Tutorial 2 – Sensor Tag IO: LED, Serial Input/Output, Buzzer Control and IEEE Address

Aim

This tutorial shows you how to control the LEDs, buzzer and serial input using contiki on the SensorTag.

- **Concepts**

1. LED
2. Buttons
3. Serial Input/Output
4. Buzzer
5. IEEE Address

LEDs

Example: contiki-examples/hello-world

The SensorTag has two user LEDs – Red and Yellow. The following functions and definitions are used. The “dev/leds.h” header file must be included.

Defines used in functions	
LEDS_GREEN	Green LED only
LEDS_RED	Red LED only
LEDS_ALL	All LEDs

Function Name	**Operation**
leds_get(void);	Get value of LEDs
leds_set(unsigned char led);	Set LEDs on or off
leds_on(unsigned char led);	Turn on specified LEDs
leds_off(unsigned char led);	Turn off specified LEDs
leds_invert(unsigned char led);	Invert LED value
leds_toggle(unsigned char led);	Toggle LED value

e.g. `leds_toggle(LEDS_GREEN)`

Acknowledgement: Dr. Matt D’ Souza (University of Queensland), Dr. Brano Kusy (CSIRO)

Serial Input/Input

Example: contiki-examples/serial-interface

Contiki supports serial input and output. Printf is commonly used for serial output. A process event is used for serial input (receiving). The “dev/ serial-line.h” header file must be included.

Function Name	Operation
Printf(“string”, parameters)	Prints string via serial port

Event	Operation
serial_line_event_message	Receive serial input event

The kermit terminal (kermusb script) can be used to send/receive serial input/output from the sensortag. The Kermit.sh can be found in: “contiki-examples/tools”. To make it work, you need the following commands:

```
chmod +X kermusb.sh
sudo apt-get install ckermit
./kermusb.sh
```

You will see the following information:

```
user@instant-contiki:~/comp6733/contiki-examples/tools$ ./kermusb.shConnecting to
/dev/ttyACM0, speed 115200
 Escape character: Ctrl-\ (ASCII 28, FS): enabled
Type the escape character followed by C to get back,
or followed by ? to see other options.
```

Now try to type some letters such as “abc”, hold CTRL and then press ENTER at the end of typing for the serial driver to work. The terminal will display the following information with a beep:

```
received line: ▯�`�f�▯
```

re-type abc, and hold CTRL and then press ENTER, it will show the following information with a beep:

```
received line: abc
```

Note: you need reboot the kermusb every time you restart a new program.

Buzzers

Example: contiki-examples/serial-interface/serial-interface.c

Acknowledgement: Dr. Matt D’ Souza (University of Queensland), Dr. Brano Kusy (CSIRO)

The SensorTag has a buzzer. The following functions are used. The “buzzer.h” header file must be included.

Function Name	Operation
buzzer_start(int frequency value)	Turn on buzzer for
buzzer_stop()	Turn off buzzer

E.g. turn on buzzer at 10kHz

```
buzzer_start(10000);
```

NOTE: Must hold CTRL and then press ENTER at the end of typing.

When you reset the Node, you will see the new ID appear in the bootup message.

IEEE Address

You may get the IEEE (MAC) address of your device by using the following API:

```
include “ieee-addr.h”
void ieee_addr_cpy_to (unit8_t *dst, uint8_t length);
```

Conclusion

This tutorial shows you how to control the LEDs, buzzer and serial input using contiki on the SensorTag. Refer to the Contiki documentation for more information.

Related Documentation

- Contiki Wiki