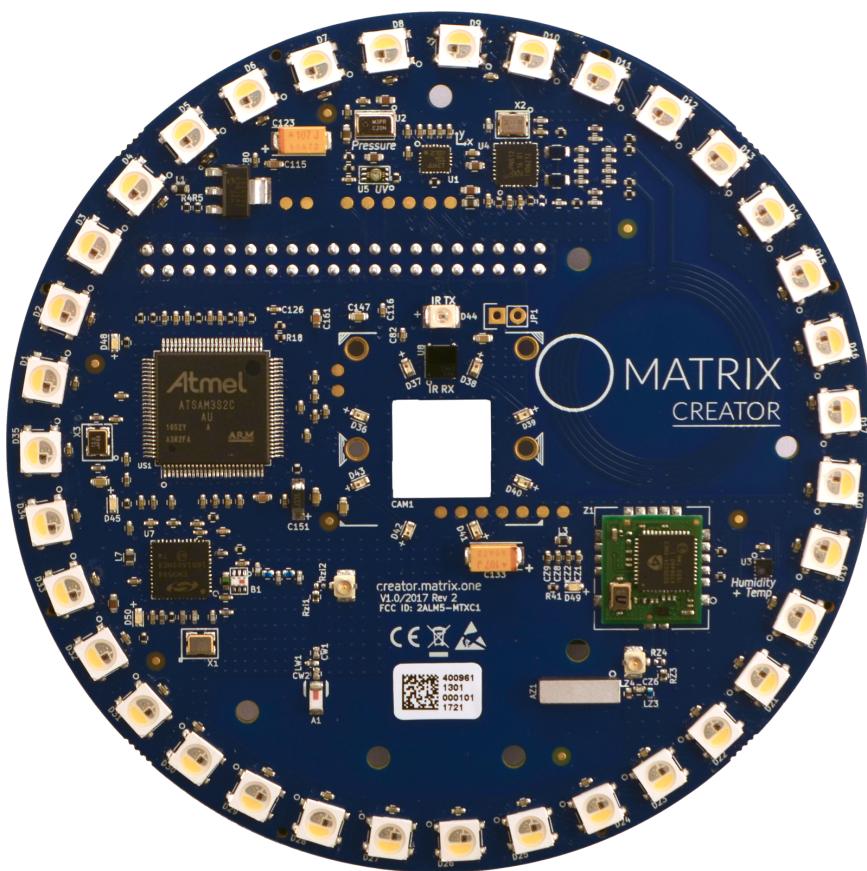




MATRIX Creator

Datasheet / 2017



Content

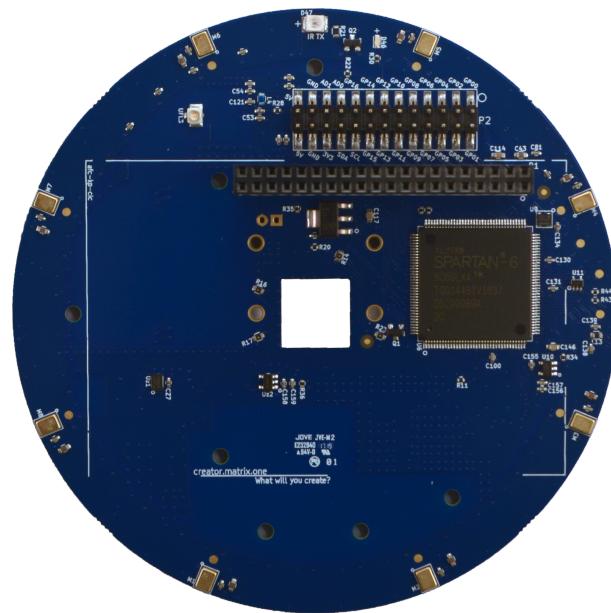
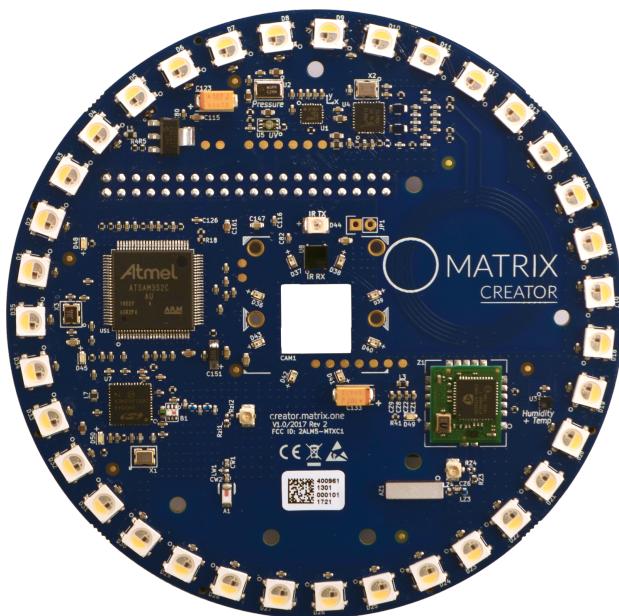
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Revision History

