DB052E Smart IO Box User Manual

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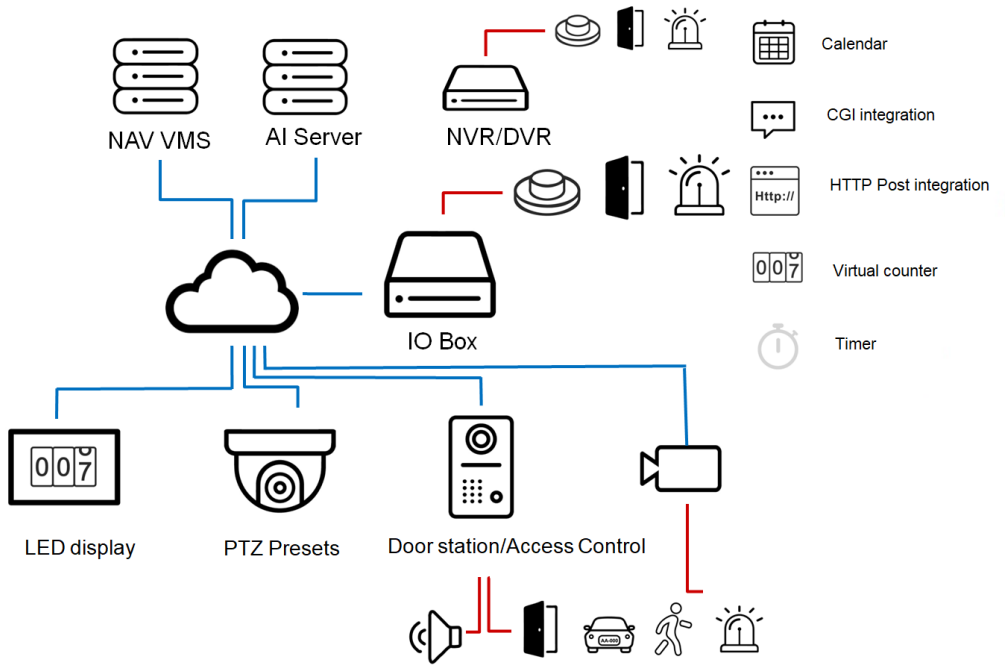
Summary

LILIN Smart IO Box contains digital inputs, digital outputs, and relay outputs for interfacing other devices. The metadada of camera IVS, NVRs motion & alarm inputs, Navigator with number plate recognition or facial recognition can be integrated by LILIN Smart IO Box. The metadata gets parsed by LILIN Smart IO Box for triggering event outputs.

The event outputs include digital outputs, HTTP Post for other devices, and IR remote outputs. There are 32 SmartEvents available for scheduling actions based on timer and calendar. Programmable CGI parsers, virtual counter can be used for triggering PTZ presets, NVR digital outputs, external digital alarms, LED displays, and white light LEDs, and audio outputs of door stations.



Key Features

- Supports 8 digital inputs, 4 MOSFETs, and 4 DC-Relays with jump switches for DI/DO mode.
- Support dry / wet contact for digital inputs.
- Support 2 hardware digital counters and 16 software virtual counters.
- Support event scheduling with holiday list.
- Support remote control IR output.
- Support digital timer for alarm outputs.
- Support CGI virtual input and HTTP Post for virtual output.
- Support metadata parsing for alarm outputs.
- Support email and FTP notification.
- Support HTTP & HTTPs
- Support PoE interface

Trademarks & Acknowledgments

LILIN HTTP APIs

You might need to reference LILIN HTTP documents for programming SmartEvents.

Caution

- Do not drop or damage the equipment
- Do not install the equipment near fire or heat sources
- Keep the equipment from rain, moisture, smoke, or dust
- Do not cover the opening of the cabinet with cloth and/or plastic or install the unit in poorly ventilated places. Allow 10cm between this unit and its surroundings
- Do not continue to operate the unit under abnormal conditions such as smoke, odor, or loss of signal whilst power is turned on
- Do not touch the power cord with wet hands
- Do not damage the power cord or leave it under pressure
- To avoid unnecessary magnetic interference, do not operate this unit near magnets, speaker systems, etc.
- All connection cables should be grounded properly

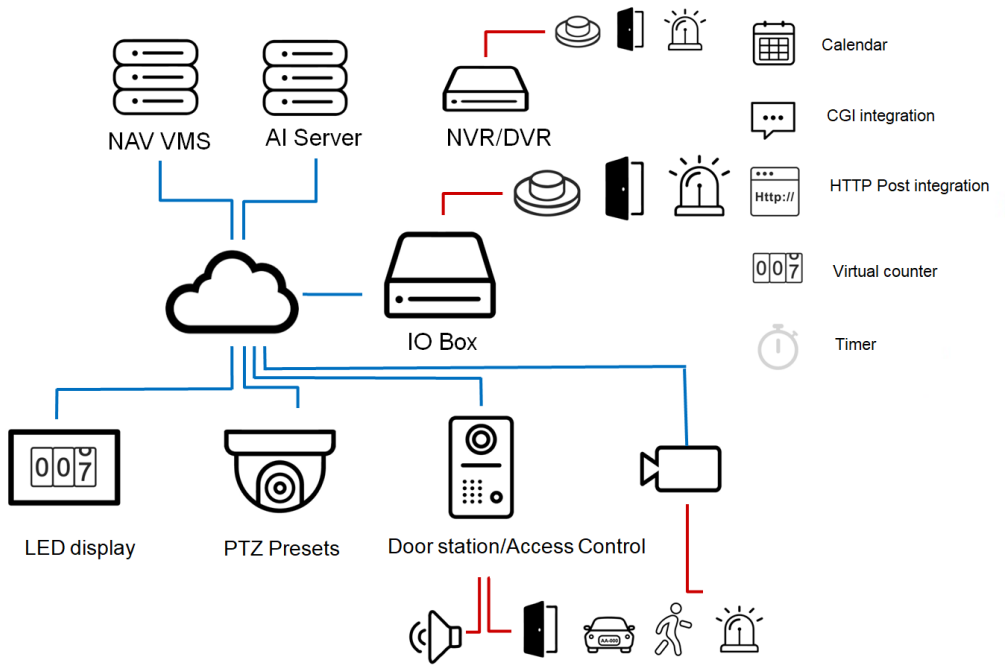
Disclaimer

Please be aware that this user manual may cover a range of product specifications for various models. Characteristics and features discussed and/or illustrated in this manual may not be applicable or available to all models. We reserve the right to change product specifications, designs and equipment without notice and without incurring obligation.

Chapter 1 System Overview

Chapter 1-1 System Requirements

LILIN's Smart IO Box can receive metadata from NAV, NVR/DVR, and IP camera. The Smart IO Box also provides digital inputs, digital output, and IR control output for interfacing other device via hardware. The system diagram is displayed below:



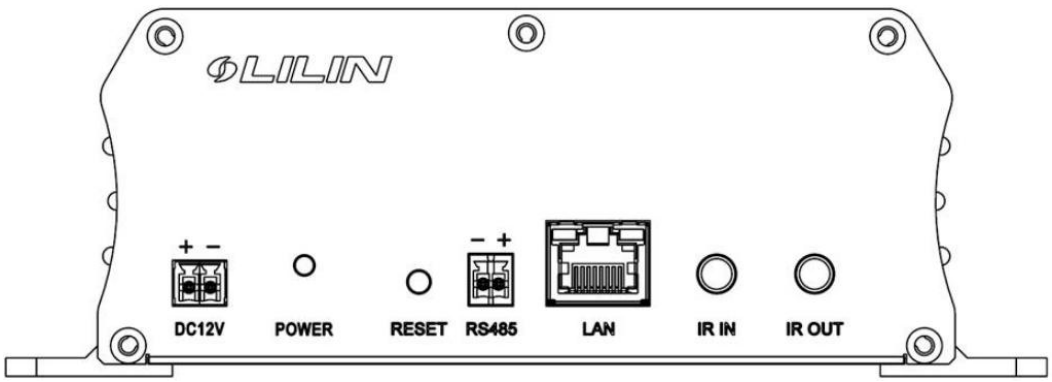
Chapter 1-2 Software Requirements

LILIN Smart IO Box uses HTML5 which supports many browsers without any software plug-in.

