Programming Guide

VIA Smart ETK SDK

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Revision History

Version	Date	Changes
0.0.1	2014/04/03	Initial draft – SmartETK v0.0.11
0.0.2	2014/08/01	Add UART module and remove network Ethernet functions Modify watch dog scenario – SmartETK v0.0.17 – add timeout and keep alive functions

1. Introduction

VIA Smart ETK SDK supports the hardware controlling API for Network, Watch Dog, RTC, and UART modules.

Smart ETK is programmed with the socket IO as the communication between JAVA and C language to control hardware modules. We implement the board support service like bss_vt6080 to listen the request from Smart ETK API. We bind 127.0.0.1 as the internal listening IP, to keep it from establishing the connection with the external network.

2. System Requirements

2.1 Hardware Requirements

VIA Smart ETK SDK is compatible with the following main board:

DS2 (VT6080) with Android BSP

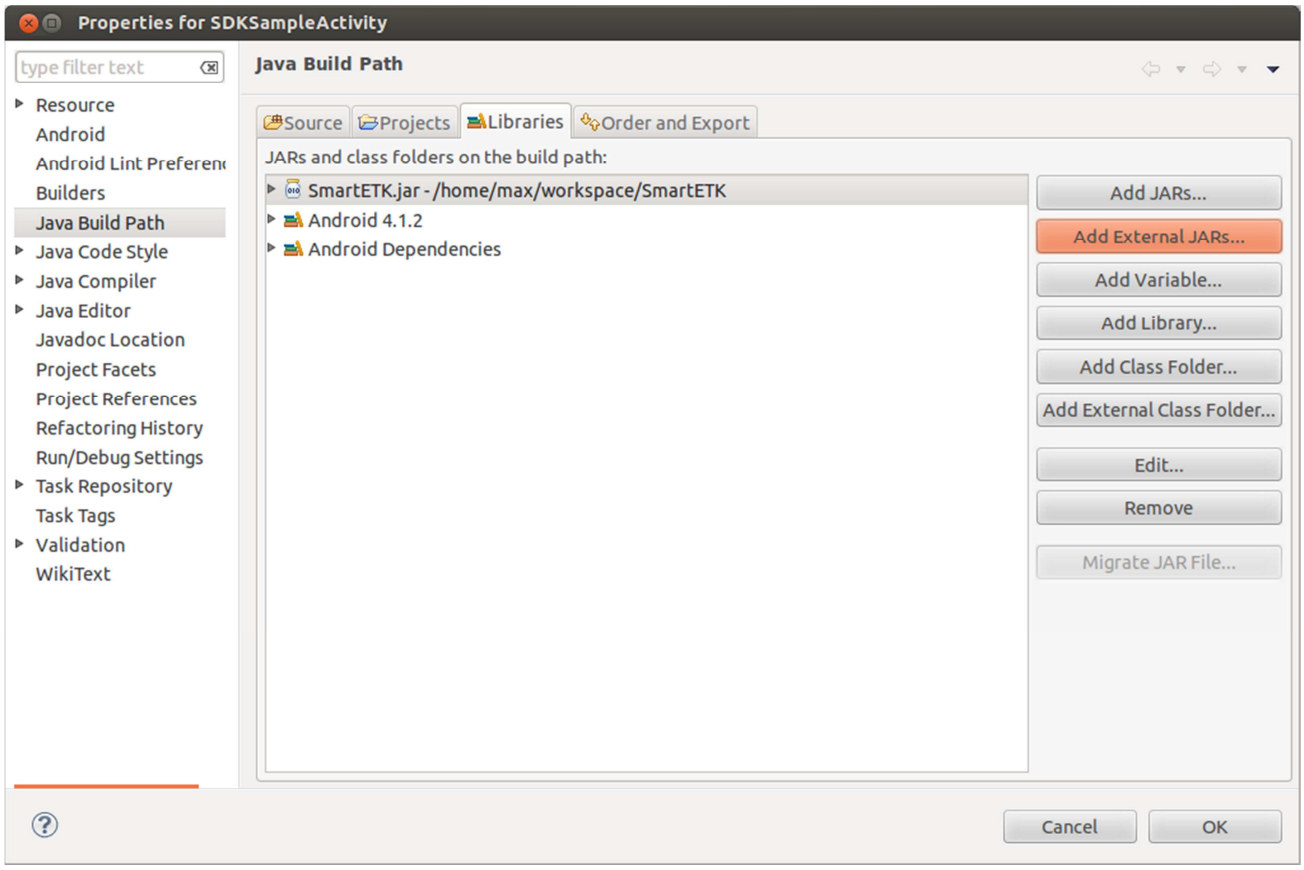
2.2 Software Requirements

Microsoft Windows or Ubuntu Linux
Eclipse IDE with Android Development Tools (ADT) installed

