MATRIX
ROBOTICS SYSTEM

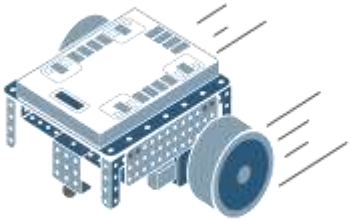
MATRIX CATALOG 2025

Welcome to Download Our Catalog!

View in Two-Page Mode

STEAM Education, Future Technology.

Contents



What is MATRIX Robotics?

MATRIX is the smart robotics platform and ecosystem built on education, industry, and international standards.

In the fast-paced AI era, a complete and highly efficient teaching solution is your critical advantage to excel.

Educational equipment ▼ **Teaching resources** ▼ **Competition & Certification** ▼

EASY

Intuitive building	The MATRIX building system uses a real-world close-to-life connection method, allowing your concepts to be visualized and rapidly formed with simple ease.
Dual-Language learning	MATRIXBlock provides the corresponding C++ code for every block, enabling you to effortlessly learn both programming languages.

FAST

Mechanism adjustment	Utilizing the MATRIX patented quick connector, mechanical structures can be disassembled and reassembled in just one second, greatly accelerating development time.
Innovation validation	The wealth of electronic control modules and structural components allows you to rapidly validate any innovative idea at any time.

PROFESSIONAL

International recognition	MATRIX products are featured in world-renowned robotics competitions such as WRO, FIRST, WorldSkills, and MARC.
Industry application	Leading companies like Google and HIWIN have chosen the MATRIX Building System as a component for their industrial showcase projects.

MATRIX Can help applicable scenarios

K–12 STEM	Interdisciplinary learning	Science and technology clubs
Competitions & Certifications	Maker & development	Topic Research

Solving real-world teaching challenges

Challenges	MATRIX Can help
Curriculum is disconnected from industry.	Industry-grade modules + open-source design enable the easy acquisition of knowledge that is directly applicable in the future workplace.
Difficulty maintaining focus/attention.	Remote control, graphical programming, C language, and AI-assisted coding make learning engaging, helping students quickly gain a sense of achievement.
Difficulty demonstrating teaching effectiveness.	The learning objectives are matched with competitions and certifications, and professional evaluation criteria are used to ensure that the teaching effects are clearly visible.

Our Milestones

2017

Developed by KKITC, the MATRIX robot has earned recognition from both FIRST and WRO.

2019

WorldSkills AI mobile robot designated Robot Kit.

2022

MARC (Master AI Robot Cup) designated Robot Kit.

2023

Collaborates with Arduino for global STEM education.

2024

WRO Future innovators competition kit partner and provide teaching content on the WRO learning platform.

2025

launch MATRIX MissionGO Set for WRO RoboMission.

MATRIX: The bridge to the future of robotics

Transition from SPIKE to MATRIX: 100% compatible and open source ready.

Plastic brick → **MATRIX building system(Metal) Operate > Create** → **MATRIX building system(Metal) Create > Operate** → **Industrial Scenarios**

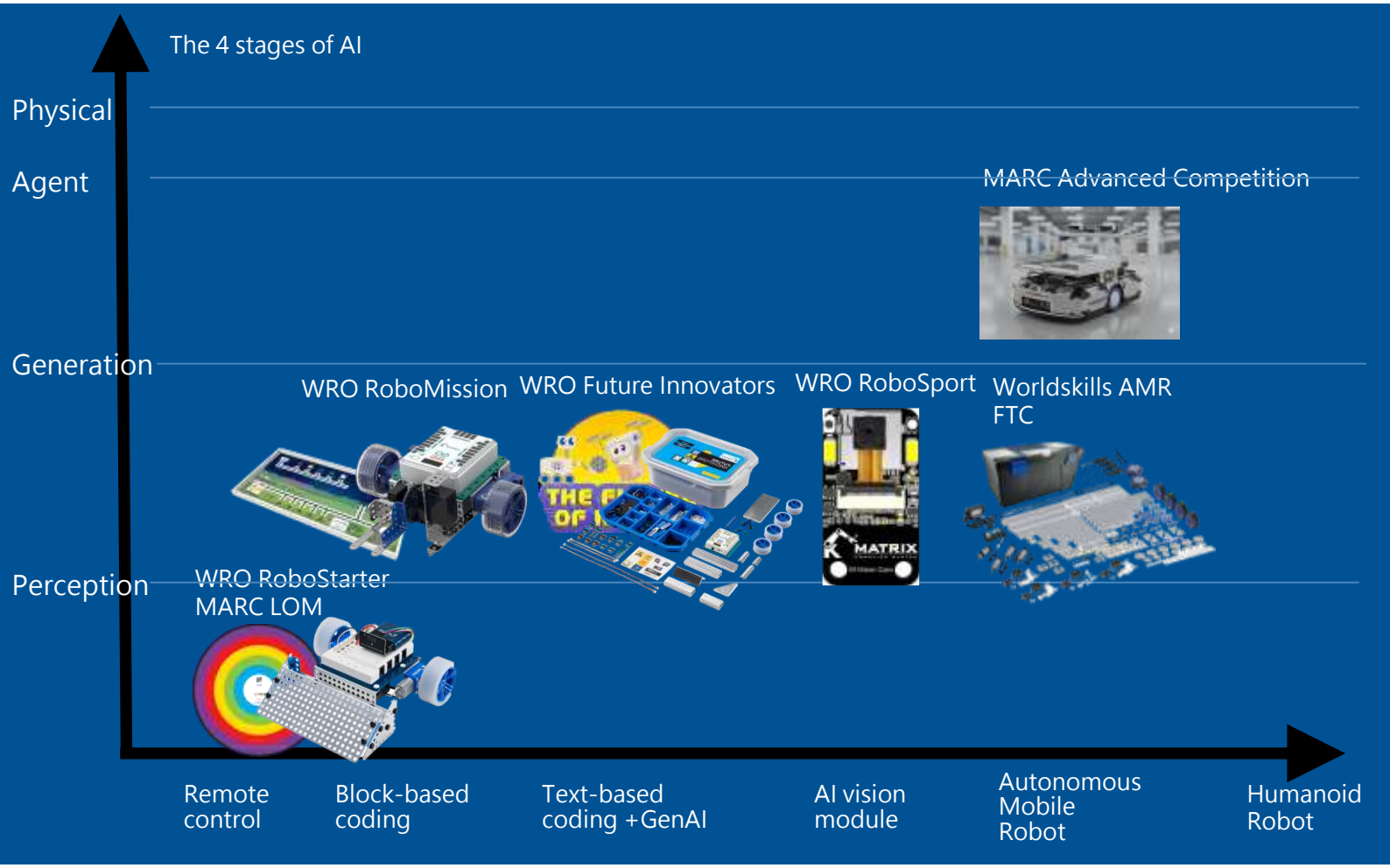
6-12 years old | 12-15 years old | 16-18 years old

- Real-world assembly logic and use the ML quick connector compatible with Plastic brick.
- Extremely durable, with high collision and load capacity.

