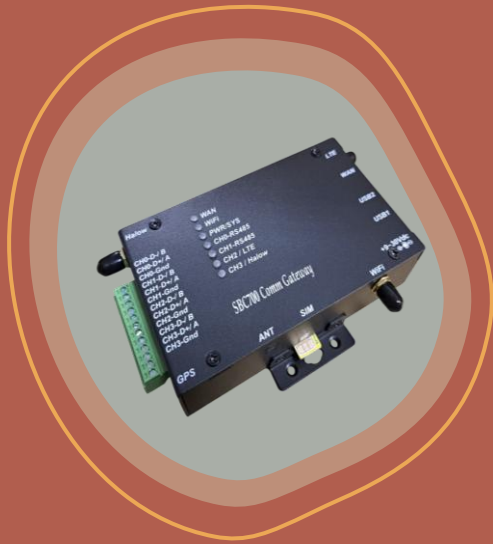


TECHWARE Technology Co. Ltd.

Zebra Chen / **TECHWARE**



Industrial Wi-Fi HaLow Solution



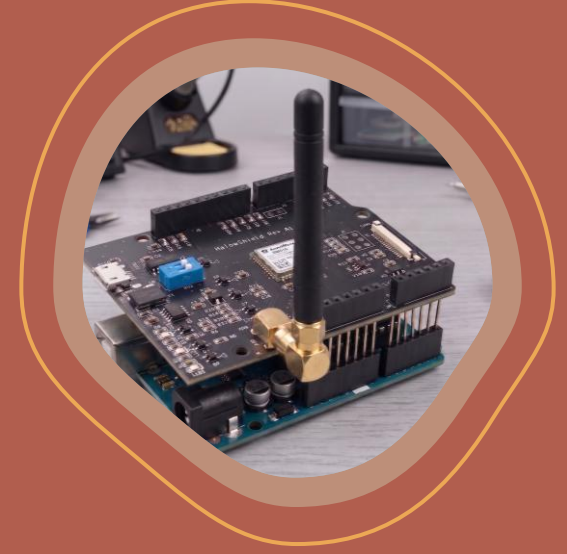
SBC700-HaLow



Eth-HaLow

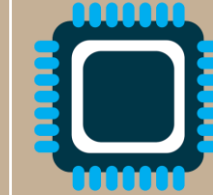


**M.2 card &
Usb-HaLow**



HaLowShield

Industrial Communication Gateway - **SBC700HaLow**



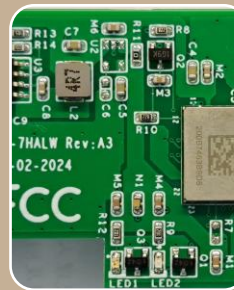
Networking Processor

- CPU 580Mhz
- 32MB Storage
- OpenWRT/Linux Kernel v5.1



4G/LTE & WiFi/Ethernet

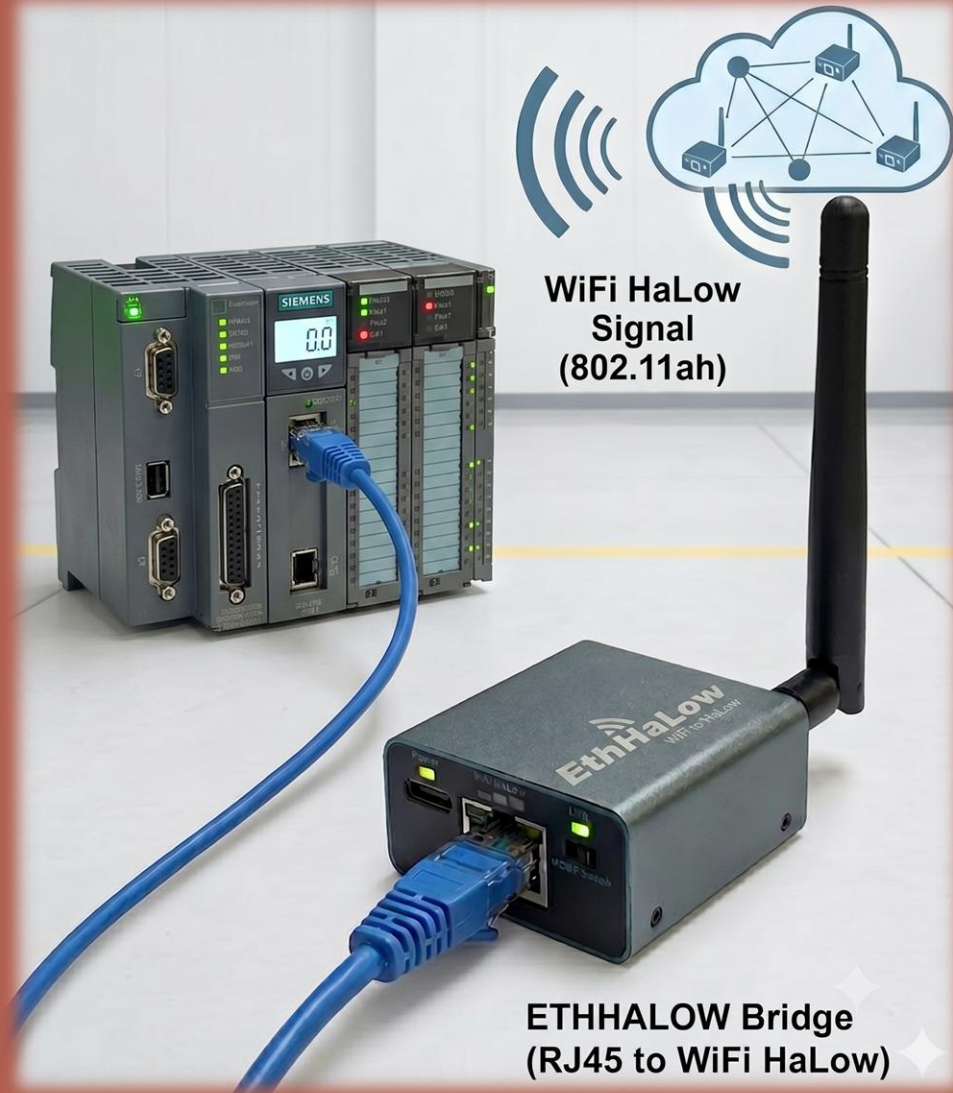
- MiniPCIe socket
- 2.4Ghz WiFi/100 BaseT
- USBH 2.0 ports



802.11ah & RS485

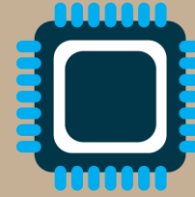
- Newracom nrc7394
- Supports **902 ~ 928MHz**
- 2-4 ports Isolation RS485

