TMA Hardware Integration Lab

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TMA Hardware Integration Lab overview

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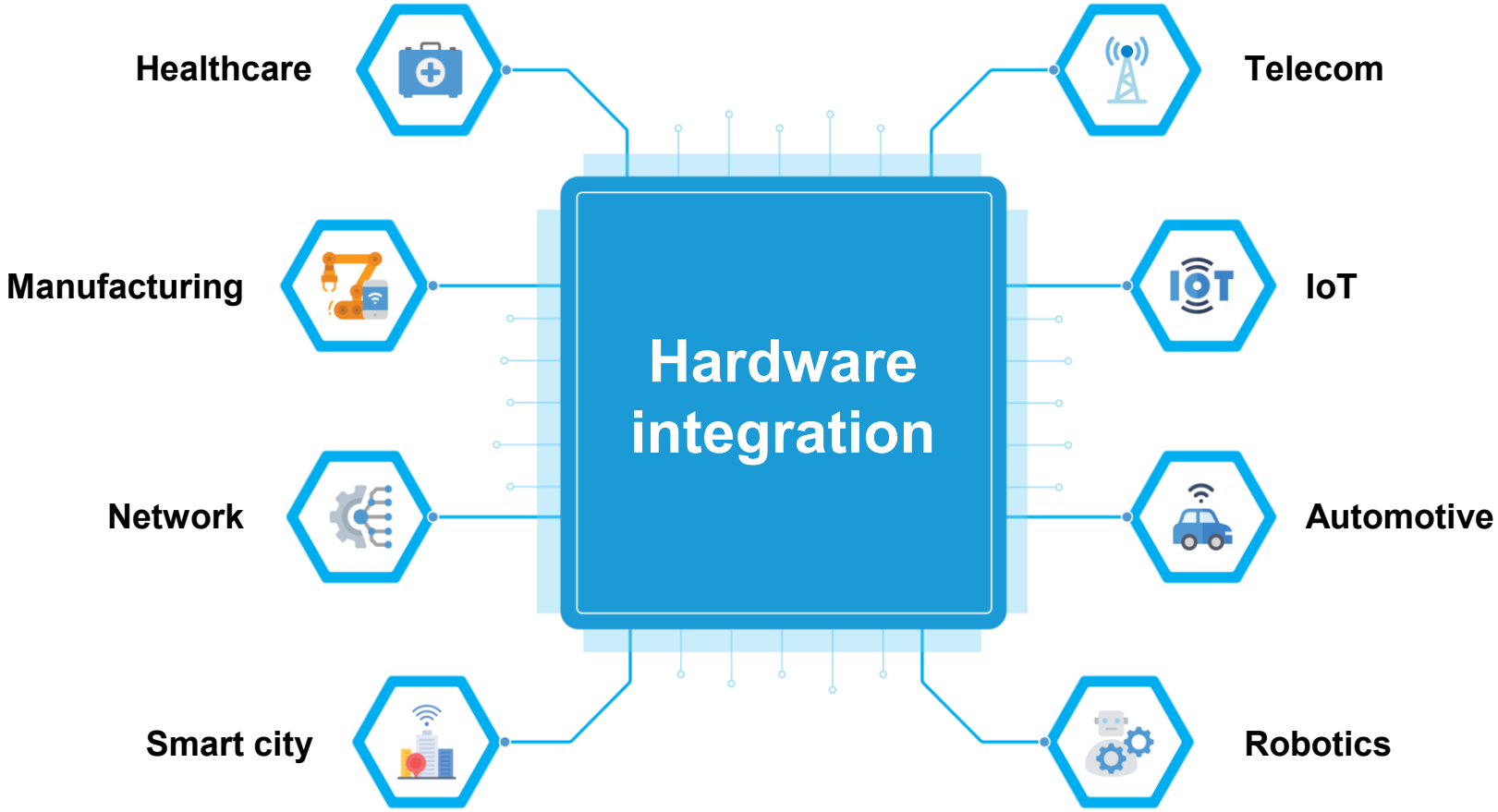
Case studies