- Metric structure components (open source)
- Supports Scratch and ArduinoIDE (open source)
- With maker equipment (3D printing & laser cutting)

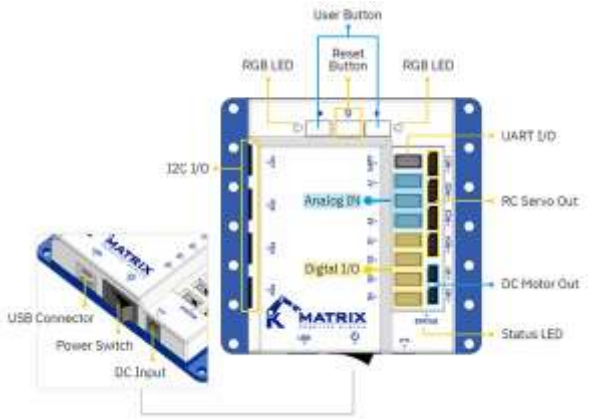
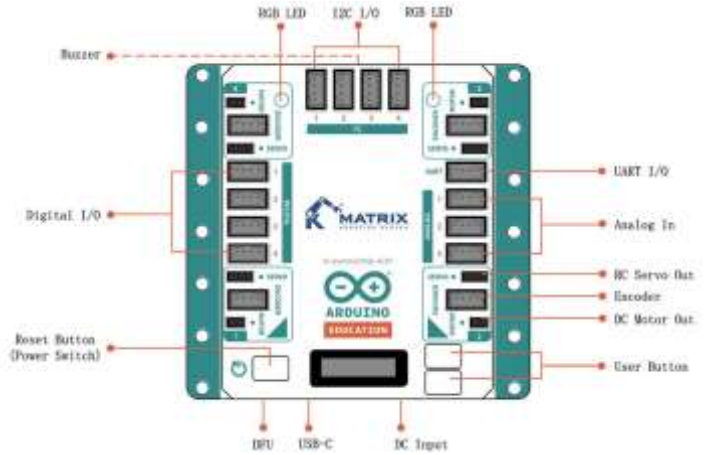
- Simulation to real
- Autonomous vehicles
- lights-out manufacturing
- Automatic Storage retrieval system

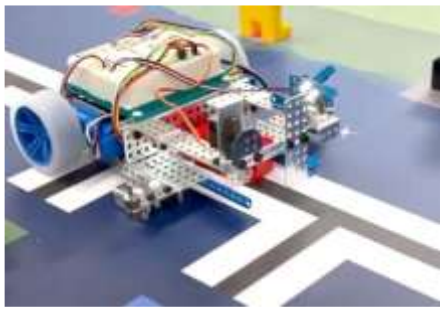
The AI Robotics Education Roadmap by MATRIX



MATRIX Controller

Key to the World of Real Engineering

MATRIX Mini 2.0	MATRIX Mini R4
	
Single-processor architecture: The core processor is the well-known Arduino UNO R3 (ATmega328P).	Dual-processor architecture: The Arduino UNOR4 WiFi is the core controller, responsible for the main program logic and user interaction, along with Wi-Fi and Bluetooth wireless communications. The STM32F103 micro controller then acts as a co-processor to efficiently handle real-time tasks such as motor driving and reading sensor data.
2 DC, 4 servo, 4 digital, 3 analog,4 I²C,1 UART, supports SPI	4 DC, 4 servo, 4 motor encoder, 4 digital, 3 analog,4 I²C,1 UART, supports SPI and CAN Bus
Input : user buttons Output : RGB LEDs	Input: user buttons, inertial measurement unit Output : RGB LEDs, Buzzer, OLED screen



MATRIXBlock
Visualize Your Code in Action

Drag, Drop, Create

With Scratch-block based system, and you can directly see the C++ code corresponding to each block. MATRIXblock will become your bridge to Coding.

Built-in Lessons

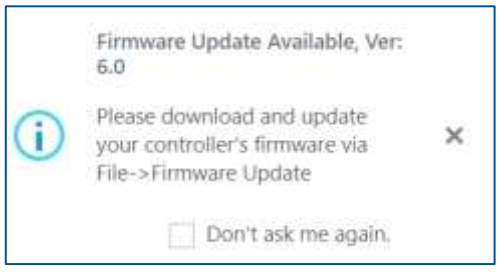
Our built-in tutorials guide you through every essential aspect, helping you get up to speed fast.

Serial with Visualize

MATRIXblock includes a serial monitor with a graph view, letting you track and visualize sensor data easily in real-time.

MATRIXblock R4 Update!

- **Smarter control, greater stability**
- **DC motor advanced control: precision for any motor.**
- **IMU enhancements: redesigned STM32-based algorithm**
- **Drive DC chassis control class: a unified driving system.**
- **Color sensor improvements, a new color ID mode.**
- **Example programs and fixes.**
- **Stability and bug fixes.**



