
APPLICATION NOTE

VACUUM FLUORESCENT DISPLAY MODULE

AN-E-2230A



CHARACTER DISPLAY MODULE

M202SD01LA INSTRUCTION MANUAL

GENERAL DESCRIPTION

Futaba Vacuum Fluorescent Display Module M202SD01LA, with Futaba VFD 202-SD-01GKM display, produces 20 digits on 2 rows.

Each character is displayed in 5×7dot matrix.

Consisting of a VFD, one chip controller, driver IC, the module can be connected directly to the system bus, thus simplifying interfacing.

The bright and aesthetically pleasing VFD makes the module desirable for application in office equipment's, such as computer terminals, measuring equipment's, 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. One chip controller is equipped on the module and it realizes intelligent terminal.
The module can be connected to the system bus directly.
- 1-2. Two hundred and twenty-three character fonts consisting of alphabets, katakanas, numeral and other symbols can be displayed.
- 1-3. By using dimming function, brightness can be controlled into 6 levels.
- 1-4. Since a DC/DC converter is included, only 5V power source is required to operate the module.
- 1-5. High quality and reliability, also long life can be achieved with FUTABA VFD.
- 1-6. Compact, light weight and thin design by using SMART (Surface Mount And Reflow Technology) provides excellent built-in capability.
- 1-7. Either parallel or serial input interface can be selected.
In case of serial input, it is possible to choose 1200 and 9600 bps.

2. GENERAL SPECIFICATIONS

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

Table-1

Item	Specification	Unit
Outer Dimension	(L) 100.0±1	mm
	(W) 35.0±1	
	(T) 26.3 Max.	
Weight	80	g

2-2. SPECIFICATIONS OF THE DISPLAY PANEL

Table-2

Item	Specification	Unit
Display Area (H×W)	12.92×69.7	mm
Number of Digits	20digits(5×7dots)×2rows	–
Digits Size (H×W)	4.16×2.25	mm
Digits Pitch (H×W)	8.76×3.55	mm
Color of Illumination	Green($\lambda_p=505\text{nm}$)	–

2-3. ENVIRONMENT CONDITIONS

Table-3

Item	Symbol	Min.	Max.	Unit
Operating Temperature	T_{opr}	-20	+70	°C
Storage Temperature	T_{stg}	-40	+85	°C
Operating Humidity (note)	H_{opr}	20	85	%
Storage Humidity (note)	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_{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}	$V_{CC}=5V$	2.4	–	–	V
L-Level Input Voltage	V_{IL}	$V_{CC}=5V$	–	–	0.8	V

