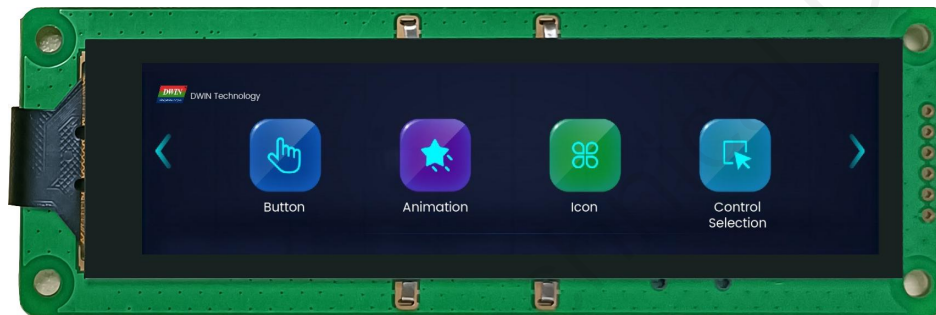


# DMG96240C037\_03WTC

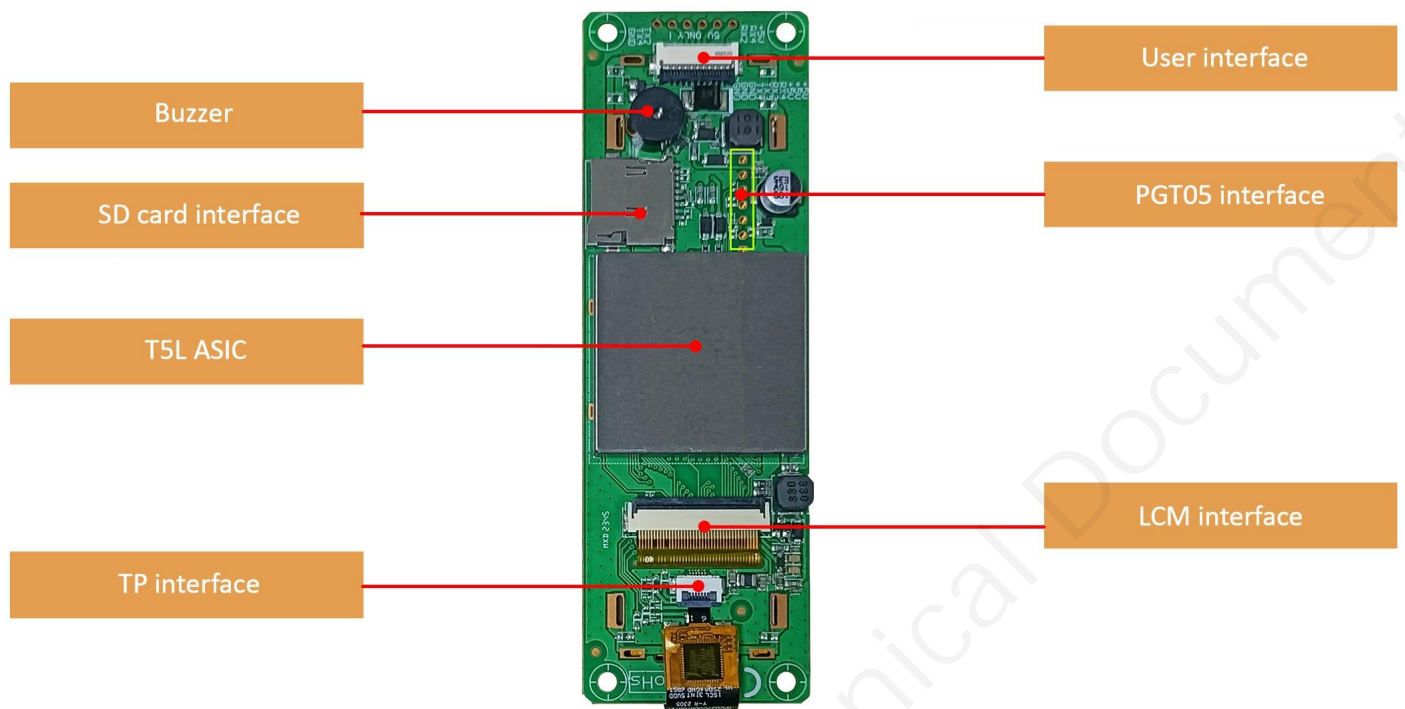
## Features:

- Based on T5L1, running DGUS II system, commercial grade.
- 3.7-inch, 240\*960 pixels resolution, 16.7M colors, IPS-TFT-LCD, Wide viewing angle.
- Optical bonding capacitive touch panel.



