 | Operation cannot be performed while library is in emulation mode |
| RFID_ERROR_INVALID_ANTENNA | -9993 | Antenna number is invalid |
| RFID_ERROR_INVALID_HANDLE | -9992 | Radio handle provided is invalid |
| RFID_ERROR_INVALID_PARAMETER | -9991 | One of the parameters to the function is invalid |
| RFID_ERROR_NO_SUCH_RADIO | -9990 | Attempted to open a non-existent radio |
| RFID_ERROR_NOT_INITIALIZED | -9989 | Library has not been successfully initialized |
| RFID_ERROR_NOT_SUPPORTED | -9988 | Function not supported |
| RFID_ERROR_OPERATION_CANCELLED | -9987 | Operation was cancelled by call to cancel operation, close radio, or shut down the library |
| RFID_ERROR_OUT_OF_MEMORY | -9986 | Library encountered an error allocating memory |
| RFID_ERROR_RADIO_BUSY | -9985 | The operation cannot be performed because the radio is currently busy |
| RFID_ERROR_RADIO_FAILURE | -9984 | The underlying radio module encountered an error |
| RFID_ERROR_RADIO_NOT_PRESENT | -9983 | The radio has been detached from the system |
| RFID_ERROR_CURRENTLY_NOT_ALLOWED | -9982 | The RFID library function is not allowed at this time |
| RFID_ERROR_RADIO_NOT_RESPONDING | -9981 | The radio module's MAC firmware is not responding to requests |
| RFID_ERROR_NONVOLATILE_INIT_FAILED | -9980 | The MAC firmware encountered an error while initiating the nonvolatile memory update. The MAC firmware will return to its normal idle state without resetting the radio module |
| RFID_ERROR_NONVOLATILE_OUT_OF_BOUNDS | -9979 | An attempt was made to write data to an address that is not in the valid range of radio module nonvolatile memory addresses. |
| RFID_ERROR_NONVOLATILE_WRITE_FAILED | -9978 | The MAC firmware encountered an error while trying to write to the radio module's nonvolatile memory region. |
| RFID_ERROR_RECEIVE_OVERFLOW | -9977 | The underlying transport layer detected that there was an overflow error resulting in one or more bytes of the incoming data being dropped. The operation was aborted and all data in the pipeline was flushed. |

Access Operation Result:

| <i>Value</i> | <i>Description</i> |
|--------------|--|
| 0x00 | Success |
| 0x01 | Read after write verify failed. |
| 0x02 | problem transmitting tag command |
| 0x03 | CRC error on tag response to a write |
| 0x04 | CRC error on the read packet when verifying the write |
| 0x05 | Maximum retry's on the write exceeded |
| 0x06 | Failed waiting for read data from tag, possible timeout. |
| 0x07 | Failure requesting a new tag handle. |
| 0x0A | error waiting for tag response, possible timeout |
| 0x0B | CRC error on tag response to a kill |
| 0x0C | Problem transmitting 2nd half of tag kill. |
| 0x0D | tag responded with an invalid handle on first kill command |
| 0xFA | tag has insufficient power to perform the memory write |
| 0xFB | specified memory location is locked and/or permalocked |
| 0xFC | specified memory location does not exist |
| 0xFD | Tag failed to response within timeout |
| 0xFE | CRC was invalid |
| 0xFF | general error |

12.9 Support Dot Net Compact Framework

R1000ReaderCF.dll is a C# wrap of Native C/C++ DLL of RFID18k6cReader.dll. It provides APIs for Dot Net Compact Framework programmer to control the RFID Reader.

12.9.1 Class “R1000Reader”

This is main class instantiated by applications. It provides properties and methods for accessing the RFID Reader. The methods in R1000ReaderCF have the same name as their Native implementation.

12.9.2 Programming Model

The first is add reference of R1000ReaderCF.dll to your project.