Chapter 1-3 The Hardware

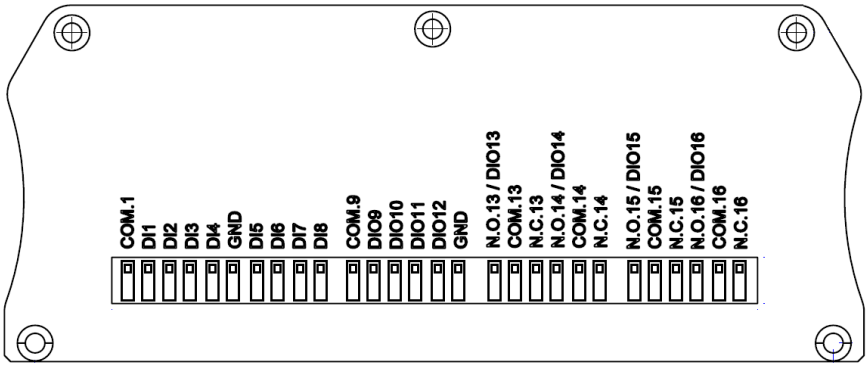
Front View: the front panel is described below:

(1) DC12V power input
(2) Power LED indicator
(3) Reset button
(4) RS-485 connector
(5) LAN network connector
(6) IR Input
(7) IR Output



Rear Panel: The rear panel contains the digital inputs that they are described below:

(1) Digital inputs: DI #1~D4,
(2) Digital inputs or outputs: DIO #9 ~ DIO #12, the default is at input mode. If you want to configure them to digital outputs, please open the case and change the jumpers to DO mode.



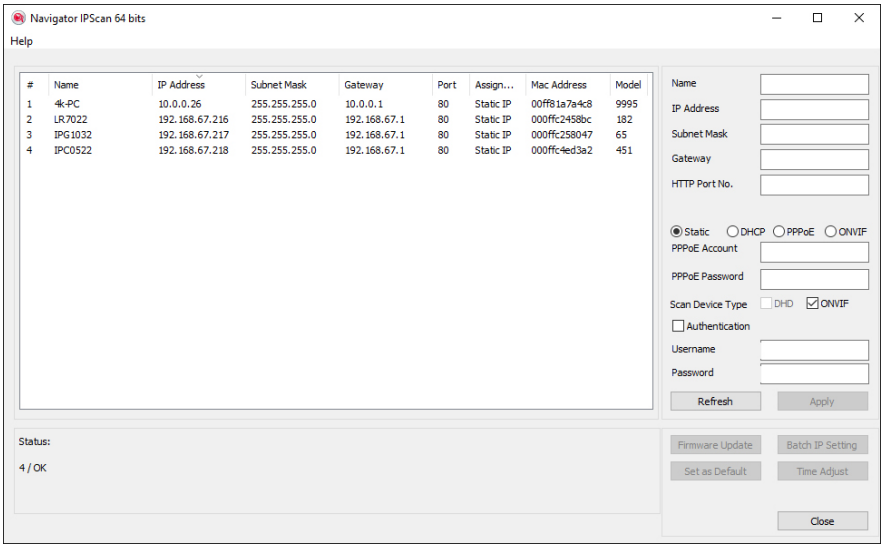
Chapter 2 Before Accessing Smart IO Box

Before accessing the Smart IO Box, make sure that the Smart IO Box's RJ-45 network connector and power cable are properly connected. To set the IP address, consult your network administrator. The default IP address for each Smart IO Box is 192.168.0.200. Users can use the default IP address to verify the camera's network connection.

Chapter 2-1 Configure IP Addresses using the IPScan Utility

To configure the IP address of your Smart IO Box, download IPScan from our official website. To change the IP address, subnet mask, gateway, or HTTP port of your Smart IO Box, follow the steps below:

- Run the IPScan utility
- Click **Refresh**. All available devices will be listed on the screen
- Select the device item from the device list
- To edit or modify IP address, subnet mask, gateway, or HTTP port, use the box
- Click **Apply** for the changes to take effect
- Click **Refresh** again to verify the changed settings



Chapter 2-2 Configure IP Addresses through HTML Connection

To change an IP address on a webpage, type the default IP address (192.168.0.200) into the browser address bar and follow the steps below:

- Due to security reason, create the username and password for the first login. To login to the Smart IO Box, please create the username and password on the login page. Press **Confirm** to complete the setting and login simultaneously.
- Click **Setup→Network** to edit or modify IP address, subnet mask, gateway, or HTTP port
- Click **Submit** for the changes to take effect.

Once completed, you can access the Smart IO Box's by entering the default IP address via a web browser. A security warning dialog box will appear. Click OK to download the ActiveX directly from the IO Box.

Chapter 2-3 Login

Due to security reason, create the username and password for the first login. To login to the Smart IO Box, please create the username and password on the login page. Press **Confirm** to complete the setting and login simultaneously.

Minimum Password Strength Requirements:

1. The password length must be 8 or more characters.
2. The password must include at least 1 number (0~9), 1 uppercase letter, 1 lowercase letter and 1 symbol.

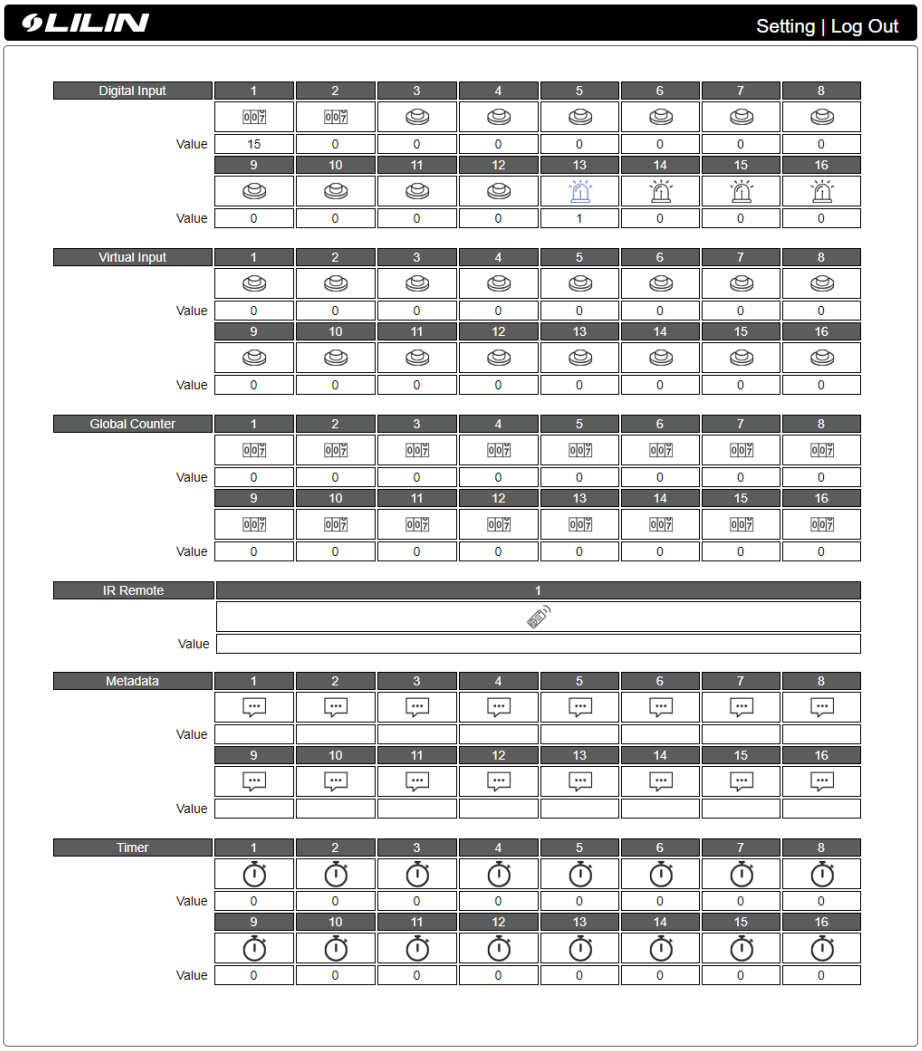
Note: Please preserve the credential for accessing the IO Box properly. Forgetting the credential for accessing the camera, please perform hardware factory default.

