

PSCockpit

PSCOCKPIT BOARDS QUICK GUIDE

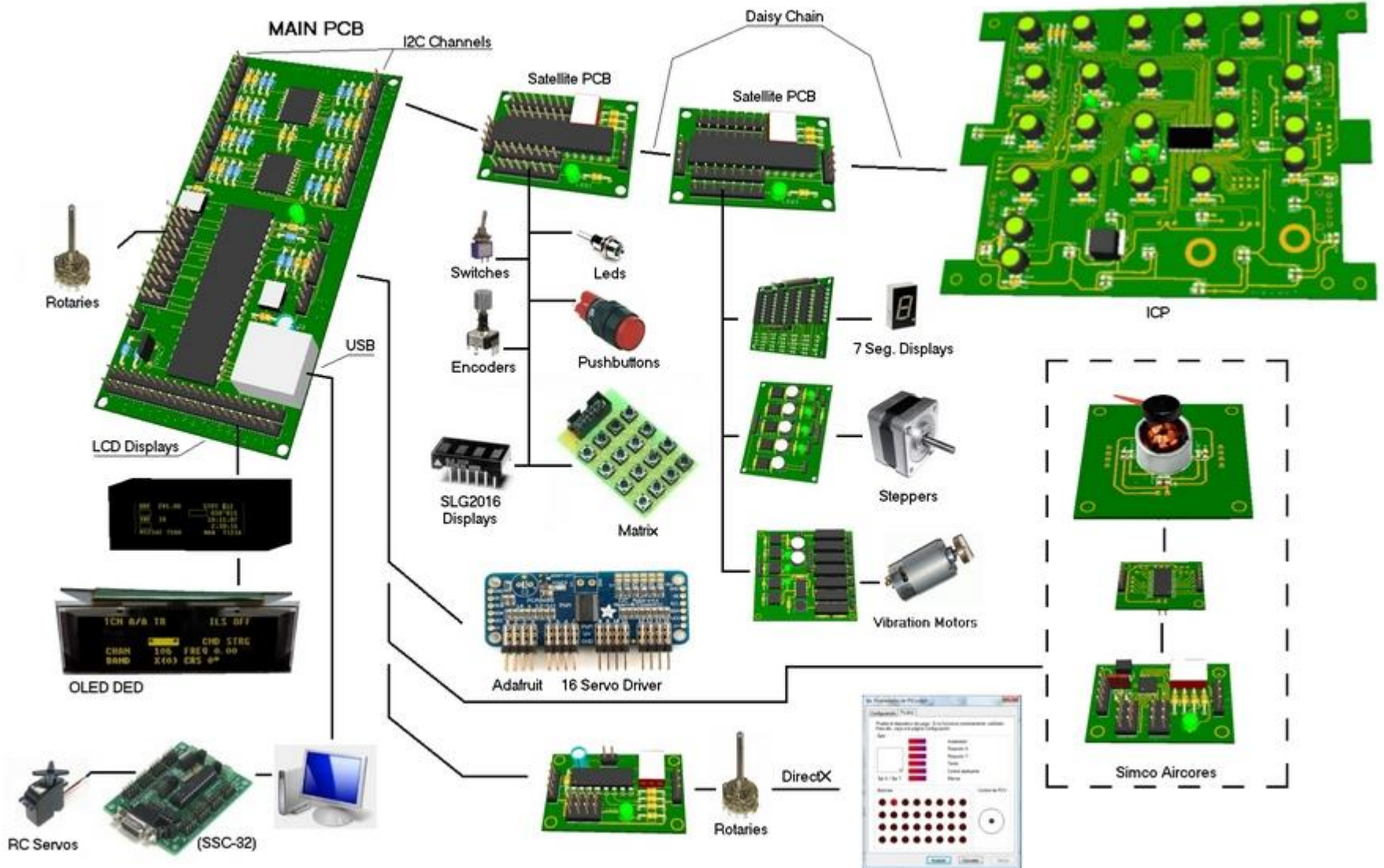
Version 3

CAUTION:

- Read this quick start guide completely before wiring and applying power to the boards! Errors in wiring can damage the Main PCB or any of the satellite PCB's.
- Observe precautions for handling electrostatic discharge sensitive devices
- Never reverse the power coming into the boards or power going out of the boards
- Never connect peripherals boards when the main board is powered on

By JShepherd

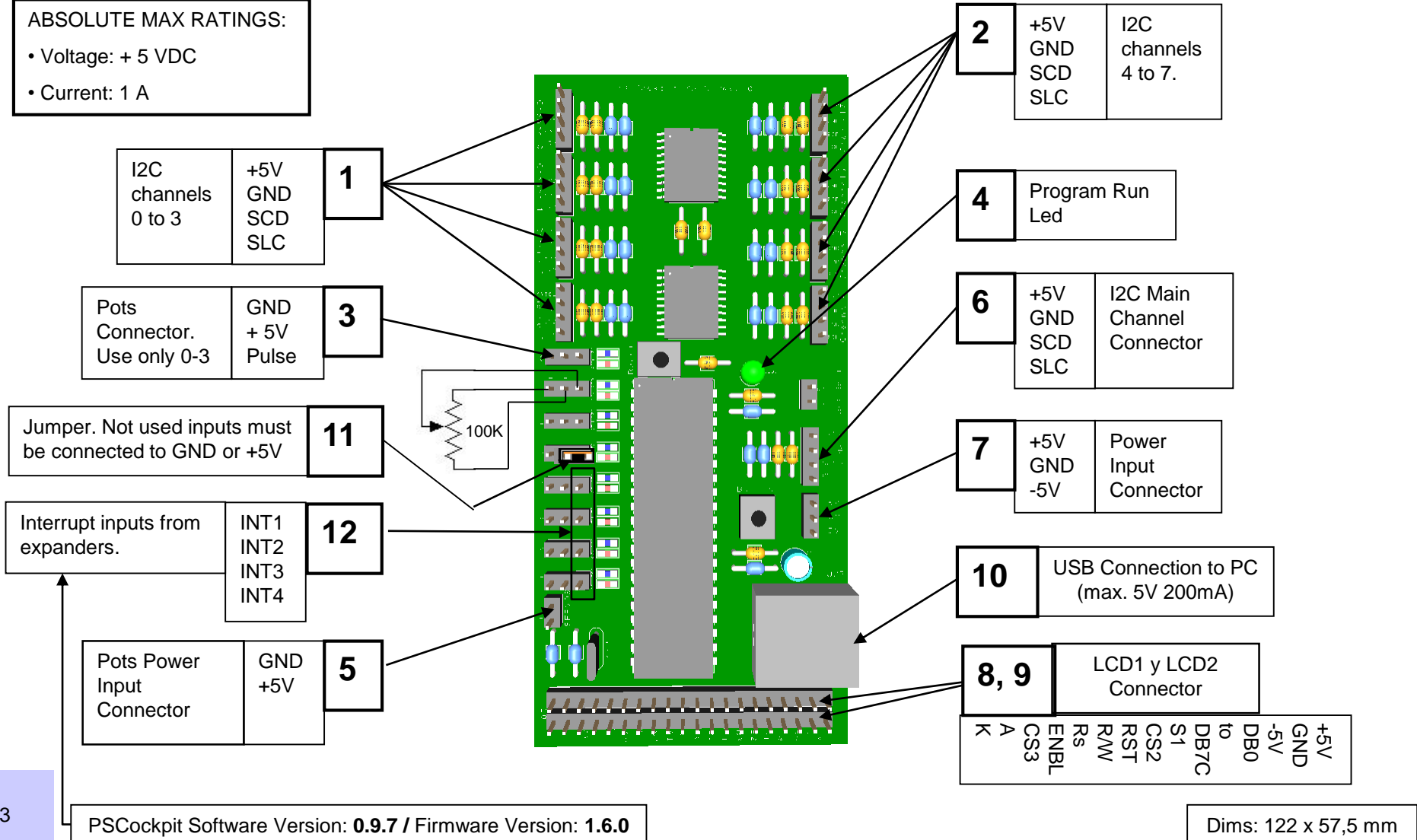
PS Cockpit System Overview



PS Cockpit Main Board 1/2

ABSOLUTE MAX RATINGS:

- Voltage: + 5 VDC
- Current: 1 A



PSCockpit Main Board 2/2



1, 2

These are the I2C channels where you can connect up to 8 satellite pcb's in daisy chain to each of the channel. The maximum sinking current from each I2C channel connector to its daisy chain is 1 A. If your daisy chain needs more than 1 A, you can supply power directly to any satellite pcb.

3

These are the connectors where you connect pots. Use caution and remove power when connecting. Only inputs 0 to 3 can be used for pots.