C# example:

```
using Unitech.R1000.Reader;
using Unitech.R1000.Reader.Constants;
using Unitech.R1000.Reader.Structures;

//Create and Initialize the RFID Library
String strVersion = String.Empty;
R1000Reader.RFIDCreate(ref strVersion);
//Open the RFID Reader
R1000Reader.RFIDOpen(0);
//Inventory & retrieve the tag's epc
RFID_INVENTORY stInventory = new RFID_INVENTORY();
ACCESS_STATUS stAccessStatus = new ACCESS_STATUS();
//operation in blocking mode
R1000Reader.RFIDInventory(stInventory, ref stAccessStatus, true, 3000);
if (stAccessStatus.dwStatus == 0 && stAccessStatus.dwErrorCode == 0)
{
    for (int i = 0; i < stAccessStatus.unAntennas; i++)
    {
        ANTENNA_STATUS stAntennaStatus = new ANTENNA_STATUS();
        R1000Reader.RFIDGetAntennaStatus(i, ref stAntennaStatus);
        for (int j = 0; j < stAntennaStatus.unCount; j++)
        {
            ACCESS_DATA accessData = new ACCESS_DATA();
            UInt32 nRet = R1000Reader.RFIDGetAccessData(i, j, ref accessData);
            if (nRet == 1 && accessData.unEPCLength > 0)
            {
                //Get EPC from accessData.pnEPC;
            }
        }
    }
}
//Close the RFID Reader
R1000Reader.RFIDClose(0);
//Destroy RFID Library
R1000Reader.RFIDDestroy();
```

13 Useful function call – without include SysIOAPI.DLL

Below API maybe useful for you to control HT6xx/PA96x

13.1.1 Warm-boot. Cold-boot and power off

```
#include <pkfuncs.h>
#include "oemioctl.h"

// Warn boot
KernelloControl(IOCTL_HAL_REBOOT, NULL, 0, NULL, 0, NULL);

// Cold boot
KernelloControl(IOCTL_COLD_BOOT, NULL, 0, NULL, 0, NULL);

// Power off
{
    DWORD dwExtraInfo=0;
    BYTE bScan=0;
    keybd_event( VK_OFF, bScan, KEYEVENTF_SILENT, dwExtraInfo );
    keybd_event( VK_OFF, bScan, KEYEVENTF_KEYUP, dwExtraInfo );
}
```

14 Get Device ID

In HT6xx/PA96x, an unique ID had been burnt into terminal, user can check it by pressing "Func"+"9".

The sample code for read device ID as follow,

```
////////////////////////////////////
HWND hDeviceId = GetDlgItem(hWnd, IDC_DEVICEID);

PDEVICE_ID pDeviceID = NULL;
TCHAR outBuf[512], deviceID[200];
DWORD bytesReturned;
char platformID[64];

pDeviceID = (PDEVICE_ID)outBuf;
pDeviceID->dwSize = sizeof(outBuf);
if (KernelIoControl(IOCTL_HAL_GET_DEVICEID, NULL, 0, outBuf, sizeof(outBuf), &bytesReturned))
{
    // Platform ID
    memcpy((PBYTE)platformID, (PBYTE)pDeviceID + pDeviceID->dwPlatformIDOffset, pDeviceID->dwPlatformIDBytes);
    // Device ID
    memcpy((PBYTE)deviceID, (PBYTE)pDeviceID + pDeviceID->dwPresetIDOffset, pDeviceID->dwPresetIDBytes);
}
////////////////////////////////////
```

The code will have platformID holds Platform ID, and deviceID holds Device ID.

15 Get OEM Info

In HT6xx/PA96x, an OEM ID had been burnt into terminal, user can check it by pressing "Func"+"9".

