



79 GHz Anti-Smashing Radar

User Manual



Foreword

General

This manual introduces the installation, functions and operations of the 79 GHz anti-smashing radar (hereinafter referred to as "the Radar"). Read carefully before using the device, and keep the manual safe for future reference.

Safety Instructions

The following signal words might appear in the manual.

Signal Words	Meaning
 DANGER	Indicates a high potential hazard which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a medium or low potential hazard which, if not avoided, could result in slight or moderate injury.
 CAUTION	Indicates a potential risk which, if not avoided, could result in property damage, data loss, reductions in performance, or unpredictable results.
 TIPS	Provides methods to help you solve a problem or save time.
 NOTE	Provides additional information as a supplement to the text.

Revision History

Version	Revision Content	Release Time
V1.1.1	Added notes for configuring radar parameters.	October 2025
V1.1.0	- Updated parameter configurations of the Radar. - Added precautions when using the Radar.	February 2022
V1.0.1	Added note for drilling holes when installing the radar.	June 2021
V1.0.0	First release.	February 2021

Privacy Protection Notice

As the device user or data controller, you might collect the personal data of others such as their face, audio, fingerprints, and license plate number. You need to be in compliance with your local privacy protection laws and regulations to protect the legitimate rights and interests of other people by implementing measures which include but are not limited to: Providing clear and visible identification to inform people of the existence of the surveillance area and provide required contact information.

About the Manual

- The manual is for reference only. Slight differences might be found between the manual and the product.
- We are not liable for losses incurred due to operating the product in ways that are not in compliance with the manual.

- The manual will be updated according to the latest laws and regulations of related jurisdictions. For detailed information, see the paper user manual, use our CD-ROM, scan the QR code or visit our official website. The manual is for reference only. Slight differences might be found between the electronic version and the paper version.
- All designs and software are subject to change without prior written notice. Product updates might result in some differences appearing between the actual product and the manual. Please contact customer service for the latest program and supplementary documentation.
- There might be errors in the print or deviations in the description of the functions, operations and technical data. If there is any doubt or dispute, we reserve the right of final explanation.
- Upgrade the reader software or try other mainstream reader software if the manual (in PDF format) cannot be opened.
- All trademarks, registered trademarks and company names in the manual are properties of their respective owners.
- Please visit our website, contact the supplier or customer service if any problems occur while using the Issuer.
- If there is any uncertainty or controversy, we reserve the right of final explanation.

Important Safeguards and Warnings

This section introduces content covering the proper handling of the device, hazard prevention, and prevention of property damage. Read carefully before using the device, and comply with the guidelines when using it.

Transportation Requirements



- Pack the device with packaging provided by its manufacturer or packaging of the same quality before transporting it.
- Transport the device under allowed humidity and temperature conditions.

Storage Requirements



Store the device under allowed humidity and temperature conditions.

Installation Requirements



WARNING

- Do not connect the power adapter to the device while the adapter is powered on.
- Strictly comply with the local electric safety code and standards. Make sure the ambient voltage is stable and meets the power supply requirements of the device.
- Do not connect the device to two or more kinds of power supplies, to avoid damage to the device.
- Use the accessories suggested by the manufacturer. Installation and maintenance must be performed by qualified professionals.
- When using a laser beam device, avoid exposing the surface of the device to laser beam radiation.



- Personnel working at heights must take all necessary measures to ensure personal safety including wearing a helmet and safety belts.
- Do not place the device in a place exposed to sunlight or near heat sources.
- Keep the device away from dampness, dust, and soot.
- Put the device in a well-ventilated place, and do not block its ventilation.
- Use an adapter or cabinet power supply provided by the manufacturer.
- The power supply must conform to the requirements of ES1 in IEC 62368-1 standard and be no higher than PS2. Please note that the power supply requirements are subject to the device label.
- Put the device in a well-ventilated place, and do not block its ventilation.

Operation Requirements



- Check whether the power supply is correct before use.
- Do not unplug the power cord on the side of the device while the adapter is powered on.
- Operate the device within the rated range of power input and output.

- Use the device under allowed humidity and temperature conditions.
- Do not drop or splash liquid onto the device, and make sure that there is no object filled with liquid on the device to prevent liquid from flowing into it.
- Do not disassemble the device without professional instruction.
- Do not aim the device at strong light sources (such as lamplight, and sunlight) when focusing it.
- Do not vibrate, squeeze or immerse the device in liquid during transportation, storage or installation.
- We recommend you use the device with a lightning protection device for stronger protection against lightning. For outdoor scenarios, strictly comply with the lightning protection regulations.
- Ground the function earthing portion of the device to improve its reliability. The device is a class I electrical appliance. Make sure that the power supply of the device is connected to a power socket with protective earthing.

Maintenance Requirements



Clean the device with a soft dry cloth or a clean soft cloth dipped in neutral detergent.

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1 Product Information

1.1 Overview

The 79 GHz anti-smashing radar adopts leading technologies of high-precision microwave measurement and high-speed digital signal processing, endowing it with high accuracy, free of commissioning, and high stability. The radar is ideal for working with boom barrier to monitor and control vehicles that enter and leave, and prevent the barrier arm from hitting people or vehicles when it falls. It can also work with the camera to read and recognize license plate, providing reliable evidence for parking management.

The Radar sends the information of detection target to the host computer or central platform through RS-485 communication or Wi-Fi, so the real-time information can be displayed on the computer or the platform. It can also send the information to the relay to trigger the camera for taking snapshots, and helps control barrier opening and closing.

1.2 Features

- 79 GHz monolithic microwave integrated circuit (MMIC) technology allows higher resolution and more stable detection.
- Uses the latest algorithm to filter interference, suitable for advertising barriers, fence arm barriers, straight arm barriers, and folding arm barriers.
- Uses MIMO (multiple-input multiple-output) technology to recognize movement directions of targets, ideal for scenes with both vehicles and people entering and leaving.
- Adjustable detection distance and width, and no need of reading scene data, applicable to complicated scenes.
- Applicable to multiple complex onsite environments without background learning.
- Supports updating through RS-485 and mobile app (with Wi-Fi connection), and allows online commissioning and firmware upgrade, providing ease of operation.
- Convenient installation and maintenance: Comparing with loops, you can easily install the Radar by tightening the screws, with no need of road construction.
- Capable of identifying vehicles and people, preventing the barrier arm from hitting the vehicles and people.
- Long service life of 5–10 years.
- Two LED indicators are designed to better know the working status of the Radar: Red for power, and green for activity.
 - ◇ Solid red: Powered on.
 - ◇ Solid green: Target is detected. When the target leaves, the green indicator turns off.
- Automatically goes to the last working status before it is powered off.
- Adaptable to harsh environments and its detection performance will not be influenced by electromagnetic interference, light, dust, rain, and snow.