Chapter 3 LILIN I/O Box Operations

When logged in as an administrator, two main features are available: 1) I/O status and 2) configurations.

Chapter 3-1 IO Status

Click on IO Status button. It will show the values of global counter, triggering status of digital inputs or outputs, and IR receiver status. IO Status panel is easy for an engineer to troubleshoot.



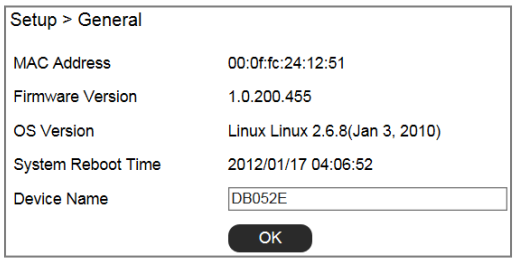
Chapter 4 Settings

As an administrator, you can configure the Smart I/O Box via a standard HTML webpage. Click Setting at the top-right corner of the screen after you log in to the camera.

Chapter 4-1 System

Chapter 4-1-1 General

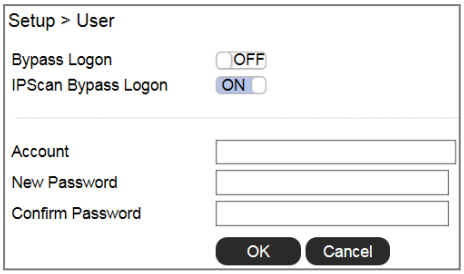
Under System Settings→General, you will see server system information, such as MAC address, firmware version, os version, system reboot time, and device name settings. To modify these options, follow the instructions below:



- **MAC Address:** The MAC address of the camera
- **Firmware Version:** Firmware version of the camera
- **OS Version:** The version number of the camera
- **System Reboot Time:** The last time your system was rebooted.
- **Device Name:** The device name can be found using the IPscan utility, which allows you to identify Smart IO Box. To change the device name, enter a new name for the Smart IO Box and click Submit.

Chapter 4-1-2 User

The Smart IO Box supports up to 10 user accounts. Each account can be individually configured for its access rights. To add/edit a user, click Add/Edit User. To access a Smart IO Box without authentication, switch the Bypass Logon option to On. Enable IPScan Bypass Logon to log in the Smart IO Box through IPScan without authentication. To add a user, press Add User, and you will see the following screen:

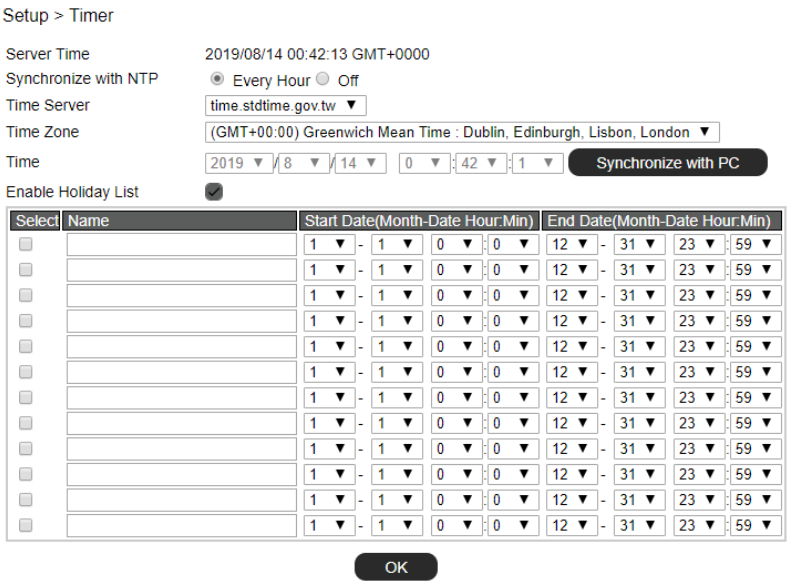


Enter the account name, password and confirm password to add new account. Click Submit to update the settings.

To edit account information, click Edit User. To delete a user, click Remove User. Click Submit to update the settings.

Chapter 4-1-3 Timer Settings

You can change the time of your camera through a HTML web page. Simply select the date and time in the drop-down menus, and click OK to apply. You may also set the holiday list in this page.



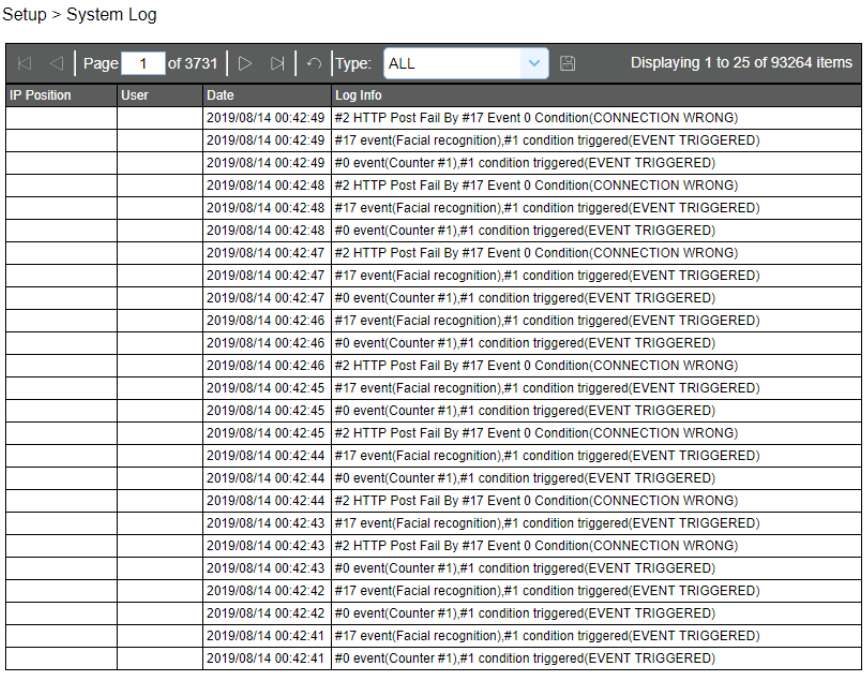
Synchronize with an NTP server

To synchronize with an NTP server, change the Synchronize with NTP to Every Hour. The camera will synchronize its system time with a time server every hour.

Note: This function requires Internet connection.

Chapter 4-1-4 System Log

You can view the system-generated log in this page. Click Save icon to export the log to a text file.



