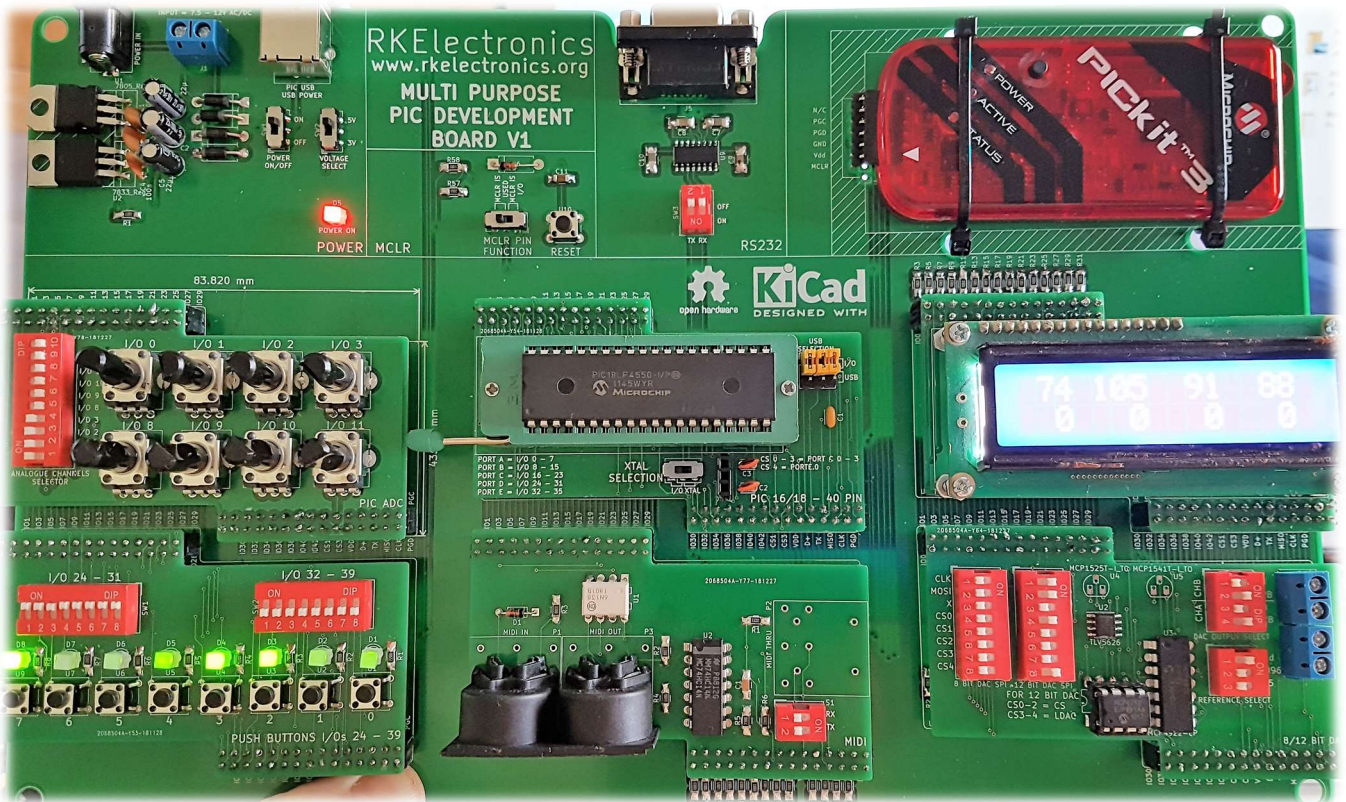


VERSION 1  
JANUARY 9, 2019



# PIC MICROCONTROLLER DEVELOPMENT BOARD – DAUGHTER BOARD CATALOGUE

PROJECT MANUAL DOC REF: RKD3

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## PREFACE

First of all thank you for downloading this project, I hope that you find it useful, educational or just a good read. Like most of my projects, they are designed and written such that most hobbyist electronics enthusiasts can build the designs using common components and materials.

Where best possible, low cost, easily obtainable components are used within the design. Drawings of electrical schematics, circuit board art work and component placement diagrams are provided with this report.

For more information, please visit my website at;

**[www.rkelectronics.org](http://www.rkelectronics.org)**

## VERSION CONTROL

<b>Version</b>	<b>Date</b>	<b>Changes</b>
1	09.01.2019	Initial Release

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## INTRODUCTION

This catalogue details the Daughter Boards designed for the RKElectronics PIC Microcontroller Development Board.

## STANDARD

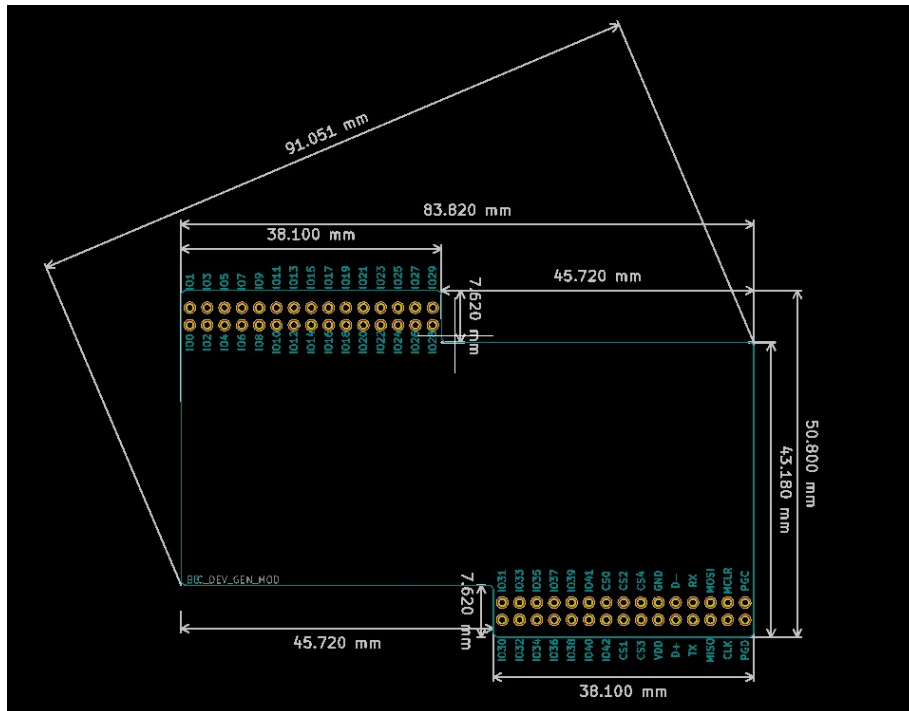
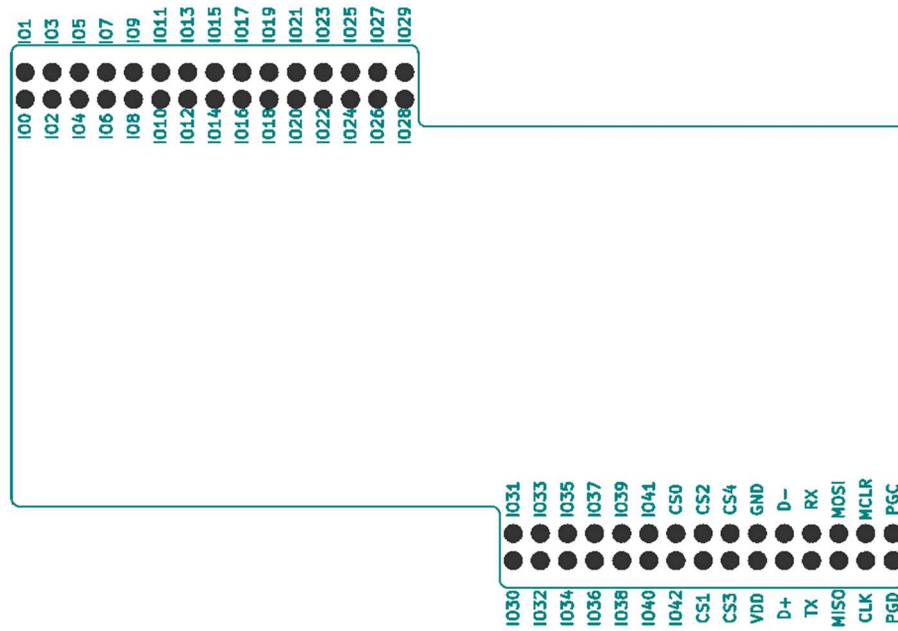


Figure 1 – PIC Development Board Daughter Board Standard Drawings

## BUILD AND TEST STATUS

This section details what daughter boards I have designed, built and tested at time of writing.

**Table 1 – Build and Test Status**

<b>Daughter Board</b>	<b>Designed</b>	<b>Built</b>	<b>Tested</b>	<b>Known Issues</b>
Seven Segment	Y	Y	N	NONE
12 Bit DAC	Y	Y	Y	NONE
Board to Board Expansion	Y	N	N	NONE
Breakouts	Y	Y	N	NONE
dsPIC30F 18Pin	Y	N	N	NONE
dsPIC30F 28Pin [A]	Y	N	N	NONE
dsPIC30F 28Pin [B]	Y	Y	N	NONE
dsPIC30F 28Pin [C]	Y	N	N	NONE
dsPIC30F 40Pin [A]	Y	N	N	NONE
dsPIC30F 40Pin [B]	Y	Y	N	NONE
PIC16/18 [8-14-20][A][Non USB]	Y	N	N	NONE
PIC16/18 [28][A][Non USB]	Y	N	N	NONE
PIC16/18 [40][A][Non USB]	Y	N	N	NONE
PIC16/18 [8-14-20][B][USB]	Y	Y	N	NONE
PIC16/18 [28][B][USB]	Y	Y	Y	NONE
PIC16/18 [40][B][USB]	Y	Y	Y	NONE
16x2 LCD	Y	Y	Y	NONE
LEDS	Y	N	N	NONE
MCP3208 [A]	Y	N	N	NONE
MCP3208 [B]	Y	N	N	NONE
MIDI	Y	Y	Y	NONE
PIC ADC	Y	Y	Y	NONE
Push Buttons [A]	Y	Y	Y	NONE
Push Buttons [B]	Y	Y	Y	NONE
Switches	Y	N	N	NONE
ULN2003	Y	N	N	NONE



# SEVEN SEGMENT

## GENERAL ARRANGEMENT

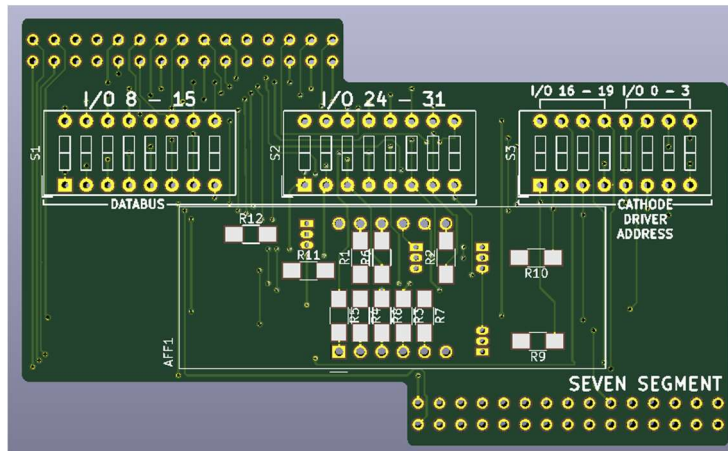


Figure 1 – Seven Segment Display Board General Arrangement

## PURPOSE

This board allows the use of a 4 x seven segment display using the principle of strobing.