4

This is the "program run" led. It will light steady when the program is running and will blink whenever it is receiving data from the USB connector.

5

This terminal connects power to pots channels 0 to 3. Apply 5 VDC for 100K Ohm pots.

6

This is the I2C Main Channel. It is reserved for future use.

7

This is the Power Input connector. It provides power to the logic and also to the I2C channels. -5V is used for LCD backlight if needed. It is highly recommended to use PC type power supply. You can use one free connector from your PC internal power supply taking care that the total current (PC + PSCockpit elements) do not exceed the power supply capacity.

8, 9

These are the LCD1 and LCD2 connectors. You can use text or graphic LCD supporting parallel data transfer. Please refer to your LCD data sheet for correct connections.

10

This is the USB connection for the PC. Simply plug a USB cable from this plug to USB port of your PC. The firmware program of the microprocessor will begin once you have powered the logic (see 7) and you have established the communication between the PCB and the PC.

11

Analogue inputs for potentiometers not used must be connected to ground or +5V. Use a jumper between these pins to do so.

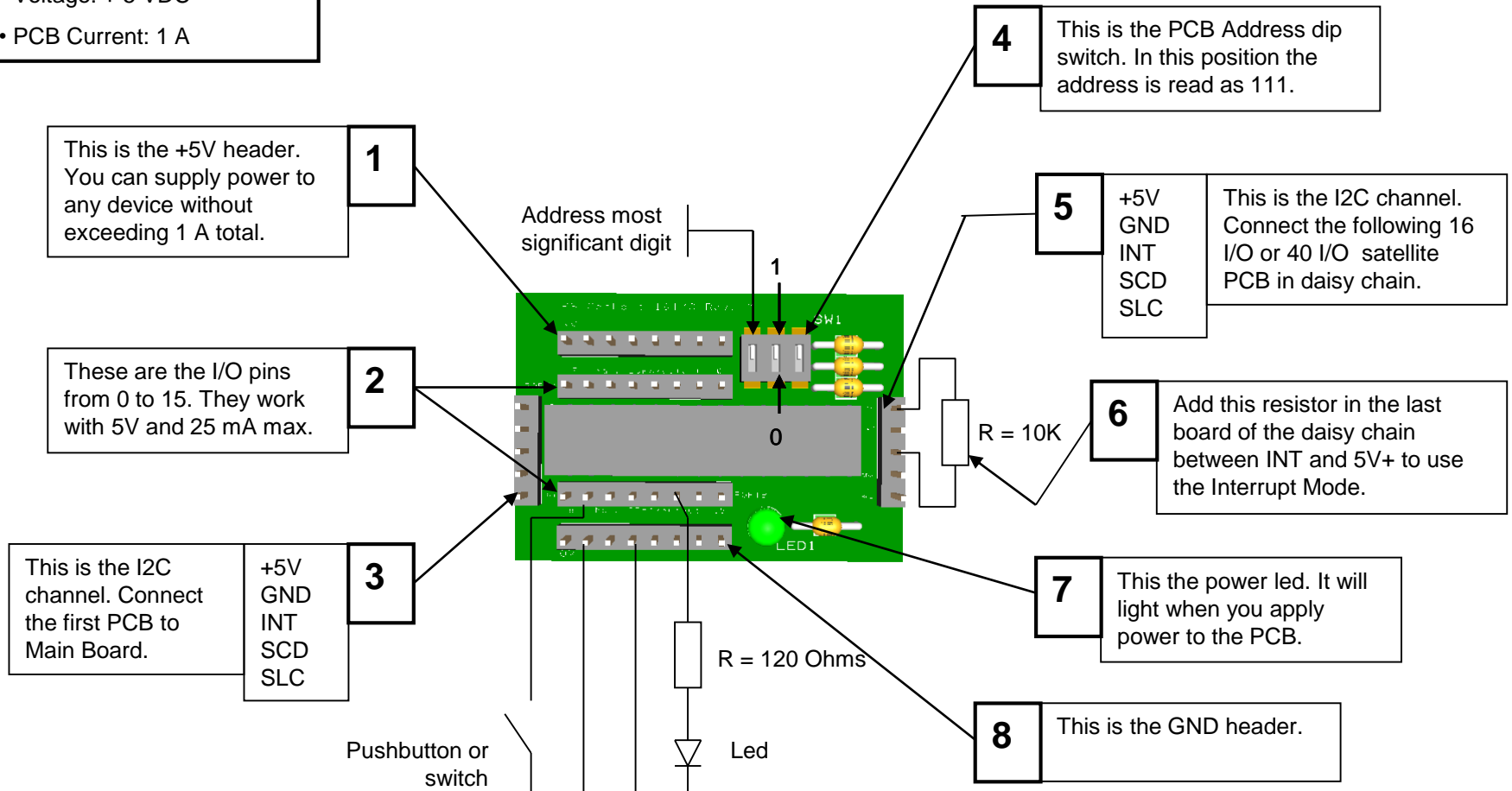
12

Interrupt inputs to connect the interrupt pin from the 16 or 40 I/O expanders. I2C channels 0 & 1 to INT1, channels 2 & 3 to INT2, channels 4 & 5 to INT3 and channels 6 & 7 to INT4. A 10K resistor should be added to the last expander of the daisy chain between INT and 5V+. See expanders pages.

16 DIGITAL I/O PCB

ABSOLUTE MAX RATINGS:

- Voltage: + 5 VDC
- PCB Current: 1 A



40 DIGITAL I/O PCB

ABSOLUTE MAX RATINGS:

- Voltage: + 5 VDC
- PCB Current: 1 A

1 This is the +5V header. You can supply power to any device without exceeding 1 A total.

2 These are the I/O pins from 0 to 39. They work with 5V and 15 mA max.

3 This is the power led. It will light when you apply power to the PCB.

4 This is the I2C channel. Connect the first PCB to Main Board.

+5V
GND
INT
SCD
SLC

Pushbutton or switch

R = 120 Ohms

Led

5

This is the PCB Address dip switch. In this position the address is read as 111.

6

+5V
GND
INT
SCD
SLC

This is the I2C channel. Connect the following 16 I/O or 40 I/O satellite PCB in daisy chain.

7

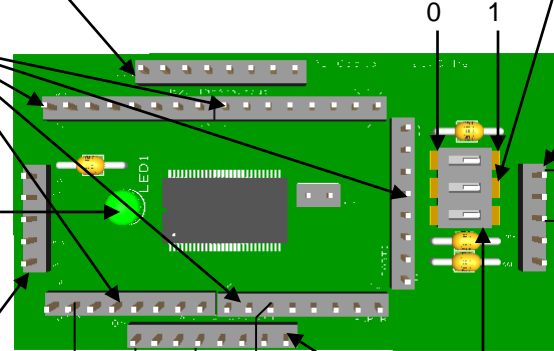
Add this resistor in the last board of the daisy chain between INT and 5V+ to use the Interrupt Mode.

R = 10K

Address most significant digit

8

This is the GND header.

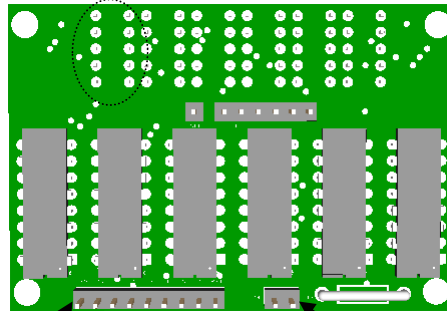


7 SEGMENT DISPLAYS PCB

ABSOLUTE MAX RATINGS:

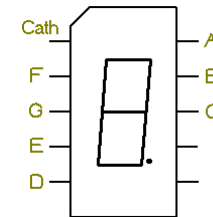
- Voltage: + 5 VDC

Bottom side of
the PCB



2

These are the sockets for 7 segment displays. They are designed to be used with the Avago HDSP-7803 (not included). You can use others doing the wiring as shown:



1

This is the power supply and displays command lines. Connect the DSP 1 to 6 and RST to 7 consecutive output pins of the 40 or 16 Digital IO PCB.

+5V
GND
DSP 1
To
DSP 6
RST

3

PWM
GND

This is the PWM connector. The PCB is supplied with a shunt to GND for full brightness. If you want to use a dimmer, remove the shunt and connect a PWM source to PWM pin. If you want to use the BIT Off remove the shunt and connect a POWER OFF bit output.