2-6. ELECTRICAL CHARACTERISTICS

Table-6

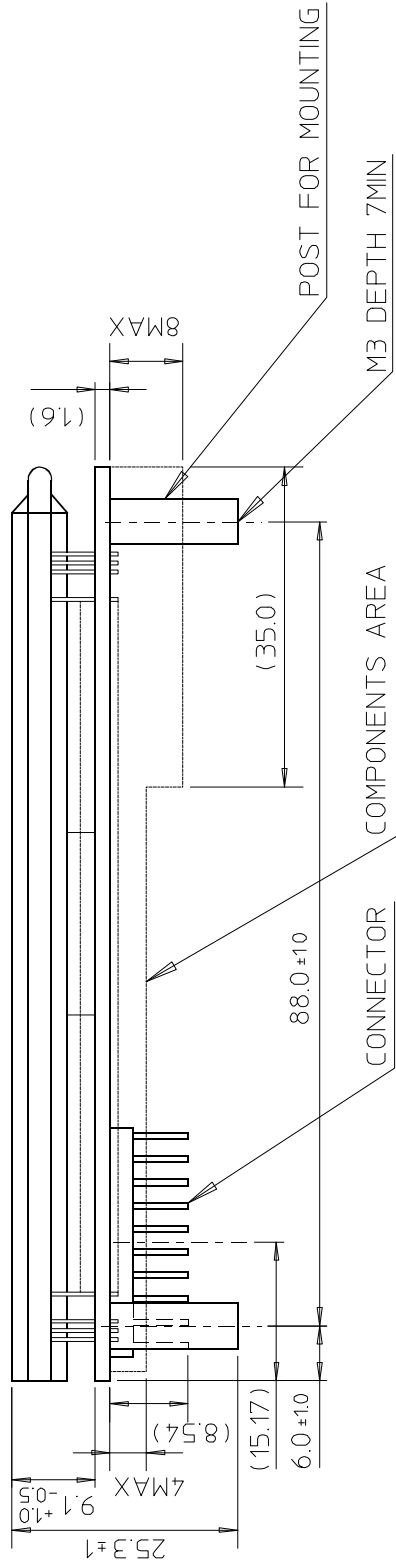
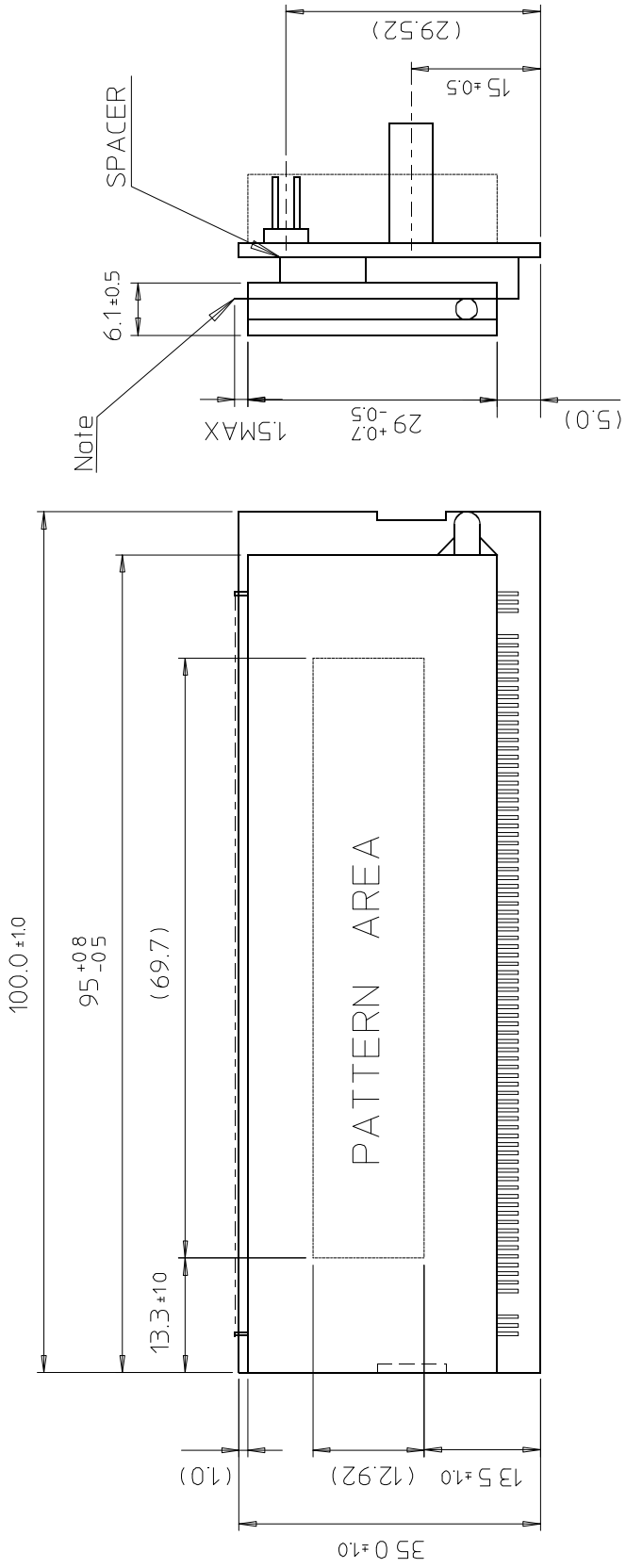
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Current	I_{CC}	$V_{CC}=5V$ All on	–	350	450	mA
Power Consumption	–		–	1.8	–	W
Luminance	L		340 (100)	690 (200)	–	cd/m ² (fL)
H-Level Output voltage	V_{OH}	$V_{CC}=5V$ $I_{OH}=500\mu A$	4.5	–	–	V
L-Level Output voltage	V_{OL}	$V_{CC}=5V$ $I_{OL}=2.0mA$	–	–	0.5	V

note) The surge current can be approx.10 times the specified supply current at power on.

