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BATCAM FX

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English

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Product Overview

What is BATCAM FX?

BATCAM FX is a **fixed-mount ultrasonic camera** built around an array of multiple microphones and a high-speed FPGA-based processor. Installed across a wide range of industrial environments, it overlays the acoustic distribution (heatmap) on the camera image to visually show where faults such as gas/air leaks or electrical discharge (partial discharge) occur. It lets you intuitively locate ultrasonic sources on screen that are invisible to the eye and difficult to distinguish by ear.

Key Features

- **112-channel digital MEMS microphone array** — Captures acoustic signals over a wide area simultaneously to precisely estimate the source location.
- **Ultrasonic measurement up to 100 kHz** — Captures even ultrasonic leak and discharge signals that are inaudible to humans.
- **Digital Filter technology** — Suppresses background noise even in noisy equipment environments and cleanly isolates the target signal.
- **Real-time acoustic overlay** — Overlays the sound-pressure distribution on the camera image in real time.
- **Fixed-mount, outdoor installation design** — IP65 water/dust resistance enables permanent outdoor monitoring.
- **FX Viewer integration** — The dedicated software supports real-time monitoring, recording, analysis, and report generation.

Where It Is Used

- **Gas and compressed-air leak detection** — Detects fine leaks in piping, valves, fittings, and tanks in the ultrasonic range.
- **Partial discharge (PRPD) diagnosis of electrical equipment** — Detects insulation-fault signals such as Corona, Surface, and Floating discharge and identifies their location.
- **Continuous equipment monitoring** — After fixed installation, long-term automatic monitoring detects anomalies early.

How It Works

BATCAM FX uses **beamforming**, in which the FPGA computes in real time the minute time differences between the acoustic signals arriving at the 112 microphones, to calculate the direction and strength of the sound source. The calculated sound-pressure distribution is registered with the built-in camera image and displayed on screen as a color heatmap. The deeper or redder the color, the higher the sound pressure (beam power) at that point.

Part Names

The main interfaces and indicators of the unit are as follows.

- **Front microphone array** — 112-channel MEMS microphones + camera lens
- **Status LED** — Green during normal operation; red on fault/power-off
- **RJ45 communication port** — Data transmission and PoE power input
- **DC power terminal** — Connection for the supplied DC power supply (seal with the end cap when not in use)
- **Rear VESA 75 mounting holes** — For wall/post fixing (M4)
- **Bottom tripod mount** — For tripod mounting

What's in the Box

- BATCAM FX unit ×1
- DC power supply (DC 24 V, 2 A) and power cable
- Waterproof communication-cable connector
- End cap for sealing the DC terminal
- VESA 75 fixing screw set

Safety & Handling Precautions

Before You Start

Be sure to read and understand these safety instructions before installation and use. Failure to follow them may result in electric shock, product damage, or measurement errors. Installation and electrical work must be performed by qualified personnel.

Power Precautions

- Use only a **PoE+ or higher rated** supply or a **DC 24 V / 2 A** supply. Connecting a power source outside these specifications may damage the product.
- When supplying power via PoE, the unused **DC connection terminal must be sealed with the supplied end cap**. An exposed terminal degrades waterproof performance.
- Do not handle the power connector with wet hands.
- Do not connect or disconnect cables while power is being supplied.

Installation Environment

- The operating temperature range of this product is **-20 ~ 50 °C** and the operating humidity range is **10 ~ 85 %**. Measurement performance may degrade in environments outside these ranges.
- The water/dust resistance rating is **IP65**. For outdoor installation, always join the communication-cable connector using the **supplied waterproof connector**.
- Avoid locations exposed to prolonged direct sunlight, accumulated high heat, or continuous strong vibration.
- Do not block the front of the microphone array with water, dust, or foreign matter. Doing so reduces measurement accuracy.

Mounting and Fall Precautions

- The unit weighs approx. **1.2 kg**. Use it only after **securely fixing** it with the rear VESA 75 mount or the bottom tripod mount.
- For elevated (overhead) installation, take fall-prevention measures and confirm that the structure adequately supports the unit's load.

Network Precautions

- When connecting multiple units to the same network, change each unit's IP address to be different before installation.
- **Do not use** the `192.168.100.xxx` range. It conflicts with the device's internal network and connection will be blocked.

Handling and Maintenance

- Do not disassemble or modify the unit. Doing so voids the warranty and damages waterproof performance.
- When cleaning the surface, use a dry or soft cloth, and avoid solvents and high-pressure water jets.
- If abnormal operation is observed — such as unusual noise, overheating, or a persistent red LED — cut off power and contact your representative.