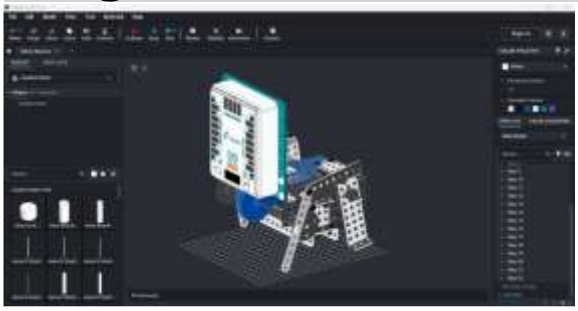
More information

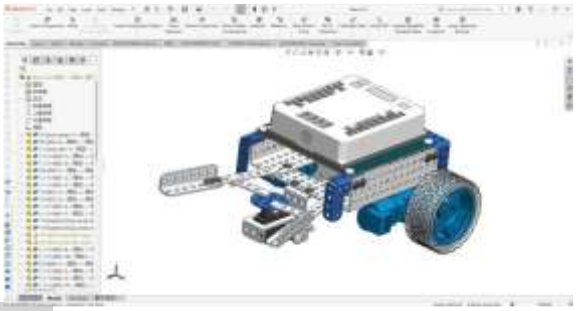
MATRIX Building System

MATRIX Video

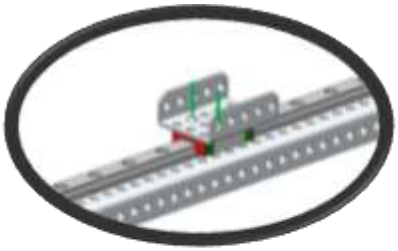
All components are meticulously designed to ensure high compatibility and synergy, allowing users to rapidly translate concepts into concrete robotics prototypes and applications.

Design in Studio & SolidWorks





Connect HIWIN Linear Guides



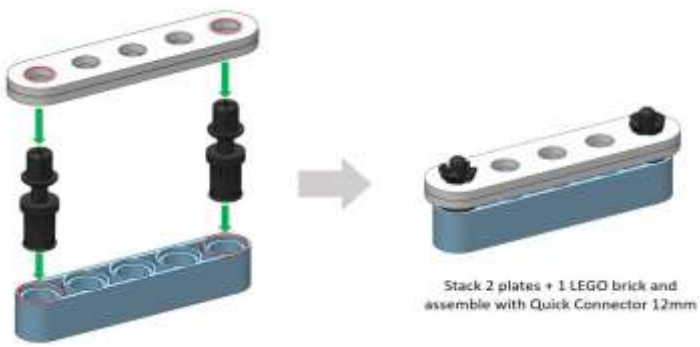
ML Quick Connector

Perfect Match

Fully compatible with brick - connects plastic and metal with flawless precision.

Stronger Together

Combine MATRIX's durability with brick's versatility for advanced hybrid builds.



Our Clients Say

MATRIX Video

What truly elevates MATRIX to a new level is the latest update to MATRIXBlock, its graphical programming environment.

The improved movement control—especially the new Advanced Movement Blocks—has greatly increased the accuracy and reliability of the robot behaviour. Since precise movement is essential in robotics competitions, this update puts MATRIX in a much stronger position for competitive robotics education.

Overall, MATRIX continues to evolve in impressive ways, offering both ease of use and strong technical capability.

Vahid Jourabchi,
National Organiser of WRO in Oman

As an international world champion coach, I highly recommend the MATRIX Robotics System.

Its unique building system helps students learn real-world engineering skills and innovative building methods.

The programming interface effectively bridges Scratch-based coding and C++, preparing students from beginner to advanced levels for the future of robotics and engineering.

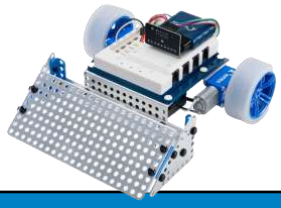
Darren Ng,
Founder of TESSLAB ROBOTICS

I recently completed the three introductory webinars for the MATRIX Future Innovators Kit. The sessions offered a clear overview of the kit and MATRIXBlock software, making it easy to start experimenting creatively—even for someone familiar with platforms like EV3.

With a bit more technical depth or advanced sessions, this could grow into a very solid training program. I'm excited to keep exploring the MATRIX ecosystem!

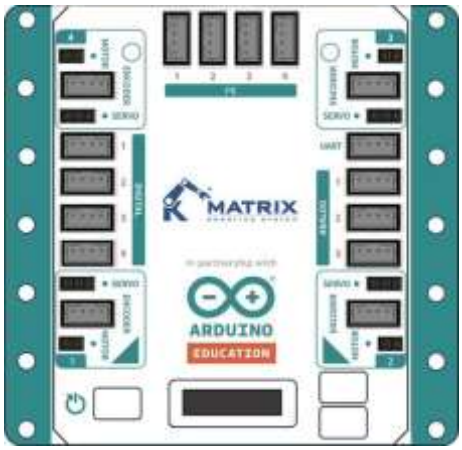
Liza Waseem,
WRO Pakistan Coordinator

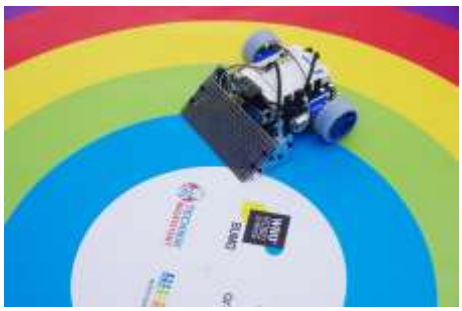
MATRIX Education Solution

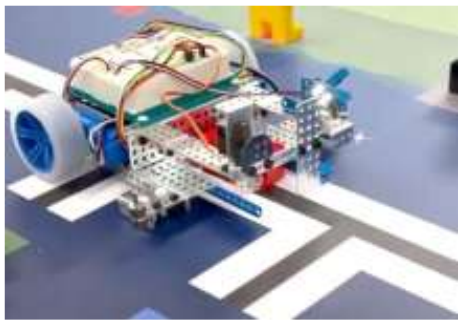


Product	MATRIX Mini Essential Set	MATRIX Mission GO Set
SKU	MR0001v2	MA321
Controller	MATRIX Mini 2.0	MATRIX Mini R4
Part Quantity	165 pcs	242 pcs
Electronic module	Color×1,Laser×1, Joystick×1	Line Tracer×1, Color Sensor×1
Motor	TT Motor (metal gear)×2	TT Encoder Motor (metal gear) ×2, RC Servo (metal gear) ×1, Micro Servo (metal gear) ×1
Quick Connector	Quick Connector: 5mm×50, 7mm×20, 12mm×20	ML Quick Connector – 5mm×40, Quick Connector – Battery Box×4, Quick Connector: 5mm×40, 7mm×40, 12mm×40
Optional	MX120 Expansion Set	MX300 Expansion Set , Joystick2
Feature	Enlightenment Robot	Mission-Ready Core Set
Competition	WRO RoboStarter sumo MARC LOM	WRO RoboMission

MATRIX Future Innovators Set
MAFI900
MATRIX Mini R4
660 pcs
Color Sensor×2, Grayscale Sensor×1, Laser Sensor×2, Miniature Switch×2, Temperature and Humidity Sensor×1, PIR Motion Sensor×1, Potentiometer Sensor×1, Water Level Sensor×1, Soil Moisture Sensor×1, Gesture Sensor×1, One Wire Temperature Sensor×1
TT Encoder Motor (metal gear)×2, TT Motor (metal gear)×2, Micro Servo (metal gear) ×2
Quick Connector: 5mm×80, 7mm×60, 12mm×40
M-Vision Cam (Visual module), Joystick2
Rapid Prototyping Tool
WRO Future Innovators







MATRIX Mini Essential Set

MR0001

Unboxing Video

A quick-start enlightenment robot kit

Mastery begins with Remote Control and advances to Block-based Programming. Discover the excitement of learning in competition!

