

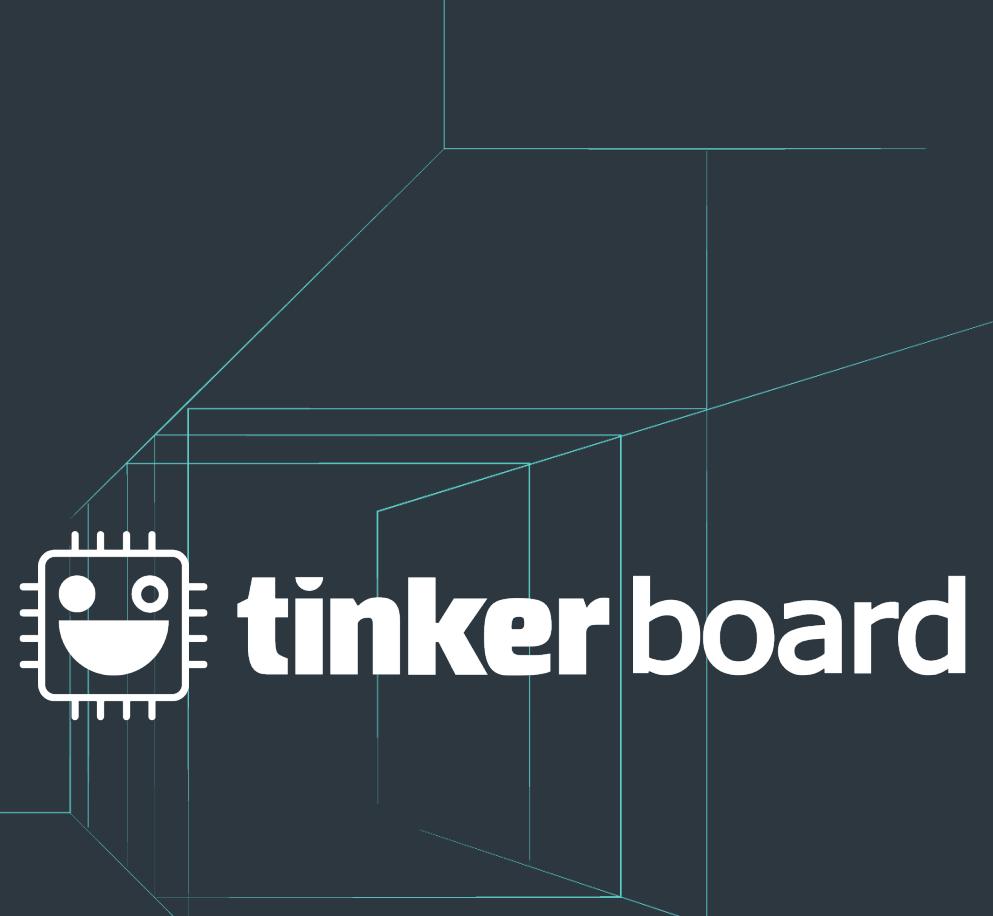
# Tinker Edge R

AIoT를 위한 최선의 엣지 단말기



# Contents

- Tinker 소개
- Tinker 비교 가이드
- 산업 활용 예시
- 액세서리 소개



# Product Roadmap

Product MP

Next Gen new

Q3'22

Q4'22

Q1'23

Q2 '23

## Tinker Edge T

4 x Cortex-A53 @ 1.5GHz, edge TPU  
1GB LPDDR4, 8GB eMMC



## Tinker Edge R

2 x Cortex-A72 @ 1.8GHz +  
4 x Cortex-A53 @ 1.4GHz, NPU  
2+1/4+2GB LPDDR, 16GB eMMC