Specifications

Product Specifications

- **Dimensions** — 150 mm × 150 mm × 75.5 mm
- **Weight** — 1.2 kg
- **Communication port** — RJ45
- **Power supply** — PoE 100–240 VAC (PoE+ or higher) or DC 24 V, 2 A
- **Status LED** — Front LED (normal: green / fault·cut-off: red)
- **Power consumption** — Max. 25 W
- **Mounting** — Rear VESA 75 standard or bottom tripod mount

Camera

- **Lens type** — Fixed lens
- **Field of view (FOV)** — Horizontal 62.2° / Vertical 48.8°
- **Resolution** — 1600 × 1200 pixels
- **Frame rate** — 25 FPS

Microphone

- **Number of channels** — 112 channels
- **Sensor type** — Digital MEMS microphone
- **Measurement distance** — 0.3 m ~ 100 m
- **Measurement band** — Ultrasonic band up to 100 kHz

Environment

- **Water/dust resistance** — IP65
- **Operating temperature** — -20 ~ 50 °C
- **Operating humidity** — 10 ~ 85 %

These specifications are subject to change without notice. Final figures are based on the factory specification sheet.

Installation

I. System Configuration

BATCAM FX is a network-based device that is configured by connecting it to a server or user PC with a UTP cable. You can choose the power supply method depending on the installation environment.

- (Recommended) Use **CAT6 or higher** UTP cable
- (Recommended) Maximum cable length **within 80 m**
- (Recommended) Use a **Gigabit Ethernet** connection for FX Viewer

II. Power Supply Methods

1) Using the DC power supply

If a 220 V power source is available at the installation site, use the DC power supply included with the product. Power is supplied through the **DC connection terminal** on the bottom of the unit.

2) Using a PoE switch or injector

If a 220 V power source is difficult to provide at the installation site, use a separate PoE device. BATCAM FX has built-in PoE, so it can supply both data and power over a single network cable at distances up to 80 m.

- You must select a **PoE+ or higher rated** device.
- When supplying power via PoE, **the DC connection terminal must be sealed with the supplied end cap**.

III. Mounting and Installation

BATCAM FX is a fixed-mount ultrasonic camera that is installed by fixing it to a wall or post using the VESA 75 holes on the rear of the product.

- VESA mount detailed specification: **VESA75_TAP M4 × 0.7 DP8**

Waterproof/Dustproof Installation (Outdoor)

BATCAM FX has IP65-rated water/dust resistance. For outdoor installation, the communication-cable connector must always be joined and installed using the **supplied waterproof connector**.

Quick Start — Initial Connection

Initial camera registration information

When registering a new camera in FX Viewer, factory-default units use the following default values.

- **IP** — 192.168.50.11
- **Port** — 80

- **RTSP Port** — 8554
- **UserName** — admin
- **Password** — admin

※ You must fix the PC's wired network range to `192.168.50.xxx` before registering.

Installation precautions

- When connecting multiple units, change each unit's network IP address before installation.
- When changing the IP range, do not use the `192.168.100.xxx` range (conflicts with the internal network).

Camera angle of view and recommended installation distance

The camera's angle of view is **62° horizontal, 48° vertical**. Depending on the distance to the measurement target, the measurement range that fits in one screen can be estimated as follows.

- X-axis (horizontal) length (m) = **1.202 × distance (m)**
- Y-axis (vertical) length (m) = **0.890 × distance (m)**

For example, if the measurement target is 5 m away, a range of approx. 6.0 m × 4.5 m fits in one screen. Determine the installation distance to match the size of the target equipment.

Camera Registration & Network Setup

Camera Registration and Network Setup

To use a BATCAM FX device in FX Viewer, you must first register the camera.

1. Registering a new camera

Go to Settings → Camera menu and press the **“+”** button to register a new camera. Factory-default units use the following network values.

- **IP** — 192.168.50.11
- **Port** — 80
- **RTSP Port** — 8554
- **UserName** — admin
- **Password** — admin

※ You must fix the connecting PC's wired network to the `192.168.50.xxx` range before registering.

2. Automatic device entry

When you select a BATCAM FX device connected to the network, the **IP, RTSP port, and device name** are entered automatically. If a duplicate device name exists, registration fails and an error popup is displayed.

3. Changing IP settings (automatic / static)

Once BATCAM FX is connected normally, you can change the IP settings in the camera information.

