

THE GATEWAY TO HUMANOID RL RESEARCH

TRON1

MULTI-MODAL BIPED ROBOT

EMPOWER
INNOVATORS



Modular Foot-End: Get 3 Modes with 1 Purchase

PRODUCT
OVERVIEW



C5I[®] Digital Innovation Partner



TRON1

LimX Dynamics' TRON 1 is the first multi-modal biped robot, serving as a R&D platform that supports innovation in both robotic hardware and software across various disciplines and fields.

TRON 1 features a unique and innovative "Three-In-One" modular design for multi-modal algorithm development, equipped with a fully open SDK and hardware interfaces to unlock the hardware's potential to meet the demands of high-complexity verification and validation (V&V).

TRON 1 supports full-process development with Python, and one-click Sim2Real deployment, significantly accelerating reinforcement learning research.

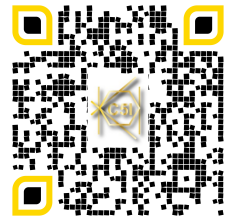
Boasting a wide range of practical ports, TRON 1 allows for various expansion accessories to maximize its applications in diverse research areas. The goal is to empower innovators in academic research, new technology development, industrial exploration, educational training, and more.

In the AI era of general-purpose robots, TRON 1 serves as the best onboarding platform for humanoid robot motion control and a must-have testbed for Embodied Intelligence research.

INNOVATIVE
CONFIGURATIONS

SPIN UP
RL RESEARCH

SUPPORTS CROSS-FIELD
RESEARCH



"Three-in-One" Modular Foot-end Structure

TRON 1 features a modular design that allows for seamless switching among three different foot end configurations. With automatic hardware recognition and software adaptation, it provides a flexible and versatile platform for research.

