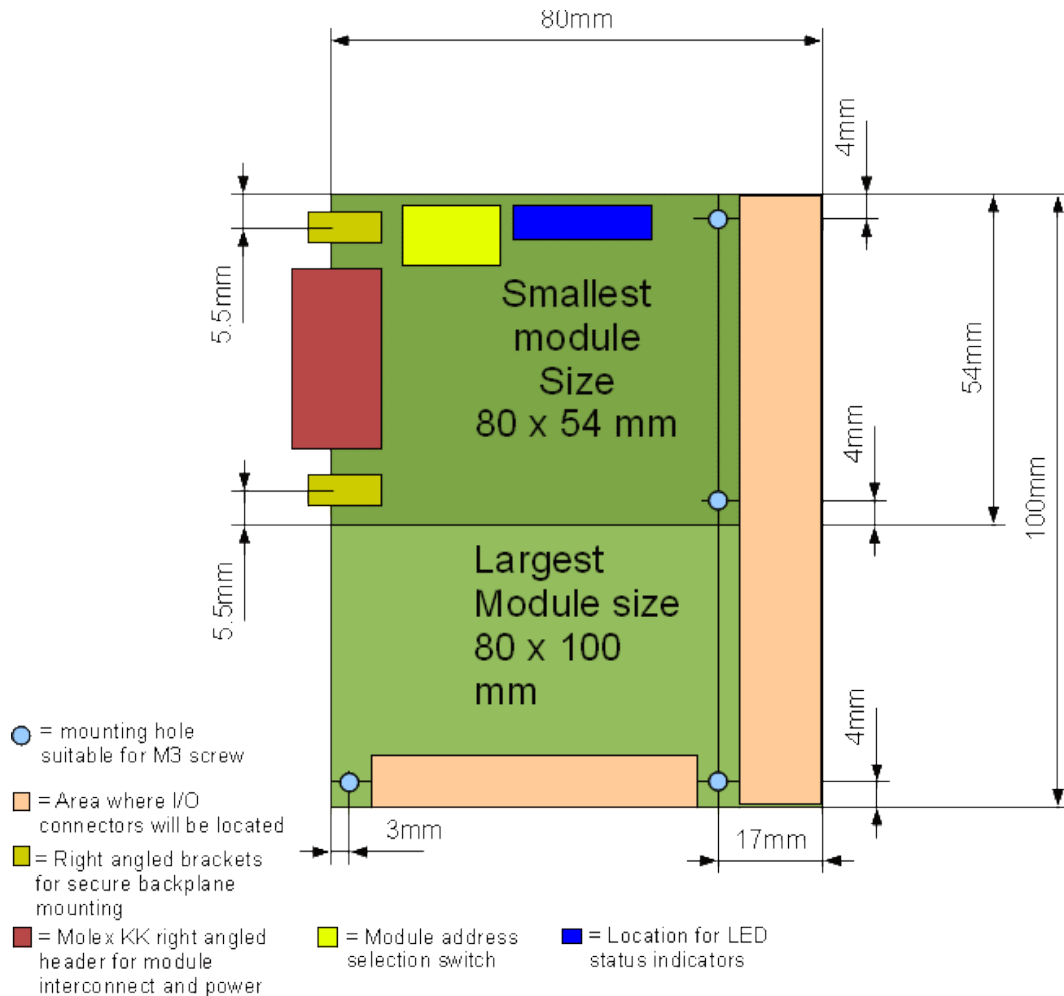


Module general specification

Mechanical

All modules are the same length and have a maximum and minimum width, the main connector on each is in the same location on the left side relative to the top edge of the board, the module specific I/O connectors have pre-defined locations, status indicator LED's have a pre-defined location and the module address selector switch has a pre-defined location.



Electrical

All modules have a common module interconnect connector which is a Molex KK right angled header with the following pinout-

Pin	Signal	Description
1	RS485_A	RS485 serial communications
2	RS485_B	RS485 serial communications
3	0V	0V connection for logic +5V supply
4	+5V	+5V power supply for logic and relay coils
5	RESET	Reset signal, connect to 0V for 1mS min to reset the board

Pin	Signal	Description
6	-12V	With reference to 0V. Used by some modules to power analogue circuitry
7	+12V	With reference to 0V. Used by some modules to power analogue circuitry
8	SIG_A	Module interconnect signal A
9	SIG_B	Module interconnect signal B
10	0V	0V connection for logic +5V supply
11	-DRIVE	Power supply electrically isolated from 0V, +5V etc. Used by modules that have output drivers for motors etc
12	+DRIVE	Positive with respect to -DRIVE.

