



# SPARK TECHNOLOGY LIMITED

Tel : (852) 2646-2239 Fax : (852) 2646-0280

Address: Unit 1806, 18/F, Technology Park, 18 On Lai Street, Siu Lek Yuen, Shatin, N.T., Hong Kong

Website : <http://www.spark-hk.com>

Email : [sales@spark-hk.com](mailto:sales@spark-hk.com)

## SPT0004 – SINGLE AXIS ACCELERAOMETER MODULE (Preliminary 1.1)

### ● DESCRIPTION

The SPT0004 is an accelerometer module specially designed for pedometer application. This solution can be easily integrated into systems by a digital interface. The SPT0004 consists of a single axis acceleration sensor with integrated driver to provide pulse output for step detection and digital output for different tilt angle. All step calculation and noise filtering are included in the ASIC.

### ● FEATURES

- Integrated +/- 2g acceleration sensor
- Sensitivity adjustable by software
- High accuracy
- Integrated ASIC for signal conditioning
- Ready to use step and calorie information
- Easy to use digital interface
- Supply voltage from 2.2 V to 3.3 V
- Low power consumption (STOP mode < 1uA, ACTIVE < 20uA)
- Small form factor (20 mm x 15 mm x 3mm)
- Surface Mount Package for easy production, no calibration required

### ● APPLICATIONS

- Pedometer
- Motion Sensor

### ● TECHNICAL SPECIFICATIONS

Parameter	Specification
Sensitivity	± 2g
Resolution	1 step
Supply voltage	2.4V to 3.3 V
Current consumption (Stop Mode)	< 1uA
Average Current consumption (Operating)	< 20uA
Operating temperature	0°C ~ 50°C

Table 1: Specification



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## ● PIN DESCRIPTION

Pin	Name	I/O	State	Function
1	VDD	/	/	Supply voltage, connect to VDD
2	PULSE1	output	L	Active high, pulse each step
3	PULSE2	output	L	Active high, pulse each 10 steps
4	ENABLE	Input	L	Active High
5	RESET	Input	L	Active high
6	SELECT	Input	L	Active high
7	READY	output	L	Ready signal by slave
8	DATA	I/O	X	Data
9	CLOCK	Input	L	Clock generated by Master
10	GND	/	/	Ground

Table 2: Pin descriptions

## ● OPERATION & TIMINGS

The accelerometer module operates as a slave device. On power up, the accelerometer module enters STOP mode which consumes negligible current. To use the module, the master should pull high the ENABLE pin. The slave device outputs pulses if step are detected with default sensitivity.

To communicate with the slave, the master sends the command and options to the slave with MSB first. After receiving the command, the slave will acknowledge by setting the ready signal. The master should acknowledge the ready signal by setting the clock. According to different functions, the master should decide whether to set the DATA pin to input or output.

Command	Option	Data	Description
0100	0001	20 bits	Get Step Count
0100	0010	20 bits	Get Calorie
0100	0011	/	Reset Step Count & Calorie
0100	0100	8 bits	Get Threshold
0100	0101	8 bits	Set Threshold
0100	0110	12 bits	Get Tilt angle

Table 3: Table of Commands

### Setting sensitivity

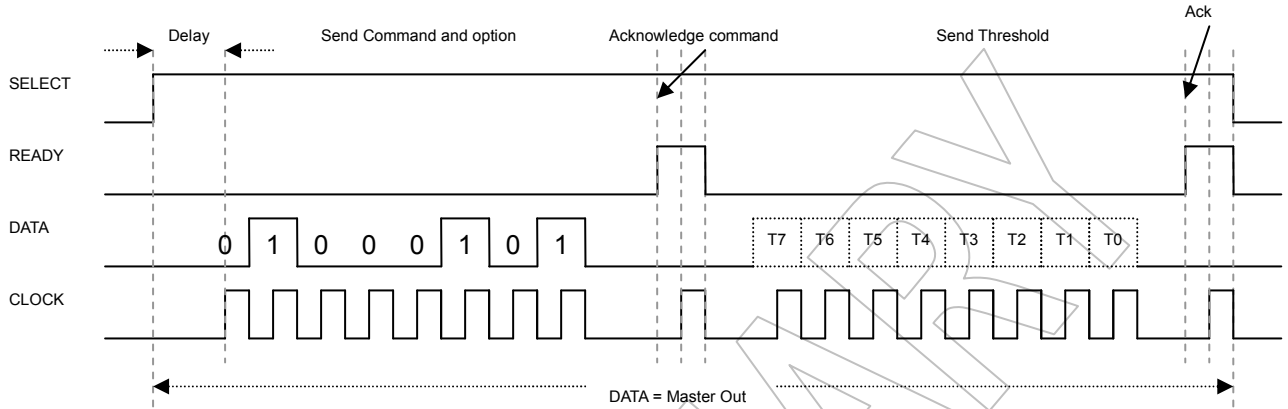
The higher the sensitivity, the more sensitive the device will get valid steps. To adjust the sensitivity, the master can first get the threshold stored in the slave and then modify the threshold to the slave.



