APPLICATION NOTE

VACUUM FLUORESCENT DISPLAY MODULE

AN-E-2211D

CHARACTER DISPLAY MODULE

M204SD01AA INSTRUCTION MANUAL

GENERAL DESCRIPTION

Futaba Vacuum Fluorescent Display Module M204SD01AA, with Futaba VFD 204-SD-01G display, produces 20 digits on 4 rows.
Each character is displayed in 5×7 dot matrix.
Consisting of a VFD, microcomputer, driver IC, the module can be connected directly to the system bus easily, thus simplifying interfacing.
The bright and aesthetically pleasing VFD makes the module desirable for an application in office equipments, such as computer terminals, measuring equipment, etc.

⚠ 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. Using an one chip micro computer, the module can be connected to the system bus directly.

1-2. Two hundred sixteen different characters consisting of alpha-numeric and other symbols can be displayed.

1-3. Since a DC/DC converter is included, only a 5V power source is required to operate the module.

1-4. High quality and reliability, also long life can be achieved with FUTABA VFD.

1-5. Either parallel or serial mode can be selected as the data input form.

1-6. The module is small, light and thin mechanical sizing allows for maximum reliability.

1-7. The module’s surface mount components allow for maximum reliability.

1-8. The module has up three definable characters, they can be displayed as original fonts.

1-9. Four levels of brightness control is available.

2. GENERAL SPECIFICATIONS

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

Table-1

Item	Specification	Unit
Outer Dimensions	(L) 135.0 ± 1 (W) 70.0 ± 1 (T) 31 Max.	mm
Weight	Approx. 145	g

2-2. SPECIFICATION OF THE DISPLAY PANEL

Table-2

Item	Specification	Unit
Display Area	33.2×89.65	mm
The Number of Digits	20 digits (5×7dots)× 4 rows	–
Dot Pitch (H×W)	0.75×0.69	mm
Dot Size (H×W)	0.5×0.44	mm
Character Size(H×W)	5.0×3.2	mm
Character Pitch (H×W)	9.4×4.55	mm
Color of Illumination	Green (λp=505nm)	–

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

2-3. ENVIRONMENT CONDITIONS

Table-3

Item	Symbol	Min.	Max.	Unit
Operating Temperature	*T*opr	-20	+70	°C
Storage Temperature	*T*stg	-20	+70	°C
Operating Humidity (Note)	*H*opr	20	85	%
Storage Humidity (Note)	*H*stg	20	90	%
Vibration (10 to 55 Hz)	–	–	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*cc	-0.3	7.0	V
Input Signal Voltage	V_{IS}	-0.3	7.0	V

2-5. RECOMMENDED OPERATING CONDITIONS

Table-5

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	*V*cc	–	4.5	5.0	5.5	V
H-Level Input Voltage	V_{IH}	*V*cc=5V	2.0	–	–	V
L-Level Input Voltage	V_{IL}	*V*cc=5V	–	–	0.8	V