Revision	Date	Description
1.0	08/22/2017	First Release

Description

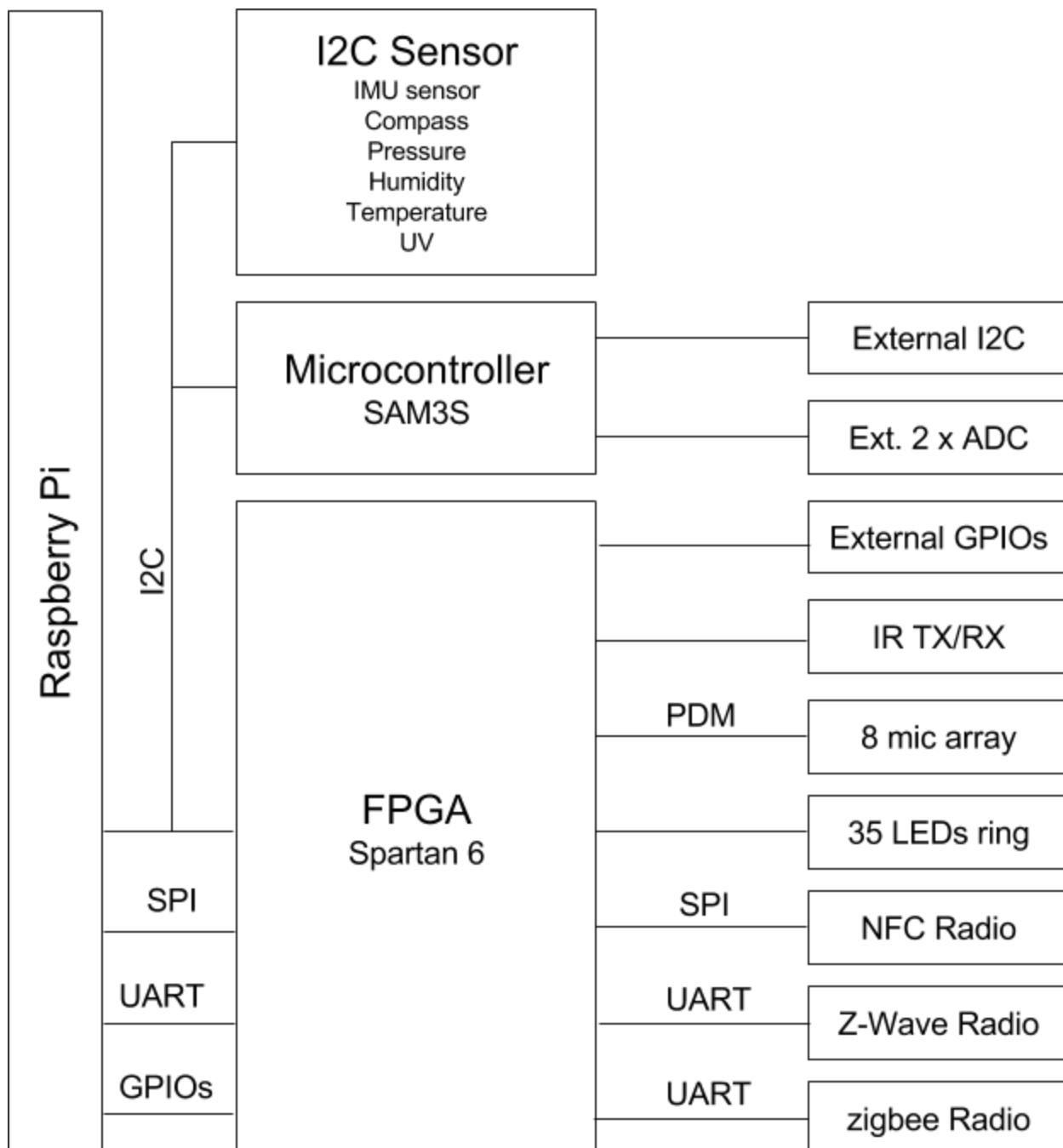
MATRIX Creator is an IoT daughter board for the Raspberry Pi designed to encourage makers and businesses around the world to harness the power of their imagination. It comes fully loaded with sensors, an FPGA, a microcontroller, Z-Wave and zigbee communications, an 8 microphone array, and a beautiful LED ring to allow novice and expert software developers alike to easily build hardware applications.