2 Structure

2.1 Appearance

Figure 2-1 Appearance



2.2 Dimensions

Figure 2-2 Front and rear panels (mm [inch])

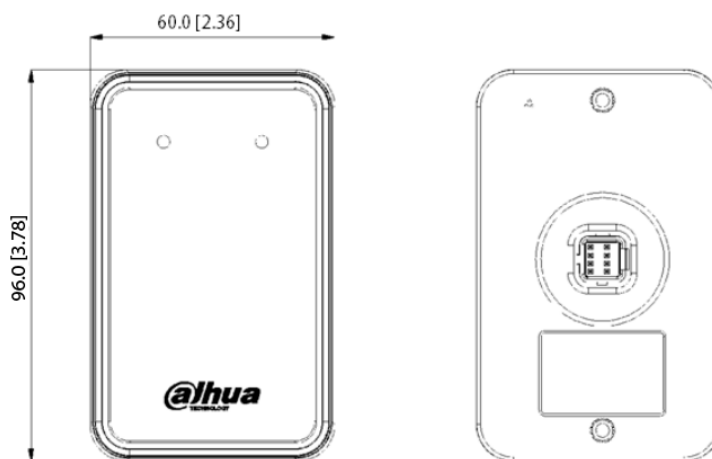
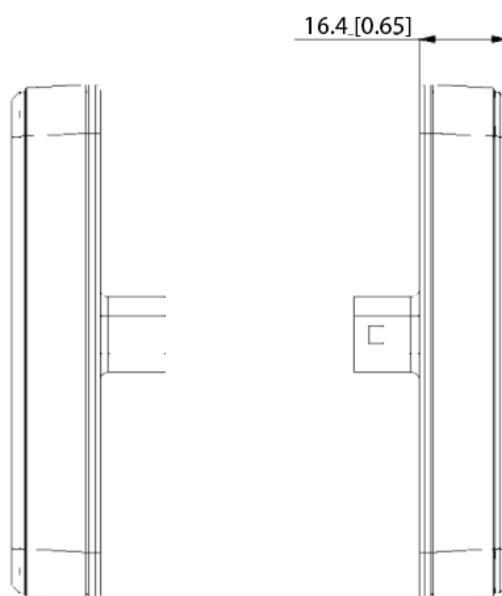


Figure 2-3 Side panel (mm [inch])



3 Installation

3.1 Tools

Hole opener, Phillips screwdriver, straight screwdriver, wire stripper, RS-485 cable, and computer.

3.2 Installing the Radar

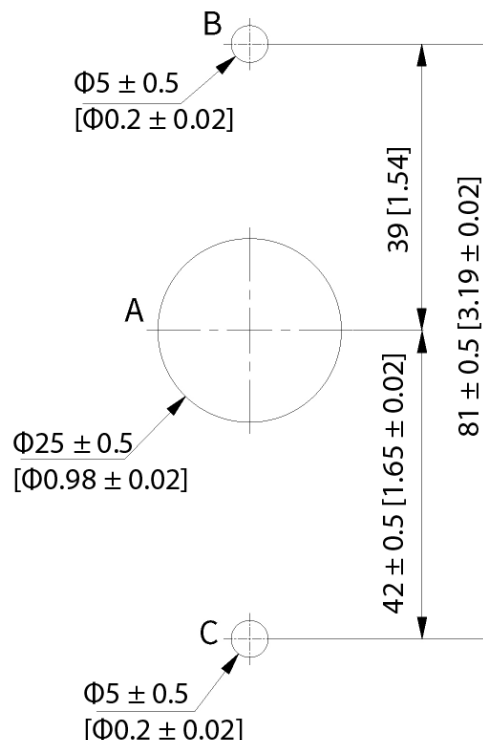
Step 1 Drill holes.

Step 2 Drill a $\Phi 23$ mm (0.9") circular hole (hole A) on the casing of the advertising barrier and at a height of 68 cm (26.8") from the ground 78 cm (30.7") is recommended when large trucks are frequently seen), and then drill two $\Phi 5$ mm (0.2") circular holes (holes B and C). The distance between holes A and B is 39 mm (1.5"), and the distance between holes A and C is 85 mm (3.3").



Holes for installing the Radar onto Dahua barrier casing are preserved by standard. Skip drilling holes when you are using Dahua barriers.

Figure 3-1 Hole size (mm [inch])



Step 3 Fix the Radar.

Step 4 Install waterproof joints between the Radar and the casing. Fix the Radar to the casing through A, B and C holes with screws. Connect radar cables to the barrier through hole A. For details on the installation result, see Figure 3-3.



Hole A is for securing the Radar, and hole B and C are for keeping the Radar straight. When using Dahua barriers, fix the Radar through the preserved hole A and B.