## Tinker Board 2S

2 x Cortex-A72 @ 2.0GHz +  
4 x Cortex-A53 @ 1.5GHz  
2GB/4GB LPDDR4, 16GB eMMC



## Tinker Board 2

2 x Cortex-A72 @ 2.0GHz +  
4 x Cortex-A53 @ 1.5GHz  
2GB/4GB LPDDR4



## Tinker Board S R2.0

4 x Arm® Cortex®-A17 @ 1.8 GHz  
2GB LPDDR3, 16/32GB eMMC



## Tinker Board R2.0

4 x Arm® Cortex®-A17 @ 1.8 GHz  
2GB LPDDR3



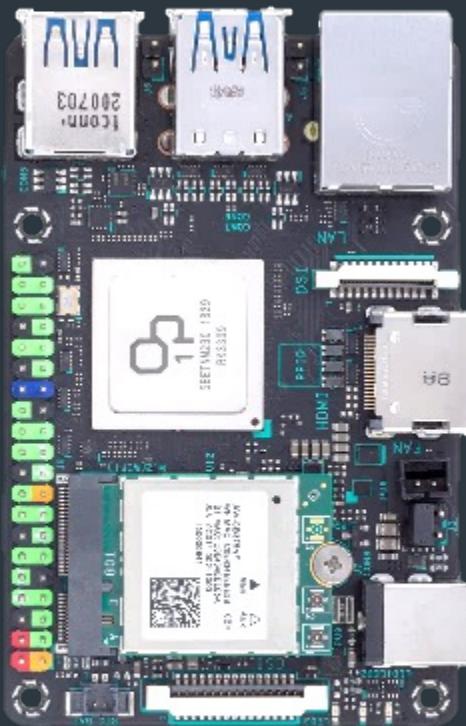
## Tinker System 2

**Hang Seo Beon** RK3399, Fanless,  
2GB/4GB LPDDR4, 16/32GB eMMC  
Certified with RF Regulation



# Tinker Board Series 소개

TINKER BOARD 2S



TINKER BOARD S R2.0



TINKER ACCESSORIES



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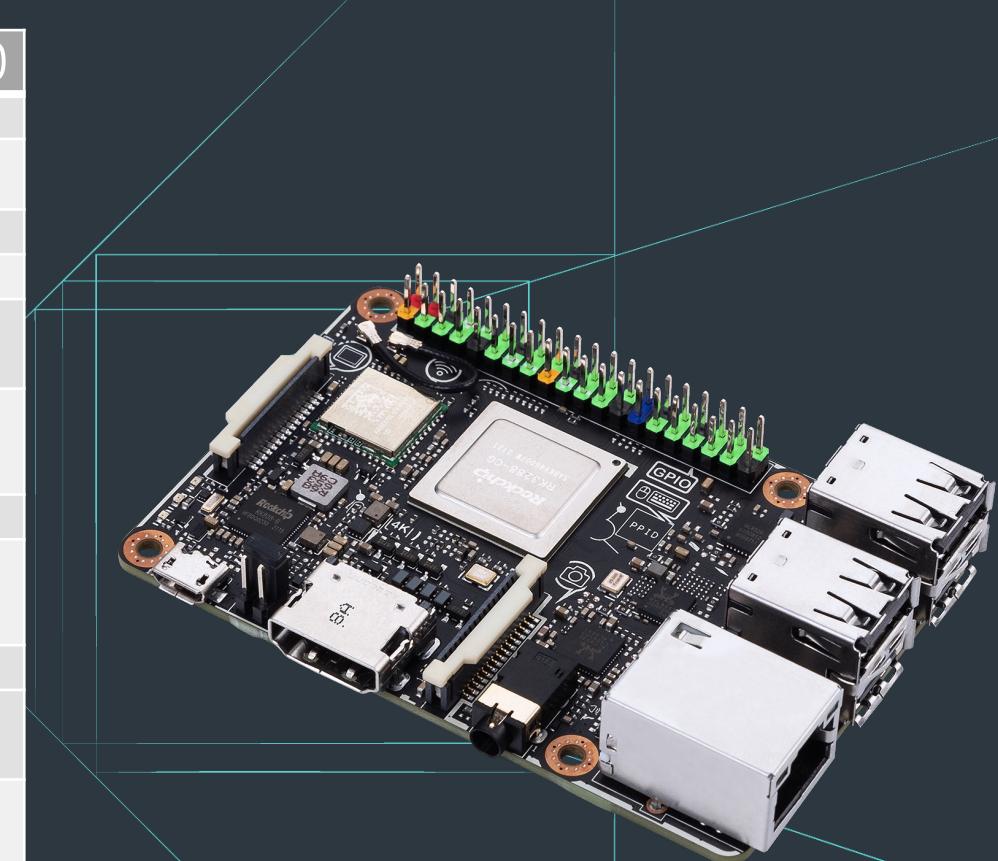
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Beomseok Park - [baam.park.95@gmail.com](mailto:baam.park.95@gmail.com)

ASUS IoT

# Tinker Board R2.0 series - 사양

TINKER BOARD R2.0 / TINKER BOARD S R2.0	
SoC	Rockchip RK3288-CG.W (32bit)
CPU	Quad-core ARM Cortex-A17 @ up to 1.8 GHz
GPU	ARM Mali™-T764 MP4 @ 650MHz
Memory Size	Dual-CH LPDDR4 2GB/4GB
Storage	1 x Onboard 16GB eMMC* 1 x Micro SD card slot
Display	1 x HDMI (up to 4K/30Hz & CEC HW Ready) 1 x 15-pins MIPI DSI (2 lane) (HD)
Camera	1 x 15-pins MIPI CSI-2 (2 lane)
Connectivity	1 x RJ-45 GbE LAN 1 x Wi-Fi 802.11ac & BT 4.2 (2T2R, swappable antenna)
USB	4 x USB 2.0 Type-A
AUDIO	1 x HDMI audio out Realtek ALC4030U Codec with 1 x <ul style="list-style-type: none"><li>- 40-pin connector for GPIO (I2C, PWM, UART, SPI, I2S, etc)</li><li>- DC fan header</li><li>- RTC battery header</li><li>- Power-On/Reset/Recovery/Debug headers</li></ul>
Power Connector	5V/2.5~3A Micro USB
OS Support	Debian 10 (32bit)/ Android 11 10 (32bit)
Dimension	85 x 56 mm



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# SPEC 비교 – Tinker Board R2.0 vs RPi 4

Model	Tinker Board R2.0 Series	4B
Core Processor (SoC)	Rockchip RK3288-CG.W <b>Quad-Core A17 1.8GHz</b>	Broadcom BCM2711B0 Quad-Core A72 1.5GHz
GPU	ARM Mali-T760 MP4 <b>600MHz</b>	Broadcom VideoCore VI 500MHz
RAM	2GB	1GB / 2GB / 4GB
Display Output Resolution	1 x HDMI@4K	<b>2 x Micro HDMI@4K</b>
4K Video Playback	<b>Yes</b>	No (Might be support in the future)
System Storage	<b>eMMC (S only) + SDIO 3.0</b>	SDIO 2.0
NIC	Gb LAN	Gb LAN
Audio SPEC	1 x audio jack (with microphone) 1 x S/PDIF contact pin for extension <b>192K/24bit sampling rate</b>	1 x audio jack (with Composite Video output)
Wi-Fi	802.11 b/g/n	<b>Dual-band</b> 802.11 b/g/n/ac
Bluetooth	Yes, 4.2	Yes, <b>5.0</b>
Swappable Antenna for Better Signal	<b>Yes, w/ swappable antenna</b>	No
USB	4 x USB 2.0	2 x USB2.0 + <b>2 x USB3.0</b>
Official Supported OS	Linux – Debian & <b>Android 11</b>	Linux – Debian