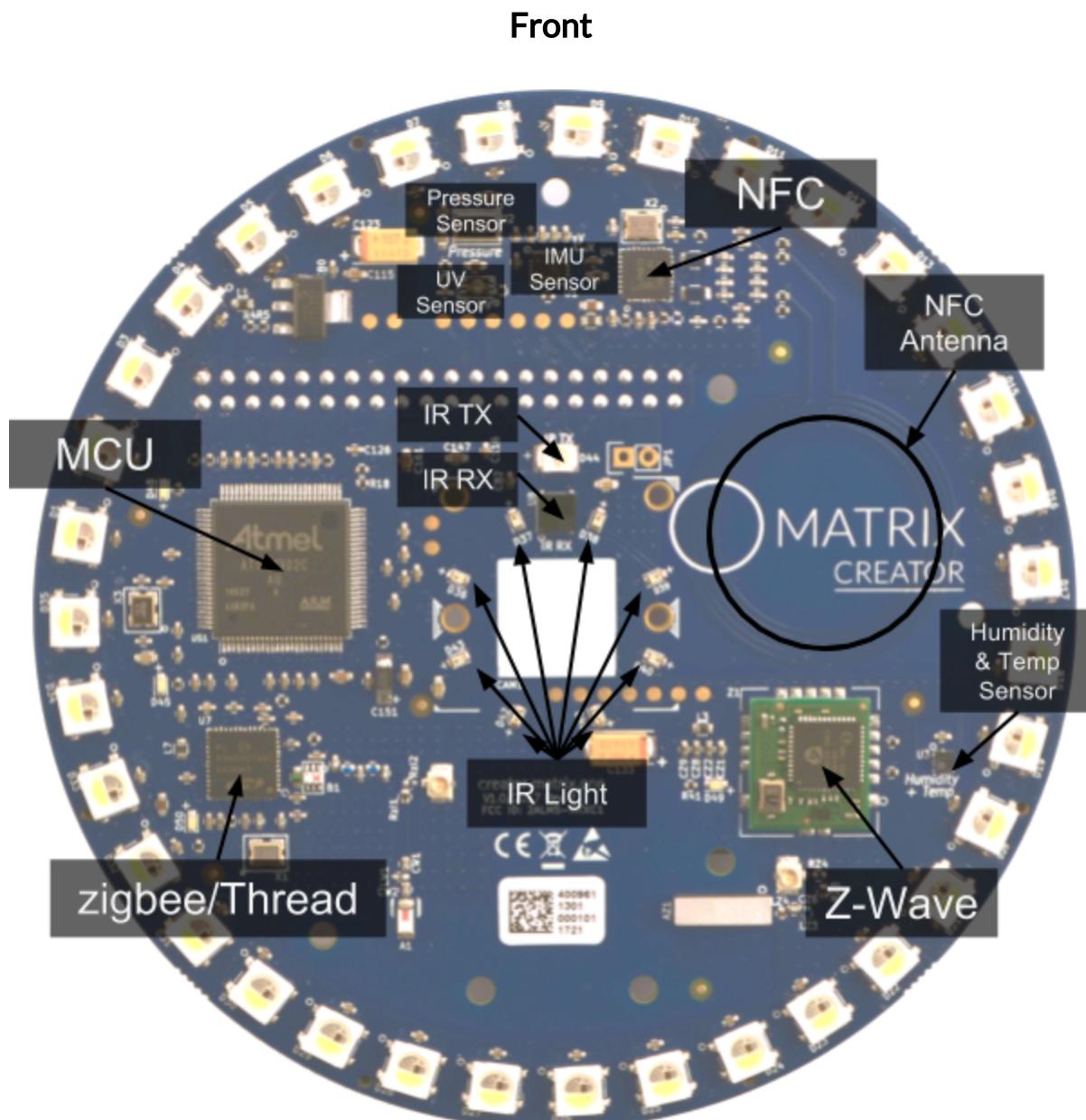
Hardware specifications

- Microcontroller : Atmel ATSAM3S2C Cortex ([link](#))
- FPGA : Xilinx Spartan 6 FPGA XC6SLX4 ([link](#))
- Wireless
 - zigbee/Thread : Integrated zigbee/802.15.4 System-on-Chip EM3588 ([link](#))
 - Z-Wave : General Purpose Z-Wave® Module ZM5202 ([link](#))
 - NFC : Full NFC Forum-compliant frontend PN512 ([link](#))
- Sensors
 - UVA Light Sensor VEML6070 ([link](#))
 - Precision pressure sensor with altimetry MPL3115A2 ([link](#))
 - Humidity and temperature sensor HTS221 ([link](#))
 - 3D accelerometer, 3D gyroscope, 3D magnetometer LSM9DS1 ([link](#)).
- Additional features
 - 35 RGBW LEDs ([link](#))
 - IR Receiver Module TSOP57X ([link](#))
 - IR Emitter Diode APT1608SF4C-PRV([link](#))
 - 8 MEMS audio sensor MP34DB02 ([link](#))
- I/O
 - 2 x ADC channels.
 - 17 external GPIO. These are connected to FPGA so they could potentially implement any digital interface e.g PWM, Servo, UART, I2C etc.
 - SPI
 - I2C

