

SUMAVISION

Operating Instructions

IPQAM modulator



SUMAVISION TECHNOLOGIES CO., LTD.

Introduction

Version Description

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The product in this manual is:

SUMAVISION IPQAM 10K511 modulator

The version of this manual is V3.1.

This manual provides complete configuration introductions of IPQAM modulator series.

User can choose to read relevant parts of this manual according to the equipment purchased.

Any change or version upgrade of this manual will not notice again.

The Agreements of the Instructions

Before reading the Instructions, please read the following agreements carefully:

1. Font and format

- ✓ The texts in the Instructions are prepared by using V Arial typeface;
- ✓ The first-level titles in the Instructions are prepared in bold using II Arial typeface, the second-level titles are prepared in bold using III Arial typeface, and the third-level titles are prepared in bold using IV Arial typeface;
- ✓ All the notes of the Instructions are prepared by using regular Arial, and are separated before and after the texts by using "=====";




2. Keyboard operation

- ✓ The Arial characters in "<>" refer to the key name or button name, for instance <Enter>, <Tab>, <Back Space> are refer to Return, Tab, Backspace respectively.
- ✓ <Key 1 + Key 2> refers to pressing the key 1 and key 2 on the keyboard at the same time, for instance <Ctrl+Alt+A> refers to pressing "Ctrl", "Alt" and "A" three keys at the same time.
- ✓ < Key 1, Key 2> refers to pressing Key 1 first on the keyboard, releasing, and then pressing Key 2, for instance <Alt, D> refers to pressing <Alt> key, after releasing the key and then pressing <D> key.

3. Mouse operation

- ✓ Click: Quickly press and release a mouse button.
- ✓ Double-click: Press twice quickly and release a mouse button.
- ✓ Drag: Hold down a mouse button, and move the mouse.

4. Signs

- ✓  Note, carefulness, warning and danger: to remind users the matters should be paid attention to in the day-to-day maintenance and operation.
- ✓  Description, prompts and tips: to necessarily add and describe the descriptions of the operation contents.
- ✓  Help: to describe in detail the parts of the operation contents that it is not easy for users to understand.

Target Readers

This manual introduces the functions and methods of using and maintaining the IPQAM modulator, and is applicable to the following readers:

- ✓ Digital video/audio engineering technicians
- ✓ Digital video/audio system administrators
- ✓ Digital video/audio system engineers

Contact Us

Sumavision Technologies Co., Ltd. is committed to providing a full range of technical support. When users are not familiar with the device or any fault of the device occurs, it is recommended not to disassemble the device, but to contact Sumavision Office or the After-sales Technical Support Department of the Company.

You can contact us by the following addresses:

Address: Building 1, No.15 Kaituo Road, Shangdi Information and Industry Base, Haidian District, Beijing ,CHINA, 100085

After-sales Technical Support Hotline: 8008103018

24-hour hotline:

Website: www.sumavision.com

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Chapter 1 Overview

1.1 Instruction to product use

SUMAVISION IPQAM 10K511 modulator is a self-developed product of Beijing Sumavision Technologies Co., Ltd. for all-IP networking transmission and VOD (Video-On-Demand) system. It can be placed directly on the head end of the system, sub-head end, and any HUB node of an optical fiber trunk network in a residential quarter for achieving the reception, routing, multiplexing, scrambling, modulation and up-conversion to a RF cable television band of GbE (Gigabit Ethernet) data of MPEG over IP. The typical network diagram of the IPQAM modulator is as shown in FIG. 1-1.

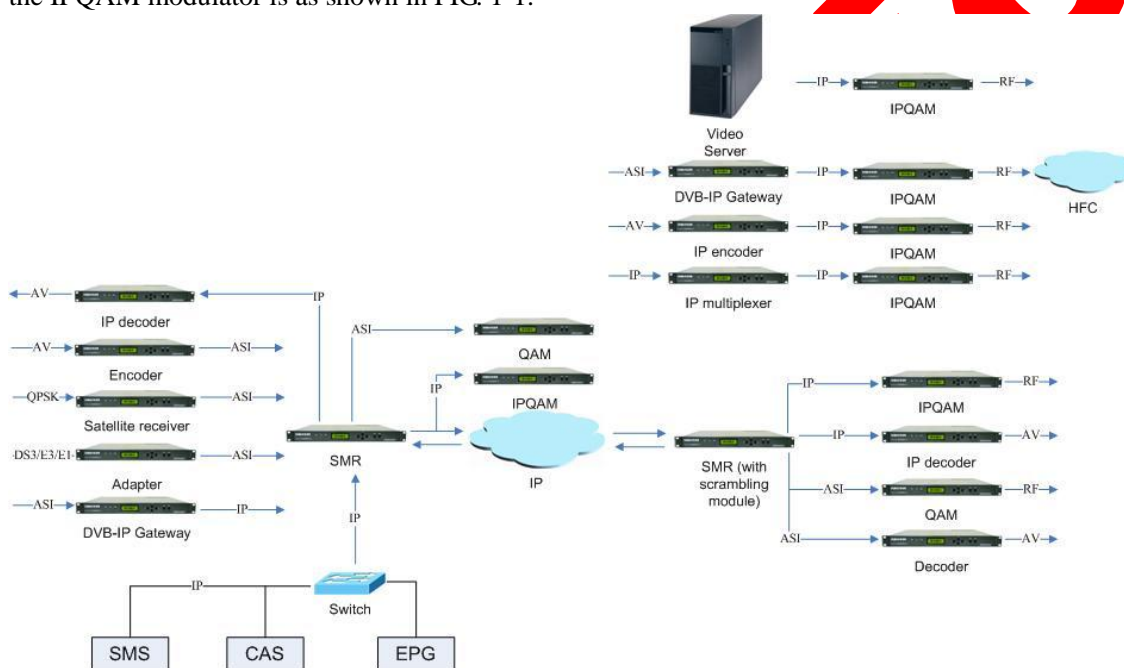


Fig. 1-1 IPQAM modulator Networking Diagram

In FIG. 1-1, the IPQAM receives TS stream data, comprising the following steps of: firstly, finishing the decapsulation, filtering and emptying of UDP (User Datagram Protocol) packet, mapping programs to corresponding QAM (Quadrature Amplitude Modulation) channel according to the preset UDP port number; and then analyzing PID values of Video TS packet and Audio TS packet in various TS streams to finish PID mapping; and multiplexing various SPTS streams mapped in the same output channel as MPTS multi-program code streams, and outputting a RF (Radio Frequency) signal through QAM modulation.

The IPQAM modulator used in the network diagram is SUMAVISION 10K511.

1.2 Product Identification

There are product name, model and manufacturer, etc. on the front panel of IPQAM modulator, as shown in Fig. 1-2 IPQAM modulator Front Panel.

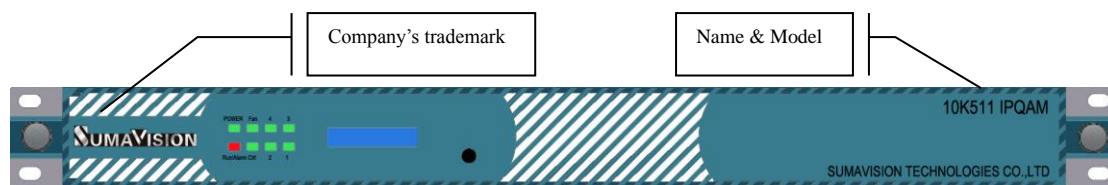


Fig. 1-2 IPQAM modulator Front Panel

Product name: IPQAM modulator

Model: SUMAVISION IPQAM 10K511 modulator

Manufacturer: Sumavision Technologies Co., Ltd., as shown in Fig. 1-2 IPQAM modulator Front Panel

Identification description: there's the ex-factory identification on the rear panel of the device, as shown in Fig. 1-3 Ex-factory Identification.


S/N: 1209IPQAM30010

Fig. 1-3 Ex-factory Identification

Where, "S/N" refers to the ex-factory serial number, "IPQAM" stands for the device model and "30010" is the production code.

1.3 Environmental Requirements

1.3.1 Requirements on Transportation Environment

The device must be handled prudently and carefully to avoid damages to the device. Ensure that people who transport, maintain or operate the device have professional skills and are familiar with the operation of device. If there's any question during the transport, maintenance and operation of the device, please contact the Aftersales Technical Support Department of Sumavision, with the way to contact referring to the foregoing contents.

The device is high-grade electronic product, and should be handled gently and kept away from falling or collision. And additionally, attention should be paid to the following:

- ✓ Please do not place this device on unstable trolleys, shelves, brackets or tables, otherwise, the device may fall and cause serious damages, which can lead to abnormal operation.
- ✓ During transportation, the trolley used to transport the device should be kept balance. When user has arrived at the designated location or have to stop on the way, ensure whether the trolley is reliable first, and then stop moving to avoid the falling of device, causing malfunction.
- ✓ Please arrange special person to transport or install this device, and avoid many persons participating in the transportation.

1.3.2 Site room environmental requirements

✓ Site room area:

The front door and back door of the cabinet should leave at least 1.2m to 1.5m for opening the door or routine maintenance. The cabinet can not be installed against the wall, and the distance between the cabinet side and the wall should be not less than 0.8m.

✓ Site room floor:

Site room floor should be non-conductive, dust-proof, and its surface smoothness error should be less than 2mm per square meter. The volume resistivity of anti-static material should range from $1 \times 10^7 \Omega$ to $1 \times 10^{20} \Omega$, and the ground current-limiting resistor is $1M\Omega$. Floor load-bearing should be larger than $450kg/m^2$.

✓ Environment temperature:

The device can operate normally in the environment whose temperature ranges from $10^\circ C$ to $40^\circ C$, and the places where conditions permit can install air-conditioning system for cooling.

✓ Relative humidity:

Normal working humidity: $\leq 90\%$ ($20^\circ C$);

Allowed working humidity: $\leq 95\%$ (without condensation).

✓ Environmental pressure:

86-105kpa.

✓ Site room doors and windows:

Doors and windows of the site room should be sealed with dust-proof rubber strips, and windows should be double-glazed and strictly sealed.

✓ Site room wall surface:

The wall surface of site room can use wallpapers or be printed with lusterless paint, however, powder coating is not suitable.

✓ Air cleanliness:

The requirements are shown as Table 1-1 Site room dust indicators and Table 1-2 Site room harmful gas indicators.

Table 1-1 Site room dust indicators

Maximum diameter (μm)	0.05	1.00	3.00	5.00
Maximum concentration (particles per cubic meter)	14×10^5	7×10^5	24×10^4	13×10^4

Table 1-2 Site room harmful gas indicators

Gas	Average (mg/m ³)	Max. (mg/m ³)
Sulfur dioxide SO ₂	0.20	1.50
Hydrogen sulfide, H ₂ S	0.01	0.30
Nitrogen dioxide, NO ₂	0.04	0.15
Ammonia, NH ₃	0.05	0.15
Chlorine, Cl ₂	0.01	0.30

✓ Fire-fighting requirements:

Site room should be equipped with automatic fire alarm system, hand-held extinguishing system or fixed extinguishing system.

✓ Power supply requirements:

The devices, air-conditioning system and lighting system should have their own power system respectively.

1.3.3 Power supply requirement

Parameters for normal operation of EMR are shown as follows:

- ✓ Power supply:
 - Voltage: 100V-240V AC;
 - Power frequency: 50Hz-60Hz
- ✓ Power consumption: < 350W
- ✓ Nominal fuse: 8.8A
- ✓ Grounding: the device should be well grounded through the ground terminal.

Chapter 2 Product Descriptions

2.1 Appearance

IPQAM modulator appearance is shown as Fig. 2-1 IPQAM modulator Appearance.

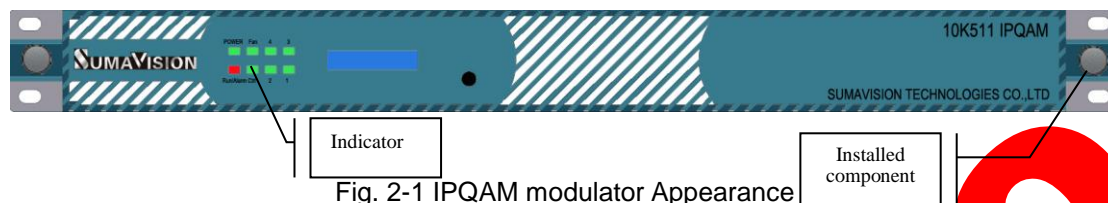


Fig. 2-1 IPQAM modulator Appearance

2.1.1 Description of equipment connector

Various input and output interfaces are arranged on front panel and rear panel of the IPQAM 10K511 modulator, which are used for signal connection with other digital transmission equipment. Its structure is as shown in FIG. 2-2 and FIG. 2-3.