## Key Summary

1. 더 나은 CPU/GPU 성능
2. 더 빠른 시스템 저장소 I/O 성능
3. 4K 재생 가능

4. 더 나은 오디오 퀄리티
5. 변경 가능한 안테나를 통한 더 나은 무선 신호
6. 엄청난 기술적, 기업적 지원

# SPEC 비교 – Tinker Board R2.0 vs RPi 3B/3B+

Model	Tinker Board R2.0 Series	3B	3B+
Core Processor (SoC)	Rockchip RK3288-CG.W <b>Quad-Core A17 1.8GHz</b>	Broadcom BCM2837 Quad-Core A53 1.2GHz	Broadcom BCM2837B0 Quad-Core A53 1.4GHz
GPU	ARM Mali-T760 MP4 <b>600MHz</b>	Broadcom VideoCore IV 300MHz	Broadcom VideoCore IV 400MHz
RAM	<b>2GB</b>	1GB	1GB
Display Output Resolution	1 x HDMI@ <b>4K</b>	1 x HDMI@1080P	1 x HDMI@1080P
4K Video Playback	<b>Yes</b>	No	No
System Storage	<b>eMMC (S only) + SDIO 3.0</b>	SDIO 2.0	SDIO 2.0
NIC	<b>Gb LAN</b>	100M LAN	Gb LAN (shared with USB 2)
Audio SPEC	1 x audio jack (with microphone) 1 x S/PDIF contact pin for extension <b>192K/24bit sampling rate</b>	1 x audio jack (with Composite Video output)	1 x audio jack (with Composite Video output)
Wi-Fi	802.11 b/g/n	802.11 b/g/n	<b>Dual-band</b> 802.11 b/g/n/ <b>ac</b>
Bluetooth	Yes, 4.2	Yes	Yes
Swappable Antenna for Better Signal	<b>Yes, w/ swappable antenna</b>	No	No
USB	<b>4 x USB 2.0</b>	4 x USB 2.0 (shared with LAN)	4 x USB 2.0 (shared with LAN)
Official Supported OS	Linux – Debian & <b>Android 11</b>	Linux – Debian	Linux – Debian

## Key Summary

1. 확실히 더 나은 CPU/GPU 성능
2. 더 빠른 시스템 저장소 I/O 성능
3. 4K 출력 및 4K 재생 가능

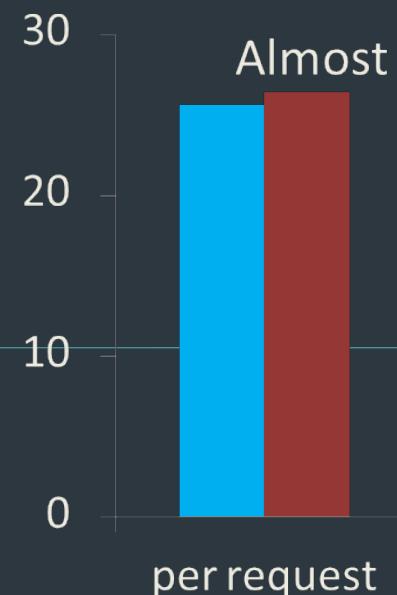
4. 더 나은 오디오 퀄리티
5. 변경 가능한 안테나를 통한 더 나은 무선 신호
6. 엄청난 기술적, 기업적 지원

# Benchmark 비교 – Tinker Board R2.0 vs RPi 4

## CPU -- Sysbench Test Result\*

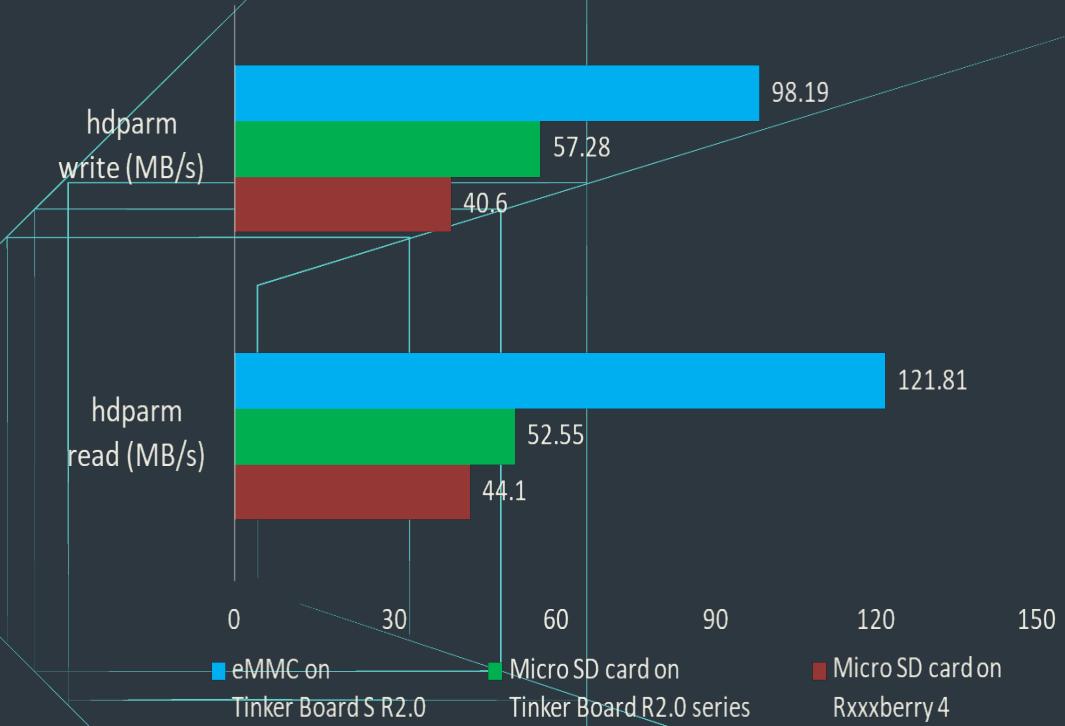
(ms) **The Lower the better!**

Almost the same!