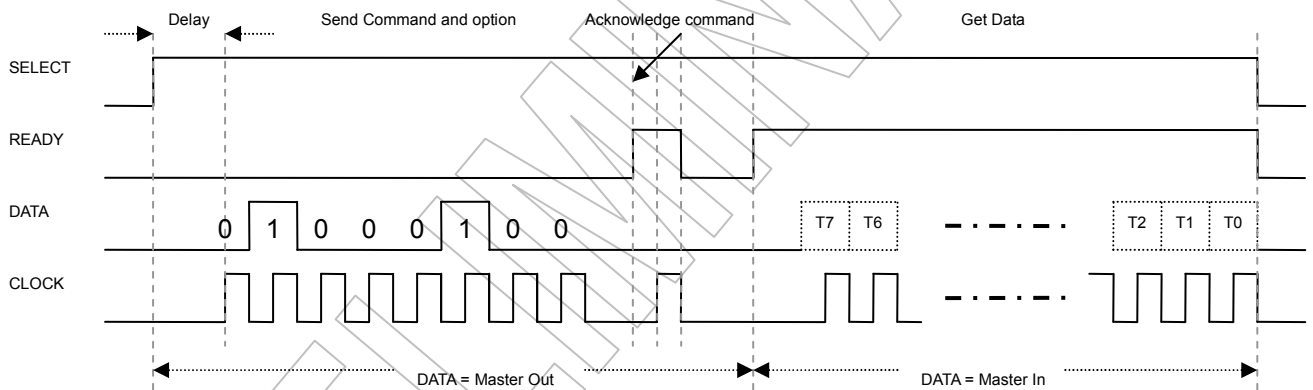
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- **Set Threshold**



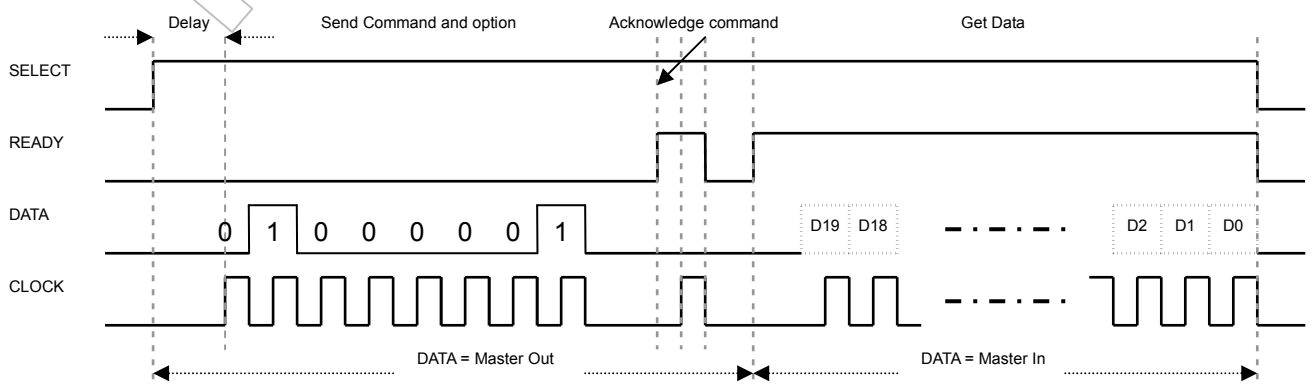
- **Get Threshold**



## Step count and calorie

The slave always counts the step and stores in the internal memory. From the step count, the slave also calculates the calorie consumed. The master can get the calorie and total step count by corresponding commands. The step count and calorie value can be reset by desired command.