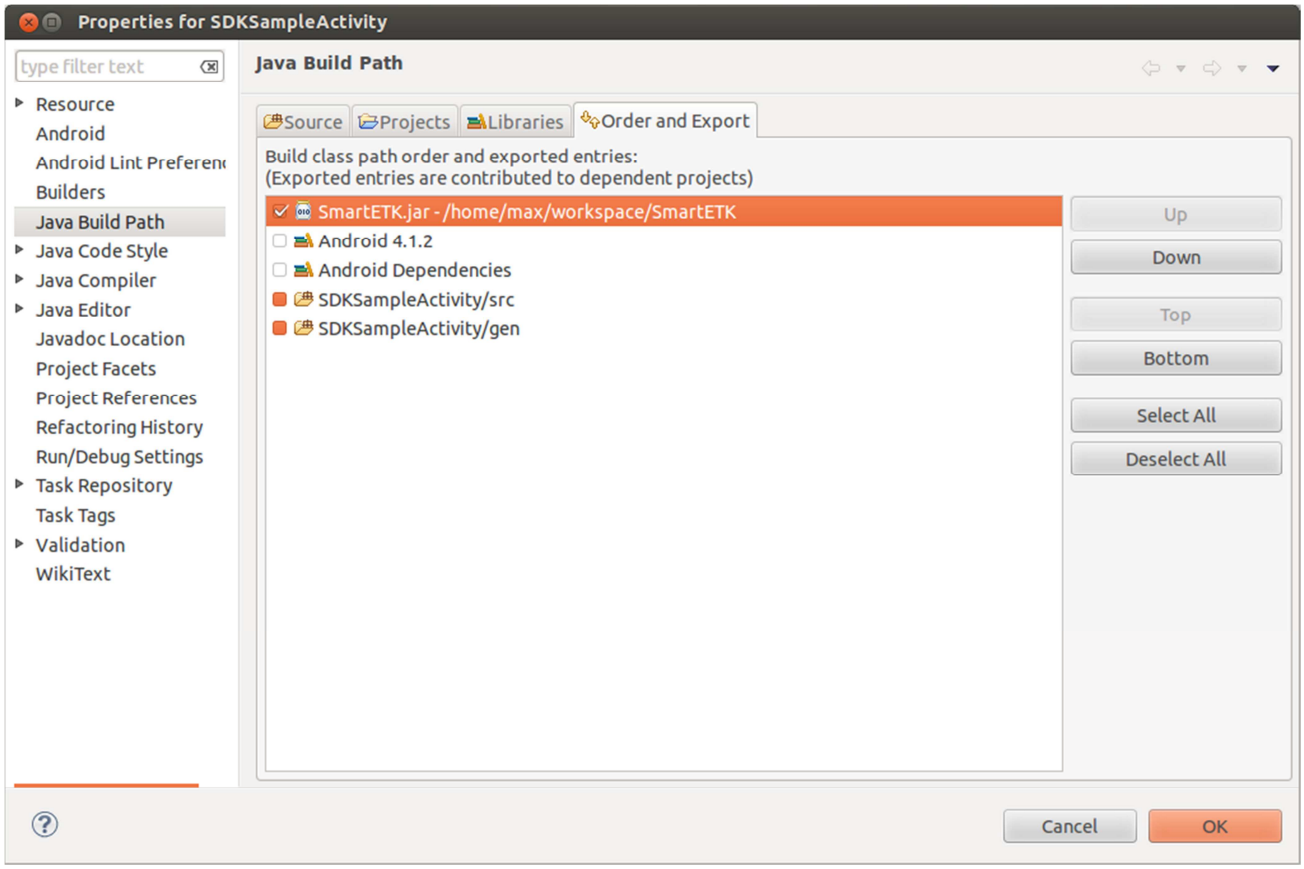
3. Install and Usage

3.1 Installation on development computer

Open Eclipse IDE and create an Android project. In project properties, import SmartETK.jar by “Add External JARs...” into project.



Select “Order and Export” tab, move SmartETK.jar to the top and choose it.



3.2 Installation on target board

Install VIA released firmware and done.

4. Smart ETK SDK API

4.1 Class definitions

Network, Watch Dog, RTC, and UART modules are placed in class named com.viaembedded.smartetk, and returned values is placed in class named com.viaembedded.smartetk. Import this package com.viaembedded.smartetk.* into Java code to use them.

4.2 Function return values

There are some types of return values found throughout the Smart ETK SDK API.

SmartETK.S_OK

The S_OK return value has the constant value 0. When a function returns the S_OK value, that indicates that the function has successfully completed.

SmartETK.E_FAIL

When a function returns the E_FAIL value, that indicates that the function has failed to complete.

SmartETK.E_VERSION_NOT_SUPPORT

When a function returns the E_VERSION_NOT_SUPPORT value, that indicates that the versions of SmartETK.jar and bsservice are not compatibility.

SmartETK.E_INVALID_ARG

When a function returns the E_INVALID_ARG value, that indicates that the arguments are invalid.

SmartETK.E_FUNC_NOT_SUPPORT

When a function returns the E_FUNC_NOT_SUPPORT value, that indicates that the function is not supported on this board.

SmartETK.E_CONNECTION_FAIL

When a function returns the E_CONNECTION_FAIL value, that indicates that the bsservice doesn't response the request. Please make sure bsservice is running successfully.

SmartETK.E_NOT_RESPOND_YET

