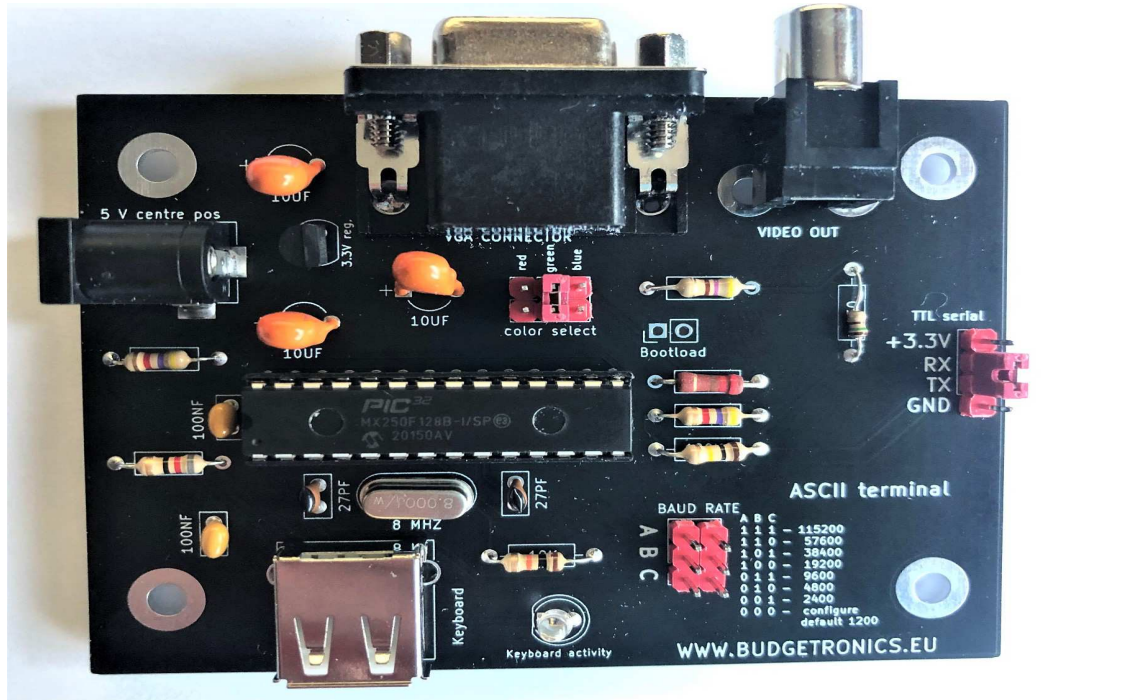# BUILDING KIT ASCII VIDEOTERMINAL
## for USB keyboards

