



Laika®

Explorer V1.20

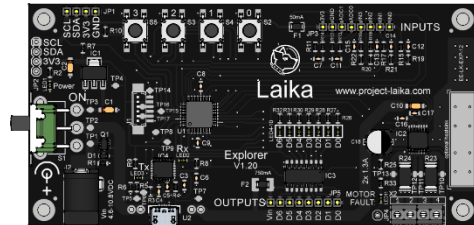
Multi-function USB I/O Expander and Controller

Features

- Dual h-bridge 1.3A motor drive with PWM speed control
- 4.6V to 10.8V input range
- USB communication
- 4x digital inputs
- 2x analogue inputs
- 7x 100mA low-side drive digital outputs
- Zero power draw from USB
- Reverse polarity protected
- Over-voltage protected
- 4x on-board tactile buttons
- 7x on-board LEDs
- Modular footprint design
- Expandable with up to 31 add-on modules
- Up to 4 instances of each module
- Use Python, Scratch or C

Applications

- Motor control, relay and solenoid driving
- LED display
- Sensor monitoring: temperature, humidity
- User interface: MP3 controller



Description

Laika is a series of electronic designs which connect together easily allowing interfacing and control of a large range of real-world devices such as motors, switches, lights, lamps, relays, solenoids, potentiometers and many more. The Explorer is the first in the range of Laika and forms the communications hub for the system. It also features on-board hardware making the Explorer a stand-alone solution. Additional modules are only required if the on-board functionality needs expanding.

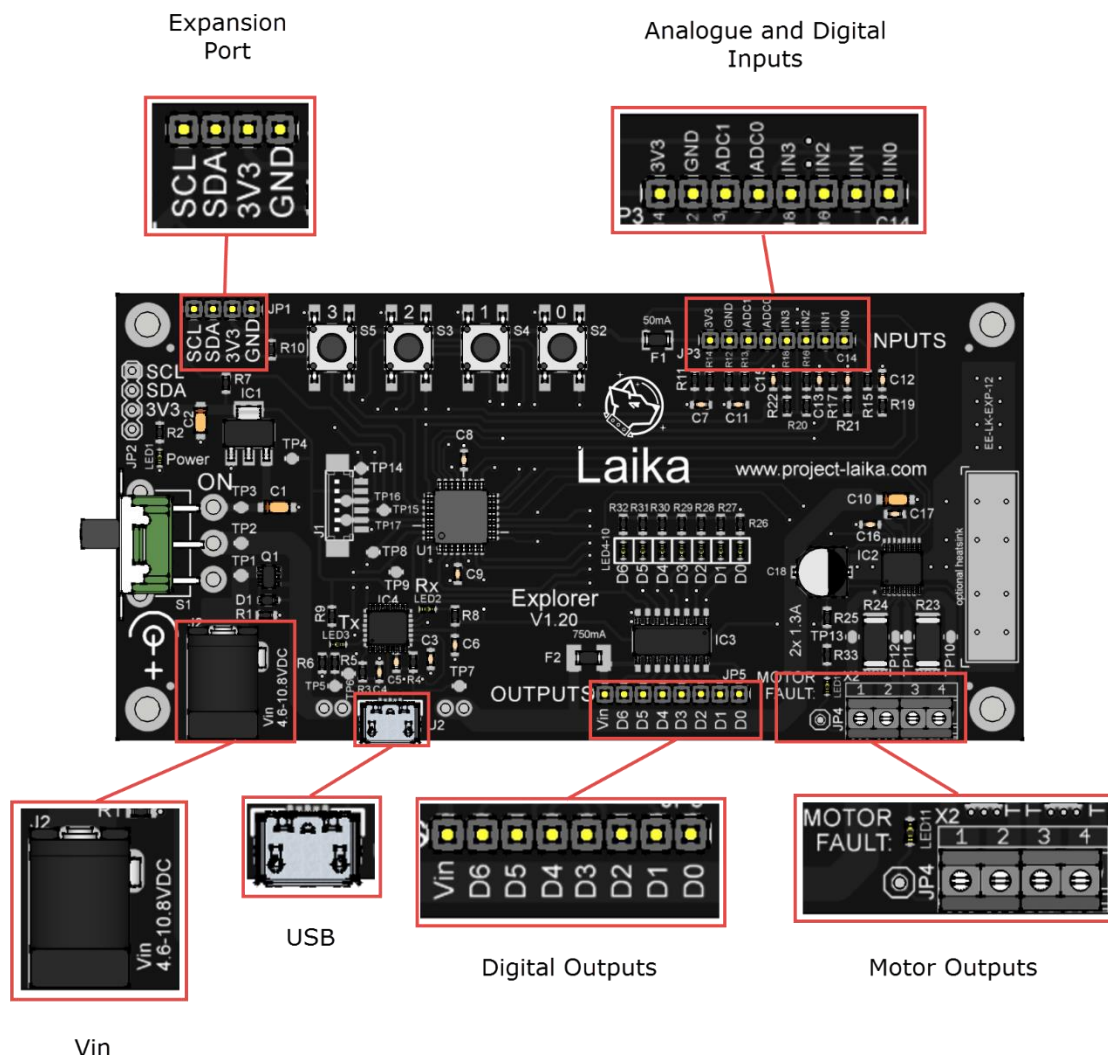
Laika can be controlled in a variety of ways. Perhaps the easiest is to use Scratch or Python. Software drivers are also available for 'C' programming. When using the software drivers the USB communication takes place over a fully enumerated stack allowing for maximum speed. Alternatively, the Explorer can be 'seen' as a COM port allowing standard terminal programs to control the device at a baud of 125000.