When a function returns the E_NOT_RESPOND_YET value, that indicates that the bsservice function is still running and doesn't be finished yet.

SmartETK.E_TIMEOUT

When a function returns the E_TIMEOUT value, that indicates that there is no corresponding data had been received within the period.

SmartETK.E_UART_OPENFAIL

When Uart.open() returns the E_UART_OPENFAIL value, that indicates that the UART device can't be opened successfully. Please make sure the name of the tty device is existent.

SmartETK.E_UART_NOT_OPEN

When a function returns the E_UART_NOT_OPEN value, that indicates that uart object cannot be operated normally. It might represent the application doesn't

open uart device before calling other operating function; or it was reset by the other uart object.

SmartETK.E_UART_ALREADY_OPENED

When Uart.open() returns the E_UART_ALREADY_OPENED value, that indicates that the uart object had been opened. If you need to open other uart device, please calling close function to close the current device, then open the other uart again.

SmartETK.E_UART_TTY_BEEN_USED

When Uart.open() returns the E_UART_TTY_BEEN_USED value, that indicates that the tty device had been used by other uart object. If you want to use it, you can call reset function to release the resource and open it again.

SmartETK.E_UART_BAUDRATE_NOT_SUPPORT

When Uart.setConfig() returns the E_UART_BAUDRATE_NOT_SUPPORT value, that indicates that baud rate is not support.

4.3 Network Class

Network Class

Syntax:

```
Network();
```

Description:
Create a new Network object.

Example:
Create an Network object.

```
Network m_network = new Network();
```

Network.setWakeOnLan()

Syntax:

```
int setWakeOnLan(boolean bEnable);
```

Description:
Enable or disable Network wake on LAN function from suspend mode.

