

BG Micro Serial VFD



Figure 1. Blurry, out-of-focus close-up photograph of BG Micro Serial VFD.

Description

The BG Micro Serial VFD is a low cost, easy-to-use alphanumeric display. The vacuum fluorescent display (VFD) emits a pleasant bluish green glow that is easily read at a distance and over a wide viewing angle. The unit display upper and lower case alphanumeric characters using a 5x7 dot matrix with no descenders. There is no visible cursor, special effects or downloadable characters. The unit understands backspace, carriage return and new line control codes. See VFD datasheet for more information.

Interface

The BG Micro Serial VFD has an asynchronous serial input. The incoming signal can be jumper selected for either RS-232 levels or TTL levels. The serial data format is defined as eight (8) data bits, no (0) parity bits, one (1) start bit and one (1) stop bit. The serial data rate is 9600 baud.

The serial interface adapter can be removed and the native parallel interface can then be accessed. See VFD datasheet for more information.

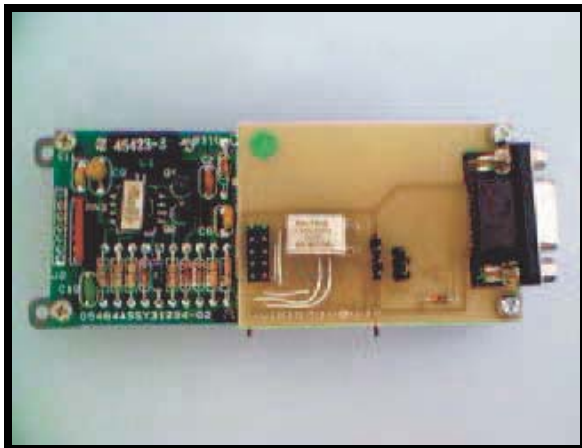


Figure 2. Rear view of BG Micro Serial VFD showing serial interface adapter (on right).

Connections

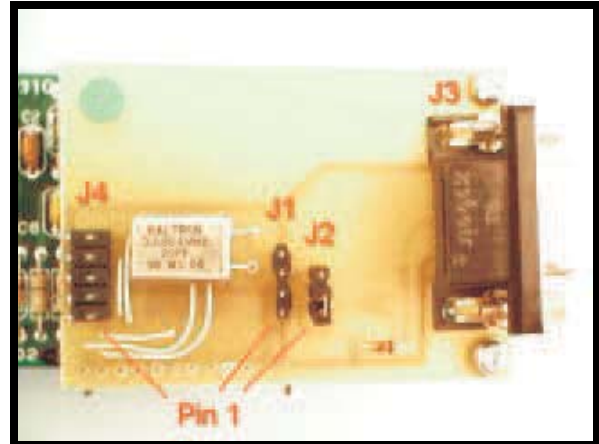


Figure 3. Connector close-up.

J1 – Power and TTL serial input

1	Ground
2	+5V at 300mA typical, 500mA max
3	TTL serial data input
4	Ground

J2 – Serial signal selector

1	RS-232
2	Common
3	TTL

Connect pins 2 and 3 for RS-232 signal (from J3)*.
Connect pins 1 and 2 for TTL signal (from J1).

*Factory setting

J3 – RS-232 serial data input – DB9 female

1	Not connected
2	Not connected
3	RxD – receive data
4	Not connected
5	Signal ground
6	Not connected
7	Not connected
8	Not connected
9	Not connected

J4 – In system programming (ISP) connector

1	MOSI
2	+5V
3	LED
4	Ground
5	Reset
6	Ground
7	SCK
8	Ground
9	MISO
10	Ground

The serial adapter uses an Atmel 90S2313-10SC microcontroller to perform the interface function. The source code can be modified to add extra functionality. An Atmel/Kanda compatible programming dongle or equivalent is required to reprogram the device. This is not required for normal usage.

Description

The 03601-88 VFD is an alphanumeric vacuum fluorescent display with one (1) line of sixteen (16) characters. Each character is composed of a 5 x 7 character cell. The display has a built-in character generator and controller. ASCII data is supplied in parallel via the 8 bit parallel input, and clocked with the WRITE line. A BUSY line reflects the status of the display. When a character is written to the display, the BUSY line will momentarily go high, indicating that the display is processing the input. Once the BUSY line goes low again, the display can accept more input. The unit is powered by +5V (±5%) at approximately 300mA.

Pin	Name	Description
1	BUSY	Display status line. When high, the unit is processing information. When low, the unit is ready to accept new data or commands.
2	WRITE	Positive pulse writes data on the data bus D0-D7 to the controller.
3	D7	Data bit 7 (MSB)
4	D6	Data bit 6
5	D5	Data bit 5
6	D4	Data bit 4
7	D3	Data bit 3
8	D2	Data bit 2
9	D1	Data bit 1
10	D0	Data bit 0 (LSB)
11	V _{CC}	+5V ±5% @ 300mA (typical)
12	GND	Ground