2-6. ELECTRICAL CHARACTERISTICS

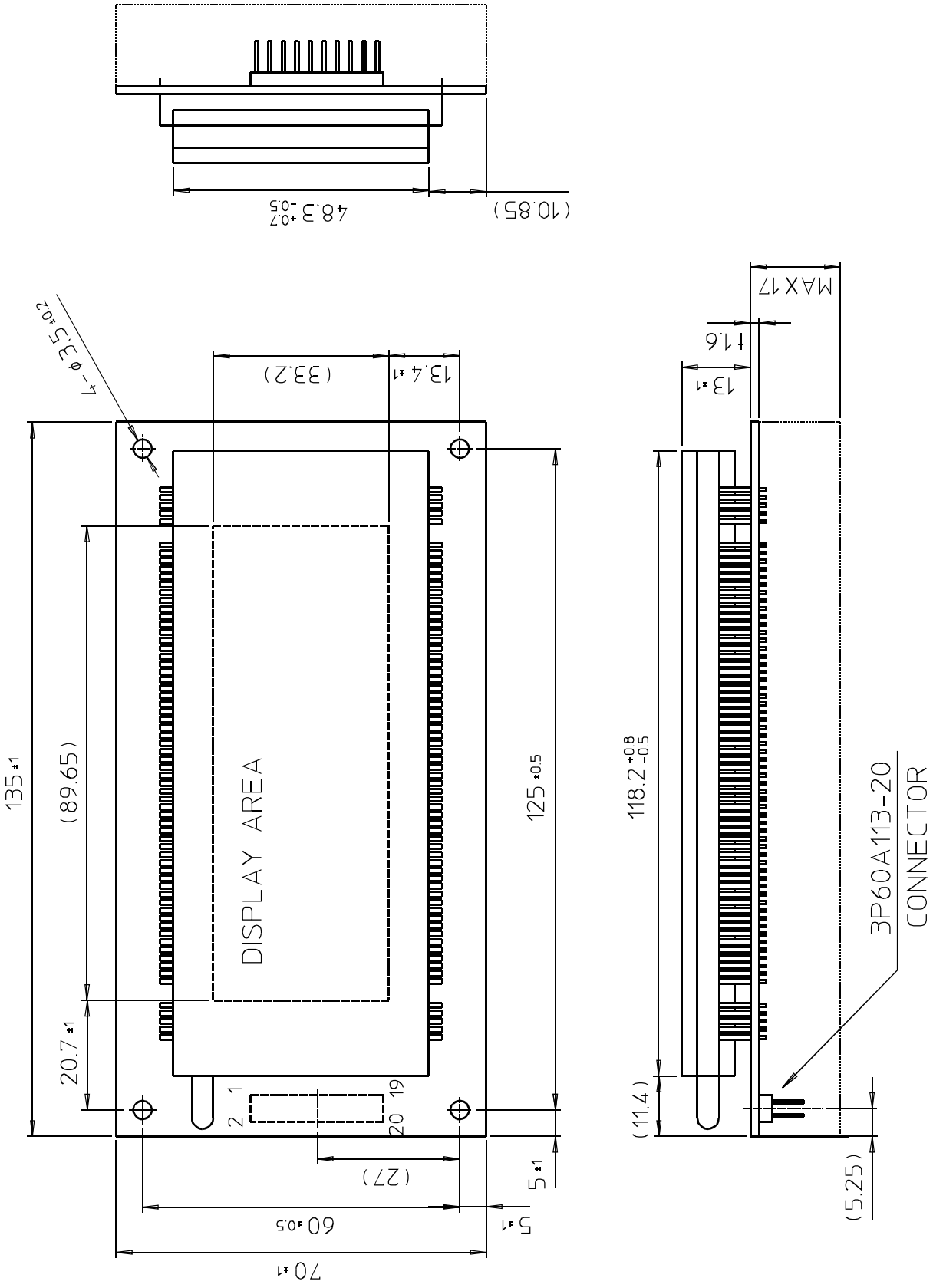
Table-6

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Current	*I* cc	*V*cc=5.0V (All on)	–	0.75	1	A
Power Consumption	–		–	3.75	–	W
Luminance	*L*		340	690	–	cd/m^2
H-Level Input Current	I_{IH}	V_{IH}=2.0V	–	–	20	μA
L-Level Input Current	I_{IL}	V_{IL}=0.8V	–	–	-0.4	mA
H-Level Output Voltage	V_{OH}	*V*cc=5V I_{OH}=-1.0mA	4.0	–	–	V
L-Level Output Voltage	V_{OL}	*V*cc=5V I_{OL}=4.0mA	–	–	0.45	V

Note) The surge current can be approx.3 times the specified maximum supply current at power on, except peaked charge current to a capacitor.

