ENVM-02-U

Low power environment detection

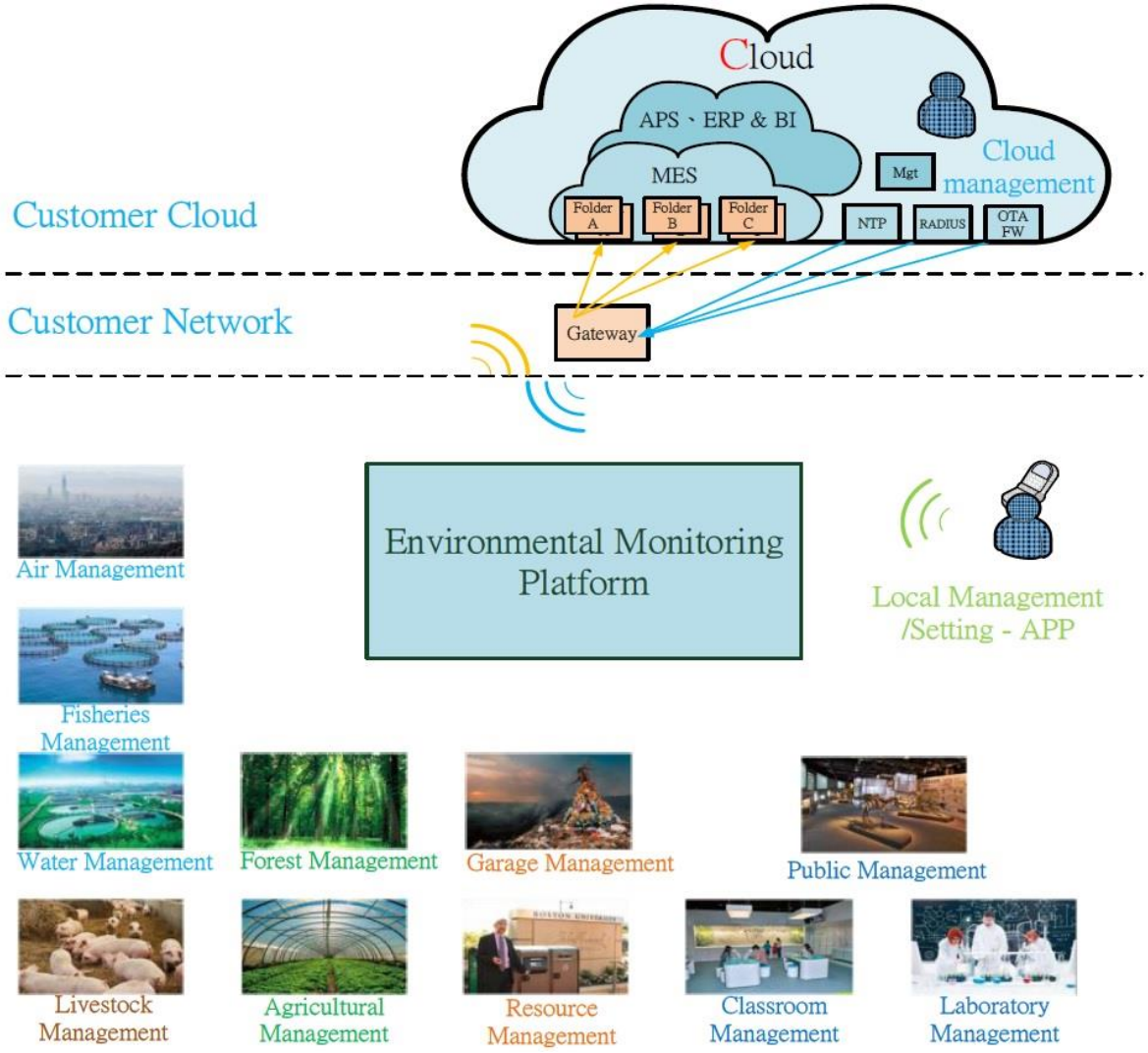
UART digital modules (TTL)

Data sheet

Abstract

Technical data sheet describing ECM-01-U is a low-power digital gas sensor solution, which integrates a gas sensor solution for detecting low levels of gases typically found indoors or workplace, with a microcontroller unit (MCU) and an Analog-to-Digital converter to monitor the local environment and provide a standard digital interface.

