# 16-Channel XCORE Product Specification

# Product Appearance


# Applicable Model

Xcore: 16-Channel

# Core Configuration

- CPU: Quad-core Cortex-A53 @ 1.3GHz, with built-in NPU delivering up to 28.8 TOPS
- Mainboard: PCB, 85×100mm, 8-layer through-hole, 1.6mm thickness
- Flash: 16GB eMMC
- SDRAM: 2 × LPDDR4X, 8GB total (2×4GB)
- Video Output: HDMI 2.0
- USB: 1 × USB 2.0, 2 × USB 3.0 (extensible)
- Ethernet: 2 × Gigabit (1000M) ports
- Storage: 1 × onboard TF card slot
- Expansion Interfaces: 4 × UART, 5 × I2C, 1 × SPI
- OS: Domestic embedded Linux, kernel version 4.19.125

# Supported Algorithms

Algorithms and Logical Functions Implemented by AIBOX (Over 60 Built-in Algorithms):

I. Capture Functions

A. Structured Capture:

1) Face
2) Human Body
3) Motor Vehicles
4) Non-Motor Vehicles
5) License Plates

B. Capture Mode: Timed Capture

II. Recognition Functions

Human/Vehicle Recognition:

1) Face Recognition & Comparison
2) License Plate Recognition & Comparison

III. Alert Functions

A. Environmental Anomalies:

1) Fire Alarm
2) Smoke Alarm
3) Fire Equipment Inspection
4) Debris Accumulation Detection
5) Warning Sign Detection
6) Irregular Oil Unloading

B. Safety Gear Violations:

1) No Safety Helmet
2) No Mask
3) No Work Uniform
4) No Safety Harness
5) No Reflective Vest

C. Perimeter Intrusion (Personnel):

1) Loitering
2) Climbing Detection
3) Intrusion
4) Boundary Crossing
5) Overcrowding
6) Understaffing
7) Unauthorized Departure
8) Prolonged Presence

D. Abnormal Behavior:

1) Fall Detection
2) Smoking Detection

3) Phone Call Detection
4) Mobile Phone Use
5) Running
6) Sleeping on Duty
7) Unauthorized Absence
8) Crowd Gathering
9) Physical Altercation
10) Distress Call

E. Perimeter Security (Vehicles):

1) No Parking
2) Vehicle Departure
3) Non-Motor Vehicle Parking Prohibition
4) Non-Motor Vehicle Departure
5) Riding Without Helmet
6) Excess Motor Vehicles
7) Insufficient Motor Vehicles
8) Special Vehicle Restriction (19 types)
9) Motorcycle Entering Gas Station

## Product Features

**Device Access:**

- Supports connection to high-definition network cameras compliant with ONVIF, RTSP, RTMP, and WebRTC standards
- Supports H.265/H.264 video standards, with compatibility for IP cameras of up to 8 megapixels

**Intelligent Applications:**

- Total database capacity supports up to 300,000 face images across 64 databases
- Multi-algorithm integration: Face mode, Hybrid mode (face-person binding + video structured analysis)
- Face recognition: Supports up to 8/16 video streams at full load
- Video structured analysis: Supports up to 8/16 video streams at full load
- Perimeter alert: Supports up to 8/16 video streams at full load
- Behavioral alert: Supports up to 8/16 video streams at full load
- Supports face capture, face recognition and comparison alerts, stranger recognition alerts, etc.
- Supports facial attribute recognition: gender, age, hat, glasses, mask, etc.
- Supports capture of faces, human bodies, motor vehicles, non-motor vehicles, and license

plates, with face-person binding and person–non-motor vehicle binding

- Supports human attribute analysis: upper/lower garment color, garment style, backpack status, safety helmet detection, etc.
- Supports vehicle attribute analysis: motor/non-motor vehicle classification, color, brand, driving direction, etc.
- Supports license plate recognition and license plate–vehicle binding, including license plate color and row number attribute parsing
- Supports fire/smoke detection, fire extinguisher recognition, and debris accumulation alerts
- Supports intelligent perimeter monitoring functions such as area intrusion and illegal parking detection
- Supports behavioral alerts: running, falling, smoking, making phone calls, looking at phone, sleeping on duty, fighting, calling for help, etc.
- Supports customized algorithm development for specific industries

**System Features:**

- Supports software platforms including GB/T 28181
- Provides extensive RESTful API interfaces for third-party platform integration

**Application Scenarios:**

- Delivers face recognition, full-target structured analysis, and intelligent alert capabilities. Integrated with upper-layer platform software, it enables closed-loop applications in face capture/recognition, video structuring, and smart alert scenarios. Supports secondary development and AI algorithm expansion.
- Applicable in smart factories, hazardous chemical monitoring, and various early warning systems.
- Suitable for face recognition scenarios: access points in smart communities and office buildings, key personnel watchlist management and recognition alerts, stranger identification, etc.
- Ideal for structured environments requiring capture of faces, humans, vehicles, non-vehicles, and license plates, such as vehicle management in smart parks and license plate recognition in smart communities.