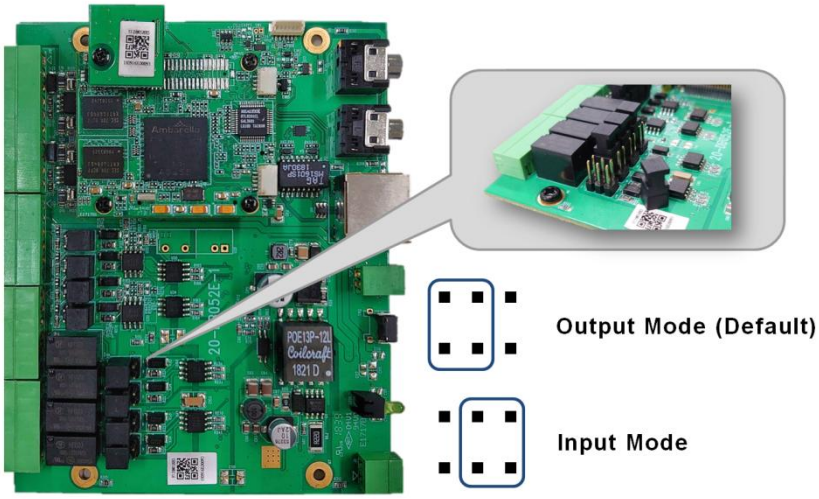
IP Position	User	Date	Log Info
		2019/08/14 00:42:49	#2 HTTP Post Fail By #17 Event 0 Condition(CONNECTION WRONG)
		2019/08/14 00:42:49	#17 event(Facial recognition),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:49	#0 event(Counter #1),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:48	#2 HTTP Post Fail By #17 Event 0 Condition(CONNECTION WRONG)
		2019/08/14 00:42:48	#17 event(Facial recognition),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:48	#0 event(Counter #1),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:47	#2 HTTP Post Fail By #17 Event 0 Condition(CONNECTION WRONG)
		2019/08/14 00:42:47	#17 event(Facial recognition),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:47	#0 event(Counter #1),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:46	#17 event(Facial recognition),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:46	#0 event(Counter #1),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:46	#2 HTTP Post Fail By #17 Event 0 Condition(CONNECTION WRONG)
		2019/08/14 00:42:45	#17 event(Facial recognition),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:45	#0 event(Counter #1),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:45	#2 HTTP Post Fail By #17 Event 0 Condition(CONNECTION WRONG)
		2019/08/14 00:42:44	#17 event(Facial recognition),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:44	#0 event(Counter #1),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:44	#2 HTTP Post Fail By #17 Event 0 Condition(CONNECTION WRONG)
		2019/08/14 00:42:43	#17 event(Facial recognition),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:43	#2 HTTP Post Fail By #17 Event 0 Condition(CONNECTION WRONG)
		2019/08/14 00:42:43	#0 event(Counter #1),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:42	#17 event(Facial recognition),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:42	#0 event(Counter #1),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:41	#17 event(Facial recognition),#1 condition triggered(EVENT TRIGGERED)
		2019/08/14 00:42:41	#0 event(Counter #1),#1 condition triggered(EVENT TRIGGERED)

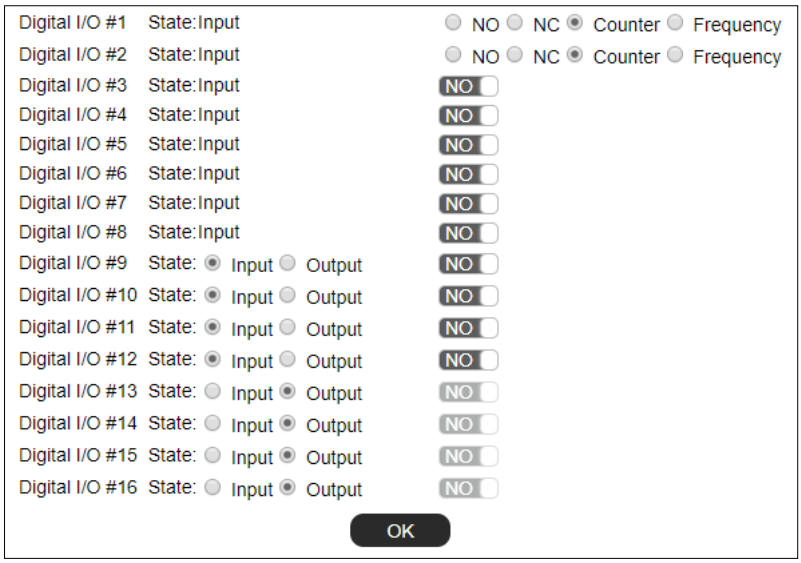
Chapter 4-2 Controls

Controls page contains the settings of digital inputs and outputs, metadata configurations, and global counters. Make sure that the Controls are properly set up before configuring SmartEvent.

Chapter 4-2-1 Digital I/O

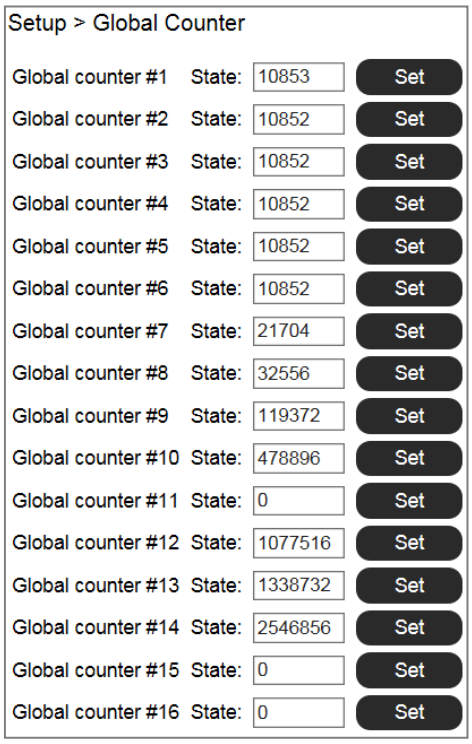
The Smart IO Box supports a wide range of control interface for each channel including NO, NC, counter and frequency. Please select the feature according to requirement and press OK to save the settings.





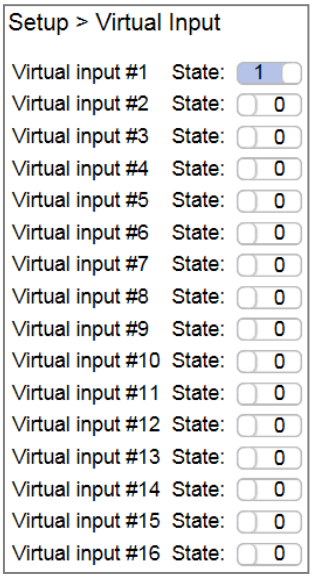
Chapter 4-2-2 Global Counter

The global counters are for counting a trigger of a digital input. The global counter can be triggered by a metadata, a digital input, or a virtual input. The global counters can be used for output purposes, such as LED display.



Chapter 4-2-3 Virtual Input

The Smart IO Box provides up to 16 virtual inputs. Virtual inputs are CGI commands that these can be used for other device to trigger.



Chapter 4-2-4 Metadata

Metadata is the HTTP response of a CGI command. LILIN Smart IO Box is able to receive the metadata from an IP device. The metadata is the URL response of an IP device.

Number	Metadata Server Name	Metadata Server IP/DNS	Port
1	NVR Motion Detection	192.168.0.111	80
2	LPR Camera In Motion Detection	192.168.0.200	80
3	LPR Camera Out Motion Detection	192.168.0.200	80
4	Camera Motion Detection	192.168.0.200	80
5	Camera Tripwire1	192.168.0.200	80
6	Camera Tripwire2	192.168.0.200	80
7			80
8			80
9			80
10			80
11			80
12			80
13			80
14			80
15			80
16			80

The example below, Smart IO Box is able to receive the metadata of motion events, MotionDetect token of /getalarmmotion CGI command, from an IP camera. The events are captured into the valuable %Trigger1% for actions. In the SmartEvent, %Trigger1% can be used for a global counter for event triggering.