K–12 STEM

Interdisciplinary learning

Competitions & Certifications

Specification

Building System

01-0003 L Shaped Beam - 3 Hole 2 pc	05-0309 Flanged Plate 3 x 9 Hole 2 pc
01-0009 L Shaped Beam - 9 Hole 2 pc	06-0005 C Shaped Beam - 5 Hole 2 pc
01-0021 L Shaped Beam - 21 Hole 2 pc	06-0013 C Shaped Beam - 13 Hole 1 pc
03-0002 Beam Joiner - 2D Right Angle 4 pc	07-0007 Servo Horn Wheel Brace - Long 4 pc
04-0305 Gusset Plate 3 x 5 Hole 2 pc	17-0709 Triangle Plate 6-8-10 Hole 2 pc
04-0309 Gusset Plate 3 x 9 Hole 2 pc	11-6050 MATRIX Quick Connector - 5mm 50 pc
04-0921 Gusset Plate 9 x 21 Hole 2 pc	11-6070 MATRIX Quick Connector - 7mm 20 pc
05-0303 Flanged Plate 3 x 3 Hole 2 pc	11-6120 MATRIX Quick Connector - 12mm 20 pc
05-0307 Flanged Plate 3 x 7 Hole 2 pc	11-4403 M4 Nylon Shoulder Washer 20 pc

Motors/Wheels

- MTT-MG001-BK MATRIX TT Motor with metal gear box & Brackets (1 Pair) 1 pc
- TT-TIRE_B MATRIX TT Wheel (Blue Rim) 2 pc
- 13-0010 MATRIX Steel Ball Caster 2 pc

Accessory

- MJ2 MATRIX Joystick Pack 1 pc

Controller

- MR-000 V2-4 MATRIX Mini Controller Set (V2.4) 1 pc
- 5521DC-06V2 6 Cell AA Battery Box V2

Sensors

- M5-009V2-RJ12 MATRIX Laser Sensor V2(RJ12) 1 pc
- M5-002V3-RJ12 MATRIX Color Sensor V3(RJ12) 1 pc

Tools

- 8020P-2 M4 Hex Wrench and Crosshead screwdriver
- 15-0001 MATRIX Quick Connector Staple 1 pc

Resources

Teaching presentation

Learn to Build a Sumo Robot with MATRIX Mini Essential Set

Lesson1 Robots in Life
Lesson2 Language to Communicate with Robots
Lesson3 Understanding Robot Sumo
Lesson4 Robot's Grand Turn
Lesson5 Remote Control Robot Part 1
Lesson6 Remote Control Robot Part 2
Lesson7 Color sensor
Lesson8 Line-Following Challenge
Lesson9 Laser sensor
Lesson10 Crash Contes
Lesson11 Robot Modification
Lesson12 Automated Program Design
Lesson13 Manual Program Design
Lesson14 Robots with Dual-Mode Control
Lesson15 Robot Sumo Challenge Part 1
Lesson16 Robot Sumo Challenge Part 2

Play RoboStarter with MATRIX Mini Essential Set

Lesson1 Introduction to Robot Sumo
Lesson2 Robot Sumo Basic Movement
Lesson3 Robot Sumo Remote Control
Lesson4 Robot Sumo with Laser Sensor
Lesson5 Play Robot Sumo Part 1
Lesson6 Play Robot Sumo Part 2

Guidebook

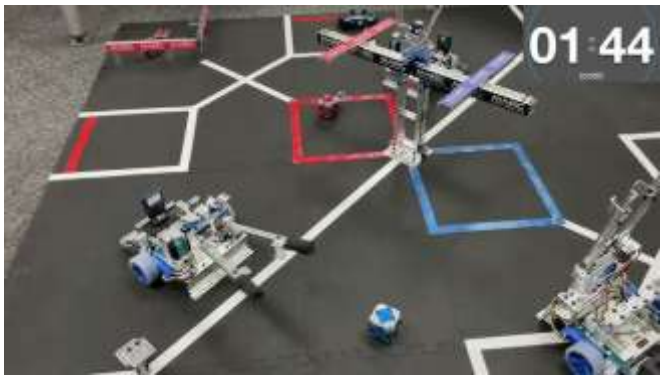
MATRIX Robotics Guidebook- Mini 2.0 Controller Edition
MATRIX Robotics Guidebooks – Structural Components Edition

Result

Competition

WRO RoboStarter sumo

MARC LOM (League of Mecha-clash)



Certification

MATRIX MissionGO Set

MA321

Introducing Video

Mission-ready core set for WRO RoboMission

Applicable to all robot challenge categories, this kit is the ideal starting tool for competitors.It provides a streamlined chassis structure, along with functional and practical sensors and ML Quick Connector compatible with Plastic brick, making it the perfect entry point into competitive robotics.