System architecture



Outdoor environment:

Air Management
Fisheries Management
Water Management
Forest Management
Garage Management
Resource Management

Indoor environment:

Livestock Management
Agricultural Management
Public Management
Classroom Management
Laboratory Management

Features

- Managing the sensor drive modes and measurements while detecting environmental gas
- Provides indication of IAQ and Industrial levels without a host intervention
- Simplifies development for faster time to market
- Extended battery life in portable applications
- Small form-factor designs
- Saves up to 60% in PCB footprint
- Designed for high volume and reliability (>2 year lifetime)

Benefits

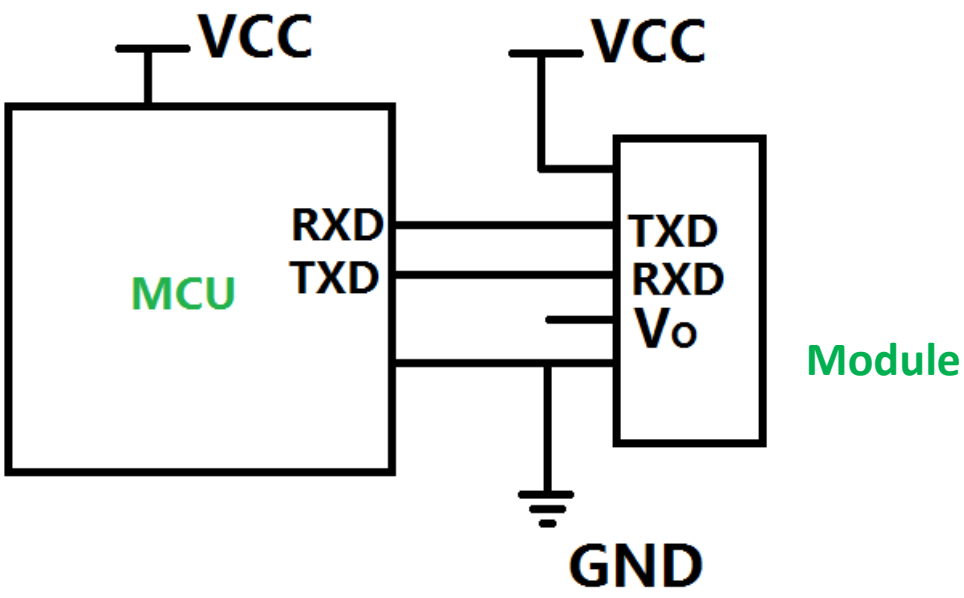
- Integrated MCU
- On-board processing
- Standard digital interface
- Optimized low-power modes
- Standard gas calibration has been completed
- Low component count
- Proven technology platform

Specification	
Operating voltage range	3.7 to 5 VDC
Operating temperature range	-5 to 50 ℃
Operating humidity range	10 to 95 %RH (no coagulation)
Preheating time	<=5 MIN
Sensor type	Electrochemical & Catalytic combustion
Sampling way	Diffusion
Equipment service life	Two years (in the air)
Note: Warranty does not include sensor.	

The following different gas type sensors can be used.			
Sensor type	***Gas type***	***Range***	***Resolution***
Electrochemical	O_2	0 to 30 %	0.01%
	CO	0 to 1000 ppm	0.1ppm
	VOCs	0 to 1000 ppm	0.01ppm
	SO_2	0 to 20 ppm	0.1ppm
	NO	0 to 250 ppm	0.5 ppm
	NO_2	0 to 20 ppm	0.1ppm
	O_3	0 to 10 ppm	0.02ppm
	C_2H_3CL	0 to100 ppm	1ppm
	CL_2	0 to 200 ppm	0.1ppm
	H_2S	0 to100 ppm	0.1ppm
	HCL	0 to 50 ppm	1ppm
	HCN	0 to 50 ppm	1ppm
	NH_3	0 to 1000 ppm	0.5 ppm
	PH	0 to 20 ppm	0.1ppm
	CH_3SH	0 to 10 ppm	0.1ppm
	ETO	0 to 500 ppm	10ppm
Catalytic combustion	CH_4	0 to 100% LEL	1 % LEL

(Note: If you want to change the sensor, please contact customer service.)