Ethernet to Wi-Fi HaLow Bridge – **EthHaLow**



WiFi HaLow
Signal
(802.11ah)

ETHHALOW Bridge
(RJ45 to WiFi HaLow)



Processor

- NRC7394
- 2MB Storage
- FreeRTOS/Newracom SDK



Functions

- 802.11ah/100BaseT Ethernet
- Pair 1-to-1 Mode
- Client / Bridge Mode



Wi-Fi HaLow

- RJ45 Ethernet
- USB +5V power input
- Web Configuration

Wi-Fi HaLow M.2 Key-E Card – **M2HaLow**

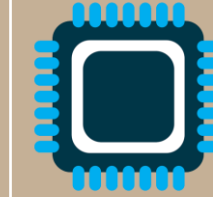


WiFi HaLow 802.11ah
Long-Range Signal

IPC with Embedded
M.2 WiFi HaLow Module

IPC with Embedded
M.2 WiFi HaLow Module

Reliable Long-Range Connectivity for IoT



Processor

- NRC7394
- 2MB Storage
- FreeRTOS/Newracom SDK



Functions

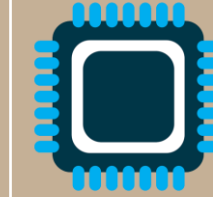
- 802.11ah
- Client / Bridge Mode
- Plug-n-Play