WHEELED

UNLEASH THE FULL POTENTIAL FOR
ALL-TERRAIN MOBILITY



SOLE

STAND AND WALK IN HUMANOID
LEGGED FORM FACTOR

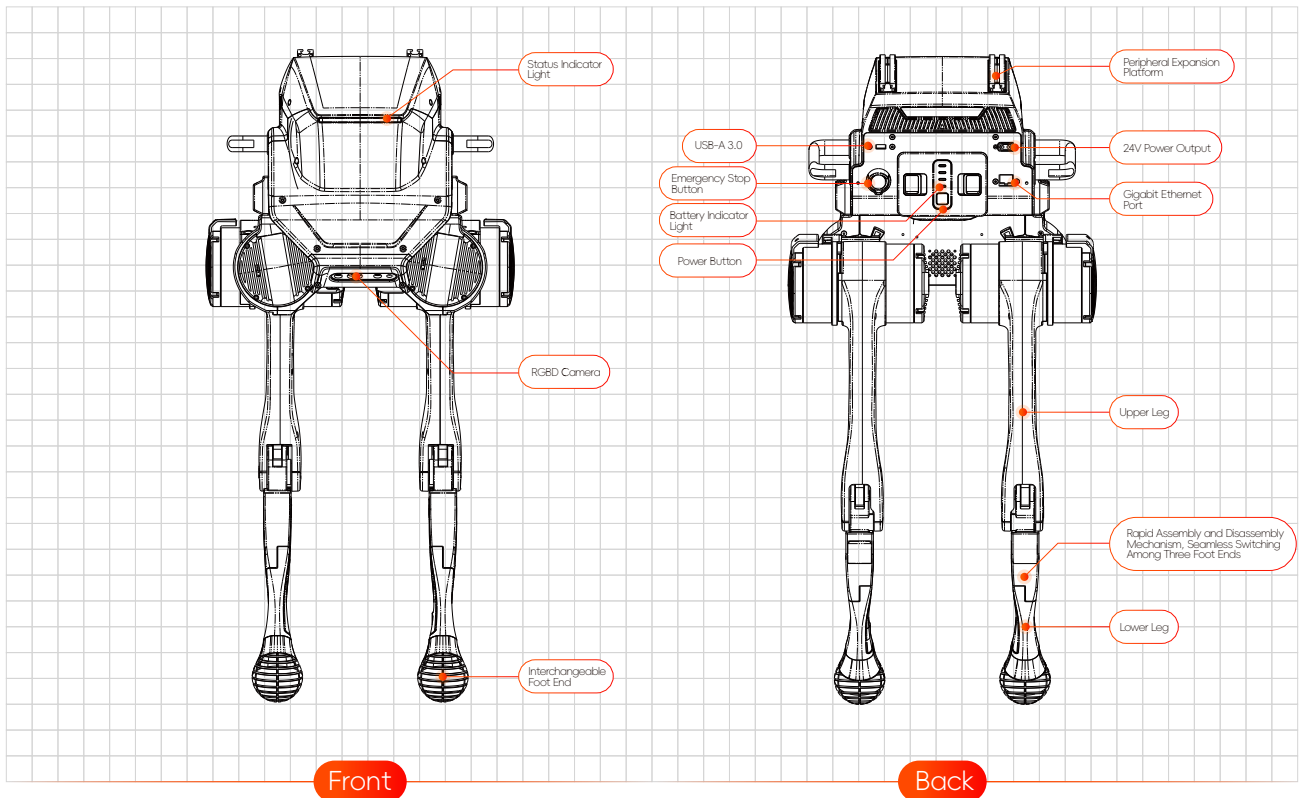


POINT-FOOT

EASY TO CONTROL IN THE SIMPLEST
LEGGED FORM FACTOR

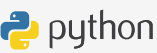


Diagram



Spin up RL Research

Compatible with full-process development in Python, C++ not required



Comprehensive URDF to minimize the Sim2Real gap



Detailed user manual, professional secondary development guide and code examples



Mainstream Simulation Platforms
NVIDIA Isaac, Mujoco, Gazebo, etc.



MuJoCo



Practical Peripheral Expansion Ports for Diverse Research Goals



Radars



Robotic Arm



Camera



Dual-Spectrum Gimbal



Product Specifications

Category	Details	Std. Ed.	EDU Ed.
Mechanical Parameters	Dimensions	≤392mm x 420mm x 845mm	≤392mm x 420mm x 845mm
	Material	Aluminum Alloy + Industrial Plastic	Aluminum Alloy + Industrial Plastic
	Net Weight	≤20kg	≤20kg
Battery Parameters	Battery Supply Voltage	48V	48V
	Maximum Battery Power	1000W	1000W
	Battery Swapping	☑	☑
	Battery Type	Ternary Lithium	Ternary Lithium
	Battery Capacity	240Wh (48V/5Ah)	240Wh (48V/5Ah)
	Battery Range	≥2h (At Rated Operational Conditions)	≥2h (At Rated Operational Conditions)
	Charging Methods	Battery Charging Quick Battery Swap	Battery Charging Quick Battery Swap
	Charger	Battery Charging Dock	Battery Charging Dock
	Charging Time	<1h (20%-80%) 1.5h (100%)	<1h (20%-80%) 1.5h (100%)
Performance Parameters	Load Capacity	10kg (Maximum 15kg)	10kg (Maximum 15kg)
	Movement Speed	- Point-Foot: <1m/s - Sole: <1m/s - Wheeled ≥5m/s	- Point-Foot: <1m/s - Sole: <1m/s - Wheeled ≥5m/s
	Maximum Climbing Angle	≥15°	≥15°
	Maximum Obstacle Height Limitation	15cm	15cm
	Computer Specification	12th Gen i3 / 16GB RAM / 512GB (CPU/Memory/Storage)	12th Gen i3 / 16GB RAM / 512GB (CPU/Memory/Storage)
	Operating Environment	-5°C to 40°C Operates in favorable weather conditions	-5°C to 40°C Operates in favorable weather conditions
Actuator Parameters	Rated Voltage (V)	48V	48V
	Rated Torque (Nm)	30Nm	30Nm
	Peak Torque (Nm)	80Nm	80Nm
	Peak Motor Speed (rad/s)	15rad/s	15rad/s