STEPPERS/OUTPUTS PCB

ABSOLUTE MAX RATINGS:

Steppers:

- Voltage: + 12 VDC
- 1 A

Outputs:

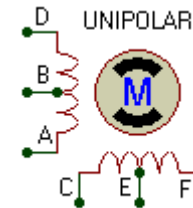
- Voltage: + 24 VDC
- 1 A

The pcb is supplied with jumpers in these connectors to be used with the stepper. If you want to use the outputs individually, remove the jumpers and connect the load as shown in the diagram.

3

A
F
C
D
B
E

This is the stepper connector. Only unipolar stepper motors can be used. Connect the stepper as shown:



This is the power supply and output command lines. Connect the OUT1 to 5 to 5 consecutive output pins of the 40 or 16 Digital IO PCB.

OUT1 to
OUT5
+5V
GND

1

This is the output connector. Connect the load as shown in the diagram.

L (load)
GND

2

NOTE

- When using two different power supplies for different voltages you must have the same ground by shorten together both grounds.

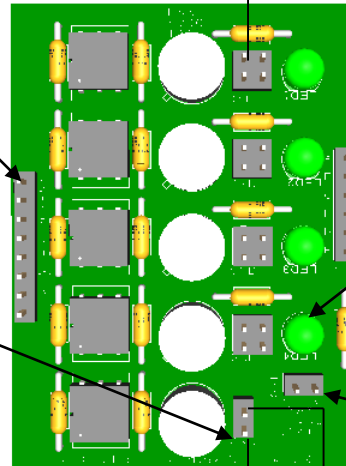
4

These are the LED output indicators. They will light whenever an output is activated. They work only with the stepper.

5

+
GND

This is the power supply connector for the stepper. Use it only for this purpose.



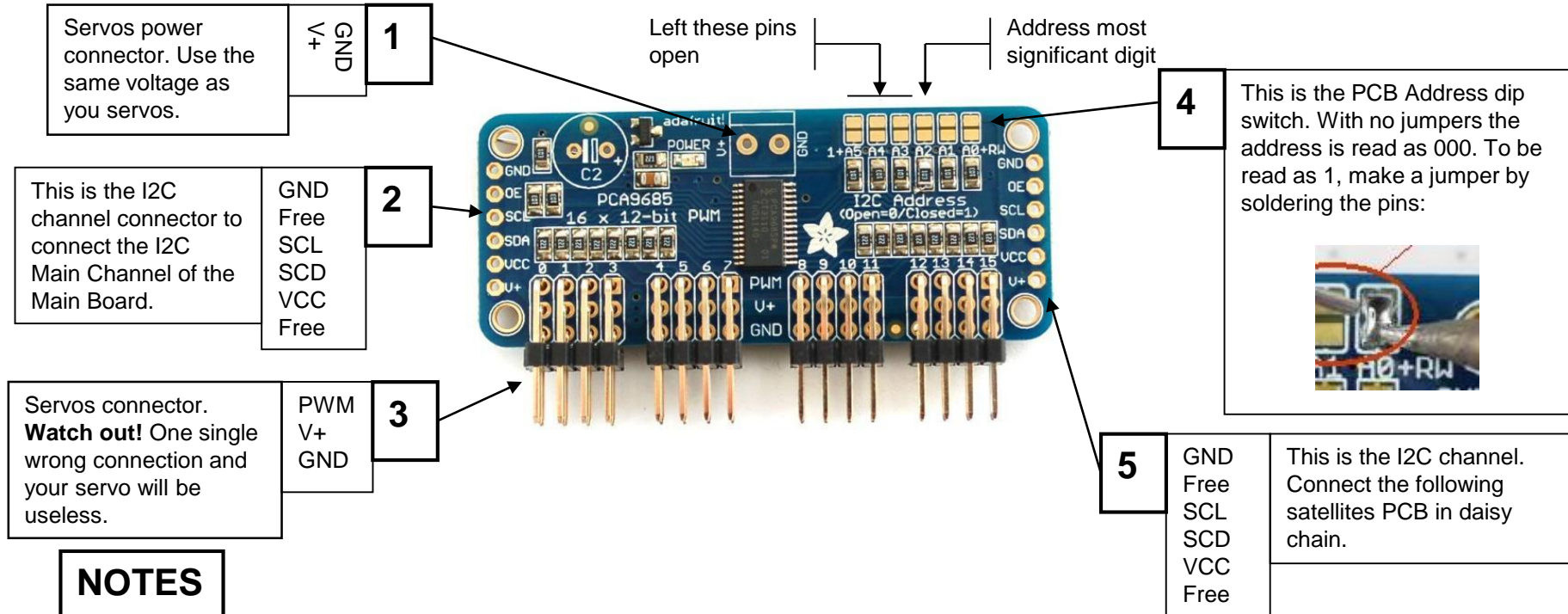
Load (1 A max)

24VDC Max.

Dims: 65 x 48 mm

PSCockpit Software Version: **All** / Firmware Version: **All**

ADAFRUIT 16 SERVOS PCB



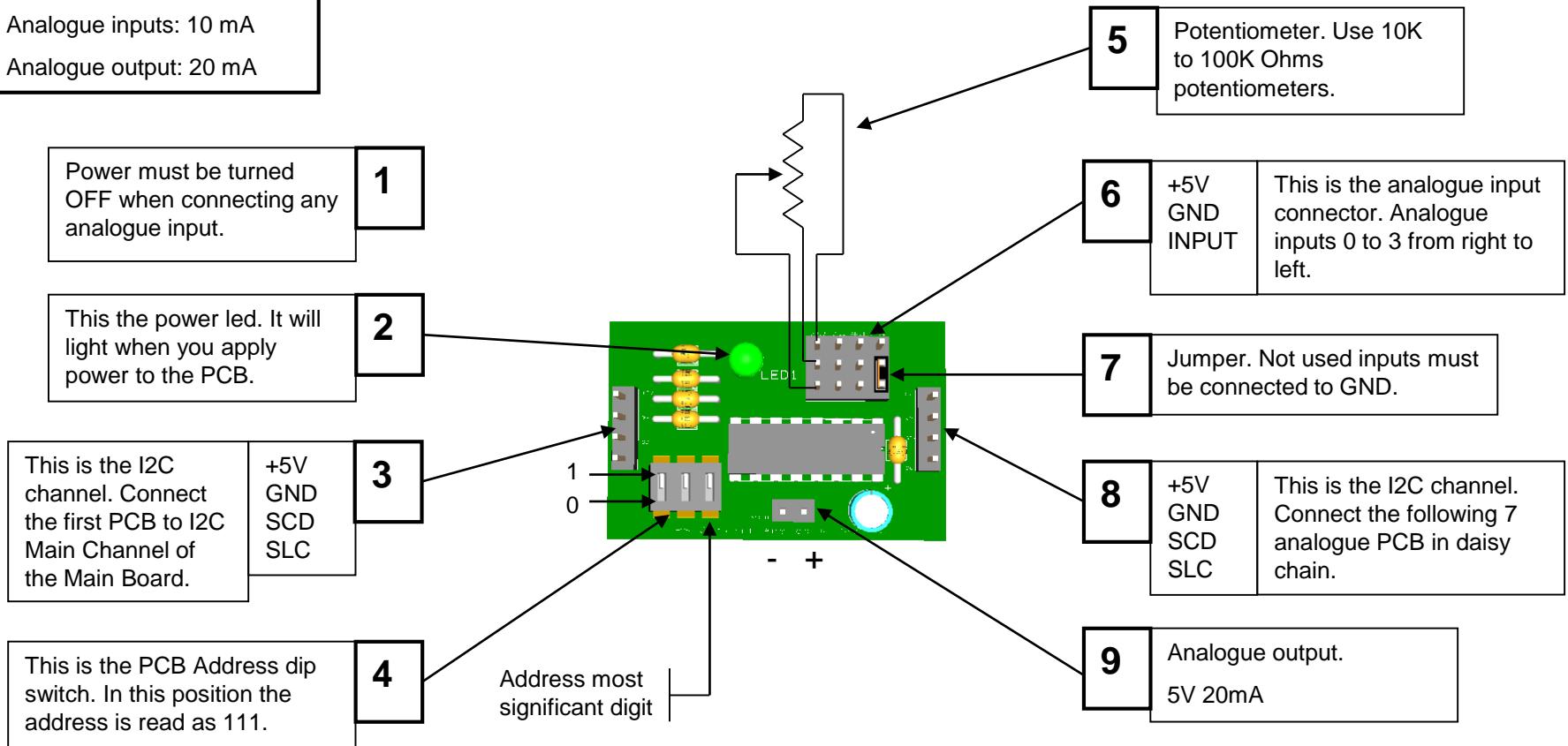
NOTES

- The Adafruit board is non compatible with the SSC-32 board for servos. Only one option can be used at once in the PSCockpit system.
- Only 2 Adafruit boards can be connected.
- Adafruit boards have to be connected only to the Main I2C Channel of the Main Board.
- The firmware of the Main Board has to be updated to version 1.4.0
- PSCockpit software must be version 0.9.6 or higher
- I2C address of the Adafruit board has to be selected with the 3 less significant digits, the other 3 must remain open.