Fig. 2-2 Front panel

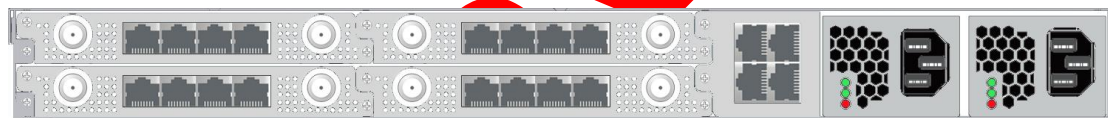


Fig. 2-3 Rear panel

- ✓ CA scrambling interface identifier as "CA"
- ✓ Network management control interface identifier as "CTRL"
- ✓ DTI interfaces identifier as "DTI-1" and "DTI-2"
- ✓ Modulator cards identifier as "QAM Card 1" ~ "QAM Card 4"
- ✓ Gb SFP module interfaces identifier as "GbE-1" ~ "GbE-4" (The number of SFP interfaces is determined by configuration)
- ✓ RF output interfaces identifier as "RF1" and "RF2" (The number of RF output interfaces is determined by configuration)

2.1.2 Instructions to optional configuration

IPQAM 10K511 modulator is flexible in configuration, and various modulation cards may be selected based on user demands. The modulation cards QT242, QT241 and QT083 are provided for option at present. The optional board card supports the use of mixed insertion. The functional characteristics of three kinds of modulation cards are described as follows.

QT242 modulation card:

QT242 modulation card is provided with four SFP module interfaces and two RF output interfaces. Each RF output interface supports 24 non-adjacent frequency output. Each card supports 48 non-adjacent frequency output.

QT241 modulation card:

QT241 modulation card is provided with four SFP module interfaces and a RF output interfaces. RF output interface supports 24 non-adjacent frequency output. Each card supports 24 non-adjacent frequency output.

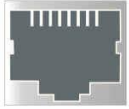
QT083 modulation card:

QT083 modulation card is provided with two SFP module interfaces and three RF output interfaces. Each RF output interface supports 8 non-adjacent frequency output. Each card supports 24 non-adjacent frequency output.

2.1.3 CA scrambling interface (CA)

The module provides two Ethernet interfaces for the user on the front panel for CA scrambling. The interface type is RJ45 and its various parameters are as shown in Table 2-1 Ethernet interface connector parameters.

Table 2-1 Ethernet interface connector parameters

Electrical characteristics	Maximum current	2 amps	Its appearances can be shown as the figure below: 
	Insulation resistance	5000 megohms	
	Signal pin DC resistance	30 milli-ohms @100 mA	
	Metal shell shielding force	Min. 20dB (20-200MHz)	
	Applicable ambient temperature	-50~+105 °C	
Material characteristics	Signal pin contact surface plating	Metal shell, tin-plated	
	Filler	UL90V-0 retardant thermoplastic	
Mechanical characteristics	Durability	750 times	
	Insertion/pullout force	Max. 5 lbs	

2.1.4 Network management control interface (CTRL)


The module provides two Ethernet interfaces for the user on the front panel for network control and upgrading. The interface type is RJ45 and its various parameters are as shown in Table 2-1 Ethernet interface connector parameters.

2.1.5 Gigabit Ethernet interface (GbE)

The modulator is provided with a total of 4 GbE input interfaces for the user to input a code stream. The interface type is SFP.

Its various parameters are as shown in Table 2-2 Parameters of GbE interface connector.

Table 2-2 Parameters of GbE interface connector


Interface connector	SFP	The appearance diagram is shown as follows: 
Interface	1000Base-T/1000Base-X	
Interface protocol	In accordance with IEEE 802.3z (optical interface) or IEEE 802.3ab standard (electrical interface)	
Interface rate	1000M self-adaptation	

2.1.6 RF output interface (RF)

The modulator is provided with a total of 8 RF output interfaces, outputting RF signals of the cable television within 45-1003MHz frequency bands. The output interface is of a 75Ω Inch F-type socket. If a test channel is to be used, plug an F plug on the radio-frequency cable into the output socket and tighten.

Electrical characteristics, material characteristics, mechanical characteristics and appearance diagrams are as shown in Table 2-3 Parameters of RF output interface connector

Table 2-3 Parameters of RF output interface connector


Electrical characteristics	Normal impedance	75Ω	The appearance diagram is shown as follows: 
	Frequency range	0-20GHz	
	Rated value of voltage	500 VRMS (maximum at sea level)	
	Voltage withstanding of dielectric	1500 VRMS (minimum at sea level)	
	Voltage standing wave ratio	1.5 (maximum)	
Material Characteristics	Body and metal fittings	Nickel plating	
Mechanical characteristics	Insertion force	Maximum torque 2.5 lbs	
	Pull-out force	Maximum axial tension 3 lbs	
	Nut tension	Minimum 100 lbs	
	Thrust of central needle	Minimum 6 lbs	
	Durability	At least achieve 500 times of drawing	

2.1.7 Power Socket

The modulator provides two power sockets on the rear panel. The device will be powered on if the power lead is insert the power socket correctly.

The power sockets used by the modulator fully conform to the international industrial standards, for detailed information, refer to Table 2-4 Power Socket Parameters.

Table 2-4 Power Socket Parameters

GB 1002-1996	Types, basic parameters and dimensions of single phase plugs and socket-outlets for household and similar purposes	Its appearances can be shown as the figure below: 
GB 2099.1-1996	Plugs and Socket-outlets for Household and Similar Purposes — Part1: General Requirements	

2.1.8 Indicator

The modulator panel is provided with at least 8 indicator lights, including:

- Power
- Run/Alarm
- Fan
- Ctrl
- 1
- 2
- 3
- 4



After determining the equipment is corrected accurately, plug the power line into a power socket of the rear panel of the equipment, open the equipment, if a Power light turns on, it indicates the equipment has been electrified, having conditions of equipment operation.

When the equipment operates normally, there is no any abnormal phenomenon and alarm indication, so that the Run/Alarm light of the equipment panel turns to green. If the work is abnormal and it gives an alarm, and the Run/Alarm light turns to red.

4 lights of QAM Card Status 1-4 correspond to 4 board cards in a card slot bit respectively; when the corresponding board card works in order, the light turns to green; otherwise, it turns to red; and if no board card inserts into the corresponding board card bit, the light does not turn on.

2.2 Heat Emission Descriptions

Six exhaust fans are installed on the rear panel of the modulator for reducing temperature rise of the equipment caused by heating various chips inside the equipment during working in operational process.

The exhaust flow of the modulator is as shown in FIG. 2-4.

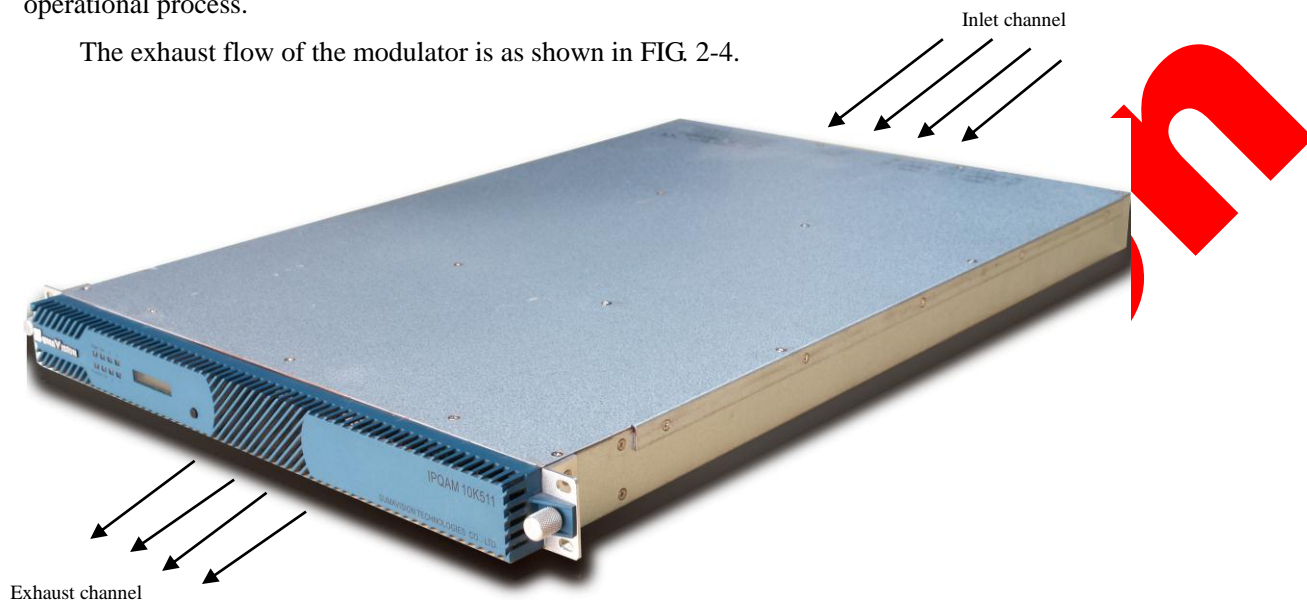


Fig. 2-4 The exhaust flow of the modulator

2.3 Control Descriptions

SUMAVISION IPQAM 10K511 modulator can achieve the control through Web and SNMP network management system.

Chapter 3 Technical Characteristics

3.1 Main performance parameters

Main functions of modulator are as follows:

- √ ITU-T J.83 Annex A, B and C international standards, compatible with DVB- C standard;
 - √ GbE input, data throughout of 960Mbps maximum;
 - √ Supporting multicast reception, as well as IGMP V1, V2 and V3 (with active IP filtration performance);
 - √ 8+8 optical interfaces (optional electrical interface) redundancy, ensuring high reliability of data reception;
 - √ High integration, single RF port supporting 24-non-adjacent frequency points output;
 - √ Stand-alone 1RU, reaching 192-frequency point RF signal output;
 - √ Each frequency point support 256 channels maximum, and single port may processes at most 512 PIDs;
 - √ 2048 unicast addresses can be received by single GE port; and the total upper limit of the single device may be up to 8192;
 - √ 2048 multicast addresses can be received by single GE port; and the total upper limit of the single device may be up to 8192;
 - √ Strong kernel process: TS over IP, multiplexing, scrambling, PSI /SI process, modulation and up-conversion;
 - √ Board card backup mechanism, ensuring the high reliability of data output;
 - √ Compatible with DWDM optical fiber net, optioning single-mode/multi-mode light absorption;
 - √ Abundant QAM mode: 64, 128, 256;
 - √ Full-band agility: 45~1000MHz;
 - √ Support VOD, broadcast, data traffic and multi-protocol, and achieve seamless connection with various types of VOD servers;
 - √ Support DATA and multi-protocol, and achieve seamless connection with various types of VOD servers;
- Support HD/SD programme transmission;
- √ Adopt modularization plug-in design, facilitating upgrade and maintenance;
 - √ Support hot plug and maintain conveniently;
 - √ Dual-power standby, ensuring equipment operation;
 - √ Strong background configuration function and web master monitoring system, ensuring high stability of equipment operation;

- √ Excellent RF index, ensuring high reliability and expansibility of the next generation network;
- √ Provide WEB network management, operating directly and conveniently;
- √ Concentrate SNMP network management system, being capable of realizing remote or local all-weather network monitoring;
- √ Remote on-line upgrading function, ensuring excellent expandability.

The output level is as shown in table 3-1:

Note: Different board cards are slightly different in level.

Table 3-1 Output level

Number of used frequency points	Single frequency point (dbuv)	Interface output (dbuv)
1	120	120
4	112	120
8	109	120
12	107	120
16	105	120
20	104	120
24	103	120

3.2 Standard compliance

The modulator is in line with the international and domestic industry standards, including:

- ✓ GY/T 170-2001 Encoding and Modulation Standard for Digital CATV Broadcasting Channel
- ✓ GY/T 198-2003 Technical Requirements and Measurement Methods for Digital CATV Broadcasting QAM Modulator
- ✓ GY/T 106-1999 Technical Specification for CATV Broadcasting System
- ✓ GY/Z 174-2001 Information Specification of Digital TV Broadcasting Business
- ✓ IEEE Std 802.3ab-1999 (Clause 40), Physical Layer Parameters and Specifications for 1000 Mb/s Operation Over 4 Pair of Category 5 Balanced Copper Cabling, Type 1000BASE-T
- ✓ IEEE Std 802.3z-1998 (Clauses 34-39, 41-42) Type 1000BASE-X MAC Parameters, Physical Layer, Repeater, and Management Parameters for 1000 Mb/s Operation
- ✓ ITU-T J.83 Annex A/B/C Digital Multiprogramme Systems for Television Sound and Data Services for Cable Distribution

- ✓ EN300 429 Digital Video Broadcasting (DVB): Framing structure, channel coding and modulation for cable systems

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Chapter 4 Dimension and Weight

4.1 Dimensions

IPQAM 10K511 modulator external structure is shown as Table 4-1 IPQAM modulator Physical Parameters.

Table 4-1 IPQAM modulator Physical Parameters

Physical Parameters	Value (Unit)
Height	44.4mm (1U)
Width	482.6mm (19")
Depth	675.5mm

4.2 Weight

The device weights <15kg, and its specific quality is related to the configurations of the device. Please be subject to the device actually purchased.