Serial connection to VGA or Composite video out

Specifications

- Single chip ASCII video display terminal with VT100 and VT52 emulation
- VGA or Composite Video output with automatic switch over. Composite can be PAL or NTSC.
- VGA can display 24 lines x 80 characters or an extended resolution of 36 lines x 80 characters
- Composite video can display 18 lines x 48 characters (PAL) or 15 lines x 44 characters (NTSC)
- Standard USB keyboard input with support for standard US keyboard layout or French, German, Italian, Belgian, Russian or United Kingdom keyboard layouts
- TTL or RS232 serial input/output. Baud rates from 40 to 1,000,000 bits per second with odd, even or no parity and one or two stop bits
- Extended VT100 terminal emulation. Extensions include graphics codes for drawing lines, boxes and circles (which can be hollow or filled)
- Graphics resolution is 480x288 pixels in VGA 25 line mode, 480x432 pixels in VGA 36 line mode, 288x216 in PAL composite and 264x180 pixels in NTSC composite mode
- Three built in fonts (standard, large and jumbo) and four character attributes (normal, underline, reverse and invisible)
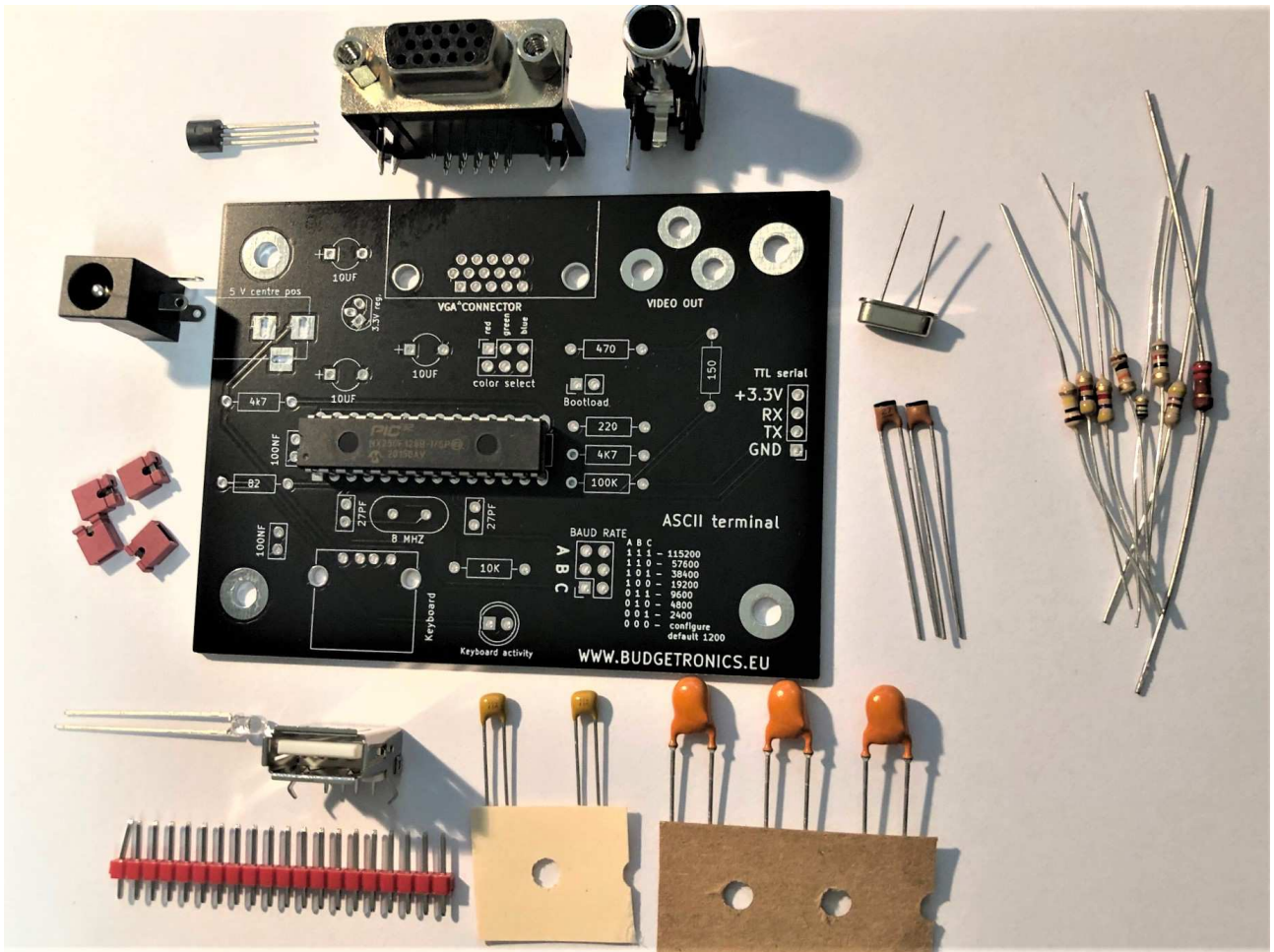
PARTS LIST

1x PCB, 90mm x 66mm
1x USB connector
1x 15 pins VGA connector
1x RCA connector
1x 8MHz quartz
1x Pin header (to be cut in the right size)
4x jumpers
1x programmed PIC32MX250F128B-I/SP microcontroller
1x MCP1700-3002 voltage regulator
1x 3mm LED
2x 27pF ceramic capacitor
2x 100nF ceramic capacitor
3x 10µF ceramic capacitor
1x 82Ω (grey red, black)
1x 150Ω (brown, green, brown)
1x 220Ω (red, red, brown)
1x 470Ω (yellow, violet, brown)
2x 4K7Ω (yellow, violet, red)
1x 10KΩ (brown, black, orange)
1x 100KΩ (brown, black, yellow)

Building the kit

The building kit is easy to construct. Every part value is clearly indicated on the PCB. Just follow the steps.

1. Fist solder all the resistors in the correct place.

2. Now solder all the ceramic capacitors and the 10 uF tantalium capacitors. The tantalium capacitors have a + and – side. This is indicated on the PCB.

3. Connect the LED and take care of the right polarity The LED has a flat side align this with the PCB print. The flat side is the side with the shorter leg of the LED.

4.Connect the quartz and the voltage regulator exactly as indicated on the PCB. The voltage regulator takes the 5 volt power supply to 3,3 volts because that is the voltage the microcontroller uses.