Figure 3-2 Fix the radar

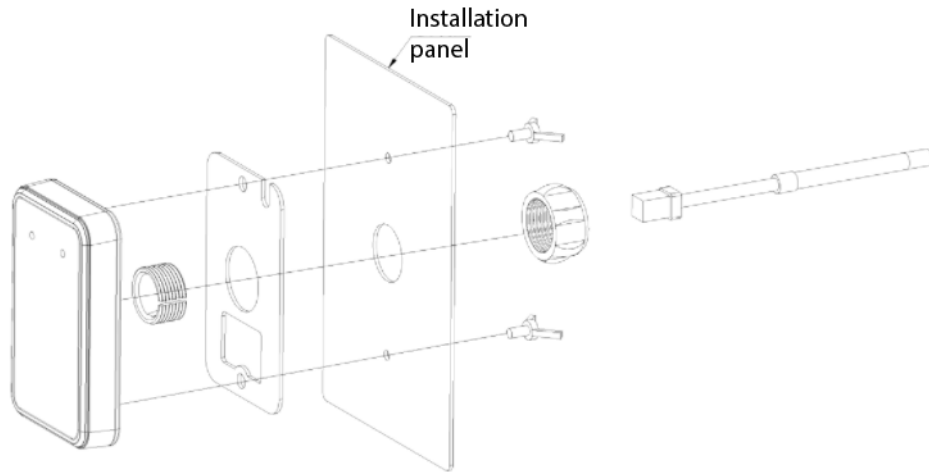
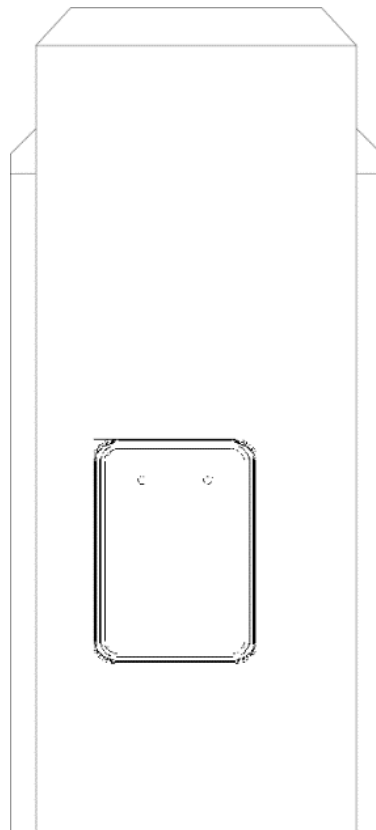
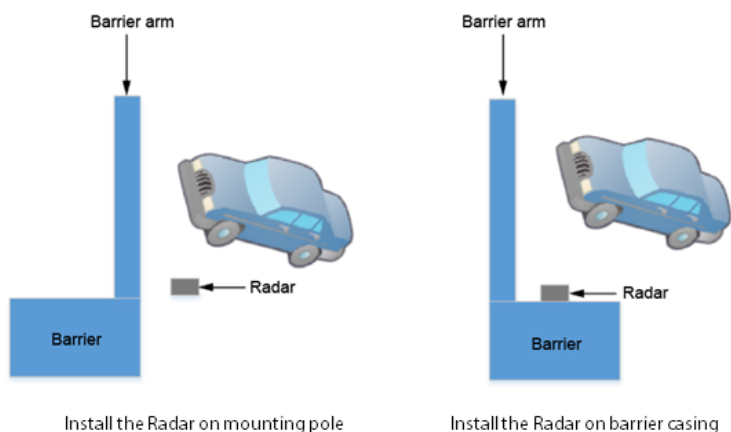


Figure 3-3 Illustration of successful installation



- The Radar can be installed either on the barrier casing or the mounting pole. For details, see Figure 3-4. For both of the installation methods, the Radar needs to be installed within 50 cm (19.7") of the barrier arm. Right Width and Left Width should be more than 0.5 m (1.6 ft) to avoid interference from the barrier arm.
- The installation of different arms is different. For details, refer to the specific installation guide. Contact technical support for complex scenarios.

Figure 3-4 Radar installation methods



3.3 Wiring

3.3.1 Cables

Figure 3-5 Cable connection

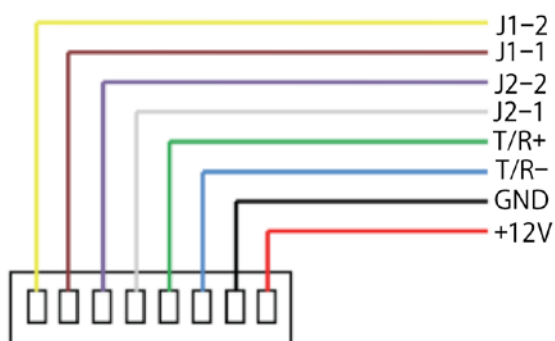


Table 3-1 Cable description

Cable	Color	Description
J1-1	Brown	Relay output. Connects to the radar/loop port and GND/common port of the barrier. The connection does not distinguish between the positive and negative.
J1-2	Yellow	
J2-1	White	79 GHz radar cannot be downgraded to earlier versions using the standard update method. You have to short-circuit this port to downgrade it.  Do not short-circuit the port during normal use to avoid compromising the performance of the Radar.
J2-2	Purple	
T/R-	Blue	RS-485 port.
T/R+	Green	
GND	Black	Power input of the Radar. We recommend using a 12 V/1 A external adaptor for power supply.
+12V	Red	

3.3.2 Cable Connection

Connect the ports of the Radar to external devices.

- Connect +12 V (red) and GND (black) to positive and negative terminals of a 12 V power supply respectively.
 - ◇ A solid red indicator on the Radar indicates that the power supply is normal.
 - ◇ Check if the indicator flashes red.
- Connect J1-1 (brown) and J1-2 (yellow) to the loop and COM ports of the barrier.
- Connect J2-1 (white) and J2-2 (purple) to a switch, and then you can short-circuit them to update the Radar to any available versions.



The connection does not distinguish between positive and negative.

- T/R- (blue) and T/R+ (green) connection.
 - ◇ Connect to a computer through RS-485 cable to debug the configuration application of the Radar.
 - ◇ Connect to an access camera to read operation logs of the Radar from the camera without interfering the Radar. The green cable connects to the 485-2A of the camera and the blue cable connects to 485-2B.

4 App Commissioning

Scan the QR code provided in the accessory to download and install the STJ79 app.



Make sure that you have granted the App permissions of your Bluetooth, location, network and storage information.

4.1 Connecting Radar

Step 1 Download the App.

Step 2 Scan corresponding QR code to download the App on your phone.

Figure 4-1 QR codes for App download

IOS

Android



Step 3 Enable Wi-Fi on your phone and connect the one starting with RADAR.
Default password is 123456789.

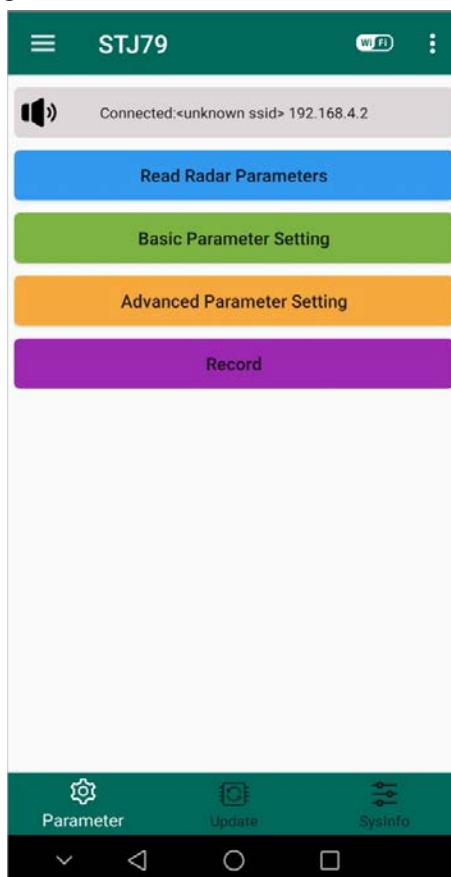


To avoid unauthorized parameter changing, we recommend you change the Radar name and password by tapping **WIFI** on system information page.

