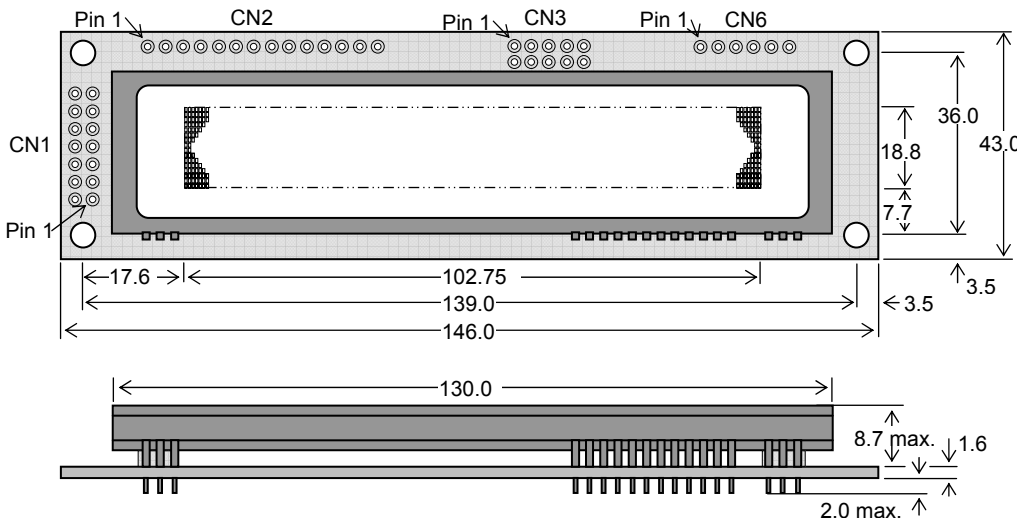


# Dot Graphic VFD Module

# GU140x16J-7806AC

- ❑ 140x16 Dot Graphic (2x20 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.



### CN3 – SERIAL INTERFACE

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

NC = Do Not Connect

### CN1/2 - 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 J3 (2-3) or J3 (1-2)

### ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Condition
Power Supply Voltage	VCC	5.0VDC +/- 5%	GND=0V
Power Supply Current	ICC	250mADC typ.	VCC=5V
Logic High Input	VIH	0.8xVCC min. VCC max.	VCC=5V
Logic Low Input	VIL	0VDC min 0.6VDC max.	VCC=5V
Logic High Output	VOH	3.5VDC min. VCC max.	IOH=-10uA
Logic Low Output	VOL	0VDC min 0.6VDC max.	IOL =4mA

### OPTICAL AND ENVIRONMENTAL SPECIFICATIONS

Parameter	Value
Display Area (XxY mm)	102.75 x 18.8
Dot Size/Pitch (XxY mm)	0.585 x 1.025 / 0.735 x 1.185
Luminance	1000 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) + luminance
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	F0H + xpos + ypos
Set Area Commands	L	L	F1H + x1 + y1 + x2 + y2 + cmd where cmd 49H = Invert Area 46H = Fill Area 43H = Clear Area 4FH = Set Outline Box 6FH = Clear Outline Box
Write Graphic Image	L	L	F1H + x1 + y1 + x2 + y2 + cmd + data
Set Font / Spacing	L	L	F2H + font style
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

	00	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0
00	UDF1	!	@	A	B	C	D	E	F	G	H	I	J	K	L	M
01	UDF2	!	1	2	3	4	5	6	7	8	9	*	+	=	>	?
02	UDF3	"	2	B	R	B	r	A	E	r	/	/	/	/	/	/
03	UDF4	#	3	C	S	c	s	A	R	/	/	/	/	/	/	/
04	UDF5	\$	4	D	T	d	t	a	e	#	/	/	/	/	/	/
05	UDF6	%	5	E	U	e	u	E	O	=	/	/	/	/	/	/
06	UDF7	&	6	F	V	f	v	U	D	+	/	/	/	/	/	/
07	UDF8	'	7	G	W	g	w	G	O	=	/	/	/	/	/	/
08	UDF9	(	8	H	X	h	x	H	O	=	/	/	/	/	/	/
09	UDF10	)	9	I	Y	i	y	I	O	=	/	/	/	/	/	/
0A	UDF11	*	*	J	Z	j	z	J	O	=	/	/	/	/	/	/
0B	UDF12	+	+	K	[	k	[	K	O	=	/	/	/	/	/	/
0C	UDF13	,	,	L	]	l	]	L	O	=	/	/	/	/	/	/
0D	UDF14	-	-	M	^	m	^	M	O	=	/	/	/	/	/	/
0E	UDF15	.	.	N	_	n	_	N	O	=	/	/	/	/	/	/
0F	UDF16	/	/	O	`	o	`	O	O	=	/	/	/	/	/	/

#### LCD Font

#### Cyrillic Font

	80	90	A0	B0	C0	D0	E0	F0
80	И	А	А	Р	Р	А	Р	А
81	Е	Е	Е	С	С	Е	С	Е
82	Б	Б	Б	С	С	Т	Т	Т
83	Р	Р	Д	Д	Г	Г	Г	Г
84	С	С	В	В	А	А	А	А
85	И	И	Е	Е	С	С	С	С
86	И	И	Е	Е	К	К	К	К
87	И	И	Е	Е	К	К	У	У
88	И	И	Е	Е	К	К	У	У
89	И	И	Е	Е	К	К	У	У
8A	И	И	Е	Е	К	К	У	У
8B	И	И	Е	Е	К	К	У	У
8C	И	И	Е	Е	К	К	У	У
8D	И	И	Е	Е	К	К	У	У
8E	И	И	Е	Е	К	К	У	У
8F	И	И	Е	Е	К	К	У	У

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

#### Proportional 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	P
50	Q	R	S	T	U	V	W	X	Y	Z	:	:	:	:	:	:

#### Serial / Parallel Selection

J6	Interface
Open	Sync Serial / Parallel (default)
Link	Asynchronous Serial

#### CN1 Pin 3 Function

J3	Font
2 & 3	/ Reset
1 & 2	Busy

All J12 links & J6 should be open for parallel operation.

#### Parallel Interface type (M68 / i80)

J2	J4	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

J12	7-8	Configuration
O	O	9600, N, 8, 1
L	O	19200, N, 8, 1
O	L	38400, N, 8, 1
X	X	Self Test Mode

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