
APPLICATION NOTE

VACUUM FLUORESCENT DISPLAY MODULE

AN-E-2258



CHARACTER DISPLAY MODULE

M202MD12BA INSTRUCTION MANUAL

GENERAL DESCRIPTION

Futaba Vacuum Fluorescent Display M202MD12BA, with Futaba VFD 202-SD-12GK display, produces 20 digits on 2 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, thus simplifying interfacing.

The bright and aesthetically pleasing VFD makes the module desirable for application in office equipment's, 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. Two hundred twenty-three different characters consisting of alphanumeric and other symbols can be displayed.
- 1-2. By using dimming function, brightness can be controlled into six levels.
- 1-3. Since a DC/DC converter is included, only a 5V power is required to operate the module.
- 1-4. High quality reliability and long life can be achieved with FUTABA VFD.
- 1-5. The module can be communicated by RS-232C interface.
- 1-6. The module's small, light and thin mechanical sizing allows for maximum mounting flexibility.

2. GENERAL SPECIFICATIONS

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

Table-1

Item	Specification	Unit
Outer Dimensions	(W) 190 ± 1	mm
	(H) 64 ± 1	
	(T) 27 Max.	
Weight	Approx. 200	g

2-2. SPECIFICATIONS OF THE DISPLAY PANEL

Table-2

Item	Specification	Unit
Display Area	146.1×29.0	mm
Number of Digit	20 digits (5×7 Dots)×2 rows + Triangle Mark	–
Character Size	10.5(H)×5.5(W)	mm
Character Pitch	15.5(H)×7.4(W)	mm
Color of Illumination	Green($\lambda_p=505\text{nm}$)	–

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 (10~55Hz)	–	–	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	6.5	V
Input Signal Voltage	V_{IS}	-20	+20	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
DATA “1”(MARK)	V_{MARK}	RS-232C	-15	–	-5	V
DATA “0”(SPACE)	V_{SPACE}		5	–	15	V