To setup metadata, finish the settings below:

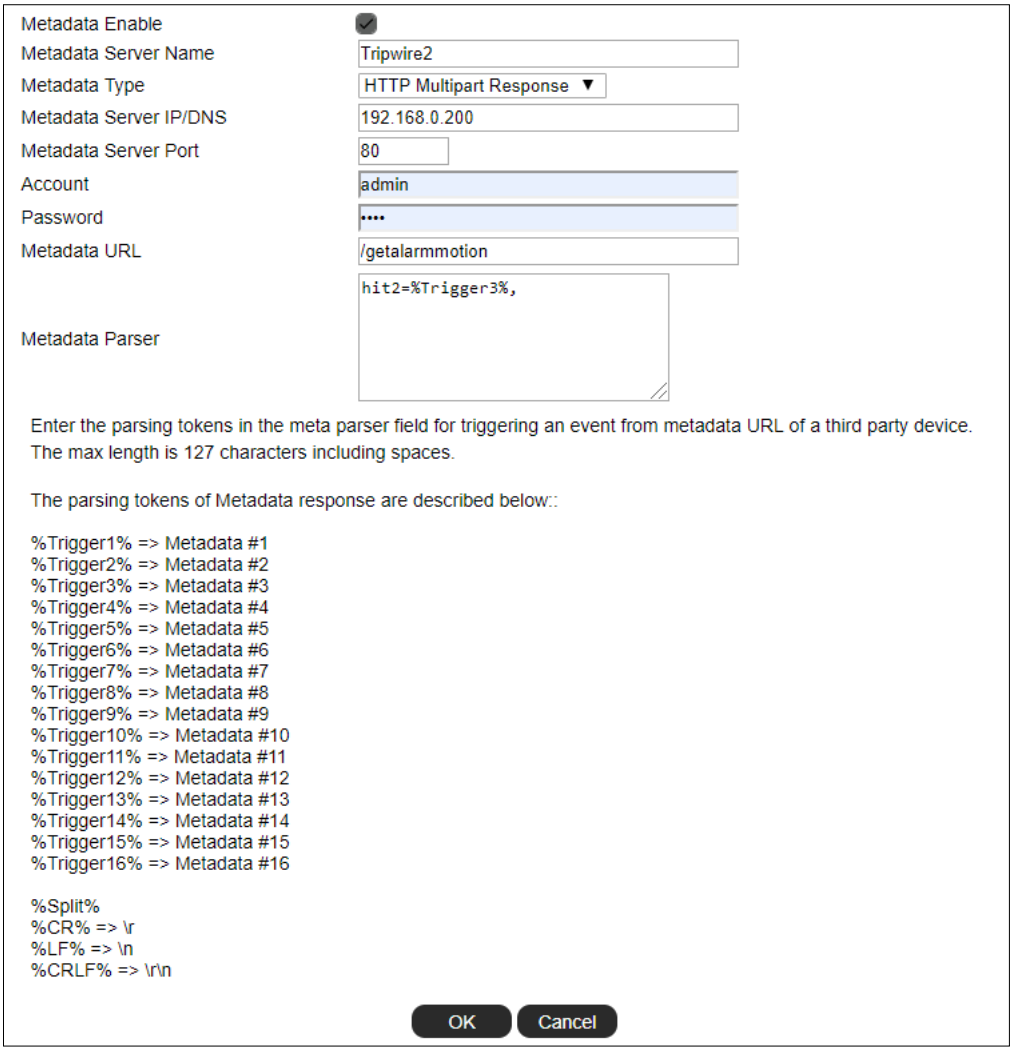
Metadata Enable: Enable metadata service.
Metadata Server Name: Specify the name of the metadata service.
Metadata Type: (1) HTTP multipart response, (2) HTTP response

(1) HTTP multipart response—Continuous responses
(2) HTTP response—Client-pull by a schedule

Metadata Server IP/DNS: The IP address of an integrated device.
Metadata Server Port: The port number of the integrated device.
Account: Account name of an integrated device.
Password: password of an integrated device.
Metadata URL: The URL of the an integrated device. “/” is required.
Metadata Parser: The parsing tokens for the valuables of Triggers.

Special characters
If there are special characters such as “/”, “\r”, “\n”, and “\r\n” in the metadata, enter special characters for parsing the metadata.

%Split%
%CR% => \r
%LF% => \n
%CRLF% => \r\n

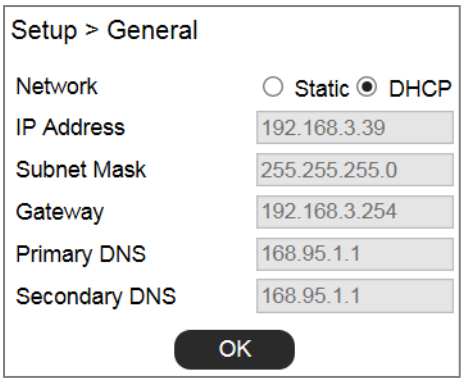


Chapter 4-3 Network

Chapter 4-3-1 General

Network settings are the basic settings that connect LILIN Smart IO Box to the network. The default IP address of Smart IO Box is 192.168.0.200. Enter this IP address into your web browser to verify the network connection between a local PC and your Smart IO Box.

To set up a local area network, enter the IP address, subnet mask, gateway, and DNS. Click Submit to update the settings.



To acquire Internet access, contact your local Internet Service Provider (ISP) for a global IP address. Enter the IP address (global), subnet mask, and gateway IP provided by your ISP.

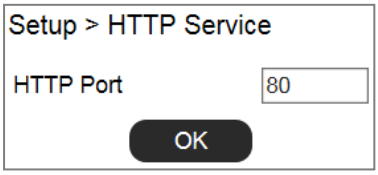
- **Default DNS**—The IP address of the default and first DNS server
- **Second DNS IP Address**—The IP address of the backup and second DNS server to the default DNS

A router, gateway, or other DHCP software server can remotely assign an IP address to your Smart IO Box. There is no need to manually configure the IP address, subnet mask, and gateway. However, every time the DHCP service is rebooted, the IP address of the Smart IO Box may vary. You may need to use IPscan to search for the Smart IO Box. To enable DHCP, click the DHCP option and click Submit.

Note: Once the DHCP option is enabled, the Smart IO Box is assigned an IP address by the DHCP server. This feature is only permitted in LAN environments.

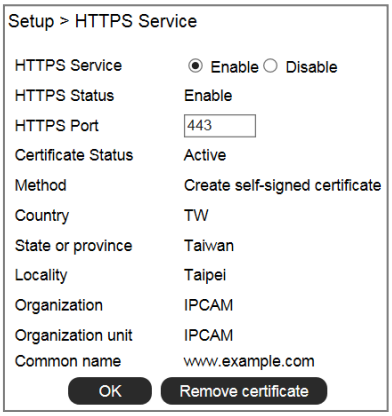
Chapter 4-3-2 HTTP Service

HTTP is a reliable protocol for video streaming. With correct port forwarding, videos can be sent over the Internet. Details are described in the appendix. To change the HTTP port number, consult your network administrator.



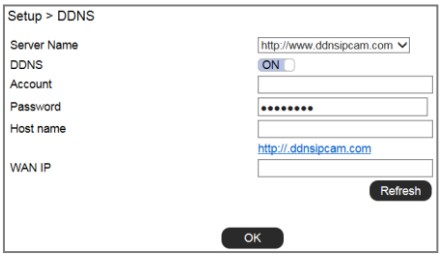
Chapter 4-3-3 HTTPs

If users want to use HTTPS for confidential communication, please use HTTPS port 443.



Chapter 4-3-4 DDNS

The DDNS service allows you to automatically update the DNS server. LILIN provides three DDNS servers to choose from (we recommend you use the first one from the drop-down menu). Click OK for the changes to take effect.