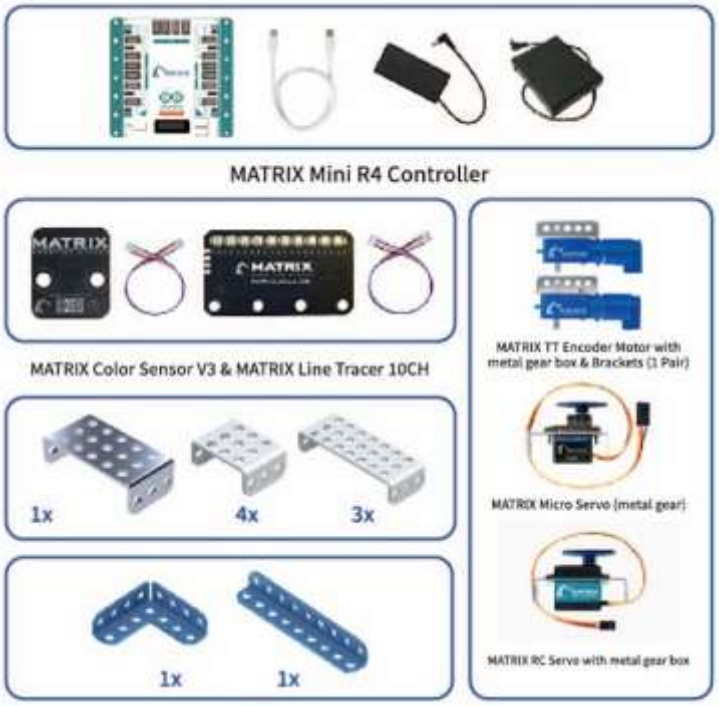
Sample available Nov 2025

Pre order from Nov-Dec 2025

Shipping from Jan 2026

K–12 STEM | **Interdisciplinary learning** | **Competitions & Certifications**

Specification



Resources

Teaching presentation

Learn to Build a Mission Robot with MATRIX MissionGO Set

Lesson1 Introduction to Competition Concept
Lesson2 MATRIX & Parts Introduction
Lesson3 MATRIX Assembly Skills
Lesson4 Robot Assembly
Lesson5 Software Installation and Overview
Lesson6 Firmware Flashing Tutorial
Lesson7 Main Controller Operation
Lesson8 Basic Programming Blocks Part 1
Lesson9 Basic Programming Blocks Part 2
Lesson10 Basic Programming Blocks Part 3
Lesson11 Chassis Motor (DC) Control Part 1
Lesson12 Chassis Motor (DC) Control Part 2
Lesson13 Chassis Motor (DC) Control Part 3
Lesson14 Claw Motor (Servo) Control
Lesson15 Micro Switch
Lesson16 Color Sensor
Lesson17 RGB Sensor
Lesson18 Grayscale Sensor
Lesson19 P-Line Following
Lesson20 Laser Sensor
Lesson21 Ultrasonic Sensor
Lesson22 MATRIX Combined with LEGO
Lesson23 MATRIX Combined with 3D Printing
Lesson24 MATRIX GPIO Block Usage

Guidebook

MATRIX Robotics Guidebook- R4 Controller Edition
MATRIX Robotics Guidebooks – Structural Components Edition

Result

Competition

WRO RoboMission

Certification

MATRIX Future Innovators Set

MAFI900

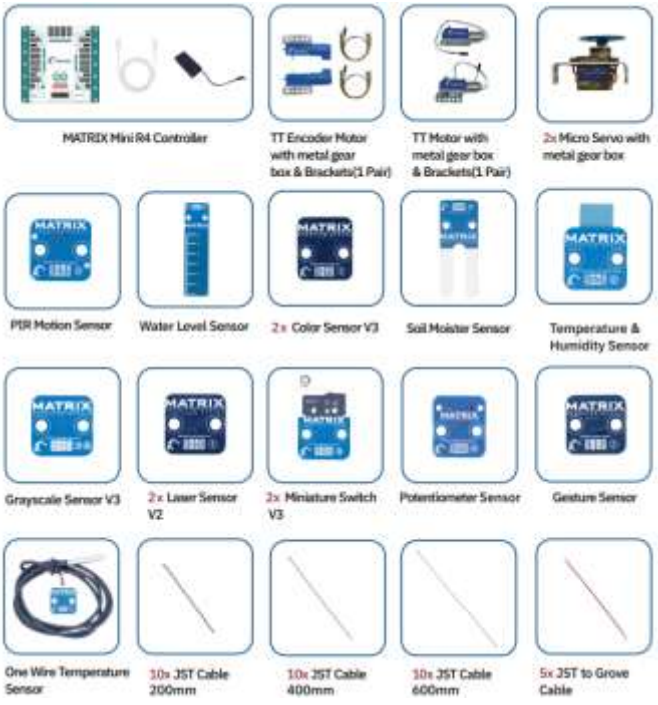
Unboxing Video

Official co-branded kit by WRO X ARDUINO X MATRIX
Enabling everyone to quickly realize real-world innovative solutions.

- Easy to Use, Time and Effort Saving.
- Rapid Prototyping Tool, Quickly validate innovative ideas.
- Metal material, durable and eco-friendly.
- Sustainable Curriculum, Zero Waste.

K–12 STEM	**Interdisciplinary learning**	**Science and technology clubs**
Competitions & Certifications	**Maker & development**	**Topic Research**

Specification



Resources

Teaching presentation

Learn to Build a robot solution with MATRIX Future Innovators Set

Lesson1 MAFI900 Introduction & Basic Test Part 1

Lesson2 MAFI900 Introduction & Basic Test Part 2

Lesson3 Tap to Light Up the Night Lamp

Lesson4 Safety Alarm System

Lesson5 Micro Switch Mechanism

Lesson6 Firmware Flashing Tutorial

Lesson7 Grayscale Sensor

Lesson8 Color Sorting System

Lesson9 Lighting Control

Lesson10 Environmental Monitoring Station

Lesson11 Smart Plant Pot

Lesson12 Laser Beam Security Line

Lesson13 Gesture Remote Controller

Guidebook

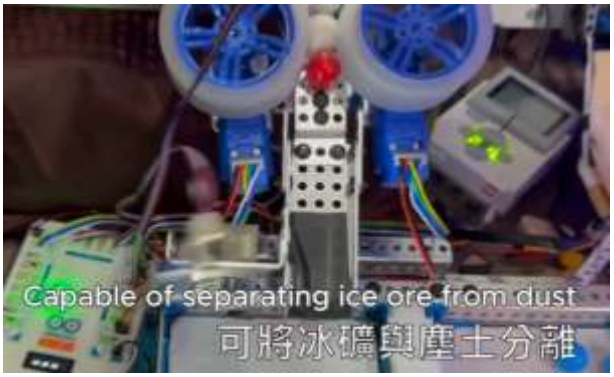
MATRIX Robotics Guidebook- R4 Controller Edition