## 1. Hardware and interface

### 1.1 Hardware interface



Hardware interface

## 1.2 Hardware and interface description

| No. | Name              | Description   |
|-----|-------------------|---|
| 1   | T5L1 ASIC         | Developed by DWIN. Mass production in 2019, 1MBytes Nor Flash on the chip, 512KBytes used to store the user database. Rewrite cycle: over 100,000 times |
| 2   | LCM interface     | FPC40_0.5mm, RGB interface  |
| 3   | CTP interface     | 6Pin_0.5mm interface, IIC interface   |
| 4   | User interface    | 10Pin_1.0mm latching socket for power supply and serial communication. Download rate (typical value): 12KByte/s   |
| 5   | Flash             | 16MBytes NOR Flash, for fonts, pictures and audio files. Rewrite cycle: over 100,000 times  |
| 6   | Buzzer            | 3V passive buzzer   |
| 7   | SD card interface | FAT32. Download files by SD interface can be displayed in statistics. Download rate: 4Mb/s  |
| 8   | PGT05 interface   | When product crashes by accident, you can use PGT05 to update DGUS kernel and make the product return to normal   |

## 2. Specification parameters

### 2.1 Display parameters

|   |   |
|---|---|
| <b>LCD Type</b>   | IPS, TFT LCD  |
| <b>Viewing Angle</b>  | Wide viewing angle, 85°/85°/85°/85° (L/R/U/D)   |
| <b>Resolution</b>   | 240×960 pixels (support 0°/90°/180°/270°)   |
| <b>Color</b>  | 24-bit 8R8G8B   |
| <b>Active Area (A.A.)</b>   | 22.9mm (W)×91.4mm (H)   |
| <b>View Area (V.A.)</b>   | 22.9mm (W)×91.4mm (H)   |
| <b>Backlight Mode</b>   | LED   |
| <b>Backlight Service Life</b>   | >20000 hours (Time of the brightness decaying to 50% on the condition of continuous working with the maximum brightness)                            |
| <b>Brightness</b>   | 350nit  |
| <b>Brightness Control</b>   | 0~100 grade (When the brightness is adjusted to 1%~30% of the maximum brightness, flickering may occur and is not recommended to use in this range) |
| <b>Note:</b> You can use dynamic screen saver wallpapers to avoid afterimages caused by fixed page display for a long time. |   |

### 2.2 Touch parameters

|                            |  |
|----------------------------|--|
| <b>Type</b>                | CTP (Capacitive touch panel)                             |
| <b>Structure</b>           | G+G structure with surface cover of Asahi tempered glass |
| <b>Touch Mode</b>          | Single point touch, support continuous sliding touch     |
| <b>Surface Hardness</b>    | 6H   |
| <b>Light Transmittance</b> | Over 90%   |
| <b>Life</b>                | Over 1,000,000 times touch                               |

## 2.3 Serial interface parameters

|                        |  |     |     |     |      |
|------------------------|--|-----|-----|-----|------|
| <b>Mode</b>            | UART2: ON=TTL/CMOS; OFF=RS232<br>UART4: ON=TTL/CMOS; OFF=RS232 (Only available after OS configuration) |     |     |     |      |
| <b>Voltage Level</b>   | Test Condition   | Min | Typ | Max | Unit |
|                        | Output 1, Iout = -4mA  | 2.7 | 3.2 | -   | V    |
|                        | Output 0, Iout = 4mA   | -   | 0.1 | 0.4 | V    |
|                        | Input 1  | 2.4 | 3.3 | 5.5 | V    |
|                        | Input 0  | 0   | -   | 1.0 | V    |
| <b>Baud Rate</b>       | 3150~3225600bps, typical value of 115200bps  |     |     |     |      |
| <b>Data Format</b>     | UART2: N81<br>UART4: N81/E81/O81/N82 , 4 modes (OS configuration)                                      |     |     |     |      |
| <b>Interface Cable</b> | 10Pin_1.0mm  |     |     |     |      |