The sample code for read OEM ID as follow,

```
////////////////////////////////////
{
    TCHAR szBuff[500];

    ZeroMemory(szBuff, sizeof(szBuff));

    SystemParametersInfo(SPI_GETOEMINFO, 500, (LPVOID)szBuff, 0);

    MessageBox(szBuff);
}
////////////////////////////////////
```

16 Get firmware and bootloader version info

```
////////////////////////////////////
{
    DEVICE_CONFIG cfg;
    if (KernelIoControl(IOCTL_GET_DEVICE_CONFIG, NULL, 0, &cfg, sizeof(cfg), NULL))
    {
        //Get OS Version
        mbstowcs(stringBuffer, cfg.swVersion, strlen(cfg.swVersion));
        swprintf(szProductID, _T("OS version : %s"), stringBuffer);
        Show(szProductID);

        //Get Bootloader Version
        memset(stringBuffer, 0, sizeof(stringBuffer));
        mbstowcs(stringBuffer, cfg.bootloadversion, strlen(cfg.bootloadversion));
        wsprintf(szProductID, _T("Bootloader version : %s"), stringBuffer);
        Show(szProductID);
    }
}
////////////////////////////////////
```

17 Camera related functions (C#)

Please get C# sample program from below URL.

http://w3.tw.ute.com/pub/cs/software/Sample_Program/Camera/CameraDemo_C_Sharp.zip

17.1 Open Camera

Function Description:

Open camera and initial video resource for encoding / decoding processes. This must be called before any other functions.

Function Call:

```
bool OpenCamera();
```

Return code:

```
TRUE:           Success.  
FALSE:         Fail
```

17.2 Release Camera

Function Description:

Close camera and release video resource. This must be called after using the camera.

Function Call:

```
void ReleaseCamera();
```

17.3 Start Preview

Function Description:

Start preview within a rectangle area as given in the parameters. Using screen coordinates. Actual displaying area can be a little smaller than the rectangle for hardware reasons. Preview is camera real time image. This must be called before capturing image or recording video.

Function Call:

```
bool StartPreview(int left, int top, int width, int height);
```

Parameter:

```
left:           Left of preview position.  
top:           Top of preview position.  
width:         Width of preview size.  
height:        Height of preview size.
```

Return code:

```
TRUE:           Success.  
FALSE:         Fail.
```

17.4 Stop Preview

Function Description:

Finish the preview. This must be called before starting playback

Function Call:

```
void StopPreview();
```

17.5 Get transparent color key

Function Description:

Get which color is transparent of display context. The transparent pixels will be replaced by camera image.

Function Call:

```
int GetColorKey();
```

Return code:

The color key is described by ARGB value.

17.6 Capture Image

Function Description:

Capture a photo with the specified resolution and store in JPEG file format. This must be called within StartPreview() and StopPreview().

Function Call:

```
bool CaptureImage(string filename, int width, int height);
```

Parameter:

| | |
|-----------|-----------------------|
| filename: | Storing path. |
| width: | Width of resolution. |
| height: | Height of resolution. |

Return code:

| | |
|--------|----------|
| TRUE: | Success. |
| FALSE: | Fail. |

17.7 Start Capture Video

Function Description:

Start video capturing with the specified resolution and frame rate. This will record video in "m4v" file format continuously until called EndVideoCapture(). This must be called within StartPreview() and StopPreview().

Function Call:

```
bool StartVideoCapture(string filename, int width, int height,int fps);
```

Parameter:

| | |
|-----------|--------------------------------|
| filename: | Storing path. |
| width: | Width of resolution. |
| height: | Height of resolution. |
| fps: | Frame rate of recording video. |

Return code:

| | |
|--------|----------|
| TRUE: | Success. |
| FALSE: | Fail. |

17.8 Stop Capture Video

Function Description:

Stop video capturing.

Function Call:

bool EndVideoCapture()

Return code:

TRUE: Success.
FALSE: Fail.

17.9 Initial Playback Decoder

Function Description:

Initial the playback decoder.

Function Call:

bool InitializeDecoder(string filename, int left, int top, int width, int height);

Parameter:

filename: Video file path.
left: Left of playback position.
top: Top of playback position.
width: Width of playback size.
height: Height of playback size.

Return code:

TRUE: Success.
FALSE: Fail.

17.10 Release Playback Decoder

Function Description:

Release the playback decoder.

Function Call:

void UnInitializeDecoder();

17.11 Start Playback

Function Description:

Start playing video. Playback will be displayed in the same screen as the preview screen.