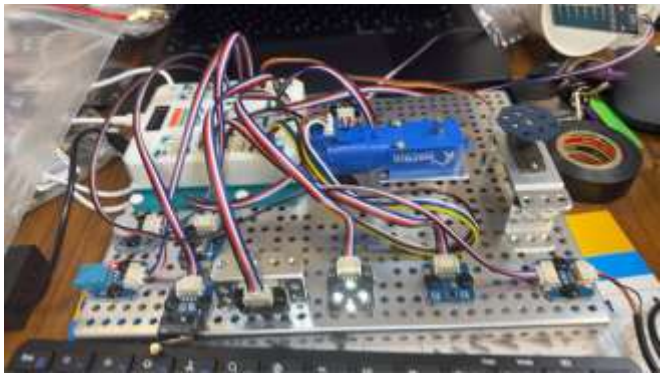
MATRIX Robotics Guidebooks – Structural Components Edition

Result

Competition

WRO Future Innovators





Certification

MATRIX FTC Challenge Set

FTC-M110

Competition Videos

All-new MATRIX FTC Challenge Set has over 700 MATRIX parts and comes with the AndyMark® NeveRest Motors.

MATRIX

AndyMark®

Specification

4 pc	01-0007 L Shaped Beam – 7 Hole	
4 pc	01-0009 L Shaped Beam – 9 Hole	
2 pc	03-0001 Beam Joiner – Straight	
4 pc	03-0004 Beam Joiner – 2D Right Angle	
2 pc	03-0005 Beam Joiner – 3D Right Angle	
4 pc	03-0031 Beam Joiner XL - Straight	
2 pc	03-0032 Beam Joiner XL - Right Angle	
4 pc	04-0921 Gusset Plate 9 x 21 Hole	
4 pc	05-0309 Flanged Plate 3 x 9 Hole	
2 pc	06-0005 C Shaped Beam - 5 Hole	
2 pc	06-0009 C Shaped Beam - 9 Hole	
2 pc	06-0013 C Shaped Beam - 13 Hole	
2 pc	06-0021 C Shaped Beam - 21 Hole	
2 pc	06-0029 C Shaped Beam - 29 Hole	
2 pc	06-0037 C Shaped Beam - 37 Hole	
4 pc	06-0049 C Shaped Beam - 49 Hole	
16 pc	07-0004 Bearing Plate	
16 pc	08-0007 4mm Hub	
6 pc	08-0019 4mm Axle collar	
12 pc	09-0001 M4 Standoff Spacer 32mm	
12 pc	09-0003 M4 Standoff Spacer 16mm	
2 pc	10-0080 D Shaft 80mm	
4 pc	10-0132 D Shaft 132mm	
4 pc	10-0164 D Shaft 164mm	
32 pc	11-3404 M4 4mm Flat Point Set Screw	
150 pc	11-4108 M4 8mm Button Head Screw	
50 pc	11-4116 M4 16mm Button Head Screw	
50 pc	11-4124 M4 24mm Button Head Screw	
150 pc	11-4502 M4 Hex Nut With Tooth Washer	
50 pc	11-4503 M4 Hex Nut With Nylon Lock	
6 pc	13-0004 Spacer 8mm	
20 pc	13-0005 Spacer 4mm	
4 pc	13-0024 Metal Gear 24 Tooth	
4 pc	13-0040 Metal Gear 40 Tooth	
6 pc	13-0056 Metal Gear 56 Tooth	
2 pc	16-0001 Omni Wheel (With 4mm Wheel & Nut & Tube)	
8 pc	17-0709 Triangle Plate 6-8-10 Hole	
2 pc	31-0049 XL L Shaped Beam - 49 Hole	
4 pc	13-0009 96mm Wide Wheel	
2 pc	06-0302 C Channel 216mm	
2 pc	06-0304 C Channel 312mm	
2 pc	06-0309 C Channel 408mm	
6 pc	08-0008 6mm Hub	
30 pc	11-3106 M3 Hex Socket Head Cap Screws (6mm)	
1 pc	14-0005 Battery Charger	
2 pc	14-0006 Servo Ext Wire 200mm	
2 pc	14-0007 Servo Ext Wire 450mm	
1 pc	14-0014 Battery 12V 3000mAh Ni-MH	
4 pc	50-0011 Servo with Metal Gears	
1 pc	15-0012 Wrench for M4 Set Screw	
1 pc	15-0013 Wrench for M4 Button Head Screw	
1 pc	15-0015 Storage Box(MATRIX Black)	
1 pc	15-0018 3mm Cross Screwdriver	
1 pc	50-0015 Tool Kit	

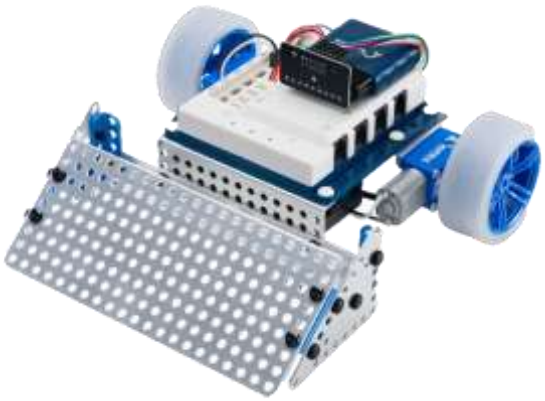
MATRIX Expansion Set

Use and enjoy the fun brought by the MATRIX Building System!

Workshop Video

Best solution to WRO RoboStarter Sumo & MARC LOM

Mini Essential Set
MR0001



Expansion Set
MX120

* The image is for reference only *

Best solution to WRO RoboMission

MissionGO Set
MA321

Expansion Set
MX321

Electronic module - Senor (External Analog Inputs)

MS-003V2 Grayscale Sensor V3

- Supports operating voltage 3.3V ~ 5V
- Equipped with miniature infrared sensor
- Fine-tune digital output threshold using tuning knob
- Provides both analog output (AOUT) and digital output (DOUT)
- Recommended sensing distance: 5~20mm. Adjust based on lighting conditions.