Step 4 Open the App.

Step 5 Tap  at the upper-right corner on the homepage to connect the radar.

Figure 4-2 Connection succeeded



4.2 Configuring Radar Parameter

After the Radar is installed and connected to the app, you need to adjust the corresponding parameters based on the actual site.



Unsuitable parameters might increase the risk of vehicles being smashed by the barrier arm.



When you face the Radar and the indicator lights are at the upper side, your left and right hand are the left and right side of the Radar.

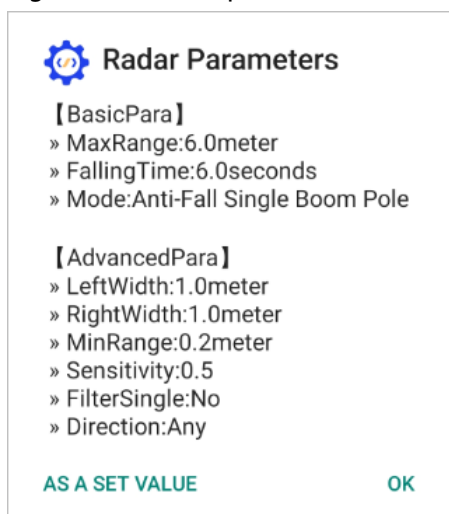
Table 4-1 Parameter description of the Radar

Parameter	Description
MaxRange	The maximum lengthways detection distance of the Radar. The recommended value is the actual arm length deducting 0.3 m. Set a lower value when there is metal interference at the end of the arm.
MinRange	The range filtered by the Radar. We recommend you leave it as default (0.3 m). When there is interference near the Radar, set a higher value to avoid false alarms.  The value should be no higher than 1 meter to avoid the risk of vehicles being smashed by the barrier arm.

Parameter	Description
LeftWidth	Detection width at the left or right side of the Radar normal line. Set them to values that are not below 0.5 m.  The wider the detection range, the more stable the detection.
RightWidth	
FallingTime	Set based on the actual falling duration of the arm.  This is only for signal feedback. The speed the arm falls at will not be affected.
Sensitivity	Reserved parameter.
Mode	Select according to the actual arms, such as straight arm, fence arm and advertising arm.  - The fence mode is applicable for the non-conventional straight arms (such as folding arms and telescopic straight arms with connecting components in the middle). - The advertisement arm is applicable for the flag-style advertising barriers.
FilterSingle	Yes: The Radar detects vehicles only. No: The Radar detects both vehicles and pedestrians.  For higher detection sensitivity, leave the parameter as default.
Direction	Whether to filter out the vehicles coming from the wrong way.  Only available in trigger mode.

Step 1 Tap **Read Radar Parameters** to view current parameters after the Radar is successfully connected.

Figure 4-3 Current parameter



Step 2 Configure basic and advanced parameters.

- 1) Tap **Basic Parameter** and **Advanced Parameter** on the homepage to configure them as needed.

Figure 4-4 Basic parameters

Basic Parameter Setting			
—	3.0	+	MaxRange
—	6.0	+	FallingTime
Anti-Fall Single Boo ..			Mode

Figure 4-5 Advanced parameters

Advanced Parameter Setting			
—	1.0	+	LeftWidth
—	1.0	+	RightWidth
—	0.3	+	MinRange
—	0.3	+	Sensitivity
No			FilterSingle
Any			Direction

- 2) Tap the green frame next to the corresponding parameter to save the configuration.

4.3 Testing the Radar

After the parameter configuration is completed, test the Radar before put it to use.

- The Radar identifies people and vehicles.
 1. After opening the barrier and making a person enter the radar detection range, the green indicator does not turn on, and after the person leaves, the barrier arm does not fall. This means the radar successfully identified the person.
 2. After opening the barrier and driving a vehicle to the radar detection range, the green indicator turns on, and after the vehicle leaves, the barrier arm does not fall. This means the radar successfully identified the vehicle.
- The barrier arm does not hit vehicles.
 1. Open the barrier, and drive a vehicle at speed lower than 10 km/h to pass the barrier. When it passes the barrier, the green indicator keeps on, and the barrier arm does not jitter or hit the vehicle.
 2. Open the barrier, and drive a vehicle to the radar detection range. Stop the vehicle in the detection range for 1 minute, the green indicator keeps on, and the barrier arm does not jitter or hit the vehicle.
- The barrier arm does not hit people.
 1. When the barrier arm falls after a vehicle leaves, a person passes the barrier, the green indicator turns on, and the barrier arm does not hit the person.
 2. A person moves back and forth along the direction of the barrier arm, the green indicator keeps on, and the barrier arm does not hit the person.

4.4 Updating Firmware

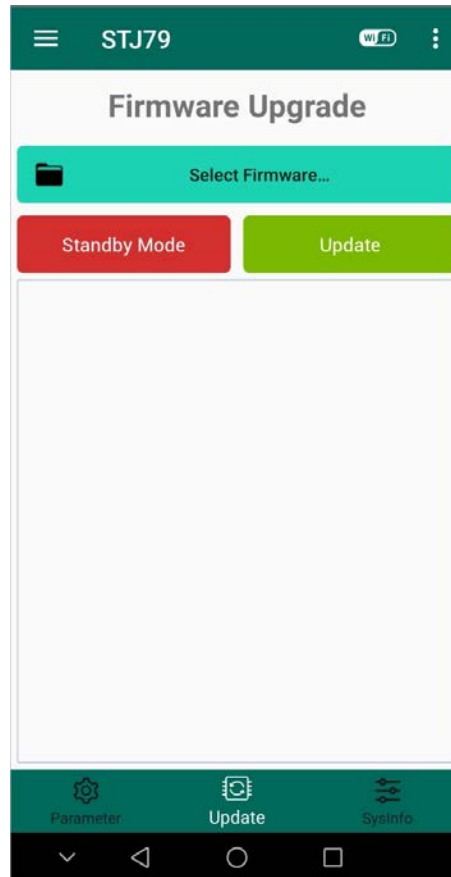
View available firmware list on the **Firmware Upgrade** page.

Step 1 Tap **Update** after successful connection.

Step 2 Tap **Select Firmware**.

Step 3 Tap **Update Radar**.

