UNIVERSIDADE TECNOLÓGICA FEDERAL DO PARANÁ

Sensores na Internet das Coisas

Disciplina:
Internet das Coisas
(TECS1)

Prof. Hermano Pereira

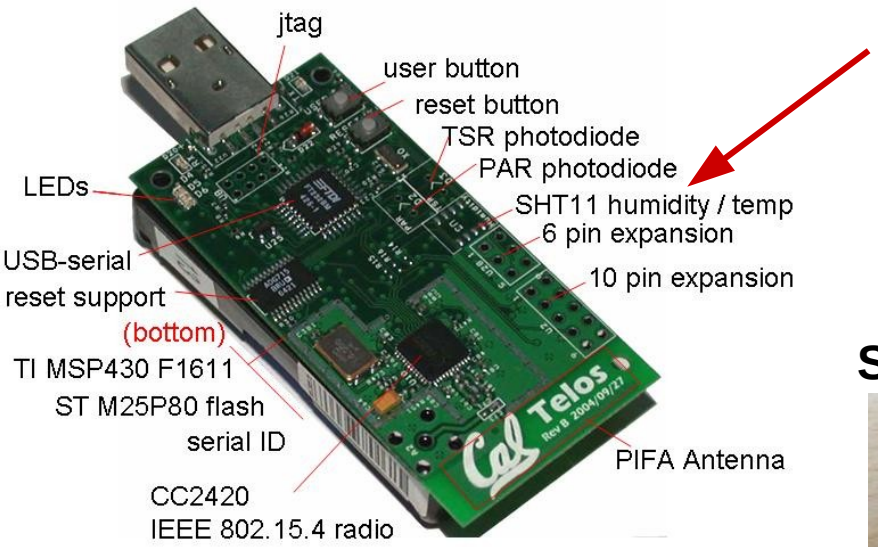
TSI – UTFPR - GP

Sensores na IoT

- → Componente eletrônico
- → Detectar eventos/mudanças no ambiente
- → Enviar informação
- → Também atuador
- → Mais comuns: temperatura, umidade, luz ...

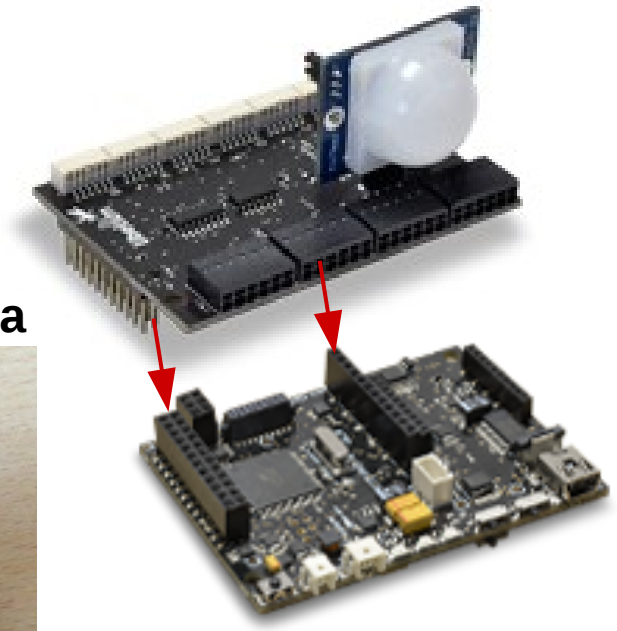
Sensores em Motes

Sensores Integrados



TelosB + SHT11 Temp+Umidade

Sensores em Placas



Waspmote +
Event Sensor

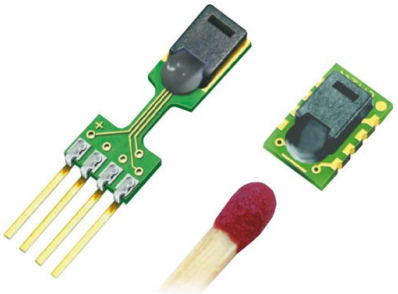
Sensores por Pinos/Solda

TelosB + Buzzer

Tipos Sensores

Temperatura e Umidade

SHT11



-40º a 128º C (+-0.4)

