

Generating a New Message for the LED Matrix Array

Revised June 15, 2023

We have developed a C program that translates ASCII messages into pixel patterns formatted for initializing Block RAM (BRAM) pixel memory in the LED Matrix Controller. This document describes the steps you need to take to generate a new message and use it to build a new bitstream file.

1. Build a C project using source files in the `c_generator` directory of the repository.
2. Edit the file `bram_init.c`. Change the `DEFAULT_STRING` macro to your desired string message.
3. Edit the `DEFAULT_MASK` macro for your desired pixel coloration. This is an 8-digit hex number; each digit specifies the color of one row (1=green, 2=green, 4=red).
4. Compile and run the program.
5. Copy the “init1” output into the “INIT” block for the upper BRAM in file `pixel_ram.sv`.
6. Copy the “init2” output into the “INIT” block for the lower BRAM in file `pixel_ram.sv`.
7. Save `pixel_ram.sv` and generate a new bitstream, then test it to make sure it works properly.
8. To use with a USB drive, use a file browser to open the folder in the Vivado project folder named `...project_name\project_name_runs\impl_1\`
9. Copy the file `ledmatrix_top.bit` to the USB drive.
10. Make sure that the JP2 jumper on the Nexys board is set to “USB”.
11. Plug the USB drive in and turn the board on. It should automatically load the file.

