Crt Monitor Dumb Terminal

Simple-Circuit 2024

This educational project shows how to add text and graphing to the Raspberry Pi Pico2 HSTX DVI example program. The DVI generator runs on core-2. The UART (Serial1) ASCII input data is handled by core-1. Text is displayed in a 60 wide by 40 line 5x7 character set. Comma or space delimited numbers (+-. and 0-9) are parsed and plotted on an x-t or x-y 256x256 pixel display.

UART ASCII data is sent from a second Pico or other processor. Data pin D1 is the 3.3V level serial input. Two BAUD rate options are available. Leave data pin D2 open for 4800 and ground it for 500,000. The 500,000 BAUD was selected to allow an Arduino Uno to connect at a fast BAUD rate while functioning as a PS2 keyboard input to UART interface.

Data pin D2 when left open selects ASCII character display and plotting. Grounding it selects plotting only. When text is displayed, shifting lines up is time consuming. About 10ms per line is required. Turning off text shortens the time to about 5ms (at 500,000 BAUD). You can plot at 100 lines per seconds or faster at 200 lines per second for plot only.

The UART is set to have a large input buffer. Data can be sent at a rate faster than the display update as long as the buffer is not over run (16,384 bytes).

The character display handles control characters for back space, carriage return, line feed and form feed (clear screens). Additional control characters are used to set the graphics functions:

Ctrl-t sets the graphing mode to x-t chart recorder (up to four numbers)

Ctrl-y sets the graphing mode to x-y plotting (two numbers x and y)

The graphs are zero based showing plus and minus values. Full scale gain is set by preceding the first number with the # character.

#1.5 10

Sets plot-1 to -1.5 to 1.5 and plot-2 to -10 to +10

#5 20 -3 7

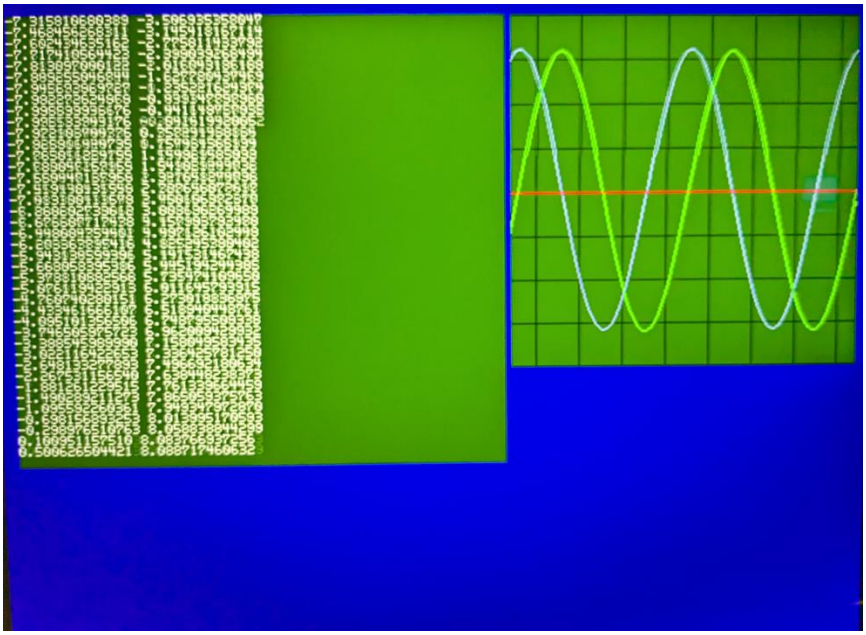
Sets plot-1 to -5 to +5, plot-2 to -20 to 20, plot-3 to +3 to -3 and plot-4 to -7 to +7

Where the plot is bottom to top.

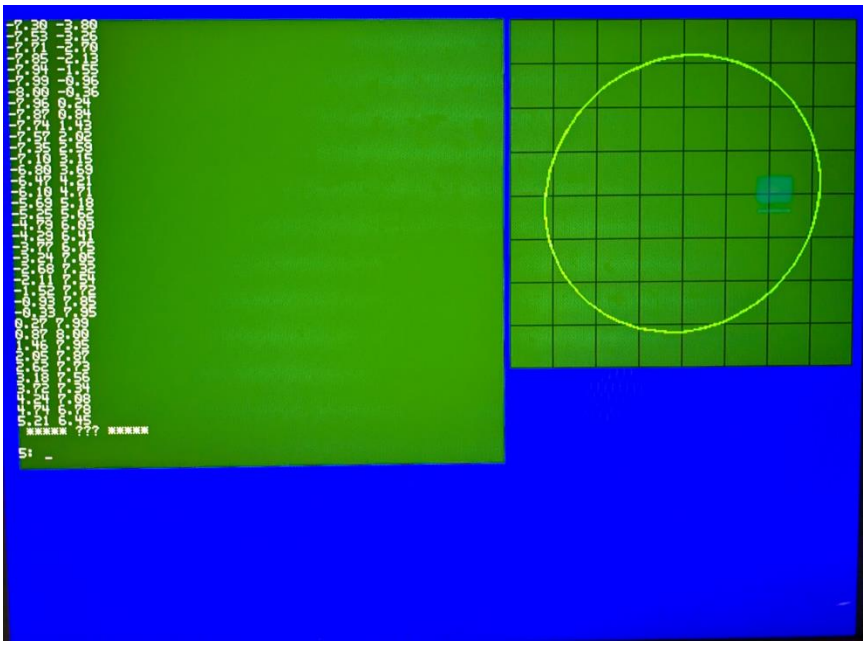
The Arduino project is located in the folder: pico_hstx_example_term. It requires these files:

