Raging Bits VFD 8 Chars v1.1

(With or without driver)

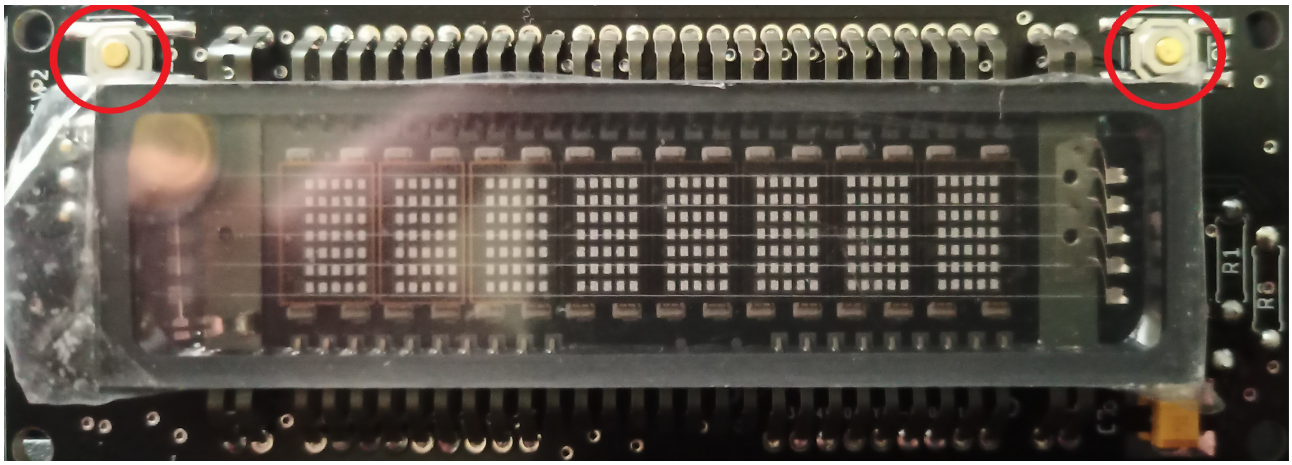
Top level specs

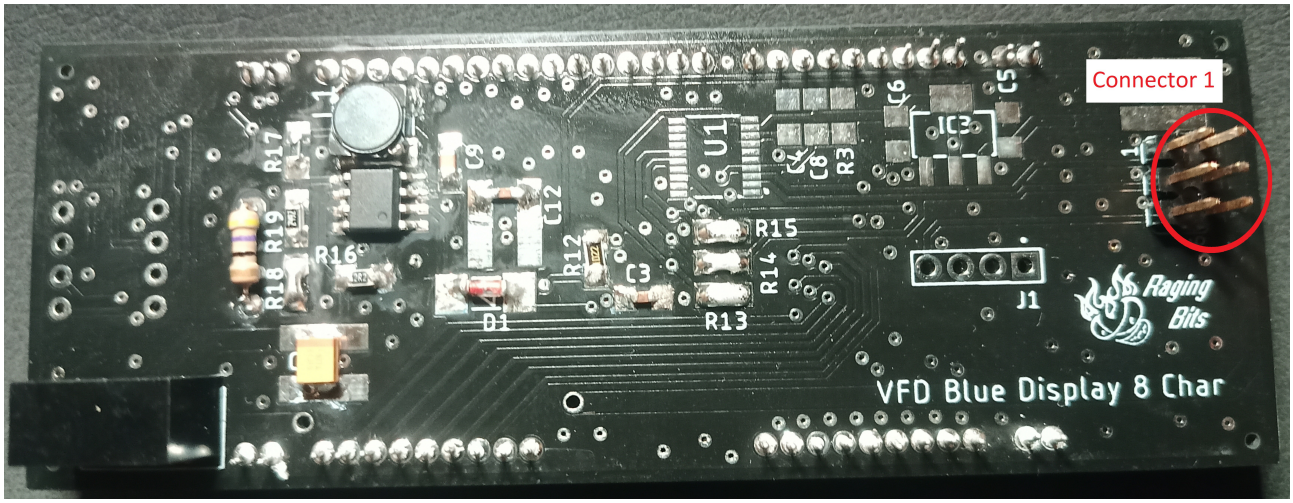
Pure Blue luminescence.