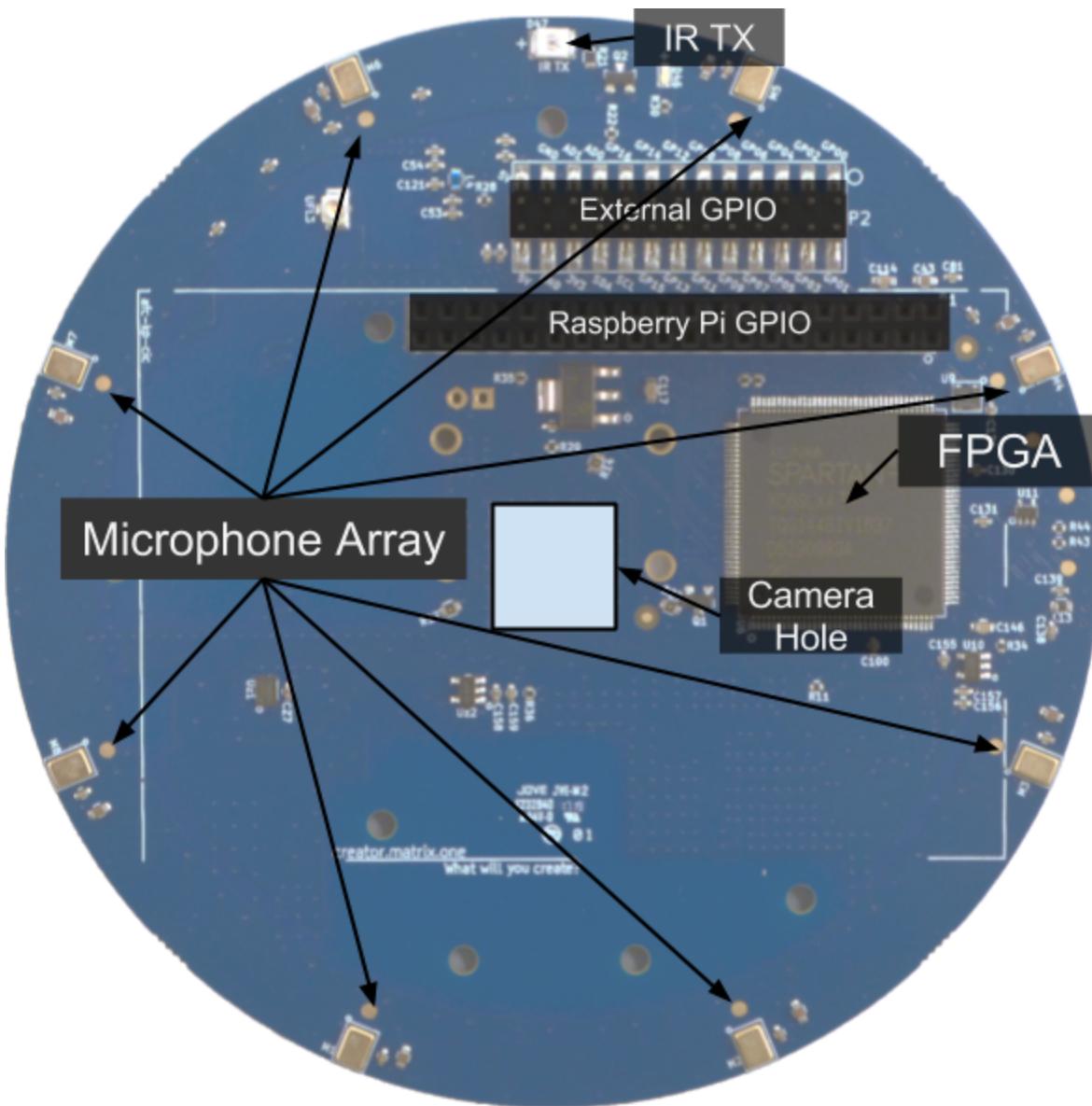
Block Diagram



Components localization



Back



Pin Assignments

Raspberry Pi GPIO

MATRIX VOICE FUNCTION	MATRIX CREATOR CONNECTION	RPI FUNCTION	RPI PINS	RPI GPIO	RPI PINS	RPI FUNCTION	MATRIX CREATOR CONNECTION	MATRIX CREATOR FUNCTION
	NC	DC Power	3V Power	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40	5V 5V GND GPIO14 GPIO15 GPIO18 GND GPIO23 GPIO24 GND GPIO25 GPIO8 GPIO7 ID_SC GND GND GPIO12 GND GPIO16 GPIO20 GPIO21	5V 5V GND UART TXD0 UART RXD0 GPIO GND EM3588 NC GND FPGA FPGA SPI0_CE0_N SPI0_CE1_N NC GND FPGA FPGA FPGA ZM5202	5V 5V GND FPGA FPGA NRST JTAG Reset GND Zigbee Chip Power Enable GND IRQ NFC FPGA FPGA GND nReset GND IR RX Zigbee Chip Reset ZWave Chip Power Enable	