## SCHEMATIC DIAGRAM

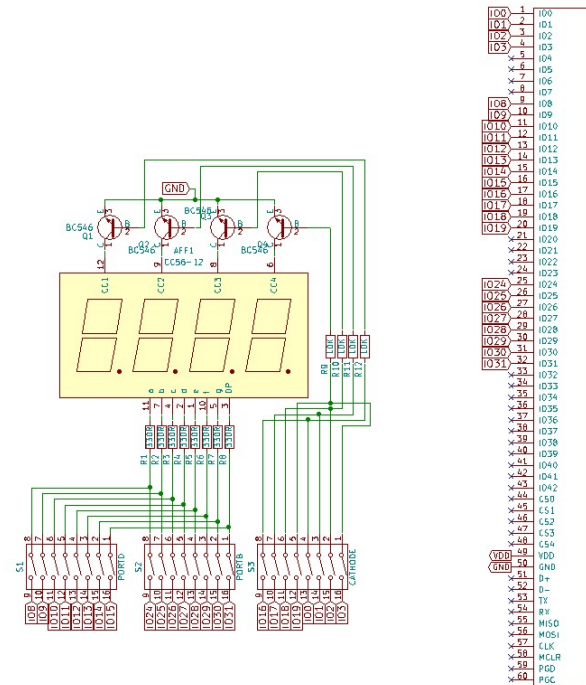


Figure 2 – Seven Segment Schematic Diagram



# BOARD TO BOARD EXPANSION

## GENERAL ARRANGEMENT

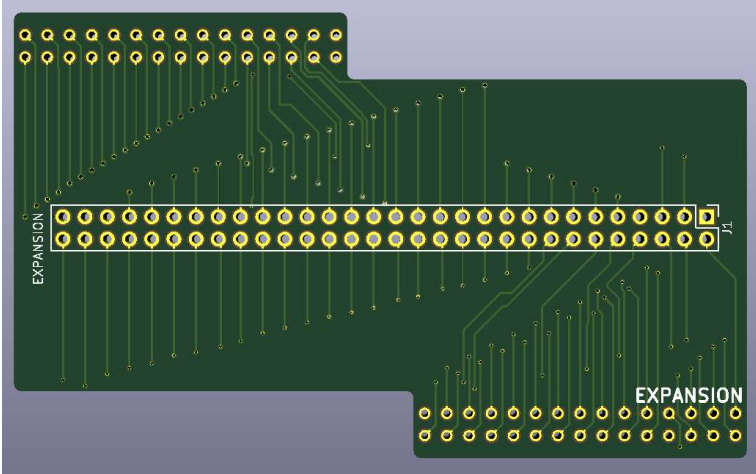


Figure 5 – Board to Board Expansion General Arrangement

## PURPOSE

The board to board expansion allows easy connection of two or more main boards. This is useful for larger simulations.

## SCHEMATIC DIAGRAM

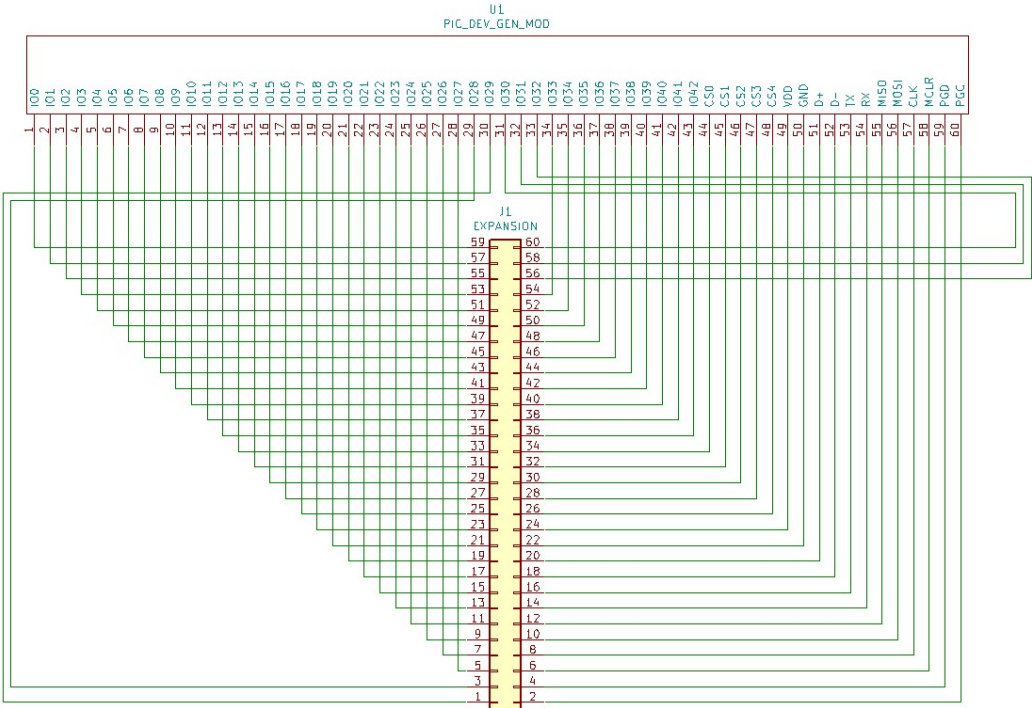


Figure 6 – Board to Board Schematic Diagram

# BREAKOUTS

## GENERAL ARRANGEMENTS

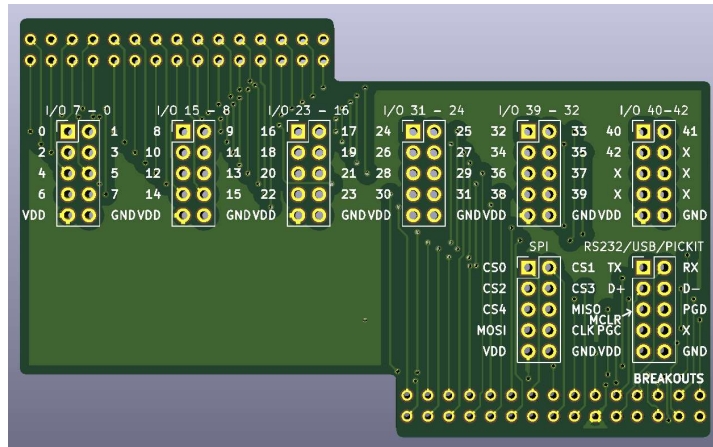


Figure 7 – Breakouts General Arrangement

## PURPOSE

The breakout board allows the development board to be easily connected to other development systems or breadboards.

## SCHEMATIC DIAGRAM

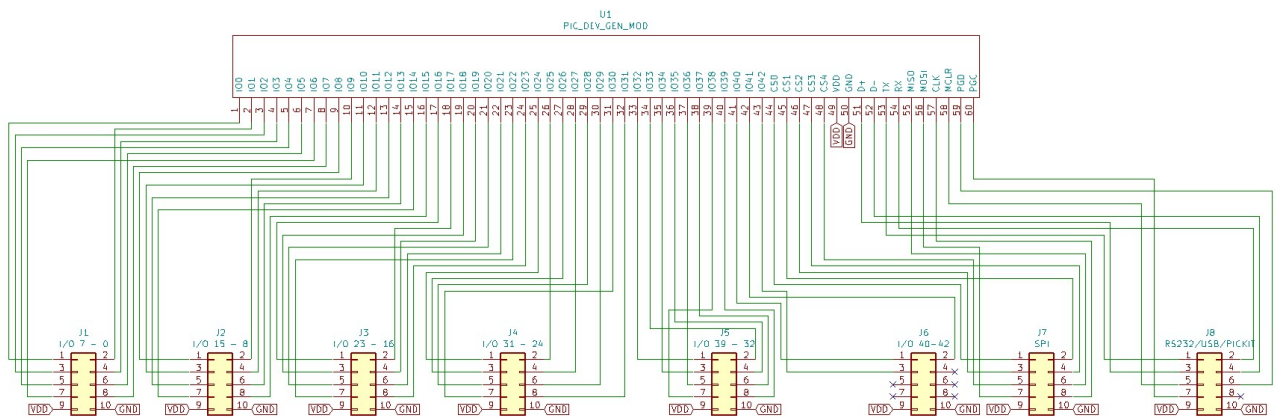


Figure 8 – Breakouts Schematic Diagram

# DSPIC30F 18 PIN

## GENERAL ARRANGEMENT

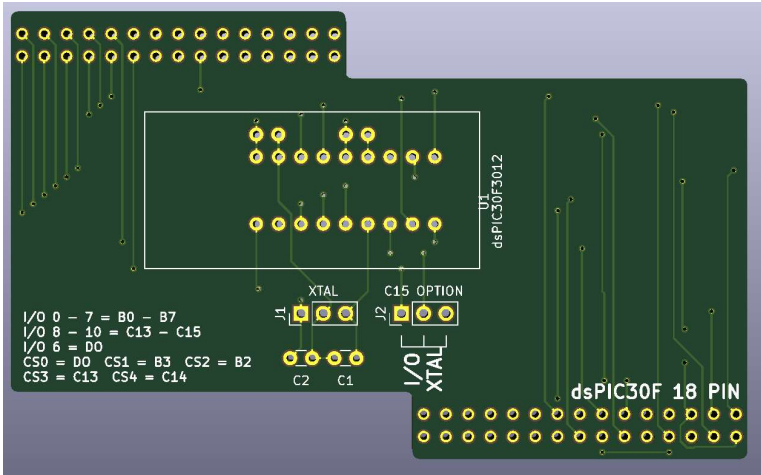


Figure 9 – dsPIC30F 18Pin General Arrangement

## PURPOSE

The dsPIC30F 18 Pin board is for 18 pin dsPIC30F microcontrollers. This board also features C15 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

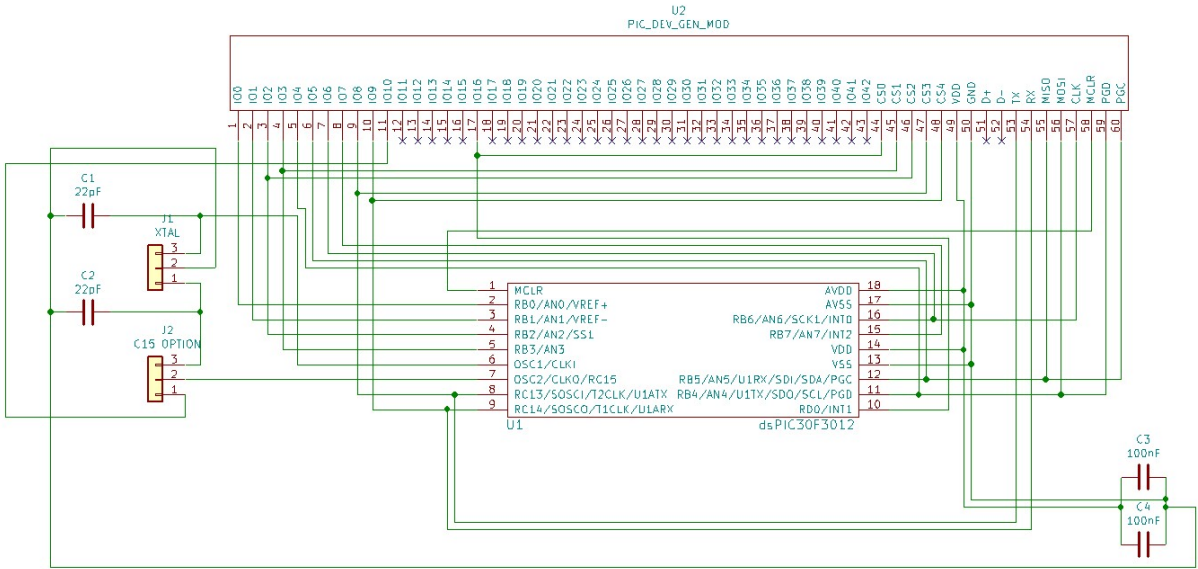


Figure 10 – dsPIC30F 18 Pin Schematic Diagram

# DSPIC30F 28 PIN [TYPE A]

## GENERAL ARRANGEMENT

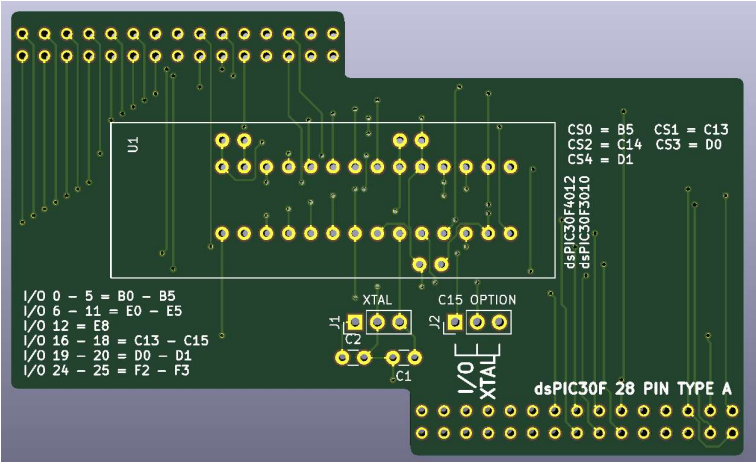


Figure 11 – dsPIC30F 28Pin Type A General Arrangement

## PURPOSE

The dsPIC30F 28 Pin Type A board is for 28 pin dsPIC30F microcontrollers [dsPIC30F4012/dsPIC30F3010]. This board also features C15 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

