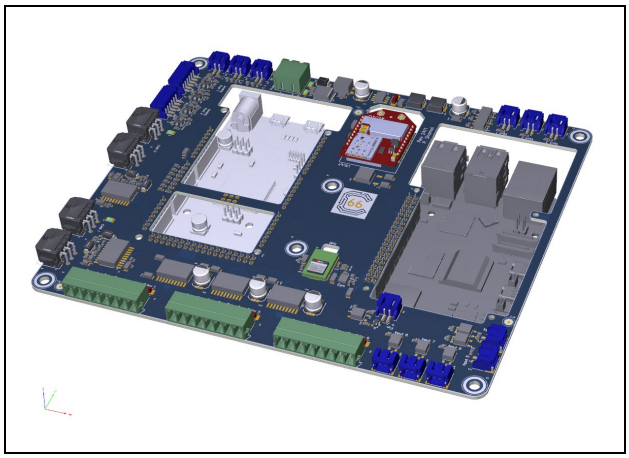
SDE25 is an expansion board suitable for Arduino Due[1] plus Raspberry PI[2] boards used in various student design activities. SDE25 provides expansion boards for +12V inputs and relay driver outputs as well as the support for CAN, IOT, and various sensor applications. SDE25 mounts above the two controllers utilizing their header pins eliminating the need for any soldering or wiring which allows users to replace the controllers as needed in a fast and easy way.
This expansion board provides inputs for three temperature sensors as well as two sets of two differential analog inputs.



Suitable for

- Student Design Teams
- Senior Design Projects

Key features

- 12 Relay drivers
- 8 Dry-contact input channels
- 4 Analog inputs
- 3 Analog inputs suitable for NTC/PTC temperature sensing
- 1 Fan output for local cooling
- 1 GPS module
- 1 Gyroscope/accelerometer module
- 1 LTE/IOT/Wi-Fi module
- 2 CAN channels with 12V supply lines

I. Absolute Maximums

Technical Data	Condition	Parameters			Unit
		Min.	Typ.	Max.	
Input supply voltage	Transient, any duration			20	V
Digital ports	Transient, any duration			12	V
Analog ports	Transient, any duration			5	V

II. Recommended Operation Conditions

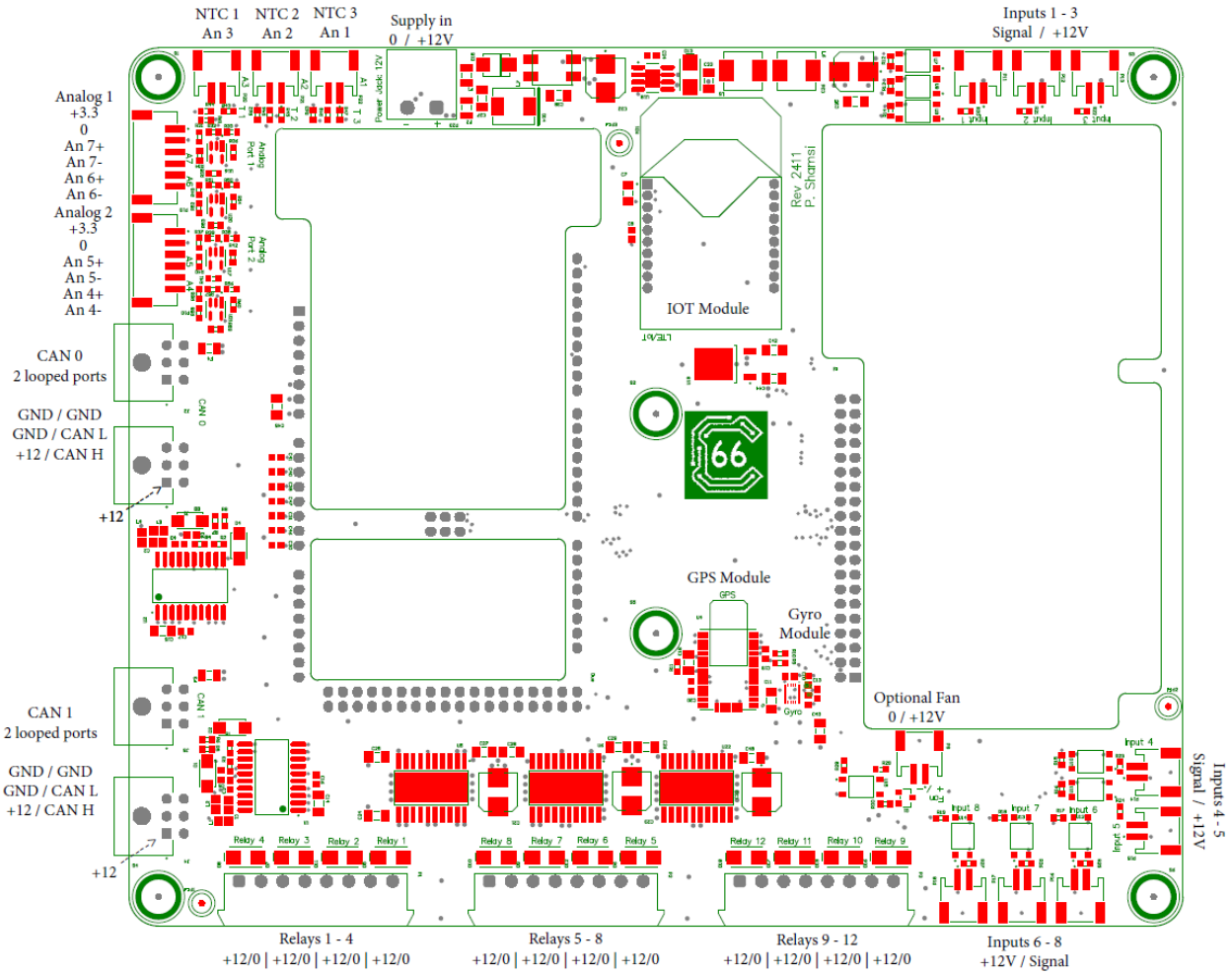
Technical Data	Condition	Parameters			Unit
		Min.	Typ.	Max.	
Supply voltage	Continuous operation, T_{cp} < 80 C	10	12	20	V_{DC}
Relay current	Maximum continuous current per relay port		2	3	A
Relay current	Maximum continuous current for all ports combined		4	5	A
Input signals	Voltage	0		12	V_{DC}
Analog ports		0		3.3	V_{DC}