- **Get Step Count**

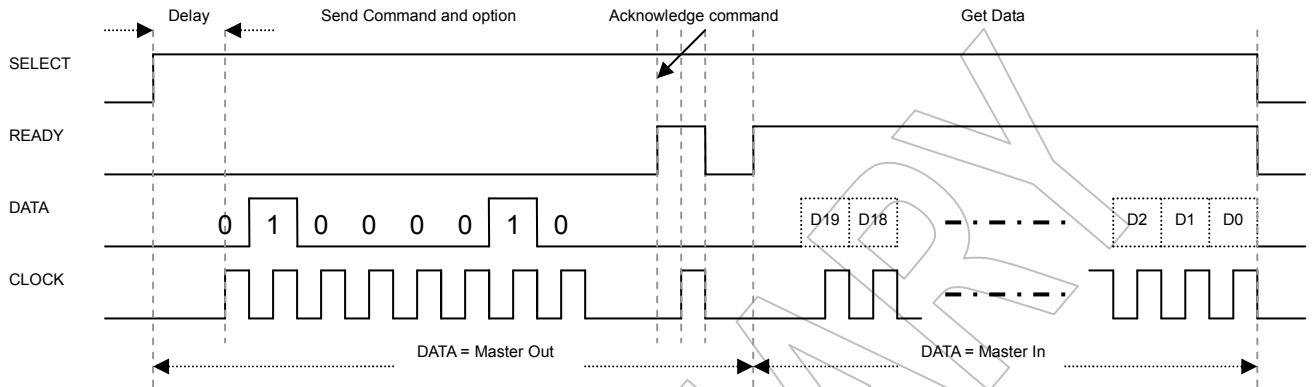




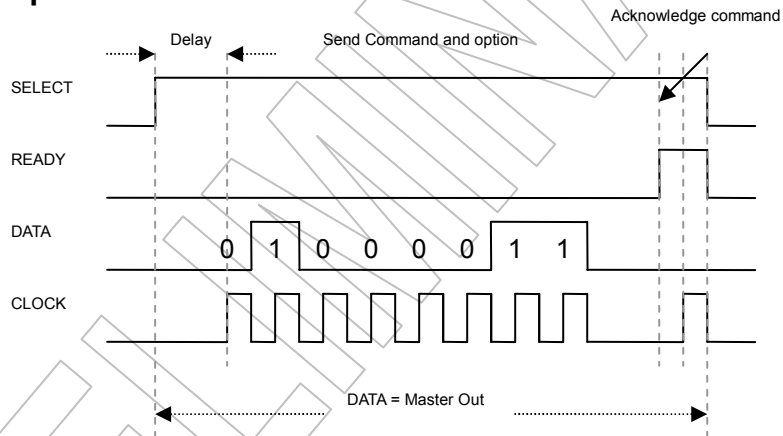
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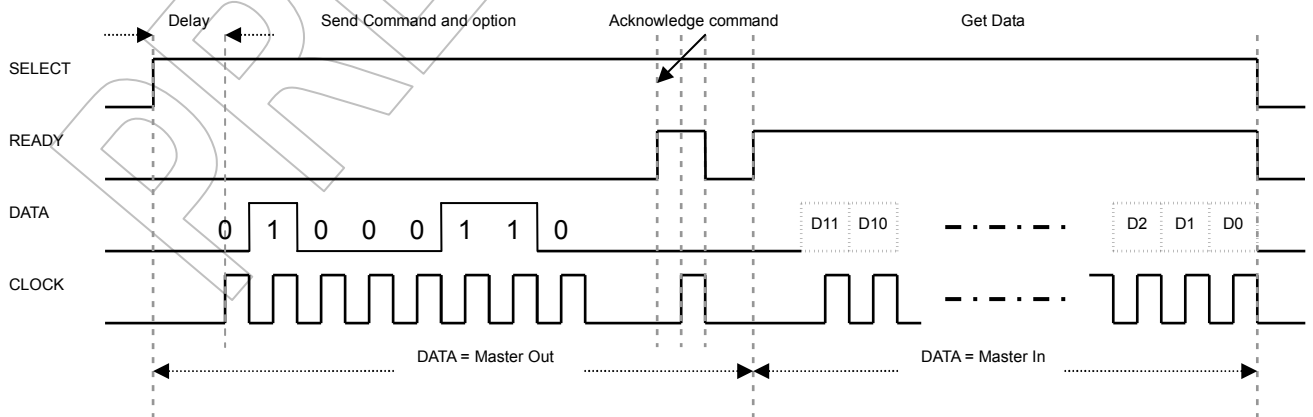
- **Get Calorie**