Category	Details	Std. Ed.	EDU Ed.
Sensor Configuration	RGBD Camera	Optional	☑
	IMU	☑	☑ (IMU Data Access for Developers)
Extensibility	Peripheral Expansion Ports	1*USB3.0 1*GbE	1*USB3.0 1*GbE
	Peripheral Power Supply Port	24V, Output Power: 100W(Peak 200W)	24V, Output Power: 100W (Peak 200W)
	Peripheral Mounting Point	☑	☑
	Handheld Remote Controller	1 Pcs	1 Pcs
	Remote Controller Communication Range	50m	50m
	Software Upgrade	Supported	Supported
	Remote E-Stop	☑	☑
	E-Stop Button	☑	☑
	Secondary Development	—	Supported
Developer Tools	SDK	—	☑
	Data Visualization Tools	—	☑
	Data Recording and Playback	—	☑
	Joint Control Algorithm	—	☑
Foot End Extension	Simulation Platforms	—	☑
	Point-Foot	Four-directional movement, Steering, Stepping in place, In-place standing up, In-place squatting, Body height adjustment	Four-directional movement, Steering, Stepping in place, In-place standing up, In-place squatting, Body height adjustment
	Sole	Four-directional movement, Steering, Stepping in place, In-place standing up, Static standing, In-place squatting, Body height adjustment, Fall recovery	Four-directional movement, Steering, Stepping in place, In-place standing up, Static standing, In-place squatting, Body height adjustment, Fall recovery
	Wheeled	Wheeled forward/backward movement, Differential steering, In-place standing up, Static standing, In-place squatting, Body height adjustment, Fall recovery	Wheeled forward/backward movement, Differential steering, In-place standing up, Static standing, In-place squatting, Body height adjustment, Fall recovery
Others	Spare Battery	1 (Optional)	1 (Optional)
	Roll Cage	1	1
	Accessories: Point-Foot	1 Pair	1 Pair
	Accessories: Wheeled	1 Pair	1 Pair
	Accessories: Sole	1 Pair	1 Pair