5. Now solder the microcontroller but TAKE CARE! that you solder it in the right orientation. The microcontroller has a litlle dent on one side. This small dent has to face to the OUTSIDE of the PCB. See picture:

Look twice to make sure the microcontroller is facing the right way before you solder it. because it is very difficult to take it out again after you soldered it in. Fast soldering and not to hot.
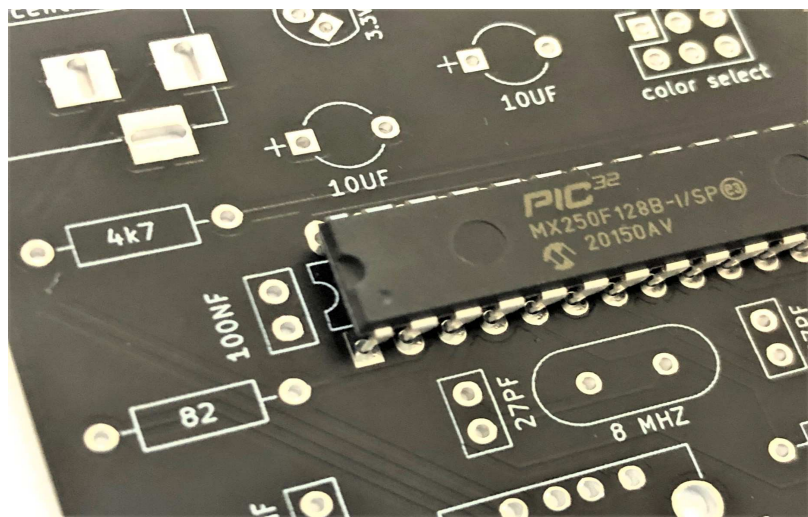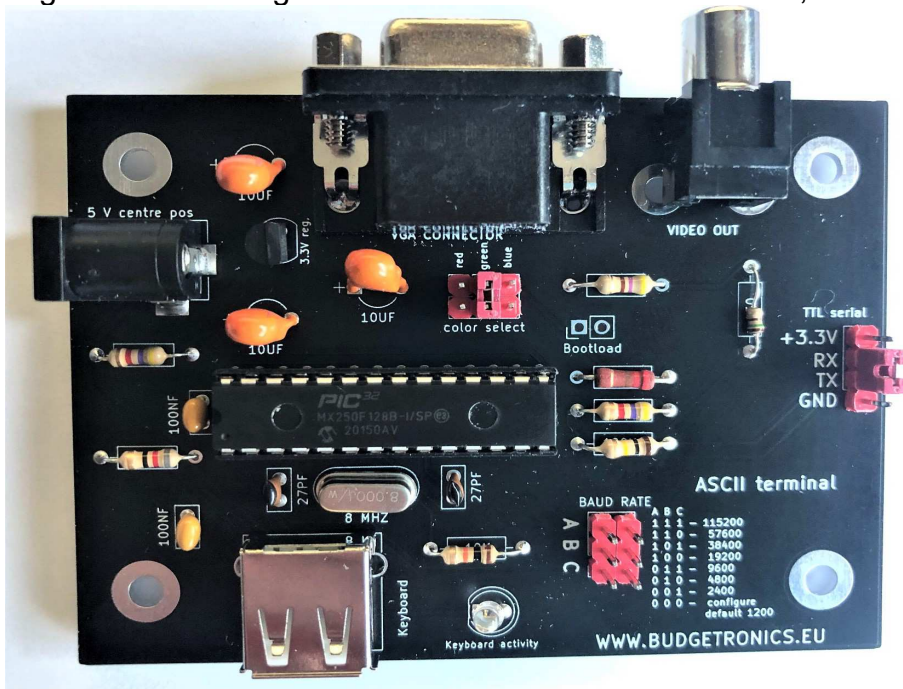

Now solder all the connectors and the headers. You will have to cut the headers to the right size.

After finishing all the soldering the terminal looks like shown below,

The baudrate jumpers are not really needed because you can also set the baudrate in the software, later more about this. On the PCB you can see how to set the baudrate with the jumpers. A number 1 is a jumper placed and a 0 is no jumper placed.

As a last thing you have to choose which color the output of the ASCII terminal on the screen will have, green, red or blue. To choose you have to place one of the jumpers on the "color select" header. otherwise there will be no output on the screen to look at.

Now everything is ready you can connect the terminal to a VGA or composite monitor, connect a USB keyboard and power it up with a 5 volts power supply, centre positive.