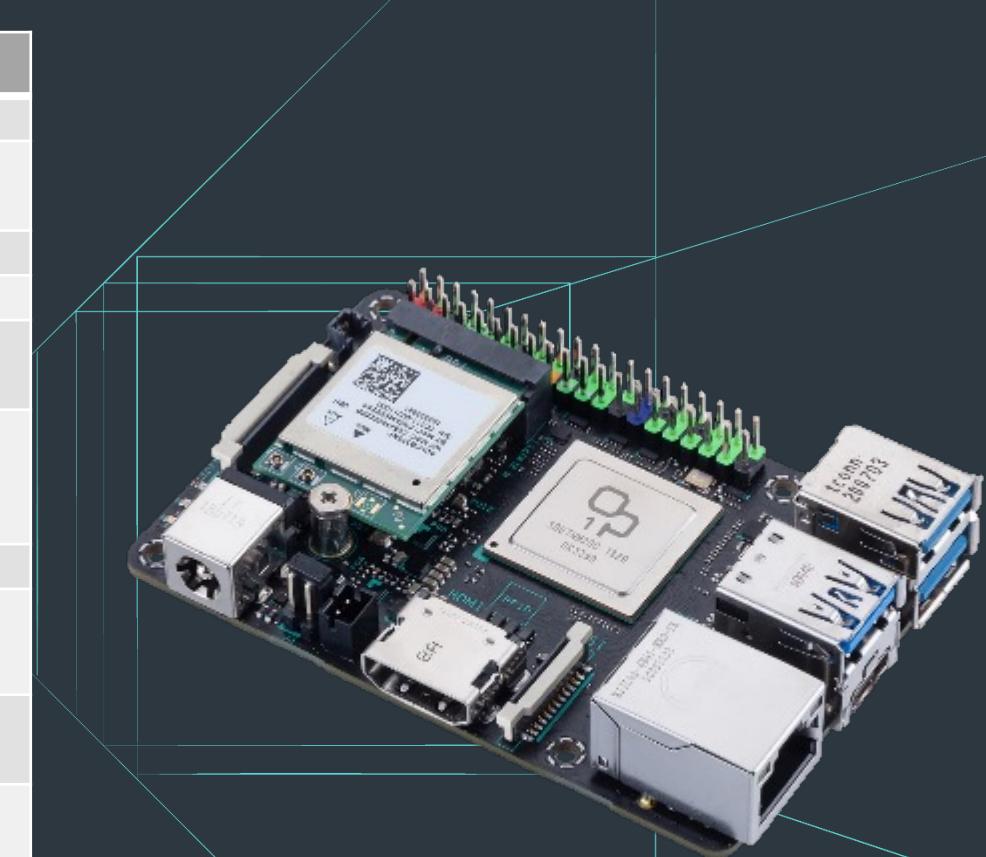
## GPU -- glmark2 Test Result

**20% better** than the other SBC board



# Tinker Board 2 series - 사양

TINKER BOARD 2 / TINKER BOARD 2S	
SoC	Rockchip RK3399 (64-bit)
CPU	Dual-core ARM Cortex-A72 @ 2.0GHz + Quad-core ARM Cortex-A53 @ 1.5GHz
GPU	ARM Mali-T860 MP4 @ 800MHz
Memory Size	Dual-CH LPDDR4 2GB/4GB
Storage	1 x Onboard 16GB eMMC* 1 x Micro SD card slot
Display	1 x HDMI 2.0 (up to 4K/60Hz & CEC HW Ready) 1 x Type-C (DP 1.2 Alt Mode) 1 x 22-pins MIPI DSI (4 lanes)
Camera	1 x 15-pins MIPI CSI-2 (2 lane)
Connectivity	1 x RJ-45 GbE LAN 1 x Wi-Fi 802.11ac & BT 5.0 (2T2R, swappable antenna)
USB	3 x USB 3.2 Gen1 Type-A 1 x USB 3.2 Gen1 Type-C OTG
Internal Headers	- 40-pin connector for GPIO (I2C, PWM, UART, SPI, I2S, etc) - DC fan header - RTC battery header - Power-On/Reset/Recovery/Debug headers
Power Connector	12V~19V DC-in (Barrel jack 5.5Ø/2.5Ø)
OS Support	Debian 10 / Android 11
Dimension	85 x 56 mm