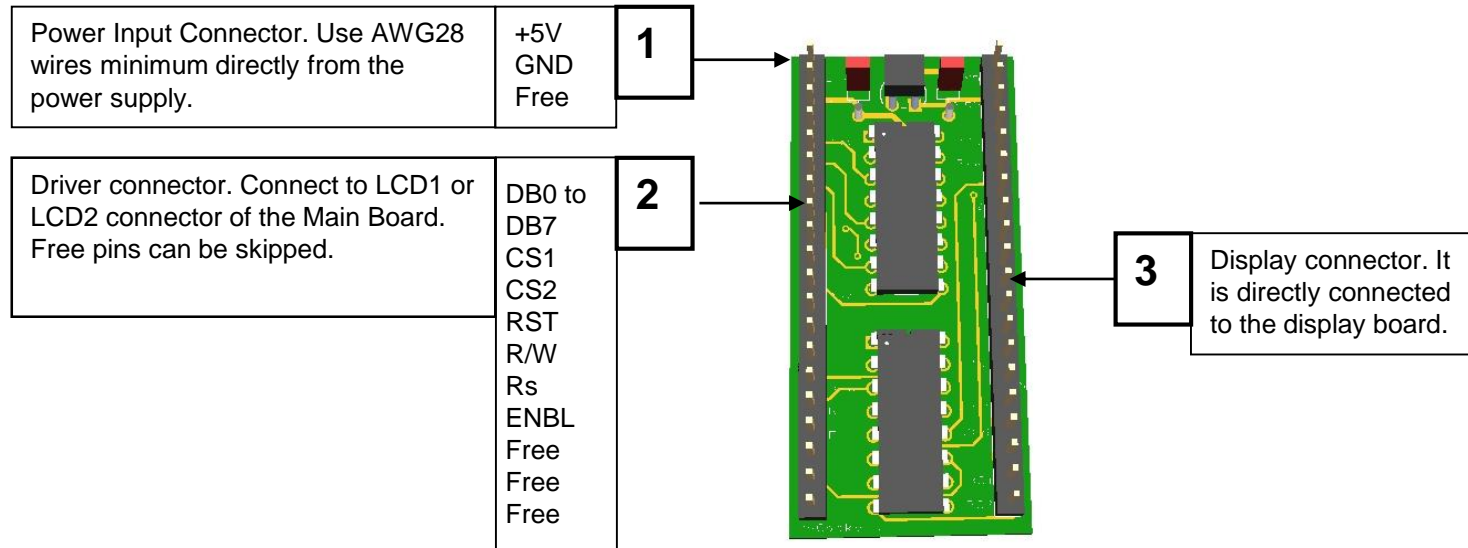
ANALOGUE PCB

ABSOLUTE MAX RATINGS:

- Voltage: + 5 VDC
- PCB Current: 1 A
- Analogue inputs: 10 mA
- Analogue output: 20 mA