TMA hardware capability

200+
Embedded engineers

Integrated
200+ devices

Services
Design, test, integrate, and maintain



Our expertise

01 Hardware Engineering

- PCB Design & Layout
- RF & Power Design
- Prototyping & Enclosure Design
- Sensor Interfacing
- Reliability & Compliance

02 Edge AI & IoT Intelligence

- TinyML & Model Deployment
- Neural Accelerators & DSP
- IoT Protocols (MQTT, LoRa, NB-IoT)
- Predictive Analytics
- OTA Model Updates

03 Embedded Systems

- MCU/MPU Firmware Development
- RTOS & Embedded Linux
- Drivers & Board Support Packages (BSP)
- Connectivity (BLE, Wi-Fi, LoRa, LTE)
- Power Optimization
- Testing & Validation

04 Industrial Design

- Product Concept Development
- 3D Enclosure Design
- Product Appearance & Ergonomics
- Hardware Integration
- Design for Manufacturability (DFM)

05 3D Printing & Mechanical Prototyping

- Enclosure & Mechanical Prototyping
- Dimensional Verification
- Component Fit Validation
- Assembly Validation Before Production

06 System Integration & Support

- Multi-Device Interoperability
- Edge-to-Cloud Integration
- End-to-End Prototyping
- Lifecycle Support & Updates

Our services



Hardware Design

Hardware product prototyping



Firmware Development

IoT development, Firmware development, driver development



Integration

Integration of various devices into customer solutions



Hardware Testing

Functional and non-functional requirements verification



Mass Production Coordination

Represent the client in coordinating procurement, manufacturing, assembly, testing, and overseas shipment of finished products.



Maintenance

Bug fixing / New feature development /

End-Of-Life component / Retrofit design



Product Certification Coordination

Represent client to work with global certification bodies (TUV SUD, CE, ...) to get product to sell legally in target markets

Quy trình

Tùy chọn (nếu cần)

1

Phân tích yêu cầu & Đánh giá tính khả thi

Tìm hiểu, phân tích yêu cầu và đánh giá tính khả thi về kỹ thuật, nguồn lực và rủi ro

2

Đề xuất giải pháp & Lập kế hoạch dự án

Xác định giải pháp (phạm vi, phương án triển khai), tiến độ, sản phẩm bàn giao và tiêu chí nghiệm thu

3

Kỹ thuật & Phát triển

Thiết kế, phát triển và tích hợp phần cứng, firmware cùng các mô-đun khác theo phạm vi đã thống nhất

4

Kiểm thử & Xác thực

Thực hiện kiểm thử chức năng và tuân thủ tiêu chuẩn, xác minh kết quả và khắc phục các vấn đề phát sinh

5

Hỗ trợ chứng nhận & Điều phối sản xuất

Điều phối chứng nhận sản phẩm và chuẩn bị cho sản xuất hàng loạt (sản xuất, mua sắm, lắp ráp và kiểm soát chất lượng)

6

Bàn giao & Nghiệm thu

Bàn giao sản phẩm, tài liệu và toàn bộ hạng mục đã thống nhất.

Dịch vụ tùy theo phạm vi dự án

Thiết kế phần cứng

Phát triển firmware

Tích hợp hệ thống

Our process

Optional (if needed)

1

Requirement Analysis & Feasibility Assessment

Understand needs, analyze requirements, and assess technical feasibility, resources, and risks.

2

Solution Proposal & Project Planning

Define solution (scope, approach), timeline, deliverables, and acceptance criteria.

3

Engineering & Development

Design, develop and integrate hardware, firmware and other modules based on agreed scope.

4

Testing & Validation

Perform functional and compliance testing, verify results and resolve issues.

5

Certification & Production Preparation

Coordinate product certification and prepare for mass production (manufacturing, procurement, assembly, quality control).

6

Delivery & Handover

Deliver product, documentation, and all agreed deliverables.