0-100% (+-3%)

SHT25

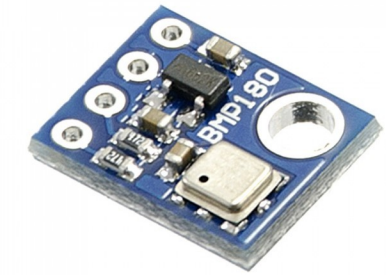
-40º a 128º C (+-0.2)

0-100% (+-1.8%)

→ em motes Sky/TelosB

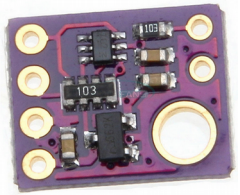
Tipos Sensores

Pressão Atmosférica



BMP180
Bosch

Luminosidade



MAX44009

Movimento

MS-320LP

→ em motes Z1

Tipos Sensores

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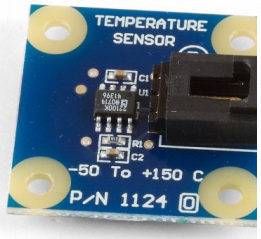
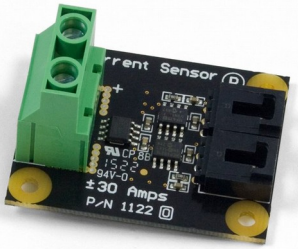
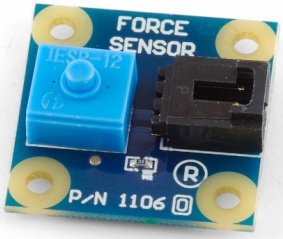
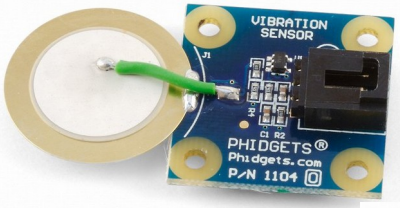
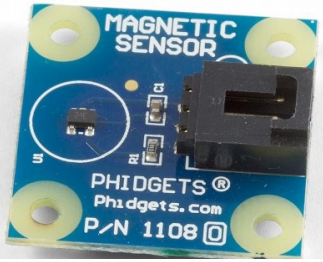
Phidgets.com











