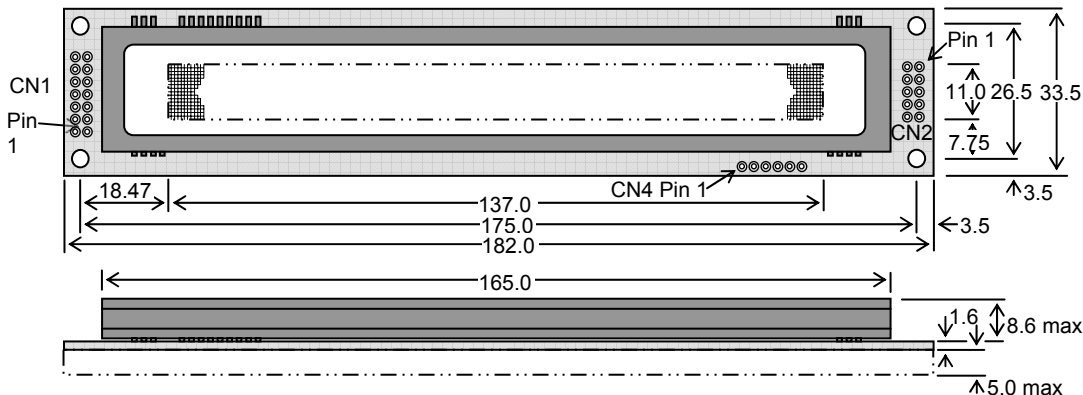


# Dot Graphic VFD Module

# GU280x16G-7806AC

- 280x16 Dot Graphic (2x40 characters)
- Single 5V Supply
- High Brightness Blue Green Display
- Operating Temp -40°C to +85°C
- 3 Multi Sized Fonts
- 5x7 & 10x14 Cyrillic Fonts
- 4/8 Bit Parallel LCD & Serial Interfaces

The module includes the Vacuum Fluorescent Display glass, VF drivers and micro-controller ICs with refresh RAM, character generator and interface logic. The 4/8 bit parallel & serial bi-directional interfaces are 5V TTL/CMOS compatible. The command set is LCD compatible with extended graphic functions.



### CN2 – SERIAL INTERFACE

Pin	Async	SPI
1	5V	5V
2	NC	SCK
3	RXD	/SS
4	LINK1	SIN
5	0V	0V
6	LINK2	SOUT
7	TXD	NC
8	/RES	/RES
9	MB	MB
10	HB	HB

NC = Do Not Connect

### CN1 - PARALLEL INTERFACE

Pin	Sig	Pin	Sig
1	GND	2	VCC
3	NC*	4	RS
5	R/W	6	E
7	D0	8	D1
9	D2	10	D3
11	D4	12	D5
13	D6	14	D7

Pin 3 can be changed to /RESET or BUSY terminal and selectable by jumper J2 (2-3) or J2 (1-2)

### ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Condition
Power Supply Voltage	VCC	5.0VDC +/- 5%	GND=0V
Power Supply Current	ICC	400mADC typ.	VCC=5V
Logic High Input	VIH	0.8VDC min. Vcc max.	VCC=5V
Logic Low Input	VIL	0VDC min. 0.2VDC max.	VCC=5V
Logic High Output	VOH	3.8VDC min. Vcc max.	IOH = 1.5mA
Logic Low Output	VOL	0VDC min. 0.6VDC max.	IOL = 1.6mA

### OPTICAL and ENVIRONMENTAL SPECIFICATIONS

Parameter	Value
Display Area (XxY mm)	137.05 x 11.00
Dot Size/Pitch (XxY mm)	0.34 x 0.5 / 0.49 x 0.7
Luminance	500 cd/m <sup>2</sup> Typ.
Colour of Illumination	Blue-Green (Filter for colours)
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +85°C
Operating Humidity (non condensing)	20 to 80% RH @ 25°C

### SOFTWARE COMMAND SUMMARY

Instruction	R/W	RS	D0-D7
Clear Display	L	L	01H
Cursor Return Home	L	L	02H
Entry Mode Set	L	L	04H-07H
Display ON/OFF	L	L	08H-0FH
Cursor Shift Left	L	L	10H
Cursor Shift Right	L	L	14H
Display Shift Left	L	L	18H
Display Shift Right	L	L	1CH
Select 4/8 bit interface	L	L	20H (4Bit) / 30H (8Bit) + <i>luminance</i>
Display Luminance	L	H	00H-03H (must follow above command)
Set CG RAM Addr.	L	L	40H-7FH
Set DD RAM Addr.	L	L	80H-E7H
Read BUSY/Addr.	H	L	00H-FFH D7 Busy = High
Read Data from RAM	H	H	00H-FFH
Set Graphic Cursor	L	L	FOH + <i>xpos</i> + <i>ypos</i>
Set Area Commands	L	L	F1H + <i>x1</i> + <i>y1</i> + <i>x2</i> + <i>y2</i> + <i>cmd</i>
	L	H	49H = Invert Area
	L	H	46H = Fill Area
	L	H	43H = Clear Area
	L	H	4FH = Set Outline Box
	L	H	6FH = Clear Outline Box
Write Graphic Image	L	L	F1H + <i>x1</i> + <i>y1</i> + <i>x2</i> + <i>y2</i> + <i>cmd</i> + <i>data</i>
Set Font / Spacing	L	L	F2H + <i>font style</i>
Set RS Low	0FH		Serial Comms. only
Read Data	FEH		Serial Comms. only
Read Cursor Position	FFH		Serial Comms. only