OLED DISPLAY DRIVER PCB

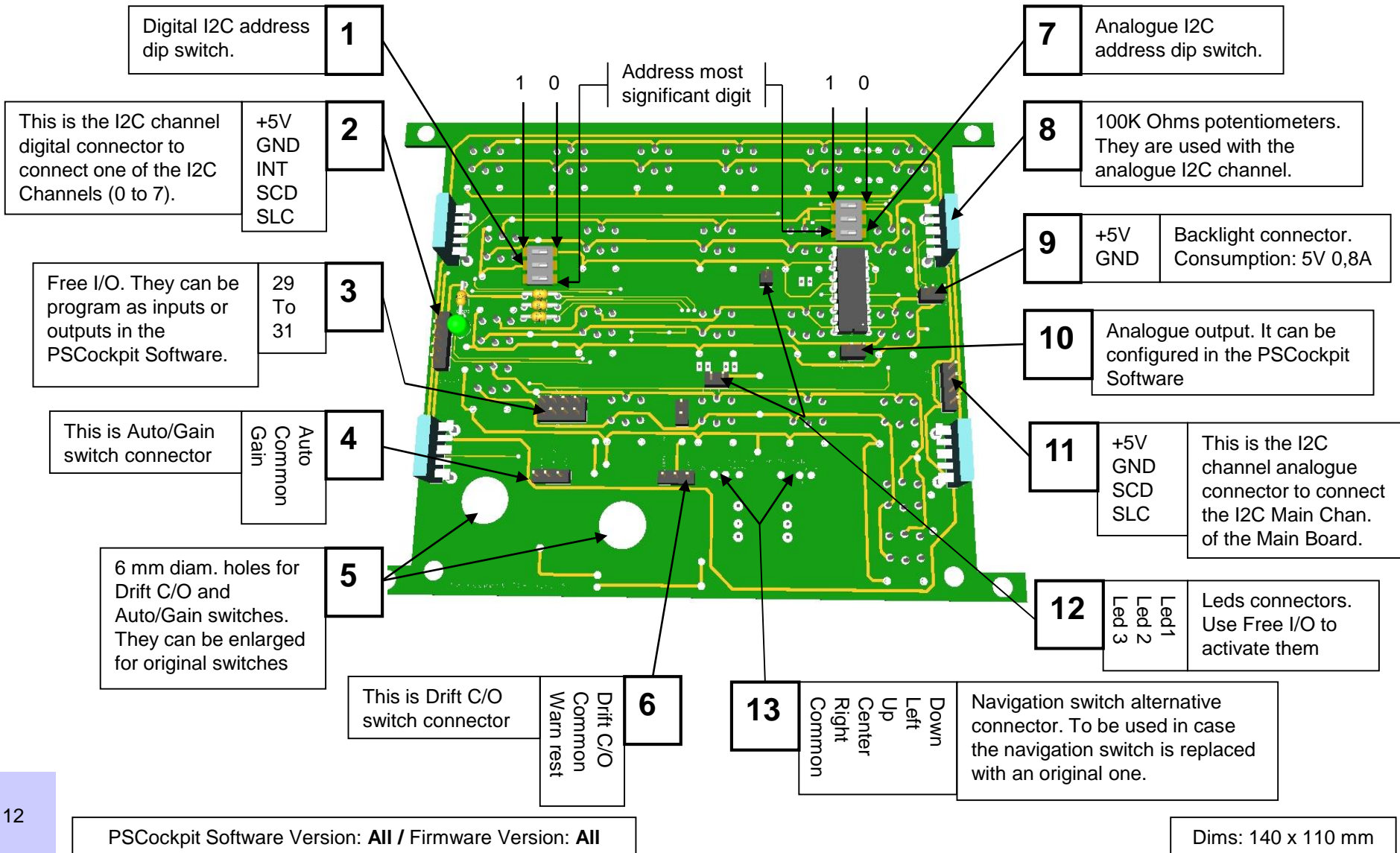


OLED DISPLAY TROUBLESHOOTING

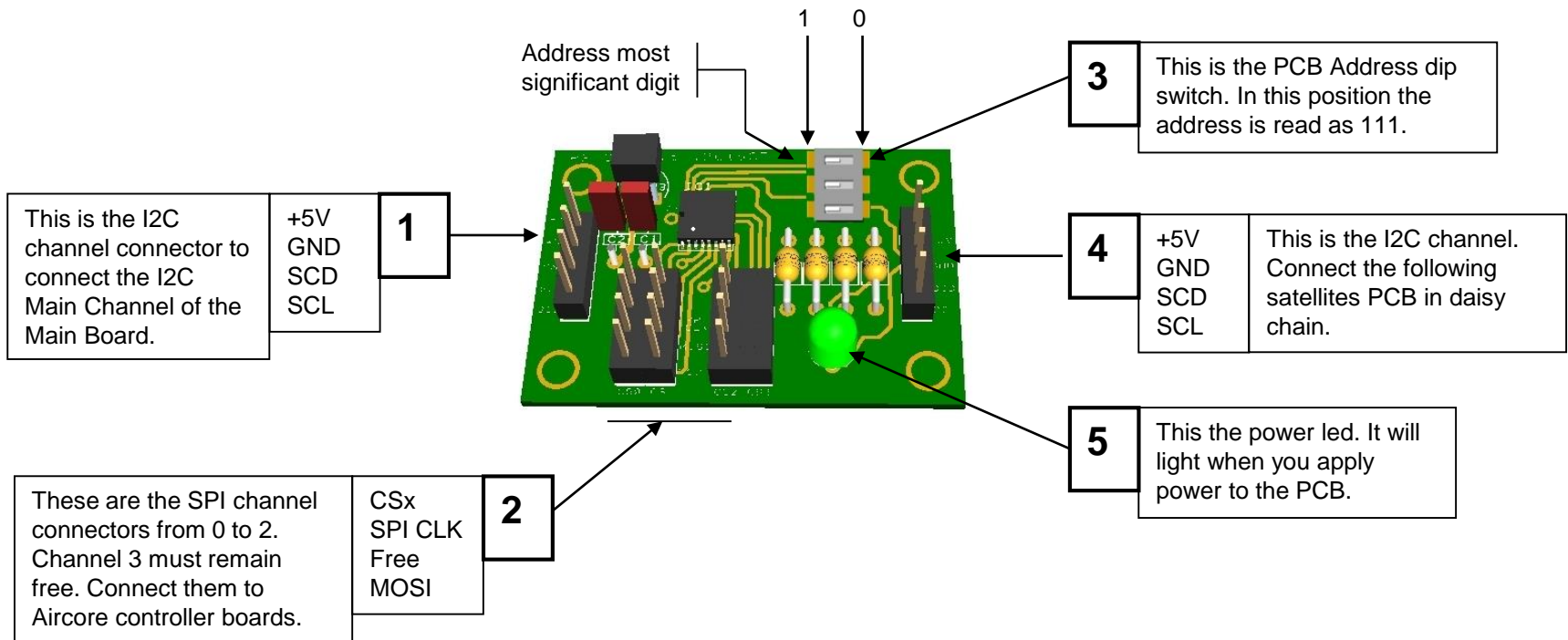
Some users have reported Oled Display faults as a result of a very sensitive hardware. This leads to miss configuration and a not working display. To avoid issues follow this recommendations:

- Be extremely careful while disconnecting the small connector between the display and its own board.
- Double check wirings and cable continuity.
- Use Main Board firmware version 1.5.1 or higher
- Check your power supply for a stable +5 VDC and 0,5 A.
- Connect only used pins from DB0 to ENBL (14 wires).
- Wait 10-20 seconds from powering the Main Board and the OLED Display before entering PSCockpit for configuration.