8 Chars 7x5 pixels.

3.5V MIN to 5V MAX
240mA@4V
PT6302LQ-001 direct driver or Serial PORT Commands

97mm x 37mm x 20mm





Device interface

Version with direct PT6302LQ-001 has an SPI interface.
Version with RTC has Serial Port interface commands. This is a fixed speed of 9600bps 8n0

PIN MAP - Connector 1

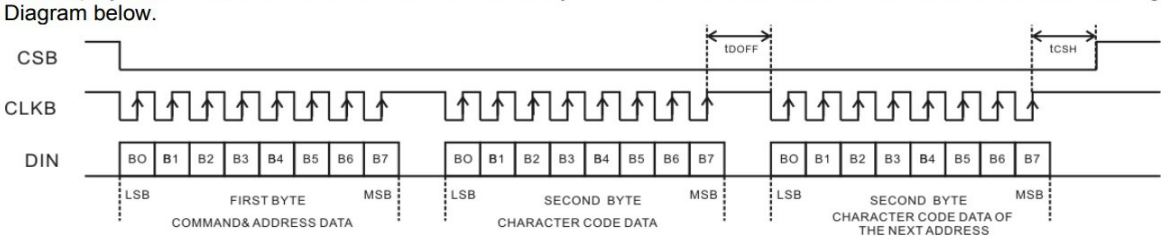
1 – MOSI (din)/ UART RX	2 – VCC
3 – Clock (clkb)/UART TX	4 – GND
5 – Chip Select (scb)/UART nReset	6 – nReset (rstb – active low)

Interface and Commands (Direct PT6302LQ-001 SPI)

SPI mode 3 in LSB to MSB, CPOL 1 and CPHA 1.

DATA TRANSFER

The Display Control Command and the data are written by an 8-bit serial data transfer. Please refer to the Write Timing Diagram below.



COMMANDS

The following are the list of commands issued by PT6302. When data is written into the RAM (DCRAM, CGRAM, or ADRAM) in a continuous manner, the addresses are automatically incremented internally. It is therefore not necessary to specify the first byte.

NO.	COMMAND	LSB FIRST BYTE B0	B1	B2	B3	B4	B5	B6	MSB B7	LSB SECOND BYTE B0	B1	B2	B3	B4	B5	B6	MSB B7	
1	DCRAM DATA WRITE	X0	X1	X2	X3	1	0	0	0	C0	C1	C2	C3	C4	C5	C6	C7	
2	CGRAM DATA WRITE	X0	X1	X2	*	0	1	0	0	C0	C5	C10	C15	C20	C25	C30	*	2ND BYTE
										C1	C6	C11	C16	C21	C26	C31	*	3RD BYTE
										C2	C7	C12	C17	C22	C27	C32	*	4TH BYTE
										C3	C8	C13	C18	C23	C28	C33	*	5TH BYTE
										C4	C9	C14	C19	C24	C29	C34	*	6TH BYTE
3	ADRAM DATA WRITE	X0	X1	X2	X3	1	1	0	0	C0	C1	*	*	*	*	*	*	
4	GENERAL OUTPUT PORT SET	P1	P2	*	*	0	0	1	0									
5	DISPLAY DUTY SET	D0	D1	D2	*	1	0	1	0									
6	NO. OF DIGITS SET	K0	K1	K2	*	0	1	1	0									
7	ALL LIGHTS ON/OFF	L	H	*	*	1	1	1	0									
	TEST MODE	0	0	0	*	0	0	0	1									

Notes:
1. The Test Mode is not a user function, but an IC internal function
2. *=Not relevant
3. Xn=RAM address bit, n = 0 to 3
4. Cn=RAM character code bit, n=0 to 34
5. Pn=General output port status bit, n=1 to 2
6. Dn=Display duty bit, n=0 to 2
7. Kn=Number of digits bit, n=0 to 2
8. H=All lights on
9. L=All lights off

See PT6302LQ-001 datasheet.

Interface and Commands (Serial Port interface)

UART speed at 9600 8 bits no parity (1start 1 stop bits).

The command interface is composed by 4 parts, Start Command Character, Command Identification, Command Data and Stop Command Character.
The Start Command Character is always '\n' (0x0A)
The Stot Command Character is always '\r' (0x0D)
The Command Identification may be:

- Show Text: '0' (0x30)
- Show Time: '1' (0x31)
- Show Date: '2' (0x32)
- Get Time/Date: '3' (0x33)
- Set Time/Date: '4' (0x34)

Byte Representation:
[0x0A][0x3n][...][0x0D]

The Display replay may have 2 formats:

- Acknowledge: \nOK\r
- Not Acknowldge \nNOK\r

A command cannot be issued until the previous has been properly replied too.

When the command starts being sent, it has a maximum timeout , between characters being received, of 10ms before being terminated.

Show Text (Cmd Id 0x30)

The Show Text command indicates the display to show the text contained in the Command Data.

The Command Data can have up to 100 bytes length.