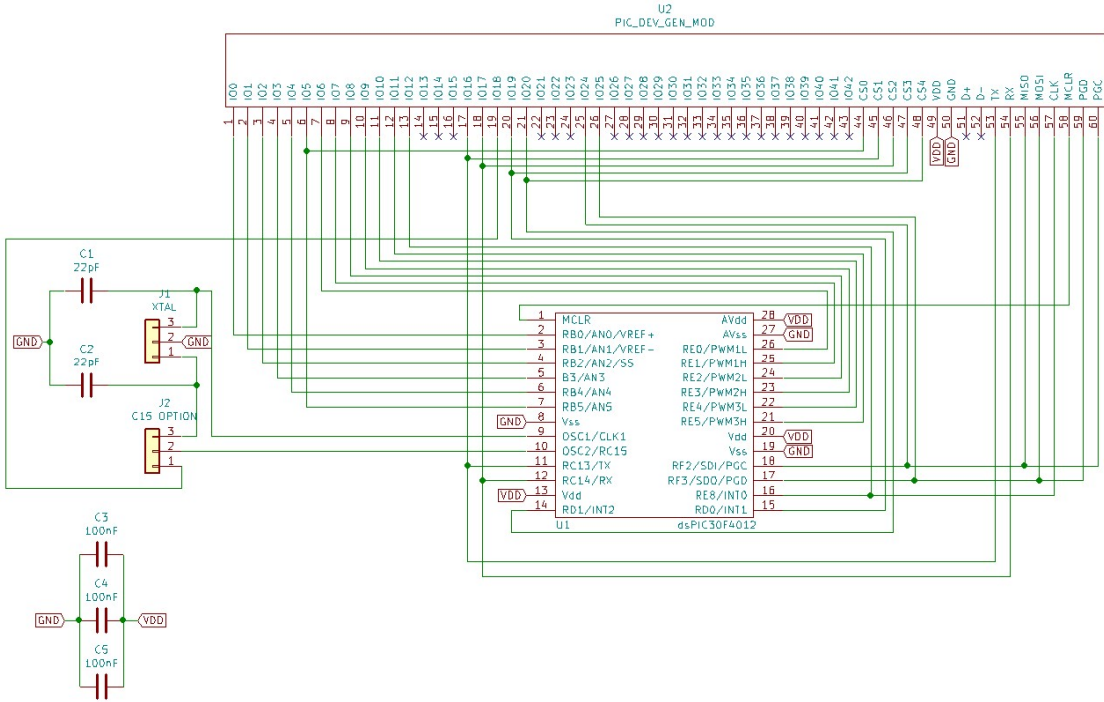


Figure 12 – dsPIC30F 28 Pin Type A Schematic Diagram



# DSPIC30F 28 PIN [TYPE B]

## GENERAL ARRANGEMENT

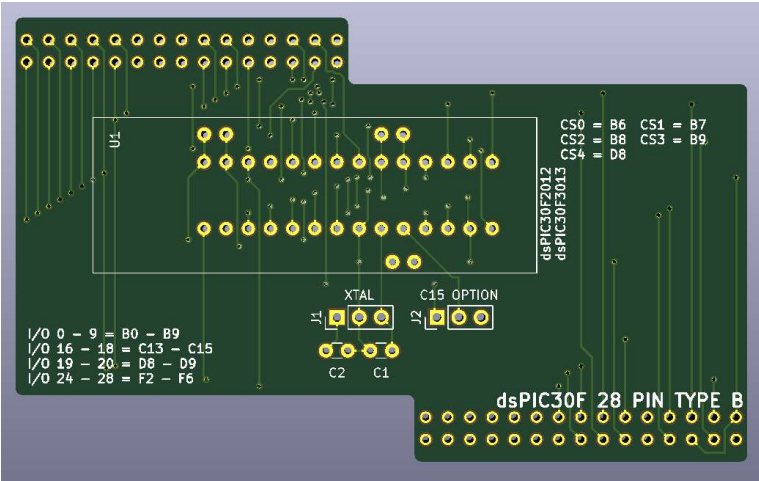


Figure 13 – dsPIC30F 28 Pin Type B General Arrangement

## PURPOSE

The dsPIC30F 28 Pin Type B board is for 28 pin dsPIC30F microcontrollers [dsPIC30F2012/dsPIC30F3013]. This board also features C15 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

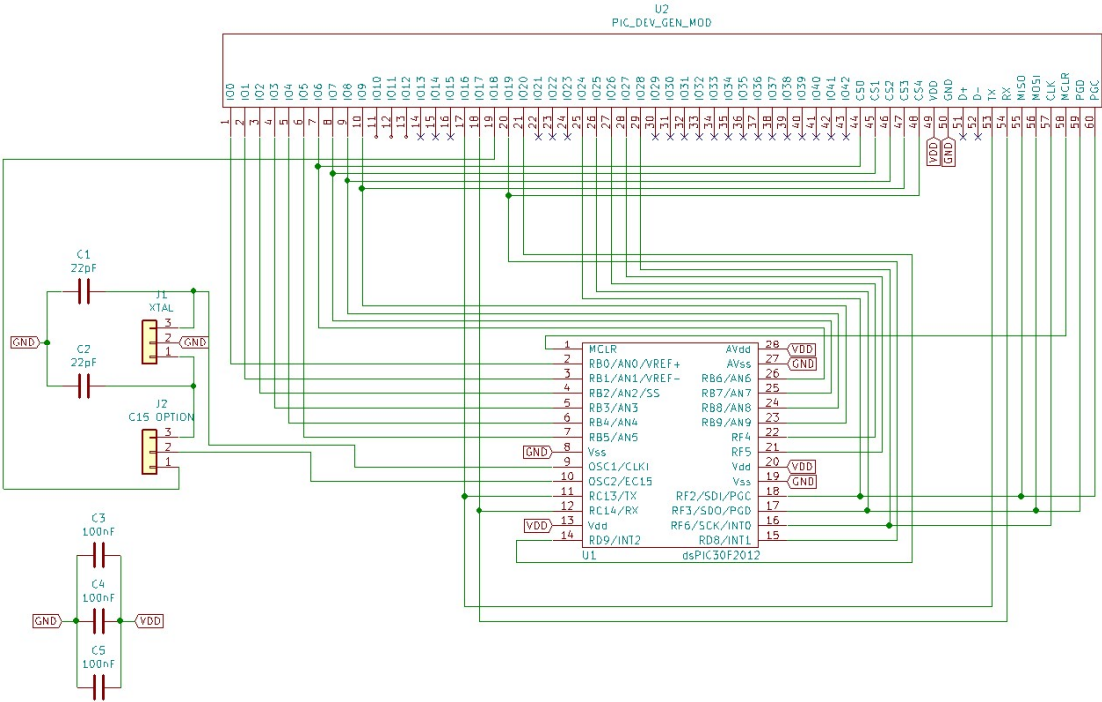


Figure 14 – dsPIC30F 28 Pin Type B Schematic Diagram

# DSPIC30F 28 PIN [TYPE C]

## GENERAL ARRANGEMENT

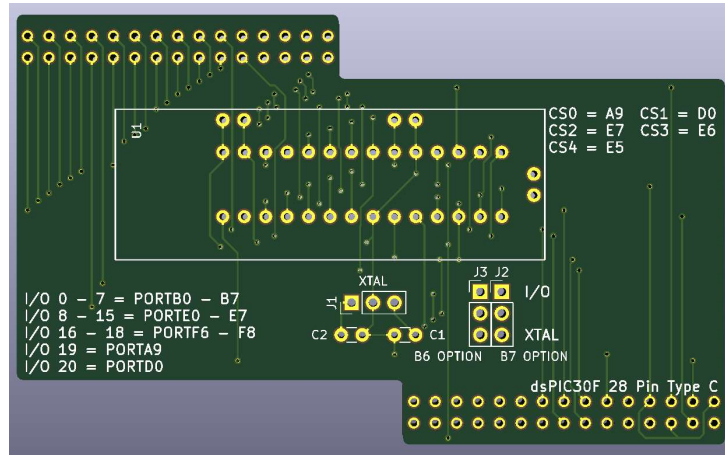


Figure 15 – dsPIC30F 28 Pin Type C General Arrangement

## PURPOSE

The dsPIC30F 28 Pin Type C board is for 28 pin dsPIC30F microcontrollers [dsPIC30F2020]. This board also features the B6 and B7 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

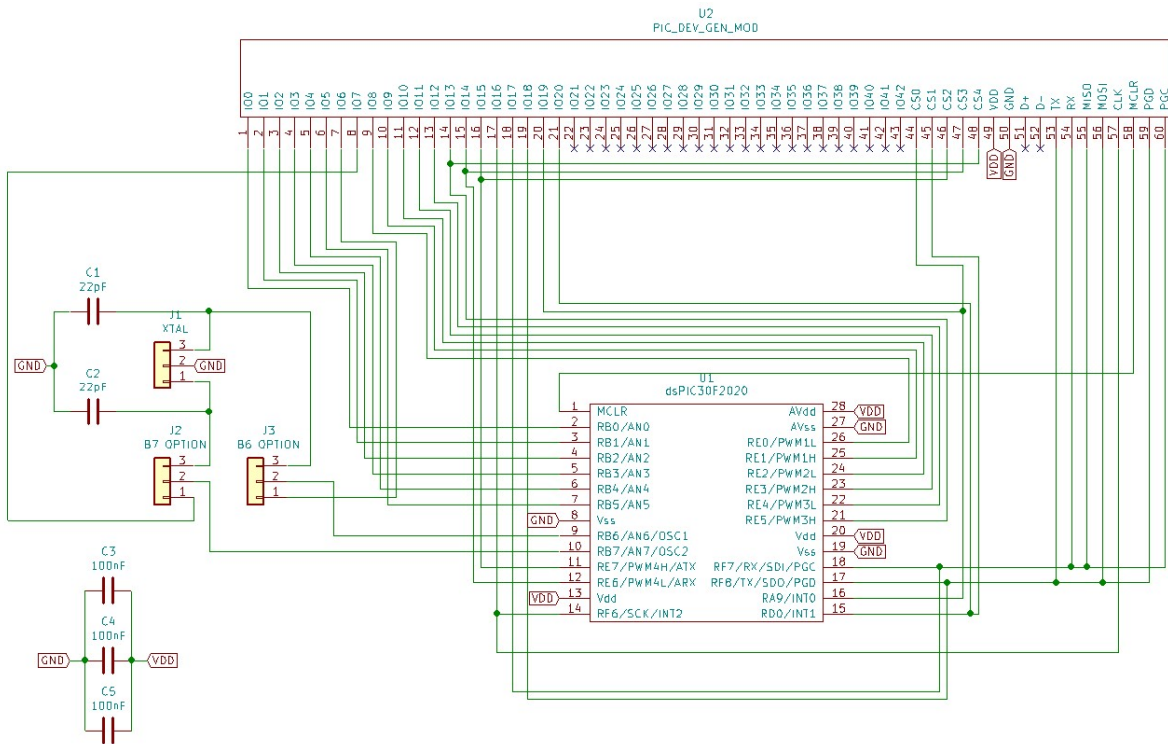


Figure 16 – dsPIC30F 28 Pin Type C Schematic



# DSPIC30F 40 PIN [TYPE A]

## GENERAL ARRANGEMENT

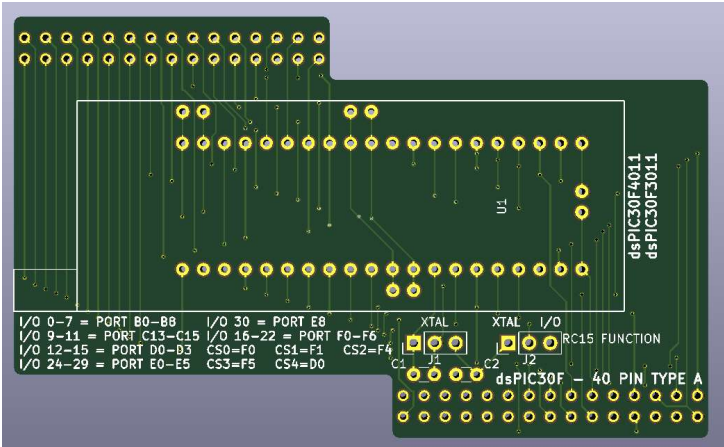


Figure 17 – dsPIC30F 40 Pin Type A General Arrangement

## PURPOSE

The dsPIC30F 40 Pin Type A board is for 40 pin dsPIC30F microcontrollers [dsPIC30F4011/dsPIC30F3011]. This board also features the C15 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

