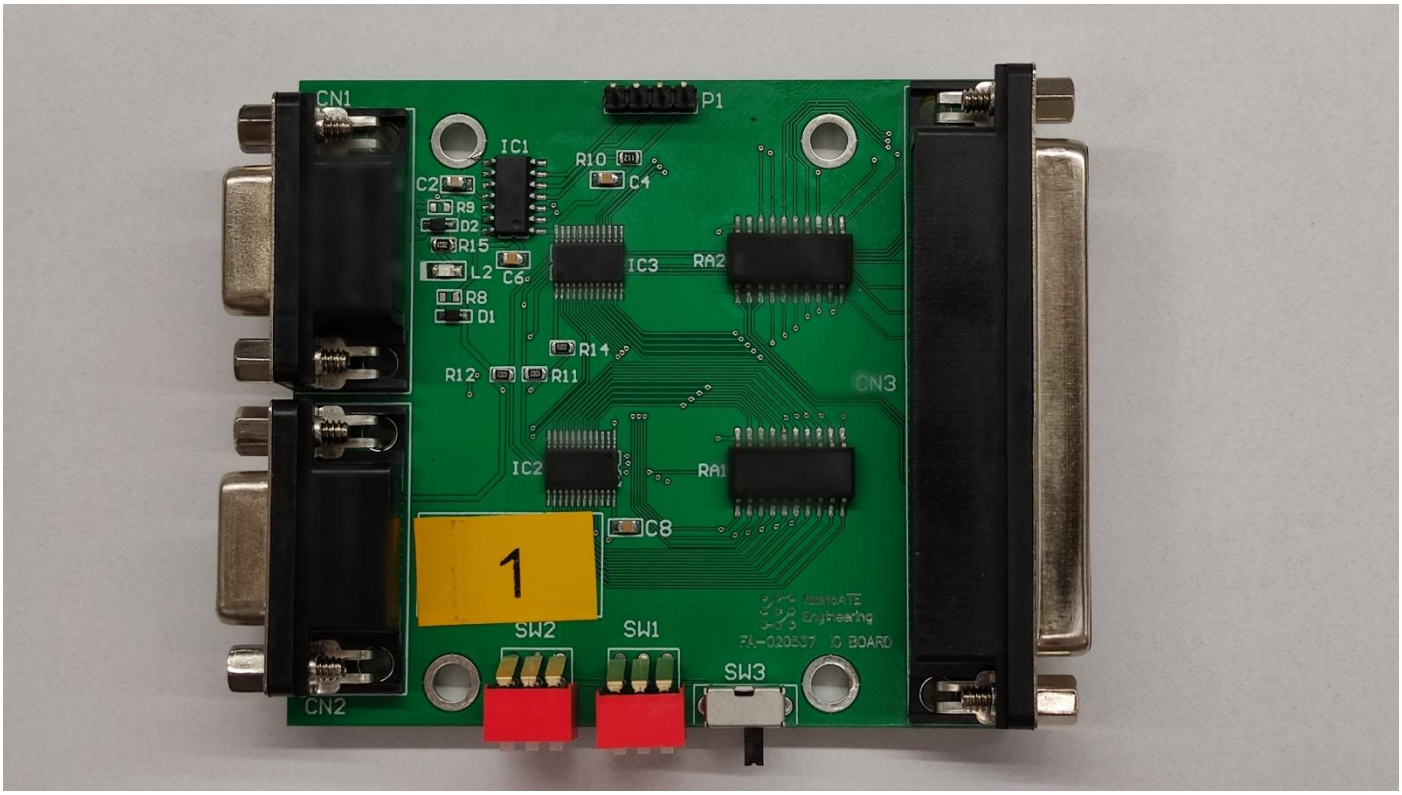