- **Reset Step count & Calorie**



- **Get Tilt Angle**



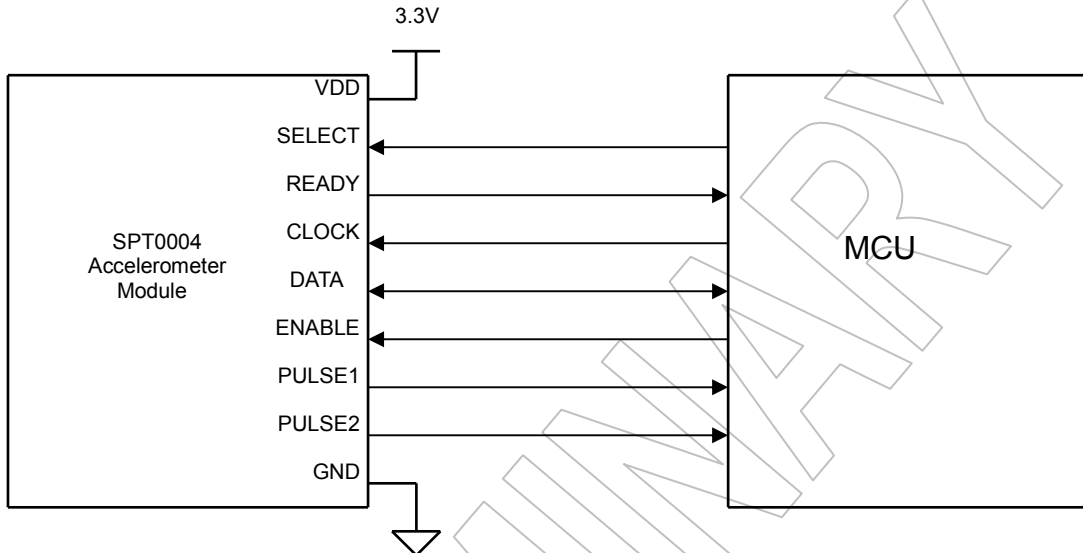


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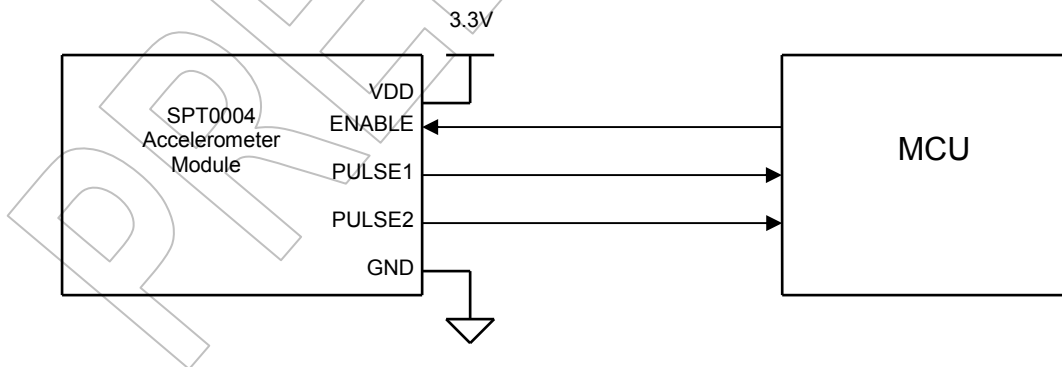
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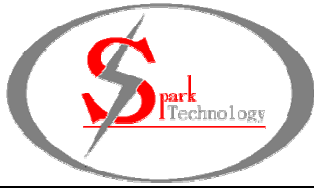
## ● APPLICATION CIRCUIT

Accelerometer with digital interface:



Pedometer application using default sensitivity:





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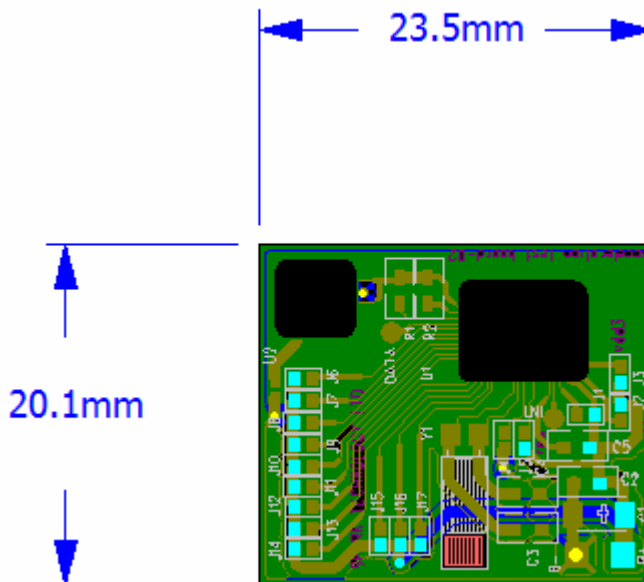
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## ● MECHANICAL & DIMENSION



## ● CONTACT INFORMATION

SPARK TECHNOLOGY LIMITED  
世發科技有限公司

*Authorized distributor of Honeywell*

Email : [sales@spark-hk.com](mailto:sales@spark-hk.com)

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