## 2.4 Electrical specifications

|   |                               |                       |
|---|-------------------------------|-----------------------|
| <b>Rated Power</b>                        | <5W                           |                       |
| <b>Operating Voltage</b>                  | 4.5~5.5V, typical value of 5V |                       |
| <b>Operating Current</b>                  | 150mA                         | VCC=5V, max backlight |
|   | 80mA                          | VCC=5V, backlight off |
| <b>Recommended power supply: 5V 1A DC</b> |                               |                       |

## 2.5 Operating environment

|                              |                                    |
|------------------------------|------------------------------------|
| <b>Operating Temperature</b> | -20℃~70℃ (5V @ 60% RH)             |
| <b>Storage Temperature</b>   | -30℃~80℃                           |
| <b>Conformal Coating</b>     | None                               |
| <b>Operating Humidity</b>    | 10%~90%RH, typical value of 60% RH |

### 3. Reliability test

#### 3.1 Electrostatic discharge test

Test temperature: 25°C. Test humidity: 50%RH.

- Test standard :  EN 61000-4-2:2009     IEC 61000-4-2:2008     GB/T 17626.2-2018  
 Other:

Table 1: Electrostatic Discharge Immunity (Air Discharge)

| Test Points Locations | Test Levels |      |      |      |      |      |       |       |
|-----------------------|-------------|------|------|------|------|------|-------|-------|
|                       | -2kV        | +2kV | -4kV | +4kV | -8kV | +8kV | -15kV | +15kV |
| Screen                |             |      | A    | A    | .    |      |       |       |
| /                     | /           | /    | /    | /    | /    | /    | /     | /     |
| /                     | /           | /    | /    | /    | /    | /    | /     | /     |

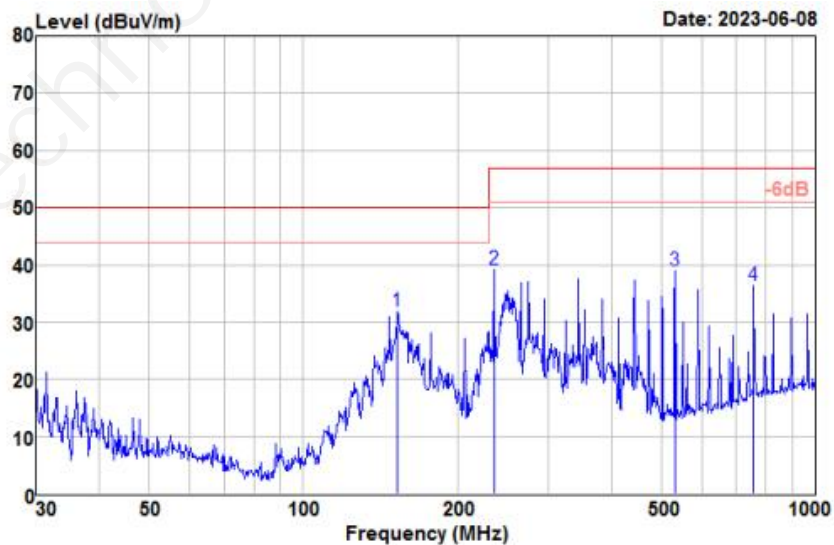
Table 2: Electrostatic Discharge Immunity (Direct Contact)

| Test Points Locations | Test Levels |      |      |      |      |      |      |      |
|-----------------------|-------------|------|------|------|------|------|------|------|
|                       | -2kV        | +2kV | -4kV | +4kV | -6kV | +6kV | -8kV | +8kV |
| Border                | /           | /    | /    | /    | /    | /    | /    | /    |
| /                     | /           | /    | /    | /    | /    | /    | /    | /    |
| /                     | /           | /    | /    | /    | /    | /    | /    | /    |