Parameters:
bEnable – enable or disable Network wake on LAN function from suspend mode.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

Network.getWakeOnLan()

Syntax:

```
int getWakeOnLan(boolean[] bEnable);
```

Description:
Get the status if Network wake on LAN function from suspend mode is enabled or disabled.

Parameters:
bEnable – return true for enable, return false for disable.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

4.4 WatchDog Class

WatchDog Class

Syntax:

```
WatchDog();
```

Description:
Create a new WatchDog object.

Example:
Create an WatchDog object.

```
WatchDog m_watchdog = new WatchDog();
```

WatchDog.setEnable()

Syntax:

```
int setEnable(boolean bEnable);
```

Description:
Enable or disable watch dog function. If watch dog function was enabled, it should be fed within a period, otherwise the system will reboot.

Parameters:
bEnable – enable or disable watch dog function.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

WatchDog.getEnable()

Syntax:

```
int getEnable(boolean[] bEnable);
```

Description:
Get the status if watch dog function is enabled or disabled.

Parameters:
bEnable – return true for enable, return false for disable.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

WatchDog.setTimeout()

Syntax:

```
int setTimeout(int iTimeout);
```

Description:
Set watch dog timeout value. The argument is an integer representing the timeout in seconds.

Parameters:
iTimeout – timeout value. (only support timeout in 2, 4, 8, 16, 32, and 64 seconds).

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

WatchDog.getTimeout()

Syntax:

```
int getTimeout(int[] iTimeout);
```

Description:
Get watch dog timeout value.

Parameters:
iTimeout – return timeout value.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

WatchDog.keepAlive()

Syntax:

```
int keepAlive();
```

Description:
Keep watch dog alive to avoid rebooting the system.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

4.5 RTC Class

RTC Class

Syntax:

```
RTC();
```

Description:
Create a new RTC object.

Example:
Create an RTC object.

```
RTC m_rtc = new RTC();
```

RTC.setWakeUpTime()

Syntax:

```
int setWakeUpTime(byte byMode, int iYear, byte byMonth, byte byDay, byte byHour, byte byMin, byte bySec);
```

Description:

Set the wake up time and mode in RTC. The behavior of wake up from suspend mode will start at the wake up time, and it must loop according to the wake up mode.

Parameters:

byMode –
- RTC.ARG_RTC_MODE_DAY for wake up every day.
- RTC.ARG_RTC_MODE_MONTH for wake up every month.
- RTC.ARG_RTC_MODE_WEEK for wake up every week.

iYear – Year since 1900 ~ 2155 for wake up time
byMonth – Month (1 ~ 12) for wake up time
byDay – Day of the month (1 ~ 31) for wake up time
byHour – Hours (0 ~ 23) for wake up time
byMin – Minutes (0 ~ 59) for wake up time
bySec – Seconds (0 ~ 59) for wake up time

Return:

S_OK – if the function succeeds.
E_* – if the function fails.

RTC.getWakeUpTime()

Syntax:

```
int getWakeUpTime(RTCStatus RS);
```

Description:

Get the wake up time and mode set in RTC.

Parameters:

RTCStatus – Wake up time and mode set in RTC

```
class RTCStatus
{
        byMode –
                RTC.ARG_RTC_MODE_DAY for wake up every day.
                RTC.ARG_RTC_MODE_MONTH for wake up every month.
                RTC.ARG_RTC_MODE_WEEK for wake up every week.
        iYear – Year since 1900 ~ 2155 for wake up time
        byMonth – Month (1 ~ 12) for wake up time
        byDay – Day of the month (1 ~ 31) for wake up time
        byHour – Hours (0 ~ 23) for wake up time
        byMin – Minutes (0 ~ 59) for wake up time
        bySec – Seconds (0 ~ 59) for wake up time
}
```

Return:

S_OK – if the function succeeds.

E_* – if the function fails.

RTC.setEnable()

Syntax:

```
int setEnable(boolean bEnable);
```

Description:
Enable or disable RTC wake up function from suspend mode.