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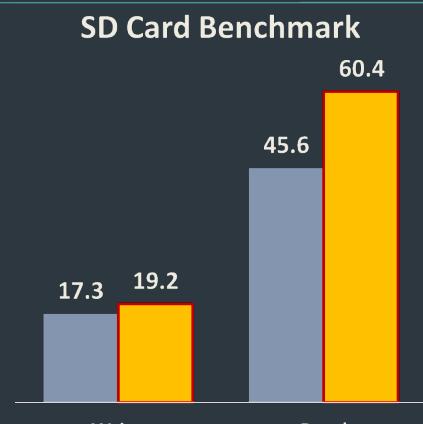
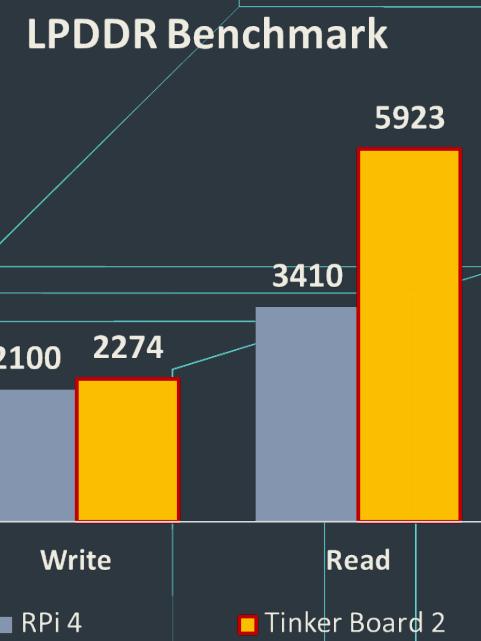
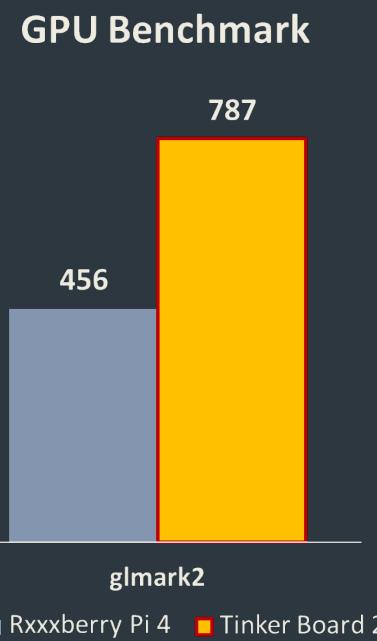
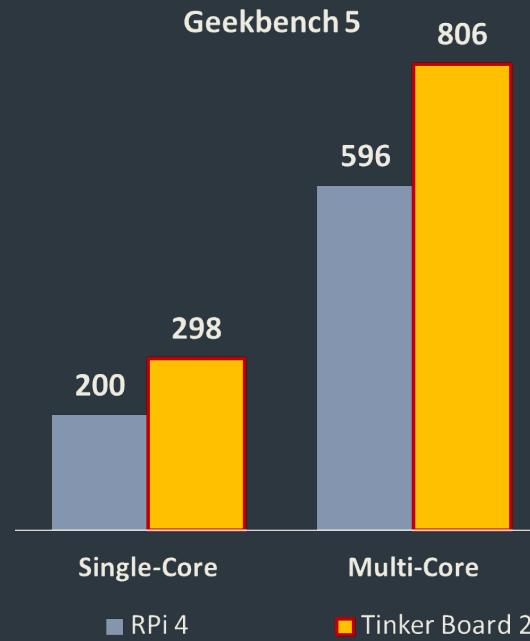
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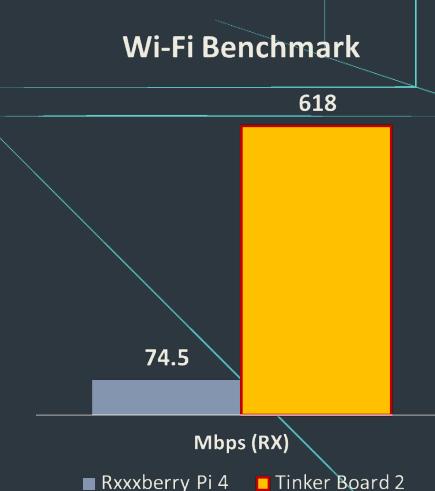
# SPEC 비교 – Tinker Board 2 vs RPi 4

Model	Tinker Board 2 Series	Raspberry Pi 4 Model B
Core Processor (SoC)	Rockchip RK3399 (64-bit) Dual-core ARM Cortex-A72 @ <b>2.0GHz</b> + Quad-core ARM Cortex-A53 @ 1.5GHz	Broadcom BCM2711 Quad-core ARM Cortex-A72 1.5GHz
GPU	ARM Mali-T860 MP4 @ 800MHz	Broadcom VideoCore VI 500MHz
RAM	Dual-CH LPDDR4 2GB/4GB	Single-CH LPDDR4 2GB / 4GB / <b>8GB</b>
Display	1 x HDMI 2.0 (up to 4K/60Hz & CEC HW Ready) 1 x Type-C (DP 1.2 Alt Mode) 1 x <b>22-pins MIPI DSI (4 lane)</b> 1 x 15-pin MIPI CSI-2 (2 lane)	2 x Micro HDMI (up to 4K/60Hz) 1 x 15-pins MIPI DSI display port (2-lane) 1 x 15-pin MIPI CSI camera port (2-lane)
System Storage	<b>1 x Onboard 16GB eMMC (S only)</b> 1 x Micro SD card slot	1 x Micro SD card slot
Internal Headers	40-pin connector for GPIO (I2C, PWM, UART, SPI, I2S, etc) <b>DC fan header</b> <b>RTC battery header</b> <b>Power-On/Reset/Recovery/Debug headers</b>	40-pin GPIO header
Wi-Fi	1 x Wi-Fi 802.11 a/b/g/n/ac & BT 5.0 ( <b>2T2R</b> )	1 x Wi-Fi 802.11b/g/n/ac & BT 5.0 (1T1R)
Swappable Antenna for Better Signal	<b>Yes, w/ swappable antenna</b>	No
USB	<b>3 x USB 3.2 Gen1 Type-A</b> <b>1 x USB 3.2 Gen1 Type-C OTG</b>	2 x USB 3.0 ports 2 x USB 2.0 ports
Official Supported OS	Debian 11 / <b>Android 11</b>	Linux – Debian 10

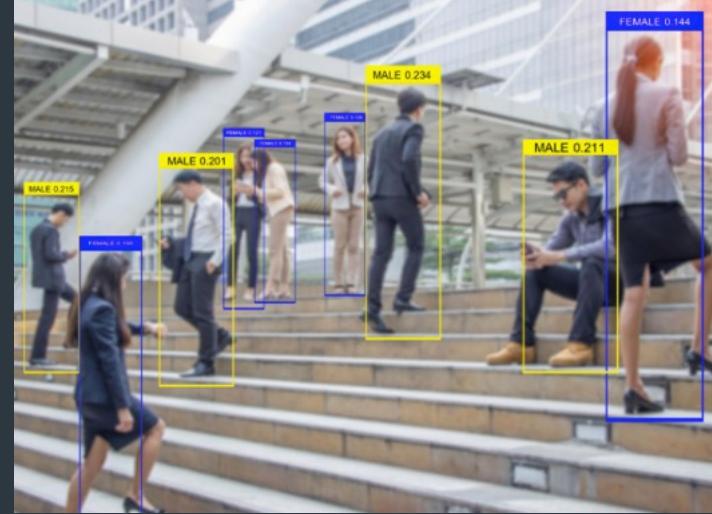
# Benchmark 비교 – Tinker Board 2 vs RPi 4



P/E(쓰기-읽기) 사이클은 플래시 메모리 장치의 수명을 결정하며, 예상 케 하는 하나의 척도입니다.