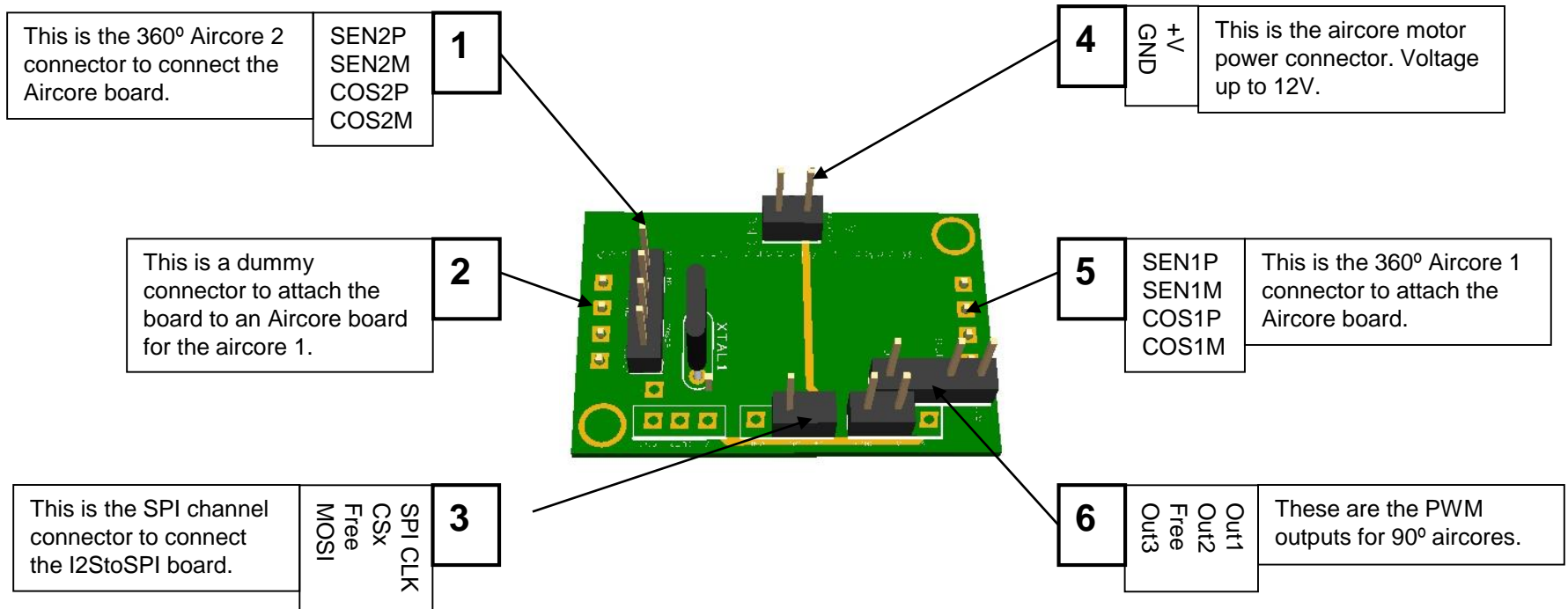
ICP PCB



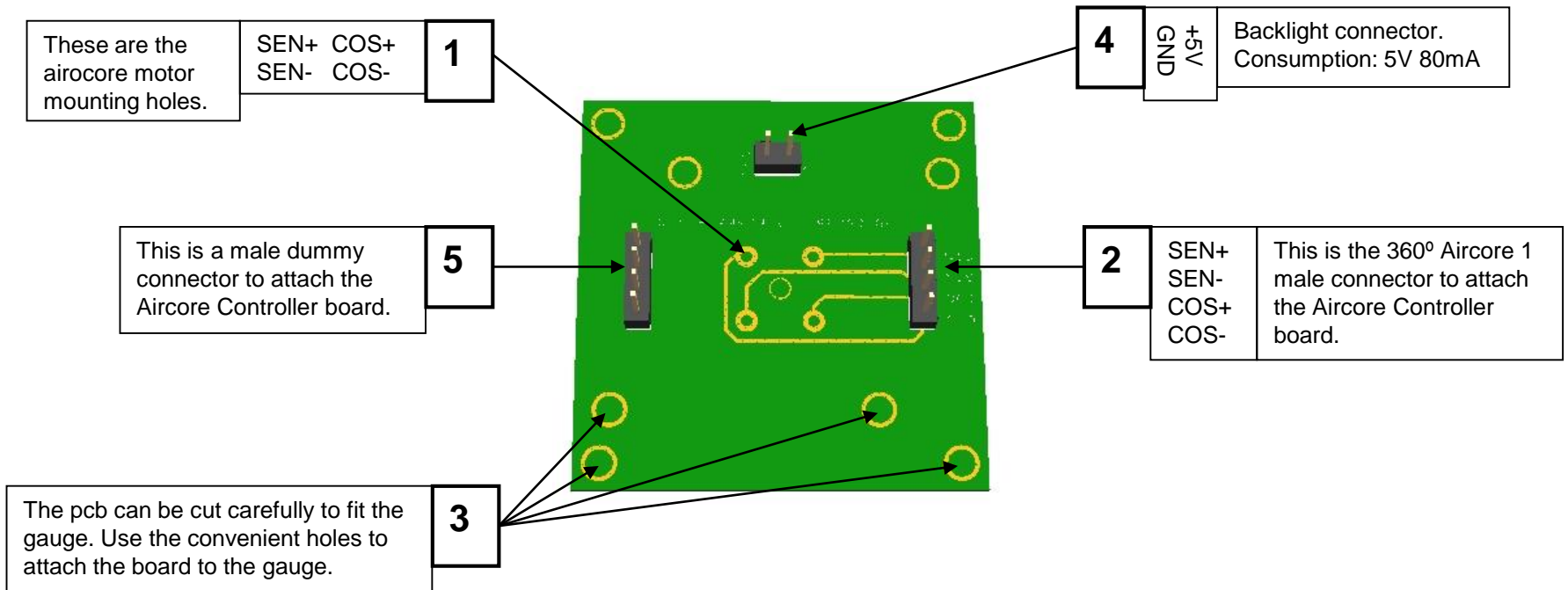
I2CtoSPI PCB



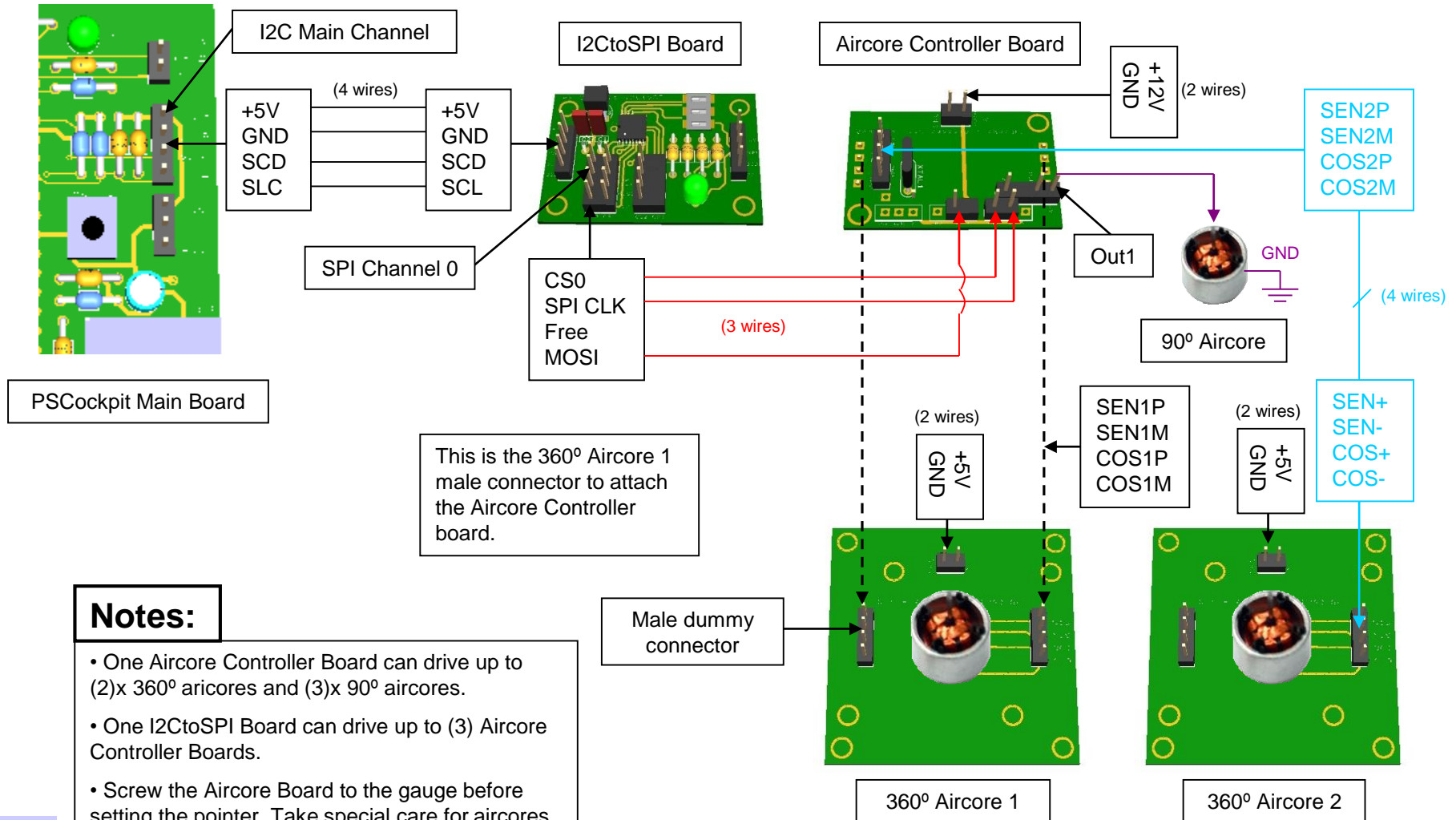
AIRCORE CONTROLLER PCB



AIRCORE PCB



SIMCO 2022-705 AIRCORE CONNECTION EXAMPLE



VIBRATION MOTORS PCB

ABSOLUTE MAX RATINGS:

+ 18 VDC, 1A

This is the connector to supply power to the vibration motors. Use the same voltage than the vibration motors. Maximum voltage is 18V. When using 5V only 2 speeds will be noticed.

V+
V-

1

These are the digital inputs to control the speed of the vibration motors. Connect 5 outputs coming from the 16 or 40 I/O board.

ON
0 1
2 3

2

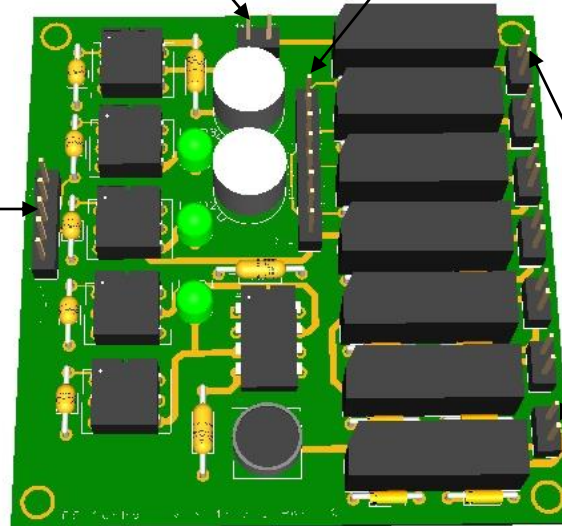
3

1 to 7
GND

These are the digital inputs to activate each one of the 7 vibration motors. Connect 7 outputs and GND coming from the 16 or 40 I/O board.

4

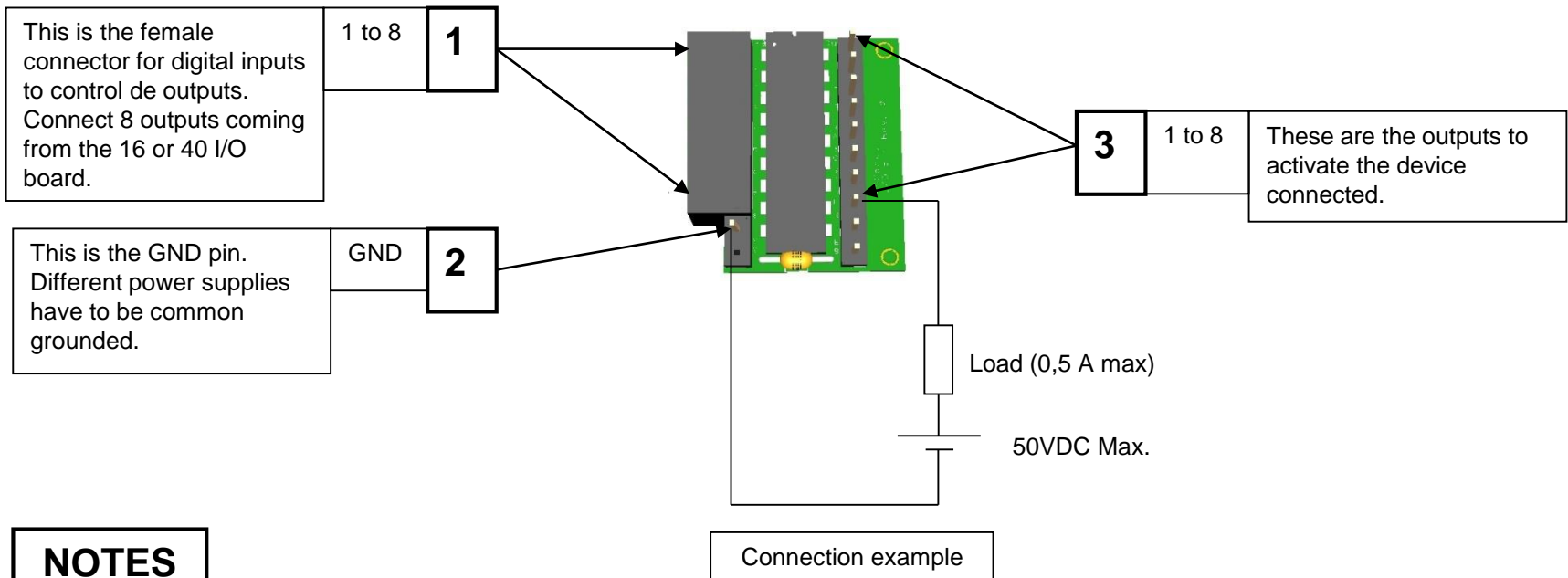
These are the connectors for the vibration motors. Polarity doesn't matter.