Parameters:
bEnable – enable or disable RTC wake up function from suspend mode.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

RTC.getEnable()

Syntax:

```
int getEnable(boolean[] bEnable);
```

Description:
Get the status if wake up function from suspend mode is enabled or disabled.

Parameters:
bEnable – return true for enable, return false for disable.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

4.6 Uart Class

Uart Class

Syntax:

```
Uart();
```

Description:
Create a new Uart object.

Example:
Create an Uart object.

```
Uart m_uart = new Uart();
```

Uart.open()

Syntax:

```
int open(String sDev);
```

Description:
Open the specified Uart device.

Parameters:
sDev – Uart device name. (Ex. ttyS0, ttyS2)

Return:
S_OK – if the function succeeds.
E_UART_OPENFAIL – open device is failed.
E_UART_ALREADY_OPENED – object already had been opened.
E_UART_TTY_BEEN_USED – device had been used by other object.
E_* – if the function fails.

Uart.close()

Syntax:

```
int close();
```

Description:
Close the current opened Uart device.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

Uart.setConfig()

Syntax:

```
int setConfig(int iBaudRate, byte byDataBIts, byte byStopBits, byte byParity, byte byFlowCtrl);
```

Description:
Set the configurations of the opened Uart device.

Parameters:
iBaudRate – baud rate (Ex. 115200)
byDataBits – data bits. 7: 7-bit data bits; 8: 8-bit data bits
byStopBits – stop bits. 1: 1-stop bits; 2: 2-stop bits
byParity – parity. 0: none; 1: odd; 2: even
byFlowCtrl – flow control. 0: none; 1: CTS/RTS

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

Uart.getConfig()

Syntax:

```
int getConfig(UartConfig UC);
```

Description:
Get the configurations of the opened Uart device and stored them in passed UartConfig Class.

Parameters:
UartConfig – Uart Configuration

class UartConfiguration
{
	int iBaudRate – baud rate (Ex. 115200)
	byte byDataBits – data bits. 7: 7-bit data bits; 8: 8-bit data bits
	byte byStopBits – stop bits. 1: 1-stop bits; 2: 2-stop bits
	byte byParity – parity. 0: none; 1: odd; 2: even
	byte byFlowCtrl – flow control. 0: none; 1: CTS/RTS
}

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

Example:

```
UartConfig UC = m_uart.new UartConfig();

if(SmartETK.S_OK != m_uart.getConfig(UC))
{
	cleanStatus();
	return;
}
```

Uart.setTimeout()

Syntax:

```
int setTimeout(boolean bEnable, int iTimeout);
```

Description:
Set the timeout of the opened Uart device.
bEnable = true, iTimeout = 0 (polling read)
bEnable = true, iTimeout > 0 (read with timeout)
bEnable = false (blocking read)

Parameters:
bEnable – enable or disable timeout function.
iTimeout – timeout value. Range 0 – 255 (0 ~ 25.5 seconds), unit is 0.1 second.

Return:
S_OK – if the function succeeds.

E_* – if the function fails.

Uart.getTimeout()

Syntax:

int getTimeout(Timeout T);

Description:

Get the timeout configuration of the opened Uart device and stored them in passed Timeout Class.

Parameters:

Timeout – timeout configuration

class Timeout

{

boolean bEnable – enable or disable timeout function

int iTimeout – timeout value. Range 0 – 255 (0 ~ 25.5 seconds), unit is 0.1 second.

}

Return:

S_OK – if the function succeeds.

E_* – if the function fails.

Example:

```
Timeout T = m_uart.new Timeout();

if(SmartETK.S_OK != m_uart.getTimeout(T))
{
        cleanStatus();
        return;
}
```

Uart.setReturnChar()

Syntax:

int setReturnChar(boolean bEnable, byte byReturnChar);

Description:

Set the termination character of the opened Uart device.
bEnable = true (blocking until byReturnChar is received, or read buffer is full.)
bEnable = false (ignore byReturnChar checking when reading data)

Parameters:
bEnable – enable or disable the termination character function.
byReturnChar – the termination character

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

Uart.getReturnChar()

Syntax:

int getReturnChar(ReturnChar RC);

Description:

Get the termination character configuration of the opened Uart device and stored them in passed ReturnChar Class.