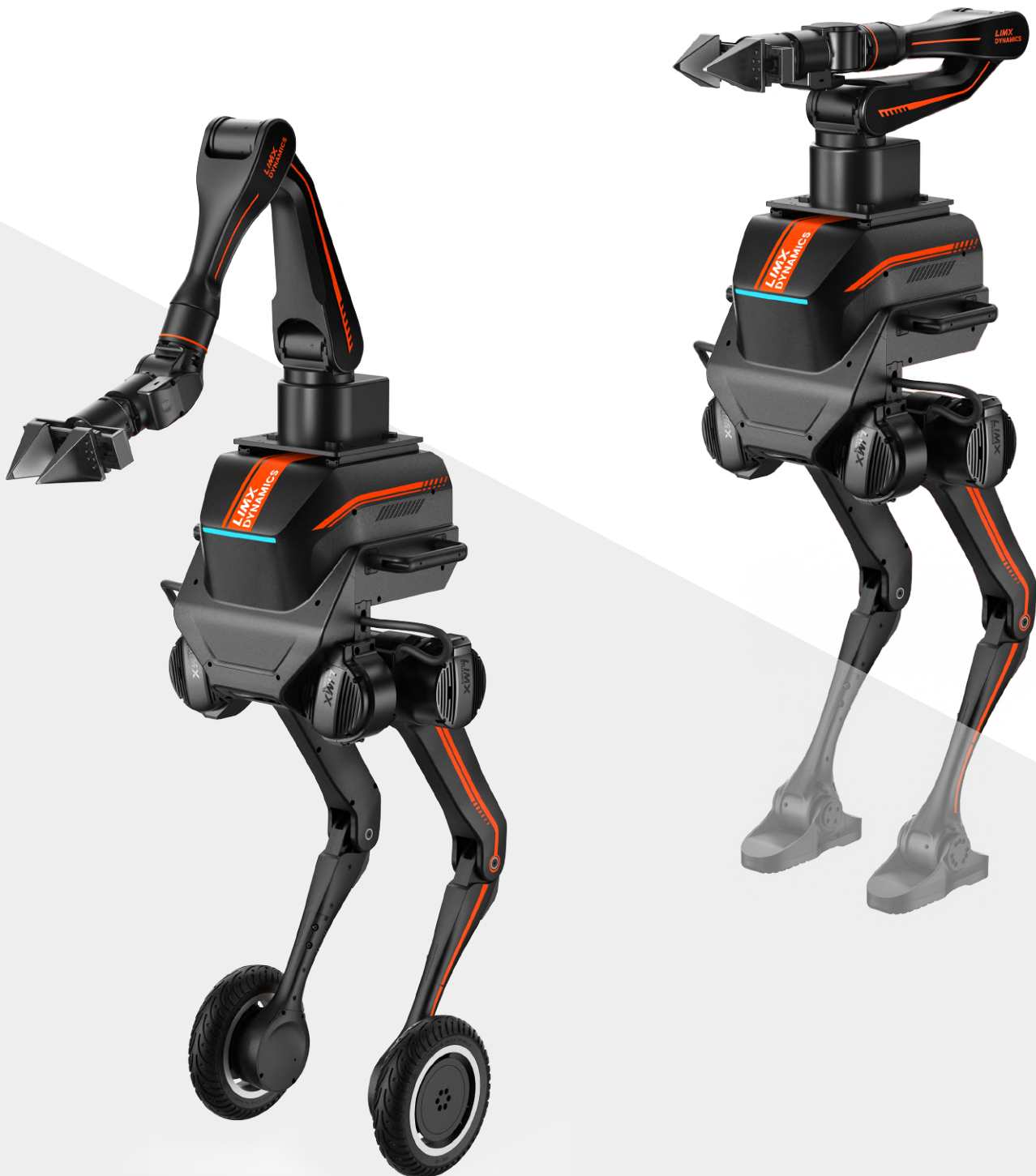


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Arm Expansion Kit



Arm Expansion Kit

Powered by a robotic arm, TRON 1 empowers researchers and developers to effortlessly explore cutting-edge research in **mobile manipulation, whole-body control, and motion planning.**



Dual Research Modes: Supports both "Arm + Sole" and "Arm + Wheeled" configurations, empowering studies in modular control of the arm or legs, and integrated whole-body control.



Streamlined for Efficiency: A minimal-configuration bipedal platform for mobile manipulation reduces the complexity of simulation and control algorithms, accelerating innovation and iteration.



Out-of-the-Box Expansion: Standard mounting adapters for immediate plug-and-play use.



Rich Open-Source Examples: For faster onboarding and lower development barriers and fast-track your projects.

Technical Specifications

Product Name	TRON 1 Arm Expansion Kit
Model Number	TRON1-AP-YG
Compatible Modes	Sole / Wheeled
DOF (Arm)	6
Arm Reach (Maximum)	647mm
Operating Height (Relative to Ground)	0 ~ 1500mm
Arm Weight	3.5kg
Payload (Rated)	1.5kg
Payload (Max)	3.5kg
Speed	Wheeled: 1.0 m/s Sole: 0.5 m/s

Accessories List

Category	Qty/Unit
Robotic Arm	
• Power Adapter	
• Power Cable	
• Power Conversion Cable	1 set
Gripper	1 set
Mounting Plate	1 pc
USB-C Adapter Cable	1 pc
Assembly Kit	
• Screws	
• Hex Key	
• T-Slot Slider	1 pack
Quick Start Guide	1 pc



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Voice Interaction Kit



Equipped with NVIDIA NX module and high-fidelity microphone array, TRON 1 supports voice wake-up, speech control, enhancing human-like interaction and adaptability across diverse scenarios—ideal for embodied AI education, guided narration, and interactive exhibitions.