OUTPUTS ENHANCEMENT PCB

ABSOLUTE MAX RATINGS:

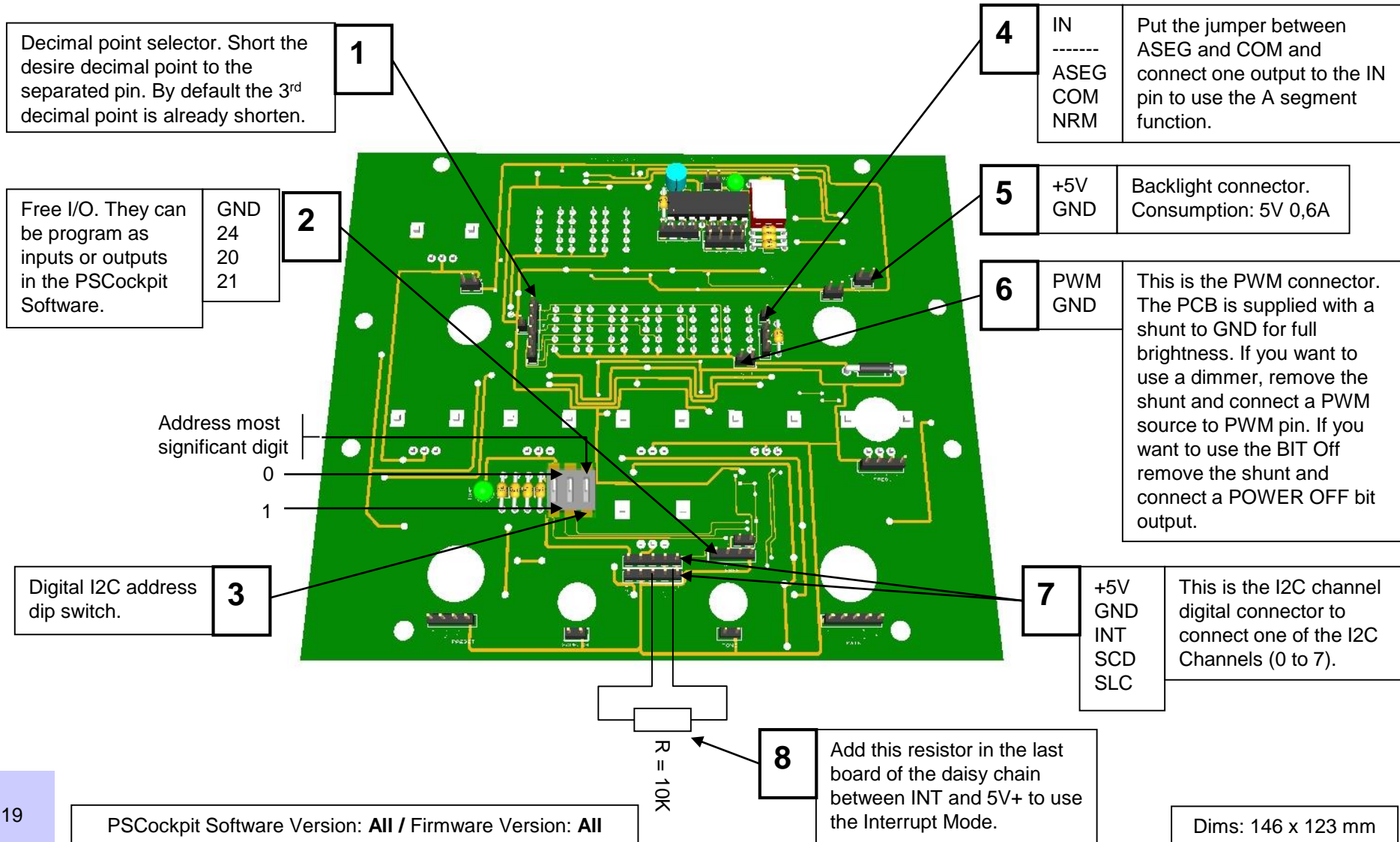
+ 50 VDC, 0,5A



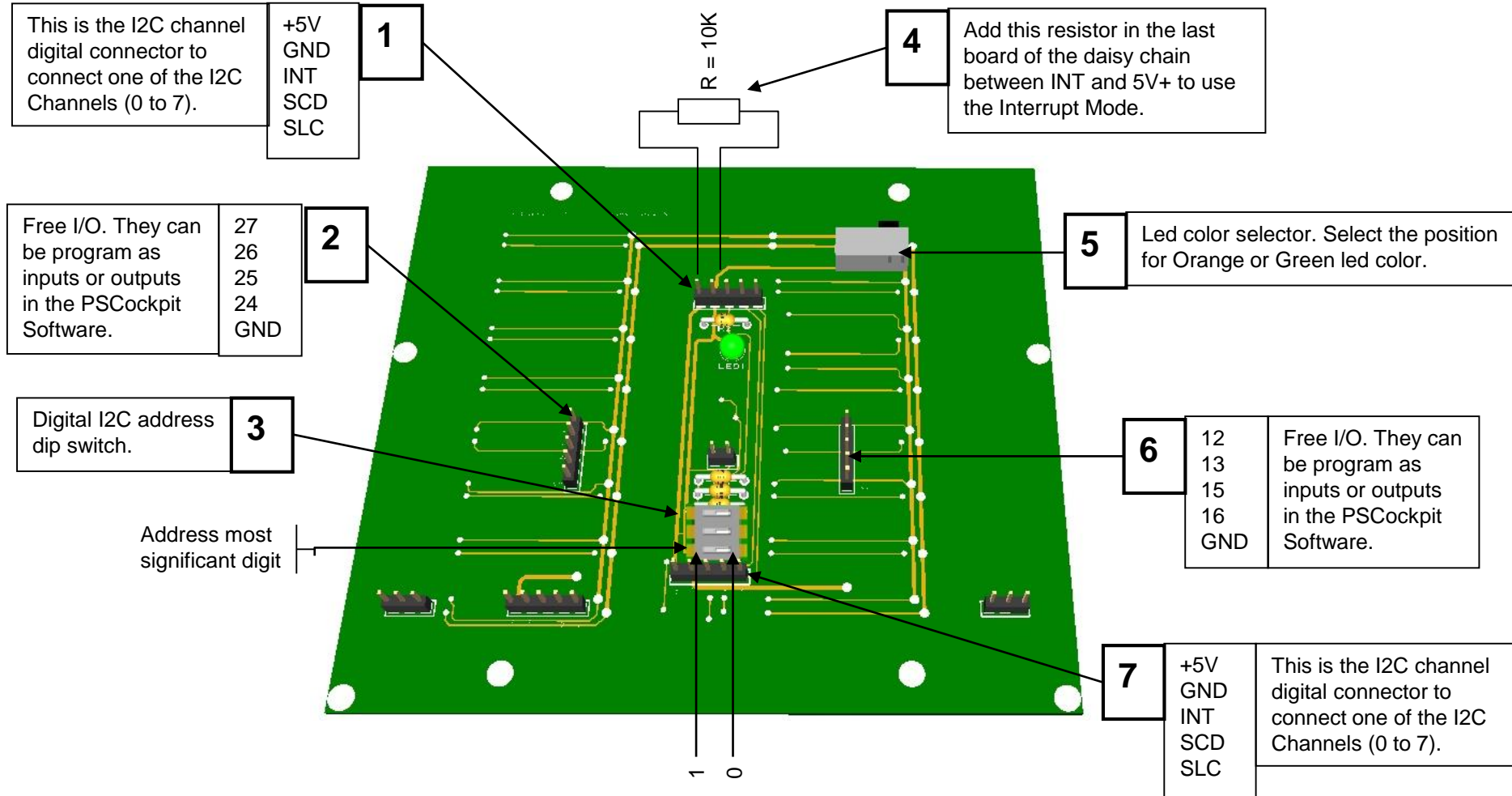
NOTES

- The I/O Enhancement board can be easily integrated with the 16 I/O and 40 I/O boards by plugging the female connector to 8 consecutive I/Os. The I/Os where the board is plugged have to be programmed as outputs in the IOLayout page of the PSCockpit software.
- When using two different power supplies for different voltages you must have the same ground by shorten together both grounds.