Parameters:

ReturnChar – termination character configuration

class ReturnChar

{

boolean bEnable – enable or disable the termination character function

byte byReturnChar – the termination character

}

Return:

S_OK – if the function succeeds.

E_* – if the function fails.

Example:

```
ReturnChar RC = m_uart.new ReturnChar();

if(SmartETK.S_OK != m_uart.getReturnChar(RC))
{
        cleanStatus();
        return;
}
```

Uart.readData()

Syntax:

```
int readData(int iReadLen, byte[] byRead, int[] iActualLen);
```

Description:
receive data from the opened Uart device.

Parameters:
iReadLen – number of bytes to read, maximum 1024 bytes per transfer.
byRead – pointer to the buffer pointer.
iActualLen – the actual number of bytes received.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

Uart.readData()

Syntax:

```
int readData(int iReadLen, byte[] byRead);
```

Description:
receive data from the opened Uart device.

Parameters:
iReadLen – number of bytes to read, maximum 1024 bytes per transfer.
byRead – pointer to the buffer pointer.

Return:
>=0 – if the function succeeds, return the actual number of bytes received.
<0(E_*) – if the function fails.

Uart.writeData()

Syntax:

```
int writeData(int iWriteLen, byte[] byWrite);
```

Description:
send the data to the opened Uart device.

Parameters:
iWriteLen – number of bytes to transmit, maximum 1024 bytes per transfer.
byWrite – pointer to data buffer.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

Uart.reset()

Syntax:

```
int reset();
```

Description:
reset the opened or open failed Uart device.
If the uart device had been used by other object, open function will return E_UART_ALREADY_OPENED fails. The object could call reset function to release the uart resource and call open uart device again.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

4.7 SystemETK Class

SystemETK Class

Syntax:

```
SystemETK();
```

Description:
Create a new SystemETK object.

Example:
Create a SystemETK object.

```
SystemETK m_system = new SystemETK();
```

SystemETK.reboot()

Syntax:

```
int reboot();
```

Description:
Reboot the machine.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

SystemETK.suspend()

Syntax:

```
int suspend();
```

Description:
Suspend the machine.

Return:
S_OK – if the function succeeds.
E_* – if the function fails.

5. Annex A: Network

5.1 Set Wake On LAN From Suspend mode

The following is the sample code:

```
boolean bSetEnable = true;

if(null == m_network)
        m_network = new Network();

if(SmartETK.S_OK != m_network.setWakeOnLan(bSetEnable))
{
        return false;
}
```

5.2 Get Wake On LAN From Suspend mode Status

The following is the sample code:

```
if(null == m_network)
        m_network = new Network();

boolean[] bGetEnable = new boolean[1];

if(SmartETK.S_OK != m_network.getWakeOnLan(bGetEnable))
{
        return false;
}

return bGetEnable[0];
```

6. Annex B: Watch Dog

6.1 Enable Watch Dog

The following is the sample code:

```
if(null == m_watchdog)
        m_watchdog = new WatchDog();

if(SmartETK.S_OK != m_watchdog.enable(true))
        return false;
```

6.2 Disable Watch Dog

The following is the sample code:

```
if(null == m_watchdog)
        m_watchdog = new WatchDog();

if(SmartETK.S_OK != m_watchdog.enable(false))
        return false;
```

6.3 Set Watch Dog Timeout Value

The following is the sample code:

```
if(null == m_watchdog)
        m_watchdog = new WatchDog();

if(SmartETK.S_OK != m_watchdog.setTimeout(32))
        return false;
```

