

MATRIX Creator

Operational Description

by MATRIX Labs™ LLC
1680 Michigan Avenue, Suite 918
Miami Beach, FL 33139

Description	2
Product name	2
Operating voltage	2
Difference between Models	2
Processors Information	3
ZigBee Radio	3
Z-Wave Radio (Model US)	3
Z-Wave Radio (Model EU)	4
NFC	4
Oscillators	4
Crystals	4
Software Version	5

Description

We built MATRIX Creator to teach novice developers about hardware, while providing experts with an extremely useful piece of hardware to add to their tool kit. We want to shape the growth of our existing and future builders, developers, makers, and engineers and reduce friction for hardware creation.

MATRIX Creator it is dev board designed for Raspberry Pi with a FPGA, a microcontroller, sensors like an IMU, temperature, humidity, light sensor, IR, 8 microphone array and 35 LED array. Also it has integrated Z-Wave and ZigBee communications, all to allow novice and expert software developers alike to build hardware applications easily.

MATRIX Creator documentation provide software to program all the chip, the user does not need any external hardware for programing. To simplify hardware application development, the MATRIX creator includes MATRIX OS, which allows developers to build hardware applications in just a few lines of code using JavaScript. Also lower level libraries in C++ are provided that allow more advanced users to take advantage of the hardware and the sensors in a more free way.

Product name

Product Name: MATRIX Creator

Reference Model: v1.0 rev2 model US, EU

Operating voltage

Nominal: 5VDC

Max: 5.2VDC

Min: 4.8VDC

Max Current: 2A

Notes: MATRIX Creator takes the power from the Raspberry Pi.

Example of power Supply recommended:

Canakit Power Supply:

- <https://www.canakit.com/raspberry-pi-adapter-power-supply-2-5a.html>
- https://www.amazon.com/Canakit-Raspberry-Supply-Adapter-Charger/dp/B00_MARDJZ4

Operating Temp: -20 to 60 °C

Battery information : No Battery

Difference between Models

US Model using Z-Wave frequency center at 908MHz.

EU Model using Z-Wave frequency center at 868MHz.

Processors Information

Reference: ATSAM3S2CA-AU

Description: ARM® Cortex®-M3 SAM3S Microcontroller IC 32-Bit 128KB

Core Frequency: 64MHz

Reference: EM3588

Description: IC RF TxRx + MCU 802.15.4 Zigbee®

Core Frequency: 24MHz

ZigBee Radio

2.4GHz Product: ZigBee Radio

Frequency Range: 2.403 - 2.482 GHz

Channels: 16 non-overlapping 2 MHz bandwidth channels at 5 MHz spacing.

- Channel 11: 2.405 GHz
- Channel 12: 2.410 GHz
- Channel 13: 2.415 GHz
- Channel 14: 2.420 GHz
- Channel 15: 2.425 GHz
- Channel 16: 2.430 GHz
- Channel 17: 2.435 GHz
- Channel 18: 2.440 GHz
- Channel 19: 2.445 GHz
- Channel 20: 2.450 GHz
- Channel 21: 2.455 GHz
- Channel 22: 2.460 GHz
- Channel 23: 2.465 GHz
- Channel 24: 2.470 GHz
- Channel 25: 2.475 GHz
- Channel 26: 2.480 GHz

Number of Channels: 16

Modulation Technique: O-QPSK

Antenna Type: Chip Antenna

Antenna Gain: 0.5dBi

Antenna Reference: 2450AT18B100E (Johanson)

Note: The EM3588 firmware provided does not allow frequencies outside this channels list. The user can not select a different frequency.

Z-Wave Radio (Model US)

Frequency Range: 908.42 MHz

Channel Number: 1

Number of Channels: 1

Modulation Technique:

- FSK (for 9.6kbps and 40 kbps)
- GFSK with BT=0.6 (for 100 kbps)

Antenna Type: Chip Antenna

Antenna Gain: 1.2dBi

Antenna Reference: W3070 (Pulse)

Note: With the software provided the user does not have the ability to change the frequency.

Z-Wave Radio (Model EU)

Frequency Range: 868.42MHz

Channel Number: 1

Number of Channels: 1

Modulation Technique:

- FSK (for 9.6kbps and 40 kbps)
- GFSK with BT=0.6 (for 100 kbps)

Antenna Type: Chip Antenna

Antenna Gain: 0.5dBi

Antenna Reference: W3070 (Pulse)

NFC

Reference: PN512 (NXP)

Description: RFID Reader/Transponder IC

Frequency center: 13.56Mhz

Antenna Type: MicroStrip Loop Inductor Antenna

Oscillators

Oscillator Reference: ASDMB-50.000MHZ-LC-T

Frequency center: 50Mhz

Type: MEMs Oscillator.

Overall Freq. Stability: ± 50 ppm

Crystals

Oscillator Reference: NX3225SA-27.12M-STD-CSR-3

Designator: X2

Frequency center: 27.12MHz

Type: MHz Crystal

Overall Freq. Stability: ± 15 ppm

Oscillator Reference: ABM8-12.000MHZ-B2-T

Designator: X3

Frequency center: 12MHz

Type: MHz Crystal

Overall Freq. Stability: ± 20 ppm

Oscillator Reference: ABM8-24.000MHZ-R60-D-1-W -T

Designator: X1

Frequency center: 24MHz

Type: MHz Crystal

Overall Freq. Stability: ± 10 ppm

Software Version

0.2.0 MATRIX Creator MALOS.

0.1.2 MATRIX Hardware Abstraction Layer (HAL)

0.3.0 MATRIX Creator Init