#### 3.2 RE test

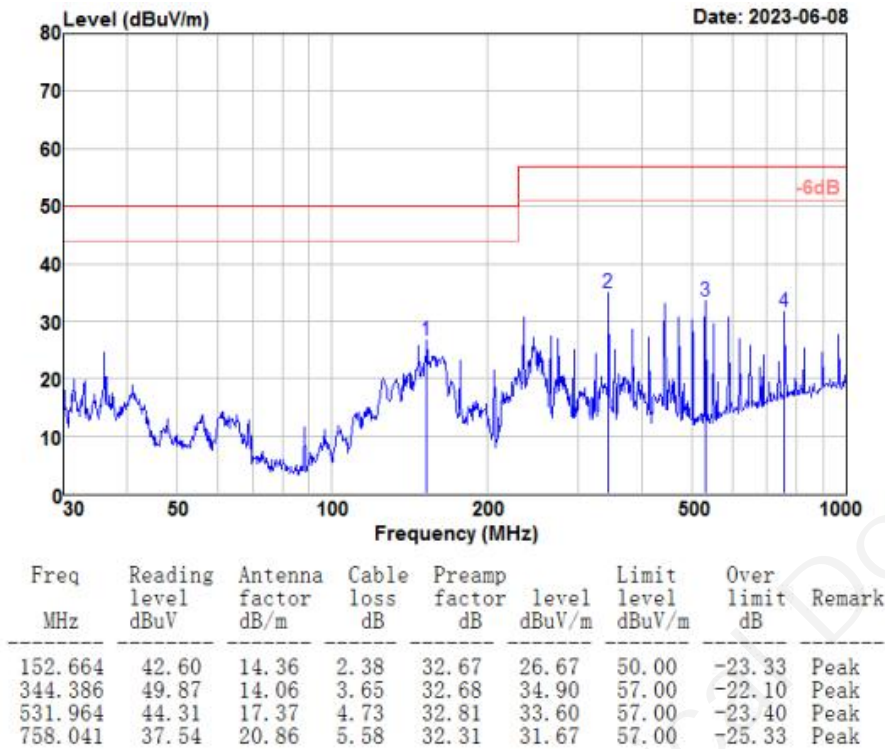
| Test Item | Test Standard | Result           |
|-----------|---------------|------------------|
| RE        | ClassA-6dB    | Normal operation |

#### HORIZONTAL



| Freq<br>MHz | Reading<br>level<br>dBuV | Antenna<br>factor<br>dB/m | Cable<br>loss<br>dB | Preamp<br>factor<br>dB | Limit<br>level<br>dBuV/m | Over<br>limit<br>dB | Remark      |
|-------------|--------------------------|---------------------------|---------------------|------------------------|--------------------------|---------------------|-------------|
| 152.664     | 47.82                    | 14.36                     | 2.38                | 32.67                  | 31.89                    | 50.00               | -18.11 Peak |
| 235.816     | 57.23                    | 11.70                     | 2.98                | 32.66                  | 39.25                    | 57.00               | -17.75 Peak |
| 531.964     | 49.60                    | 17.37                     | 4.73                | 32.81                  | 38.89                    | 57.00               | -18.11 Peak |
| 758.041     | 42.21                    | 20.86                     | 5.58                | 32.31                  | 36.34                    | 57.00               | -20.66 Peak |

**VERTICAL**



**Performance Criterion:**

- A. Normal performance within limits specified by the manufacturer, requestor or purchaser;
- B. Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention;
- C. Temporary loss of function or degradation of performance, the correction of which requires operator intervention;
- D. Loss of function or degradation of performance which is not recoverable, due to damage to hardware or software, or loss of data.

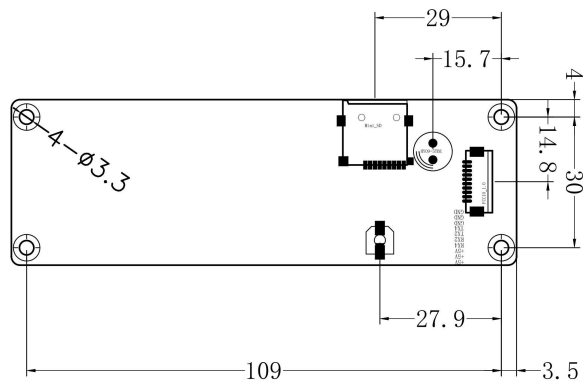
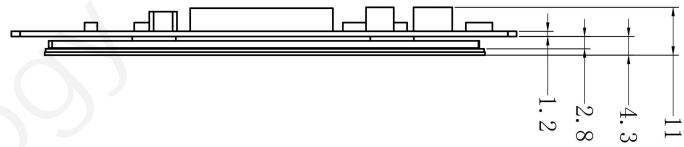
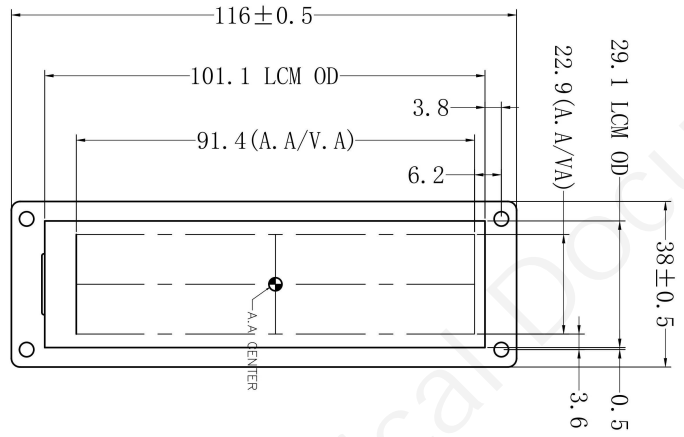
#### 4.Packaging & dimensions