Services based on scope

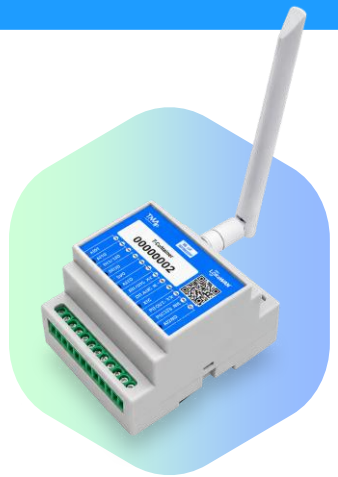
- **Hardware design**
- **Firmware design**
- **Integration**

Our products

Our products



Reefer monitoring system



Fire alarm monitoring



Medicine dispenser



Water quality monitoring



Energy management

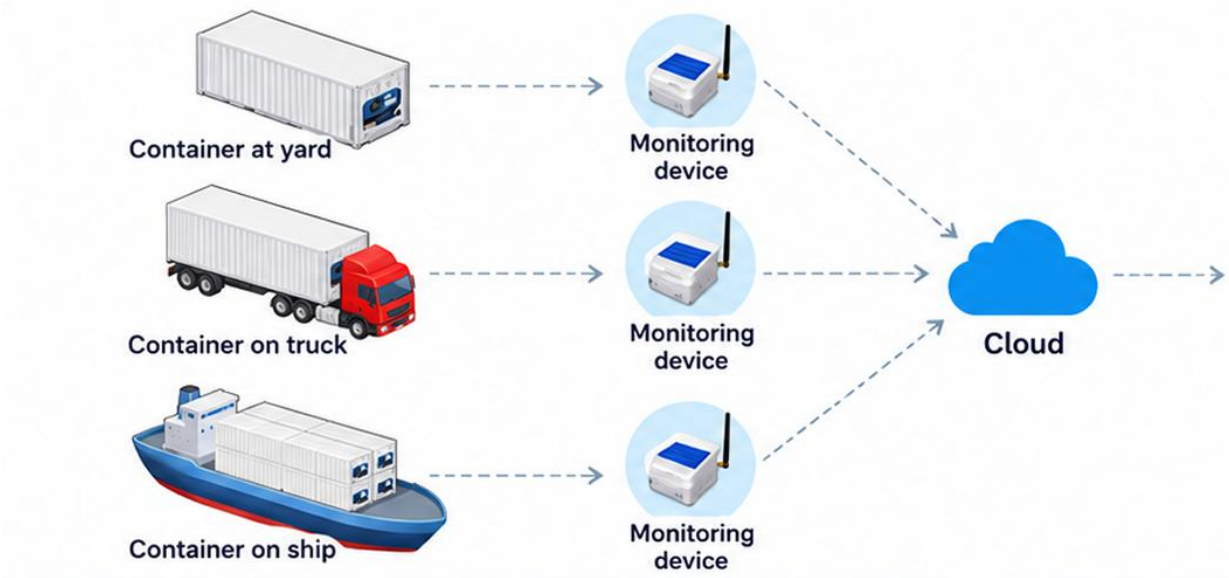


Emergency alert

Our product: Reefer monitoring system

Monitor refrigerated container temperature, humidity, and location remotely using IoT devices and a centralized software platform.

- **Real-time temperature & humidity monitoring**
- **GPS-based container tracking**
- **Automated anomaly alerts**
- **Multi-brand reefer compatibility**





Applications

- Cold chain condition monitoring
- Temperature-sensitive cargo tracking
- Refrigerated cargo anomaly detection