Ex:
To Disp. >\n0Hello World\r

From Disp. <\nOK\r

Show Time (Cmd Id 0x31)

The Show Time command indicates the display to show the current RTC time.

The Command Data is not existent for this command.

Ex:
To Disp. >\n1\r

From Disp. <\nOK\r

Show Date (Cmd Id 0x32)

The Show Date command indicates the display to show the current RTC Date.

The Command Data is not existent for this command.

Ex:
To Disp. >\n2\r

From Disp. <\nOK\r

Get Time (Cmd Id 0x32)

The Get Time command indicates the display to retrieve the current RTC time into the serial port.

The Command Data is not existent for this command.

Ex:
To Disp. >\n3\r

From Disp. <\n10:48:52 02/11/2022 Wednesday\r

From Disp. <\nOK\r

Set Time (Cmd Id 0x33)

The Get Time command indicates the display to set the current RTC time given in the command data.

The Command Data MUST have the fixed format as follow:

[0x0A][0x33] ['<H>']['<H>'][':']['<M>']['<M>'][':']['<S>']['<S>'][' ']['<d>']['<d>']['/']['<m>']['<m>']['/']['2']['0']['<y>']['<y>'][' ']['<wd>']['<wd>']['<wd>'][0x0D]

HH – Hours, MM – Minutes, SS – Seconds, dd – Day, mm – Month, yy – Year, wdwdwd – Week Day

All Values must be 2 characters long in text format with the excpetion of the week day that must by at least 3 characters long. The week day must start with Upper Case.

In text, as an example:
10:05:52 02/11/2022 Wed

or

10:05:52 02/11/2022 Wednesday

Ex:
To Disp. >\n410:05:52 02/11/2022 Wednesday\r

or

To Disp. >\n410:05:52 02/11/2022 Wed\r

From Disp. <\nOK\r

Buttons (RTC Version only)

The buttons main funtion is to choose what to display and manually setup the device time-date.

Normal Work

A button click lasts less than 3 seconds.
A button press and hold lasts more than 3 seconds.

Left button – Click press – Display date scrolling.

Left button – Hold press – No function.

Right button – Click press – Display time.

Right button – Hold press – No function.

Right+Left button – Click press – No function.

Right+Left button – Hold press – Enter time/date setup.

Setup Work

Left button – Click press – Accept current setting value and move to next setting.

Left button – Hold press – No function.

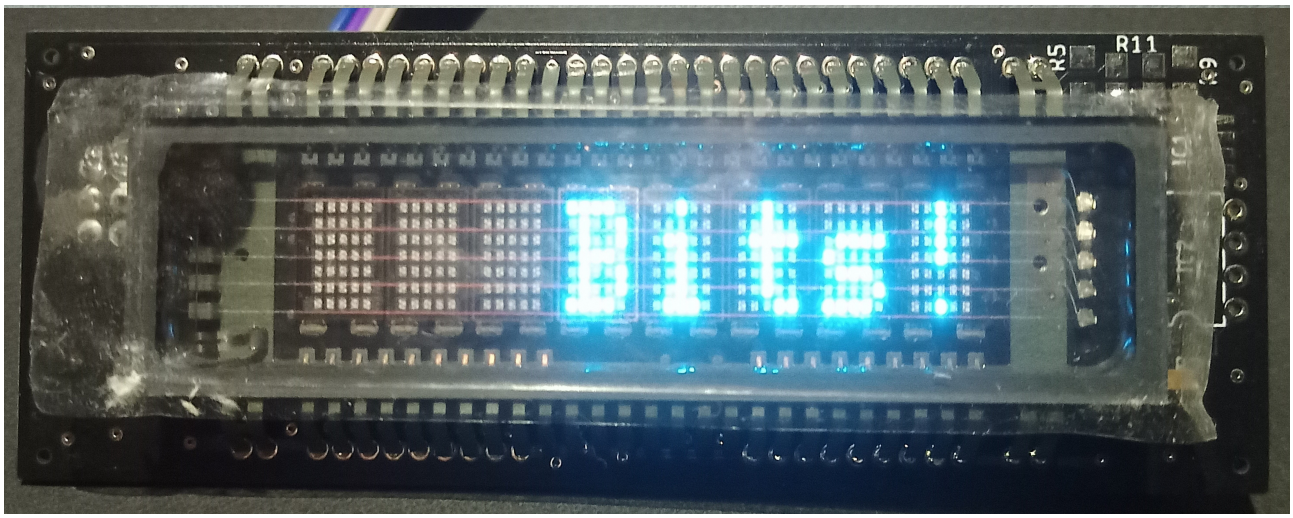
Right button – Click press – Increment the current setting value by one.