| <b>Form Factor</b>  | 38.0mm (W)×116.0mm (H)×11.0mm (T) |              |                       |                      |
|---------------------|-----------------------------------|--------------|-----------------------|----------------------|
| <b>Net Weight</b>   | 40g                               |              |                       |                      |
| Packaging Standards |                                   |              |                       |                      |
| <b>Model</b>        | <b>Dimensions</b>                 | <b>Layer</b> | <b>Quantity/Layer</b> | <b>Quantity(Pcs)</b> |
| Carton1:            | 220mm(L)×160mm(W)×47mm (H)        | -            | -                     | -                    |
| Carton2:            | 250mm(L)×200mm(W)×80mm (H)        | -            | -                     | -                    |
| Carton3:            | 320mm(L)×270mm(W)×80mm (H)        | -            | -                     | -                    |
| Carton4:            | 450mm(L)×350mm(W)×300mm(H)        | -            | -                     | -                    |
| Carton5:            | 600mm(L)×450mm(W)×300mm(H)        | 2            | 60                    | 120                  |

Disclaimer: The product design is subject to alternation and improvement without prior notice.



| Definition | Pin#     | Type | Description  |
|------------|----------|------|--------------|
| GND        | 8, 9, 10 | P    | GND          |
| TX4        | 7        | 0    | UART4 Output |
| TX2        | 6        | 0    | UART2 Output |
| RX2        | 5        | 1    | UART2 Input  |
| RX4        | 4        | 1    | UART4 Input  |
| +5V        | 1, 2, 3  | P    | Power Input  |