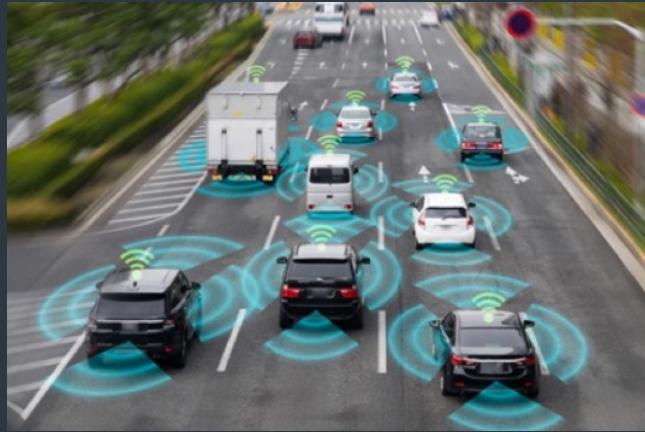
# Industry Application - Smart Cities



## 스마트 시티

- 차량 보행자 감지
- 인구 밀도/흐름 모니터링 및 분석
- 공기 질 모니터링 및 분석
- 인프라 데이터 관제 센터

# Industry Application - TRANSPORT & LOGISTICS



## 교통 & 물류

- 교통 흐름 데이터 분석
- 교통 운행 관리
- 재고 컨트롤
- 배송 패키지 추적

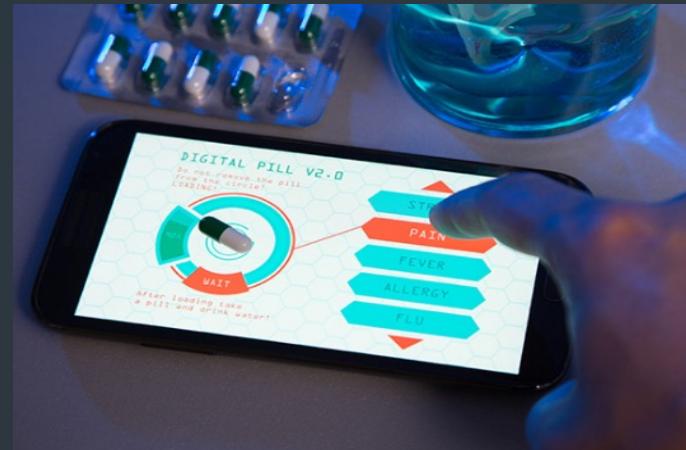
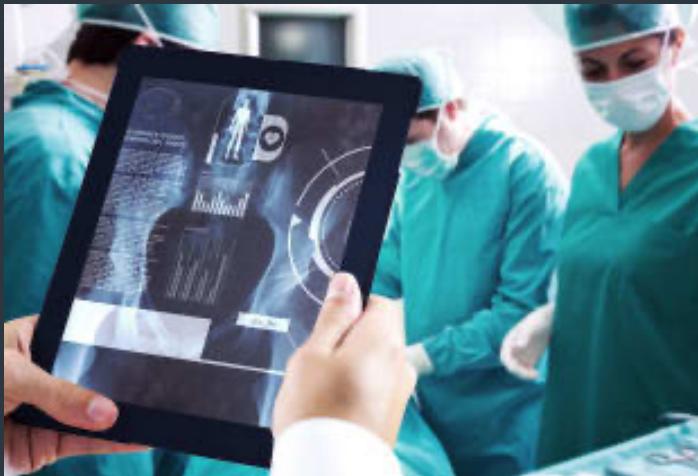
# Industry Application - RETAIL



## 소매업

- 진열대/입구에서의 고객 안면 인식
- 고객들 사이에 사회적 거리두기 인식
- 물체 인식을 통한 무인 계산
- ASUS IoT Cyber Security