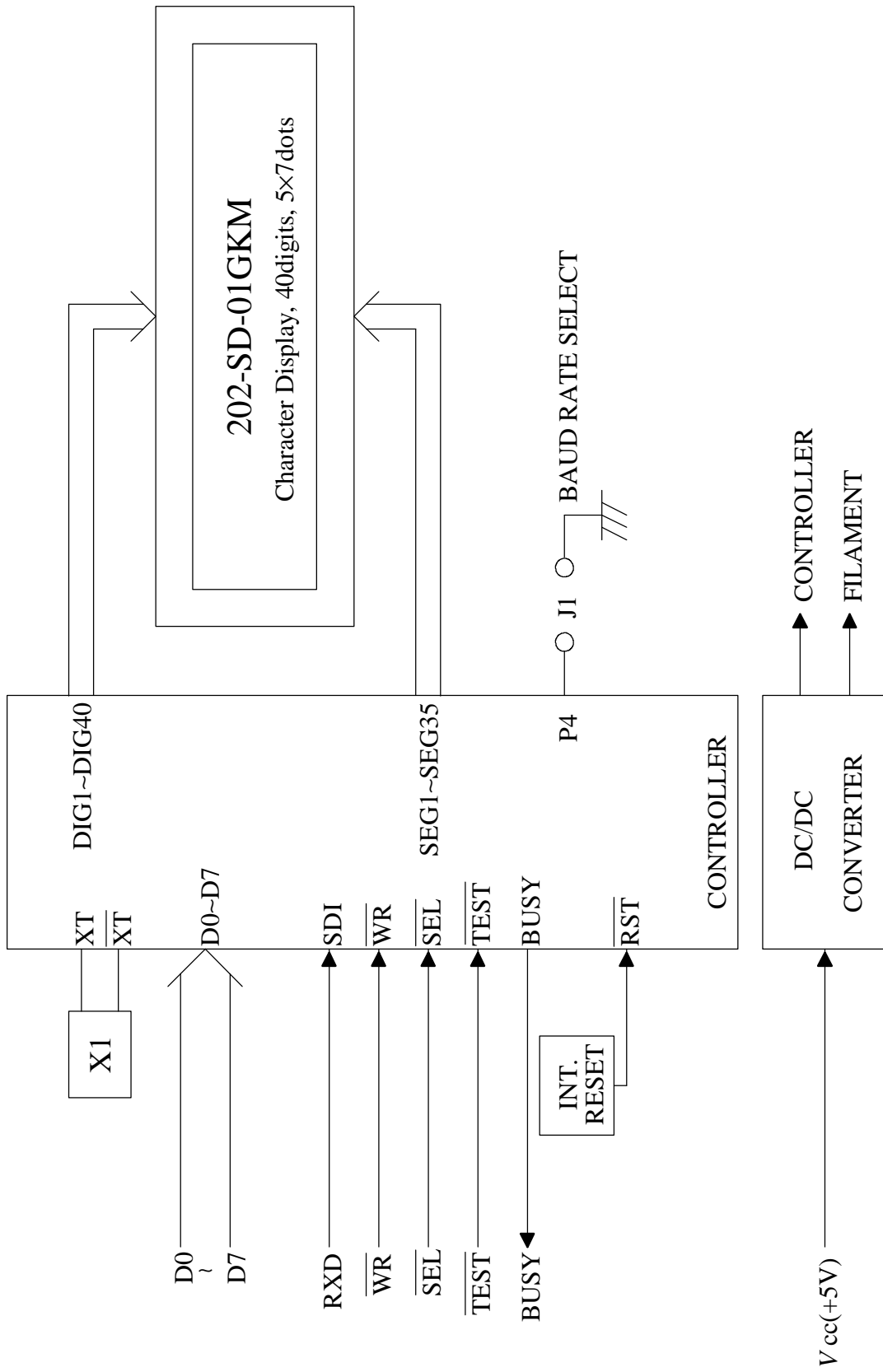
M202SD01LA MECHANICAL DRAWING

APPENDIX-1

UNIT:mm



Note) Avoid touching to any conductors (such as chassis, metal, case, etc.), because the leads are alive electrically.



M202SD01LA DISPLAY CHARACTER CODE

APPENDIX-3

D3 D2 D1 D0	D7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1		
	D6	0	0	1	1	0	0	1	1	0	0	0	1	1	0	1		
D5	0	0	1	1	0	0	1	1	0	0	0	1	1	0	0	1		
D4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1		
0 0 0 0	0		DP	SP	0	0	P	`	P	W	E	I	-	9	E	↑	△	
0 0 0 1	1				!	1	A	0	a	9	0	5	.	7	*	△	↓	
0 0 1 0	2				"	2	B	R	b	r	r	*	r	4	W	×	↑	
0 0 1 1	3				#	3	C	S	c	s	d	*	1	ウ	テ	モ	角	
0 1 0 0	4	DIM	CU1		\$	4	D	T	d	t	E	1	\	I	ト	ト	角	
0 1 0 1	5		CU2		%	5	E	U	e	u	7	又	.	オ	ナ	1	日	
0 1 1 0	6		CU3		&	6	F	V	f	v	0	あ	フ	加	ニ	ヨ	角	
0 1 1 1	7		DC		'	7	G	W	w	λ	-	1	7	+	又	ウ	火	
1 0 0 0	8	BS			(	8	H	X	h	x	P	2	4	ウ	ホ	リ	*	△
1 0 0 1	9	HT			)	9	I	V	i	v	π	3	ウ	7	1	ル	*	△
1 0 1 0	A				*	:	J	Z	j	z	P	*	エ	コ	ハ	ル	*	△
1 0 1 1	B		UF0		+	:	K	L	k	l	0	4	*	サ	ヒ	ロ	上	△
1 1 0 0	C		UF1		,	<	L	*	1	1	7	1	ウ	ホ	ウ	ウ	角	△
1 1 0 1	D	CLR	UF2		-	=	M	J	m	)	Φ	Γ	ユ	ズ	\	ウ	ウ	△
1 1 1 0	E		UF3		.	>	N	^	n	˘	0	±	9	E	ホ	˘	△	△
1 1 1 1	F	ALD	RST		/	?	0	_	o	■	Σ	#	ウ	ウ	7	"	||	

SP : SPACE