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Chapter 5 Installation and Debugging

5.1 Unpacking and Checking

Please check whether the package of the device is damaged or not when receiving the device; in case of device's damage, please contact the carrier company or the After-sales Technical Support Department of Sumavision in a timely manner.

If you complete the installation and debugging of the device by yourself, please pay attention to the deformation of device and abnormal sound inside the device when unpacking the device; check whether the device model and name are in conformity with those specified in the contract; whether the serial number of device is identical to that in the *Delivery and Maintenance Certificate of Device*; and whether the power lead, connectors and fittings, operating instructions and Certificate of Fitness are completely contained in the package case of the device.

If the installation and debugging are conducted by the after-sales technical engineers of Sumavision, they will confirm the above-mentioned information with you.

You are required to sign and return the *Delivery and Maintenance Certificate of Device* to our company after confirming there's no problem upon the unpacking and inspection, and according to which we'll provide high-quality satisfactory after-sales services.

5.2 Installation Precautions

Check whether the environmental requirements in Section 3 of Chapter I have been met. The device can be powered on for debugging after the installation is completed by following the installation steps.

5.3 Steps and Methods of Installation

The IPQAM modulator needs to be installed and used on a 19-inch cabinet. When installing the device, please open the box first, then take out the device. To ensure the device is installed firmly, please put the device on L bracket after installing L bracket on the cabinet, and fasten the device on the assembly cabinet with screws. Device installation can be shown as Fig. 5-1 Assembly cabinet for IPQAM modulator.

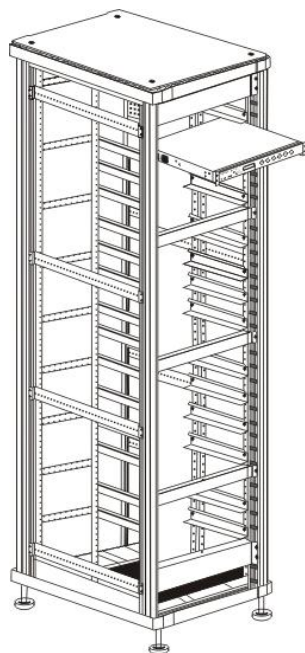



Fig. 5-1 Assembly cabinet for IPQAM modulator

 The device can be installed in any plug-in frame of the assembly cabinet. However, the general principle for arranging the location of the device is that the connection between various stand-alone devices should be arranged neatly on the assembly cabinet in accordance with the flow of signal.

5.4 Debugging

Preparations before configuration:

- The device should be stably fixed on the cabinet, and the operation environment is normal.
- The device should be connected to the ground very well.
- Check whether input signals are correctly connected.
- The device has been connected to the power supply correctly.
- If network management is needed to control devices, please connect the device with the computer.

Device power-on inspection:

- Indicators of the device display normal.
- Device keys can respond normally.
- The fans of the device can operate normally without harsh noise.
- No abnormal sounds and offensive smell.

5.5 Debugging and inspection methods

IPQAM 10K511 Modulator offers users setting menu through WEB page. The users can set parameters of the equipment to make it satisfy users' demands.

- ✓ QAM card status
Know about current equipment operation information via inquiring this menu.
- ✓ Alarm information
You can view the cause for alarm quickly when the equipment gives an alarm.
- ✓ QAM Card parameter setting
You can set operation parameters of the equipment via setting this menu.
- ✓ Network setting
You can establish connection between the equipment and the outside via setting this menu.
- ✓ Reboot the device

You can restart the modulator and initialize parameters of the modulator via setting this menu.

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Chapter 6 Method of application

The modulator, as an integral and important part of the digital television system, is the mouthpiece of the system, requiring extremely high stability and reliability. IPQAM of Beijing Sumavision Technologies Co., Ltd. has relatively high stability and reliability and supports management system through WEB interface and IPQAM network, thus user can directly and conveniently configure modulator.

6.1 Instructions to optional board card

Single IPQAM supports four modulation cards maximum. The differences of the three kinds of modulation cards can be seen in Table 6-1 Differences of optional modulation cards in configuration

Table 6-1 Differences of optional modulation cards in configuration

Type of board card	Number of SFP interface	Number of RF output interface	Number of frequency point output by single RF interface	Max number of frequency point output by single card
QT242	4 (2 backup sets)	2	24 non-adjacent frequency	48 non-adjacent frequency
QT241	4 (2 backup sets)	1	24 non-adjacent frequency	24 non-adjacent frequency
QT083	2 (1 backup set)	3	8 non-adjacent frequency	24 non-adjacent frequency

6.1.1 QT242 modulation card

QT242 modulation card is provided with four SFP module interfaces and two RF output interfaces. Each RF output interface supports 24 non-adjacent frequency output. Each card supports 48 non-adjacent frequency output.



图 6-1 QT242 modulation card

6.1.2 QT241 modulation card

QT241 modulation card is provided with four SFP module interfaces and a RF output interfaces. RF output interface supports 24 non-adjacent frequency output. Each card supports 24 non-adjacent frequency output.



图 6-2 QT241 modulation card

6.1.3 QT083 modulation card

QT083 modulation card is provided with two SFP module interfaces and three RF output interfaces. Each RF output interface supports 8 non-adjacent frequency output. Each card supports 24 non-adjacent frequency output.

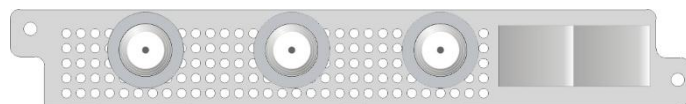


图 6-3 QT083 modulation card

6.2 Operating instruction to WEB network management

IPQAM provides a concise and humanized WEB operation interface with strong function. The parameters of the IPQAM modulator are able to be configured through the WEB to ensure its stable operation. The WEB operation interface mainly includes 6 items of [Summary], [Monitor], [Alarms], [Cards], [Maps] and [System]. Various main menus shall be introduced, aiming at the functions and operation methods of the IPQAM modulator.

The optional board cards are different, so the number of the input/output interfaces is slightly different, but the function sets are nearly the same. The function and operational approach of IPQAM modulator are introduced by taking QT242 as an example as follows.

6.2.1 WEB menu name and instruction

6.2.1.1 Requirement of IE version

⚠ Please use IE version and operation system as required, and requirement details are as follows:

Operating system	IE version	Screen resolution
Windows XP SP3/ Windows 7 SP1	IE v8.0/Firefox v23.0.1 and above	1024*768 and above

6.2.1.2 Backstage WEB logging-in

Open the browser, input IP address of the equipment in the address bar, wherein the equipment default IP as 192.168.1.100, and then enter. At the moment, language type selection page will appear, as shown in Fig. 6-1 Network management language selection page. The language of the operation interface is divided into Chinese and English, need to input the password of the account after selecting the type of the language, as shown in FIG. 6-2, and then access the WEB network management interface of the equipment. Now we will take Chinese for example to do operation instruction below.



Fig. 6-1 Network management language selection page

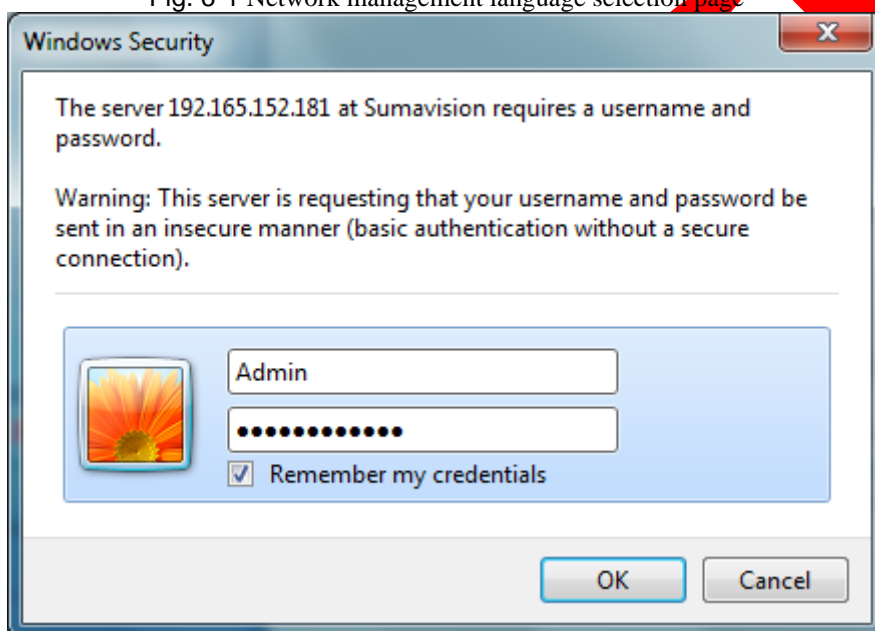



Fig. 6-2 Login frame

 Factory default user: Admin; and password: sumavisionrd

6.2.1.3 Instructions to WEB interface

The WEB network management setting interface of IPQAM modulator is mainly divided into the areas, as shown in the figure below:

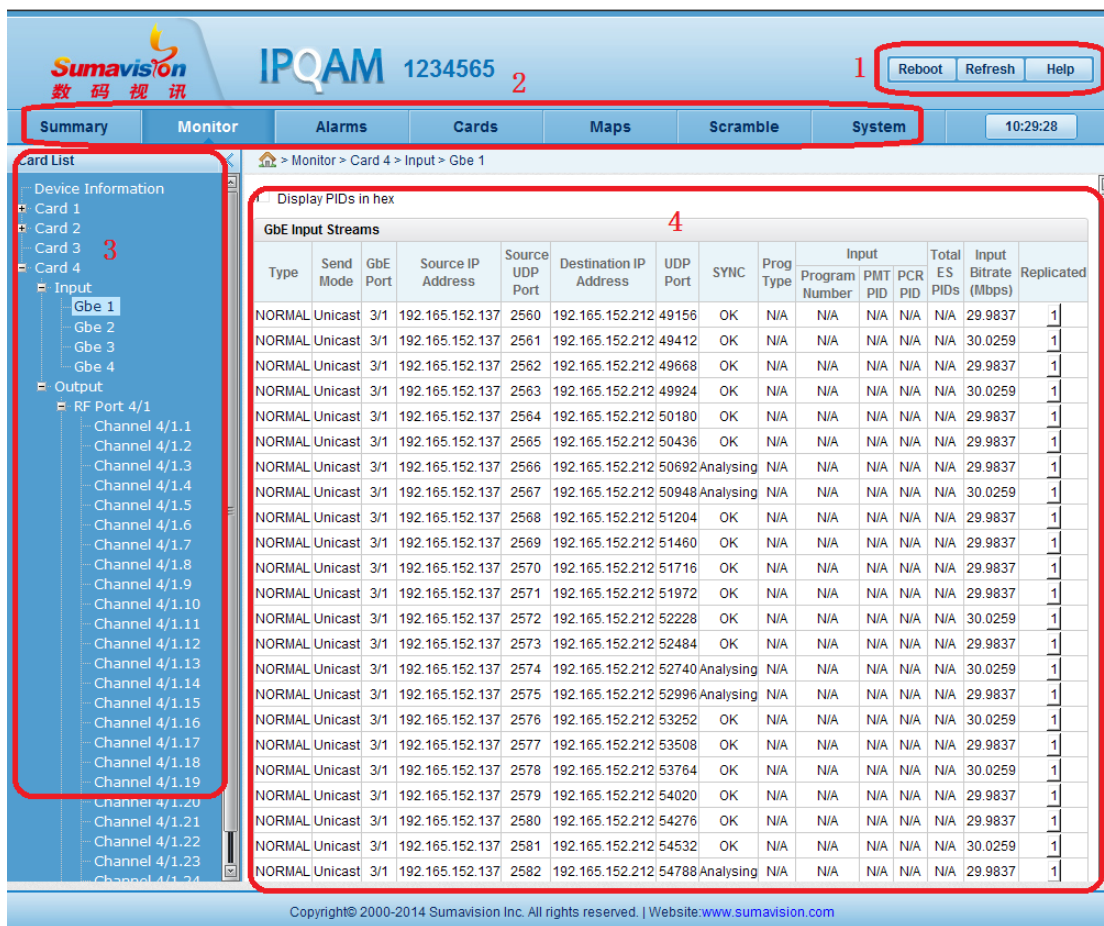


Figure 6-4 Explanatory drawing of WEB network management interface of IPQAM modulator

1. Restart and page refresh functions (no help);
2. Function option of IPQAM modulator;
3. Tree list of input/output of board card;
4. State and parameter setting area.

The operation sequences of parameter setting is that select the function option in area 2, click the node in the tree list corresponding to input/output on the board card in area 3, and then set parameters in area 4.

6.2.1.4 Summary

After normally entering the WEB network management interface, directly enter the page of the summary, as shown in FIG 6-3. List the current warning information of the device at the top of the page of the summary and display the state information of various interfaces in a mode of the schematic diagram of the rear panel of the device at the bottom. Show green in case the corresponding interface normally operates, show red in case of abnormality, and show blank on behalf of no hardware. Click on various interfaces on the picture to directly enter the setting page of the corresponding interface.