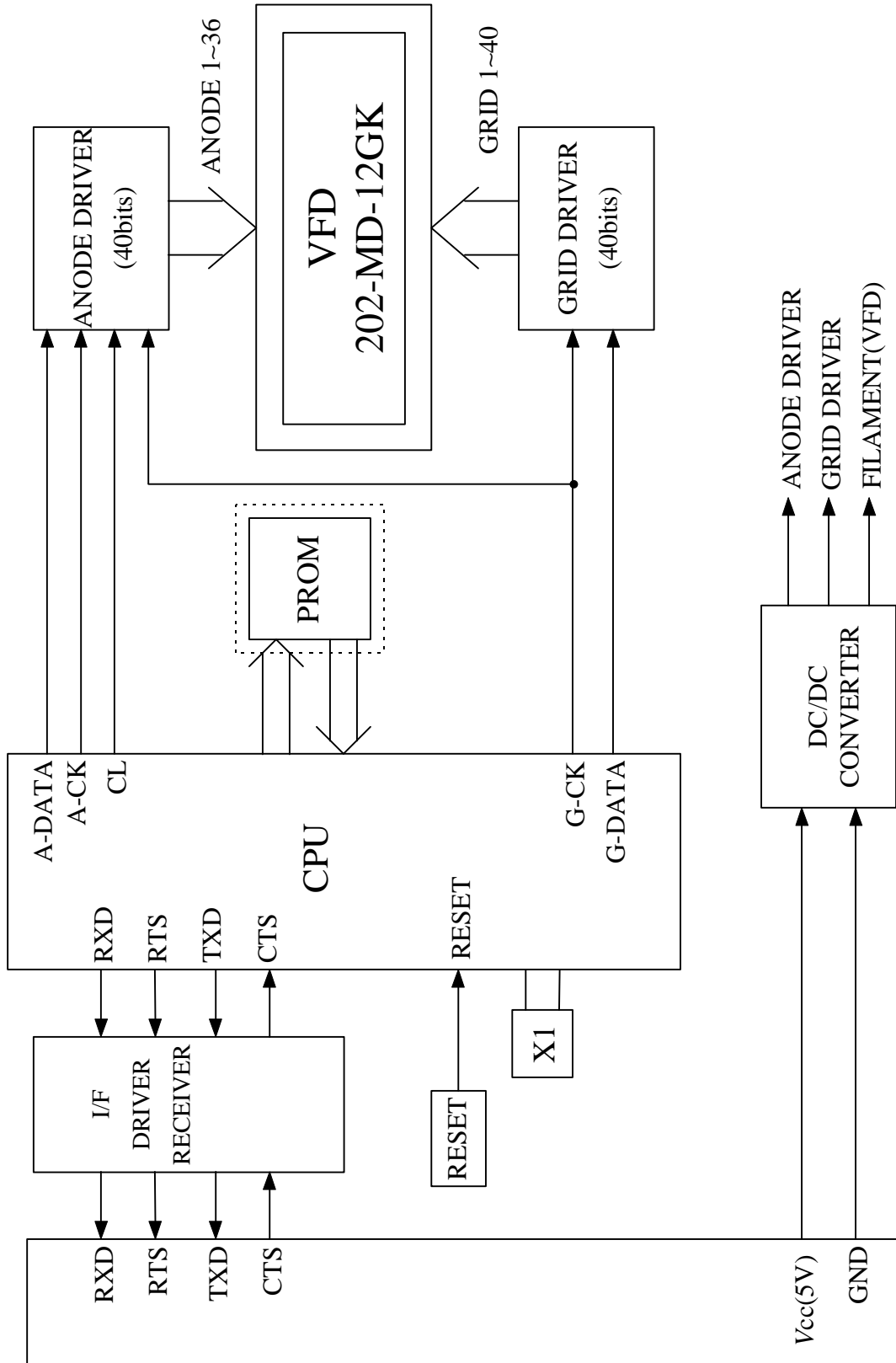
2-6. ELECTRICAL CHARACTERISTICS

Table-6

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Current (Note1)	I_{CC}	$V_{CC}=5.0V$ All on	–	1.0	1.5	A
Power Consumption	–		–	5.0	–	W
Luminance	L		350	700	–	cd/m ²

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

FIGURE-2



M202MD12BA CHARACTER DISPLAY CODE

FIGURE-3

D3 D2 D1 D0	D7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	D6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	D5	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	D4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0 0 0 0	0		DP	SP	0	a	P	`	P	a	E	|	-	9	3	↑	↖
0 0 0 1	1	ID PAUSE		!	1	A	Q	a	9	ß	ß	µ	7	✦	△	↓	↘
0 0 1 0	2	ID END		"	2	B	R	b	r	r	æ	7	4	W	×	✦	✦
0 0 1 1	3	ID CLEAR		#	3	C	S	c	s	d	∞	µ	0	7	e	7	≡
0 1 0 0	4	DIM		\$	4	D	T	d	t	e	/	\	I	ト	ト	A	A
0 1 0 1	5			%	5	E	U	e	u	7	×	=	オ	オ	1	日	7
0 1 1 0	6			&	6	F	V	f	v	θ	μ	7	カ	二	三	A	←
0 1 1 1	7		DC	'	7	G	W	g	w	λ	-	1	7	+	7	ウ	火
1 0 0 0	8	BS	TON	(	8	H	X	h	x	P	2	4	0	*	U	*	ä
1 0 0 1	9	HT	TOF	)	9	I	Y	i	y	π	3	7	7	U	U	*	ö
1 0 1 0	A	BLK	TFF	*	#	J	Z	j	z	P	*	z	コ	ハ	ハ	ö	ü
1 0 1 1	B	SCL		+	#	K	L	k	l	6	¼	*	7	ヒ	口	ト	ä
1 1 0 0	C	CAL		,	<	L	¥	l	l	7	√	7	コ	7	7	ä	ä
1 1 0 1	D	CLR		-	=	M	I	m	)	φ	7	ユ	7	ハ	ハ	ü	ü
1 1 1 0	E		TBK	.	>	N	^	n	^	Q	±	3	ヒ	ホ	ホ	≡	≡
1 1 1 1	F	ALD	RST	/	?	O	_	o	■	Σ	#	ウ	ウ	7	#	||	SP

SP : SPACE