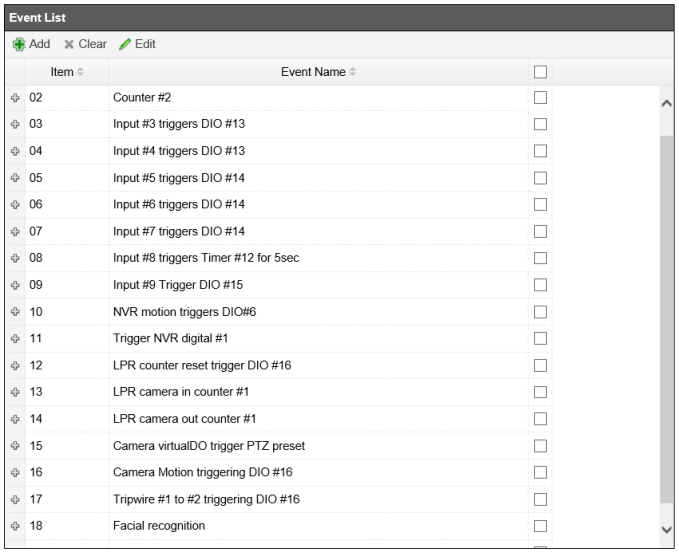


Note: The DDNS feature requires Internet connection.
To activate DDNS, go to www.ddnsipcam.com. If the Smart IO Box is on Internet with a global IP address, use the last 6 digits of the MAC address as the host name with default account and the default password,. The Smart IO Box will automatically register to www.ddnsipcam.com.

Chapter 4-4 SmartEvent

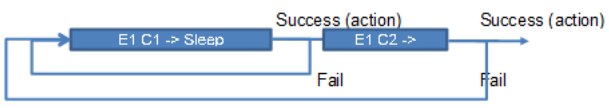
SmartEvent is a programmable event table for inputs (metadata, virtual inputs), outputs, and global counters. A user can program inputs and outputs for customization purposes.

In SmartEvent table, click an item to enter the detail settings. There are programmed events. A user is able to reference.

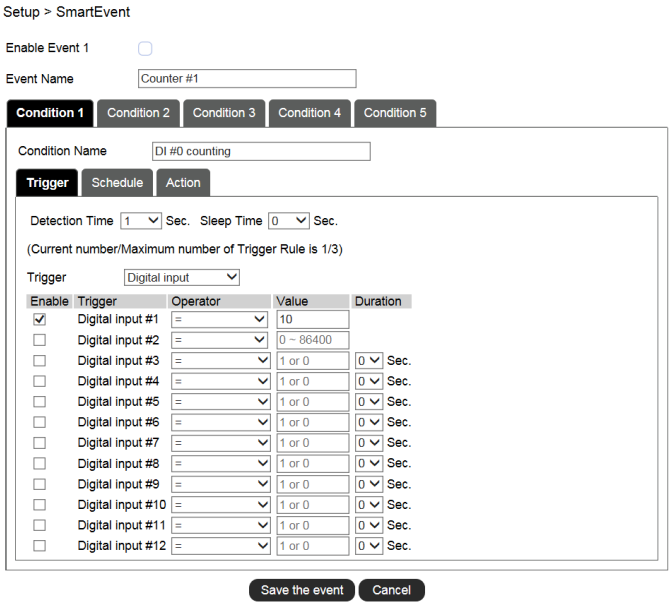


Chapter 4-4-1 The Inputs of SmartEvent

Choose an event type for entering the event name and event condition for triggering an alarm. Click Save the event button to update the settings. For events, the events are independent tasks for triggering actions. For conditions, the conditions are dependent on the previous logical result of a condition. The logical sequence is as below:

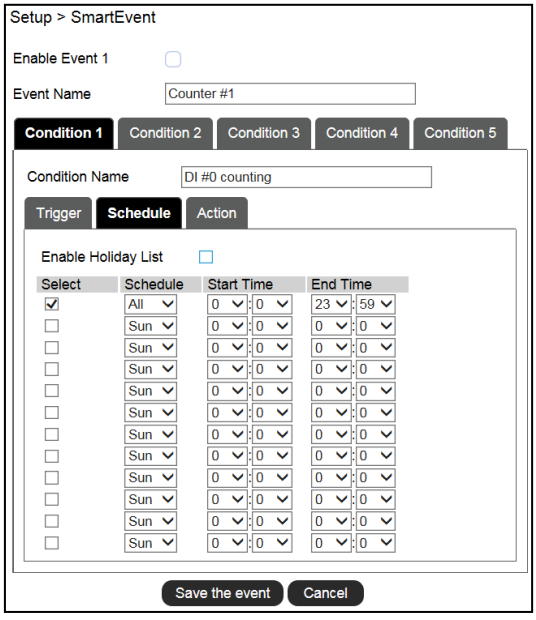


For each condition, there are trigger, schedule, and action. The trigger is the logic. There are up to three logics that can be programmed. If multiple triggers are enabled, these inputs need to be triggered for the action and the next condition. Detection time is the detection period for one or more triggers. Sleep time is the idle starting time upon the triggering.



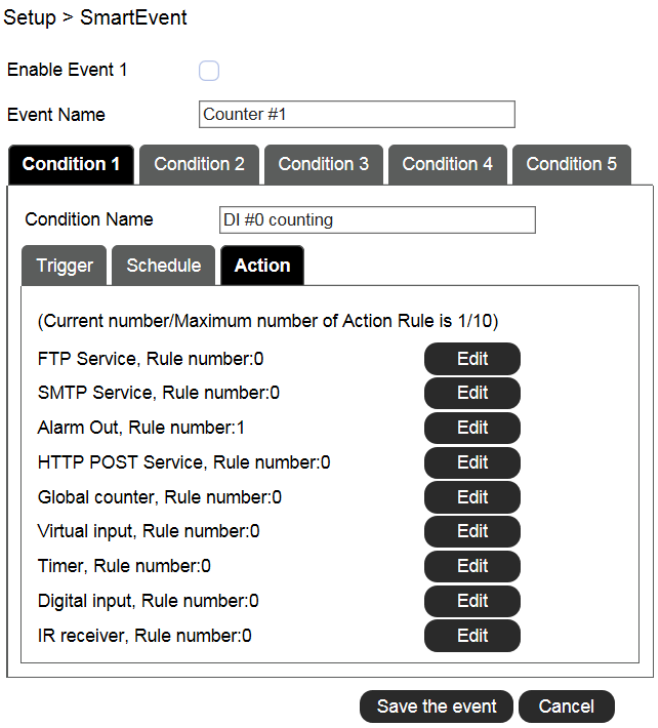
Chapter 4-4-2 The Schedule of SmartEvent

Then the page you see allows you to choose the action to take when the chosen events are detected, such as sending JPEG images to an FTP server or an email account, and/or triggering SD card video recording. To schedule event monitoring, choose Schedule when you edit an event and highlight the time periods you want the camera to detect events. Click Save the event button to update the settings.

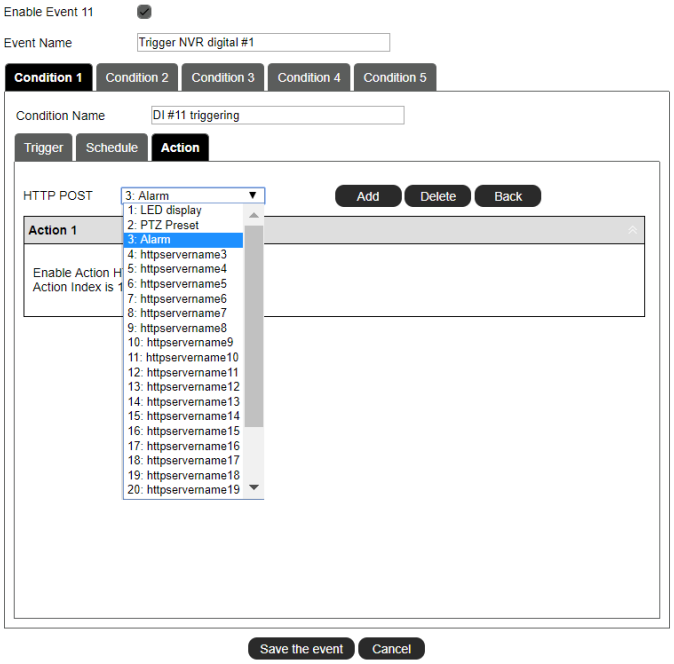


Chapter 4-4-3 The Actions of SmartEvent

Actions are the outputs for event triggering.