- Automatic IP
- Static IP

Input items when setting a static IP:

- IP address
- Subnet mask
- Gateway

After changing and saving, the device automatically reboots within 1–2 minutes and the IP settings are applied.

4. PC network setup precautions

If you change the BATCAM FX IP to a static IP, you must also change the network setting of the PC running FX Viewer to the same range.

※ On firmware **v1.0.2 or later**, when setting a static IP you must additionally enter `1.1.1.1` as the default DNS server.

5. Default RTSP connection

A registered camera can also be accessed via an RTSP stream.

`rtsp://{device IP}:8554/raw`

For development integration details, refer to the development wiki (developer guide).

FX Viewer Overview

What is FX Viewer?

FX Viewer is the dedicated software for BATCAM FX that visualizes the ultrasonic data measured by the camera in real time and provides recording and analysis functions.

Key Features

- Real-time monitoring and abnormal-noise verification
- Manual recording / trigger recording / interval recording support
- Playback and analysis of recordings (Analysis mode)
- Gas leak and partial discharge report generation (Word / PDF)
- AI background-noise removal

Real-Time Monitoring

When you select a registered camera, the sound-pressure distribution is overlaid as a heatmap on the camera image. By adjusting the measurement frequency range and the display threshold, you can clearly view only the signals of interest. For detailed registration steps, see Camera Registration and Network Setup.

Recording

You can save measurement results together with video. Three recording methods are supported: manual, trigger, and interval. For details, see FX Viewer Recording.

Analysis Mode

In Analysis mode you can review all result videos saved by manual, trigger, and interval recording. Browse and delete recording history via the event list, and the selected video plays in the center screen. For detailed analysis and report features, see Recording and Analysis.

Report Generation

You can generate the following reports based on recorded result videos.

- Gas leak report
- Partial discharge report

Reports can be downloaded as Word or PDF files.

AI Feature (Background-Noise Removal)

Even in Analysis mode, you can compare before/after applying the AI model. However, this feature is only available on **results to which the AI model was applied at the time of recording**.

External Integration (API)

BATCAM FX provides an API for integration with external software.

- REST API based (HTTP)
- RTSP video stream — `rtsp://{device IP}:8554/raw`
- WebSocket event subscription

For detailed development documentation, refer to the developer guide (development wiki).

Recording

FX Viewer Recording

FX Viewer provides three recording methods so you can save BATCAM FX measurement results together with video.

1. Recording types

- Manual recording
- Trigger recording
- Interval recording

2. Manual recording

The user starts recording by pressing the record button directly.

- The maximum recording time is **5 minutes**.
- Recording ends automatically after 5 minutes.
- Recorded files are saved in mp4 format.

3. Trigger recording

This feature automatically records when a specific noise level (dB) is exceeded.

- **Trigger Level**: Set within the 0 ~ 120 dB range
- **Trigger Duration**: The recording time when the trigger condition is met

4. Interval recording

This feature performs repeated recording at fixed time intervals. It is used to keep periodic records in long-term monitoring environments.

5. Saved file structure

When recording is performed, the following files are saved together.

- mp4 video file
- json event data file — includes beamforming information and measured values

6. Linkage with Analysis Mode

Recorded results can be reviewed in Analysis mode, and can be browsed and deleted through the recording event list. For report generation and Leak/PRPD analysis, see the Recording and Analysis page.

Recording Analysis & Reports

Analysis Mode

Analysis mode is the feature for reviewing result videos recorded on BATCAM FX and performing detailed analysis and report generation.

1. Reviewing recorded videos

You can review all result videos saved by manual, trigger, and interval recording. Browse and delete per-camera recording history via the event list, and the selected video plays in the center screen.

The following information is recorded for each recorded video.

- Recording time
- Measurement frequency range
- Display threshold
- Average / maximum beam power level

The progress bar can only be operated while the video is paused.

2. Report generation

Clicking the **“Generate Report”** button next to the progress bar opens a report-type selection popup. The reports that can be generated are as follows.

- Gas leak report
- Partial discharge report

Reports can be generated and downloaded as Word or PDF files.

Gas leak report

In addition to capture information and beamforming setup information, you can enter test information and system information. Entering the system information reflects the **Leak Index, Leak Rate, and estimated annual loss** in real time.

Input items when the measured gas is **air**:

- Distance
- Compressor output
- Compressor capacity
- Electricity rate
- Annual operating hours

Input items for gases other than air (**nitrogen / helium / hydrogen**):

- Distance
- Fluid cost per liter

- Annual operating hours

At the bottom of the report, a time–sound pressure graph and a power spectrum graph are produced.