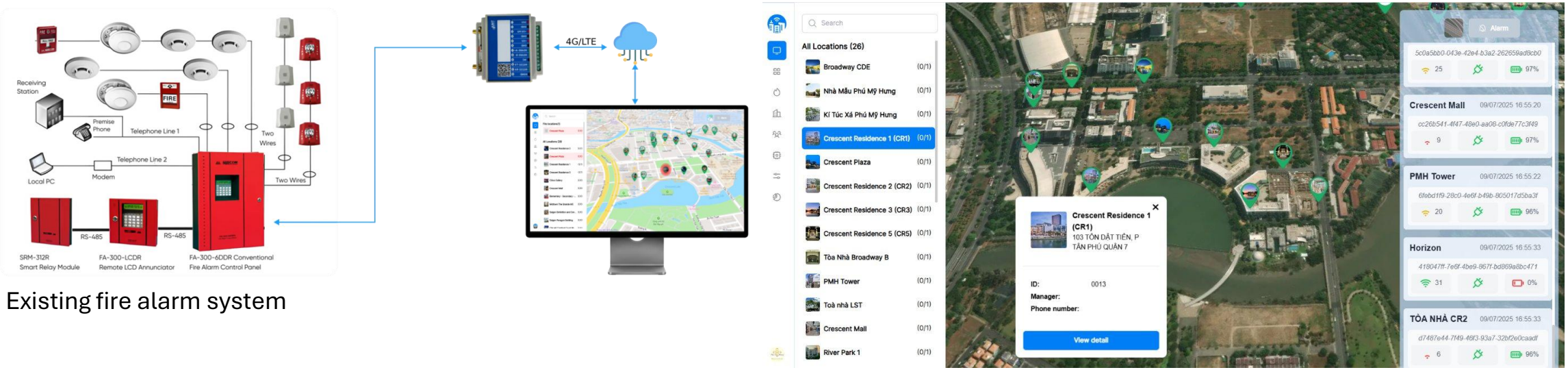
Target clients

- Food & beverage companies
- Pharmaceutical & healthcare companies
- Industrial & chemical manufacturers

Our product: Fire alarm system monitoring

Prevent false fire alarm by remote monitoring and logging the fire alarm system

- **Detect smoke, heat in real time using connected sensors**
- **Display fire alarm locations and device health on digital map**
- **Send automated alerts via phone calls, SMS, and mobile notifications**



Existing fire alarm system

Applications

- Fire alarm monitoring
- Industrial hazard monitoring
- Forest fire monitoring

Target clients

- Residential buildings
- Commercial buildings
- Factories & industrial facilities
- Forestry agencies

Our product: Medicine Dispenser

Helps users take the right medication at the right dose and time with a smart medicine dispenser and mobile app

28-compartment medication storage

Scheduled medication dispensing

Medication intake tracking for remote follow-up

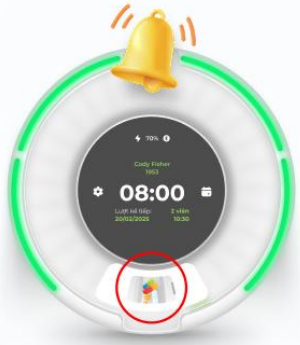
1 Place pills in the compartment

Following the instructions in the app



2 Get notified when it's time

with a sound and LED light



3 Flip the pill box upside down

to stop the alarm and take the medication



4 Pill box status after medication time

Pill box flipped

The device would stop sounding alarm and mark the scheduled dose as taken



Pillbox not flipped

The device would keep sounding alarm for user to take out the pill in the output box



Applications

- Medicine reminders
- Remote medication follow-up

Target clients

- Elder people
- Patients
- Busy individuals

Our product: Water quality montoring

Combines data collection devices with remote monitoring software to continuously monitor water quality and detect abnormalities

- **4G connectivity and GPS positioning**
- **50,000 mAh battery with up to 10 years of operation**
- **Historical data review and report export**



Applications

- Water quality monitoring
- Wastewater quality monitoring
- Water level & flow Monitoring

Target clients

- Aquaculture farms
- Water treatment plants
- Industrial plants

Our product: Energy management

Combines data collection devices with management software to automate electricity billing and payment notifications.