UHF PCB

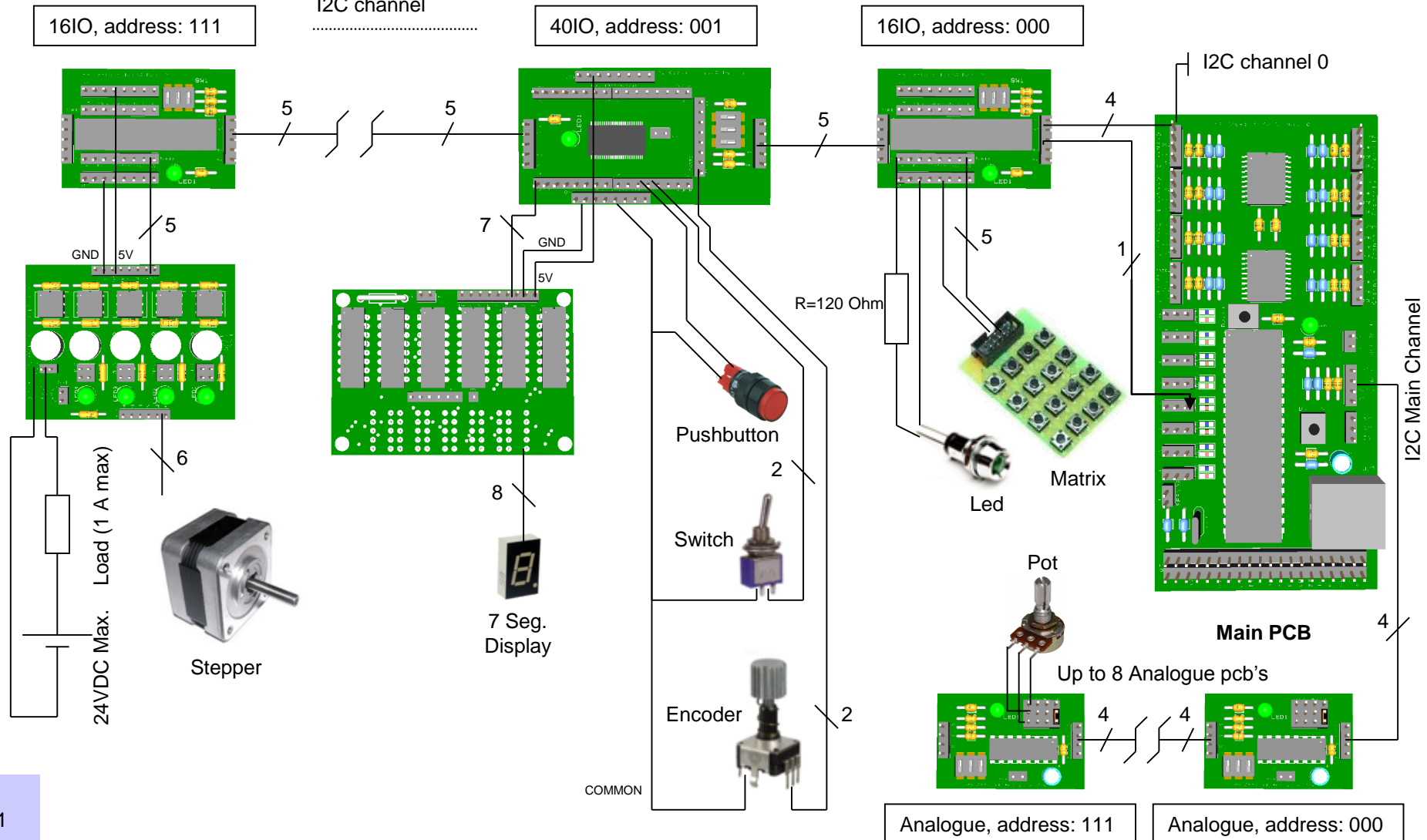


CAUTION PANEL PCB

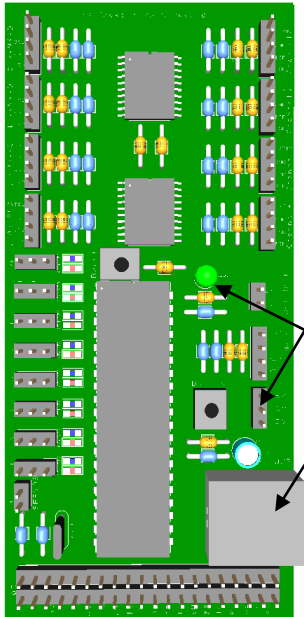


Example of Daisy Chain on I2C Channel 0


Up to 8 pcb's per
I2C channel



STEP 1: Connecting Main Board to a PC



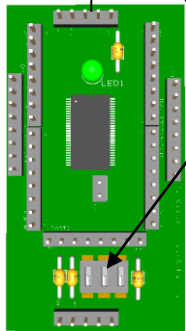
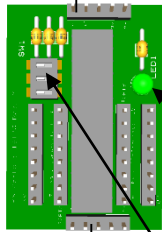
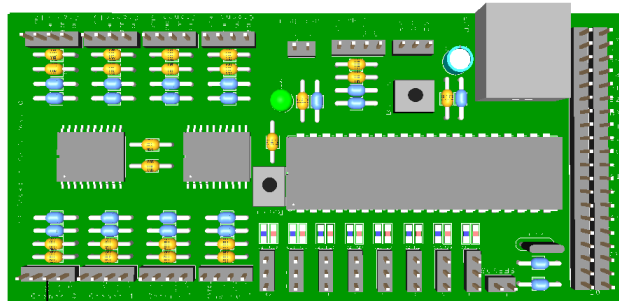
- 1 Connect 5VDC power to Main Board
- 2 Connect USB connector to PC
- 3 After a while the Program Run Led will light.
- 4 Run PSCockpit Software. The USB signal should be ON



The screenshot shows the PSCockpit Console window. The 'General Settings' tab is active. The 'Sim' dropdown is set to 'Falcon AF'. The following options are checked: 'This is the Cockpit PC', 'Enable Serial Servos SSC-32', 'Enable vibration', 'Enable Overhead Projector Movement', 'Enable LCD File', 'Enable TN Vest', 'Enable Seat Belt Tensor', and 'Minimize to System Tray'. At the bottom, there are 'OFF' and 'STOP' buttons.

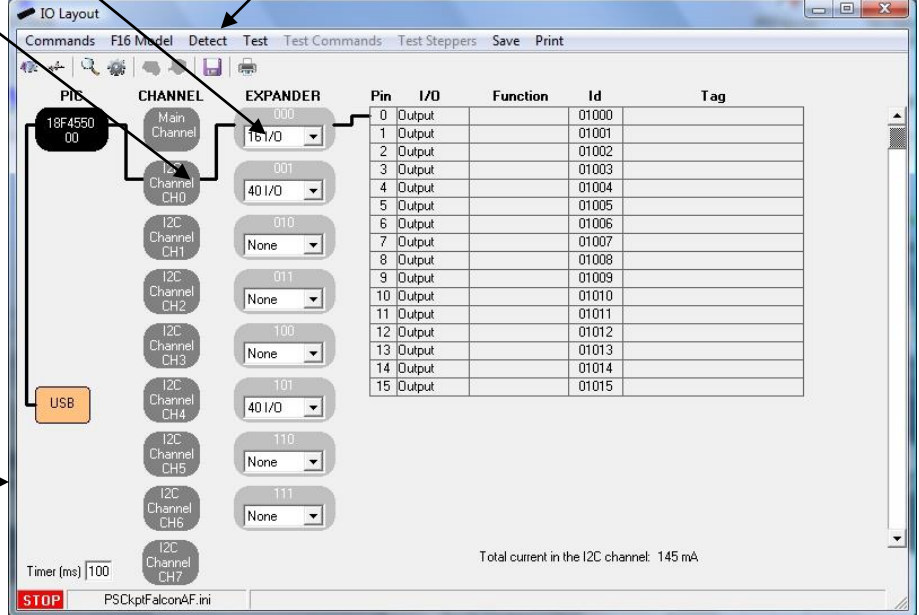


STEP 2: Connecting Expanders to Main Board



- 1 Connect Channel 0 of the Main Board to the first expander with 4 wires.
- 2 The green led will light
- 3 Add consecutively more expanders in daisy chain.
- 4 Select the address of the expanders. They must be unique in each I2C channel. See pages 5&6, item 4.
- 5 Run PSCockpit Software. Go to Config / Device Layout page

- 6 Select I2C Channel 0 by clicking on it. Now you are viewing all the expanders of that channel
- 7 Select the correct expander from the dropdown list in the addresses of your expanders
- 8 Click "Detect". The detected expanders will appear in pink.



Pin	I/O	Function	Id	Tag
0	Output		01000	
1	Output		01001	
2	Output		01002	
3	Output		01003	
4	Output		01004	
5	Output		01005	
6	Output		01006	
7	Output		01007	
8	Output		01008	
9	Output		01009	
10	Output		01010	
11	Output		01011	
12	Output		01012	
13	Output		01013	
14	Output		01014	
15	Output		01015	

Timer (ms) 100
Total current in the I2C channel: 145 mA
STOP PSCockpitFalconAF.ini



STEP 3: Connecting Digital I/O's

1

Connect leds and switches as shown. **Limit led current with a 120 Ohm resistor.**

