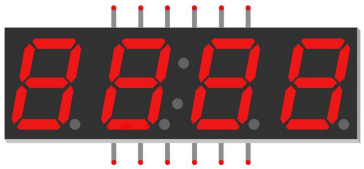
Programmable Digital Display

A user-programmable 4-digit 7-segment display



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How it works

·Each digit (all four) has a corresponding button allowing user to iterate through numbers (1-9) and alphabet (A-F)

·The “Program/Erase” button allows the user to either save the current set of characters, or erase it along with all other stored sets.

->To save, the user will press the button once. Display will then be reset and wait for next inputs.

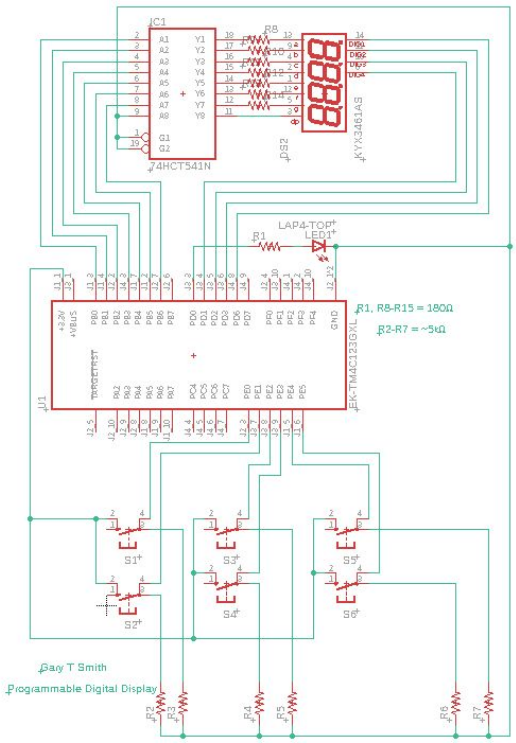
->To erase, the user will press the button twice. Display will then be reset and wait for new inputs.

·The “Play/Stop” button either begins playing the programmed character sets, or stops the ones that are currently playing.

Schematic

(KYX-3561AS display library source - custom converted to KYX-3461AS)

(tm4c123gxl library source)



Part List

1x Tiva C Launchpad dev board w/ TM4C123GH6P mcu
1x KYX-3461AS four-digit 7seg display
1x 5mm Red LED
4x Pushbutton

Calculations/Notes

V=IR
R_{seg}=3.3V/0.01A=~330Ω=180Ω or 183Ω actual (Feed 10mA to each segment LED, max 25mA)
$R_{button\_pulldown}$=~10kΩ (General rule-of-thumb)
R_{red}=3.3V/0.01A=~330Ω (Feed 10mA to red LED, max 20mA)
Connected DP to GND instead of Y8 like schematic. A8 unconnected.
Will utilize multiplexing to display all 4 digits, with 5ms delay between each.
Decided to not implement “erase” functionality in initial build. Use TIVA reset button.

Issues/Changelog

Change LED pin from P7 to 0 due to lock on PD7[3/1/21]
Pins not supplying full 3.3V, must figure out why [3/1/21]
Attempting to mitigate voltage drop from possible *loading effect* by adding buffer opamp to circuit[3/2/21]
Determined issue to be excessive GPIO power draw, ordered buffer IC chip [3/2/21]
Installed buffer chip 74HC541N, problem resolved. Updated schematic! [3/4/21]
Problem with code simulator, switched to a pre-made template [3/6/21]
Changed buttons from port A to port E due to lock[3/6/21]
Updated schematic [3/6/21]