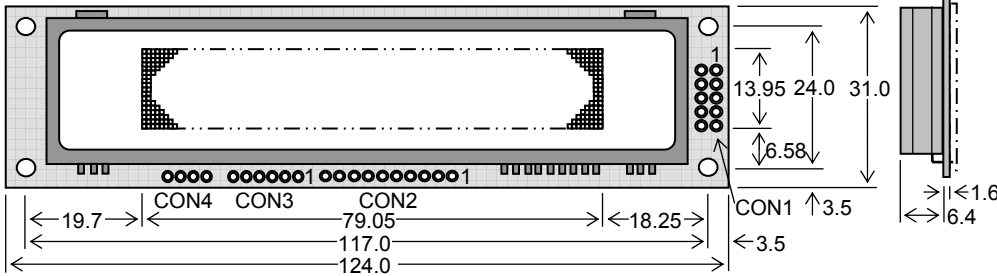


Dot Graphic VFD Module

GU180x32D-K612A8

- ❑ 180 x 32 High Brightness Dot Graphic Display
- ❑ Single 5V DC Supply
- ❑ 4 ASCII Fonts (5x5, 5x7, 10x14, 7x15)
- ❑ RS232 Asynchronous & Parallel interfaces
- ❑ 8 User I/O Pins with Key Scanning Capability

The module includes the VFD glass, VF drivers and micro-controller, character generation, interface logic and transformer-less DC/DC converter. The interface type is selected by a push button on the back of the module. Auto key scanning and general I/O are available on port PA0 – PA7 for user control.



CON3 & CON4 are not to be used in this implementation.

CON1		CON2		CON3	
Pin	Signal	Pin	Signal	Pin	Signal
1	5V	1	0V	1	Vcc
2	NC	2	ENABLE	2	RXD
3	NC	3	PA0	3	0V
4	NC	4	PA1	4	TXD
5	0V	5	PA2	5	MB
6	NC	6	PA3	6	HB
7	NC	7	PA4		
8	/RES	8	PA5		
9	MB	9	PA6		
10	NC	10	PA7		

NC = Do Not Connect

Dimensions in mm & subject to tolerances.

Uses patent applied PSU which has no inductive components.
Brown out detector active when RES is not connected.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Condition
Power Supply Voltage	VDD	5.0VDC +/- 5%	GND=0V
Power Supply Current	IDD	350 mA typ.	VDD=5VDC
RS232 Input	VSIL / VSIH	-24V min / +24V max	VDD=5VDC
RS232 Output	VSOL / VSOH	-5VDC min / +5VDC min	VDD=5VDC
CMOS Input	VIL / VIH	0.8VDC max / 2.0VDC min	VDD=5VDC
CMOS Output	VOL / VOH	0.5VDC max / 2.4VDC min	IOH=-2.0mA

OPTICAL & ENVIRONMENTAL SPECIFICATION

Parameter	Value
Display Area (X x Y mm)	79.05 x 13.95
Dot Size/Pitch (XxY mm)	0.29 x 0.29 / 0.44 x 0.44
Luminance	1000 cd/m ² (350 fL) Typ.
Colour of Illumination	Blue-Green (505nm)
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +85°C
Operating Humidity	20 to 85% RH @ 25°C

Optical filters can provide violet, red, yellow, blue & green output.

SOFTWARE COMMAND SUMMARY

Command Type	Description
Cursor Move	ASCII commands for Back Space, Horizontal Tab, Line Feed, Home, Vertical Tab, Carriage Return and Cursor Position
Character Write	Display a character from the selected font and increments the cursor according to the write mode.
Graphic Write	Write graphical data directly to a display area in either orientation. It is important to disable Hex receive mode. Set or clear individual pixels.
Macro Write	Store combinations of commands and data in up to 8 macros to reduce host communication time. Macro 0 operates at power on.
Area Control	Set, clear, invert and outline an area of the display for easy creation of highlights and menu screens.
Window Control	Pre-define 2 areas of the display as windows in which commands and data for scroll, flash, wipe and pattern are active.
Scroll	Vertically or horizontally scroll data in either direction within an area defined by window 1. Space padding, speed and repeat options.
Flash / Wipe	Flash selected window's contents. / Perform a wipe action on the selected window with predefined user patterns / wallpaper.
Font Select	Select proportional mini font, fixed spaced 5x7 font, fixed spaced 10x14 font. Use the extended font command for 7x15 font or advanced settings.
Key Scan	Set I/O port to key scanning. The I/O ports are continuously scanned for any key press and the connectivity data output to the serial port.
I/O Port	Set I/O port direction. A '1' indicates an input, a '0' indicates an output. All output lines are immediately set low.
Brightness	Set the display brightness. Level = F8H - FFH. F8H = display off. F9H = minimum, FFH = maximum (default). Auto-fade to a defined level.
Power On/Off	Turn on VFD power supply (default)/Turn off VFD power supply (display's contents will be preserved). Current consumption is about 25mA.
Set Up Display	Set the serial communication interface. Clear or reset the display. Lock or unlock the EEPROM for macros and setup configuration.

CHARACTER SETS

MINI FONT

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
20	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	<	=	>	?	
40	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	
50	p	q	r	s	t	u	v	w	x	y	z	[\]	^	_

5x7, 7x15 & 10x14 FONTS

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
20	!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
30	0	1	2	3	4	5	6	7	8	9	:	<	=	>	?	
40	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	
50	p	q	r	s	t	u	v	w	x	y	z	[\]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	[\]	^	_
80	E	°	∂	∫	∞	∑	∏	∞	∞	∞	∞	∞	∞	∞	∞	∞
90	Σ	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞
00	#	1	2	3	4	5	6	7	8	9	0	±	∞	∞	∞	∞
10	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞
20	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞
30	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞
40	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞
50	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞
60	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞	∞

The module defaults to a 4 line of 30 character display using the 5x7 font with single pixel spacing. The cursor position auto increments after each character write. The bottom left of a character is placed at the cursor x,y. The M(odule) Busy line indicates the module is busy when high. Connect the H(ost) Busy input to the MBusy to disable handshaking. Use the rear SMT button to select the configuration which is then stored in EEPROM. To send commands as hexadecimal, prefix the 2 bytes using character 60H.

Example: `10`3F`01 = Position dot x=64 y=1. To send character 60H to the display, send 60H twice.

Please note that the module defaults to HEX Receive Mode.

Subject to change without notice.
Software command syntax and port pin out Copyright 2006 Noritake Co. Limited

Doc Ref:11257 Iss.2
25 June 08

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