3. AI Feature (Background-Noise Removal)

Even in Analysis mode, you can compare before/after applying the AI model. This feature is only available on results to which the AI model was applied at the time of recording. When the AI button is disabled, the result was recorded without AI applied.

4. Event search

Using the calendar icon at the top of the event list, you can specify a start/end date to look up events within a specific period.

5. Detailed analysis features

Via the gear (settings) button next to the camera name, you can also perform additional analysis on recorded videos.

- Change beamforming settings
- LEAK analysis
- PRPD analysis

LEAK analysis

By entering environmental factor values, you can check the Leak Index, Leak Rate, and estimated annual loss. The Leak Index criteria are as follows.

- **Index 1** — 200 cc/min or less
- **Index 2** — 200 ~ 400 cc/min
- **Index 3** — 400 ~ 600 cc/min
- **Index 4** — 600 ~ 800 cc/min
- **Index 5** — Over 800 cc/min

PRPD analysis

The PRPD graph waveform varies according to the type of partial discharge, and the graph shape lets you distinguish **Corona / Surface / Floating** discharge.

Certifications & Compliance

Certification Overview

BATCAM FX meets the EMC standard requirements for sensitive electronic equipment used in measurement, control, and laboratory applications.

Electromagnetic Compatibility (EMC)

- EN 55032:2015/AC:2016
- EN 55035:2017
- EN 61000-3-2:2014
- EN 61000-3-3:2013

FCC Compliance

- FCC Part 15 Subpart B, Class A

CE Compliance

- 2014/30/EU — Electromagnetic Compatibility Directive (EMC)

KC Compliance

- Registered under Article 58-2 (3) of the Radio Waves Act

Troubleshooting

Troubleshooting

This section summarizes common problems that occur while operating BATCAM FX / FX Viewer and how to resolve them.

1. Camera is not found or registered in FX Viewer

Symptoms

- The device does not appear on the camera registration screen
- Connection fails when attempting to connect

Things to check

- The factory-default IP is `192.168.50.11`.
- The PC's wired network must be fixed to the `192.168.50.xxx` range.
- CAT6 or higher UTP cable is recommended, and installation within 80 m is recommended.

2. RTSP video does not appear

Things to check

- The default RTSP port is `8554`.
- Connection address example: `rtsp://{device IP}:8554/raw`

3. Connection drops after changing the IP

Cause — When you change the device IP, the PC must also be set to the same range.

Caution — Do not use the `192.168.100.xxx` range. It overlaps with the device's internal network and connection will be blocked.

4. PoE power is not supplied

Things to check

- The PoE device must be PoE+ or higher rated.
- When using PoE, the DC connector must be sealed with the supplied end cap.

5. The AI button is disabled in Analysis

Cause

- The AI feature cannot be used on results recorded without AI applied.
- It is only enabled on results to which a trained AI model was applied at the time of recording.

6. Further inquiries

If the above items do not resolve the issue, check the FX Viewer logs and device status information, then contact the developer guide or your representative.

FAQ

Frequently Asked Questions

Product Basics

Q. What kind of device is BATCAM FX?
BATCAM FX is a fixed-mount ultrasonic camera equipped with a 112-channel MEMS microphone array and an FPGA-based processor. It lets you visually identify the location of gas leak and electrical discharge faults. It was developed to measure gas/air leaks and electrical-equipment anomalies (partial discharge) more clearly even in noisy equipment environments by leveraging Digital Filter technology.

- Uses 112 microphones
- Can measure the ultrasonic band up to 100 kHz

Q. What is the water/dust resistance rating?
BATCAM FX supports the IP65 rating.

Installation and Power

Q. How is power supplied?
Power can be supplied via PoE+ or DC 24 V / 2 A.

Q. What are the cable requirements for installation?
CAT6 or higher UTP cable is recommended, and installation within 80 m is recommended.

Using FX Viewer

Q. What is the default login account?
The factory-default account is `admin / admin`.

Q. What recording methods are available?
Manual recording, trigger recording, and interval recording.

Q. Can reports be generated?
Gas leak reports and partial discharge reports can be generated as Word / PDF.

Network · API Integration

Q. What is the RTSP stream address?
`rtsp://{device IP}:8554/raw`

Q. What kind of API is provided?
It operates on a REST API + WebSocket basis. For detailed development integration, refer to the developer guide (development wiki).