- Compatible with professional electricity meters
- 4G LTE and Wi-Fi connectivity
- BMS integration



Applications

- Energy Consumption Monitoring
- Automated Electricity Billing & Bill Delivery

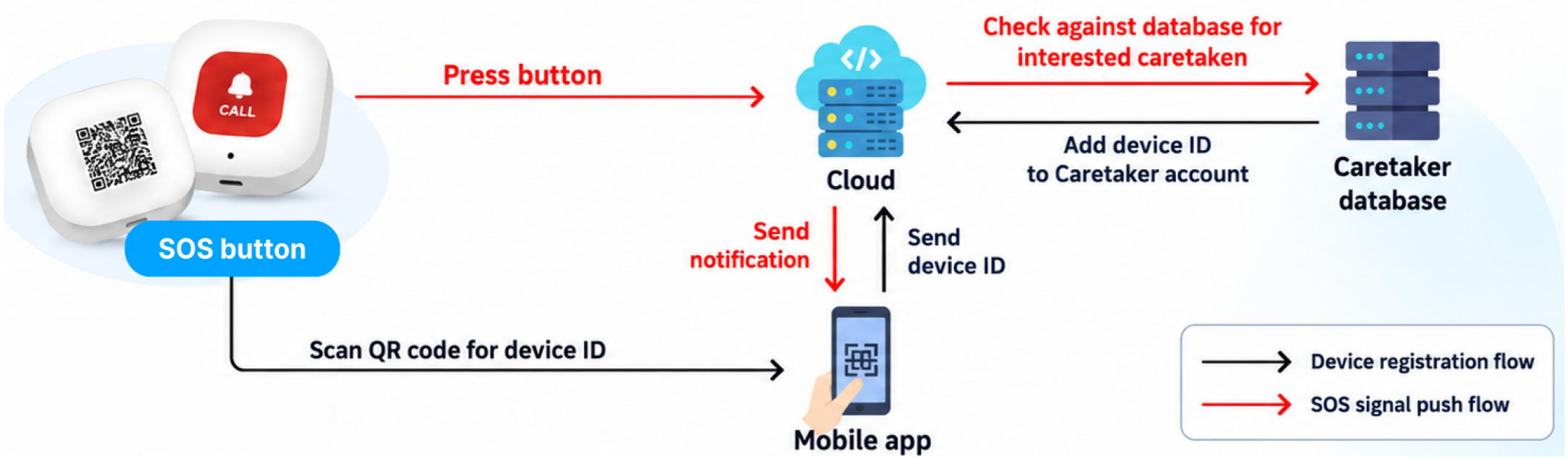
Target clients

- Industrial Parks
- Commercial Buildings
- Residential Buildings

Our product: Emergency alert

A wearable SOS button and mobile app for sending emergency alerts to caregivers via Wi-Fi or 4G.

- One-touch SOS activation
- Wi-Fi & 4G connectivity
- BLE-based device setup & firmware updates



Applications

- Personal emergency assistance
- Medical emergency alerts
- Workplace emergency alerts

Target clients

- Elderly people
- Hospitals & care homes
- Factories & construction sites

Case studies

Case study: Smart Waste Monitoring & Collection System

A technology company developing IoT solutions for commercial buildings and waste management in Australia

Automated waste weight measurement and collection event logging

Remote bin access control and centralized monitoring via web and mobile platforms

Enabled real-time bin monitoring and transparent waste collection tracking, simplifying operational oversight & auditing



Case study: Optimizer for heating energy

A Canadian technology company developing intelligent building energy solutions

Automated switching between heat pumps and gas furnaces based on cloud optimization commands

Integration with BACnet, Modbus, and wireless temperature sensors

Optimized heating energy usage and supported lower carbon emissions through coordinated heating source selection



Case study: IOT system for wood restoration

An Australian technology company developing connected monitoring and power management solutions

MoistSense and EnvironSense devices for moisture and environmental monitoring

LoadSense devices for electrical load monitoring and power control

Enabled real-time monitoring of restoration conditions & electrical loads, with traceable records to support reporting & auditing