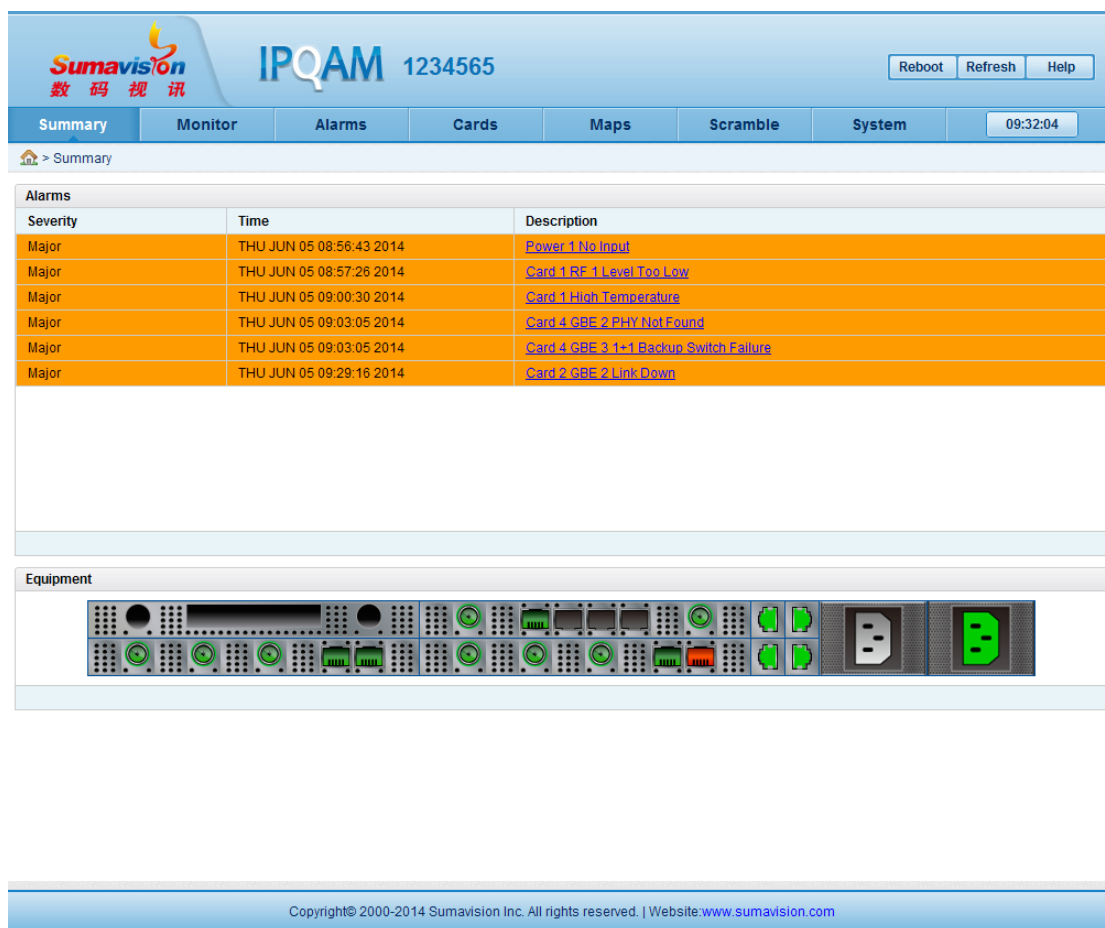


Fig. 6-3 Page of equipment summary

6.2.1.5 Monitor

The device information and the input and output information of various daughter cards may be checked from [Monitor]. Device information displays the temperature information and level information of the device board and card, and the rotating speed information of the cooling fan. The daughter card monitoring information displays the input and output information of various frequency points and the port in a mode of list for details.

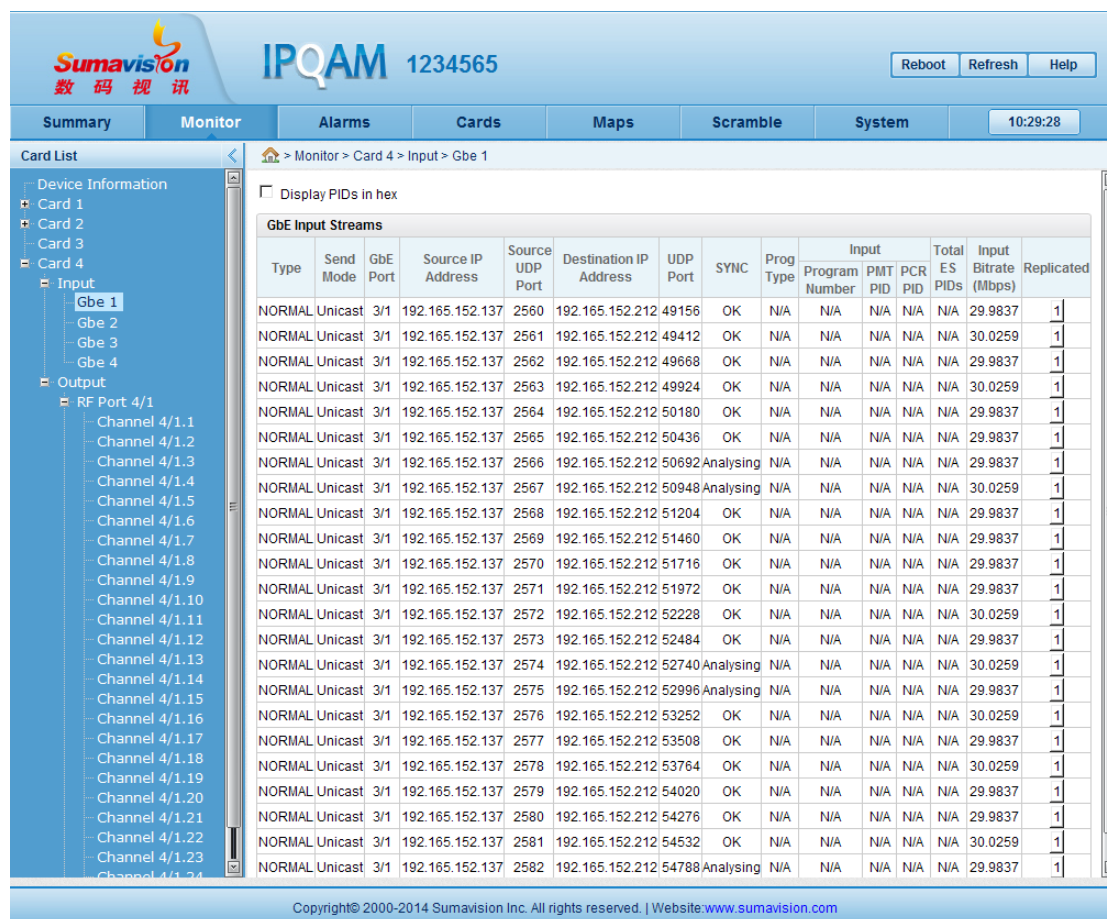


Fig. 6-4 Page of equipment monitor

6.2.1.6 Alarms

The [Alarms] page includes the existing alarm in the current device and the disappeared historical alarms. The alarm information includes the date of alarm generation, alarm level, alarm module, alarm type and detailed information. The user can take a clear understanding of the device and the working status of each modulation card through this page, quickly locate and solve the problem, so as to ensure normal operation of the device.

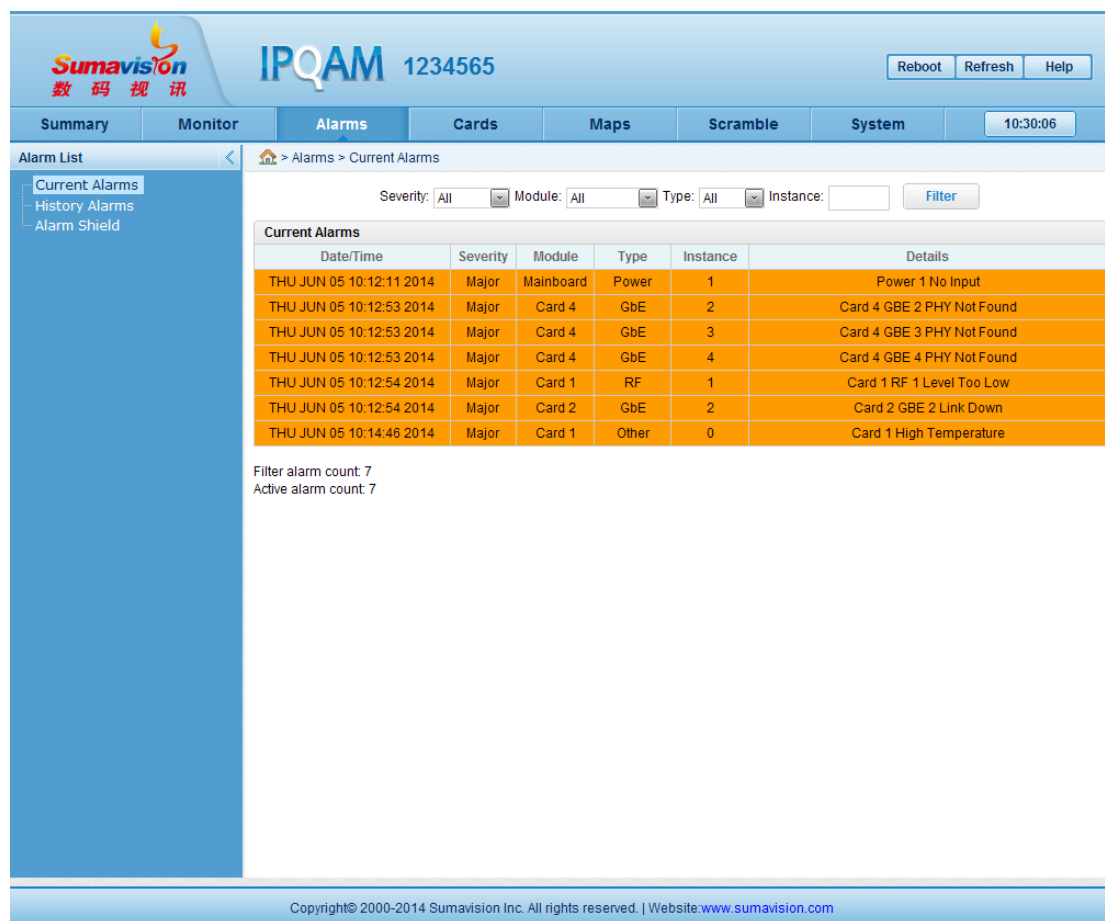


Fig. 6-5 Warning information

6.2.1.7 Cards

[Cards] page is used for setting the input internet access parameter of the modulation card and the modulated output parameter. The user will set the network parameter of the input internet access of the corresponding modulation card and the information of the output frequency point at this page.

The screenshot displays the Sumavision IPQAM web interface. The top navigation bar includes 'Summary', 'Monitor', 'Alarms', 'Cards', 'Maps', 'Scramble', and 'System'. The 'Cards' menu is active, showing a tree view of 'Card 4' with sub-items for 'Input' and 'Output'. The 'Input' sub-menu is expanded, showing 'Gbe 1' through 'Gbe 4' and 'RF Port 4/1' through 'RF Port 4/2'. The main content area is titled 'GbE Input Configuration' and contains a table with the following data:

Port Configuration	Port 1	Port 2	Port 3	Port 4	
IP Address	192.165.152.212	192.165.152.22	192.165.152.23	192.165.152.24	
Subnet Mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	
Gateway	192.165.152.1	192.165.152.1	192.165.152.1	192.165.152.1	
MAC Address	00-24-68-03-80-3C	00-24-68-03-90-3C	00-24-68-03-A0-3C	00-24-68-03-B0-3C	
Input Switch	On	On	On	On	
Speed Select	1Gbps AN	1Gbps AN	1Gbps AN	1Gbps AN	
Speed State	1Gbps Full	Link Error	Link Error	Link Error	
GbE Input Name	GBE1	GBE2	GBE3	GBE4	
Port Pair Configuration		Port Pair 1		Port Pair 2	
Primary Port	1		1		
Current Active Port	1		1		
Packet Format	188		188		
Redundancy Configuration					
Backup method	1+1				
Detention Mode of 1+1	On Gbe Link Only				
Backup Enabled	Disabled				
Check Time (100ms)	5				
Revert To Primary	Disabled				
Revert Check Time (100ms)	5				
Backup Mode	Diffe Mode				
Gratuitous ARP					
Send Enabled	Disabled				
Send Interval (s)	30				
IGMP Setting					
Send IGMP Version	IGMP_V3				

Fig. 6-6 Card setting

6.2.1.8 Maps

The [Maps] page is used for adding the code stream port information received by various frequency points. The ERM of the board and card is also set at this page.