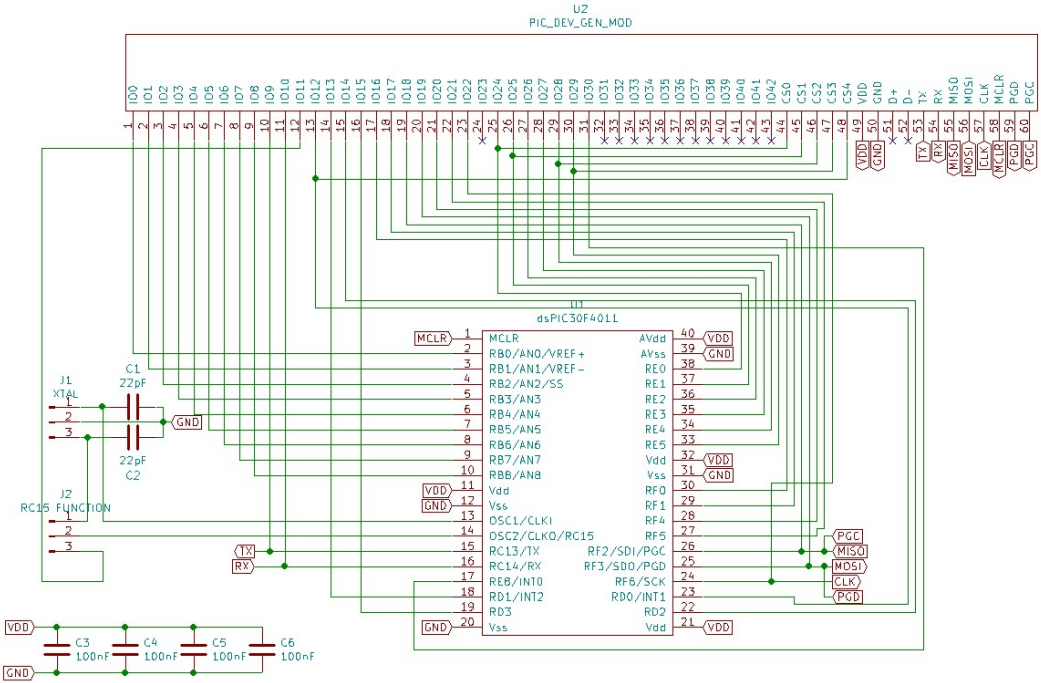


Figure 18 – dsPIC30F 40 Pin Type A Schematic Diagram

# DSPIC30F 40 PIN [TYPE B]

## GENERAL ARRANGEMENT

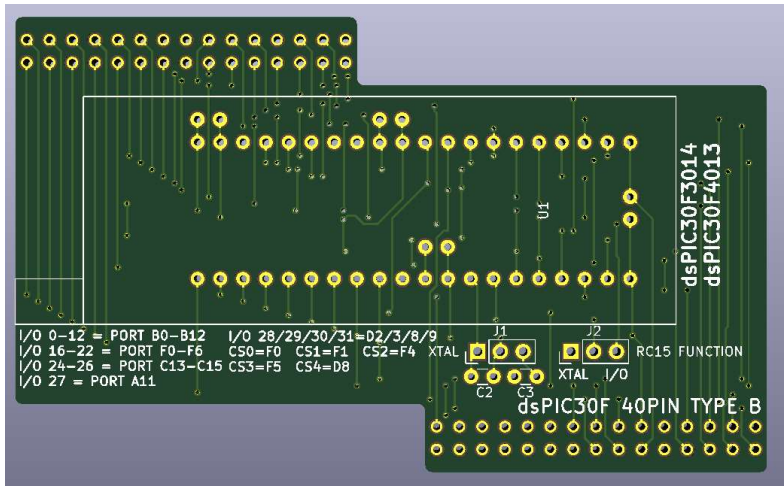


Figure 19 – dsPIC30F 40 Pin Type B General Arrangement

## PURPOSE

The dsPIC30F 40 Pin Type B board is for 40 pin dsPIC30F microcontrollers [dsPIC30F3014/dsPIC30F4013]. This board also features the C15 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

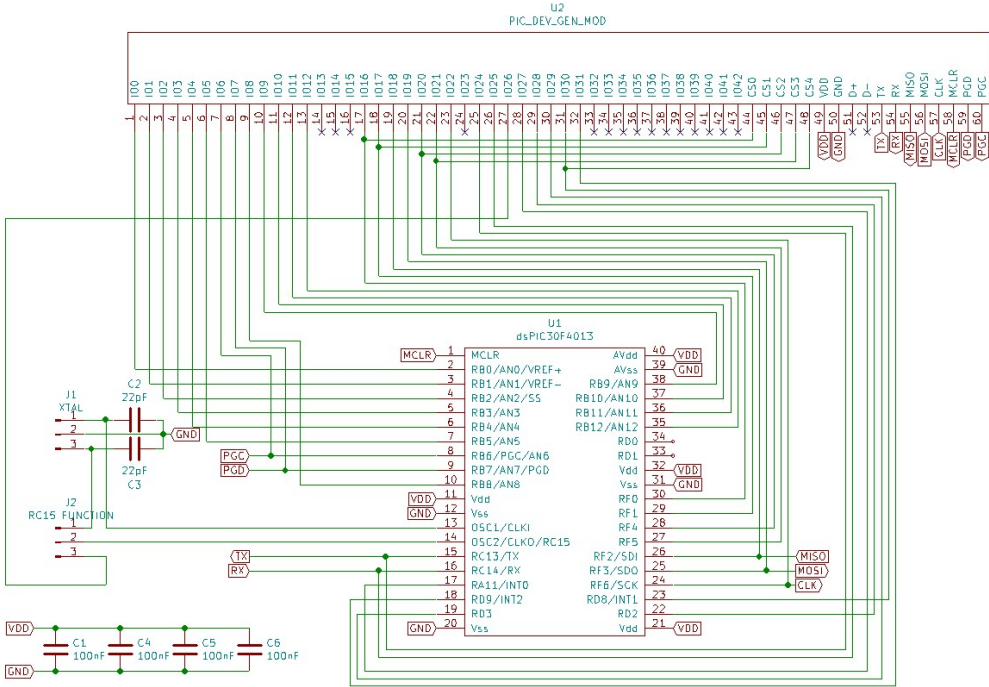


Figure 20 – dsPIC30F 40 Pin Type B Schematic Diagram

# PIC16/18F [8-14-20 PIN] NON USB [TYPE A]

## GENERAL ARRANGEMENT

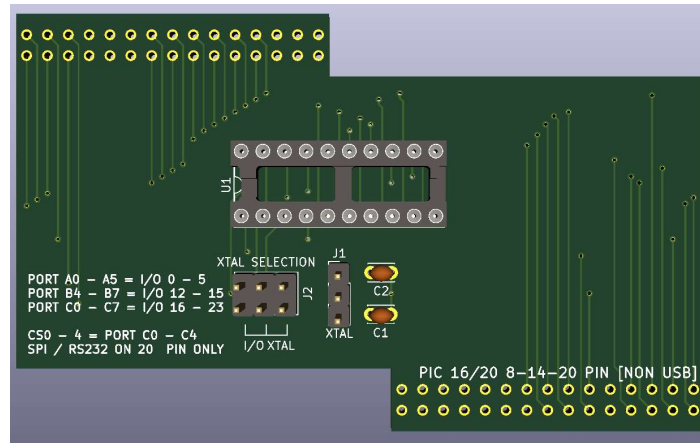


Figure 21 – PIC16/18F [8-14-20Pin] Non USB [Type A]

## PURPOSE

This board is for PIC16/18F series for either 8, 14 or 20 pin microcontrollers. This board also features the A6/A7 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

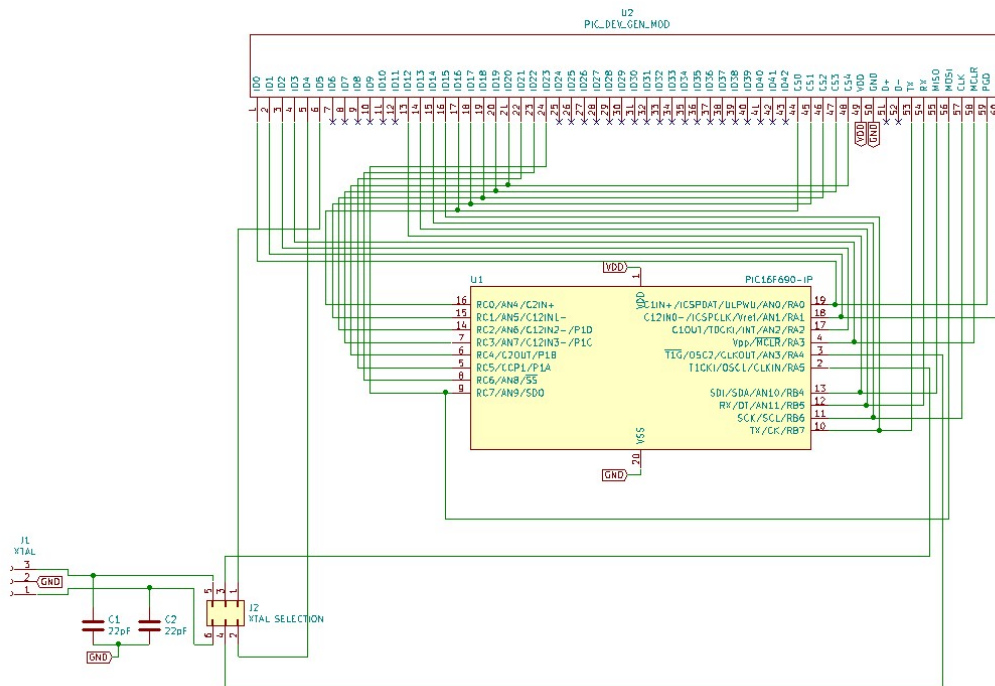


Figure 22 – PIC16/18F [8-14-20Pin] Non USB [Type A] Schematic Diagram

# PIC16/18F 28PIN NON USB [TYPE A]

## GENERAL ARRANGEMENT

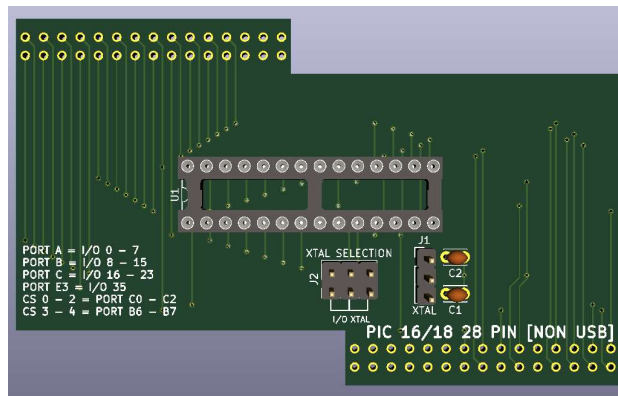


Figure 23 – PIC16/18F 28Pin Non USB [Type A] General Arrangement

## PURPOSE

This board is for PIC16/18F series for 28 pin microcontrollers. This board also features the A6/A7 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