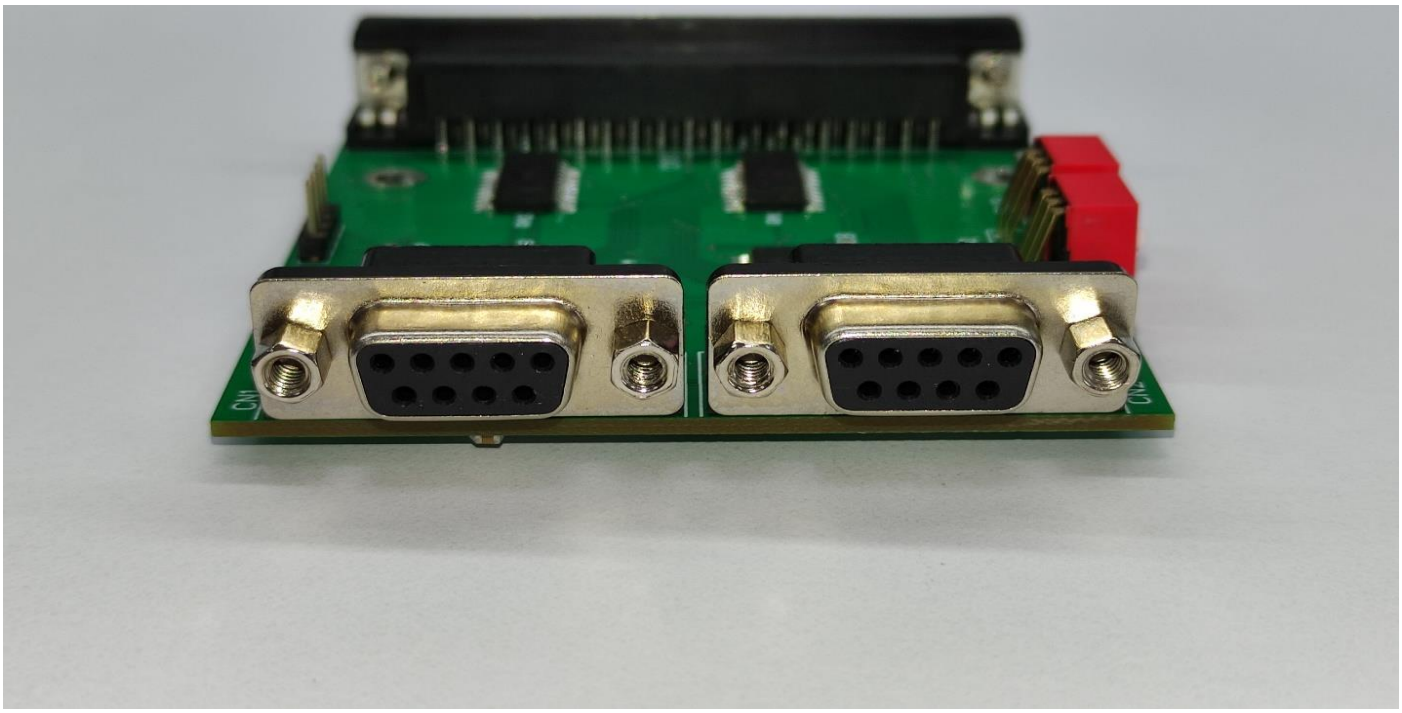
ANALOG CARDS **IO BOARD**