Summa

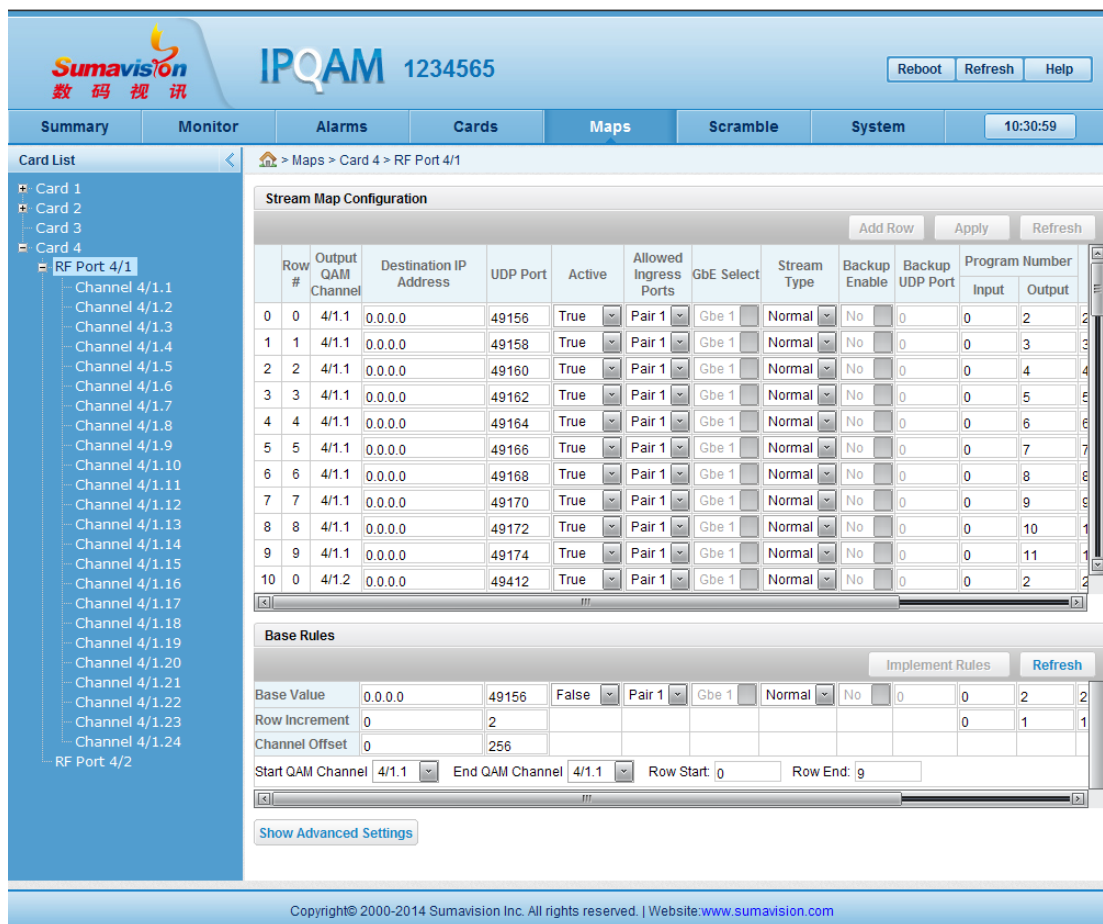


Fig. 6-7 Setting of mapping table

6.2.1.9 Scramble

The [Scramble] page is used for setting the scrambling information of the program. The current version with this function is not published temporarily.

6.2.1.10 System

The [System] page is mainly used to set the network parameters of the device and the board card control internet accesses, set the clock synchronization, and check the device version and log information, as well as set the parameters import and export, user management and card restart. In addition, the backup of the modulation card may also be set at this page.

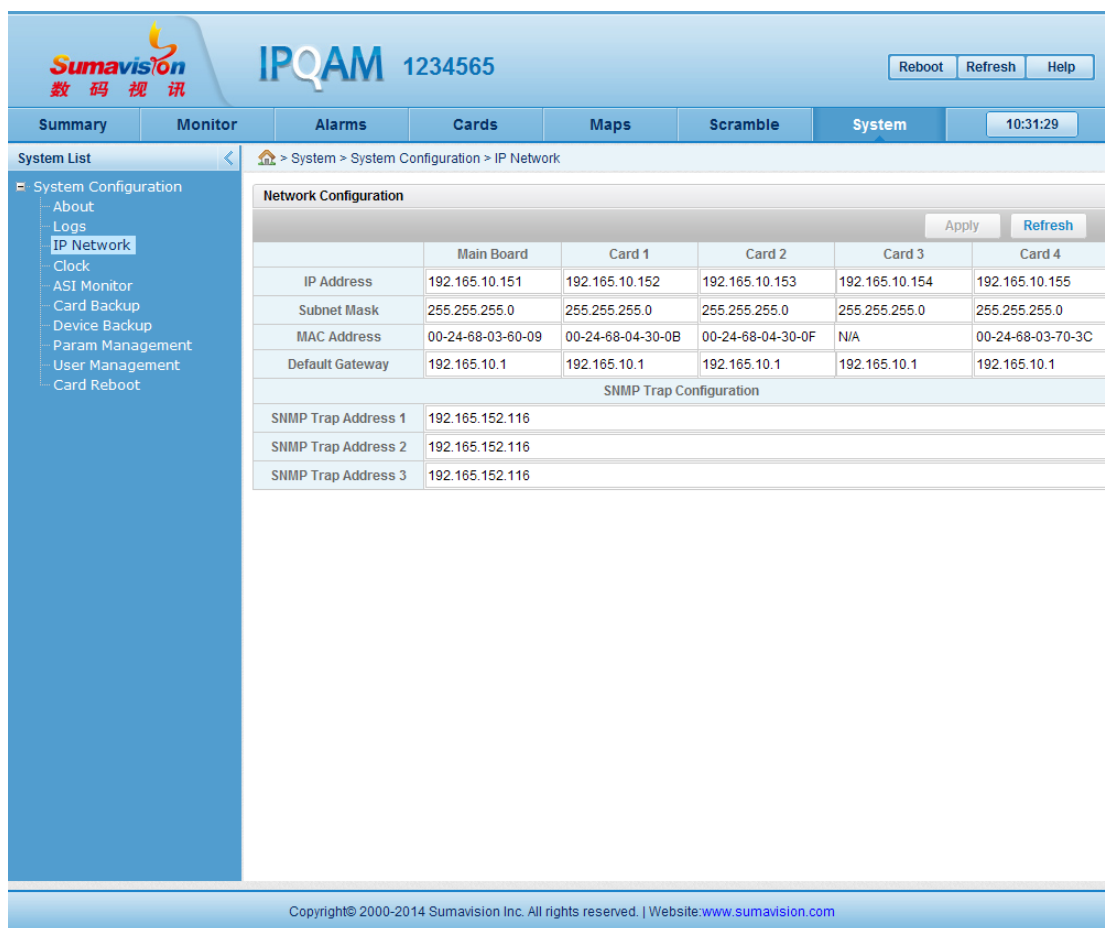


Fig. 6-8 Setting page of system

6.2.2 VOD mode operation

In the event of using the device to do modulation output of VOD mode, set GBE network parameter, RF port parameter, debugging output frequency point parameter and mapping table parameter in sequence.

Suma

6.2.2.1 Setting of GBE network parameter

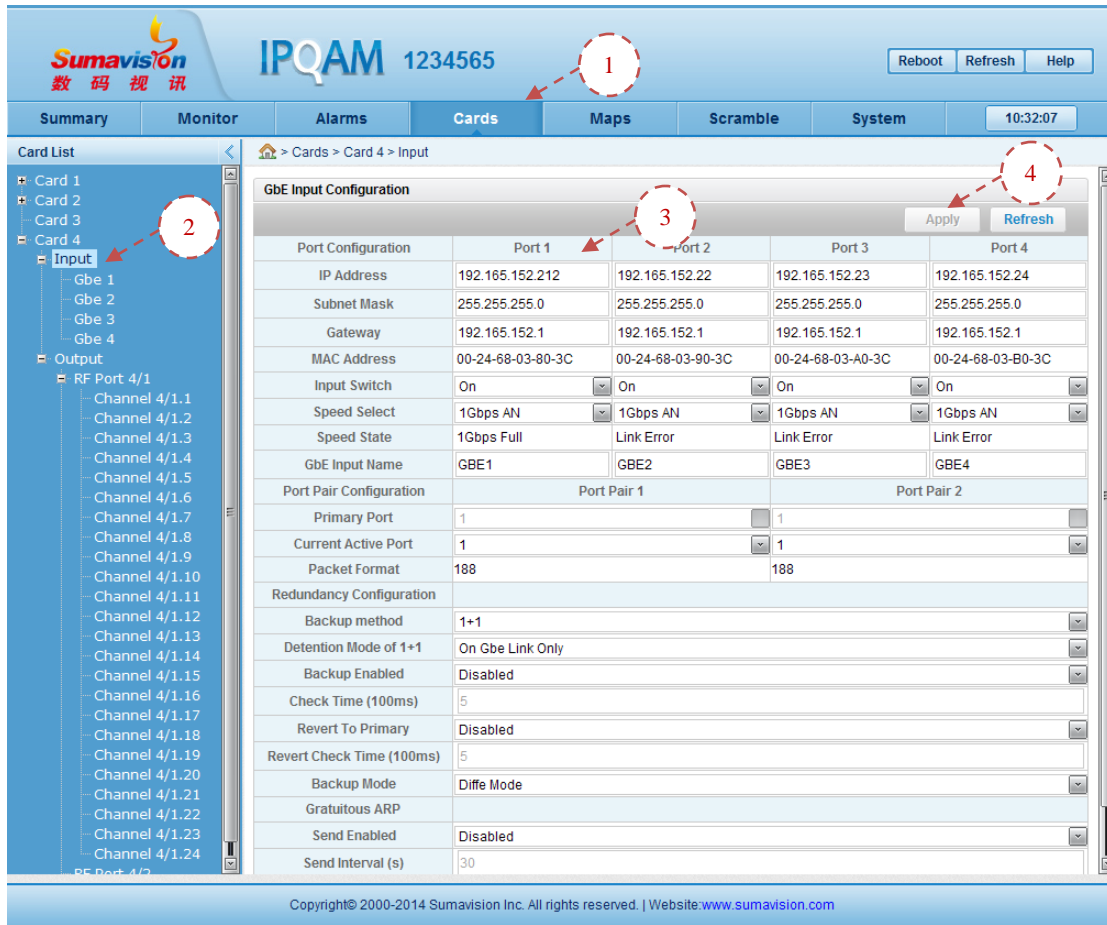


Figure 6-5 Setting of network parameter of input interface

- Step 1:** click [Card Setting] in WEB network management to enter card parameter setting page;
- Step 2:** click input corresponding to modulation card in the tree list on the left of WEB network management;
- Step 3:** set network parameters (IP, subnet mask, gateway, channel switch and speed selection) of the input channel;
- Step 4:** Click [Settings] on the page to bring the parameter settings into effect.

Table 6-2 GBE network parameter list

Name of parameter	Parameter range	Default
IP Address	Unicast IP excludes 127.XXX.XXX.XXX	192.165.152.151
Subnet Mask	Legal subnet mask address	255.255.255.0
Gateway	Unicast excludes 127.XXX.XXX.XXX, and it must be in the same segment with this internet access IP	192.165.151.1
Input Switch	On/Off	On
Speed Select	Auto-Negotiation/1Gbps AN/1Gbps Full/100Mbps Full/100Mbps Half/10Mbps Full/10Mbps Half/	1Gbps AN
Gbe Input Name	Legal set name	GBE1
Packet Format	188/204	188
Gratuitous ARP Send Enabled	Enabled/Disabled	Disabled
Gratuitous ARP	0~65535	30

Send Interval		
Send IGMP Version	No Sending/IGMP_V1/ IGMP_V2/ IGMP_V3	No Sending

6.2.2.2 Setting of parameter of RF port

After the setting of the parameter of input internet access, click output in the left of the page and set the modulation output level, frequency range and port switch of RF port.