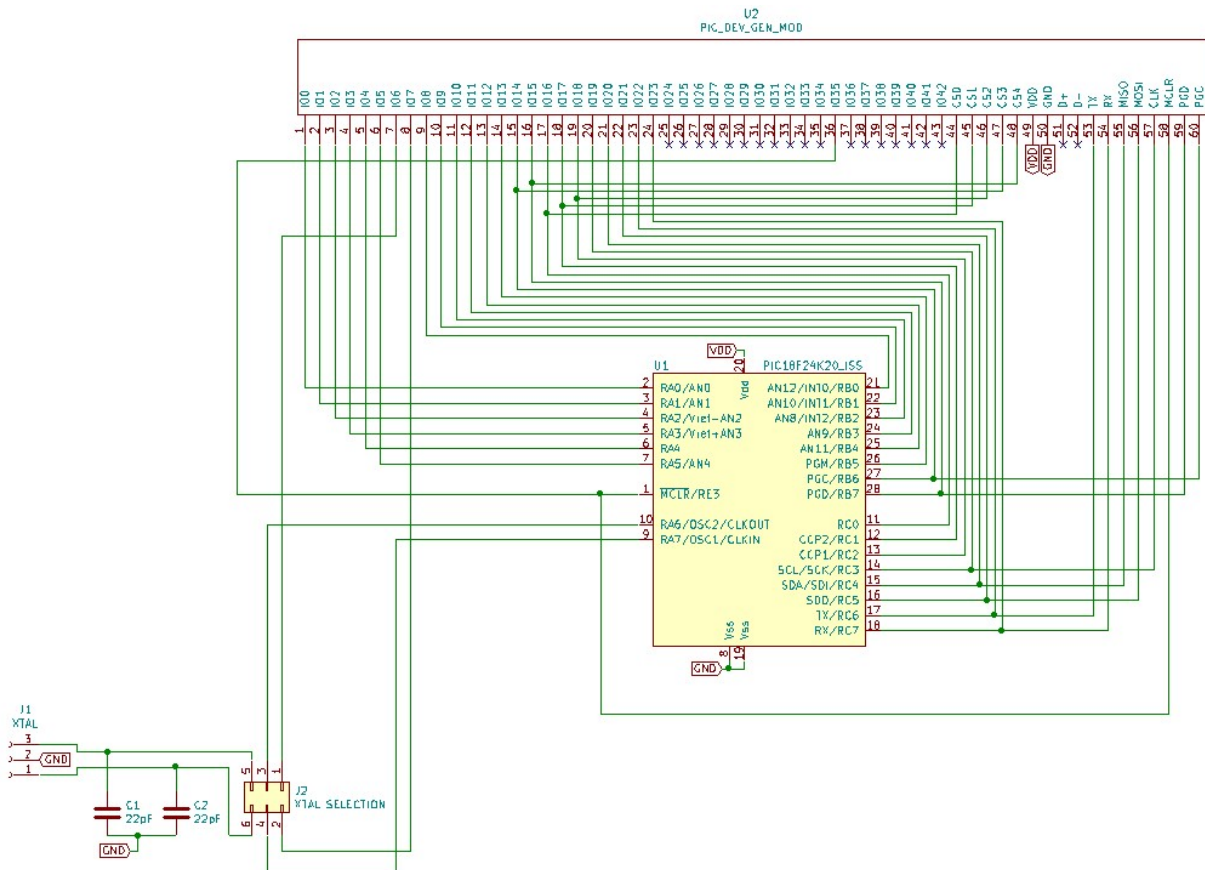


Figure 24 – PIC16/18F 28Pin Non USB [Type A] Schematic Diagram

# PIC16/18F 40PIN NONUSB [TYPE A]

## GENERALL ARRANGEMENT

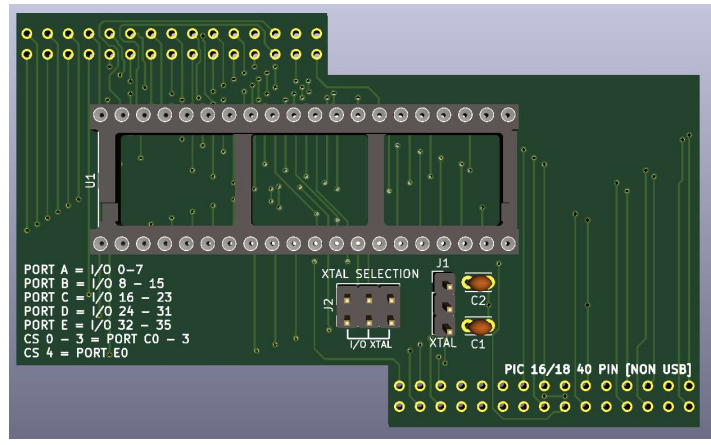


Figure 25 – PIC16/18F 40Pin Non USB [Type A] General Arrangement

## PURPOSE

This board is for PIC16/18F series for 40 pin microcontrollers. This board also features the A6/A7 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

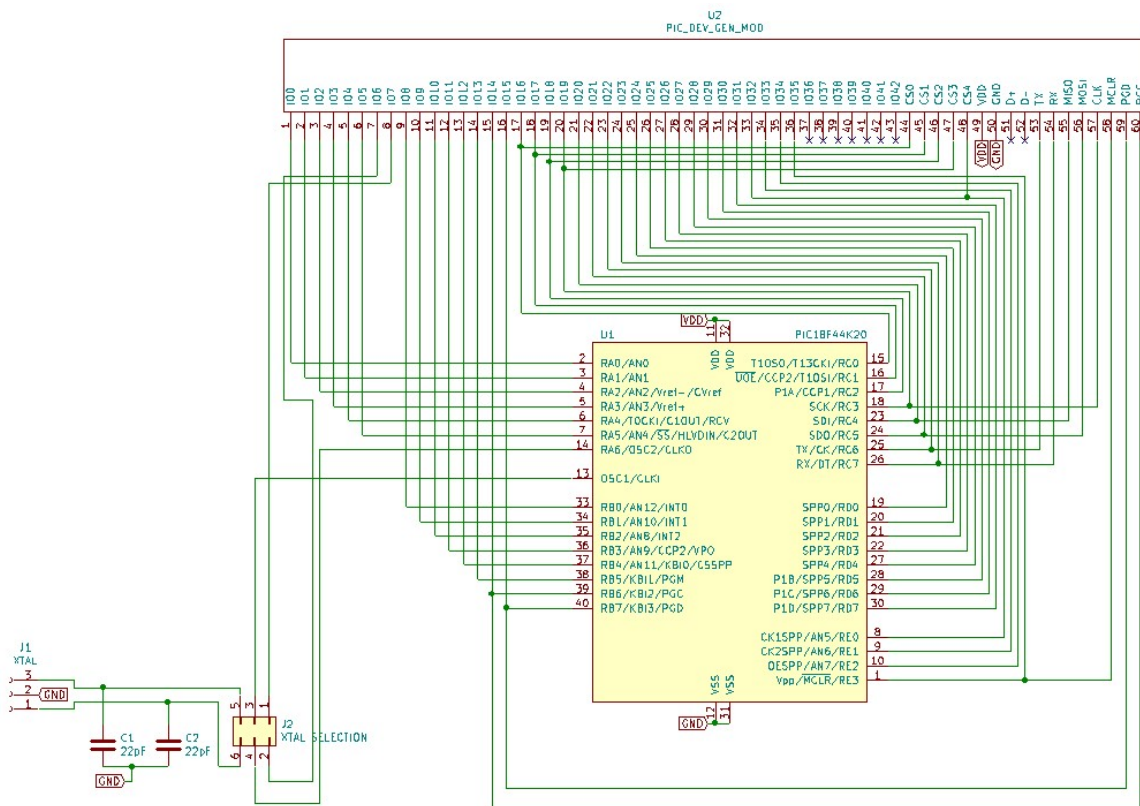


Figure 26 - PIC16/18F 40Pin Non USB [Type A] Schematic Diagram





# PIC16/18F 28PIN USB [TYPE B]

## GENERAL ARRANGEMENT

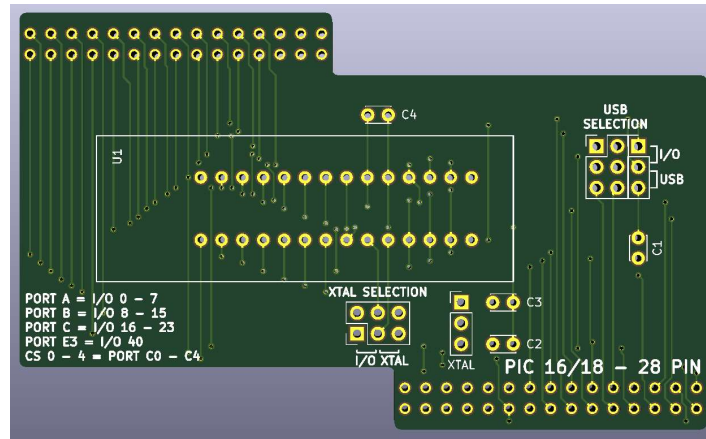


Figure 29 – PIC16/18F 28Pin USB [Type B] General Arrangement

## PURPOSE

This board is for PIC16/18F series for 28 pin microcontrollers that support the USB peripheral [i.e. 18F2550]. This board also features the A6/A7 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

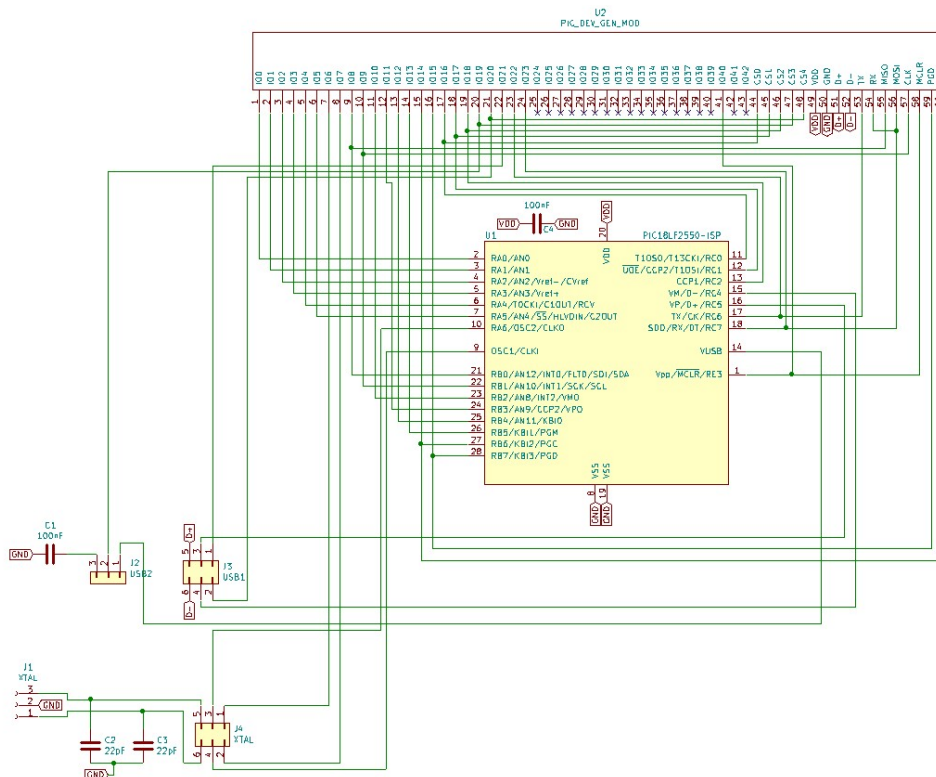


Figure 30 – PIC16/18F 28Pin USB [Type B] General Arrangement

# PIC16/18F 40PIN USB [TYPE B]

## GENERAL ARRANGEMENT

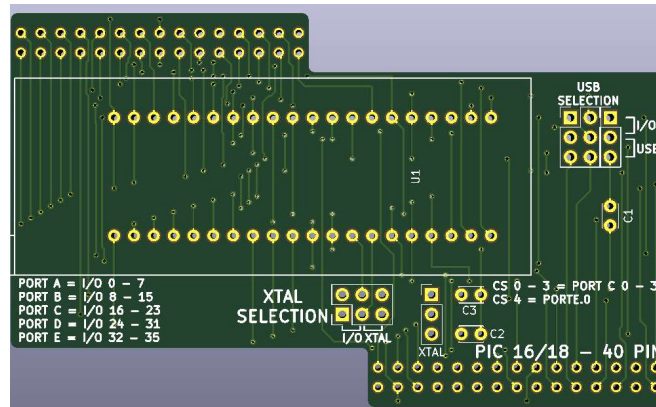


Figure 31 – PIC16/18F 40Pin USB [Type B] General Arrangement

## PURPOSE

This board is for PIC16/18F series for 40 pin microcontrollers that support the USB peripheral [i.e. 18F4550]. This board also features the A6/A7 crystal selection option for crystal or I/O. I/O connections are shown on the silkscreen above.

