Eagle Eye Application Note - AN087

Best Practices for Using the DH03 I/O Module

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Target Audience

This Application Note is intended for system integrators, security professionals, and resellers looking to deploy comprehensive I/O integration solutions that connect external devices to the Eagle Eye Cloud VMS. It targets technicians who perform installations of the Eagle Eye DH03 (SDUH-003a) I/O+Audio module for automated security systems in a variety of scenarios.

Introduction

This Application Note provides insights into the Eagle Eye DH03 I/O+Audio module, which bridges external security devices with the Eagle Eye Cloud VMS to create unified, automated security systems. Proper installation and configuration of the DH03 module is critical for the reliable integration of legacy and modern devices. Improper setup can result in missed triggers, communication failures, or unreliable automation. This Application Note explains best practices for DH03 installations and common pitfalls to avoid.

This Application Note is not exhaustive. Please use and adapt this information for your specific DH03 deployments.

Background

Modern security operations require seamless integration between cameras, sensors, alarms, and access control systems. Traditional security infrastructure often struggles with:

- **Isolated systems** - Cameras, alarms, and sensors operating independently
- **Manual response delays** - Security events requiring human intervention
- **Legacy device incompatibility** - Older analog systems are unable to integrate with modern VMS.

- **Complex multi-vendor management** - Disparate systems require separate interfaces.
- **Limited automation capabilities** - Systems are unable to trigger coordinated responses across devices.

The Eagle Eye DH03 I/O+Audio module is designed to unify these disparate systems into a single, intelligent security platform.

Key Features

The Eagle Eye DH03 15W SIP I/O Module (EN-SDUH-003a) has the following key features:

Expanded I/O Capability:

- 2 GPIO input channels for sensors, buttons, and switches
- 1 GPIO output channel for device control
- 2 relay output channels for controlling lights, alarms, and access devices
- Flexible port association with multiple cameras per bridge

Advanced Audio Integration:

- **Analog-to-IP Audio Migration** - Converts traditional speaker, mic, and headset devices into SIP-compatible IP endpoints
- **Two-Way Intercom Support** - Interfaces with existing audio hardware via dedicated mic, speaker, and headset ports
- **48 kHz OPUS Codec** - Ensures high-fidelity audio quality for both live and recorded content
- **Pre-Recorded Message Support** - Stores and plays WAV/MP3 audio files based on VMS events, button presses, or I/O triggers
- **Dual SIP Account Support** - Direct IP calling and multicast RTP capabilities

Audio Codec Support:

- OPUS 48 kHz for high-quality real-time communication
- MP3 44.1 kHz for pre-recorded content
- G.722 and G.711 (PCMU/PCMA) for legacy compatibility
- Support for WAV and MP3 pre-recorded audio files

Network and Protocol Support:

- 10/100 Mbps Ethernet connectivity (RJ45)
- Cloud VMS integration with real-time event synchronization
- Rule-based automation and alerting capabilities

Applications

The DH03 15W SIP I/O Module is recommended for the following applications:

Door Station and Intercom Integration:

- Entry points, lobbies, and secure access areas
- Converting analog door stations to IP-based systems
- Two-way communication with visitors and staff
- Integration with existing intercom infrastructure

Intrusion Detection System Integration:

- Motion sensors, door contacts, and glass break detectors
- Alarm triggering and automated response workflows
- Legacy security system modernization
- Multi-zone monitoring and control

Panic Button + 2-Way Audio Systems:

- Retail stores, schools, financial institutions, and healthcare facilities
- Emergency response with immediate audio communication
- Automatic camera activation and monitoring center alerts
- Pre-recorded emergency announcements

Paging and PA System Modernization:

- Converting analog paging systems to IP-based control
- Event-driven audio announcements via Cloud VMS
- Multi-zone broadcast control with external amplifiers
- Scheduled and triggered audio messaging

Automated Access Control:

- Gate operators, door strikes, and barrier controls
- License plate recognition triggers for access automation
- Lighting control based on detection events
- Audio confirmation for access events

Building Automation Integration:

- HVAC control relays and environmental sensors
- Facility management system integration
- Energy management and equipment control
- Automated building response systems

Legacy System Integration:

- Energy, industrial, and government facilities
- Vibration sensors, environmental monitors, and safety systems
- Modernization without full infrastructure replacement
- Cost-effective migration to IP-based systems

Installation and Integration

System Requirements

Network Infrastructure:

- 10/100 Mbps Ethernet connection with PoE capability (IEEE 802.3af) or separate 12-24V DC power supply
- Reliable IP network connectivity to Eagle Eye Switch/Bridge/CMVR

Audio System Requirements:

- Compatible analog audio devices (microphones, speakers, headsets)
- Proper impedance matching for audio inputs and outputs
- Audio cable routing and grounding considerations
- Acoustic design for optimal audio performance

I/O Device Compatibility:

- GPIO input voltage compatibility (verify with existing sensors)
- Relay output current rating verification (up to device specifications)
- Signal conditioning requirements for analog devices
- Proper electrical isolation and protection

Physical Installation Guidelines

Enclosure Placement:

- Install in environmentally controlled locations when possible (security panels, telecom closets)
- Compact metal enclosure (112 × 105 × 29 mm) suitable for behind-panel mounting
- Ensure adequate ventilation and service access
- Maintain separation from high-power electrical equipment

Connection Best Practices:

- Use appropriate cable types for audio, I/O, and network connections (Cat5/6, 18/2, 22/2 etc)
- Implement proper grounding techniques for audio quality
- Maintain separation between power and signal cables
- Secure all connections to prevent accidental disconnection