1. Location hole is used as position reference.

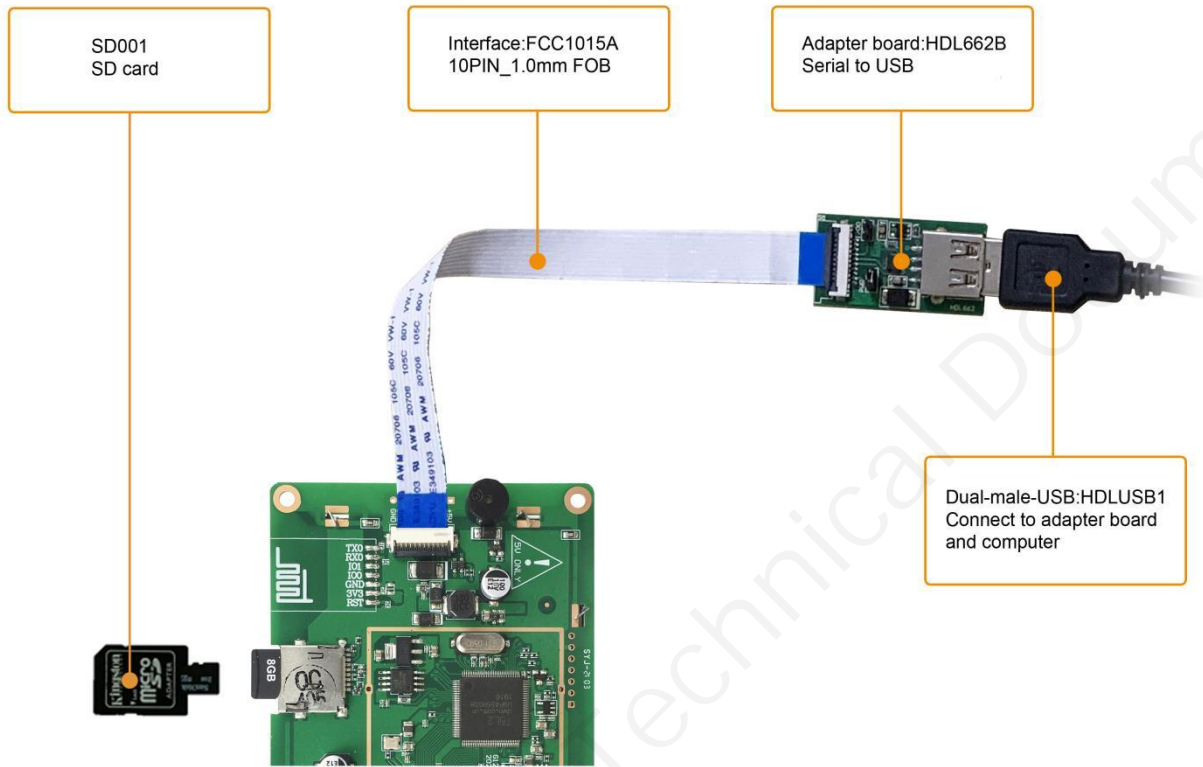
2. Unmarked Tolerance is +/-0.3mm

Note: Active area is marked in Dash Lines

|         |                    |          |            |                 |
|---------|--------------------|----------|------------|-----------------|
| Model   | DMG96240C037_03WTC |          |            | DWIN Technology |
| Drawing | A 4                | Drawn    | DWIN       |                 |
| Scale   | 1:1                | Review   |            |                 |
| Unit    | MM                 | Approval |            |                 |
|         |                    | Date     | 2023.11.03 |                 |

## 5. Debugging tools

It is recommended for new users of DWIN smart LCMs to purchase official accessories. For more details, please refer to customer service center.



## 6.T5L series IC features

- (1) Mature and stable 8051 core which is the most widely used with the maximum operating frequency of T5L is up to 250MHz, 1T(single instruction cycle)high speed operation.
- (2) Separate GUI CPU Core running DGUS II System:
  - High-speed display memory, 2.4GB/S bandwidth.
  - 2D hardware acceleration, the decompression speed of JPEG is up to 200fps@1280\*800 and the UI with animation and icons as its main feature is extremely cool and smooth.
  - Images and icons stored in JPEG format. Adopt Low-cost 16Mbytes SPI Flash.
  - Support CTP or RTP with adjustable sensitivity and maximum 400 Hz touch frequency.
  - 1-way 15bit 32Ksps PWM digital power amplifier driver loudspeaker, save power amplifier cost and achieve high signal-to-noise ratio and sound quality restoration.
  - 128Kbytes variable storage space for exchanging data with OS CPU Core and memory.
  - Support DGUS development and simulation on PC. Support background remote upgrade.
- (3) Separate CPU (OS CPU) core runs user 8051 code or DWIN OS system and user CPU is omitted in practical application:
  - Standard 8051 architecture and instruction set, 64Kbytes code space, 32Kbytes on-chip RAM.
  - 64 bit integer mathematical operation unit (MDU), including 64 bit MAC and 64 bit divider.
  - 28 IOs, 4-channel UARTs, 1-channel CAN, up to 8-channel 12-bit A/Ds and 2-channle 16-bit PWM of adjustable resolution.
  - Support IAP on-line simulation and debugging with unlimited number of breakpoints.
  - Upgrade code online through DGUS system.
- (4) 1Mbytes on-chip Flash with DWIN patent encryption technology ensure code and data security.
- (5) Operating temperature ranges from -40°C to +85°C(IC operating temperature customizable from -55°C to 105°C).

**DWIN encourages users to design your own customized product based on T5L**

## 7.Revision records

| Rev | Revise Date | Content       | Editor  |
|-----|-------------|---------------|---------|
| 00  | 2023-11-21  | First Edition | Xu Ying |

Please contact us if you have any questions about the use of this document or our products, or if you would like to know the latest information about our products:

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- DWIN Developer Forum: <https://forums.dwin-global.com/>

Thank you all for continuous support of DWIN, and your approval is the driving force of our progress!