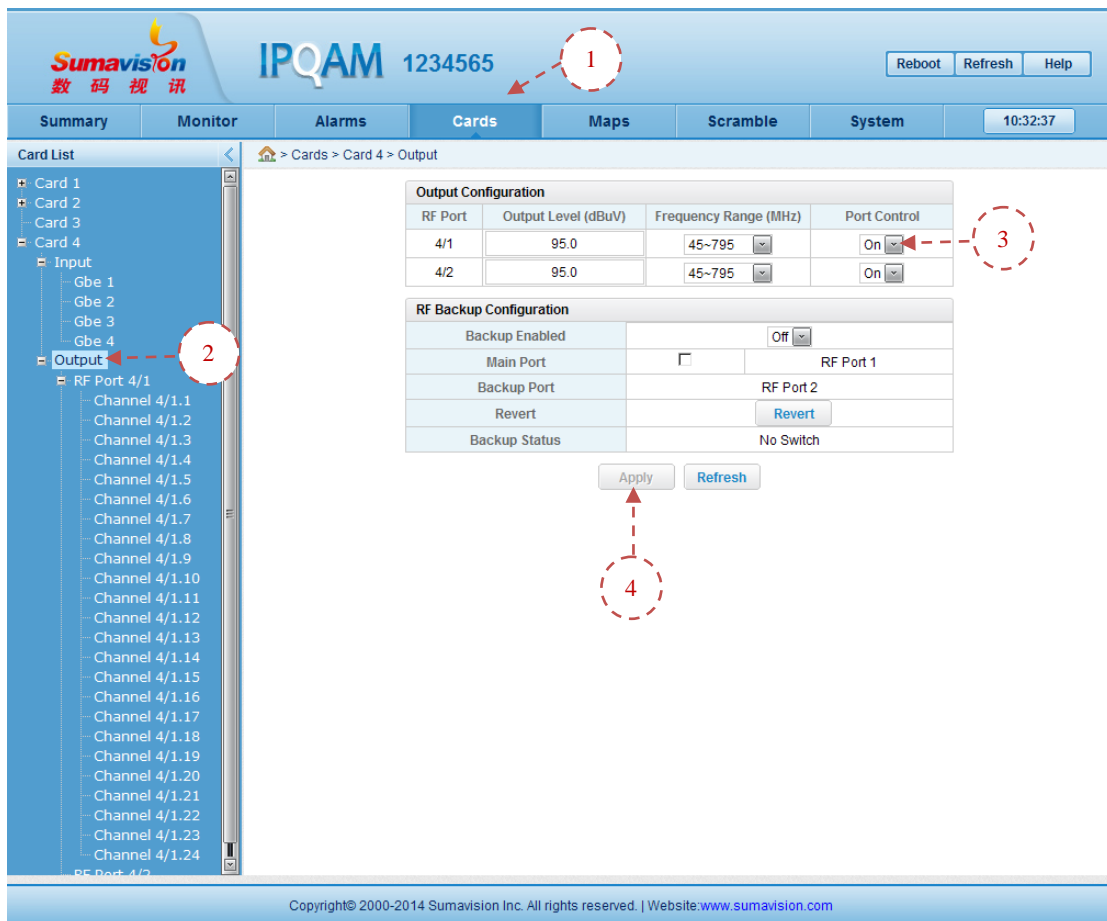


Figure 6-6 Setting of network parameter of input interface

- Step 1:** click [Card Setting] in WEB network management to enter card parameter setting page;
- Step 2:** click [Output] corresponding to modulation card in the tree list on the left of WEB network management;
- Step 3:** Turn on the used port switch, and set the output level and output frequency range of the port as planned.
- Step 4:** Click [Setting] on the page to bring the parameter settings into effect.

Table 6-3 RF port parameters List

Name of parameter	Parameter range	Default
Output Level	95~108.2dBuV (all optional board cards are different in maximum level)	95 dBuV
Frequency Range	45~1000Mhz	45~795
Port Control	On/Off	Off

6.2.2.3 Setting of parameter of frequency point of modulation output

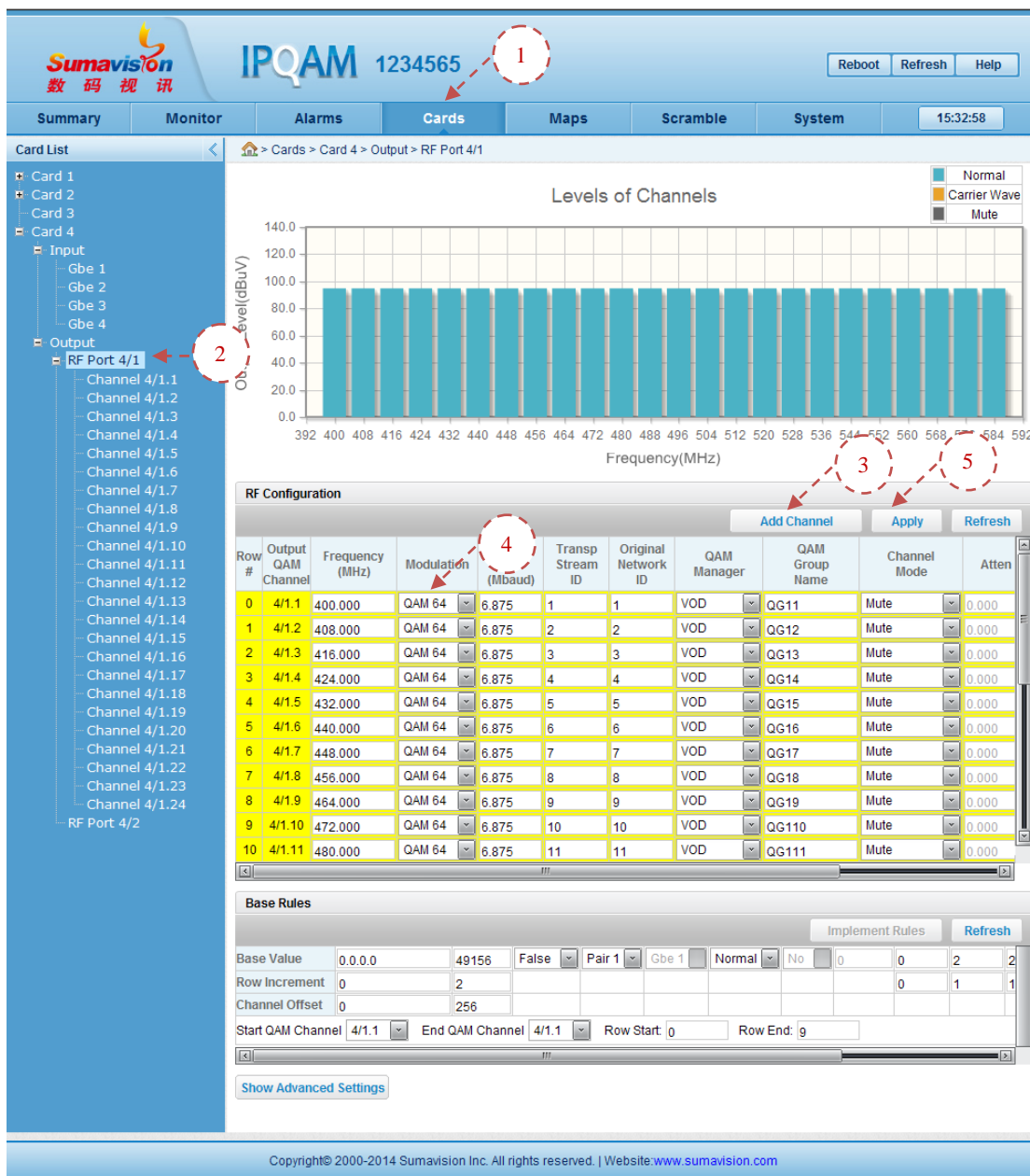


Figure 6-7 Frequency point adding and batch adding

- Step 1:** click [Card Setting] in WEB network management to enter card parameter setting page;
- Step 2:** click RF port corresponding to modulation card in the tree list on the left of WEB network management;
- Step 3:** click [Add Frequency Point] to manually add frequency point;
- Step 4:** set frequency point output QAM parameter to be planned value (frequency, QAM mode and symbol rate);
- Step 5:** Click [Setting] on the page to bring the parameter settings into effect.

⚠ 1. After adding the frequency point, the parameter line is green in default and may be yellow after modifying the frequency point parameter. Once the frequency point mode is selected to be deleted, the parameter line may be red;

2. The frequency point increment indicates the information of the port increment among various frequency points, such as setting the target IP increment as 0 and UDP port increment as 256.

Table 6-4 Added frequency point parameter list

Name of parameter	Parameter range	Default
Frequency	45~1000Mhz	100 Mhz
Modulation	QAM64/QAM128/QAM256	QAM64
Symbol Rate	3.5~7Mbaud	6.875
Transp Stream ID	0~65535	n
Original Network ID	0~65535	n
QAM Manager	VOD/Broadcast/S_VOD	VOD
QAM Group Name	Legal group name	QG1n
Chanel Mode	Normal/Mute/Carrier Wave/Delete	Mute
DTS Adjust	Enabled/Disabled	Disabled
SDV	Yes/No	No
Starting UDP Port	0~65535	0

Instructions to batch adding of frequency point

When adding more frequency points with regular frequency point increment, the batch adding function will be recommended to use to set the starting value of various items and the increment information of various frequency points, set the start and end frequency points and click settings after applying regularly. Namely, add multiple frequency points at one time.

The screenshot displays the 'Channel' configuration window. On the left, a list of channels from 4/1.8 to 4/1.24 is shown. The main table lists 11 channels with columns for Output QAM Channel, Frequency (MHz), Modulation, Symbol Rate (Mbaud), Transp Stream ID, Original Network ID, QAM Manager, QAM Group Name, Channel Mode, and Atten. Below the table is the 'Base Rules' configuration panel, which includes fields for Base Value, Increment, Offset, and various checkboxes. A 'Show Advanced Settings' button is located at the bottom of the panel. Red dashed circles with numbers 1 through 5 are overlaid on the interface to indicate key settings for batch adding: 1 points to the 'Implement Rules' button, 2 points to the 'Increment' field (set to 256), 3 points to the 'Row Start' field (set to 4/1.1), 4 points to the 'Normal' modulation dropdown, and 5 points to the 'Channel Mode' dropdown (set to Mute).

Figure 6-8 Batch adding of frequency point

Step 1: set starting value (frequency, QAM mode and symbol rate) of bath adding of frequency

point in batch rule on the frequency point adding page, select VOD for QAM management, and normal for frequency point mode;

Step 2: set frequency point increment in batch rule on the frequency point adding page;

Step 3: set start frequency point and end frequency point in batch rule on the frequency point adding page (different modulation cards cause different frequency points added at most);

Step 4: click [Application Rule] to bring the rule into effect;

Step 5: Click [Setting] on the page ,frequency point adding comes into effect.

Table 6-5 Batch adding frequency point parameter list

Name of parameter	Parameter range	Default
Frequency Base Value	45~1000Mhz	95 dBuV
Modulation Base Value	QAM64/QAM128/QAM256	45~795
Symbol Rate Base Value	3.5~7Mbaud	6.875
Transp Stream ID Base Value	0~65535	n
Original Network ID Base Value	0~65535	n
QAM Manager Base Value	VOD/Broadcast/S_VOD	VOD
QAM Group Name Base Value	Legal group name	QG1n
Chanel Mode Base Value	Normal/Mute/Carrier Wave/Delete	Mute
DTS Adjust Base Value	Enabled/Disabled	Disabled
SDV Base Value	Yes/No	No
Starting UDP Port Base Value	0~65535	0
Frequency Channel Offset	1~10Mhz	8
Transp Stream ID Channel Offset	0~65535	1
Original Network ID Channel Offset	0~65535	1
Starting UDP Port Channel Offset	0~65535	0
Start QAM Channel	1.1~1.n	1.1
End QAM Channel	1.1~1.n	1.1

6.2.2.4 Setting of parameter of mapping table

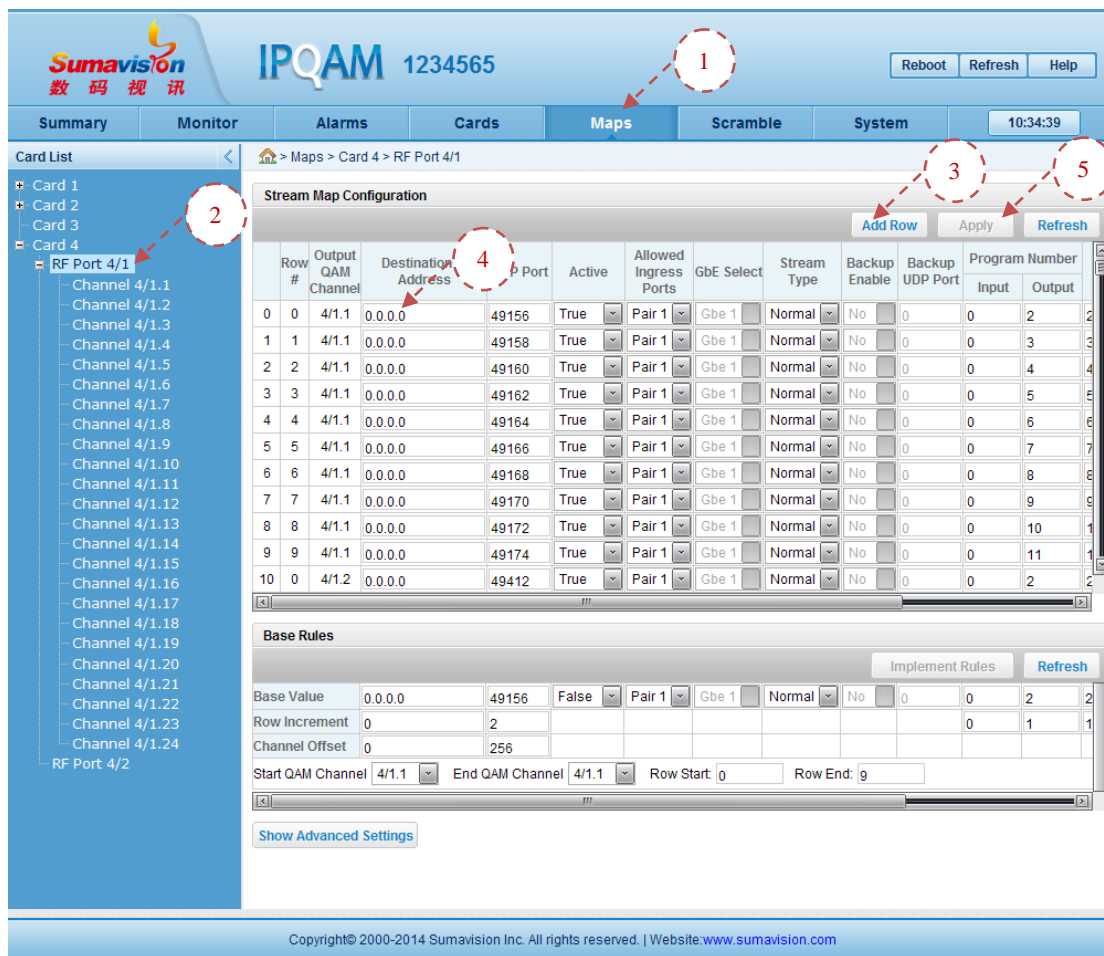


Figure 6-9 Port adding and batch adding

- Step 1:** click [Setting of Mapping Table] on WEB network management to enter mapping table setting page;
- Step 2:** click RF port corresponding to modulation card in tree list on the left of WEB network management;
- Step 3:** click [Add Port] to manually add port;
- Step 4:** Set port receiving parameters (target IP address, UDP port and the like) according to front code stream sending value;
- Step 5:** Click [Setting] on the page to bring the parameter settings into effect.

