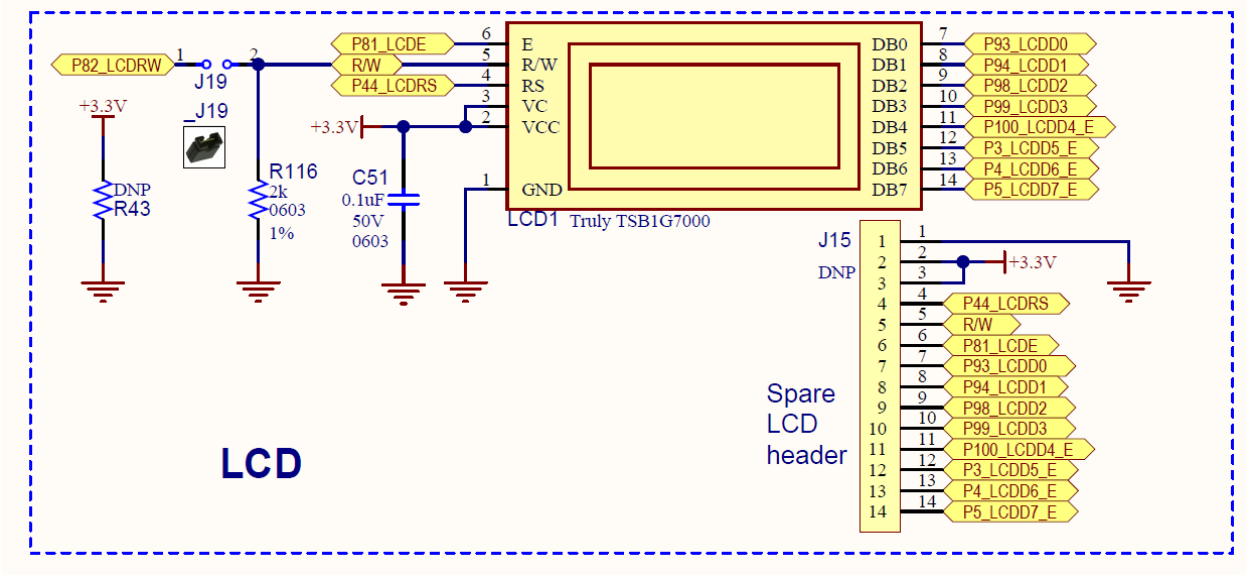
Project Overview

The project consists of a graphical animation in a DMD screen attached to the Explorer 16/32 Development board using the HD44780 controller to perform data transfer. The implementation of 4 buttons allows the user to modify the animation, this are connected to the explorer and is programmed with the "dsPIC33CH128MP508" microcontroller. Custom glyph generator would be used for testing of animation.

External communications

LCDRW connected to E, R/W and RS ports to the LCD screen via J19, a GND (ground point), VC and VCC with voltage input and to the right side the PIM connections.



Picture from CTEC1432 – Explorer 16/32 Schematic R6/3

There are also connections like DB0 to DB3 that don't have a connection to the PIC.

Table 1. LCD screen Overview

Part number	Truly TSB1G7000
Operating voltage	+3.3V
Input current	0.6A
Interface type	Parallel
Response time	508.2ms (Min.)
	762.3ms (Max.)

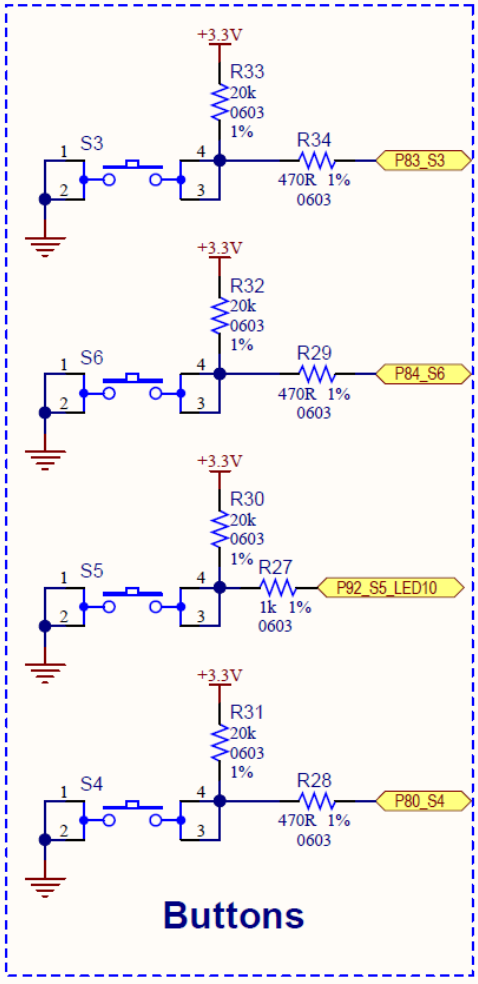
As for the connections with the PIM, there are six main ones as presented in table 2 with a short description.

Table 2. LCD PIM Mapping

Device Pin # (80-Pin TQFP)	I/Os (pic connection)	Function
62	RE12	LCD D4
64	RE13	LCD D5
77	R14	LCD D6
79	R15	LCD D7
59	RE11	LCD RS (Register Select Signal)
57	RE10	LCD E (Read/Write Signal)
No connection	No connection	LCD R/nW (pulled low by R4)

According to PIM Information Sheet

The project also makes use of the buttons embedded in the board, as so, the following would be their schematics:



Picture from CTEC1432 – Explorer 16/32 Schematic R6/3

This buttons, that function as inputs, are routed to the PIM (Plug in Module) that can be supported with different PICs. A datasheet is always provided with details on how the pins are routed to the components of the Explorer board for its correct use. Here are the basic connections and functions:

Table 3. Button PIM Mapping

Device Pin # (80-Pin TQFP)	I/Os (pic connection)	Function
44	RE9	Button S4
1	RB14	Button S3
42	RE8	Button S6
39	RE7*	Button S5 (also LED D10)

According to PIM Information Sheet

There are also GPIOs (General Purpose Input/Output) that the dsPIC33CH128MP508 uses for the programming of the inputs and outputs: Port A, Port B, Port C, Port D and Port E.

References

Mark Cools, Lecture 6: Libraries and the LCD Screen (ppt, pg. 16), Downloaded from W24 CTEC1432 Embedded Systems Applications at https://brightspace.niagaracollege.ca/d2l/home/90007

Microchip Technology Inc., dsPIC33CH128MP508 Plug-In Module (PIM) Information Sheet, Downloaded from W24 CTEC1432 Embedded Systems Applications at https://brightspace.niagaracollege.ca/d2l/home/90007

Mike Boldin, CTEC1630_Project_Hardware_Spec_RevF pdf document, Downloaded from W24 CTEC1436 Computer Engineering Project at https://brightspace.niagaracollege.ca/d2l/home/86299

F. Schlunder & T. Moffat, Microchip Technology Inc., Explorer 16/32 Development Board Schematic, Downloaded from W24 CTEC1432 Embedded Systems Applications at https://brightspace.niagaracollege.ca/d2l/home/90007