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1 General Description

This document describes the user guide of ZG Series (ZG106, ZG106AM, ZG106AH).

Edition April 2008

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2 Features of Design

ZyAura, a world class leader and supplier of IR sensor technology and temperature measurement devices, is pleased to introduce a new CO2 monitor for use in scientific, commercial, and consumer applications. The ZG106 is a new and low-cost carbon dioxide monitor implementing IR-SoC technology; it can accurately detect carbon dioxide levels between 0 to 10,000 ppm. This gas monitor is suitably fit for applications in Indoor Air Quality (IAQ), HVAC, safety, and other industries.

3 Physical interface of ZG106 series

Pin Assignment of ZG106

Warning: The Dimension in this drawing is for reference only.

V: Vdd
G: GND
D: Data (Serial Data)
C: Clock (Serial Clock)
OC: Open Collector
R: Reset

Fig.1 RJ45 inner definition
4 Serial Output

ZG106 series outputs the serial data in SPIr format. It is not the standard SPIr format. Please see 4.2, Timing of SPIr.

4.1 Typical Diagram

V: Vcc  
D: Data  
C: Clock (2 KHz)  
G: GND  
OC: Open Collector

Note: Data Pin is high when there is no data out, Time Out > 2 ms

4.2 Timing of SPIr

Fig 3. Timing of SPI

Message format

Item | MSB | LSB | Sum | CR
--- | --- | --- | --- | ---
DATA | 20ms | > 0.1 sec
4.2.1 Format of Message

<table>
<thead>
<tr>
<th>Item</th>
<th>MSB</th>
<th>LSB</th>
<th>Sum</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>“P”</td>
<td>50h</td>
<td>10h</td>
<td>00h</td>
<td>60h</td>
</tr>
</tbody>
</table>

“P” (50h): CntR (CO2 concentration)

8 bit Data Msb
8 bit Data Lsb
Item+MSB+LSB=SUM
0Dh, End of the message

Note: for the Firmware version := 2101,2102, the MSB and LSB are BCD
For Firmware version :=2103, the MSB and LSB are Hex format

4.2.2 Example:

How to judge the Firmware version?

Z 21 03 0D

The data following the ItemCode “Z” shows the version of Firmware.
Z2103 means the Firmware version is 2103
Z2102 means the firmware version is 2102

If Firmware version=2101,2102
1. Relative Concentration of CO2 (CntR)

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
<th>Sum</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>50h</td>
<td>10h</td>
<td>00h</td>
<td>60h</td>
</tr>
</tbody>
</table>

“P” the item code of CntR

Relative Concentration of CO2 = 1000ppm

CheckSum 50h+10h+00h=60h (Only Low Byte)

2. Object Temperature (Tamb)

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
<th>Sum</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>42h</td>
<td>27h</td>
<td>03h</td>
<td>6Ch</td>
</tr>
</tbody>
</table>

“B” the item code of Ambient temperature

Real Temperature Value [2703]/100= 27.03 °C

CheckSum 42h+27h+03h=6Ch (Only Low Byte)

If Firmware version=2103
3. Object Temperature (Tamb)

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
<th>Sum</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>42h</td>
<td>12h</td>
<td>C3h</td>
<td>17h</td>
</tr>
</tbody>
</table>

“B” the item code of Ambient temperature

Real Temperature Value [Hex2Dec (12C3h)]/16-273.15= 27.03 °C
4 Relative Concentration of CO2

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
<th>Sum</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>50h</td>
<td>“P”</td>
<td>42h+12h+C3h=17h (Only Low Byte)</td>
<td>0Dh (\rightarrow) ‘Carriage Return’ means End of Message</td>
</tr>
<tr>
<td>3Ah</td>
<td>MSB</td>
<td>CheckSum 40h+3Ah+98h=AAH (Only Low Byte)</td>
<td>0Dh (\rightarrow) ‘Carriage Return’ means End of Message</td>
</tr>
<tr>
<td>98h</td>
<td>LSB</td>
<td>Real CO2 concentration 15000ppm</td>
<td>0Dh (\rightarrow) ‘Carriage Return’ means End of Message</td>
</tr>
</tbody>
</table>

5 Interface Demo Board: ZGhub

General Description:
ZGhub is an Interface box with LCD, for ZG mseries. This Box can work as an interface between the CO2 monitor module and PC. See Fig.4 “ZGHub” has a 2-column character type LCD Display; it can also work without the PC. The Hub will show CO2 & Tamb (data from the ZG) continuously.
6 ZGview: Interface Program for PC

Program: ZGview
A Free version for demonstration can be downloading at [http://www.zyaura.com/support/default.asp](http://www.zyaura.com/support/default.asp)

- Running under Window operating system
- Must be used accompanied with ZGhub
- This program will show the curve of:
  - CO2 (ppm); Tamb (degC) continuously
- Modification of the setting, such as Alarm Level

![ZGview Window](image)

*Fig. 6 ZGview Window*