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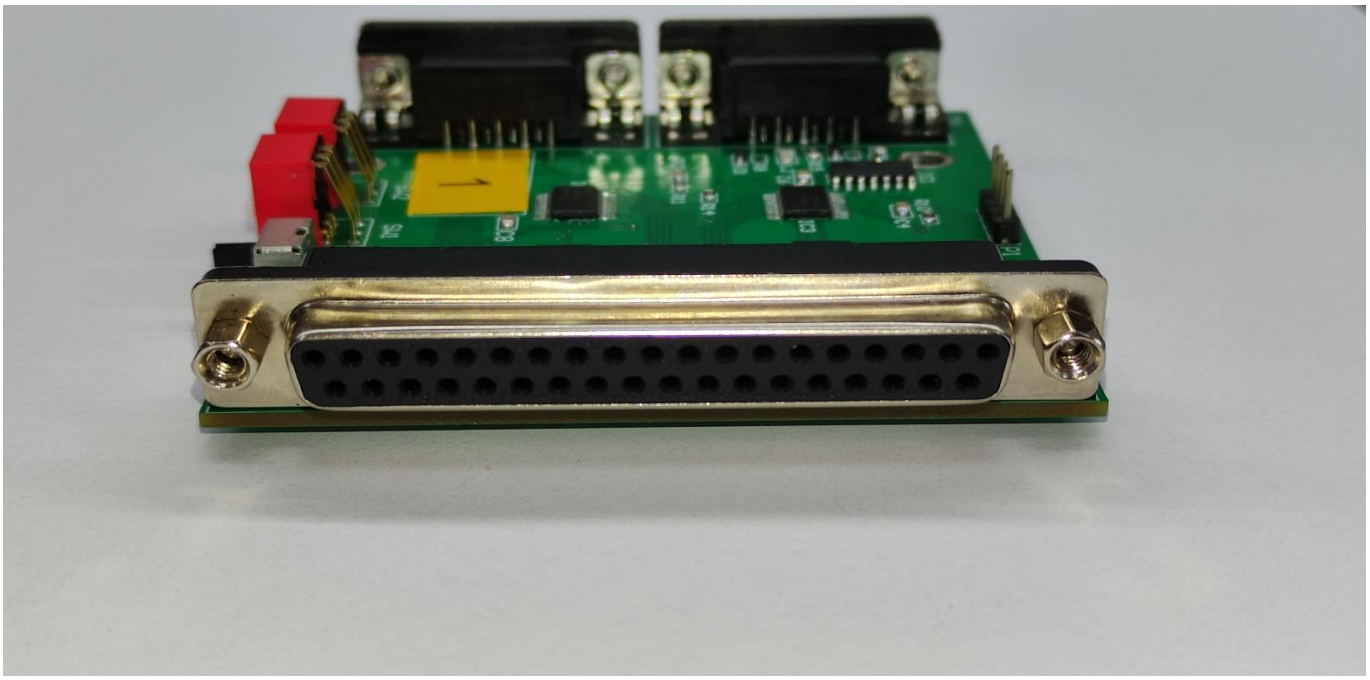