Table 6-6 Adding port parameter list

Name of parameter	Parameter range	Default
Destination IP Address	Legal IP Address	0.0.0.0
UDP Port	1~65535	49156
Active	True/False/Delete	6.875
Allowed Ingress Ports	Pair1/ Pair2	Pair1
Gbe Select	GBE1/ GBE2	GBE1
Stream Type	Normal/DataP/DataR/Data	Normal
Backup Enable	Yes/No	No
Backup UDP Port	1~65535	0

Program Number Input	0~65535	0
Program Number Output	0~65535	n
PMV	0~510	0
Data Rate Enable	Yes/No	No
Data Rate	0~200000kbps	0
Switch Rate	0~200000kbps	0

Instructions to port batch adding:

When adding more ports with regular port increment, the batch adding of the port may also be performed by using the basic batch rule at the bottom of the page. Fill in the various starting values of the port, increment of each line and among various frequency points, set the information of start frequency point, end frequency point, start line and end line information, and click settings after applying regularly. Namely, add multiple ports at one time.

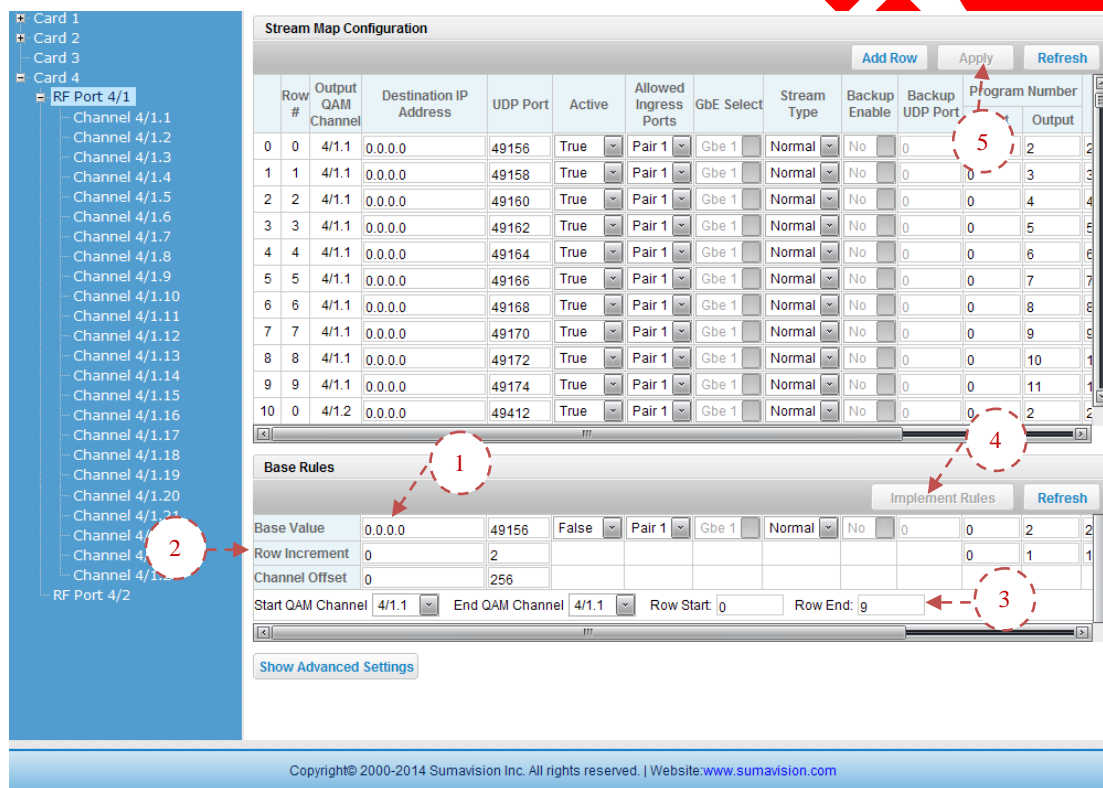


Figure 6-10 Batch adding for port

- Step 1:** set starting value of port adding parameter in batch setting rule on port adding page;
- Step 2:** set line increment and frequency point increment;
- Step 3:** set start frequency point and end frequency point, and set start line and end line;
- Step 4:** click [Application Rule] to bring the rule into effect;
- Step 5:** Click [Setting] on the page ,port adding comes into effect.

Table 6-7 Batch adding port parameter list

Name of parameter	Parameter range	Default
Destination IP Address Base Value	Legal IP Address	0.0.0.0
UDP Port Base Value	1~65535	49156

Active Base Value	True/False/Delete	6.875
Allowed Ingress Ports Base Value	Pair1/ Pair2	Pair1
Gbe Select Base Value	GBE1/ GBE2	GBE1
Stream Type Base Value	Normal/DataP/DataR/Data	Normal
Program Number Input Base Value	1~65535	0
Program Number Output Base Value	1~65535	2
PMV Base Value	0~510	2
Data Rate Enable Base Value	Yes/No	No
Data Rate Base Value	0~200000kbps	0
Destination IP Address Row Increment	0~999	0
UDP Port Row Increment	0~999	2
Program Number Input Row Increment	0~999	0
Program Number Output Row Increment	0~999	1
PMV Row Increment	0~999	1
Destination IP Address Channel Offset	0~999	0
UDP Port Channel Offset	0~999	256
Start QAM Channel	1.1~1.n	1.1
End QAM Channel	1.1~1.n	1.1
Row Start	0~63	0
Row End	0~63	9

- ⚠ 1. The line increment refers to the increment information among various ports in the same frequency point, such as setting the line increment of the target IP as 0 and the UDP port interval as 2. The increment of the mapping input program number is 0, the increment of the output program number is 1, and the PMV increment is 1;
2. The frequency point increment indicates the information of the port increment among various frequency points, such as setting the target IP increment as 0 and UDP port increment as 256.

After setting the parameters of the mapping table, be able to enter [Card Monitoring Information] page to check the input and output information of the modulation card. In case the parameter setting is correct and program source is at normal state, the input information of various ports and the modulation output information of various frequency points may be seen under the normal situation of the program source. At the moment, get access to Set Top Box to receive output of modulator and decode to watch program.


6.2.3 Broadcast mode operation

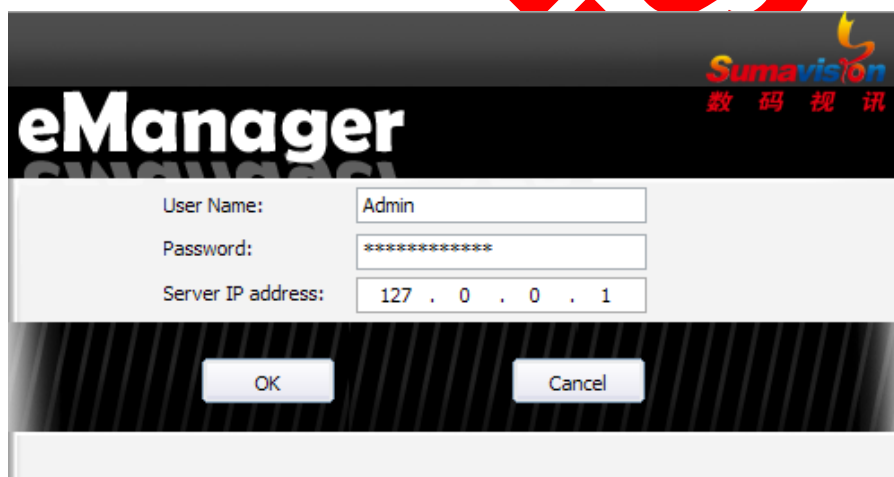
When using the broadcast mode of the equipment, set the GBE network parameter, RF port parameter, modulation output frequency point parameter and mapping table parameter to be consistent with VOD mode operation. In case of only adding the frequency point, set as Broadcast in the QAM management item. At the moment, the front end will send multi-program streams to the device receiving port.

In the event of using the broadcast mode, firstly, set the network parameter, add the frequency point and receive the port information, and receive the program stream at the front end. Then, use the IPQAM network management system to do multiplexing and publication setting. Firstly, install the eManager network management system in the network management computer, create and configure database, and then use the eManager network management to refresh IPQAM broadcast mode and set multiplexing.

The operating steps are as follows:

- 1) Open the network management

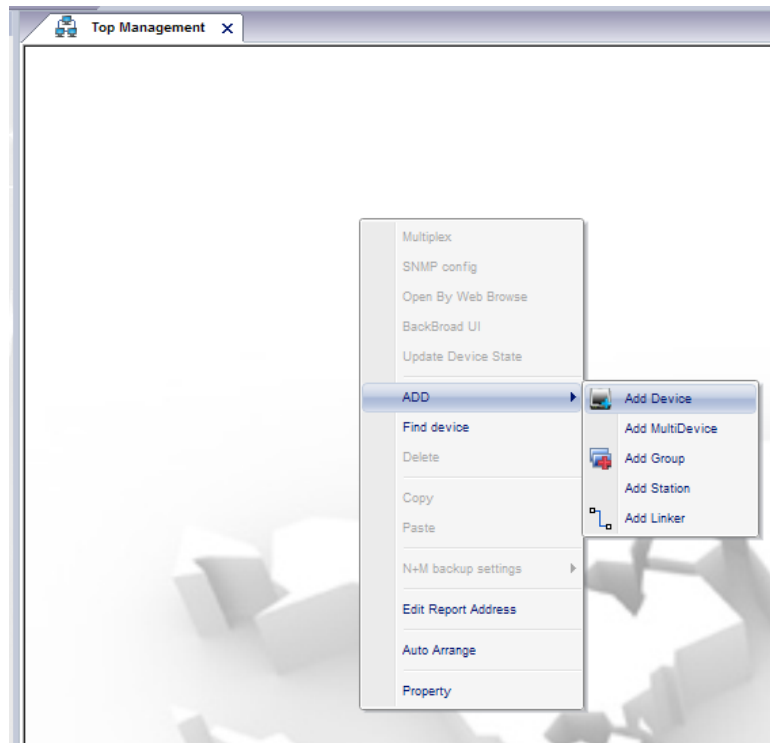
Double click eManager procedure  in desktop, fill IP address of network management data server, username and password, and then click Confirm to log in network management (username is Admin, and the initial password is sumavisionrd).