I2C SDA	FPGA, Sensors	SDA1 I2C	GPIO2					
I2C SCL	FPGA, Sensors	SCL1 I2C	GPIO3					
JTAG_TMS	FPGA, Zigbee, SAM3S	GPIO	GPIO4					
GND	GND	GND	GND					
JTAG_TCK	FPGA, Zigbee, SAM3S	GPIO	GPIO17					
JTAG_TDO	FPGA, Zigbee, SAM3S	GPIO	GPIO27					
JTAG_TDI	FPGA, Zigbee, SAM3S	GPIO	GPIO22					
3.3V	3.3V	3.3V	3.3V					
SPI_MOSI	FPGA, SAM3S	SPI_MOSI	GPIO10					
SPI_MISO	FPGA, SAM3S	SPI_MISO	GPIO9					
SPI_CLK	FPGA, SAM3S	SPI_CLK	GPIO11					
GND	GND	GND	GND					
	NC	I2C ID EEPROM	ID_SD					
IR Ring Enable	FPGA	GPIO	GPIO5					
MIC IRQ from FPGA to RPI	RPI_GPIO06	GPIO	GPIO6					
IR TX	FPGA	GPIO	GPIO13					
Zigbee Chip Boot Enable	EM3588	GPIO	GPIO19					
	NC	GPIO	GPIO26					
GND	GND	GND	GND					