# Specifications:

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| **System Parameters** | |
| Main Processor | High-performance embedded microprocessor |
| Operating System | Embedded Linux version 4.19.125 |
| **Device Access** | |
| Video Stream Input | ONVIF, RTSP, WebRTC, RTMP<br>Video Resolution: Unlimited. Supported resolutions include: 720×480, 1280×720, 1280×960, 1920×1080 (2MP), 2560×1440 (4MP), 3840×2160 (8MP) |
| Video Decoding Type | H.264 / H.265 |
| Maximum Input Capacity | 16 channels of 1080P video at 25 fps |
| Video Re-encoding | 16-channel video with overlaid algorithm results, re-encoded and output in multiple streaming formats |
| **Intelligent Parameters** | |
| AI Algorithms: Multiple parallel algorithms, configurable per channel. Flexible configuration for face recognition, structured analysis, behavioral alerts, and abnormal environment detection | Face-Person Binding + Face Recognition (Max 8/16 channels at full load):<br>Face capture, face recognition, facial attributes, human body capture, human body attributes, face-person binding |
| | Video Structured Analysis (Max 8/16 channels at full load):<br>● Image capture: Face, human body, motor vehicle, non-motor vehicle, license plate<br>● Attribute output: Face, human body, motor vehicle, non-motor vehicle, license plate<br>● License plate recognition<br>● Relationship binding: Face-person, vehicle–license plate, person–non-motor vehicle |
| | Behavior Detection Algorithm:<br>● Abnormal behavior: 1) Fall detection 2) Smoking detection 3) Phone call detection 4) Mobile phone use 5) Running 6) Sleeping on duty 7 Unauthorized absence 8) Crowd gathering 9) Physical altercation 10) Distress call 11) Fatigue driving |
| | Alert Algorithm:<br>● Intelligent alert:<br>A. Environmental anomalies: 1) Fire alarm 2) Smoke alarm 3) Fire equipment inspection 4) Debris accumulation (8 types) 5) Warning sign detection 6) Irregular oil unloading 7) Lens obstruction 8) Camera displacement 9) Animal detection 10) Object movement<br>B. Safety gear violations: 1) No safety helmet 2) No mask 3) No work uniform 4) No safety harness 5) No reflective vest<br>C. Perimeter intrusion (personnel): 1) Loitering 2) Climbing detection 3) Intrusion 4) Boundary crossing 5) Overcrowding 6) Understaffing 7) Unauthorized departure 8) Prolonged presence<br>D. Perimeter security (vehicles): 1) No parking 2) Vehicle departure 3) Non-motor vehicle parking prohibition 4) Non-motor vehicle departure 5) Riding without helmet 6) Excess number of motor vehicles 7) Insufficient number of motor vehicles 8) Special vehicle restriction (19 types) 9) Motorcycle entering gas station |

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|---|---|
| Active Reporting | 1） Face capture, face recognition, facial attribute results<br>2） Capture and attributes of faces, humans, vehicles, non-vehicles, and license plates; license plate recognition results<br>3） Alert alarms<br>4） Timed capture |
| Performance Metrics<br>Face | Capture rate ≥ 99% |
| | False capture rate < 1% |
| | Whitelist recognition rate > 99.5% |
| | False recognition rate < 0.5% |
| | Maximum database: 300,000 faces |
| Human Body | Capture rate ≥ 95% |
| | False capture rate < 1% |
| Motor Vehicle | Capture rate ≥ 90% |
| | False capture rate < 1% |
| Non-Motor Vehicle | Capture rate ≥ 95% |
| | False capture rate < 1% |
| License Plate | Capture rate ≥ 95% |
| | False capture rate < 1% |
| | Recognition rate ≥ 95% |
| Other Alarms | Capture rate ≥ 90% |
| **Platform Expansion** | |
| AI Feature Expansion | Supports AI algorithm expansion, remote upgrade and deployment |
| Platform Integration | UDP, TCP, HTTP, WEB API for integration with superior platforms |
| GB Standard Support | Supports GB/T 28181 platform cascading |
| **Interface Parameters** | |
| Network Interface | 4 network ports, 2100M/1000M +2100M adaptive Ethernet, RJ45 interface |
| WiFi | Supports 2.4G/5G WiFi and AP mode |
| 4G/5G | Dual 4G/5G support, dual SIM cards working independently, accessing different networks |
| Alarm Input | 2 channels of switch |
| Alarm Output | 2 channels of switch |
| Audio Output | 1 channel |
| Audio Input | 1 channel |
| USB Interface | 2 × USB 2.0 |

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|---|---|
| RS485 | 2 channels |
| SATA | 1 × SATA HDD interface |
| Reset Button | 1 |
| Power Indicator (PWR) | 1 |
| Run Indicator (RUN) | 1 |
| **System Functions** | |
| Face Recognition | Access control for personnel; management and recognition of key personnel lists, stranger recognition, etc. |
| Video Structured Analysis | Capture of faces, human bodies, motor vehicles, non-motor vehicles, license plates; attribute analysis; license plate recognition |
| Network Protocols | TCP, UDP, HTTP, MULTICAST, DHCP, FTP, NTP, HTTPS, RTSP, etc. |
| Built-in Web | Supports plugin-free video browsing and alarm image list |
| Log Query | Query, search, and display of captured data for faces, humans, vehicles, non-vehicles, and license plates |
| **Environmental Requirements** | |
| Operating Temperature | -20°C to +60°C |
| Storage Temperature | -30°C to +70°C |
| Relative Humidity | 10% to 90% RH, non-condensing |
| **Other** | |
| Power Supply | DC 12V ±10%, 3A |
| Housing | Metal casing |
| Dimensions (L×D×H) | 235 × 160 × 53 (mm) |
| Weight | < 2 kg |

# Dimensions：

**235 mm (L) × 160 mm (W) × 53 mm (H)**


*Note: Products of the same model may have multiple versions. Differences may exist between versions (including functional parameters, LOGO design, appearance details, product documentation, etc.). Please refer to the actual product for accurate specifications.*