## SCHEMATIC DIAGRAM

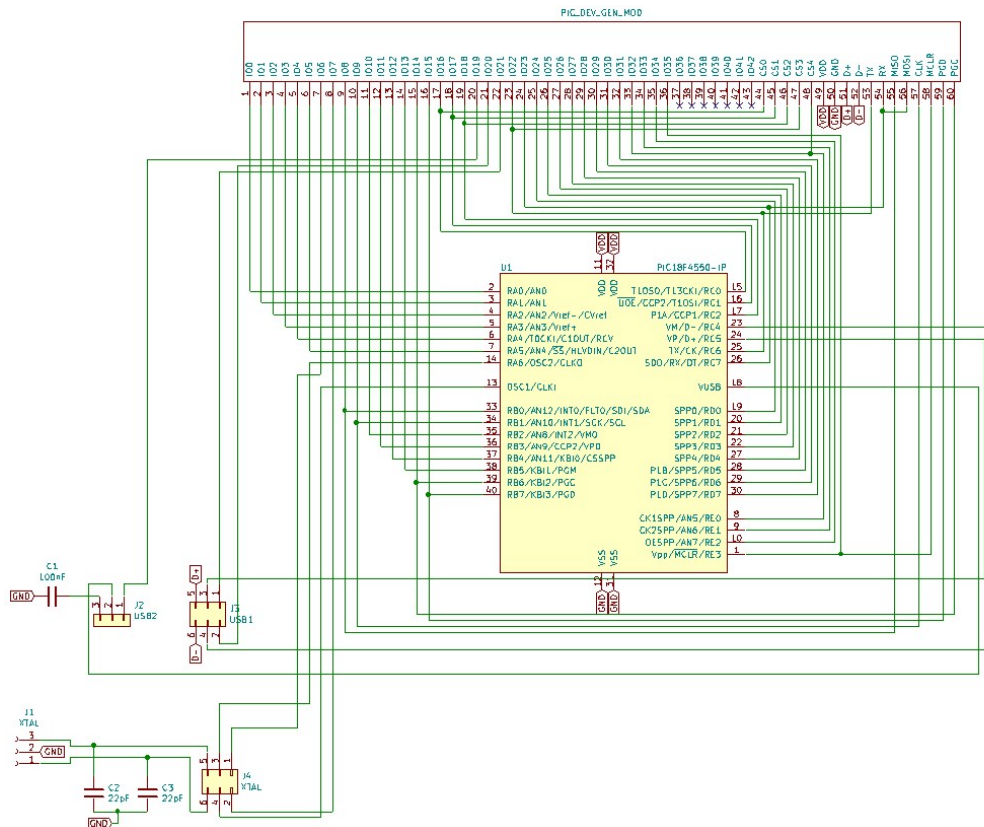


Figure 32 – PIC16/18F 40Pin USB [Type B] Schematic Diagram



# 16 X 2 ALPHANUMERIC LCD DISPLAY

## GENERAL ARRANGEMENT

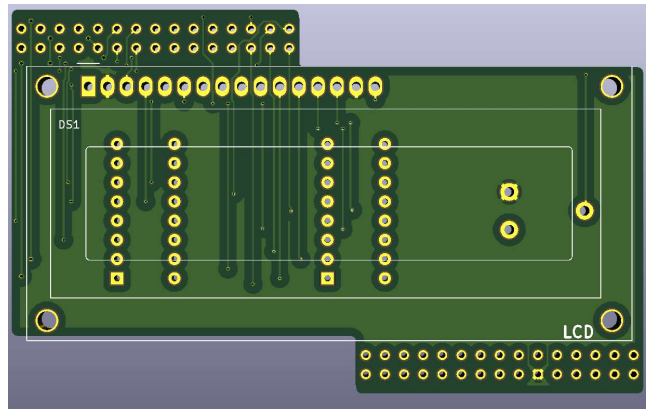


Figure 33 – LCD 16x2 LCD General Arrangement

## PURPOSE

This board is to utilise a 16x2 alphanumeric display of the HD44780 type.

## SCHEMATIC DIAGRAM

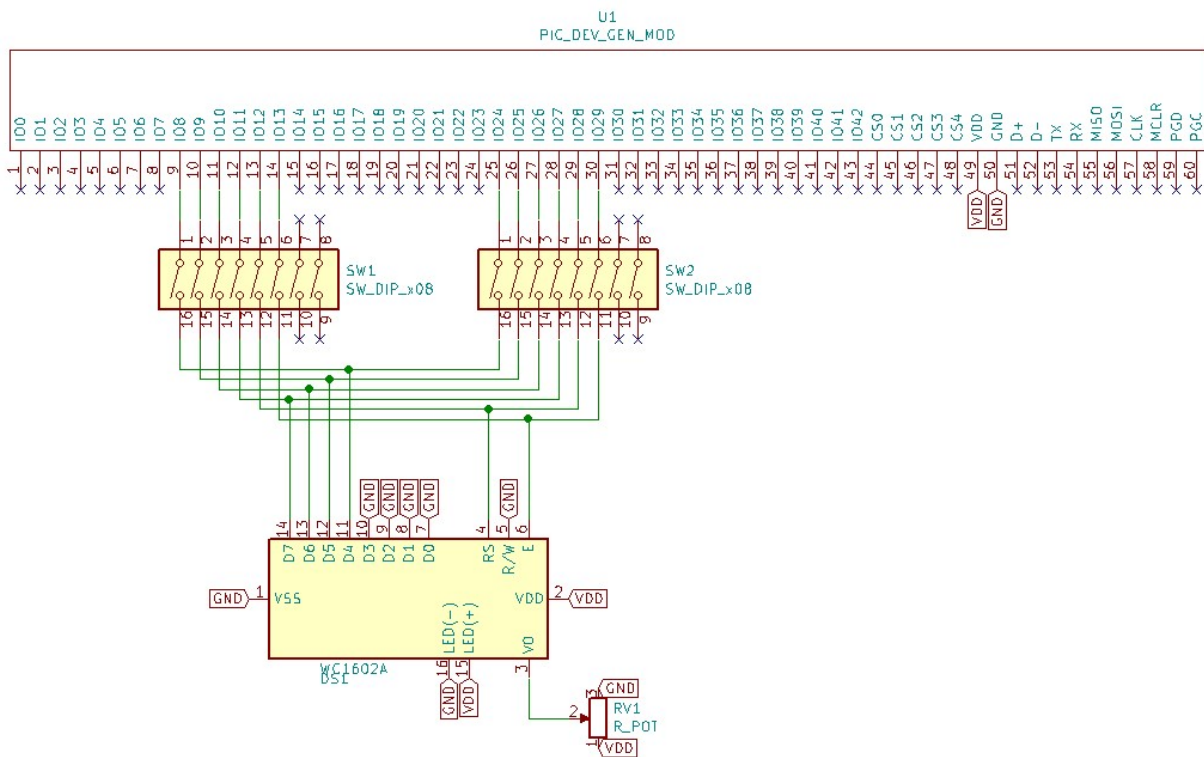


Figure 34 - LCD 16x2 Schematic Diagram

# LEDS FOR I/O 0 – 39

## GENERAL ARRANGEMENT

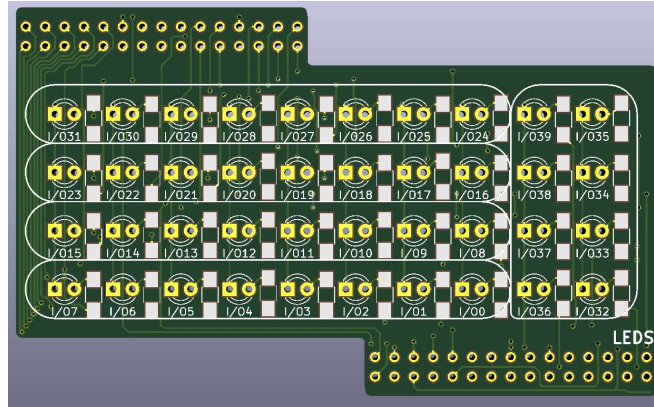


Figure 35 – LEDs General Arrangement

## PURPOSE

Indication LEDs for I/Os 0 – 39.

## SCHEMATIC DIAGRAM

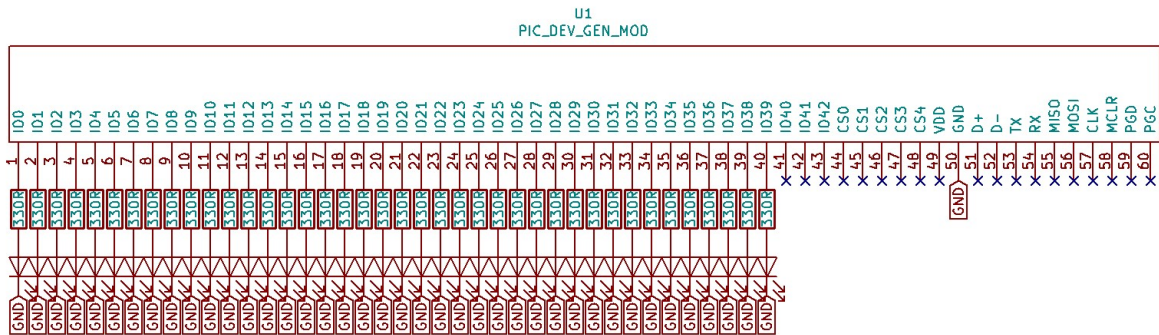


Figure 36 – LEDs Schematic Diagram

# MCP3208 [TYPE A] / ADC 12BIT

## GENERAL ARRANGEMENT

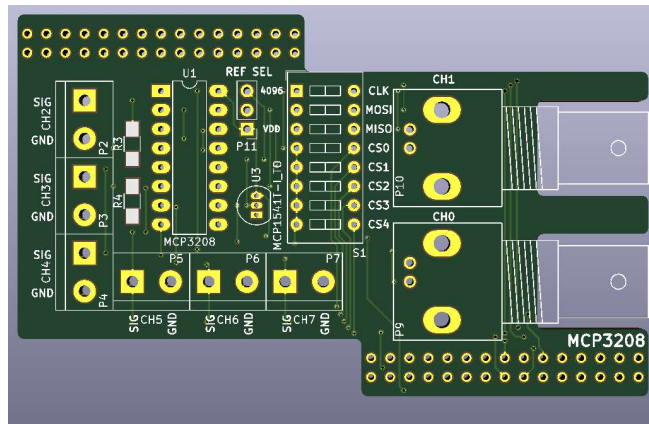


Figure 37 – MCP3208 [Type A] [ADC 12Bit]

## PURPOSE

This board allows the use of the eight channel 12 bit ADC MCP3208.

## SCHEMATIC

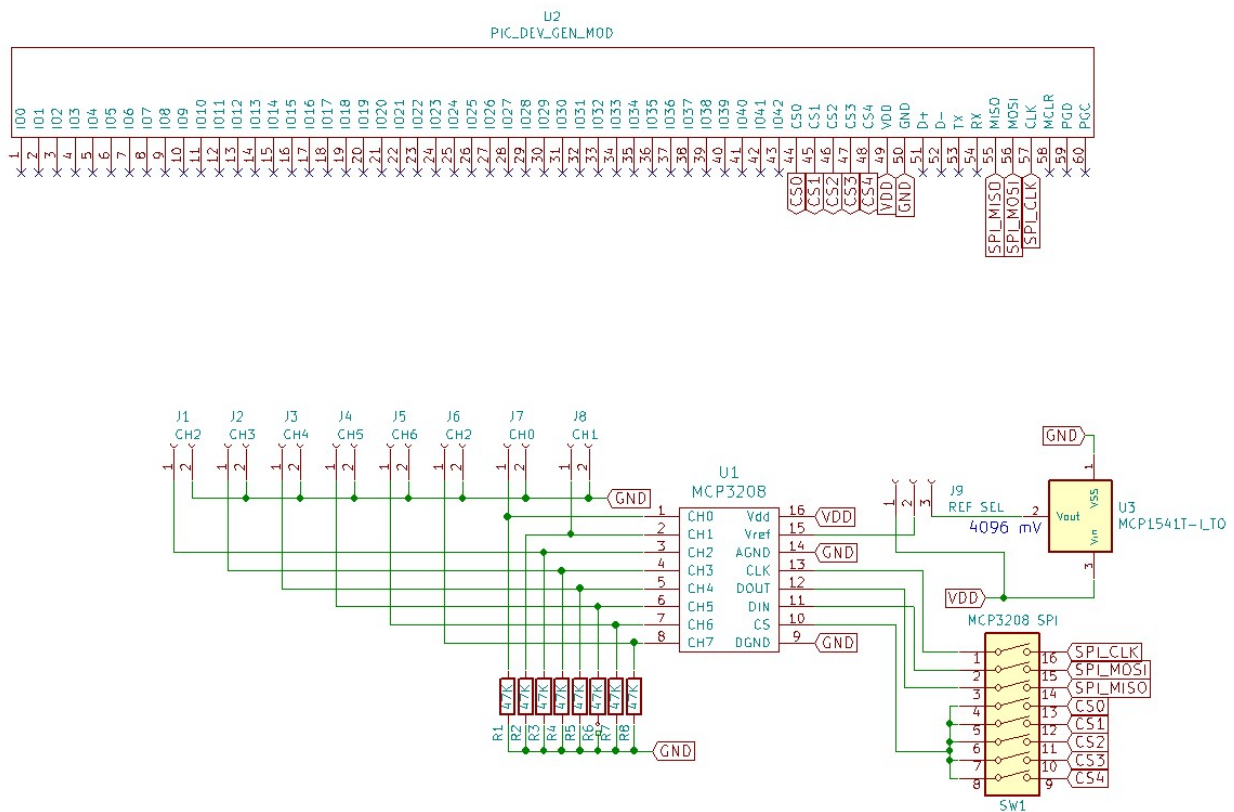


Figure 38 - MCP3208 [Type A] [ADC 12Bit] Schematic Diagram

# MCP3208 [TYPE B]

## GENERAL ARRANGEMENT

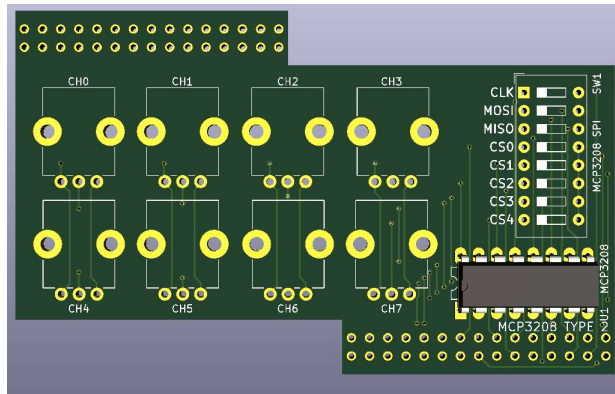


Figure 39 – MCP3208 [Type B]

## PURPOSE

Allows the use of the 12 bit ADC MCP3208 with onboard potentiometers.