CONNECTORS

- CN1 9 Pin D-sub Connector(Control&Communication)
- CN2 9 Pin D-sub Connector(Communication)
- CN3 37 Pin D-sub Connector(Output)
- **KEY FEATURES**
- USB 2.0 Full Speed Interface
- 400 kHz I2C-bus serial interface(compliant with I2C-bus standart mode 100kHz)
- Supports up to 8 boards
- 3-5.5V DC bias input
- 16 selectable slave adresses for each ICs
- 32 or 35 I/O pins, control connector dependent
- User configurable 10kΩ pull-up/pull-down for I/O pins
- 0-5V output voltage**APPLICATIONS**
- Multi-voltage environments
- Battery operated mobile gadgets
- Motherboards
- Servers RAID systems
- Industrial control
- Instrumentation and test measurement
- PLCS
- **GENERAL DESCRIPTION**

FA-020537 I/O expander is a board that allows 32(or 35) GPIO pins to be controlled from a single port by USB or D-SUB connector.

Communication with FA-020537 can be done via I2C or USB.

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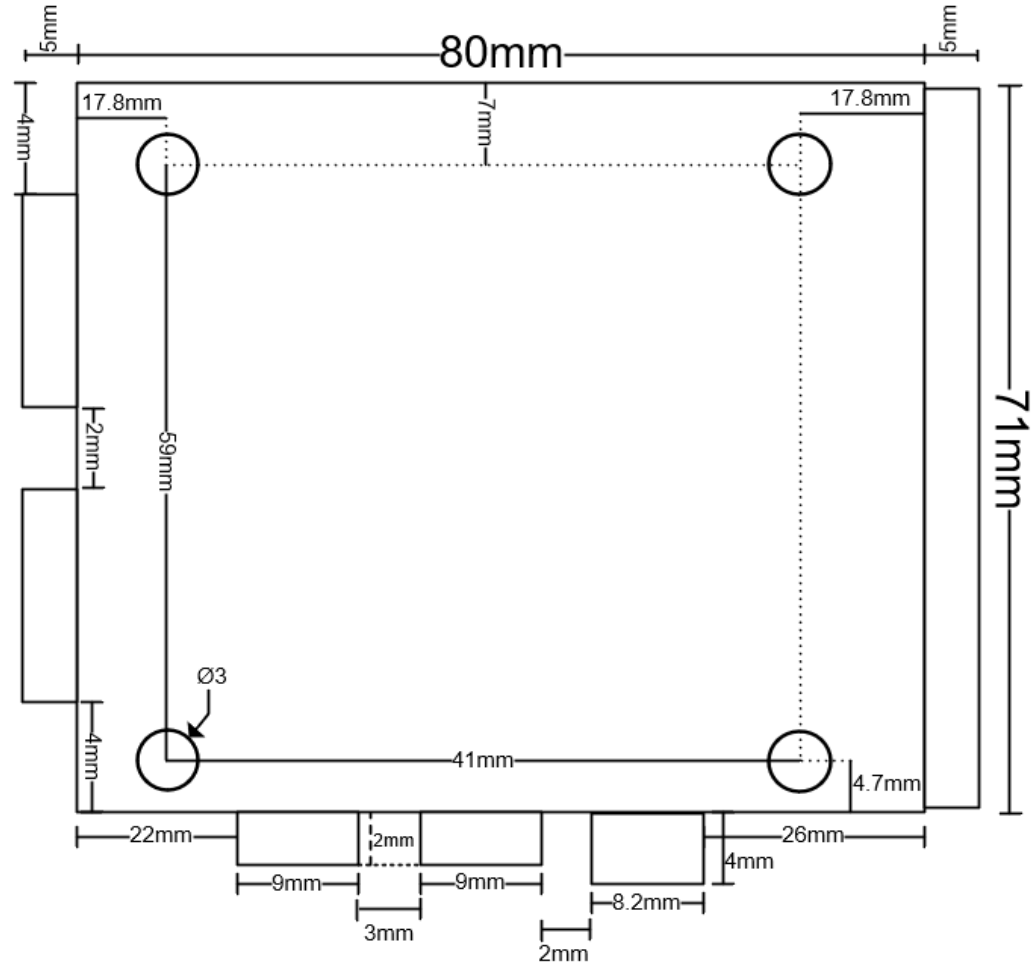
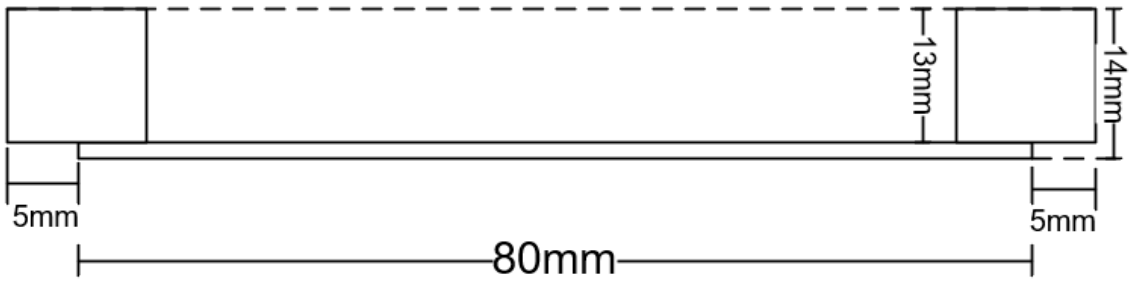
LAYOUT