- **FTP Service:** Mail event logs to an FTP server.
- **SMTP Service:** Mail event logs to an SMTP server.
- **Alarm Out:** Trigger the digital output of the Smart IO Box.
- **HTTP POST Service:** Send notification snapshots to a specified website when alarm is triggered.



To set up monitoring and event detection type, please enter the specified item settings.

Chapter 4-4-4 IR Control Setting

To enable a DB052E controls an IR device via the device's IR control codes, the requirements are:

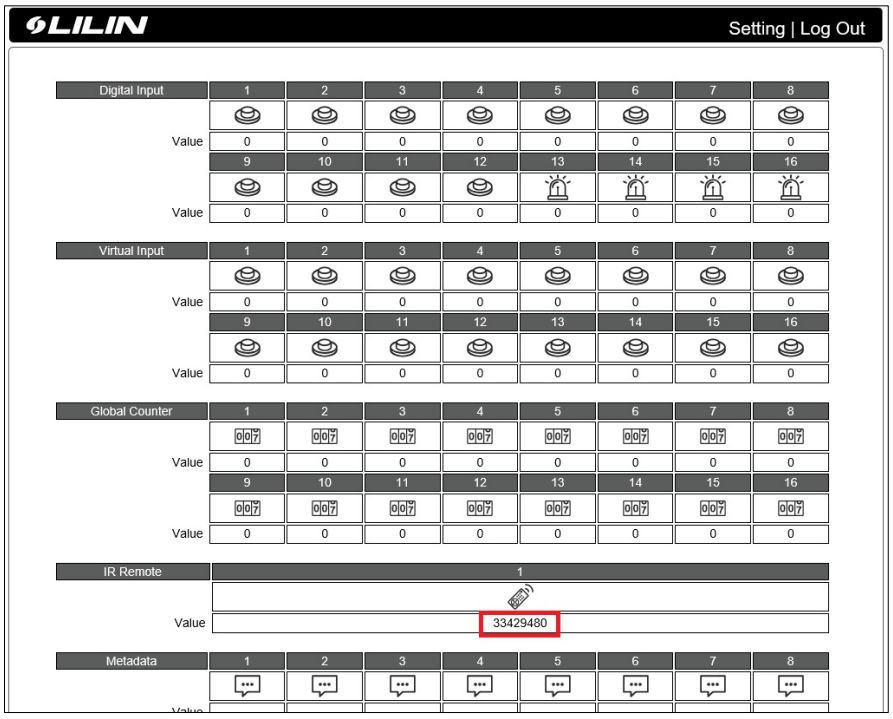
1. DB052E (FW v1.0.200.1033 or above) with an IR receiver and a sender.
2. Device with IR remote controller.
3. PC.

LILIN NVR5416 is used as an example to show how a DB052E controls an IR device via the device's IR control codes.

1. To record an IR code at DB052E sent by an NVR
   1.1 Insert an IR receiver into IR IN port and an IR sender into IR OUT port.

Note: Place IR sender close to the controlled IR receiving device.

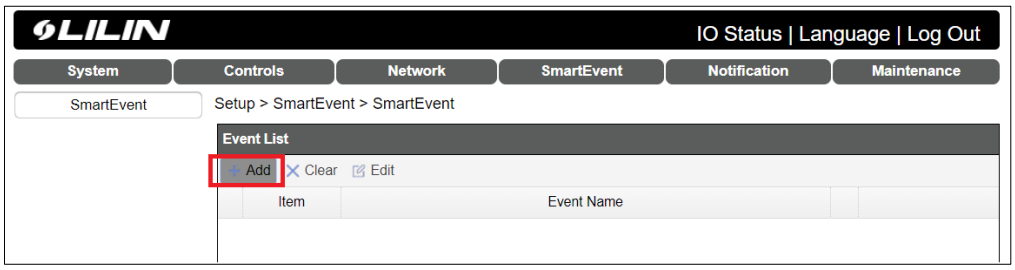
   1.2 Log in DB052E by the browser (the default IP address is 192.168.0.200).
   1.3 Create a username and a password for DB052E.
   1.4 Press the button on the IR remote control.
      Note: An NVR IR remote controller is used as an example.
      1.4.1 Press button pointing to the IR receiver of the DB052E. The IR code will be shown on the browser of DB052E.



1.4.2 Write down this IR code at IR Remote field.
1.4.3 Repeat steps 1.4.1~1.4.2 until getting all function codes that you need.

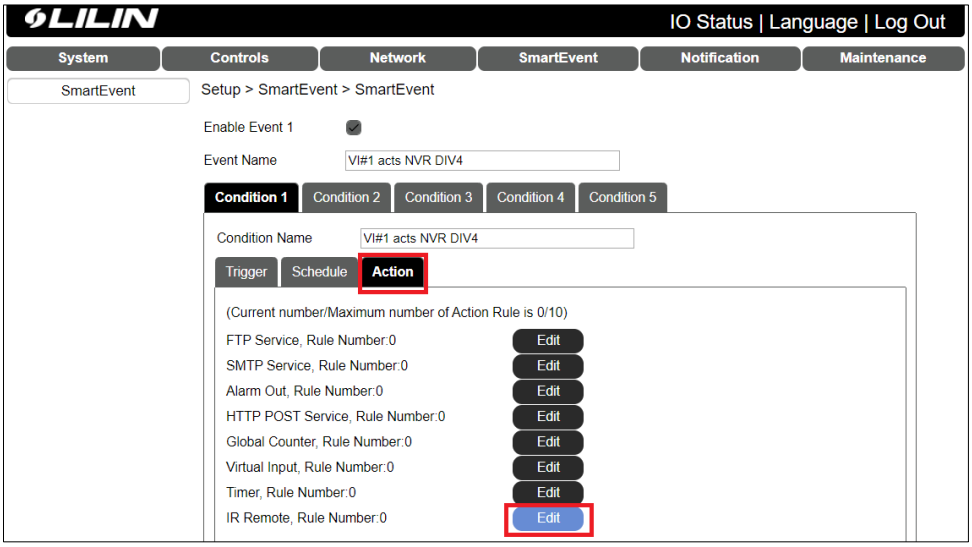
2. To send an IR code at DB052E to an NVR