Function Call:

bool StartPlayback();

Return code:

TRUE: Success.
FALSE: Fail.

17.12 Stop Playback

Function Description:

Stop playing video.

Function Call:

```
void ReleaseAudio();
```

18 Fingerprint related functions

Please get sample program and manual from below URL.

http://w3.tw.ute.com/pub/cs/software/Sample_Program/PA968/Fingerprint.zip

19 *GPS related functions*

Please get sample program and manual from below URL.

http://w3.tw.ute.com/pub/cs/software/Sample_Program/PA968/GPS_SDK1.01.zip

20 USI .NET Compact Framework Component

Please get sample program and manual from below URL.

http://w3.tw.ute.com/pub/cs/software/Sample_Program/USICF/usicf_v25.zip

21 USI ActiveX Control

Please get binary file and html example from below URL.

http://w3.tw.ute.com/pub/cs/software/Sample_Program/USIActiveX/USIActiveX.zip

21.1 Register Control

- Copy Microsoft "REGSVRCE.exe" to device.
- Run "REGSVRCE.exe ScannerActiveX.dll" to register control.
- Warmboot device to apply system change.

21.2 Embedded to html

```
<OBJECT ID="Scanner"
  CLASSID="CLSID:E81DD955-9B99-4493-8035-355DFB5028D9"
  WIDTH=0 HEIGHT=0>
</OBJECT>
```

21.3 Operate control by script language

a. Enable Scanner:

```
<SCRIPT LANGUAGE="Javascript">
  function OnRegister() { Scanner.Register=1 }
  function OnUnregister() { Scanner.Register=0 }
  function OnEnable() { Scanner.Scan=1 }
  function OnDisable() { Scanner.Scan=0 }
</SCRIPT>

<INPUT NAME="REGISTER1" TYPE="BUTTON" VALUE="Register" onClick="OnRegister()" >
<INPUT NAME="ENABLE" TYPE="BUTTON" VALUE="Enable" onClick="OnEnable()" >
<INPUT NAME="DISABLE1" TYPE="BUTTON" VALUE="Disable" onClick="OnDisable()" >
<INPUT NAME="UNREGISTER" TYPE="BUTTON" VALUE="Unregister" onClick="OnUnregister()" >
```

b. Change Hamster Setting:

```
<SCRIPT LANGUAGE="Javascript">
  function OnUPCEnable()
  {
    Scanner.SetHamster(0x79,1);
  }

  function OnUPCDisable()
  {
    Scanner.SetHamster(0x79,0);
  }
</SCRIPT>

<INPUT NAME="UPC_Enable" TYPE="BUTTON" VALUE="UPC E Enable" onClick="OnUPCEnable()" >
<INPUT NAME="UPC_Disable" TYPE="BUTTON" VALUE="UPC E Disable" onClick="OnUPCDisable()" >
>
```

22 32WAN GPRS library

Please get sample program and manual from below URL.

http://w3.tw.ute.com/pub/cs/software/Sample_Program/32WAN/32WAN_SDK.zip

23 Update notes

- V1.0 The first version
- V1.1 Wrong URL link for C# on chapter 1.4
- V1.2 PA982 support
- V1.3 Add RH767 HF/UHF programming on chapter 9 & 10
- V1.4 Modify RH767 HF programming on chapter 9.
- V1.6 Change logo
- V1.7 Modify SDK URL
- V1.8 Add RH767 UHF SkyeTek programming on chapter 11
- V1.9 Add HF API in chapter 9.
- V1.10 PA968 support and include camera, fingerprint, GPS and GPRS programming guide
- V1.11 Update the HF API.
- V1.12 Remove HF multi tag API.
- V1.13 Add Matrix 2 of 5 supporting which sharing setting with Toshiba code on page 14, 15 and 22
- V1.14 Add description about retrieve firmware and bootloader version info.
- V1.15 Add RFID reader Kitty
- V1.16 Modify for HT680.
- V.117 Document error - SD/Vibration API for PA968
Modify RFID SDK link