# Industry Application - HEALTHCARE



## 헬스케어

- 환자 질병 데이터 모니터링
- 패턴 분석을 통한 질병 인지 및 예측
- 의약품 보조 케어
- 약물 원격 처방/구매

# Case Sharing – Tinker Board S -> 주차 정산기



## 왜 킹커를 써야 할까?

- 낮은 비용으로 고성능의 키오스크 제작 가능
- X86기반 시스템에 비해 낮은 전력소모
- 컴팩트한 클라우드 기반 솔루션

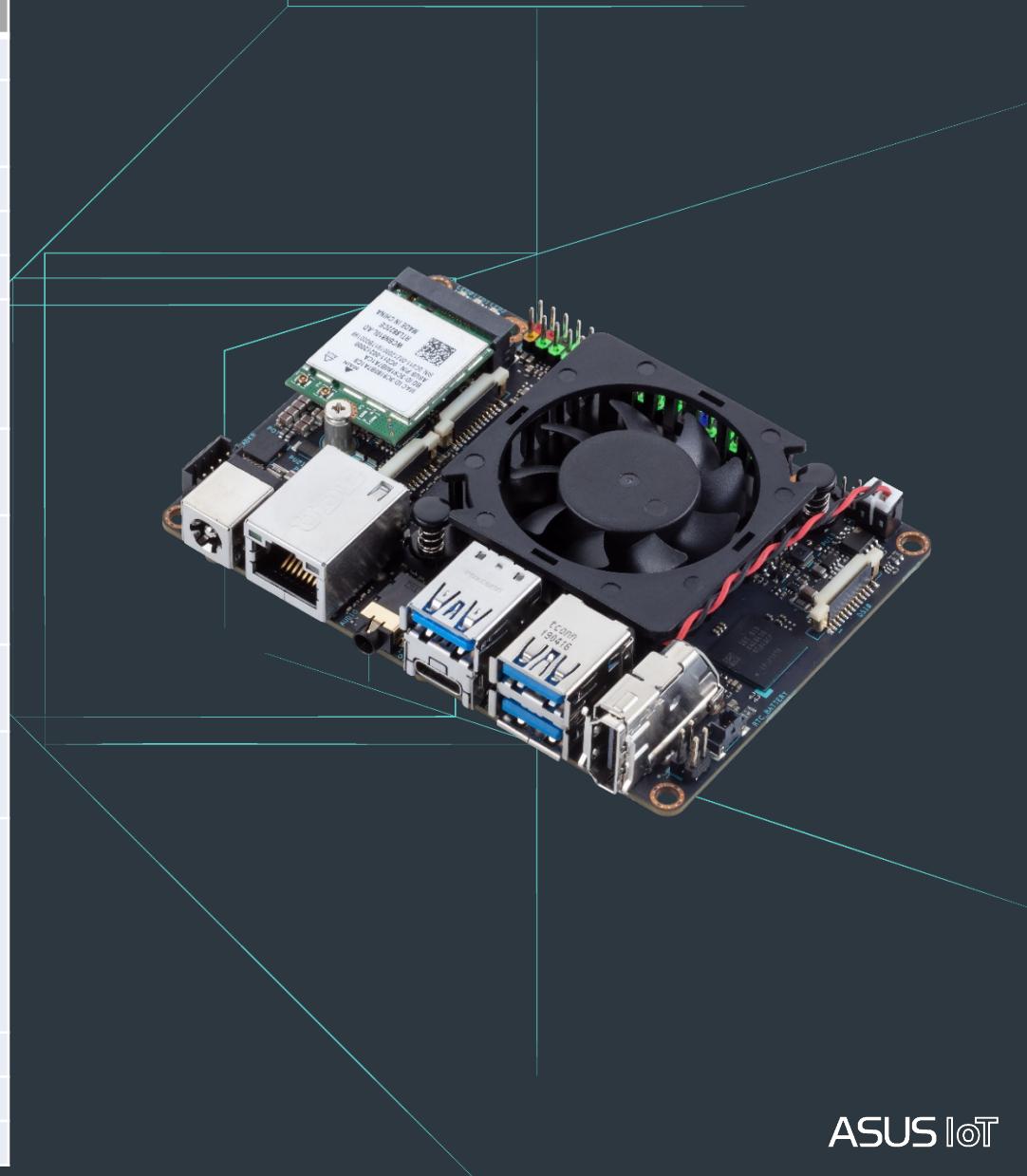
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# Tinker Edge R - 사양

	Tinker Edge R
SoC	Rockchip RK3399Pro
CPU	Dual-core ARM Cortex-A72 @ 1.8GHz + Quad-core ARM Cortex-A53 @ 1.4GHz
GPU	ARM Mali-T860 MP4 @ 800MHz
NN processor	Rockchip NPU
Memory	4GB for System + 2GB for NPU
Display	1 x HDMI 1 x Type-C (DP) 1 x MIPI DSI (4 lanes)
Storage	1x 16GB eMMC 1x Micro SD card slot
Connectivity	- RJ-45 GbE LAN - 802.11ac + BT 5.0 2T2R 1x mPCIe slot for 4G/LTE
USB	3 x USB3.2 Gen1 Type-A 1 x USB3.2 Gen1 Type-C OTG
Camera Interface	1 x MIPI CSI-2 (4 lane) 1 x MIPI CSI-2/DSI (4 lane)
Others	1 x 40-pin connector for GPIO (I2C, PWM, UART, SPI, I2S, etc) 1 x Recovery header 1 x DC fan header 1 x Power-on/Reset header 1 x RTC battery header
OS Support	Debian 10 / Android 9
Power input	12-19V DC input (Barrel + Pin header)
Form Factor	100 x 72 mm (Pico-ITX)



# Edge Series Spec Compare (ML)

	TINKER EDGE T	TINKER EDGE R
AI chip	Google Edge TPU	Rockchip NPU
AI performance	4 TOPs	3 TOPs
Framework	TensorFlow Lite	TensorFlow, TensorFlow Lite, MXNet, ONNX, PyTorch, Caffe, Darknet
Model	DeepLab, DenseNet, Inception, MobileNet, MobileNet SSD, ResNet-50, ResNet-152, SqueezeNet, VGG16, VGG19, PoseNet, EfficientNet-EdgeTpu	MobileNet, MobileNet SSD, Inception, ResNet-18, ResNet-50, Yolo v2, Yolo v3, VGG16, VGG19, VGG SSD, FCN-ResNet101, ResNeXt50, OpenPose
Linux Support	Mendel (Debian-based)	Debian 9/10
Android Support	x	Android 8.1/9
4G support	x	mPCIe for 4G/LTE

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# Case Sharing – 고성능 번호판 인식 시스템



## 왜 킹커를 써야 할까?

- 낮은 비용으로 고성능의 카메라 사용 및 AI 컴퓨터 비전 사용
- 고성능, 낮은 지연을 낮은 전력소모로 사용 가능
- 데비안 10 지원 및 차량 모니터링 컨트롤에 필요한 Rich한 I/O