MS-013 Potentiometer Sensor

- Supports 3.3V ~ 5V operating voltage
- Provides analog output (AOUT) with output voltage range of 0 to VCC
- Knob rotation angle ranges from 0° to 300°
- Output voltage changes linearly with rotation angle

Electronic module - Senor (External Analog Inputs)

MS-014 Water Level Sensor

- Supports 3.3V ~ 5V operating voltage
- Provides analog output (AOUT) which changes with water level
- Easy to use, simple for entry-level learning and simple water detection
- PCB anti-rust design, suitable for long-term immersion (not complete immersion)

MS-016 Soil Moisture Sensor

- 3.3 – 5V operating voltage
- Provides analog output (AOUT) which changes with soil moisture
- Simple design, easy to install, and has various applications
- Can be used as a practical sensor in teaching or special projects

Electronic module - Senor (External Digital Inputs)

MS-004V3 Miniature Switch V3

- Outputs a digital signal (HIGH/LOW) with only two states: pressed and not pressed.
- Built-in spring return mechanism, automatically resets after bring pressed.
- Compact size and easy installation, suitable for space-limited applications.
- Simple and clear digital output makes control logic design easier.
  - Pressed → outputs HIGH (1)
  - Released→ outputs LOW (0)

MS-012 PIR Motion Sensor

- Passive infrared sensing: does not emit any signals, making it energy-efficient and stable
- Built-in digital output, easy to connect with controller
- Detection range: up to 7 meters, sensing angle: approx. 100 degrees
- Suitable for applications like automatic lighting, security systems, and smart home devices

Electronic module - Senor (External Digital Inputs)

MS-011 DHT Temperature and Humidity Sensor

- Supports 3.3V to 5V operating voltage
- Detects both temperature and relative humidity
- Single digital pin outputs both parameters (temperature + humidity)
- Stable accuracy, suitable for general environmental monitoring
- Built-in signal filtering and temperature compensation for strong anti-interference
- Temperature measurement range: 0 ~ 50˚C, accuracy ±2˚C
- Humidity measurement range : 20 ~ 90% RH, accuracy ±5% RH

MS-015 One-Wire Temperature Sensor

- Supports 3.3V to 5V operative voltage
- High-precision temperature measurement (resolution configurable from 9 to 12 bits)
- Low power consumption, ideal for long-term monitoring
- Waterproof probe design, suitable for use in humid or enclosed environments
- Communication via 1-wire interface – simple wiring (just one digital line + GND)

Electronic module - Senor (External I²C Inputs)

MS-002V2 Color Sensor V2

- Supports 3.3V to 5V operating voltage
- Supports RGB, CMYK, and Grayscale output formats
- Built-in 14-color auto classification (Color Number) function
- Supports gamma correction, closely mimicking human vision
- Automatic or PWM dimmable fill light to adapt to different lighting conditions
- Uses I²C communication interface, supports 100~400kHz transmission rate
- RGB value range is 0-255, representing the intensity of each channel
- Recommended sensing distance is approximately 5-10 mm; sensing may become unstable or affected by ambient light if too far

MS-002V3 Color Sensor V3

- Supports RGB + Clear (brightness) four-channel sensing
- Infrared filter design enhances color recognition accuracy
- Adjustable Analog Gain and Integration Time
- Built-in automatic fill light adapts to different lighting sources
- Uses I²C communication interface, supports 3.3V ~ 5V voltage systems
- RGB value range is 0-255, representing the intensity of each channel
- Recommended sensing distance is approximately 5-10 mm;
- sensing may become unstable or affected by ambient light if too far

Electronic module - Senor (External I²C Inputs)

MS-009 Laser Sensor

- Supports absolute distance measurement, range 21-1999 mm, accuracy up to 1 mm.
- Fixed sampling frequency of 50Hz (returns data up to 50 times per second)
- Distance data returned via 16-bit values (high and low bytes)
- Equipped with timeout detection function to identify detection failures or abnormal conditions
- Uses I²C communication interface, supporting 3.3V to 5V voltage systems

MS-009V2 Laser Sensor V2

- **Using VL53L0X ToF sensor chip, with a ranging range of 50-1200mm**
- **Supports 1mm resolution with high accuracy and fast response**
- **Built-in 940nm infrared laser emitter, certified as a Class 1 laser device for safety**
- **Compact module design, ideal for embedded or space-constrained scenarios**
- **I²C communication interface, supports system voltages from 3.3V to 5V.**

Electronic module - Senor (External I²C Inputs)

MS-017 Gesture Sensor

- Supports nine basic gesture recognitions (for example waving
- up/down/left/right, clockwise/counterclockwise rotation, ect.)
- Contactless detection with a sensing range of approximately 5-15 cm
- Stable operation even in low-light environments
- Fast response speed for real-time gesture recognition
- Uses I²C communication interface, compatible with MATRIX controllers
- Supports 3.3V ~ 5V operating voltage, simple wiring, and easy integration

Electronic module - Senor (External UART Inputs)

MS-010 M- Vision Cam

- Processor: STM32H7
- Clock: 480Mhz
- Flash Memory: 2Mbyte (user available program storage space not less than 100Kbyte)
- SPAM: IMbyte
- Maximum Supported Resolutions: 640*480 and under
- Operating Voltage: 5V
- Operating Current: 200mA (without fill-in light activated), 350mA (with fill-in light activated)
- Port: USB Type-C, PH2.0-4P (UART communiation)
- Fixing hole: M4*2
- Note: 1Mbyte = 8Mbit*

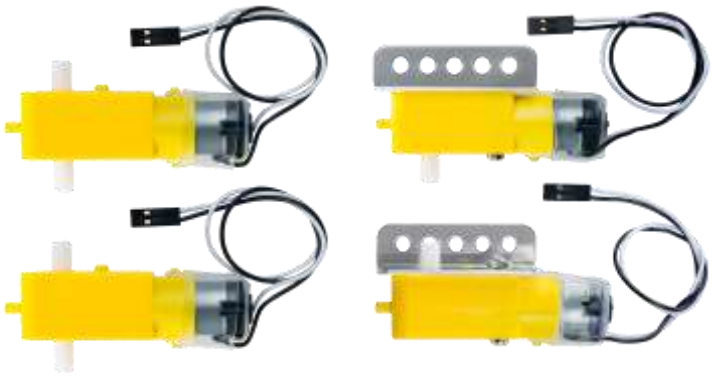
Electronic module - Composite Inputs

MJ2 Joystick 2

- Wireless Technology: 2.4GHz wireless communication for stable remote control.