External GPIO

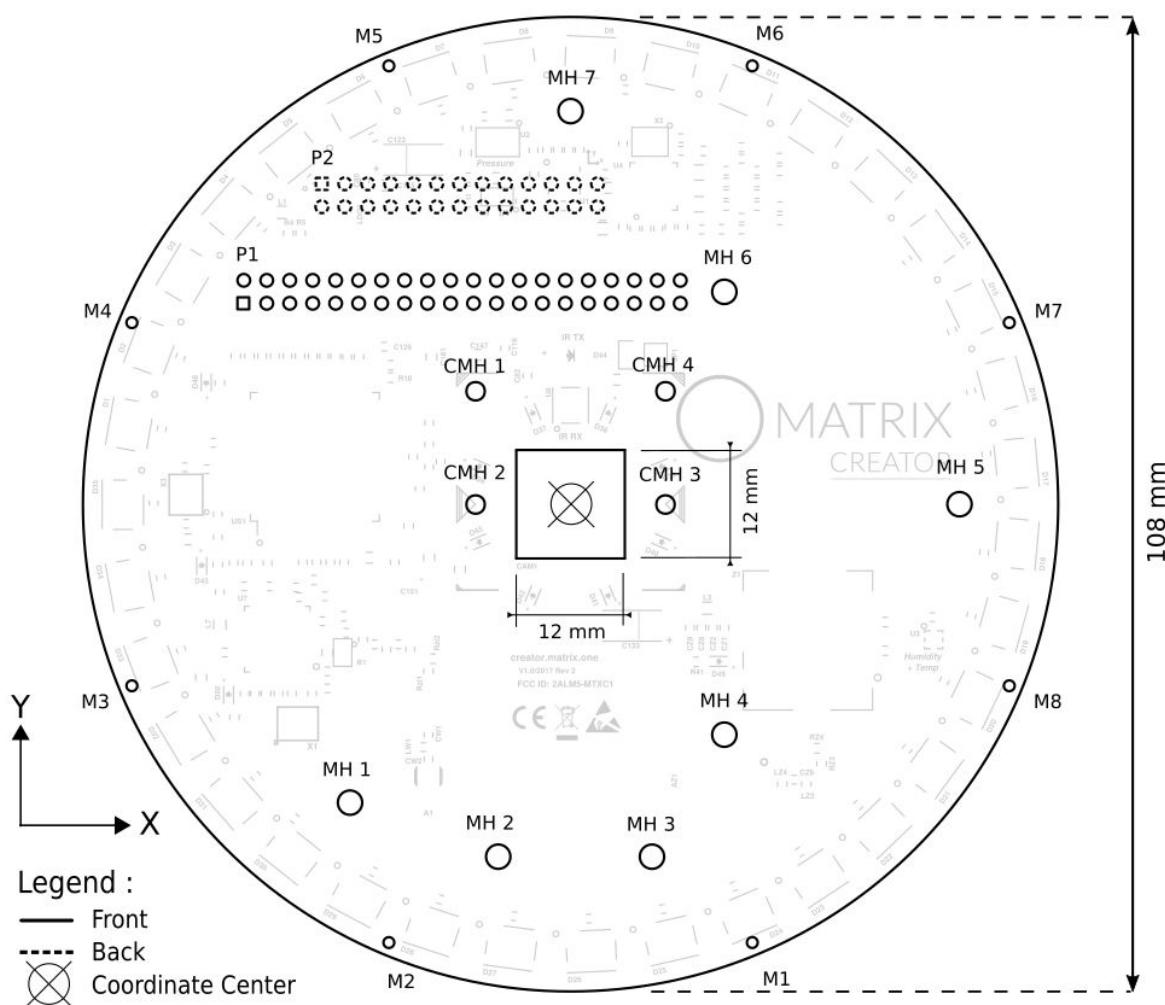
CONNECTIONS	PINS	Ext GPIO	PINS	CONNECTIONS
FPGA P78	GPIO0	1 2	GPIO01	FPGA P79
FPGA P80	GPIO2	3 4	GPIO03	FPGA P81
FPGA P82	GPIO4	5 6	GPIO05	FPGA P83
FPGA P85	GPIO6	7 8	GPIO07	FPGA P88
FPGA P92	GPIO8	9 10	GPIO09	FPGA P93
FPGA P94	GPIO10	11 12	GPIO11	FPGA P95
FPGA P98	GPIO12	13 14	GPIO13	FPGA P99
FPGA P101	GPIO14	15 16	GPIO15	FPGA P102
FPGA P106	GPIO16	17 18	SCL	FPGA P75, SAM3S
SAM3S AD0 P12	AD0	19 20	SDA	FPGA P74, SAM3S
SAM3S AD0 P14	AD1	21 22	3.3V	3.3V
GND	GND	23 24	GND	GND
5.5V	5.5V	25 26	5.5V	5.5V

