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# APPLICATION NOTE

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VACUUM FLUORESCENT DISPLAY MODULE

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AN-E-3155A



## GRAPHIC DISPLAY MODULE

### GP1009C10A INSTRUCTION MANUAL

#### GENERAL DESCRIPTION

FUTABA GP1009C10A is a graphic display module using a FUTABA 240×64 VFD. Consisting of a VFD, display drivers and a control circuit, the module can be driven by connecting to the host system through a simple interface.

## Important Safety Notice

Please read this note carefully before using the product.

### Warning

- The module should be disconnected from the power supply before handling.
- The power supply should be switched off before connecting or disconnecting the power or interface cables.
- The module contains electronic components that generate high voltages which may cause an electrical shock when touched.
- Do not touch the electronic components of the module with any metal objects.
- The VFD used on the module is made of glass and should be handled with care. When handling the VFD, it is recommended that cotton gloves be used.
- The module is equipped with a circuit protection fuse.
- Under no circumstances should the module be modified or repaired.  
Any unauthorized modifications or repairs will invalidate the product warranty.
- The module should be abolished as the factory waste.

## 1. FEATURES

- 1-1. Compact and light-weight unit using flat packed display drivers and one-chip VFD controller.
- 1-2. Driven through a simple interface.
- 1-3. High speed 8 bit data write-in capability.
- 1-4. Brightness adjustment available by software.

## 2. GENERAL SPECIFICATIONS

### 2-1. DIMENSIONS, WEIGHT (Refer FIGURE-1)

Table-1

| Item             | Specification | Unit |
|------------------|---------------|------|
| Outer Dimensions | (L) 160±1     | mm   |
|                  | (W) 70±1      |      |
|                  | (T) 36 Max    |      |
| Weight           | 400 Max       | g    |

### 2-2. OPTICAL CHARACTERISTICS

Table-2

| Item                  | Specification                      | Unit |
|-----------------------|------------------------------------|------|
| Display Area          | 107.9×28.7                         | mm   |
| Number of Dots        | 240×64                             | Dot  |
| Dot Pitch (H×W)       | 0.45×0.45                          | mm   |
| Dot Size (H×W)        | 0.35×0.35                          | mm   |
| Color of Illumination | Green ( $\lambda_p=505\text{nm}$ ) | –    |

(Note) By using a filter, uniform color changing from blue to orange (including white) can be obtained.

### 2-3. ENVIRONMENT CONDITION

Table-3

| Item                   | Symbol    | Min. | Max. | Unit |
|------------------------|-----------|------|------|------|
| Operating Temperature  | $T_{opr}$ | 0    | +70  | °C   |
| Storage Temperature    | $T_{stg}$ | -20  | +70  | °C   |
| Operating Humidity     | $H_{opr}$ | 20   | 85   | %    |
| Storage Humidity       | $H_{stg}$ | 20   | 90   | %    |
| Vibration (10 to 55Hz) | –         | –    | 4    | G    |
| Shock                  | –         | –    | 40   | G    |

(Note) Avoid operations and or storage in moist environmental conditions.

### 2-4. ABSOLUTE MAXIMUM RATINGS

Table-4

| Item                 | Symbol    | Min. | Max.          | Unit |
|----------------------|-----------|------|---------------|------|
| Supply Voltage       | $V_{cc1}$ | -0.3 | 7.0           | Vdc  |
|                      | $V_{cc2}$ | -0.3 | 14.4          | Vdc  |
| Input Signal Voltage | $V_{is}$  | -0.3 | $V_{cc1}+0.3$ | V    |

## 2-5. RECOMMENDED OPERATING CONDITIONS

Table-5

| Item                  | Symbol           | Min. | Typ. | Max. | Unit |
|-----------------------|------------------|------|------|------|------|
| Supply Voltage        | V <sub>CC1</sub> | 4.5  | 5.0  | 5.5  | Vdc  |
|                       | V <sub>CC2</sub> | 10.8 | 12.0 | 13.2 | Vdc  |
| H-Level Input Voltage | V <sub>IH</sub>  | 2.0  | –    | –    | V    |
| L-Level Input Voltage | V <sub>IL</sub>  | –    | –    | 0.8  | V    |