## SCHEMATIC DIAGRAM

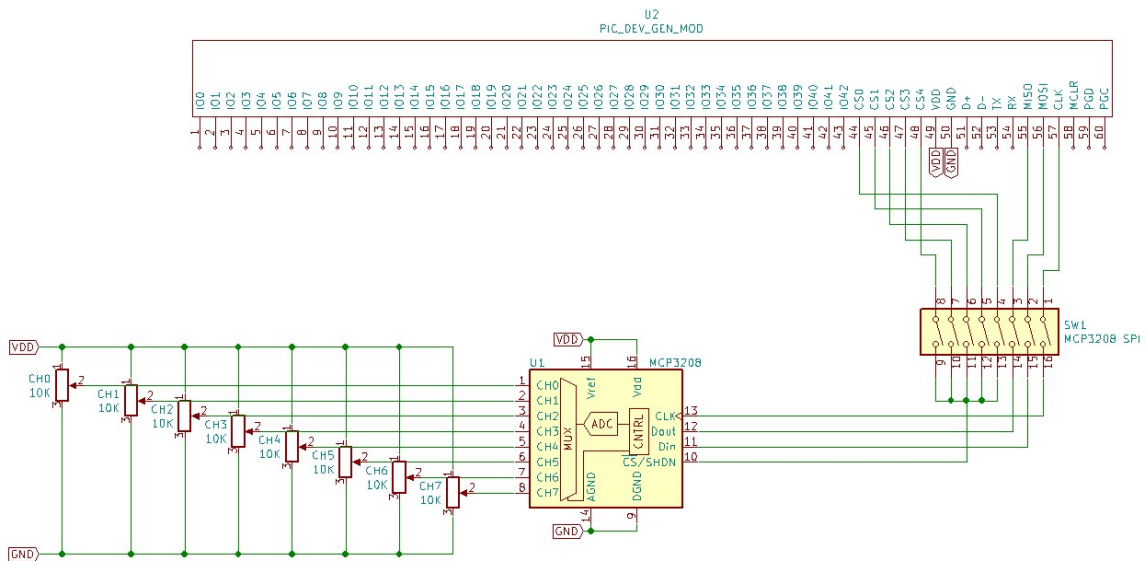


Figure 40 – MCP3208 [Type B] Schematic Diagram

# MIDI

## GENERAL ARRANGEMENT

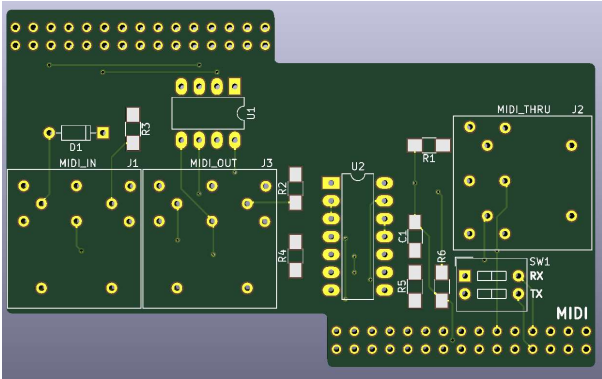


Figure 41 – Midi General Arrangement

## PURPOSE

Connects the microcontrollers RS232 TX and RX to a MIDI instrument. Provides the necessary circuit to connect to a MIDI instrument.

## SCHEMATIC DIAGRAM

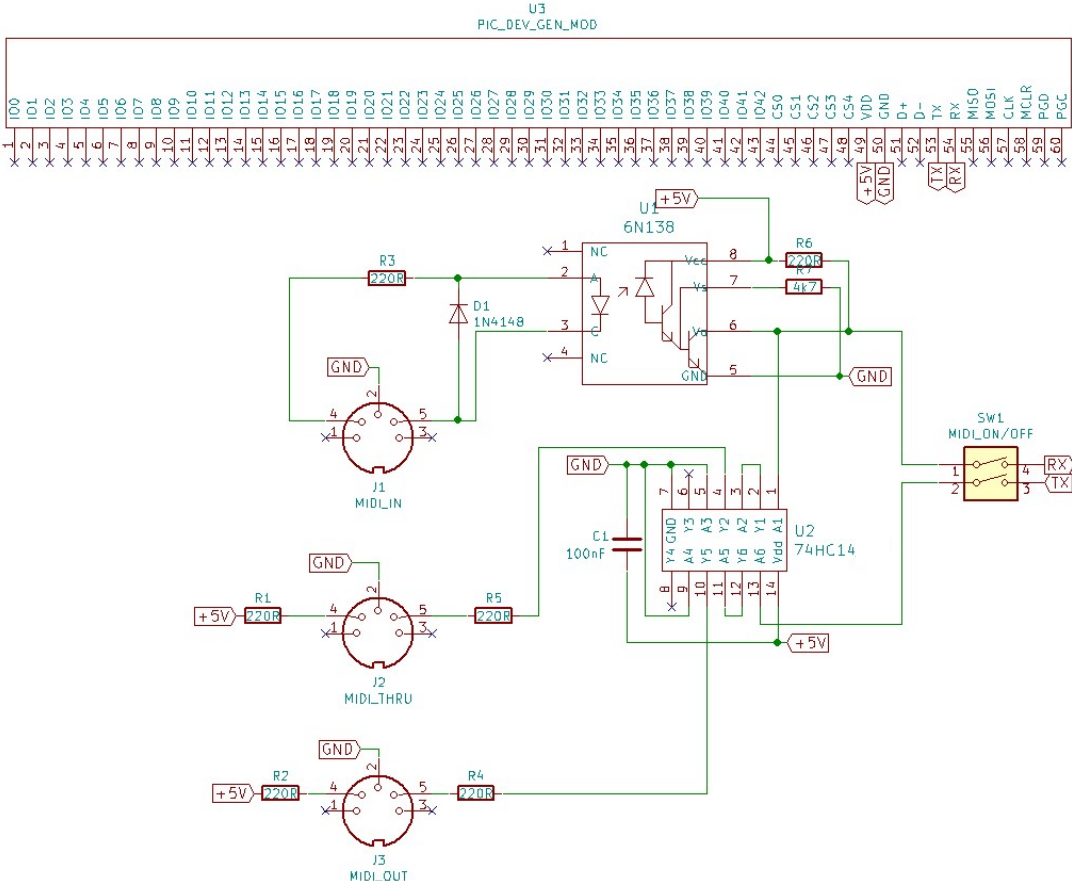


Figure 42 - Midi Schematic Diagram

# PIC ADC

## GENERAL ARRANGEMENT

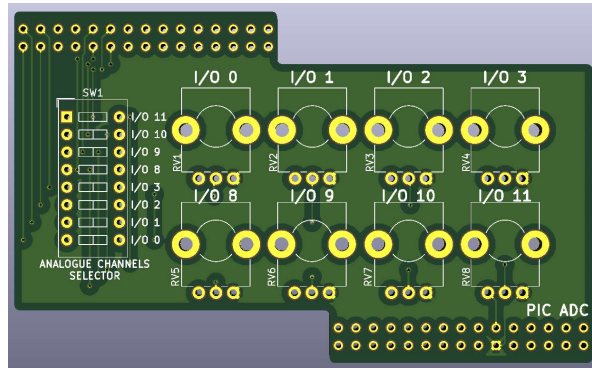


Figure 43 – PIC ADC General Arrangement

## PURPOSE

Connects an array of potentiometers to the PIC analogue inputs or other peripheral device.

## SCHEMATIC DIAGRAM

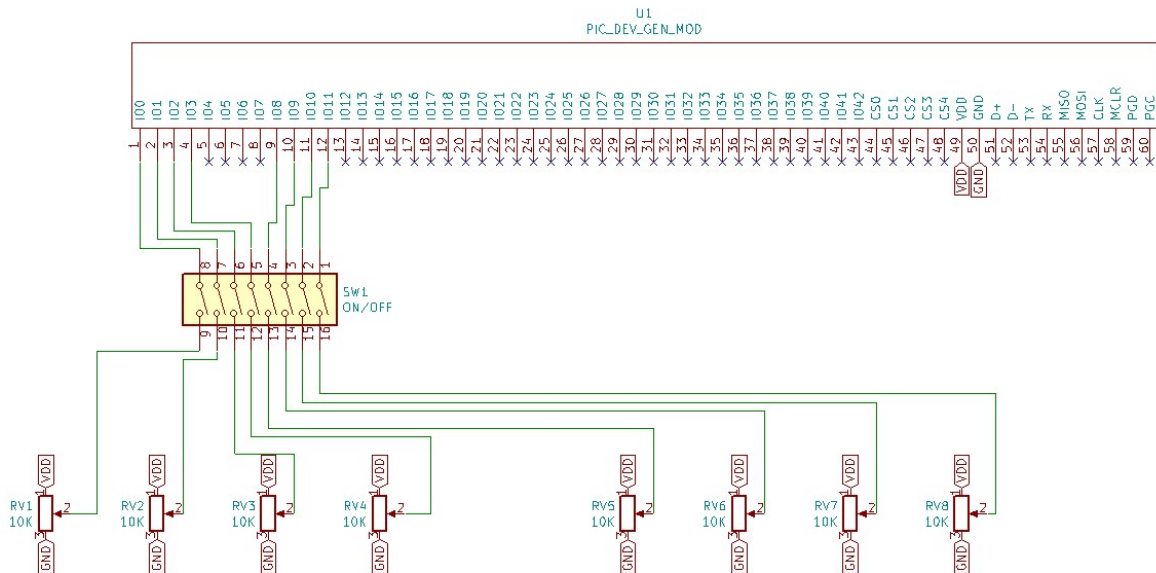


Figure 44 – PIC ADC Schematic Diagram



# PUSH BUTTONS [TYPE A]

## GENERAL ARRANGEMENT

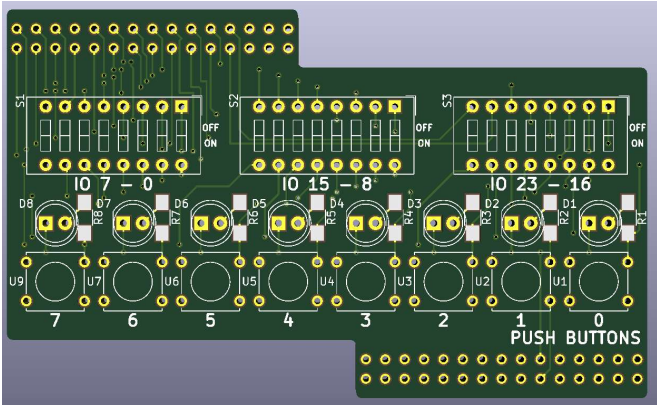


Figure 45 – Push Buttons [Type A] General Arrangement

## PURPOSE

Provides eight push buttons with I/O status LEDs. Push buttons and LEDs are connectable to three different I/O groups.