Supports customizable wake words and offline command sets; compatible with deployment of various LLM for multilingual and multi-scenario voice interaction.



Built-in AI Voice Interaction Framework: for navigation/Q&A development.



Rich Open-Source Examples: For faster onboarding and lower development barriers and fast-track your projects.

Technical Specifications

Product Name	TRON 1 Voice Interaction Kit
Model Number	TRON1-AP-VI
Compatible Modes	Sole / Wheeled
GPU	NVIDIA Ampere architecture 1024 CUDA Cores 32 Tensor Cores
GPU Max Frequency	1173MHz
AI Performance	157 TOPS (Sparse) 78 TOPS (Dense)
CPU	8-core Arm® Cortex®-A78AE v8.2 64-bit CPU 2MB L2 + 4MB L3
CPU Max Frequency	2.0GHz
SPEC int rate	167
Memory	16GB 128-bit LPDDR5 102.4GB/s
Storage	M.2 SSD (256GB standard) Supports External NVMe
Pickup Range	≤4m
Microphone Array Coverage	360°
Supported Languages	Mandarin, English
Customization Support	Wake words, LLM deployment (e.g. qwen2.5:3b, llama3.2:3b), Speech synthesis

Accessories List

Category	Qty/Unit
Audio Module • Mic Array • Mounting Plate • Power Cable	1 set
AI Computing Module • Jetson Orin NX 16GB • Power Adapter Module • Power Cable • Power Extension Cord	1 set
Mounting Plate	1 pc
Mounting Bracket	2 pc
Ethernet Cable	1 pc
Assembly Kit • Screws • Hex Key	1 pack
Huawei Router (Optional)	1 set
Quick Start Guide	1 pc



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Sensor Expansion Kit



Integrates **LiDAR + depth camera** with pre-optimized mounting positions and field-of-view (FOV) , TRON 1 provides a ready-to-use solution for 3D mapping, relocalization, navigation, and dynamic obstacle avoidance.



NVIDIA High-Performance Computing Module: Enables research on autonomous navigation and obstacle avoidance in complex environments.



Pre-Tuned Field of View and Sensor Mounting: Reduces repetitive calibration, accelerating research efficiency.



Out-of-the-Box Expansion: Standard mounting adapters for immediate plug-and-play use.



Rich Open-Source Examples: For faster onboarding and lower development barriers and fast-track your projects.

Technical Specifications

Product Name	TRON 1 Sensor Expansion Kit
Model Number	TRON1-AP-SS
Compatible Modes	Wheeled
GPU	NVIDIA Ampere architecture 1024 CUDA Cores 32 Tensor Cores
GPU Max Frequency	1173MHz
AI Performance	157 TOPS (Sparse) 78 TOPS (Dense)
CPU	8-core Arm® Cortex®-A78AE v8.2 64-bit CPU 2MB L2 + 4MB L3
CPU Max Frequency	2.0GHz
SPEC int rate	167
Memory	16GB 128-bit LPDDR5 102.4GB/s
Storage	M.2 SSD (256GB standard) Supports External NVMe
LiDAR FOV	Horizontal: 360° Vertical: -7° ~52°
Laser Wavelength	905nm
Close Proximity Blind Zone	~0.8m
Point Rate	200,000 pts/s
Frame Rate	10Hz
Depth FOV (HxV)	87° x58°
Depth Resolution	1280x720
Depth Accuracy	<2% at 2m
RGB Sensor FOV (HxV)	69° x42°
RGB Resolution	1920x1080

Accessories List

Category	Qty/Unit
LiDAR • Mounting Plate • Power Cable	1 set
Depth Camera • Mounting Bracket • Power Cable	1 set
AI Computing Module • Jetson Orin NX 16GB • Power Adapter Module • Power Cable • Power Extension Cord	1 set
Ethernet Hub	1 pc
Mounting Plate	1 pc
LiDAR Mounting Bracket	2 pc
Assembly Kit • Screws • Hex Key	1 pack
Ethernet Cable	3 pcs
Quick Start Guide	1 pc