Figure 4-6 Update the radar



- Do not exit the App or switch to other apps during update. Otherwise the update may fail.
- If update fails, disconnect and restart the Radar to restore the firmware to previous version.
- Contact technical support if update keeps failing or the Radar stays stuck.

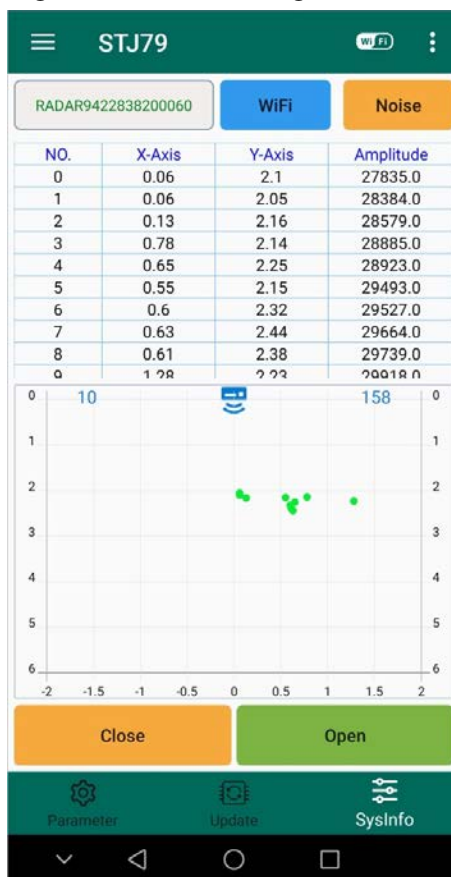
4.5 Displaying Target Information

You can view the target points within current detection range of the Radar and eliminate noise of them.

- View target points

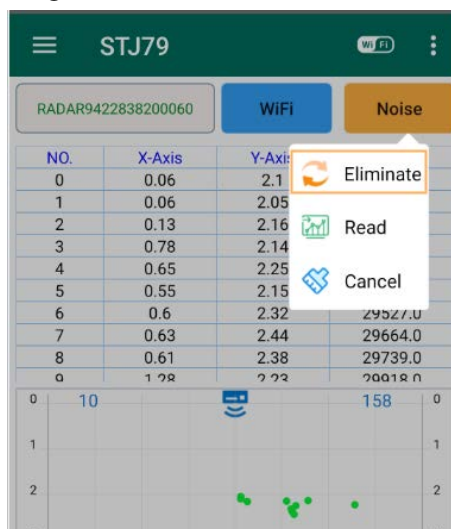
Select **SysInfo** > **Open** to view target points. Tap **Close**, and then target points are displayed with detailed coordinates.

Figure 4-7 Search for targets



- Eliminate noise
Select **SysInfo** > **Noise**, and then tap **Eliminate**.

Figure 4-8 Eliminate noise



- This function is only available when the Radar detects noise and the barrier arm cannot rise or fall normally.
- Make sure that the barrier arm is arisen when eliminating noise. If many false targets appear, we recommend adjusting background environment or starting the Radar on background learning again.

4.6 Other Functions

- View product manual, language and **About** menu information by tapping  at the upper-right corner of the App, which contains version, update, privacy protocol, user agreement and other admin permission related functions.
- Access admin functions only by admin password.

5 Software Commissioning

5.1 Installing the Software

Double-click setup.exe and follow the on-screen instructions to install the software. When installation is completed, the Radar generates a shortcut .

5.2 Software Homepage

Double-click the shortcut to open the software.

Figure 5-1 Homepage

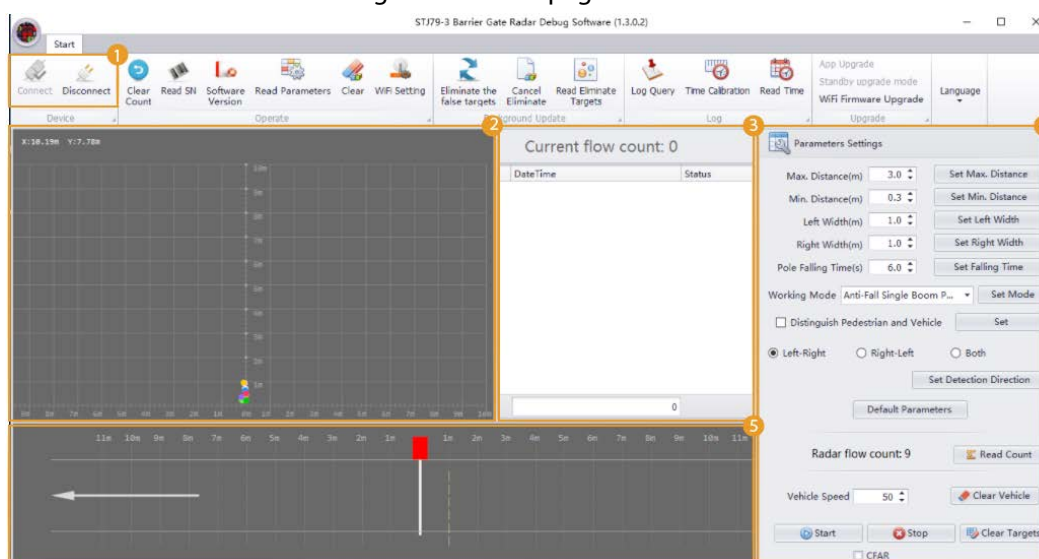


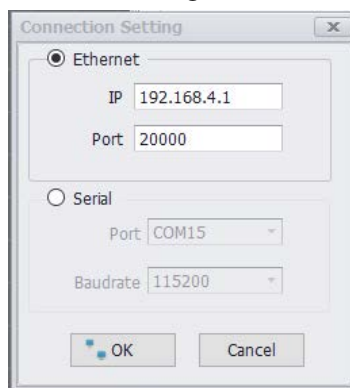
Table 5-1 Homepage description

No.	Description
1	Connects and disconnects the Radar.
2	Target points display area.
3	Dynamic display area of targets entering and leaving.
4	Parameter configuration area of the Radar.
5	Animated display area of targets entering and leaving.

5.3 Connecting the Radar

Click **Connect** at the upper-left corner. **Connection Setting** dialog box pops up. Select **Ethernet** if the Radar supports Wi-Fi. Otherwise, select **Serial**.