802.11ah M.2 Key-E Card

- Windows/Linux/Android/iOS
- M.2 Card key-E
- 3.3V power input

Wi-Fi HaLow USB dongle – **UsbHaLow**



Processor

- NRC7394
- 2MB Storage
- FreeRTOS/Newracom SDK



Functions

- 802.11ah
- Client / Bridge Mode
- Plug-n-Play

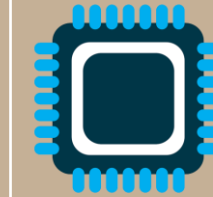
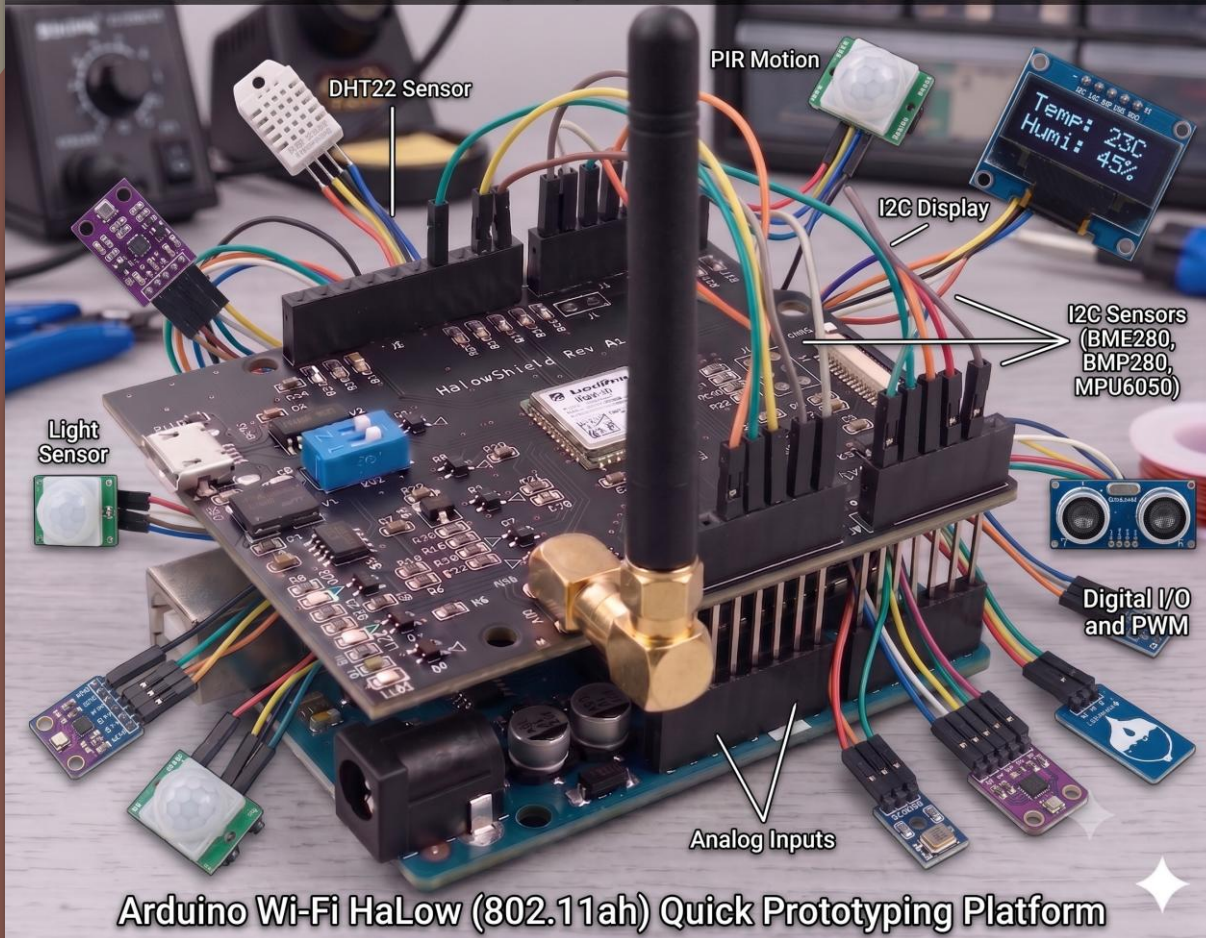