### CHARACTER SET

5x7 & 10x14 Font

UDF	LCD Font																Cyrillic Font															
	00	10	20	30	40	50	60	70	80	90	AO	BO	CO	DO	EO	FO	80	90	AO	BO	CO	DO	EO	FO								
00	UDF1		I	O	P	F	A	E	-	9	3	0	P				А	А	А	А	А	А	А	А								
01	UDF2	!	!	1	Q	a	9	A	a	7	#	2	8	9			Б	Б	Б	Б	Б	Б	Б	Б								
02	UDF3	!"#\$%	2	B	R	b	r	2	E	r	y	w	e	0			В	В	В	В	В	В	В	В								
03	UDF4	#	3	C	S	c	s	3	R	L	O	T	E	e			Г	Г	Г	Г	Г	Г	Г	Г								
04	UDF5	\$	4	D	T	d	t	\$	.	I	L	T	P	e			Д	Д	Д	Д	Д	Д	Д	Д								
05	UDF6	%	5	E	U	e	u	E	U	E	U	E	U	E	U		Е	Е	Е	Е	Е	Е	Е	Е								
06	UDF7	&	6	F	V	v	F	V	V	+	#	+	3	P	Σ		Й	Й	Й	Й	Й	Й	Й	Й								
07	UDF8	&	7	G	W	w	G	W	W	o	7	#	7	9	T		Ј	Ј	Ј	Ј	Ј	Ј	Ј	Ј								
08	UDF1	κ	8	H	X	x	H	X	X	!	κ	κ	κ	κ	κ		Ѡ	Ѡ	Ѡ	Ѡ	Ѡ	Ѡ	Ѡ	Ѡ								
09	UDF2	η	9	I	Y	y	I	Y	Y	φ	9	9	9	9	9		Ѣ	Ѣ	Ѣ	Ѣ	Ѣ	Ѣ	Ѣ	Ѣ								
0A	UDF3	ε	10	J	Z	z	J	Z	Z	0	ε	ε	ε	ε	ε		Ѥ	Ѥ	Ѥ	Ѥ	Ѥ	Ѥ	Ѥ	Ѥ								
0B	UDF4	F	+	K	K	K	K	K	K	0	+	+	+	+	+		Ѧ	Ѧ	Ѧ	Ѧ	Ѧ	Ѧ	Ѧ	Ѧ								
0C	UDF5	†	†	L	†	†	L	†	†	†	†	†	†	†	†		Ѩ	Ѩ	Ѩ	Ѩ	Ѩ	Ѩ	Ѩ	Ѩ								
0D	UDF6	†	<	L	†	†	L	†	†	†	†	†	†	†	†		Ѭ	Ѭ	Ѭ	Ѭ	Ѭ	Ѭ	Ѭ	Ѭ								
0E	UDF7	†	>	N	†	†	n	†	†	†	†	†	†	†	†		Ѯ	Ѯ	Ѯ	Ѯ	Ѯ	Ѯ	Ѯ	Ѯ								
0F	UDF8	†	/	? 0	†	†	L 0	†	†	†	†	†	†	†	†		Ѱ	Ѱ	Ѱ	Ѱ	Ѱ	Ѱ	Ѱ	Ѱ								

NOTE: UDF characters are available using 5x7 font only.

### Proportional Mini Font

UDF	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	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	[	]	^	_	

### Serial / Parallel Selection

J5	Interface
Open	Sync Serial / Parallel (default)
Link	Asynchronous Serial

### CN1 Pin 3 Function

J2	Font
2 & 3	/ Reset
1 & 2	Busy

All J7 links & J5 should be open for Parallel operation.

### Parallel Interface type (M68 / i80)

J3	J6	Mode	Signals
1-2	1-2	i80	Pin 5 = /WR, Pin 6 = /RD
2-3	2-3	M68	Pin 5 = R/W, Pin 6 = E

### SERIAL MODE

J7	Configuration		
1	2	8	
0	0	0	9600, N, 8, 1
L	0	0	19200, N, 8, 1
0	L	0	38400, N, 8, 1
X	X	L	Self Test Mode

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