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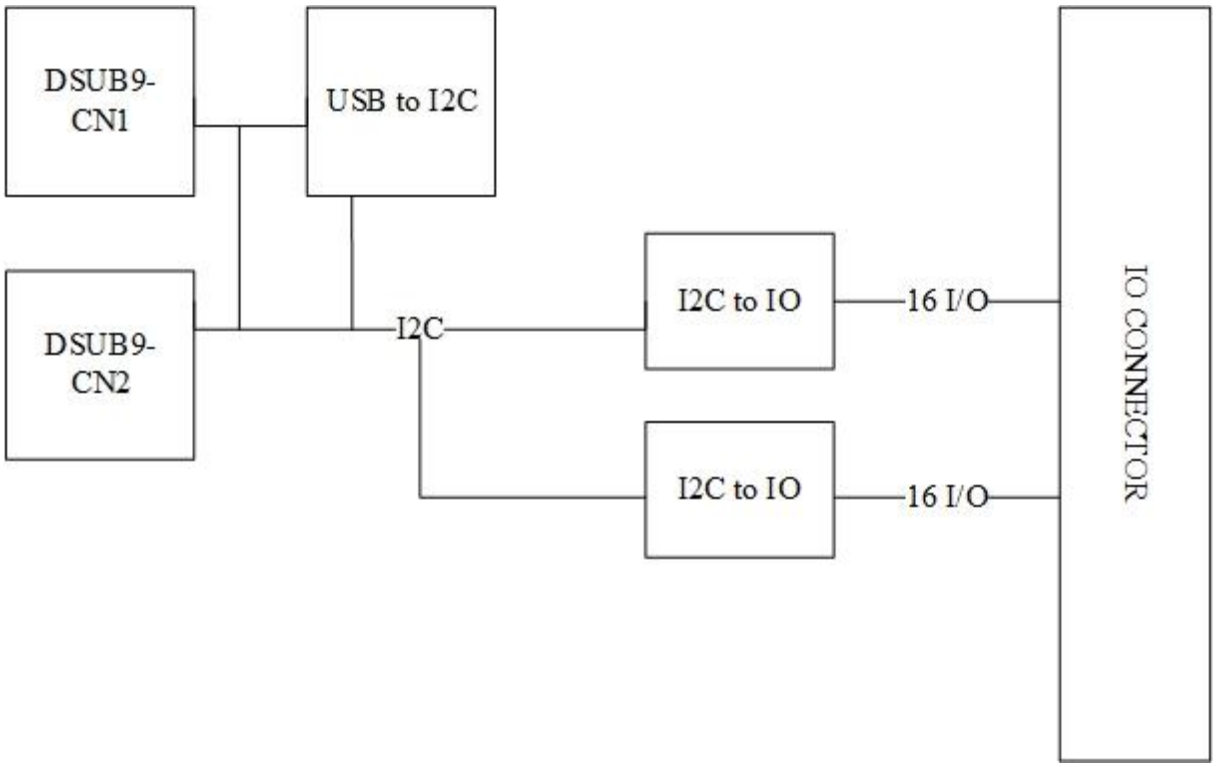
BLOCK DIAGRAM



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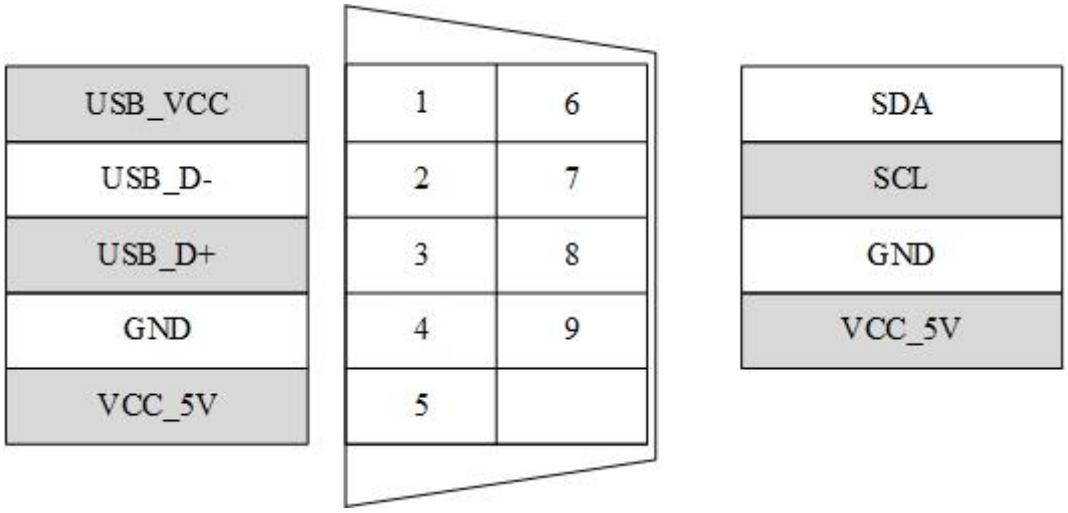
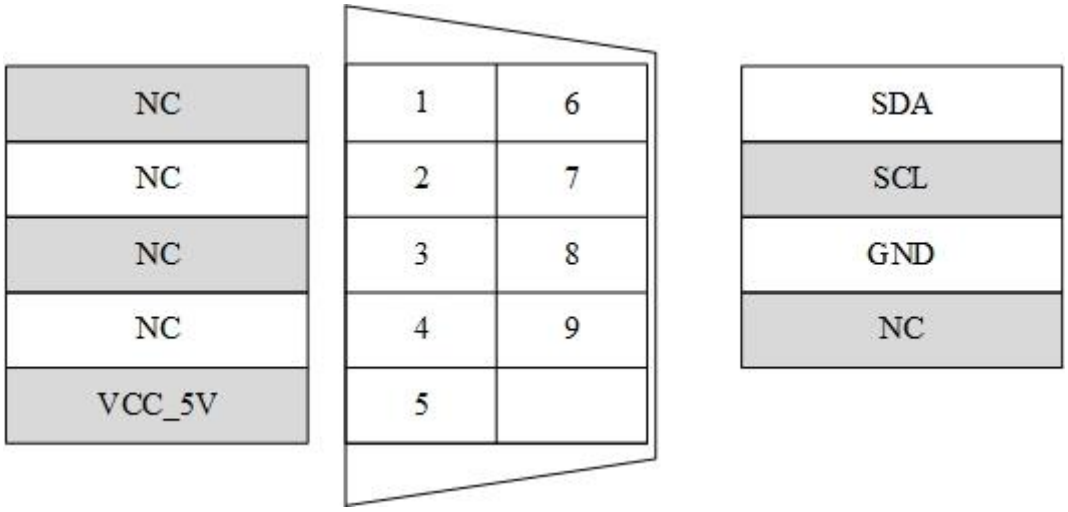
PINOUTS AND BOARD CONNECTIONS