Table 1. Pin assignments on J1

Data write timing

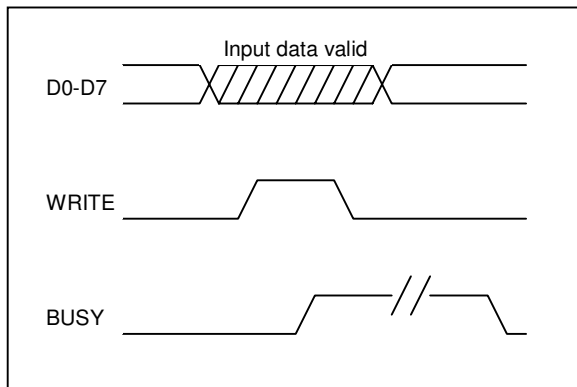
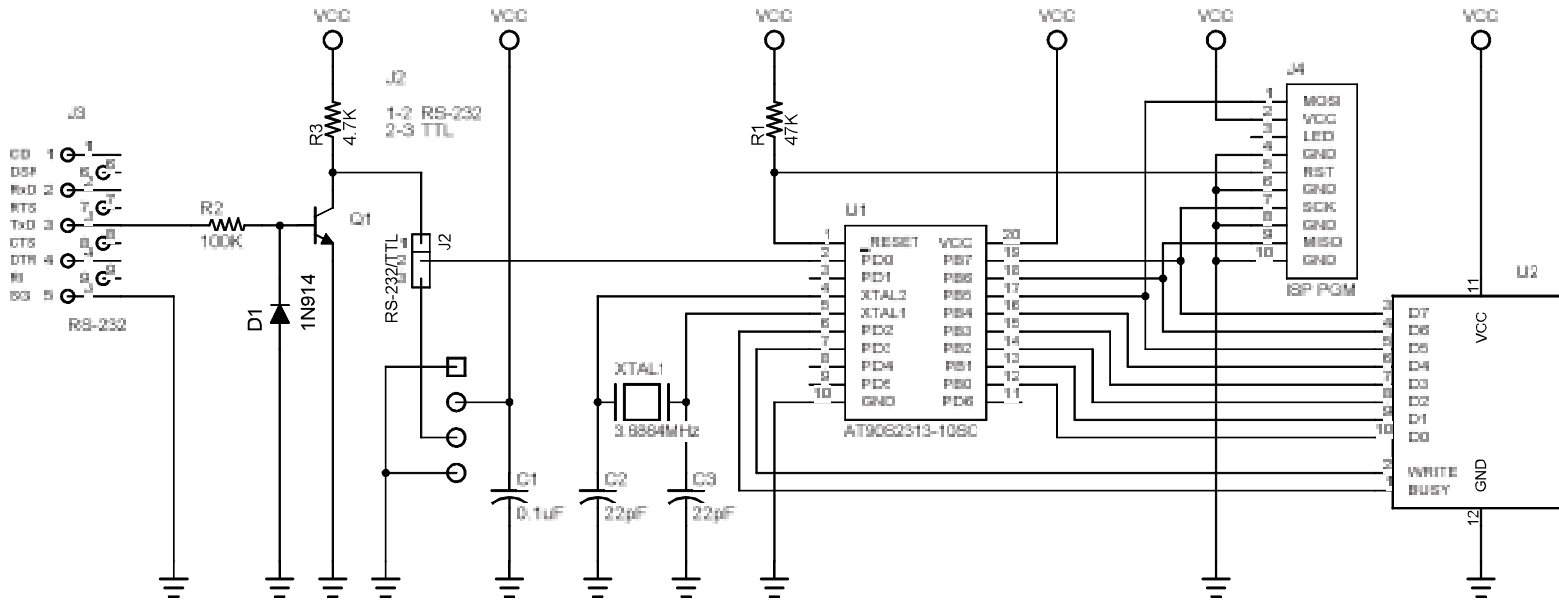


Figure 1. Data write timing

Commands

Data		Description
Decimal	Hex	
08	08	Backspace
09	09	Forward cursor
10	0A	Line feed
13	0D	Carriage return
21	15	Clear display
22	16	Home cursor
27 xx	1B xx	Move cursor to location xx (0-15)

Figure 2. Commands



J1
 1 - GND
 2 - VCC +5V
 3 - TTL SERIAL
 4 - GND

○ ○
 MOUNTING HOLES
 0.125 DRILL
 TYPICAL 2 PLACES

VFD SERIAL INTERFACE
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Beginning in March of 2004, the firmware for the BG Micro Serial VFD was updated to display a signon message when first powered up. The following control codes were added:

DC1 [Device Control 1, Ctrl-Q, 0x11, decimal 17] – Display signon message
DC2 [Device Control 2, Ctrl-R, 0x12, decimal 18] – Disable display of signon message at power up
DC3 [Device Control 3, Ctrl-S, 0x13, decimal 19] – Enable display of signon message at power up (default).

It is hoped that this sign on message will help in troubleshooting new installations. It will confirm proper connection of an appropriate power supply (+5V), but does not verify the proper operation of the RS232 or TTL level serial input.

The signon message can be displayed at any time by sending the DC1 control code.

The signon message will normally be displayed when the device is powered up. To disable this message being displayed during power on, send the DC2 control code. This will prevent the signon message from being automatically displayed at power on. The message can still be displayed by sending the DC1 control code.

The signon message can be re-enabled at power on by sending the DC3 control code.

The enable/disable status of the signon message at power on is stored in nonvolatile EEPROM memory. The EEPROM memory is rated at 100,000 write cycles. Changing the status in excess of this rating will produce undefined results. It is suggested that the status be set once for each application, and then left alone.