

SH: Wireless Smart Multi-sensor Devices

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Abstract

- ◆ Miniature Wireless Sensor Modules to be used in a Clean Room.
- ◆ Monitor environment & detect events to cut Energy consumption.

Introduction

- As small as 3*3*1cm module has 3 sensors, RF module, CPU, & Battery in it.
- Monitors Temperature, Humidity, Illumination, Pressure, Air-flow, Acceleration, and more.
- 50 to 100 modules can operate in a system.
- To operate 660hours with 10min. interval.



Fig. 2. Sensor Module

Methods

- Adopt small sized & low power components.
- Embed MEMS and ME sensors, including those developed in BEANS projects.
- Unique wireless communication technique will allow periodic monitoring & event detection in the same system.

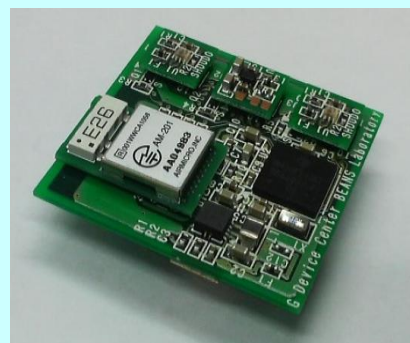


Fig. 3. PCB

Results

Example of server display

No.	センサ1	センサ2	センサ3
1	湿度 29 °C	圧力 13 %	湿度 790 hPa
2	湿度 78 %	圧力 757 hPa	圧力 95 m/s
3	湿度 65 %	圧力 764 hPa	湿度 67290 %
4	圧力 734 hPa	湿度 75967 %	圧力 78 m/s
5	湿度 39.9 °C	圧力 703 hPa	湿度 50 %
6	湿度 55.1 °C	湿度 82554 %	圧力 22 m/s
7	圧力 975 hPa	湿度 88528 %	湿度 78 %
8	湿度 21 %	圧力 718 hPa	圧力 44 m/s
9	湿度 45.1 °C	圧力 820 hPa	湿度 61944 %
10	湿度 44 %	湿度 573 °C	圧力 47 m/s
11	湿度 37666 %	湿度 43 %	圧力 703 hPa
12	湿度 51 %	圧力 1032 hPa	湿度 53.6 °C
13	圧力 27 m/s	圧力 737 hPa	湿度 48839 %
14	圧力 938 hPa	湿度 69290 %	圧力 19 m/s
15	湿度 58.9 °C	圧力 911 hPa	圧力 73 m/s
16	湿度 25.3 °C	湿度 43771 %	圧力 43 m/s
17	圧力 652 hPa	湿度 69070 %	湿度 88 %
18	湿度 98 %	圧力 807 hPa	湿度 34.4 °C
19	湿度 85 %	湿度 58.6 °C	圧力 87 m/s
20	湿度 86 %	圧力 722 hPa	湿度 54.3 °C

Fig. 1. Monitoring Screen

Summary

- ① Verified the basic architecture. Standardization awaited.
- ② More sensors are to come: Particle, Differential pressure, etc..
- ③ Further power reduction expected by new CPU & sensors.