Figure 5-2 Connecting the radar



5.3.1 Wi-Fi Connection

- Step 1 Power on the Radar and connect your PC with the Wi-Fi hotspot of the Radar.
- Step 2 The default Wi-Fi of the Radar is RADAR + 13 numbers and the password is 123456789.
- Step 3 Set the IP to 192.168.4.1 and port to 20000.
- Step 4 Click **OK**.

5.3.2 COM Connection

- Step 1 Make sure that the serial device (USB-RS-485) driver is installed and you can see the occupied COM port in PC device manager.
- Step 2 Select port according to the port in **Device Manager** (the port to be connected will automatically appear when only one serial device is available), and 115200 as baud rate.
- Step 3 Click **OK**.

5.4 Clearing Current Count

Click  and then click **Yes** in the pop-up window to clear flow data.

Figure 5-3 Confirm clearing

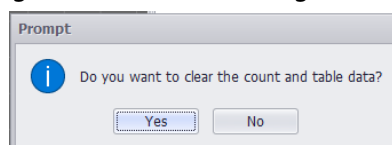


Figure 5-4 Comparison

Current flow count:0		Current flow count: 28	
DateTime	Status	DateTime	Status
		2021/02/20 15:42:12	Enter radar ...
		2021/02/20 15:42:23	Enter radar ...
		2021/02/20 15:42:31	Enter radar ...
		2021/02/20 15:43:01	Leave radar ...
		2021/02/20 15:43:02	Enter radar ...
		2021/02/20 15:43:04	Leave radar ...
		2021/02/20 15:43:04	Enter radar ...
		2021/02/20 15:43:11	Leave radar ...
		2021/02/20 15:43:12	Enter radar ...
		2021/02/20 15:43:14	Leave radar ...
		2021/02/20 15:43:14	Enter radar ...
		2021/02/20 15:43:19	Leave radar ...
		2021/02/20 15:43:20	Enter radar ...

5.5 Configuring Radar Parameter

For details on parameter description, see Table 4-1.

5.5.1 Setting Detection Range

You can set the detection range of the Radar, including the maximum, minimum, left and right side detection range.

When setting range parameter, corresponding effect displays on the right side. Click the corresponding button on the right side after configuration and a notice will prompt to show whether the configuration completes.

Figure 5-5 Set parameters

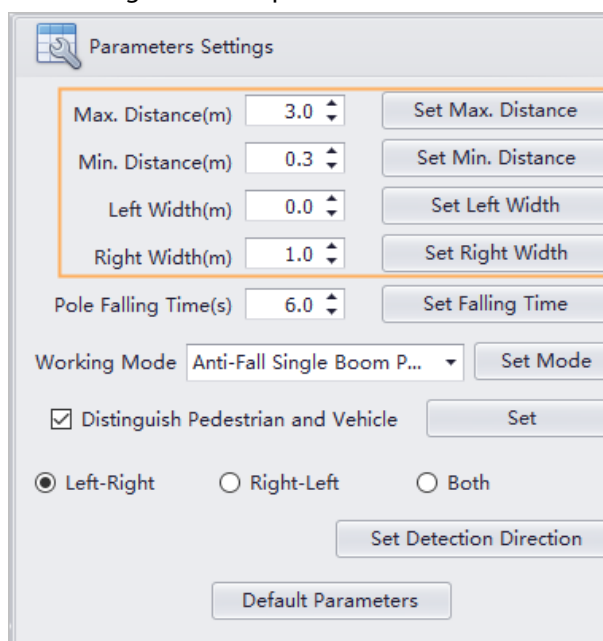
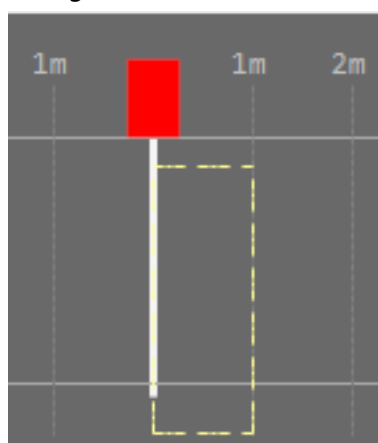


Figure 5-6 Effect



5.5.2 Configuring Barrier Arm Falling Time

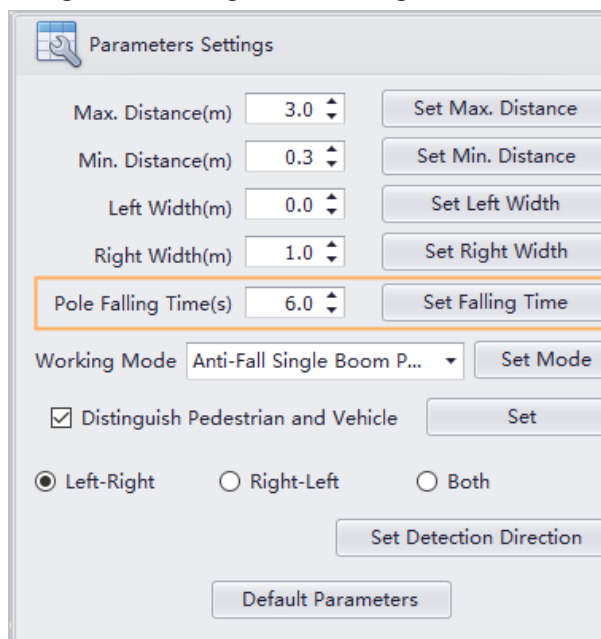


This configuration is only available for anti-smashing radar.

Configure the arm falling time of anti-smashing radar according to the period of the barrier arm from

rising to full falling. The parameter is only for feedback, which has no impact on arm falling speed. The default falling time is 6 s. Enter the corresponding falling time and click **Set Falling Time** on the right side.