Tipos Sensores

Waspmote

Gases

Events

Agriculture

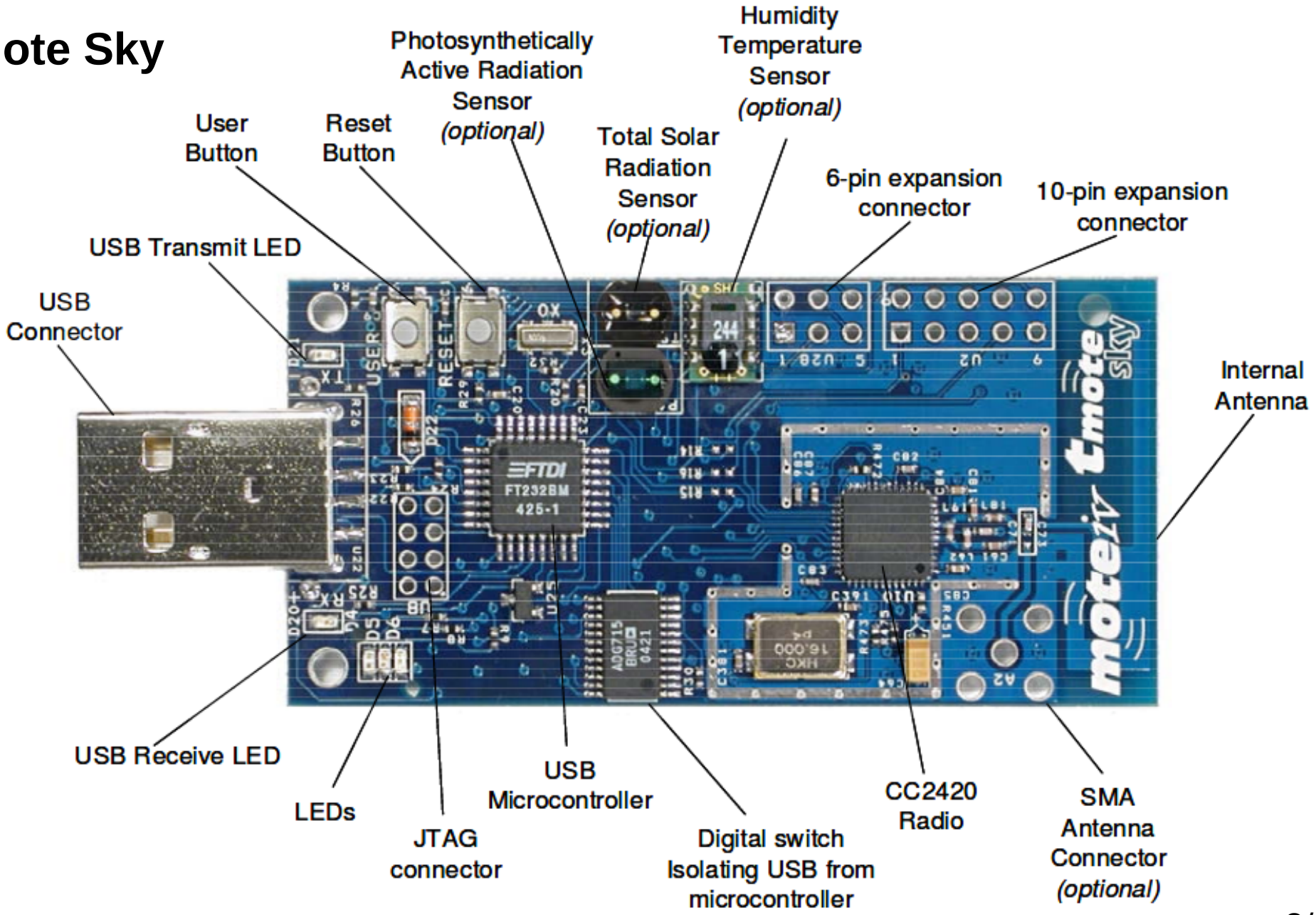
Parking

Camera

Water

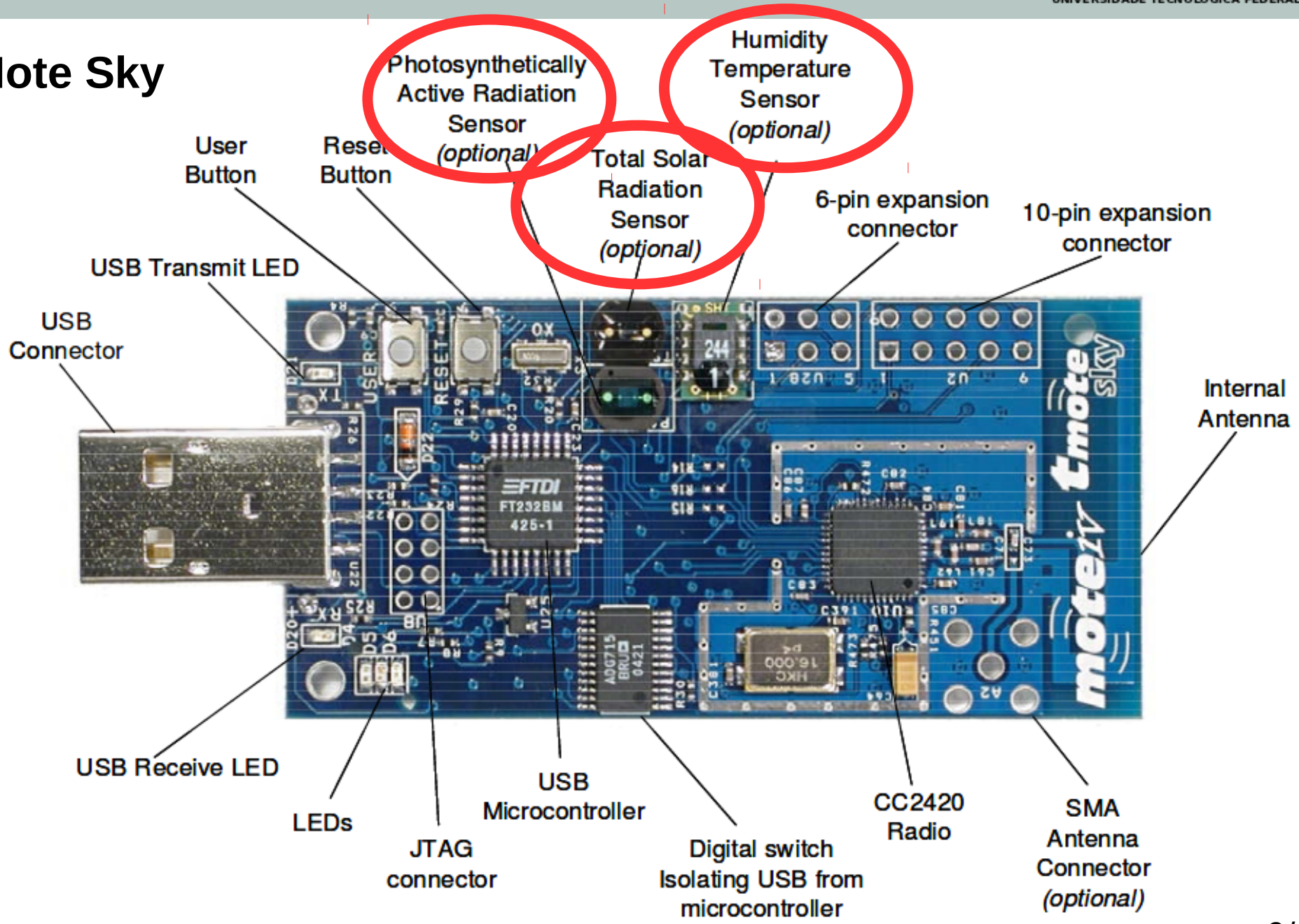
Cooja + Sensores

Mote Sky



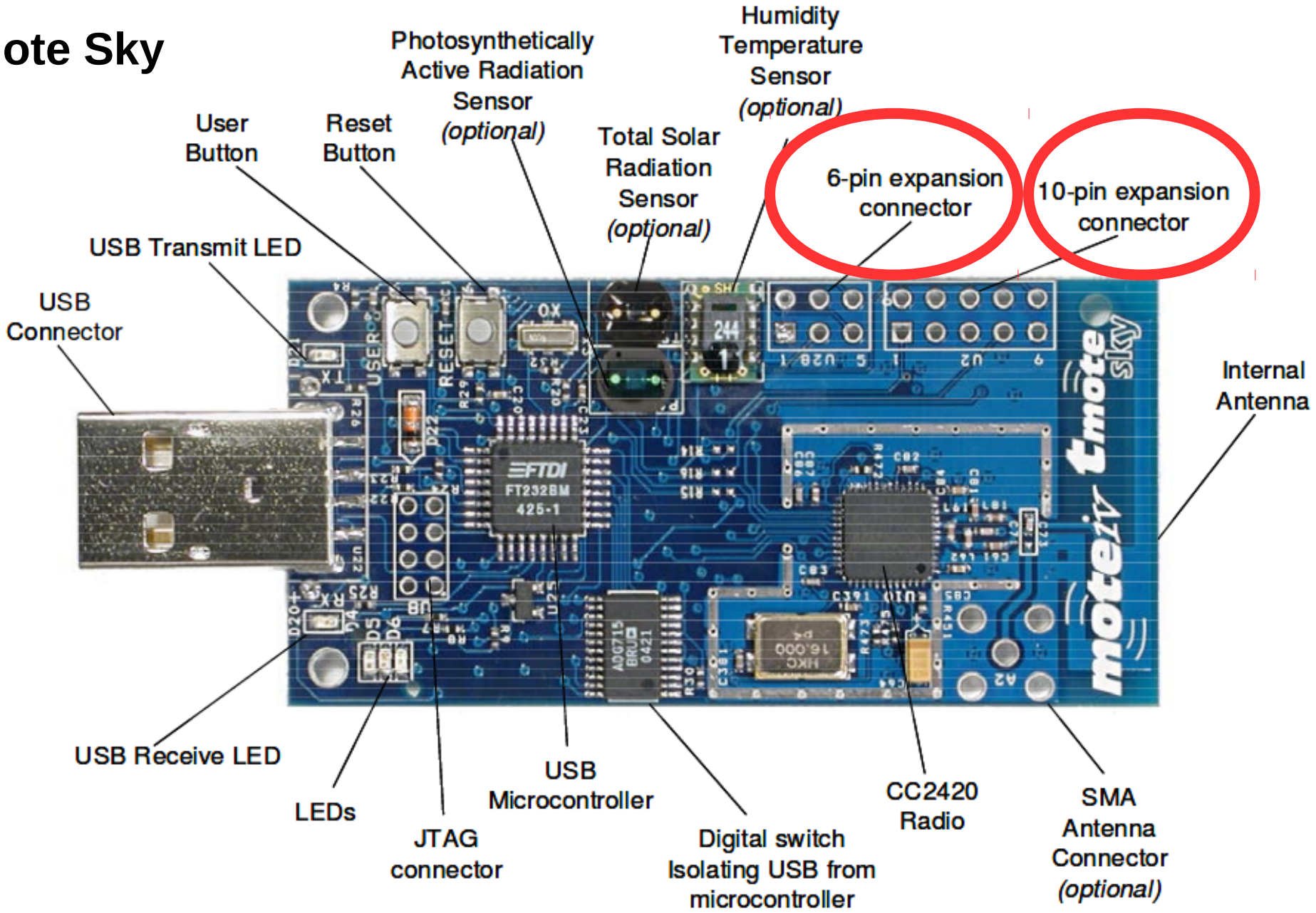
Cooja + Sensores

Mote Sky



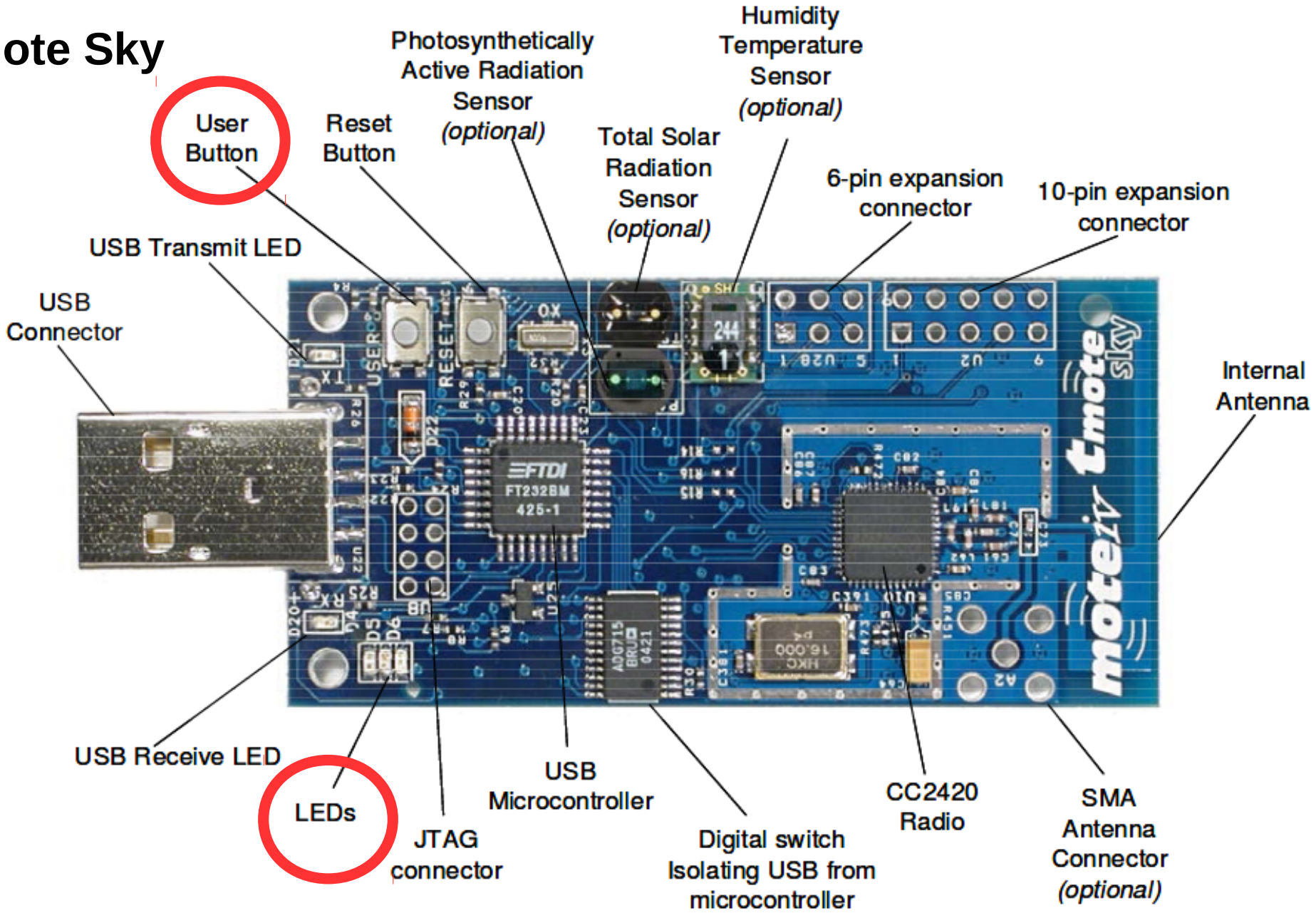
Cooja + Sensores

Mote Sky



Cooja + Sensores

Mote Sky



Vamos trabalhar?

Makefile

```
CONTIKI_PROJECT = exemplo
all: $(CONTIKI_PROJECT)
CONTIKI = /opt/contiki/