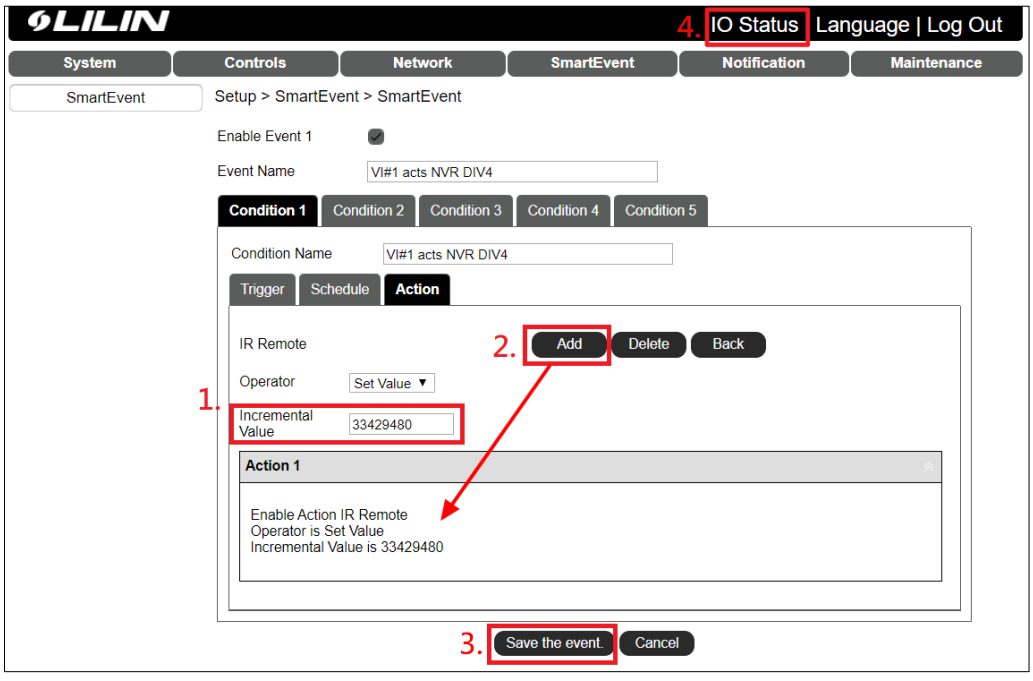
2.1 Go to Setup > SmartEvent and Add an event.



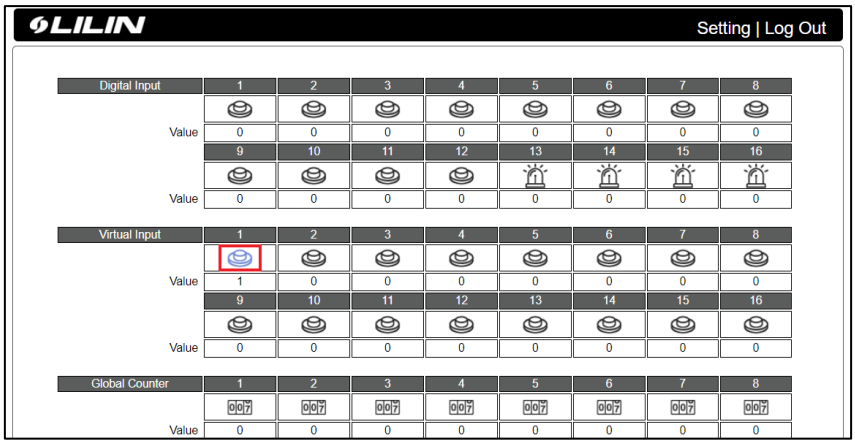
2.2 Set if the virtual input #1 gets triggered. Make the NVR switch to division 4.

2.3 Press  button pointing to the IR receiver. You will see its IR code in the browser of DB0522.





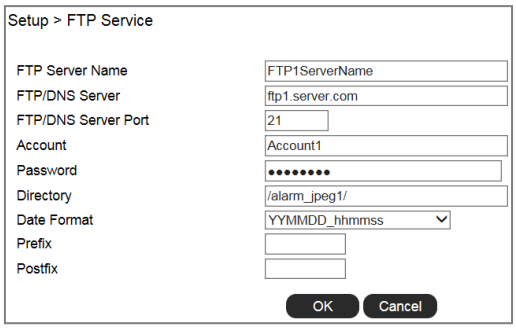
3. Trigger the virtual inputs to send the IR function codes.
Click the virtual input #1 button twice, and the NVR will automatically switch to division 4.



Chapter 4-5 Notification

Chapter 4-5-1 FTP Service

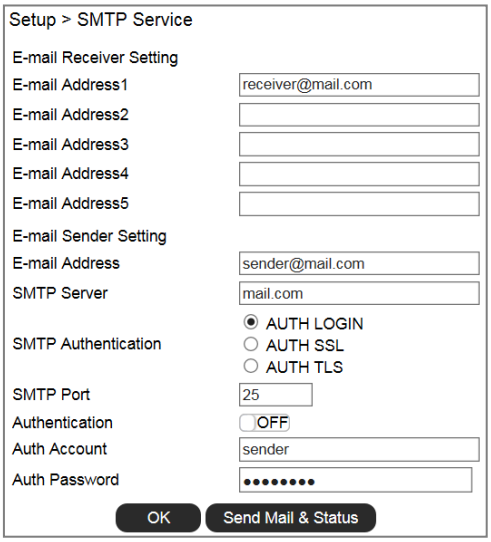
Enter the required FTP information to send alarm snapshots to an FTP server.



- FTP Server Name
- FTP/DNS server — IP address or domain name of the FTP server
- Account— account name to log in to the FTP server
- Password— password of the account
- Directory—file path for storing the JPEG snapshots
- Date format—date string for the JPEG filename
- Prefix—prefix of the JPEG filename
- Postfix—postfix of the JPEG filename

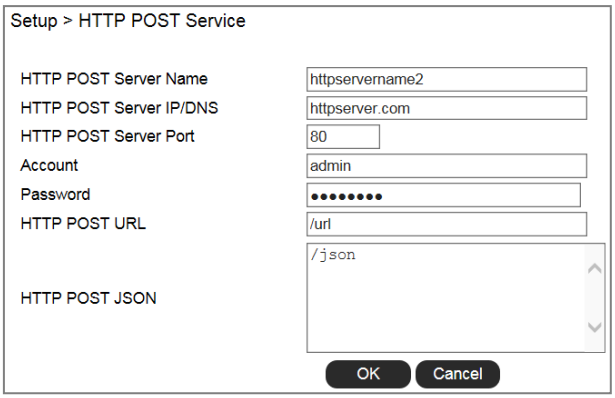
Chapter 4-5-2 SMTP (Email) Service

For alarm notification with JPEG snapshots, enter the required information to enable this Email notification service.



Chapter 4-5-3 HTTP POST Service

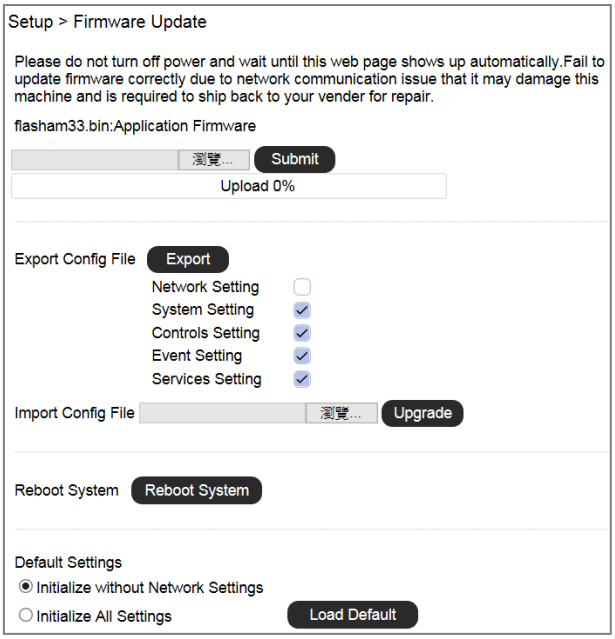
Through the POST protocol, the camera can automatically send notification snapshots to a website if an alarm is triggered.



Chapter 4-6 Maintenance

In the Maintenance page, you can click Load Default to restore the camera to factory settings, or click Reboot System to restart the camera. Restoring to factory settings does not affect IP addresses.

To update the firmware of your Smart IO Box, click Browse and locate the update file. Click Submit to start the firmware update.



Warning: Never disconnect the power during the update. This could cause irreversible damage to your device.
Note: If you forget your password, please contact your vendor or send the device to us.

Appendix

SmartEvent timing chart