If all is well you get a message as shown below with in this case an added line (not in the picture) from the maker of the USB keyboard software.
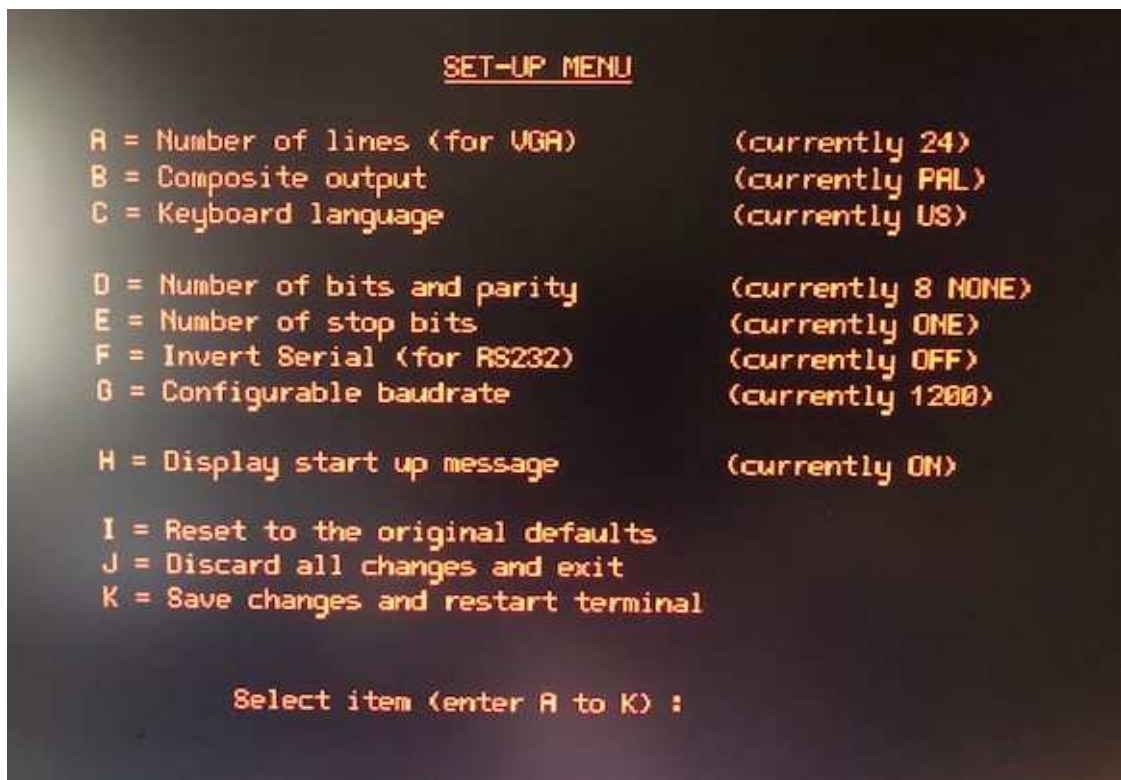
Gongratulations you suceeded building the kit succesfully. If you place a jumper on the RX and TX header you can see the output of the keyboard if you press a key. This is just the echo and only used for testing because normally you will have an external data source.

It does not work? Check all parts, check for solder blobs between pins, read this manual again and compare pictures and so on. If the keyboard does not seem to work try another USB keyboard. Some just do not work.

Also remember that you can not connect a VGA monitor and a Video out monitor at the same time. If you want to switch from VGA to Video out or vice versa you have to power down and up again because only at startup the microcontroller senses which output is used and switches to this output. Also make sure a USB keyboard is connected before power up otherewise it may not be recognized.

If it all works fine you can press together the Shift and F12 key's to get to the setup menu as shown below.


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                    SET-UP MENU

    A = Number of lines (for VGA)        (currently 24)
    B = Composite output                 (currently PAL)
    C = Keyboard language                (currently US)

    D = Number of bits and parity        (currently 8 NONE)
    E = Number of stop bits              (currently ONE)
    F = Invert Serial (for RS232)        (currently OFF)
    G = Configurable baudrate            (currently 1200)

    H = Display start up message         (currently ON)

    I = Reset to the original defaults
    J = Discard all changes and exit
    K = Save changes and restart terminal


             Select item (enter A to K) :
```

Here you can make all the needed changes and save them, by pressing K.
Option G is for changing the baudrate. If the standard is 1200 you can change the baudrate with the jumpers on the PCB. But this is not really needed normally. So just use the setup here. If you save the changes the module will remember them after powering down and up again.

Good luck with the ASCII terminal!