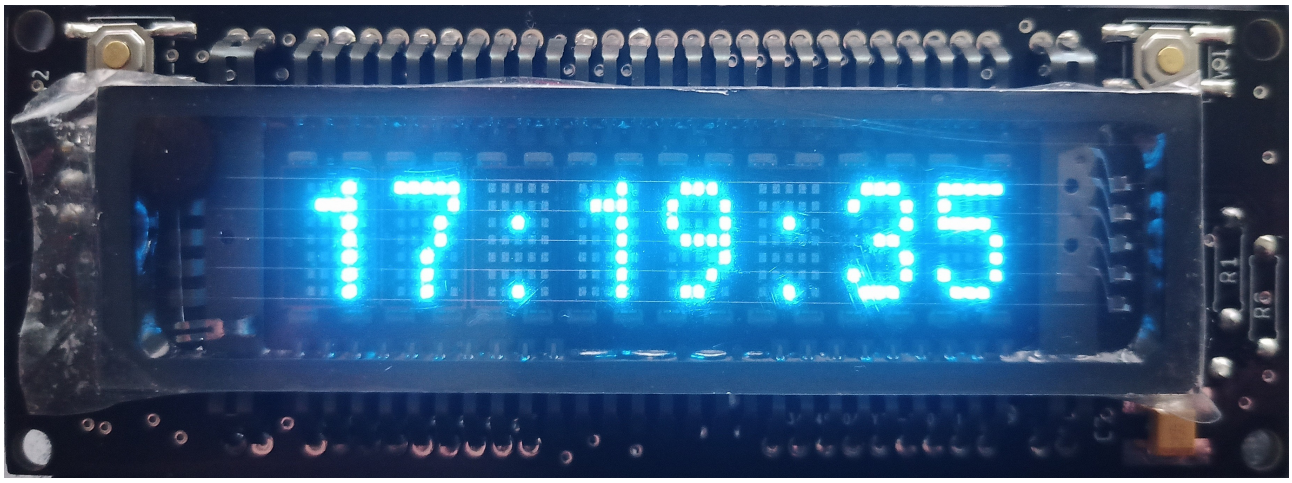
Right button – Hold press – Increment the current setting value constantly.

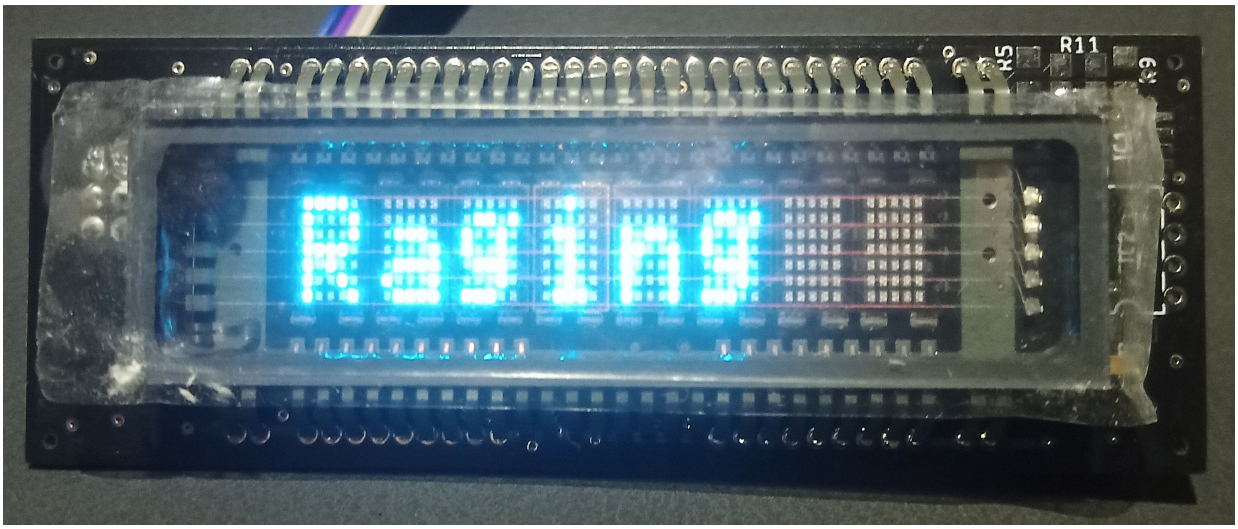
Notes

!!!ATTTENTION!!!

Never power more than 5V!!!
The LCD filament works based on a resistive path set to the LCD maximum filament current when powered by 5V.


R11
R5
39
IC1


17:19:35
SW2
SW1
R1
R6


R11
R5
39
IC1