[1] Route 66 Has no affiliation with Arduino. All rights and trademarks belong to their respective owners.
[2] Route 66 Has no affiliation with Raspberry PI. All rights and trademarks belong to their respective owners.

III. Mechanical Data

Technical Data	Condition	Unit
Dimensions Not including terminals	7.2 × 7 × 0.5	In^3

IV. Pinout



Item	Raspberry (GPIO)	Arduino (Physical pin) (AD)
Analog Ports		
Analog Port 1: A6+/-		84 (A6)
Analog Port 1: A7+/-		85 (A7)
Analog Port 2: A4+/-		82 (A4)
Analog Port 2: A5+/-		83 (A5)
Temp 1: A3		81 (A3)
Temp 2: A2		80 (A2)
Temp 3: A1		79 (A1)
CAN		
CAN 0 RX		24
CAN 0 TX		23

CAN 1 RX		76
CAN 1 TX		140
SPI (communication between Raspberry PI and Arduino controllers)		
SPI CLK	11	110
SPI Data 1	10 (MOSI)	108 (MISO)
SPI Data 2	9 (MISO)	109 (MOSI)
SPI CS	8	102
I2C (to gyroscope and GPS modules)		
SDA	2	9
SCL	3	70
UART (to Wi-Fi/LTE/IOT module)		
TX	14	
RX	15	
Reset LTE and GPS modules	17	
Connection between modules		
Inner 1	12	16
Inner 2	5	22
Inner 3	6	1
Inner 4	13	8
Inner 5	19	14
Fan		
Fan	4	
Inputs (read 1 when port is open, read 0 when port is shorted)		
Input 1	21	21
Input 2	20	20
Input 3	26	132
Input 4		144
Input 5		139
Input 6		136
Input 7		135
Input 8		134
Relays (Not active when port is cleared, active when port is set)		
Relay 1		65
Relay 2		67
Relay 3		71
Relay 4		101
Relay 5		55
Relay 6		60
Relay 7		116
Relay 8		64
Relay 9		7
Relay 10		15
Relay 11		19
Relay 12		32
Relay check 1/2		66
Relay check 3/4		72
Relay check 5/6		59
Relay check 7/8		63
Relay check 9/10		13
Relay check 11/12		26

Connector	PCB Side	Mate
Analog 1 and 2	S6B-PH-SM4-TB(LF)(SN)	Housing: PHR-6 Crimps: SPH-002T-P0.5L

		Ready crimped wires: ASPHSPH24K
NTC ports Inputs Fan	S2B-PH-SM4-TB(LF)(SN)	Housing: PHR-2 Crimps: SPH-002T-P0.5L Readymade wires: ASPHSPH24K
Power in	691313510002	691351500002
CAN/12V ports	43045-0601	Housing: 43025-0600 Crimps: 43030 Readymade wires: 79758-00xx (02, 04, 10, 12) 214756-1063
Relay ports	691305340008	691361300008

Modules	**Communication**	**Part Number**
LTE Module	UART	XB3-C-A2-UT-001
GPS Module	I2C	CAM-M8Q-0
Gyroscope	I2C	LSM9DS1TR