- pico_hstx_example_term.ino
- crtmonitor.h
- matrix.h

Compile using Earl Philhower's Arduino-Pico and the Arduino IDE.
Board: Raspberry-Pi Pico-2 Compile options: No Fs, 150MHz, -O optimize, No USB
The compiled uf2 file is: pico_hstx_example_term.ino.rpipico2.uf2

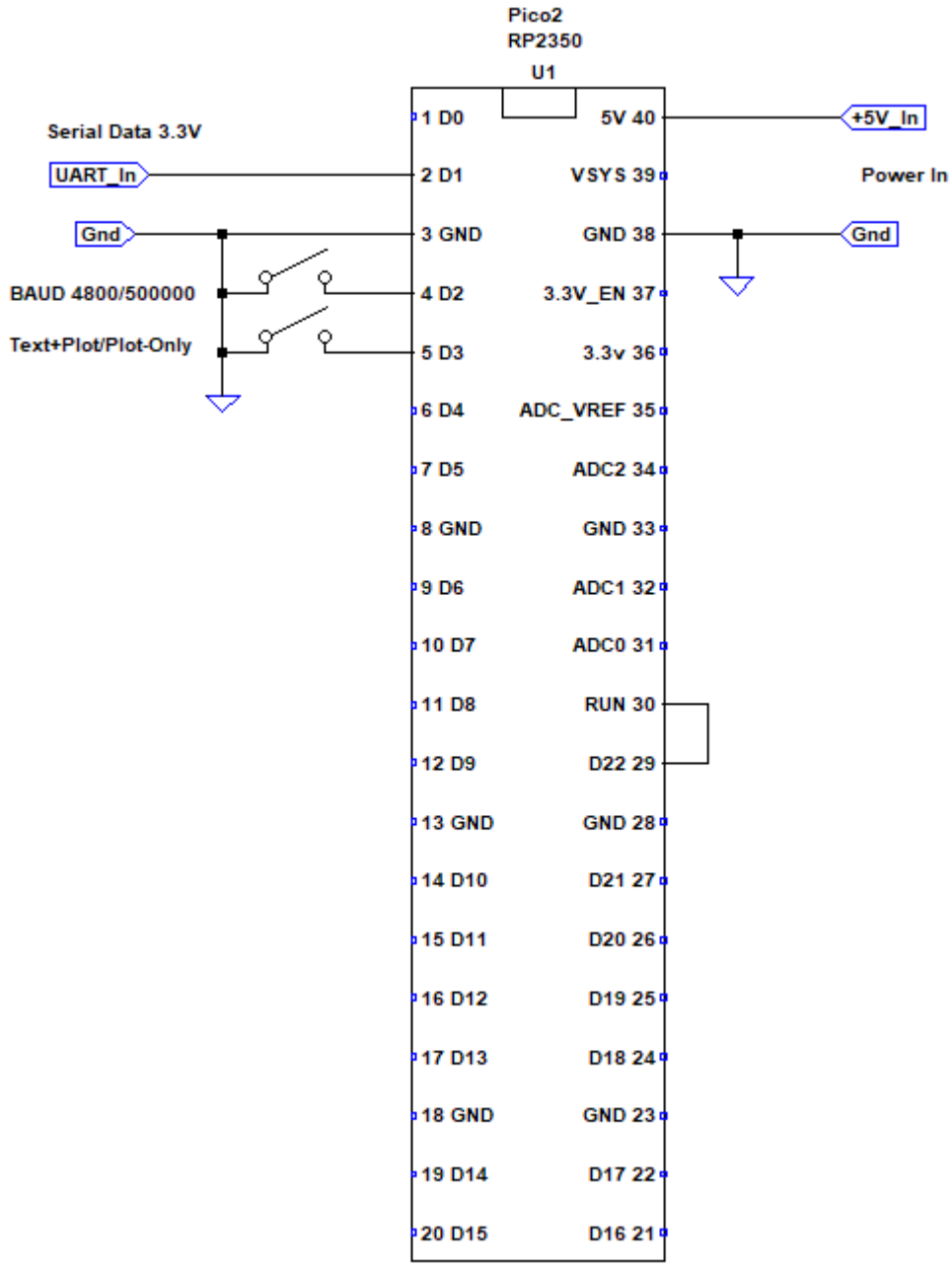


Text display with x-t plotting.



Text display with x-y plotting.

Connection schematic diagram.



Digital outputs D12 through D19 connect to the DVI socket. Reference the following site for resistor to socket connections.

https://github.com/Wren6991/Pico-DVI-Sock