ZMOD4510 Module

Datasheet v.1.0

INTRODUCTION

The PCB Artists ZMOD4510 Module is designed to support a simple MCU host system by handling complex algorithms required to determine the concentration of NOx and O3 using the ZMOD4510 gas sensor.

The module communicates with the host over a simple UART link.

FEATURES

- Powered by ARM-Cortex M0+
- UART interface for control and data
- Dedicated sleep pin
- Ultra-low power operation
- Dedicated interrupt pin for host wakeup signal
- NOx and O3 concentration readout in ppb
- AQI determination
- Mounts on a standard DIP-24 IC socket
- 4-pin JST-XH for off-board use

DESCRIPTION

This datasheet provides information on the electrical and mechanical characteristics of the PCB Artists ZMOD4510 module series.

The module incorporates a new, low power and high-performance ARM Cortex-M0+ MCU. The MCU acts as the host for the ZMOD4510 sensor on board. The sensor contains a MOx chemiresistor that is optimized for detecting trace presence of NOx and O3 in the air.

Controlled via its I2C interface, the ZMOD4510 sensor samples the air and provides raw data to the module MCU. The MCU then processes this raw data to determine various parameters like NOx and O3 concentration. The algorithms are complex and take up several kilobytes of program memory and SRAM. Therefore, using our module offloads the host MCU from running these algorithms by itself. The algorithm used to determine gas concentrations is proprietary information of IDT and is not disclosed to the end user in source code form without entering into an agreement with IDT (Renesas).

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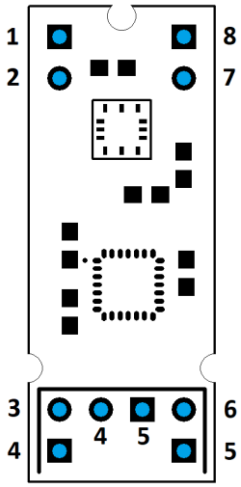
PIN ASSIGNMENTS



Top View, ZMOD4510 Module

PIN DESCRIPTIONS

Pin #	Name	Direction	Description
1	GND	-	Supply ground
2	RSVD	-	Reserved pin, leave unconnected
3	GND	-	Supply ground
4	TXD	Output	UART TxD line
5	RXD	Input	UART RxD line
6	3V3	-	3.3V supply voltage
7	INT	Output	Interrupt output
8	GND	-	Supply ground

When the ZMOD4510 module is used in JST configuration, only pins 3, 4, 5, and 6 are available.

UART COMMANDS AND RESPONSES

For detailed documentation on the instruction set, and how to use them with examples, please consult our product page:
https://pcbartists.com/zmod4510-module

All commands and responses over UART are ASCII strings terminated with a line-feed (‘\n’ or LF) character.

Every command causes the ZMOD4510 module to respond with either “S\n” for success or “F\n” for failure.
The first command after power-up may return an “F” (fail) because of unstable UART line states during power-up. We recommend re-sending the first command until an “S” is returned.

1. “**ID**\n” — Read unique device ID
   Description:
   Reads out the unique ID as 8-character long hexadecimal string
   Response:
   8-character hex ID, e.g. “ABCD1234\n”

2. “**VR**\n” — Read firmware version
   Description:
   Reads out the firmware version for the ZMOD4510 module formatted as “V.x.xx”
   Response:
   Firmware version, e.g. “V.1.00\n”

3. “**CI**\n” — Clear pending interrupt on INT pin
   Description:
   Clears the INT pin pending interrupt (sets the pin back to high)
   Response:
   “S\n” on successful execution

4. “**RS**\n” — Restart the ZMOD4510 module
   Description:
   Re-boots the ZMOD4510 module, equivalent to a power cycle
   Response:
   “S\n” on successful execution

5. “**SS***xx*\n” — Set stabilization sample count
   Description:
   Set stabilization sample count BEFORE powering up the sensor
   Response:
   “S\n” on successful setting, “F\n” if already set and sensor active

6. “**OP***X*\n” — Algorithm optimization setting
   Description:
   Optimize algorithm for auto mode, NO2 mode or O3 mode
   Response:
   “S\n” on successful execution

7. “**PU**\n” Power up sensor to start measurements
Description:
Power up the sensor to start/continue measuring
Response:
“S\n” on successful execution

8. “**PD**\n” Power down sensor and stop measurements
Description:
Power down the sensor to pause continuous measurements
Response:
“S\n” on successful execution

9. “**AQ**\n” Read outdoor AQI value
Description:
Read back AQI value in zero-padded “xxxx**.**x” format
Response:
For example, “0034.4\n” on successful execution

10. “**NO**\n” Read estimated NO2 concentration in ppb
Description:
Read back estimated NO2 concentration in zero-padded “xxxx**.**x” format
Response:
For example, “0015.2\n” on successful execution

11. “**O3**\n” Read estimated O3 concentration in ppb
Description:
Read back estimated O3 concentration in zero-padded “xxxx**.**x” format
Response:
For example, “0009.7\n” on successful execution

12. “**PN**\n” Read probability of presence of NO2
Description:
Read back probability of presence of NO2 multiplied by 100, in “xxx” format
Response:
For example, “028\n” if p(NO2) = 0.28

13. “**NR**\n” Poll sensor for new readings
Description:
Check the measurement status of the module
Response:
“S\n” if new readings are available
“W\n” if a measurement cycle is in progress
“F\n” sensor is inactive

ORDERING INFORMATION

For pricing information and ordering, please reach out to us at hello@pcbartists.com.

We accept PayPal or wire transfers (for large orders) and offer fast shipping to almost all countries via UPS or DHL.

CUSTOMIZATION OPTIONS

We provide customization options as mentioned on the product page:
https://pcbartists.com/zmod4510-module

Revision History

- **December 26, 2020**
  - Initial release