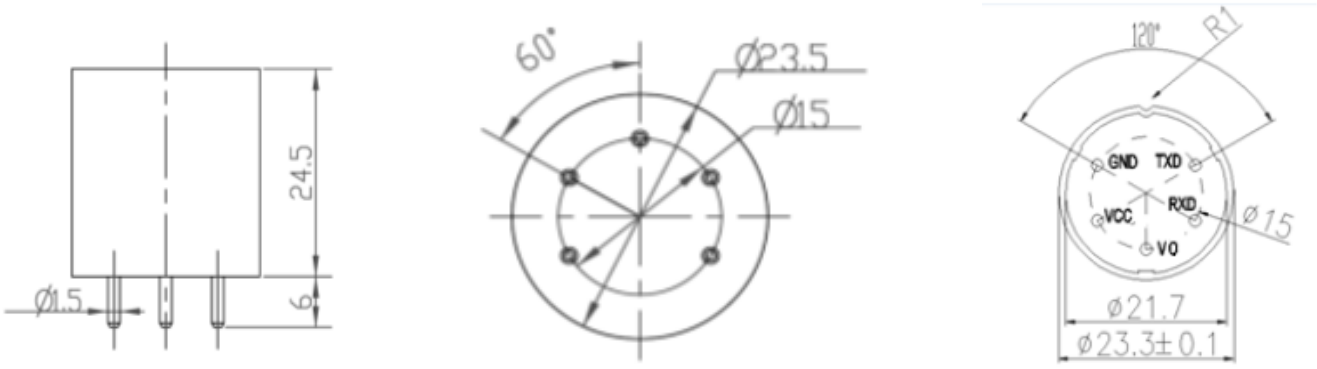
Block diagram



Notes:

1. The electrochemical module is TTL level, please select the MCU for TTL level.
2. Other voltage system, please design level convert circuit.

Package outline



ECM-01-U

Pin assignment		
Pin NO.	Name	**Description**
1	GND	Connect to ground
2	VCC	Supply voltage
3	Vo	Analog voltage output (preset)
4	RXD	UART_RXD pin is used for read data.
5	TXD	UART_TXD pin is used for transmit data.

UART interface

The module is configured to send the communication mode at the factory (Baud rate at 9600, 8, n, 1.), and the module will send the current concentration value once every 1S. If you want to change the communication mode, you can send the 0x78 command to change the communication mode to 0x04 (one question and answer), the module will only send the current concentration value when the 0x86 instruction (read module concentration) is received.

A. Read the sensor concentration mode. (ECM-01-U to MCU)

Active mode（0x03）									
TXD	Start	Address	Command	Sensor data		Reservation			Check
	0xFF	ID	0x86	High byte	Low byte	0x00	0x00	0x00	--
Passive mode（0x04）									
RXD	Start	Address	Command	Reservation					Check
	0xFF	ID	0x86	0x00	0x00	0x00	0x00	0x00	--
TXD	Start	Address	Command	Sensor data		Reservation			Check
	0xFF	ID	0x86	High byte	Low byte	0x00	0x00	0x00	--

B. Modify command of communication mode

RXD	Start	Address	Command	Mode	Reservation				Check
	0xFF	ID	0x78	Active：0x03 Passive：0x04	0x00	0x00	0x00	0x00	--
TXD	Start	Address	Command	Return status	Reservation				Check
	0xFF	ID	0x78	Success：0x01 Failure：0x00	0x00	0x00	0x00	0x00	--

Notes: 1. In the active mode, the module will be sends data at every 1's.
2. In passive mode, the module receives the read command and then transfers the data to the outside MCU.

C. Modify command of Slave Address

RXD	Start	Address	Command	Mode	Reservation				Check
	0xFF	ID	0x7C	New ID	0x00	0x00	0x00	0x00	--
TXD	Start	Address	Command	Return status	Reservation				Check
	0xFF	New ID	0x7C	Success：0x01 Failure：0x00	0x00	0x00	0x00	0x00	--

Notes: 1. Module return code with new ID .

Assembly Environment

The following restrictions should be considered within the assembly environment.

Ambient temperature: -5°C to 50°C

Ambient humidity: 10% to 95% RH, non-condensing

Avoid exposure:

1. Silicone vapours from sources such as silicone adhesives, silicone rubber, silicone sealant, silicone gel, HMDS, oils including hair gels and oils.

2. Corrosive gases and vapours such as chlorine, hydrochloric acid, sulphur oxides for example some flux vapours.

3. Acids, solvents and other liquids, including water, especially where the water contains ionic contamination such as salts.

4. Particulates and dust.

5. Long term extremes, for example high humidity, high temperature and/or high concentration extremes for extended periods.

6. Vibration, for example ultrasonic, pneumatic tools.

7. Mechanical or thermal shocks.

8. Strong air convection environment.

9. Please note gluing or soldering direct to the pins of gas sensor module will void warranty, please use PCB sockets when.

WARNING: By the nature of the technology used, any electrochemical gas sensor offered by Darwei electronic can potentially fail to meet specification without warning. Although Darwei electronic Ltd makes every effort to ensure the reliability of our products of this type, where life safety is a performance requirement of the product, we recommend that all sensors and instruments using these sensors are checked for response to gas before use.

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