## 2-6. ELECTRICAL CHARACTERISTICS

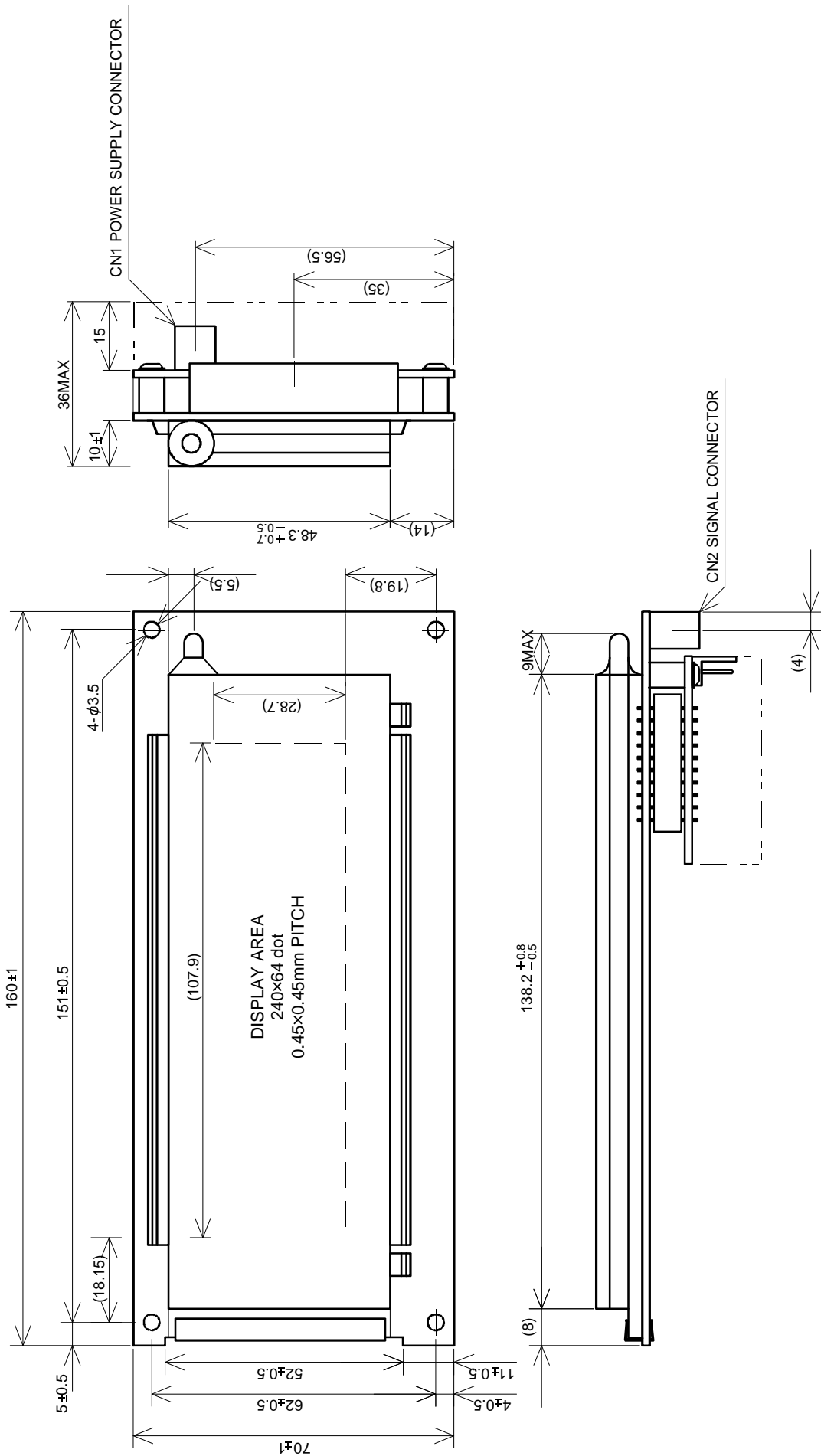
Table-6

| Item                   | Symbol           | Condition   | Min. | Typ. | Max. | Unit              |
|------------------------|------------------|---|------|------|------|-------------------|
| Supply Current         | I <sub>CC1</sub> | V <sub>CC1</sub> =5.0Vdc<br>V <sub>CC2</sub> =12Vdc | –    | 0.1  | 0.15 | A                 |
|                        | I <sub>CC2</sub> |   | –    | 0.5  | 0.6  | A                 |
| Power Consumption      | –                |   | –    | 6.5  | –    | W                 |
| Luminance              | L                |   | 100  | 200  | –    | cd/m <sup>2</sup> |
| H-Level Output Voltage | V <sub>OH</sub>  | V <sub>CC1</sub> =4.5Vdc<br>I <sub>OH</sub> =-2mA   | 4.1  | –    | –    | V                 |
| L-Level Output Voltage | V <sub>OL</sub>  | V <sub>CC1</sub> =4.5Vdc<br>I <sub>OL</sub> =6mA    | –    | –    | 0.4  | V                 |

(Note) The surge current can be approx.5 times the specified supply current at power on.

GP1009C10A OUTER DIMENSIONS

FIGURE-1



GP1009C10A CIRCUIT BLOCK DIAGRAM

FIGURE-2

