

Operation Description

The product E1-N is a smart home sensor, consisting of a microcontroller monitoring a set of environmental sensors and delivering sensor readings to the cloud over a WLAN, BLE, LAN/Ethernet or 802.15.4 mesh connection. There are some feedback features (lights, sounds), as well as a Bluetooth LE radio for local connectivity to smartphones and other devices. The product is powered by either Power over Ethernet, AC mains (using a built-in flyback PSU) or via USB-C. During normal operation, the sensor will collect sensor readings, including sound pressure level and motion events. It can also perform sound recognition using an on-device machine learning algorithm.

The sensors include:

- One MEMS microphone,
- A passive IR motion sensor
- A combined temperature, humidity, pressure and VOC (air quality) sensor
- An particulate matter (air quality) sensor,
- A limit switch to detect tampering

Feedback features:

- Dynamic speaker (1W) driven by class D amplifier to provide notification sounds and spoken instructions
- 1 RGB LED

Power supply:

- AC Flyback power supply
- USB-C input
- 802.3af PoE PD isolated flyback power supply

Connectivity:

- WLAN
- LAN (using RTL8152 PHY/MAC)
- SubGHz mesh

Radios:

- Infineon CYW43439 1x1 IEEE 802.11 b/g/n MAC/Baseband/Radio
- Silicon Labs EFR32BG22 Microcontroller with Bluetooth 5.2 radio
- Silicon Labs EFR32FG23 Microcontroller with SubGHz radio

Crystals:

- 37.4 MHz (WLAN, CYW43439)
- 38.4 MHz (BLE, EFR32BG22)
- 39.0 MHz (SubHz, EFR32FG23)
- 16 MHz (Main MCU, LPC55S69)
- 25 MHz (Ethernet PHY+MAC)
- 32.768 kHz (Main MCU, also distributed to WLAN, BLE, and SubGHz chips)

Power supply:	Input: AC85-240V, 50/60Hz or PoE or DC5V 500mA Max
For BLE:	
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40

Channel Spacing:	2MHz				
Antenna Type:	PCB Antenna				
Antenna Gain:	4.31dBi				
For 2.4G WIFI:					
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz				
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK), 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)				
Channel Spacing:	5MHz				
Number of Channels:	802.11b/g/n(HT20): 11				
Antenna Type:	PCB Antenna				
Antenna Gain:	2.36dBi				
For Lora:					
Operation Frequency:	902.2MHz to 927.8MHz				
Modulation Type:	FSK				
Antenna Type:	FPC Antenna				
Antenna Gain:	2.24dBi				
Channel Bandwidth (Hz):	100K	150K	225K	300K	450K
Operation Frequency (MHz):	902.2-927.8	902.2-927.8	902.4-927.6	902.4-927.6	902.6-927.2
Channel Spacing (Hz):	200K	200K	400K	400K	600K
Number of Channels:	129	129	64	64	42