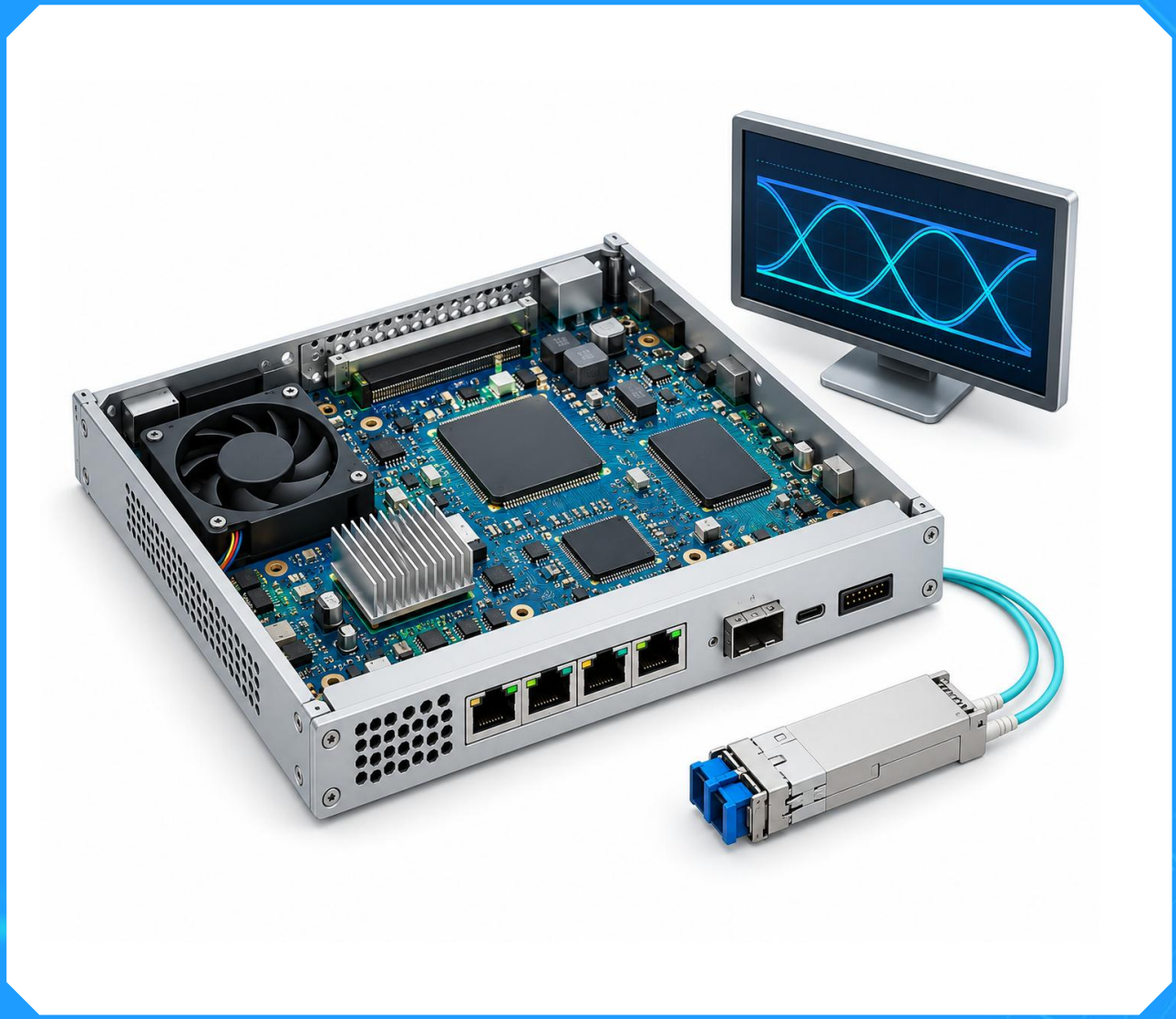
Case study: Evaluation Board for Terrabits Network Switch

A Japanese technology company developing high-capacity optical communication solutions

Integrated CPU, MCU, and FPGA architecture for firmware evaluation

Ethernet, JTAG, serial, I3C, and SPI interfaces for development and debugging

Enabled earlier detection of integration issues and more reliable firmware testing before final product integration



Case study: Clip-on Smart Companion for Nurse

A healthcare technology company developing digital medication management solutions

Voice capture and AI-powered resident-name verification during medication administration

Real-time mismatch alerts and voice-to-text nursing documentation

Enabled earlier detection of resident-name mismatches and more timely nursing documentation with less manual effort



THANK YOU!

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