- Main Controls:
  - Dual Analog Joysticks (“mushroom heads”): One on each side, each providing X and Y
  - axis analog values (0-255) for precise direction and speed control.
  - D-pad: Digital directional input for up, down, left, and right.
  - Four Primary Action Buttons: △ (Triangle), ○ (Circle), ✕ (Cross), □ (Square)
  - Shoulder Buttons: L1, L2, R1, R2
  - Other Buttons: SELECT, START, MODE, and clickable L3 (left stick) and R3 (right stick)
- Power: Powered by two AAA batteries.
- Pairing: Can pair with its dedicated receiver; usually pre-paired at the factory.
- Operation Modes: Supports Analog (default) and Digital modes
  - mportant Note: To ensure correct joystick signal readings, we recommend remaining in
  - the default Analog mode. Digital mode may cause signal transmission issues is accidentally switched

MTT- SG001 MATRIX TT Motor



MTT-SG001 **MTT- SG001-BK**

The dual-axis motor body has shafts on both sides, allowing for the installation of speed measurement dials, whereas single-axis motors cannot.

Motor weight: 30 grams

Reduction Ratio	Voltage (DC/V)	No-load speed (rpm/m)	Load speed (rpm/m)	Rated torque (kg.cm)	Rated current (mA)
1 : 48	6	200	175	1.0	220
	7.2	250	210	1.5	250
1 : 120	6	120	100	1.25	250
	7.2	150	125	1.8	320
1 : 288	6	42	36	2.0	300
	7.2	50	42	3.0	360

Motion Modules – Motor & Servo

MTT-MG001 MATRIX TT Motor with metal gear box

MTT-MG001

MTT-MG001-BK

- Gearbox reduces speed to around 130 rpm at 4.5V and increases torque.
- Dual-shaft design allows flexible mechanical configurations.
- Standard dimensions fit many wheel types.
- Controlled via PWM through MATRIX Mini R4 motor ports.

METT-MG001 MATRIX TT Encoder Motor with metal gear box

MTT-MG001

MTT-MG001-BK

- Metal gears and dual shafts
- Integrated encoder sends A/B phase pulse signals
- Measures rotation speed, angle, and direction
- Enables precise distance control, speed regulation, and synchronization
- Uses 6-pin (PH2.0-6P) connector for power and signals

MRC-MG15-180 MATRIX RC Servo with metal gear box

MRC-MG15-180

MRC-MG15-180-BK

- Supports operating voltage: 5 ~ 8.4V
- NoLoadSpeed: 0.19 ~ 0.16sec/60°
- Running Current(noload): 200 ~ 350mA
- StallTorque(atlocked): 15 ~ 25kg.cm
- StallCurrent(atlocked): 600mA ~ 1.5A
- IdleCurrent(atstopped): 8mA

MMRC-MG90S MMATRIX Micro Servo with metal gear box

MMRC-MG90S

MMRC-MG90S-BK

- Supports operating voltage: 4.8 & 6V
- NoLoadSpeed: 0.12 & 0.09sec/60°
- Running Current(noload): 90mA
- StallTorque(atlocked): 1.8 & 2kg.cm
- StallCurrent(atlocked): 750mA & 860mA
- IdleCurrent(atstopped): 5 ~ 6mA

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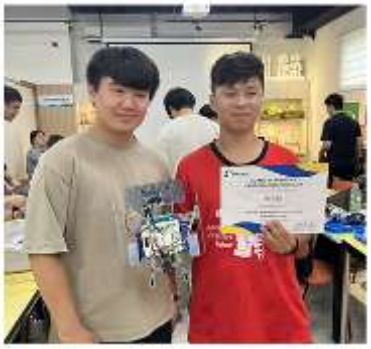
- ▶ Post important technical shares in the community.

- ▶ Delivered a webinar or workshop as the featured lecturer.
- ▶ Release large-scale projects.



Master AI Robot Cup

MARC advances robotics education by providing equal access to hands-on learning, interdisciplinary collaboration, and global engagement.

Rising Pioneers

PR 2025: Future Vision Robotics

The challenge encourages students to imagine how robots will support humans 10 years from now, identifying real-world problems and proposing creative AI and robotics-based solutions.

Competition Rules

Competition Rules & Requirements

Each team will prepare:

- **Project Report (≤20 pages, PDF)**
- **Project Video (≤90 sec)**
- **Booth display & on-site presentation**

▶ Students must complete the work (assembly, programming, booth design); coaches may guide but not execute.

▶ Evaluation focuses on creativity, functionality, process, and presentation, adjusted by age group.

▶ Booth size: 2m × 2m (max height 2m), flexible display formats allowed. Safety rules strictly enforced.

▶ Projects must demonstrate AI elements appropriate to the group level (e.g., sensor input with explanation for younger group; multi-sensor AI decision-making for older group)

League of mecha-clash

LOM 2026: Undersea Core Contest

Beneath the Surface, the Future Awaits!

Competition Rules

Exploration | **Scramble** | **Occupation**

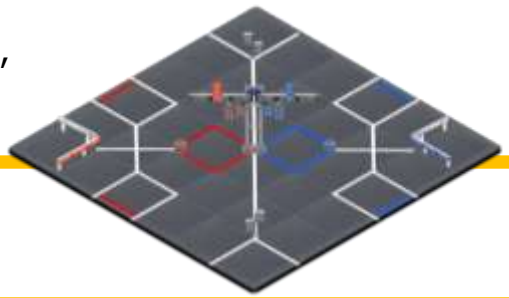
Autonomous Mode
Let your robot think on its own.

Manual Mode
Take control and fight for dominance.

Final 30 sec
Hang your robot and secure victory!

Game Highlights

Alliance Battles	Teams join forces to form two-robot alliances and take on rivals in dynamic clashes.
Earn Points	Collect energy cubes, claim the Ocean Core, and even push opponents off the field.
Double-Elimination Finals	The strongest alliances survive to the end.
MATRIX Engineering Challenge	Build smart, move fast, and hang high.



What Makes It Special

Hybrid Gameplay	Balance between autonomous intelligence and human control.
Alliance Strategy	Communication and teamwork are as important as coding.
Undersea Adventure	A striking arena themed around Poseidon's Trident and ancient ruins.
STEM in Motion	Learn real-world robotics concepts — sensors, AI logic, and mechanical design through fun and competition.

Goal

Push innovation to its limits.
Build robots that can explore, battle, and conquer — all in one mission.
Only the most creative teams will rise to claim the Ocean Core Champion title!