Figure 5-7 Configure arm falling time



Parameters Settings

Max. Distance(m) 3.0 Set Max. Distance

Min. Distance(m) 0.3 Set Min. Distance

Left Width(m) 0.0 Set Left Width

Right Width(m) 1.0 Set Right Width

Pole Falling Time(s) 6.0 Set Falling Time

Working Mode Anti-Fall Single Boom P... Set Mode

☒ Distinguish Pedestrian and Vehicle Set

☒ Left-Right ☐ Right-Left ☐ Both

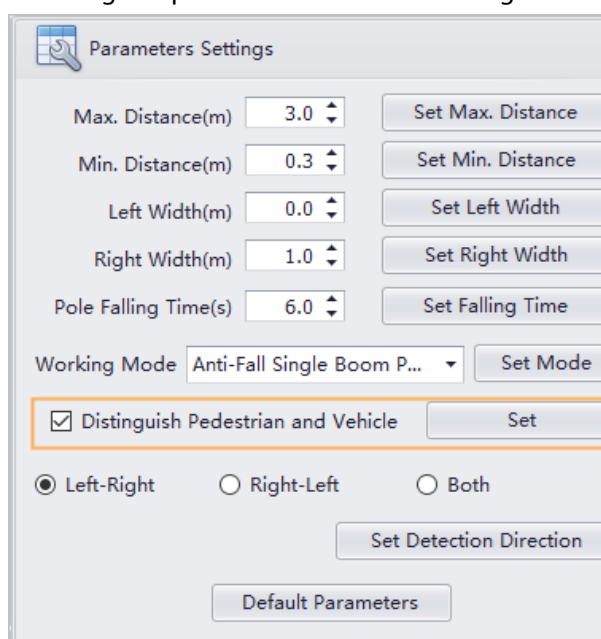
Set Detection Direction

Default Parameters

5.5.3 Distinguishing Pedestrian and Vehicle

- Select whether to distinguish pedestrian from vehicle, and then click **Set**.
- Select **Distinguish Pedestrian and Vehicle**: The Radar detects vehicles only and only vehicles can trigger the Radar.
- Cancel selecting **Distinguish Pedestrian and Vehicle**: Both people and vehicles can trigger the Radar.

Figure 5-8 Distinguish pedestrian and vehicle configuration



Parameters Settings

Max. Distance(m) 3.0 Set Max. Distance

Min. Distance(m) 0.3 Set Min. Distance

Left Width(m) 0.0 Set Left Width

Right Width(m) 1.0 Set Right Width

Pole Falling Time(s) 6.0 Set Falling Time

Working Mode Anti-Fall Single Boom P... Set Mode

☒ Distinguish Pedestrian and Vehicle Set

☒ Left-Right ☐ Right-Left ☐ Both

Set Detection Direction

Default Parameters

5.5.4 Configuring Barrier Arm Position

Select barrier position from **Boom Pole on Radar Left**, **Boom Pole on Radar Right**, **Anti-fall Single Boom pole**, **Trigger Mode**, **Rail Fence on Radar Left** and **Rail Fence on Radar Right**.

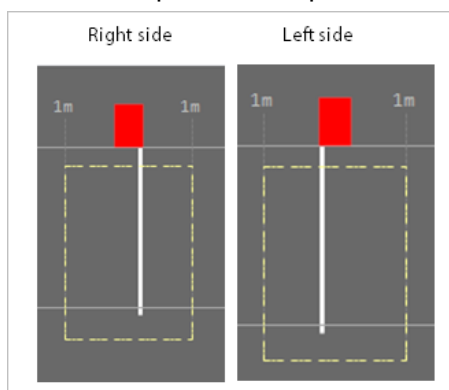
Corresponding effect is displayed on the left side.

Figure 5-9 Arm position configuration

The dialog box titled "Parameters Settings" contains the following controls:

- Max. Distance(m): 3.0 (with "Set Max. Distance" button)
- Min. Distance(m): 0.3 (with "Set Min. Distance" button)
- Left Width(m): 0.0 (with "Set Left Width" button)
- Right Width(m): 1.0 (with "Set Right Width" button)
- Pole Falling Time(s): 6.0 (with "Set Falling Time" button)
- Working Mode: Anti-Fall Single Boom P... (with "Set Mode" button)
- ☒ Distinguish Pedestrian and Vehicle (with "Set" button)
- Left-Right (selected), Right-Left, Both (radio buttons)
- Set Detection Direction (button)
- Default Parameters (button)

Figure 5-10 Arm position comparison



5.5.5 Configuring Detection Direction



This function is only available in trigger mode.

Configure the direction of approaching vehicles and the Radar detects only vehicles approaching from the defined direction.

Figure 5-11 Detection direction configuration

The dialog box titled "Parameters Settings" contains the following controls:

- Max. Distance(m): 3.0 (with a "Set Max. Distance" button)
- Min. Distance(m): 0.3 (with a "Set Min. Distance" button)
- Left Width(m): 0.0 (with a "Set Left Width" button)
- Right Width(m): 1.0 (with a "Set Right Width" button)
- Pole Falling Time(s): 6.0 (with a "Set Falling Time" button)
- Working Mode: Anti-Fall Single Boom P... (with a "Set Mode" button)
- ☒ Distinguish Pedestrian and Vehicle (with a "Set" button)
- Detection Direction: ☒ Left-Right, ☐ Right-Left, ☐ Both (with a "Set Detection Direction" button)
- Default Parameters (button)

5.5.6 Radar Flow Count

Click **Read Count** to upload currently collected vehicle flow data. **Read Overtime** appears when there is no data uploaded, and then you need to upload again.

Figure 5-12 Radar flow count

The display shows "Radar flow count: 10" and a button labeled "Read Count" with a refresh icon.

5.5.7 Clearing Counts

Click **Clear Vehicle** to clear previous vehicles flow counts and the data turns to 0. **Clear Overtime** appears when clearing fails, and then you need to clear again. If it succeeds, you can count the vehicle flow again.

5.5.8 Reading Radar Parameter

Click **Read Parameters** to read current parameter configurations of the Radar, and then you can click **Yes** to automatically copy those parameters to the Radar configuration.

Figure 5-13 View parameters

The "Prompt" dialog box displays the following information:

- Read the parameter:
- Max. Distance: 6.00m
- Min. Distance: 0.20m
- Left Width: 1.00m
- Right Width: 1.00m
- Pole Falling Time: 6.00s
- Working Mode: Single Boom Pole
- Distinguish Pedestrian and Vehicle: No
- Detection Direction: Both

At the bottom, it asks: "Whether to enter the readback value into the parameter Settings field?" with "Yes" and "No" buttons.

5.5.9 Checking Radar Interference

You can check whether there is interference in front of the Radar for first time commissioning. Click **Start** at the lower-right corner to view target information and click **Stop** to display information value of the target. If there is no interference within detection range during arm rising, the Radar works normally.