Audio Installation Considerations:

- Position microphones to minimize feedback and ambient noise
- Install speakers for optimal coverage and intelligibility
- Consider acoustic environment and background noise levels
- Test audio quality under actual operating conditions

Deployment Best Practices

Planning Phase:

- Map existing devices and their integration requirements
- Identify camera associations for each I/O port
- Plan automation rules and response workflows
- Document legacy system specifications

Installation Guidelines:

- Install in environmentally controlled locations when possible
- Ensure proper grounding and electrical isolation
- Use appropriate cable types for I/O connections
- Maintain separation between power and signal cables

Configuration Steps:

- From Dashboard, select Add Device (“+” icon top right above dashboard)
- Select “Speakers”
- Add Device (no need to configure username or password)
- After Speaker is added, locate it from the bridge it is connected to in Dashboard, and go to Settings (Kebab menu on far right of page)
- **General** tab, Configure **Name**, add **Notes** or **Tags**
- **Audio** tab:
    - **Audio** mode:
        - **Disabled**: No Audio functionality needed
        - **2-way audio**: Audio can be sent down to an attached speaker, and Audio can be received to the VMS while the session is active (requires a microphone in the location of the speaker)
        - **Talk down**: Audio can be sent down to an attached speaker.

            - Either the Audio function from Cloud VMS will be initiated at the Cloud VMS user side. The ability to talk down or listen back will be dependent on the device the user is using.
                - Ex. From a browser on a Laptop, the session will use the laptop's built-in speaker and microphone to initiate communication. The browser may ask for permission to use the Laptop devices before the connection is made.
    - **Protocol**: Currently, only SIP is supported.
    - **SIP username & SIP password:** These are not needed for support through the Cloud VMS.
    - **Speaker login & Speaker password**: Only required if changed from the default.
    - **Associate speaker with cameras**: Drag the Unlinked cameras to the Linked cameras box to enable session communication through these camera devices
- **I/O** tab:
    - **Input ports**: Input 1 and Input 2 settings
        - **Enable port**: Use these ports to receive input signals from a connected I/O device
        - **Name**: Name of the connected I/O device
        - **Idle circuit state**: This sets whether the port is configured for Normally Open or Normally Closed circuits
        - **Port status**: Shows whether the port is currently active or idle
        - **Show toggle on video**: Allows you to see the port status in camera view (whether the port is active or idle). The Icon can be set to a device type that relates to the signal
        - **Record when active**: This option allows you to trigger video recording for the camera when a signal activates this input.
    - **Output ports**: Input 1 and Input 2 settings
        - **Enable port**: Use these ports to send output signals from a connected I/O device.
        - **Name**: Shows the name of the connected I/O device.
        - **Idle circuit state**: This sets whether the port is configured for Normally Open, or Normally Closed circuits.
        - **Port status**: Shows whether the port is currently active or idle.
            - **Toggle port status**: Allows you to activate/ deactivate the relay port
        - **Show toggle on video**: Allows you to control the relay port in camera view (whether the port is active or idle). The Icon can be set to a device type that relates to the signal.
        - **Record when active**: This option allows you to trigger video recording for the camera when a signal activates this input.

Automations Workflow

1. **Input to Output Automations:** Use the Automations features to enable Input relay triggers to automatically send relay output triggers.

- **From Enhanced Web Application** (webapp.eagleeyenetworks.com):
    - **Automations**: Menu item from Left Hand menu in Webapp (Alerts/ Rules/ Actions)
    - **Rules**: From Rules page, select "+" icon on top right of page
        - **Rule name**: Name the Rule
        - **Source**: Choose "Devices"
        - **Priority**: Set the priority of the alert (self-assigned value)
        - **Notes**: Add any notes regarding the rule (not required)
        - **Alert type**: Choose "Input triggered"
        - **When**: Choose a schedule for when the alert is active
        - **Device type**: Choose "Speakers"
        - **Speakers**: Choose the I/O device for which the Rule is needed.
            - **Input port**: Choose the Input number/name where the trigger will activate for the rule to fire
        - **Actions**: Apply an existing Output Port Action, or create one with the "+" icon
            - **Add action**:
                - **Action name**: Name of action
                - **Action type**: Choose "Output port"
                - **Device**: Choose the I/O device for the Output relay
                - **I/O port**: Choose which port to trigger
                - **Duration in secs**: Choose how long the Output relay should be activated for the action

2. **Video Event to Output Automations:** Use the Automations features to enable a video analytic event to automatically send relay output triggers

- **From Enhanced Web Application** (webapp.eagleeyenetworks.com):
    - **Automations**: Menu item from Left Hand menu in Webapp (Alerts/ Rules/ Actions)
    - **Rules**: From Rules page, select "+" icon on top right of page
        - **Rule name**: Name the Rule
        - **Source**: Choose "Video"
        - **Priority**: Set the priority of the alert (self-assigned value)
        - **Notes**: Add any notes regarding the rule (not required)
        - **Alert type**: Choose the type of Video Analytic applied to the selected cameras
        - **When**: Choose a schedule for when the alert is active
        - **Cameras**: Choose which camera devices have the Alert type enabled, and should activate the Relay on alert condition
        - **Actions**: Apply an existing Output Port Action, or Create one with the "+" icon
            - **Add action**:

- **Action name**: Name of action
- **Action type**: Choose “Output port”
- **Device**: Choose the I/O device for the Output relay
- **I/O port**: Choose which port to trigger
- **Duration in secs**: Choose how long the Output relay should be activated for the action