802.11ah USB Dongle

- Windows/Linux/Android/iOS
- Web Configuration
- USB 2.0 port

Arduino Wi-Fi HaLow extension shield – **HaLowShield**

Rapid Application Feasibility (PoC) & Multi-Sensor Integration Showcase



Processor

- NRC7394
- 2MB Storage
- FreeRTOS/Newracom SDK



Functions

- TCP/UDP Communication
- AT Commands
- Built-in BME280/SPI Camera



802.11ah HaLowShield

- Ultimate Penetration
- Low Power Deployment
- Arduino Uno/Mega R3 standard pinout

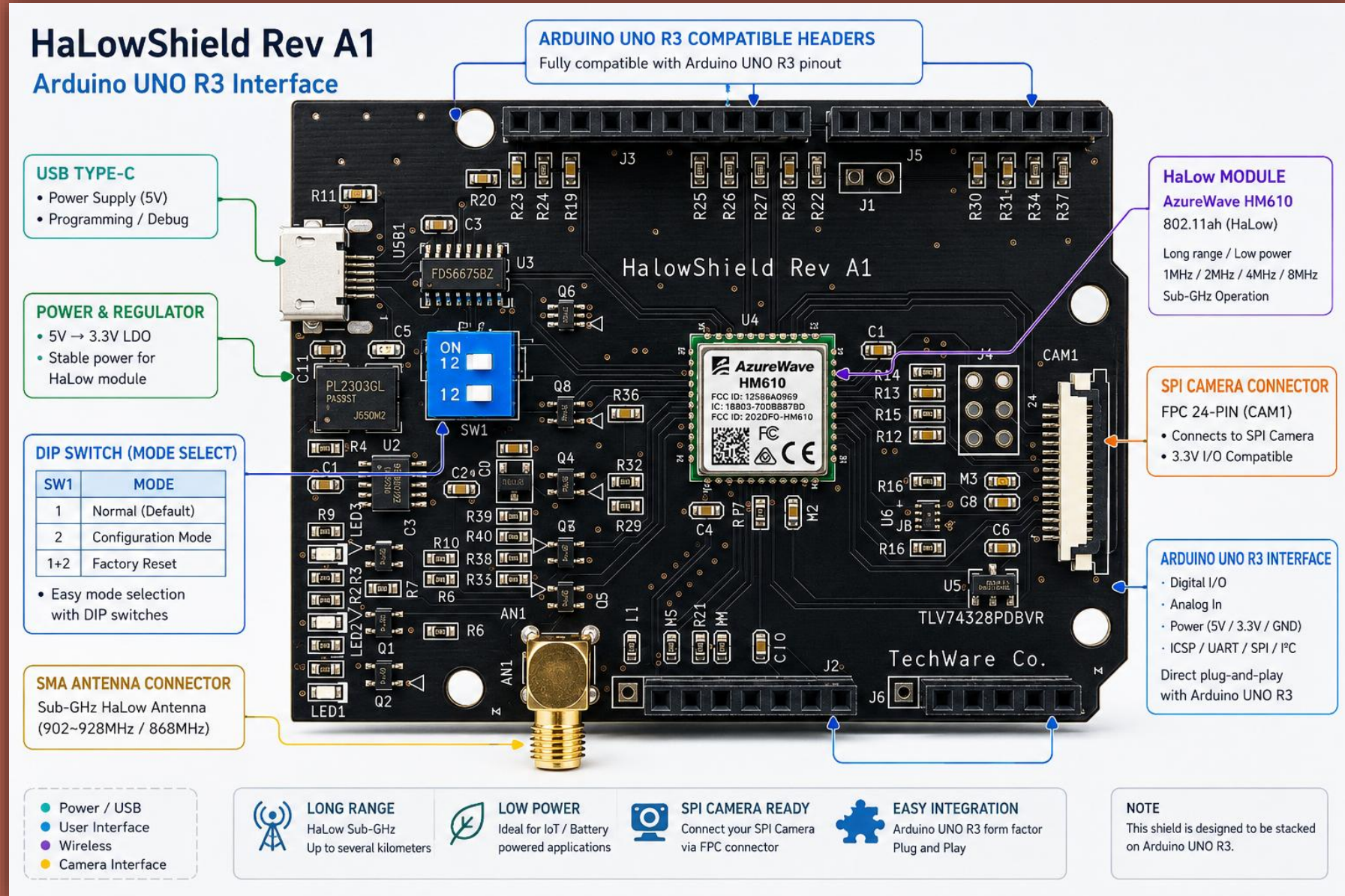
HaLowShield – Hardware Specifications and Software Architecture