include $(CONTIKI)/Makefile.include
```

exemplo.c

```
#include "contiki.h"
#include "dev/button-sensor.h"
#include <stdio.h>
PROCESS(exemplo_process, "Exemplo");
AUTOSTART_PROCESSES(&exemplo_process);
PROCESS_THREAD(exemplo_process, ev, data)
 {
  PROCESS_BEGIN();
  SENSORS_ACTIVATE(button_sensor);
  PROCESS_WAIT_EVENT();
  printf("Sensor Button foi pressionado pelo usuario!\n");
  SENSORS_DEACTIVATE(button_sensor);
  PROCESS_END();
}
```

Referências

- ***Internet das Coisas: da Teoria à Prática.***

Bruno P. Santos, Lucas A. M. Silva, Clayson S. F. S. Celes, João B. Borges Neto, Bruna S. Peres, Marcos Augusto M. Vieira, Luiz Filipe M. Vieira, Olga N. Goussevskaia e Antonio A. F. Loureiro. SBRC – 2016

- SHT11: https://www.adafruit.com/product/246

- SHT25:

https://www.sensirion.com/fileadmin/user_upload/customers/sensirion/Dokumente/2_Humidity_Sensors/Sensirion_Humidity_Sensors_SHT25_Datasheet_V3.pdf

- Sensores Zolertia Z1: http://zolertia.sourceforge.net/wiki/index.php/Z1_Sensors
- BMP180: https://www.bosch-sensortec.com/bst/products/all_products/bmp180
- MAX44009: https://datasheets.maximintegrated.com/en/ds/MAX44009.pdf
- MS-320LP: http://zolertia.sourceforge.net/wiki/images/5/52/MS-320LP_Technical_Datasheet-002.pdf
- Phidgets Sensors: www.phidgets.com
- WaspMote: www.libelium.com
- TmoteSky Datasheet: http://www.eecs.harvard.edu/~konrad/projects/shimmer/references/tmote-sky-datasheet.pdf