1. **Control Pinouts**



CN1



CN2

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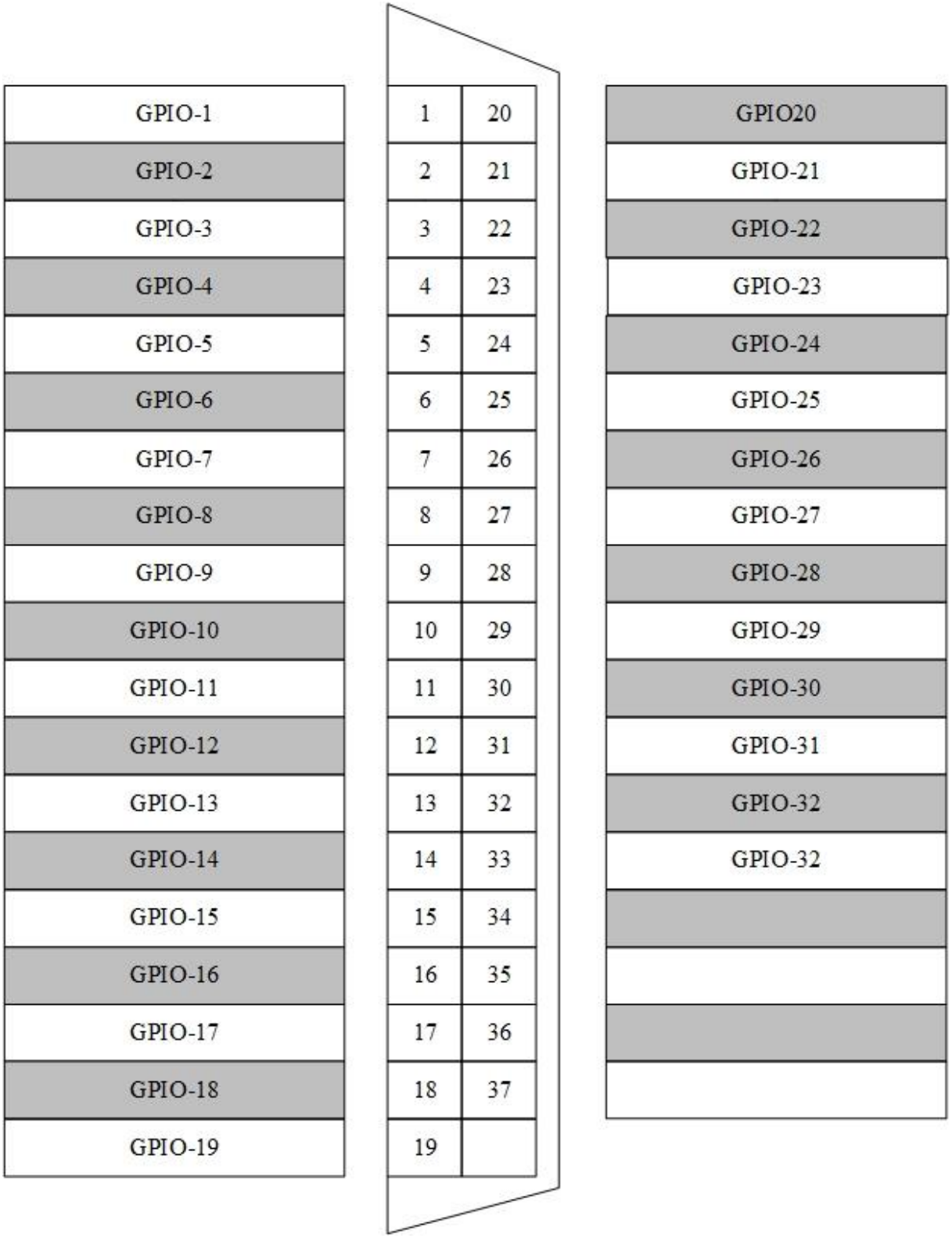
2. Output Pinouts