Electrical Specifications

External GPIO Pin	Name	Logic Level	Max current
[1...17]	FPGA pins	3.3v	10mA
18	SCL	3.3v	10mA
19	AD0	3.3v	10mA
20	SDA	3.3v	10mA
21	AD1	3.3v	10mA
22	3.3V	-	100mA
23	GND	-	-
24	GND	-	-
25	5.0V	-	100mA
26	5.0V	-	100mA

Mechanical Specifications

Front view



Label	X [mm]	Y [mm]	Description
M1	20.09	-48.50	Microphone
M2	-20.09	-48.50	Microphone
M3	-48.50	-20.09	Microphone
M4	-48.50	20.09	Microphone
M5	-20.09	48.50	Microphone
M6	20.09	48.50	Microphone
M7	48.50	20.09	Microphone
M8	48.50	-20.09	Microphone
MH1	-24.38	-33.02	Mounting hole
MH2	-8.00	-39.00	Mounting hole
MH3	9.00	-39.00	Mounting hole
MH4	17.00	-25.50	Mounting hole
MH5	43.00	0.00	Mounting hole
MH6	17.00	23.50	Mounting hole
MH7	0.00	43.50	Mounting hole
CMH1	-10.50	12.50	Camera mounting hole
CMH2	-10.50	0.00	Camera mounting hole
CMH3	10.50	0.00	Camera mounting hole
CMH4	10.50	12.50	Camera mounting hole
P1	-36.13	22.23	Raspberry Pi GPIO connector (Pin #1)
P2	-27.51	35.44	External GPIO connector (Pin #1)

Online Documentation and Support

For additional documentation and support please refer to:

<https://creator.matrix.one/>

<http://community.matrix.one/>

<https://matrix-io.github.io/matrix-documentation/>

<https://github.com/matrix-io>

<https://matrix-io.github.io/matrix-documentation/Reference/creator/#technical-datasheets>