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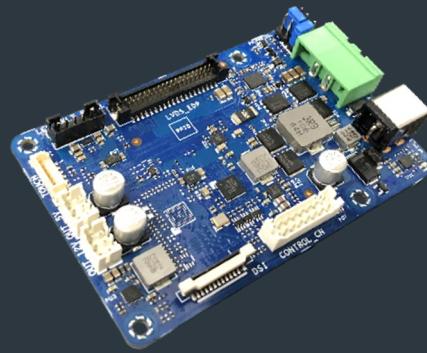
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Beomseok Park - [baam.park.95@gmail.com](mailto:baam.park.95@gmail.com)

# Tinker Board 악세서리

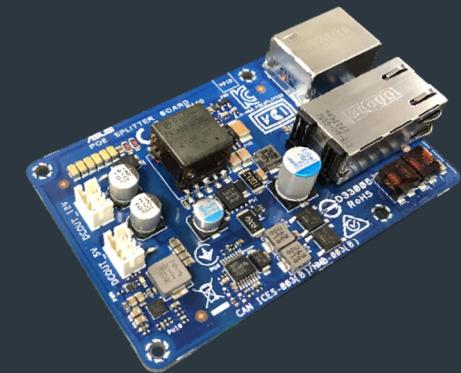
MIPI Converter

\*2022/Oct



PoE Splitter

\*2022/Sep



## MIPI to LVDS Converter Board - Spec

Input Interface		22-pin MIPI DSI (4 lane)
Output	Interface	LVDS (3.3V/5V)
	Resolutions	HD, FHD
	Blacklight	Supported (5V/12V)
	Config Jumper	- LVDS power select jumper (3.3V/5V) - Backlight power select jumper (5V/12V) - Backlight power enable jumper (High/Low Active)
	Power input	- 12V~24V (5.5/2.5 DC Jack) - 12V~24V (Phoenix Jack)
	Power output (supply Tinker)	- 5V pin header - 12V pin header
	Dimension	3.37" x 2.125" (85 x 56 mm)

## POE SPLITTER BOARD - Spec

PoE Standard		802.3at (Type 2 "PoE+")
Input	PoE Lan Input	RJ-45 (10/100/1000)
	Lan Output	RJ-45 (10/100/1000)
Output	DC Power Output (supply Tinker)	25.5 W (max) - 5V pin header - 12V pin header
Dimension		3.37" x 2.125" (85 x 56 mm)

# 완벽한 기술지원 & 고객 서비스

## 데모 단계

BSP 튜닝 및  
커스터마이즈

주변기기 Porting



## 양산 단계

Troubleshooting  
assistance

문제점  
분석 지원

고객 서비스	Basic	business	enterprise
팅커 포럼을 통한 기술지원	✓	✓	✓
문서 & 유저 가이드	✓	✓	✓
1일 이내 첫 대응		✓	✓
이메일 및 전화를 통한 기술지원		✓	✓
독립적인 시니어 FAE 컨트롤		✓	✓
소프트웨어 매니지먼트 시스템			✓

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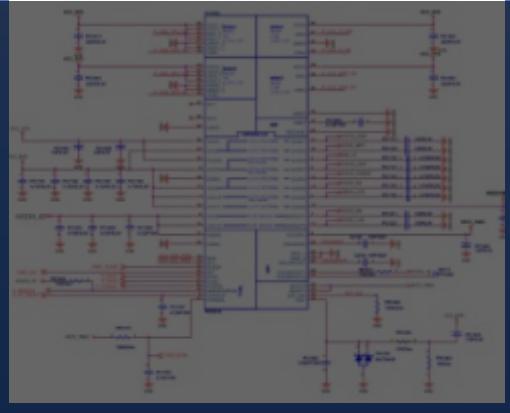
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Beomseok Park - [baam.park.95@gmail.com](mailto:baam.park.95@gmail.com)

# 문서 지원

스펙 및 사진뿐만 아니라, 제품 페이지는 하기 사항도 추가할 계획입니다

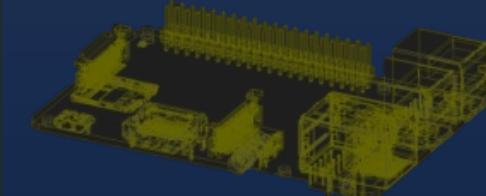
## Schematics



## 2D Drawing



## 3D Drawing



## GPIO API



## OS Images



Debian



Android

## Device QVL



## Installation



## SPEC Details



# 주변기기 포팅 예상 스케줄

Item	Panel	Camera	GPIO-based peripheral
예상 스케줄	5-6 weeks	4-5 weeks	4 weeks
요구사항	-Initial code -MIPI timing parameter -Datasheet -Vendor support	-driver -sensor settings -Datasheet -Vendor support	-datasheet -Vendor support

# ASUS IoT Product Longevity Supply Table

Model Name	Chipset/CPU	First Shipment	Estimated EOL Schedule	Extended EOL Schedule*
Tinker Board S R2.0	Rockchip RK3288-CG.W	2021/Q4	2025/Q1	2028/Q1
Tinker Board R2.0	Rockchip RK3288-CG.W	2021/Q4	2025/Q1	2028/Q1
Tinker Edge R	Rockchip RK3399 Pro	2020/Q1	2025/Q2	2028/Q2
Tinker Edge T	NXP & Google Edge TPU	2019/Q4	2024/Q4	2027/Q4
Tinker Board 2S	Rockchip RK3399	2020/Q4	2025/Q4	2027/Q4
Tinker Board 2	Rockchip RK3399	2020/Q4	2025/Q4	2027/Q4
Tinker System 2	Rockchip RK3399	2022/Q2	2025/Q4	By Request

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\*For Extended supply, please check with PM about extended supply policy.

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