The use of the Molex KK connector enables the modules to be plugged into a backplane or the modules can be mounted in an enclosure and a ribbon cable used for inter connection. We recommend Molex IDT ribbon cable and connectors -

Description		Part number
IDT cable	4 way	888-04-0016
	9 way	888-09-0016
	12 way	888-12-0016
IDT connector	4 way	38-00-2094
	9 way	38-00-2099
	12 way	38-00-2102

NOTE: Some modules only require pins 1 to 4, although you may need pins 1 to 9 if the SIG lines are used. Some modules require the +12V and -12V signals, so use the 9 way option, some modules also require +DRIVE and -DRIVE, so all 12 ways will be required.

Power supplies

The +5V signal should be a clean and well regulated supply as it is used directly by the digital electronics on the module.

The +12V, -12V supplies should be well regulated and very clean as they are used by analogue circuitry on the modules. NOTE: Only some of the modules use these supplies.

+DRIVE and -DRIVE. Only used by modules that drive power loads such as the P0906 Stepper controller module. These supplies will generally be completely electrically isolated from the +5V, 0V supplies (although isolation is not a requirement of any of the modules). These supplies will be 12V, 24V etc as required by the driving specifications of whatever is being controlled.

NOTE: Some modules capable of driving higher currents also have a 2 pin 3.5mm header located between the LED status area and the right edge of the board, this enables heavier wiring to be used to supply the +DRIVE and -DRIVE supplies. This may also be useful to reduce any noise on the ribbon cable or backplane caused by the PWM switching used on boards such as the Stepper controller.

SIG_A and SIG_B

These signals are for use by modules to enable events to be communicated by a simple level transition, the backplanes (and most modules) include pull-up resistors, so then the modules should only pull the signal LOW to indicate an event, this allows multiple modules to drive the same SIG line.

Many modules can drive the SIG lines, e.g. The Opto-isolator board (P1019) can drive either SIG line when a certain combination of inputs is active.

Many modules can respond to a state of a SIG line, e.g. The power relay board (P1017) can set all relays to a specific state when SIG_A is active.

The Stepper controller boards can use them to synchronize movements, e.g. To synchronize 2 axes to enable curved movements to be performed.

RS485_A and RS485_B

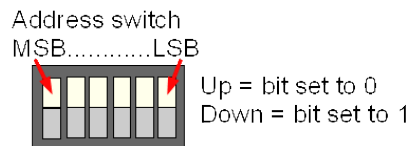
These are the primary signals for intercommunication between the modules and with an external controller, e.g. A PC via the USB-RS485 dongle.

The modules implement RS485 communications using the following protocol-

- Baud rate: 19200
- Data bits: 8
- Stop bits: 1
- Parity: Depends on comms protocol (e.g. Modbus RTU/ASCII etc)

Address selection switch

Whatever the comms protocol, all modules share a common RS485 bus and therefore must be addressed. Each module includes a 6 way DIP selector switch that enables the address to be set in the range of 0 to 63, the switch and settings are shown below-



Address selection is by binary where the LSB is on the right and MSB on the left, if the switch is UP then the bit is 0 and if down the bit is 1-

Address	Bits		Address	Bits		Address	Bits
0	000000		21	010101		43	101011
1	000001		22	010110		44	101100
2	000010		23	010111		45	101101
3	000011		24	011000		46	101110
4	000100		25	011001		47	101111
5	000101		26	011010		48	110000
6	000110		27	011011		49	110001
7	000111		28	011100		50	110010
8	001000		29	011101		51	110011

Address	Bits		Address	Bits		Address	Bits
9	001001		30	011110		52	110100
10	001010		31	011111		53	110101
11	001011		32	100000		54	110110
12	001100		33	100001		55	110111
13	001101		34	100010		56	111000
14	001110		35	100011		57	111001
15	001111		36	100100		58	111010
16	010000		37	100101		59	111011
17	010001		38	100110		60	111100
18	010010		39	100111		61	111101
19	010011		40	101000		62	111110
20	010100		41	101001		63	111111
			42	101010			