GPIO-1	1	20	GPIO20
GPIO-2	2	21	GPIO-21
GPIO-3	3	22	GPIO-22
GPIO-4	4	23	GPIO-23
GPIO-5	5	24	GPIO-24
GPIO-6	6	25	GPIO-25
GPIO-7	7	26	GPIO-26
GPIO-8	8	27	GPIO-27
GPIO-9	9	28	GPIO-28
GPIO-10	10	29	GPIO-29
GPIO-11	11	30	GPIO-30
GPIO-12	12	31	GPIO-31
GPIO-13	13	32	GPIO-32
GPIO-14	14	33	GPIO-32
GPIO-15	15	34	
GPIO-16	16	35	
GPIO-17	17	36	
GPIO-18	18	37	
GPIO-19	19		

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IO Protection

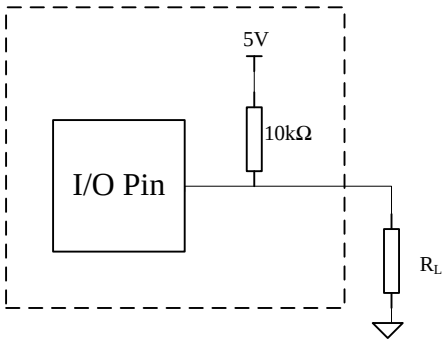
You should avoid ESD events and overvoltage, undervoltage, and overcurrent fault conditions by following guidelines.

1. If you configure a GPIO pin as an output, do not connect it to any external signal source, ground signal, or power supply.
2. If you configure a GPIO line as an output, understand the current requirements of the load connected to these signals. Do not exceed the specified current output limits of the FA-020537 device.
3. If you configure a GPIO line as an input, do not drive the line with voltages outside of its normal operating range.
4. Treat the FA-020537 device as you would treat any static sensitive device. Always properly ground yourself and the equipment when handling the FA-020537 device or connecting to it.

IO Pull-up / Pull-Down Resistor

FA-020537 device has user configurable I/O pull-up and I/O pull down resistors. Each IO channel is connected to an 10k resistor that can be pulled down or pulled up via slide switch on the board. This switch pulls all I/O lines up or down.

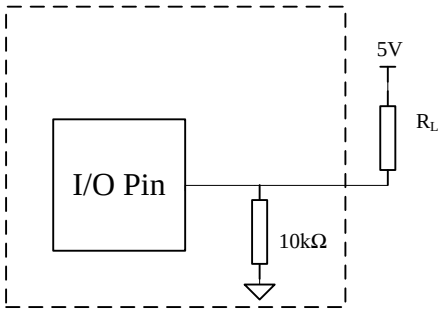
High State



If you select high on slide switch I/O lines will be pulled-up. In case of pulling a specific I/O line to low, you have to use a resistor(R_L) externally.