- 1. Arduino Uno/Mega R3 form factor, can be directly stacked on the Arduino motherboard.**
 - 2. Quickly integrates environmental sensors such as temperature, humidity, vibration, gas, and pressure.**
 - 3. Standard RF output, compatible with high-gain rod or outdoor directional antennas.**
 - 4. Optimized power conversion circuitry ensures stable motherboard power supply even during Sub-GHz high-power transmission.**
 - 5. Wide temperature range design meets the harsh outdoor environments of smart agriculture and IIoT applications.**
- 1. Open Source Library and Communication Protection**
 - 2. Provides a well-encapsulated Arduino function library, eliminating the need for in-depth understanding of low-level registers or the 802.11ah protocol.**
 - 3. Concise AT command set (UART): Includes network scanning, connection setup, and network configuration.**
 - 4. Natively supports high-performance TCP/UDP sockets, ensuring asynchronous transmission does not block the Arduino main program.**
 - 5. Built-in error handling and automatic reconnection mechanism ensure no loss of industrial data.**

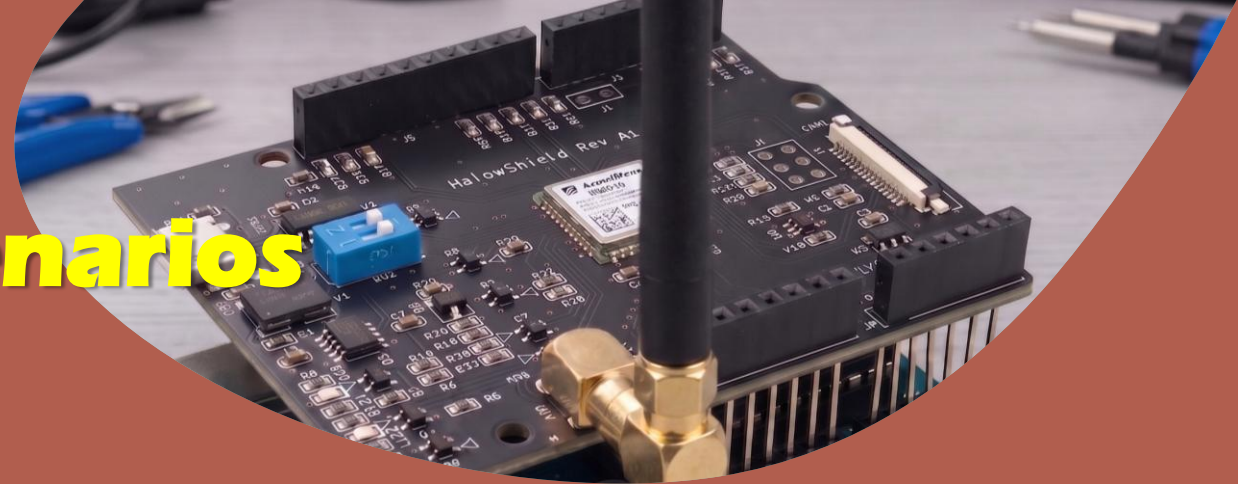
HaLowShield – PCB interface

Key Features

- ✓ **Arduino UNO R3 Compatible**
- ✓ **AzureWave HM610 Wi-Fi HaLow Module**
- ✓ **USB Type-C Interface**