Figure 5-14 Target information



6 Precautions

- We recommend connecting the Radar to an external 12 V/1 A adapter for a stable power supply. This is to avoid affecting the performance of the Radar.
- For small passing vehicles, the recommended installation height is 60 cm. For large vehicles passing, the recommended installation height is 70 cm.
- The Radar antennas are concealed inside of it. When the surface is covered by foreign objects, such as water drops, frost, rain and snow, or dust, the Radar performance can be affected. Clean the Radar in time.
- Make sure no objects, such as metal fences, advertising boards, ANPR cameras or walls, exist within the Radar detection range, to avoid the Radar receiving interference.
- Do not use the Radar with a fence arm and an advertising arm in single passages. Install another radar on the other side of the arm to assure safe passing for vehicles.
- For situations where vehicles that have a gap wider than 1 m on their body, such as semi-trailers and tank cars, we recommend using 2 radars or control the barrier arms through remote control.
- Do not install the Radar on muddy roads, or under extreme weathers, such as cloudbursts and blizzards, to avoid impacting the performance of the Radar.
- Make sure to securely fix the barrier at a wobble angle no larger than 5°. In addition, when railings are installed outside the lane, make sure they are securely fixed to avoid the Radar moving or wobbling.
- Do not place objects made of metal within 1 m range of the Radar. Make sure to install railings or speed bumps that contain metal far away from the Radar.
- Do not use the Radar in environments with strong magnetism.
- Make sure to insulate the unused bare wires after installation.
- Contact technical support when the Radar is installed in special environments.

Appendix 1 Security Commitment and Recommendation

Dahua Vision Technology Co., Ltd. (hereinafter referred to as "Dahua") attaches great importance to cybersecurity and privacy protection, and continues to invest special funds to comprehensively improve the security awareness and capabilities of Dahua employees and provide adequate security for products. Dahua has established a professional security team to provide full life cycle security empowerment and control for product design, development, testing, production, delivery and maintenance. While adhering to the principle of minimizing data collection, minimizing services, prohibiting backdoor implantation, and removing unnecessary and insecure services (such as Telnet), Dahua products continue to introduce innovative security technologies, and strive to improve the product security assurance capabilities, providing global users with security alarm and 24/7 security incident response services to better protect users' security rights and interests. At the same time, Dahua encourages users, partners, suppliers, government agencies, industry organizations and independent researchers to report any potential risks or vulnerabilities discovered on Dahua devices to Dahua PSIRT, for specific reporting methods, please refer to the cyber security section of Dahua official website.

Product security requires not only the continuous attention and efforts of manufacturers in R&D, production, and delivery, but also the active participation of users that can help improve the environment and methods of product usage, so as to better ensure the security of products after they are put into use. For this reason, we recommend that users safely use the device, including but not limited to:

Account Management

1. Use complex passwords

Please refer to the following suggestions to set passwords:

- The length should not be less than 8 characters;
- Include at least two types of characters: upper and lower case letters, numbers and symbols;
- Do not contain the account name or the account name in reverse order;
- Do not use continuous characters, such as 123, abc, etc.;
- Do not use repeating characters, such as 111, aaa, etc.

2. Change passwords periodically

It is recommended to periodically change the device password to reduce the risk of being guessed or cracked.

3. Allocate accounts and permissions appropriately

Appropriately add users based on service and management requirements and assign minimum permission sets to users.

4. Enable account lockout function

The account lockout function is enabled by default. You are advised to keep it enabled to protect account security. After multiple failed password attempts, the corresponding account and source IP address will be locked.

5. Set and update password reset information in a timely manner

Dahua device supports password reset function. To reduce the risk of this function being used by threat actors, if there is any change in the information, please modify it in time. When setting security questions, it is recommended not to use easily guessed answers.

Service Configuration

1. **Enable HTTPS**

It is recommended that you enable HTTPS to access Web services through secure channels.

2. **Encrypted transmission of audio and video**

If your audio and video data contents are very important or sensitive, we recommend you to use encrypted transmission function in order to reduce the risk of your audio and video data being eavesdropped during transmission.

3. **Turn off non-essential services and use safe mode**

If not needed, it is recommended to turn off some services such as SSH, SNMP, SMTP, UPnP, AP hotspot etc., to reduce the attack surfaces.

If necessary, it is highly recommended to choose safe modes, including but not limited to the following services:

- SNMP: Choose SNMP v3, and set up strong encryption and authentication passwords.
- SMTP: Choose TLS to access mailbox server.
- FTP: Choose SFTP, and set up complex passwords.
- AP hotspot: Choose WPA2-PSK encryption mode, and set up complex passwords.

4. **Change HTTP and other default service ports**

It is recommended that you change the default port of HTTP and other services to any port between 1024 and 65535 to reduce the risk of being guessed by threat actors.

Network Configuration

1. **Enable Allowlist**

It is recommended that you turn on the allowlist function, and only allow IP in the allowlist to access the device. Therefore, please be sure to add your computer IP address and supporting device IP address to the allowlist.

2. **MAC address binding**

It is recommended that you bind the IP address of the gateway to the MAC address on the device to reduce the risk of ARP spoofing.

3. **Build a secure network environment**

In order to better ensure the security of devices and reduce potential cyber risks, the following are recommended:

- Disable the port mapping function of the router to avoid direct access to the intranet devices from external network;
- According to the actual network needs, partition the network: if there is no communication demand between the two subnets, it is recommended to use VLAN, gateway and other methods to partition the network to achieve network isolation;
- Establish 802.1x access authentication system to reduce the risk of illegal terminal access to the private network.

Security Auditing

1. **Check online users**

It is recommended to check online users regularly to identify illegal users.

2. **Check device log**

By viewing logs, you can learn about the IP addresses that attempt to log in to the device and key operations of the logged users.

3. **Configure network log**

Due to the limited storage capacity of devices, the stored log is limited. If you need to save the log for a long time, it is recommended to enable the network log function to ensure that the critical logs are synchronized to the network log server for tracing.

Software Security

1. **Update firmware in time**

According to the industry standard operating specifications, the firmware of devices needs to be updated to the latest version in time in order to ensure that the device has the latest functions and security. If the device is connected to the public network, it is recommended to enable the online upgrade automatic detection function, so as to obtain the firmware update information released by the manufacturer in a timely manner.

2. **Update client software in time**

We recommend you to download and use the latest client software.

Physical Protection

It is recommended that you carry out physical protection for devices (especially storage devices), such as placing the device in a dedicated machine room and cabinet, and having access control and key management in place to prevent unauthorized personnel from damaging hardware and other peripheral equipment (e.g. USB flash disk, serial port).

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ZHEJIANG DAHUA VISION TECHNOLOGY CO., LTD.

Address: No. 1399, Binxing Road, Binjiang District, Hangzhou, P. R. China | Website: www.dahuasecurity.com | Postcode: 310053

Email: dhoverseas@dhvisiontech.com | Tel: +86-571-87688888 28933188