Contents

- 1 Connections
- 2 Maximum ratings
- 3 Electrical Characteristics
- 4 Dimensions

1 Connections

1.0 Pin connection



1.1 Description

Table 1: Inputs

Ident	Type	Description
INO-3	Digital	Digital input which is pulled high to 3V3. Taking this input to GND through a switch is typical usage. On-board switches S2-S5 are wired in this way.
ADC0-1	Analogue	Analogue inputs feeding a 10-bit ADC
3V3	Power	50mA fused 3V3 supply for easy wiring of ADC inputs
GND	Power	Ground

Table 2: Outputs

Ident	Type	Description
D0-6	Digital	These outputs are open-drain. They can be driven low or floating and are protected by free-wheeling diodes when used in conjunction with Vin on this port. This allows them to be used safely with motors and relays.
Vin	Power	Fused power. The voltage here is effectively the voltage at the main input. Using this Vin as the power source for devices connected the D0-6 ensures diode protection. If an alternative external power source is used then protection diodes should be used when driving inductive loads.

Table 3: Motor Outputs

Ident	Type	Description
1,2	Motor	A pair of motor driving outputs. Connecting a DC motor to these outputs will allow full forward, reverse, stop and brake control. Each output may be used separately to drive a motor in one direction: forward, stop and brake. Each output has 8-bit PWM configuration for speed control applications.
3,4	Motor	A pair of motor driving outputs. Connecting a DC motor to these outputs will allow full forward, reverse, stop and brake control. Each output may be used separately to drive a motor in one direction: forward, stop and brake. Each output has 8-bit PWM configuration for speed control applications.
JP4	Signal	An output to signal a fault condition. Logic low when in fault: over-temperature or over-current.

Table 4: Expansion Port

Ident	Type	Description
SCL	Comms	Signal clock for TWI expansion port communications interface.
SDA	Comms	Data for TWI expansion port communications interface.
3V3	Power	On-board system Vcc.
GND	Power	System Ground.

2 Maximum Ratings

Symbol	Parameter	Value	Unit
V _{in}	Input voltage	-0.3 to 11.8	V
I _m	Motor driving current	Limited to 1.3	A
I _{do}	Digital output current driving	100	mA
T _{op}	Operating temperature	-20 to 120	°C

3 Electrical Characteristics

$T_j = 25\text{ }^\circ\text{C}$, $V_{cc} = 5\text{V}$

Symbol	Parameter	Value			Unit
		Min	Typ	Max	
V_{cc}	Operating input range	4.6		10.8	V
I_s	Supply Current		22		mA
V_{in-adc}	Analogue voltage range	-0.3		3V3	V
f_{pwm}	PWM frequency		16		KHz

4 Dimensions