- ✓ **External SMA Antenna**
- ✓ **SPI Camera Expansion**
- ✓ **DIP Switch Mode Selection**
- ✓ **Long Range Sub-GHz Communication**
- ✓ **Low Power IoT Design**
- ✓ **UART Debug Support**
- ✓ **Plug-and-Play Arduino Shield Form Factor**



HaLowShield – Typical Application Scenarios



Smart agriculture and precision irrigation

Environmental monitoring and disaster early warning

Industrial Peripheral Node Data Acquisition

Smart Agriculture & Precision Irrigation

Environmental and soil monitoring nodes deployed in large-scale farms and greenhouses. Powered by batteries with TWT technology for long-term stability. Overcomes Zigbee distance limits and high 4G data costs.



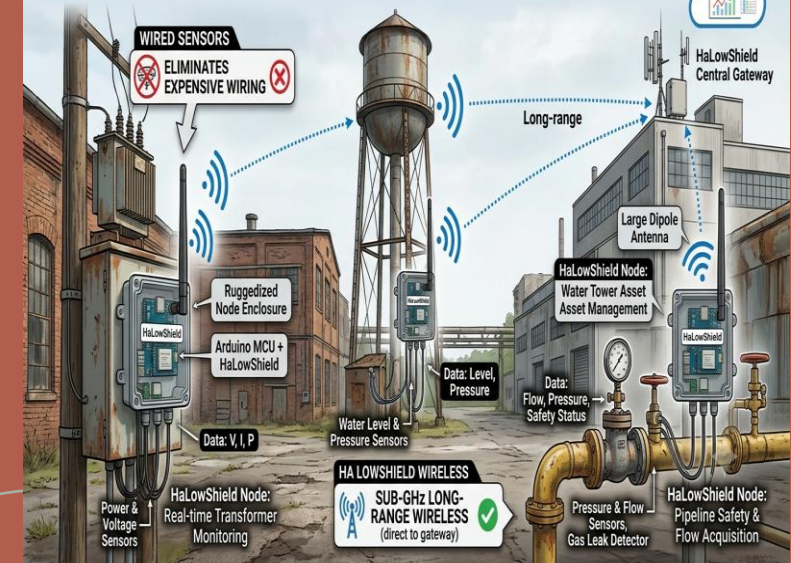
Environmental Monitoring & Disaster Early Warning

Deployed for river level monitoring and hillside vibration sensing. Utilizing its superior penetration and over 1-kilometer range, it transmits critical disaster prevention data back to the hub station in real time.



Industrial Peripheral Node Data Acquisition (HaLowShield)

Sensing peripheral assets like transformer boxes, water towers, and gas pipelines in old factory areas. No expensive wiring needed. Direct connection to central gateway via HaLowShield (Sub-GHz wireless).





感謝您

ありがとう

Thank you

Zebra Chen

www.techware.com.tw