The maximum low input voltage for an I/O pin is 0.3V. So the maximum value of R_L is 630Ω. You can use smaller values but they draw more current.

Low State



If you select low on slide switch I/O lines will be pulled-down. In case of pulling a specific I/O line to high, you have to use a resistor(R_L) externally.

The minimum high voltage for an I/O pin is 0.7V. So the maximum value of R_L is 52kΩ. You can use smaller values but they will draw more current.

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SPECIFICATIONS

1. **Current values**

Based on the USB specification the maximum current that a-bus powered USB device can draw 500 mA. As a result when the board is powered by USB port the current drive capacity at I/O pins is limited.

To increase the current drive capacity one can use an external 5V power supply.

2. **Voltage Values**

Digital Input Characteristics

Level	Min	Max
IO Pin Input Low Voltage IO Pin Input High Voltage	- 0.7V	0.3V 5.5V

Digital Output Characteristics

Level	Conditions	Min	Typ	Max
Low-Level output current(I_{OL})	VOL = 0.5 V; VDD= 2.3-5V;	8mA	-	-
	VOL = 0.7 V; VDD= 2.3-5V;	10mA	8-20mA	-
High-Level Output Voltage(V_{OH})	I_{OH} = -8mA; VDD = 2.3V;	1.8V	-	-
	I_{OH} = -8mA; VDD = 3V;	2.5V		
	I_{OH} = -8mA; VDD = 4.75V;	4.1V		

USB

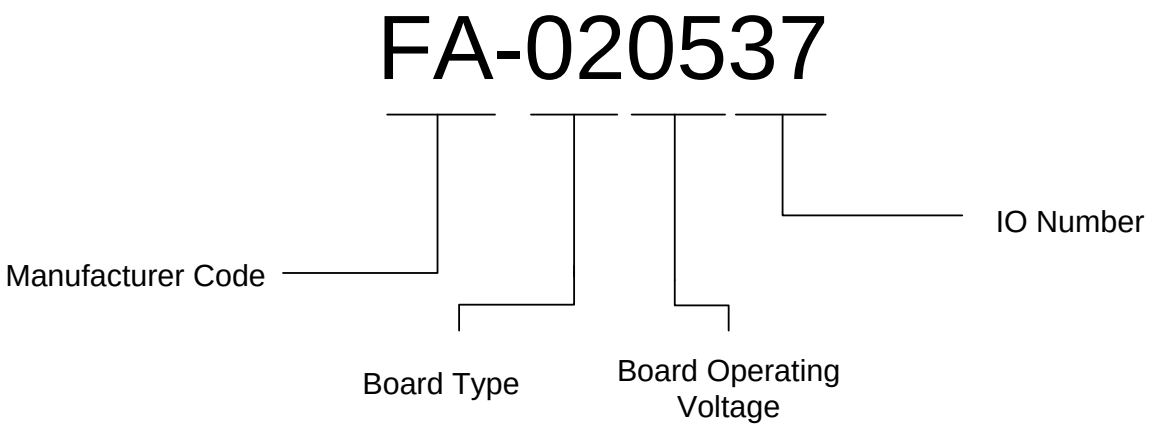
- Input Voltage: 4.5-5.25V
- No Load Current: 50mA, max
- Maximum Load Current: 500mA, max
- Suspend Current: 2.5mA, max

External DC Supply

- Input Voltage Range: 3-5.5V
- Maximum Input Current: 1A
- Power Input Connector: D-SUB 25 PIN-Male
- Power Input Mating Connector: D-SUB 25 PIN- Female

Ordering Information

ORDERING INFORMATION



Manufacturer Code: FA – fabricATE

Board Type:
01: Conn Extention Board
02: IO Expander Board
03: LVDS Driver Board
04: LVDS Receiver Board
05: Comm Type Converter Board

Operating Voltage:
01: N/A
03: 3.3V
05: 5V
12: 12V
24: 24V

IO Number: Number of IO can be applied directly

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