## SCHEMATIC DIAGRAM

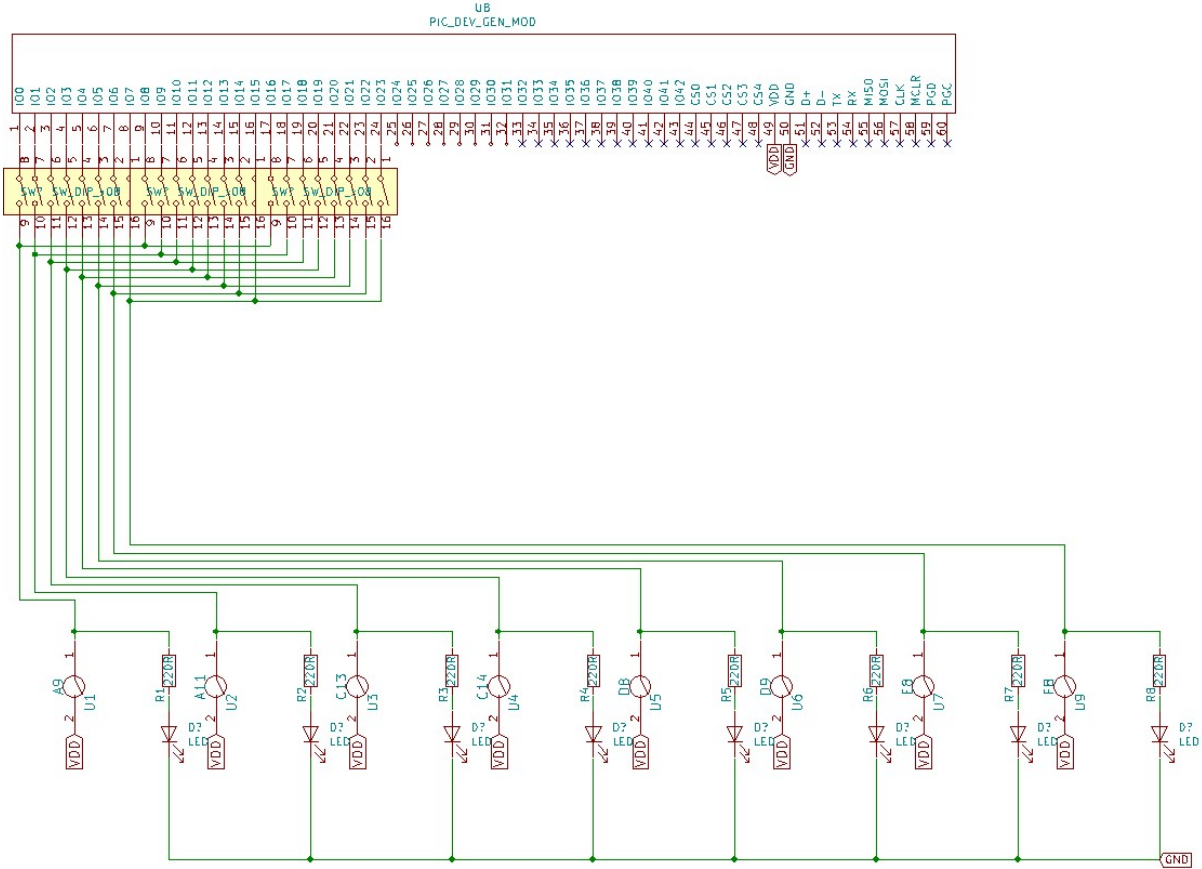


Figure 46 – Push Buttons [Type A] Schematic Diagram

# PUSH BUTTONS [TYPE B]

## GENERAL ARRANGEMENT

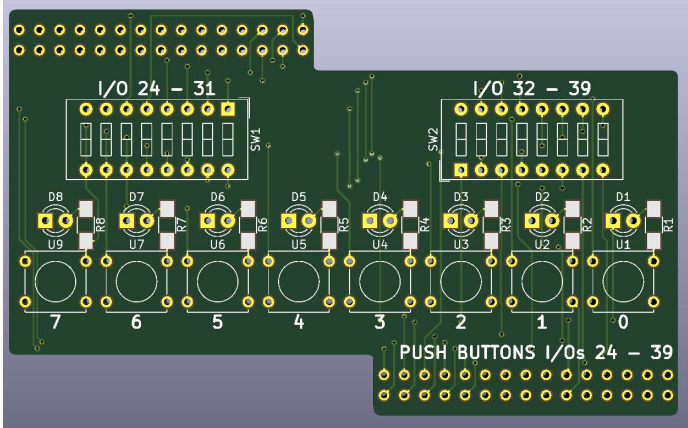


Figure 47 – Push Buttons [Type B] General Arrangement

## PURPOSE

As per type A but for different I/O groups.

## SCHEMATIC DIAGRAM

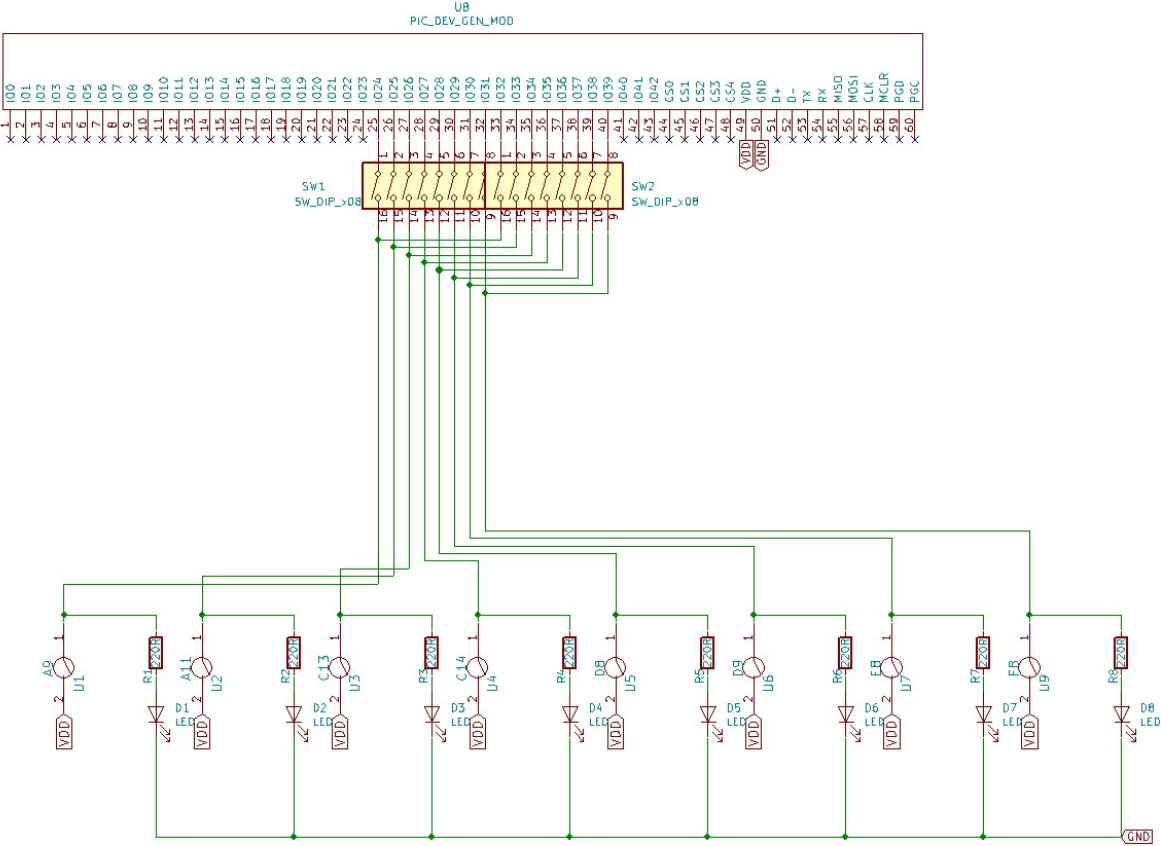


Figure 48 – Push Buttons [Type B] Schematic Diagram



# SWITCHES

## GENERAL ARRANGEMENT

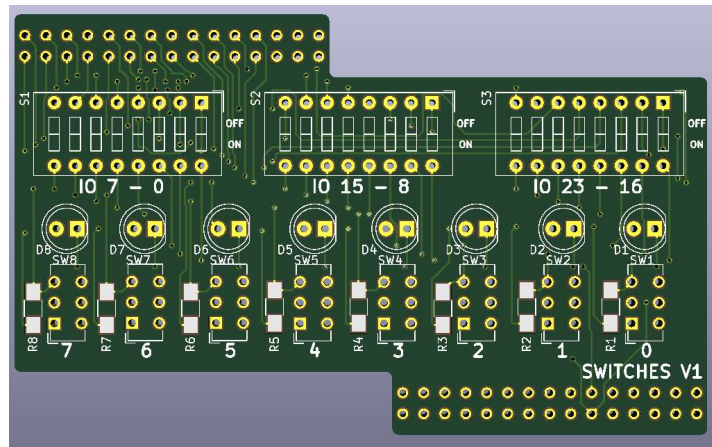


Figure 49 – Switches General Arrangement

## PURPOSE

To provide slide switches to a number of different I/O groups.

## SCHEMATIC DIAGRAM

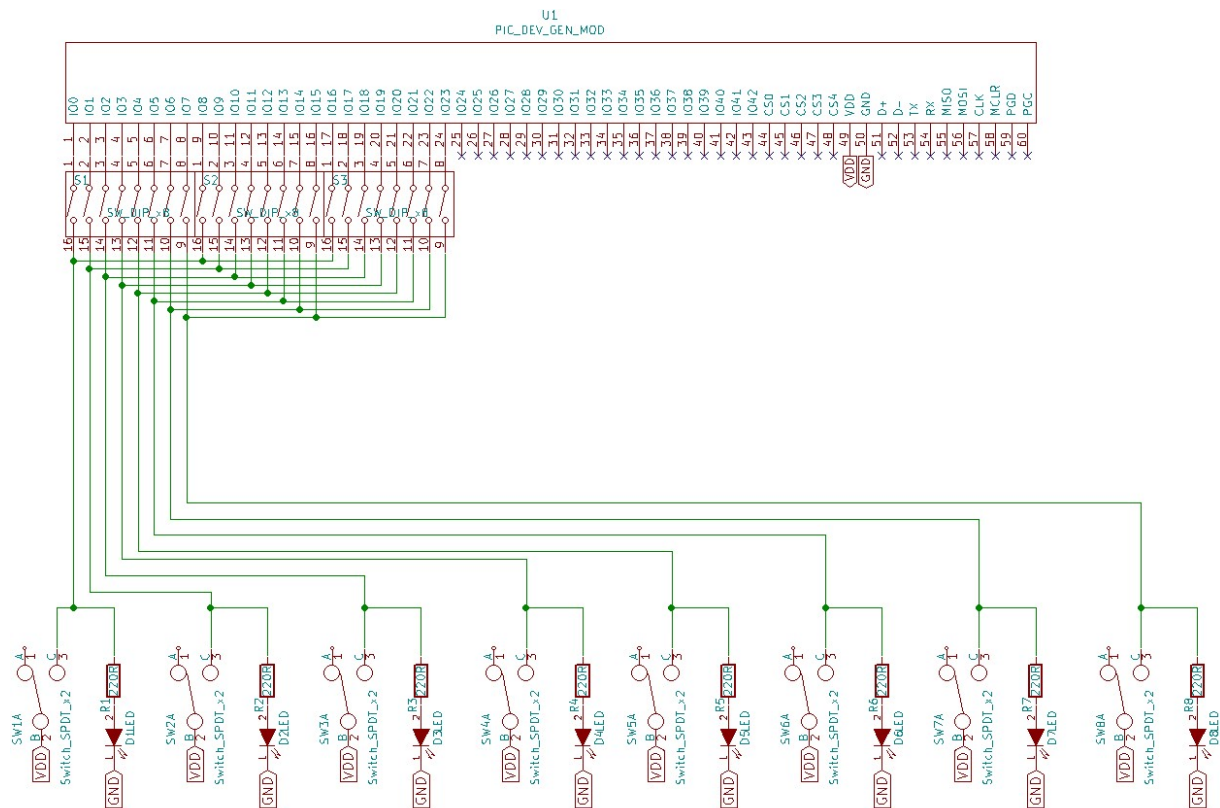


Figure 50 – Switches Schematic Diagram