6.4 Get Watch Dog Status

The following is the sample code:

```
if(null == m_watchdog)
        m_watchdog = new WatchDog();

boolean[] bGetEnable = new boolean[1];
int[] iTimeout = new int[1];

if(SmartETK.S_OK == m_watchdog.getEnable(bGetEnable))
{
        /* Do something ... */
}

if(SmartETK.S_OK == m_watchdog.getTimeout(iTimeout))
{
        /* Do something ... */
}
```

6.5 Keep Watch Dog Alive

The following is the sample code:

```
if(null == m_watchdog)
        m_watchdog = new WatchDog();

if(SmartETK.S_OK != m_watchdog.keepAlive())
        return false;
```

7. Annex C: RTC

7.1 Set RTC Wake Up From Suspend mode

The following is the sample code:

```
boolean bSetEnable = true;

if(null == m_rtc)
        m_rtc = new RTC();

if(SmartETK.S_OK != m_rtc.setEnable(bSetEnable))
{
        return false;
}
```

7.2 Get RTC Wake Up Status

The following is the sample code:

```
if(null == m_rtc)
        m_rtc = new RTC();

boolean[] bGetEnable = new boolean[1];

if(SmartETK.S_OK != m_rtc.getEnable(bGetEnable))
{
        return false;
}
```

7.3 Set RTC Wake Up Time

Wake up from suspend since 2014/5/1, every day at 12:00.
The following is the sample code:

```
byte byMode =  RTC.ARG_RTC_MODE_DAY;
int iYear = 2014;
byte byMonth = IntToByte(5);
byte byDay = IntToByte(1);
byte byHour = IntToByte(12);
byte byMin = IntToByte(0);
byte bySec = IntToByte(0);

if(null == m_rtc)
        m_rtc = new RTC();

if(SmartETK.S_OK != m_rtc.setWakeUpTime(byMode, iYear , byMonth , byDay , byHour , byMin , bySec))
{
        return false;
}
```

7.4 Get RTC Wake Up Time

The following is the sample code:

```
if(null == m_rtc)
{
        m_rtc = new RTC();
        m_RS = m_rtc.new RTCStatus();
}

if(SmartETK.S_OK != m_rtc.getWakeUpTime(m_RS))
{
        return false;
}
```

8. Annex D: UART

8.1 UART Initialize Communication

The following is the sample code:

```
private Uart m_uart = null;

m_uart = new Uart();
if(null == m_uart)
{
	cleanStatus();
	return;
}

if(SmartETK.S_OK != m_uart.open((m_sDev = mETDev.getText().toString())))
{
	cleanStatus();
	return;
}

if(SmartETK.S_OK != m_uart.setConfig((m_iBaudRate = Integer.valueOf(mETBaudRate.getText().toString())), (byte)8,
(byte)1, (byte)0, (byte)0))
{
	cleanStatus();
	return;
}
```

8.2 UART Write Data

The following is the sample code:

Notice that “mETWrite” is the EditView to store writing texts.

```
if(SmartETK.S_OK != m_uart.writeData(mETWrite.getText().toString().getBytes().length,
mETWrite.getText().toString().getBytes()))
{
	return;
}
```

8.3 UART Read Data

The following is the sample code:

```
int iReadLen = LENGTH;
byte[] byRead = new byte[LENGTH];
int[] iActualLen = new int[1];

while(SmartETK.S_OK == m_mainThreadUart.readData(iReadLen, byRead, iActualLen))
{
	if(0 == iActualLen[0])
		continue;

	/* Process received byRead byte array ... */

	for(int i = 0; i < byRead.length; i++)
		byRead[i] = 0;

	iActualLen[0] = 0;
}
```

9. Annex E: SystemETK

9.1 Reboot the Machine

The following is the sample code:

```
private SystemETK m_system = null;


if(null == m_system)
        m_system = new SystemETK();

if(SmartETK.S_OK != m_system.reboot())
        return;
```

9.2 Suspend the Machine

The following is the sample code:

```
private SystemETK m_system = null;


if(null == m_system)
        m_system = new SystemETK();

if(SmartETK.S_OK != m_system.suspend())
        return;
```