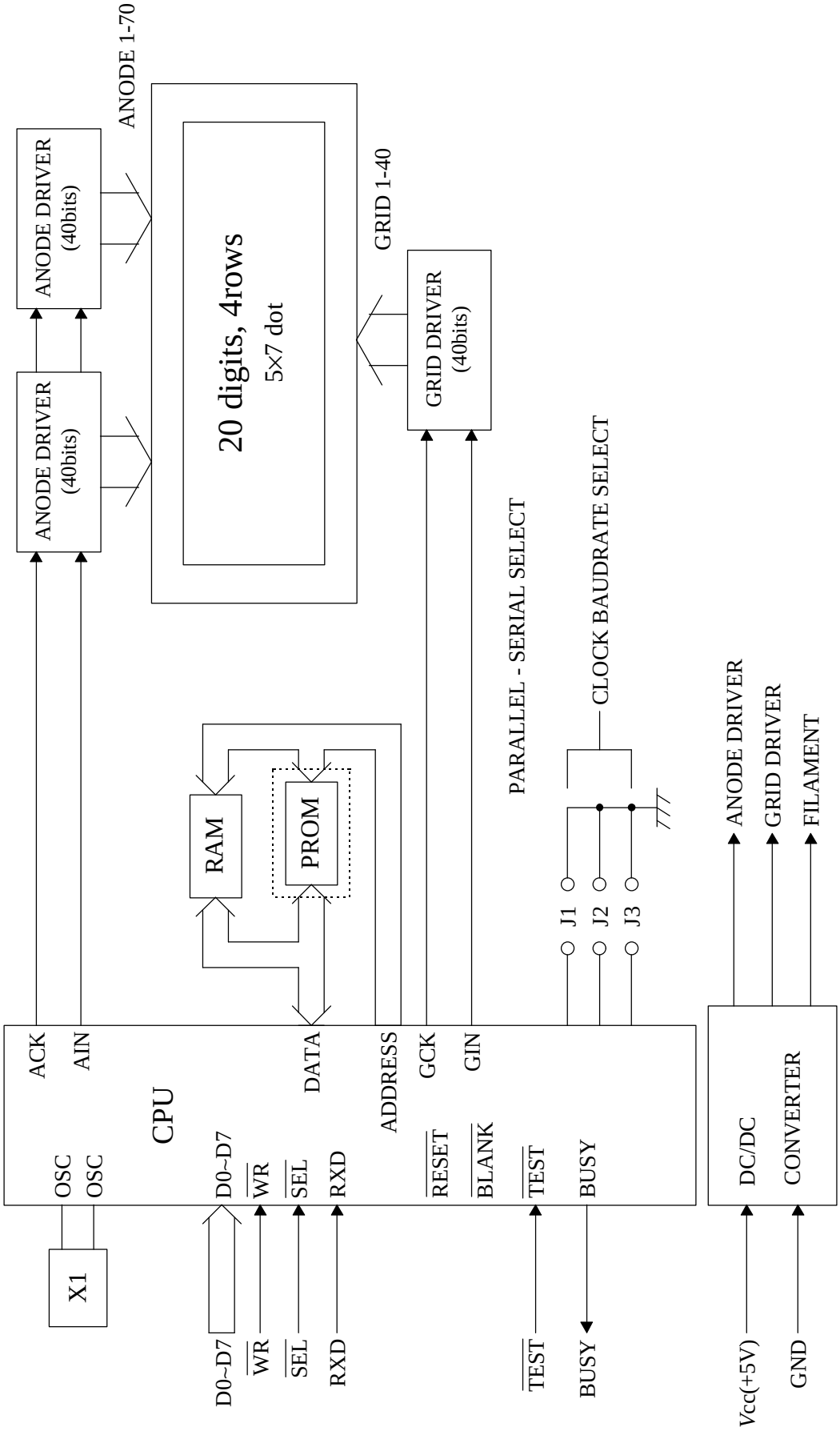
M204SD01AA MECHANICAL DRAWING

FIGURE-1



M204SD01AA　CIRCUIT BLOCK DIAGRAM

FIGURE-2



M204SD01AA DISPLAY CHARACTER CODE

FIGURE-3

D7 D6 D5 D4 / D3 D2 D1 D0		0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 1	0 1 0 0	0 1 0 1	0 1 1 0	0 1 1 1	1 0 0 0	1 0 0 1	1 0 1 0	1 0 1 1	1 1 0 0	1 1 0 1	1 1 1 0	1 1 1 1
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0 0 0 0	0		DP	SP										UF0			
0 0 0 1	1		DC1											UF1			
0 0 1 0	2		DC2											UF2			
0 0 1 1	3	DEF															
0 1 0 0	4	DIM															
0 1 0 1	5																
0 1 1 0	6																
0 1 1 1	7																
1 0 0 0	8	BS															
1 0 0 1	9	HT															
1 0 1 0	A	LF															
1 0 1 1	B																
1 1 0 0	C																
1 1 0 1	D	CR															
1 1 1 0	E																
1 1 1 1	F		RST														

SP:SPACE