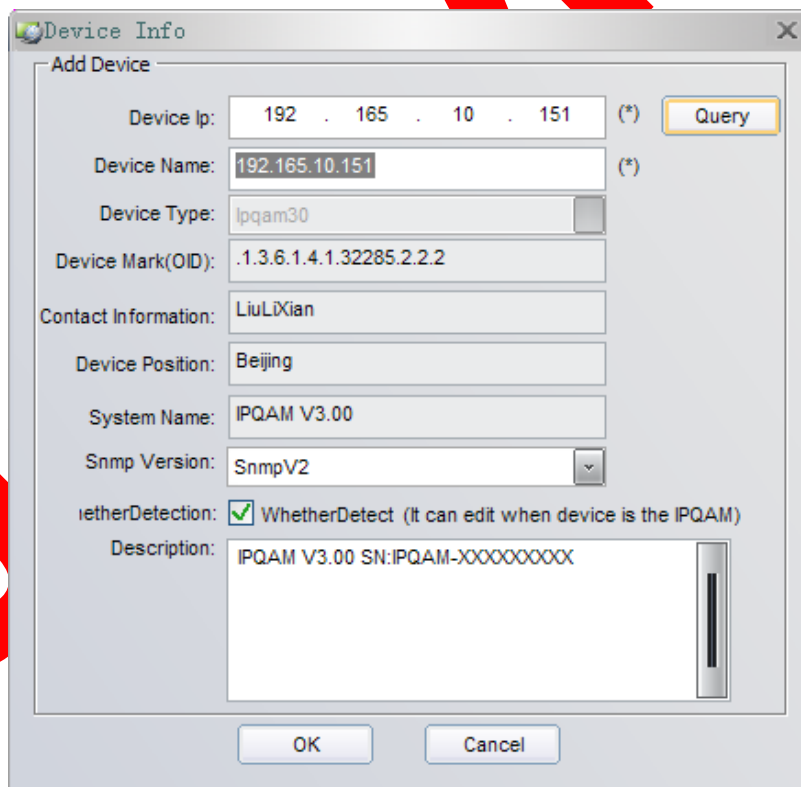
User Name:	Admin
Password:	*****
Server IP address:	127 . 0 . 0 . 1

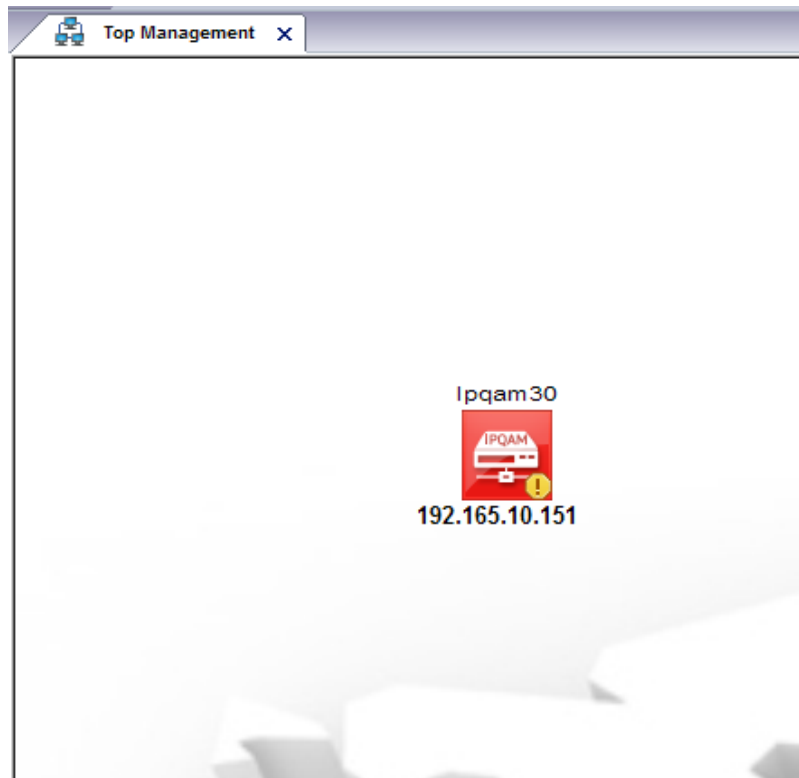
OK Cancel

- 2) Add equipment
 - a. Click on the right of the mouse in the blank space, and select the Add Device under ADD

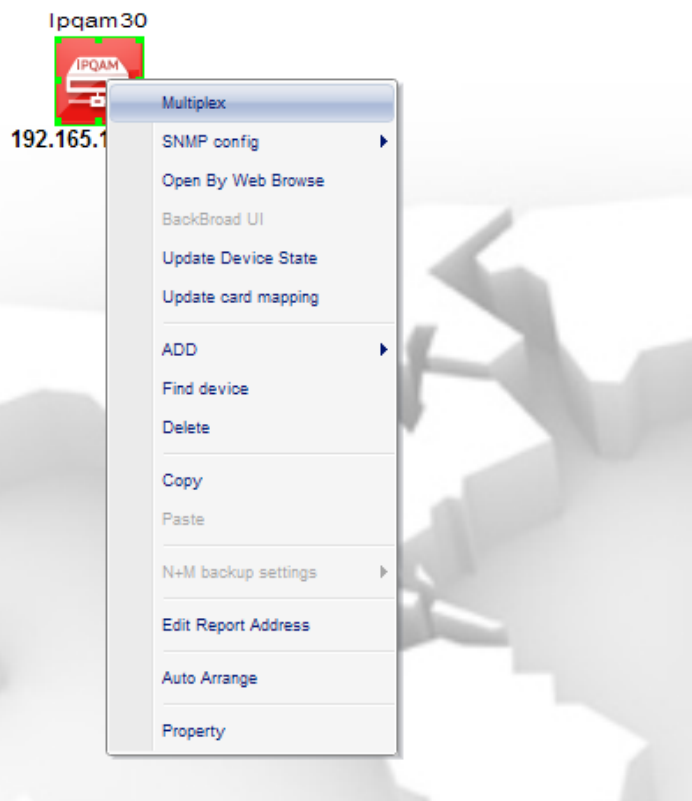


b. After correctly inputting equipment IP in the frame of adding equipment, click on Query, input the equipment name, and click on OK.

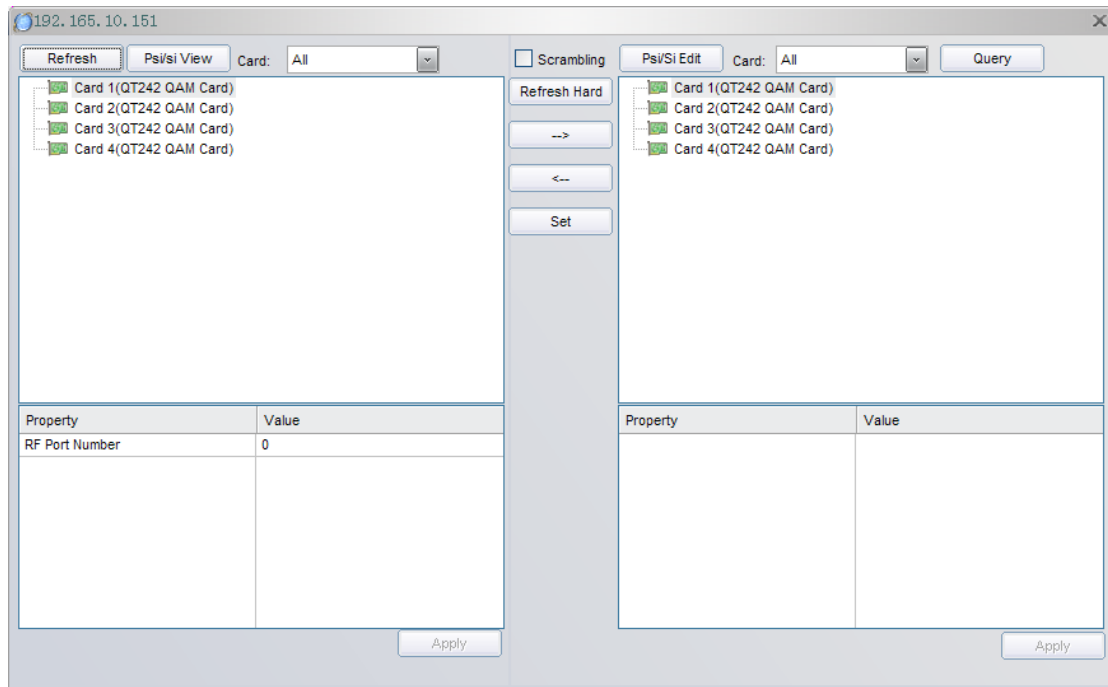




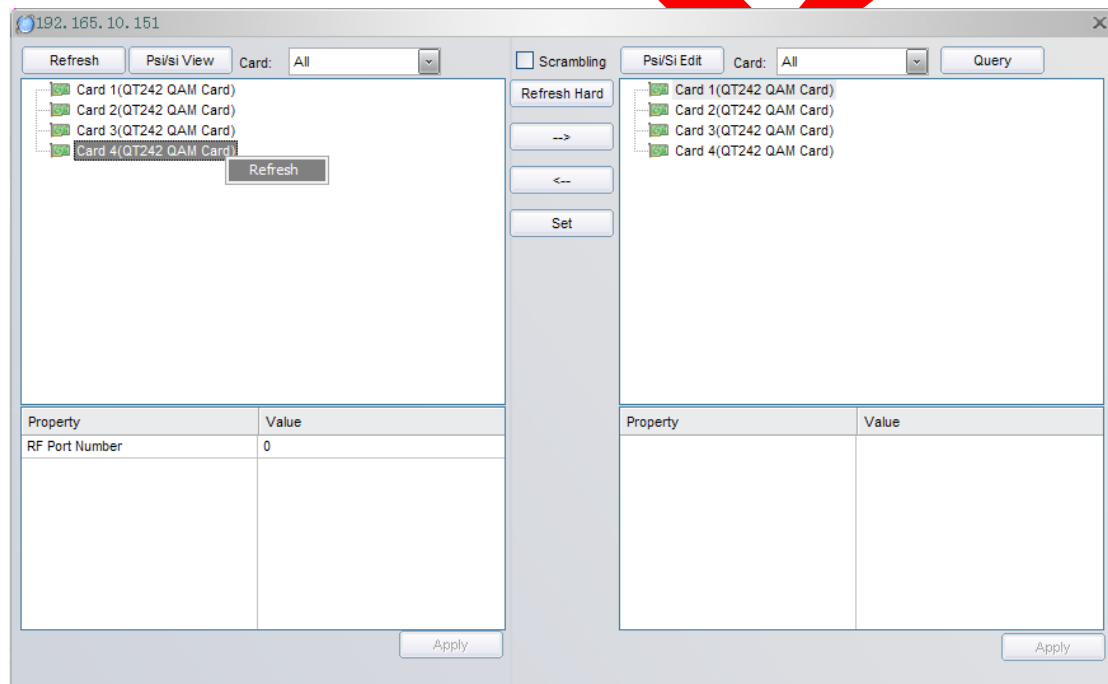
- 3) Network management multiplexing
 - a. Click on the right of the mouse in the device space, and select Multiplex



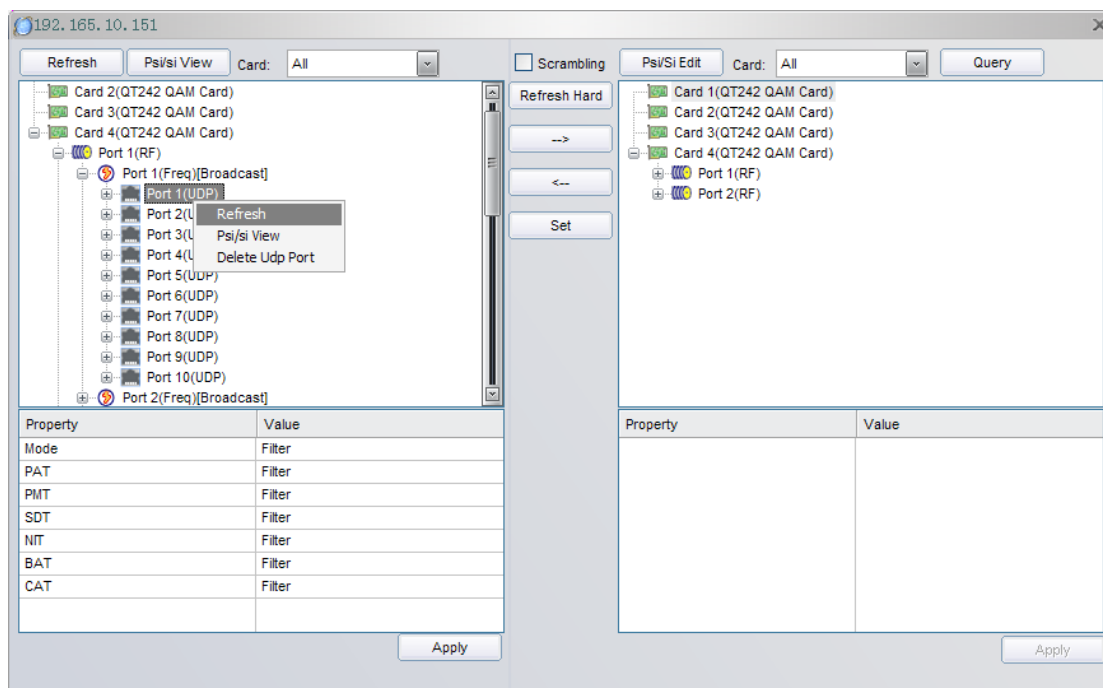
- b. After multiplexing setting interface is popped up on the network management, click refresh hardware in the interface to refresh equipment input/output hardware.


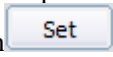
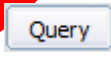


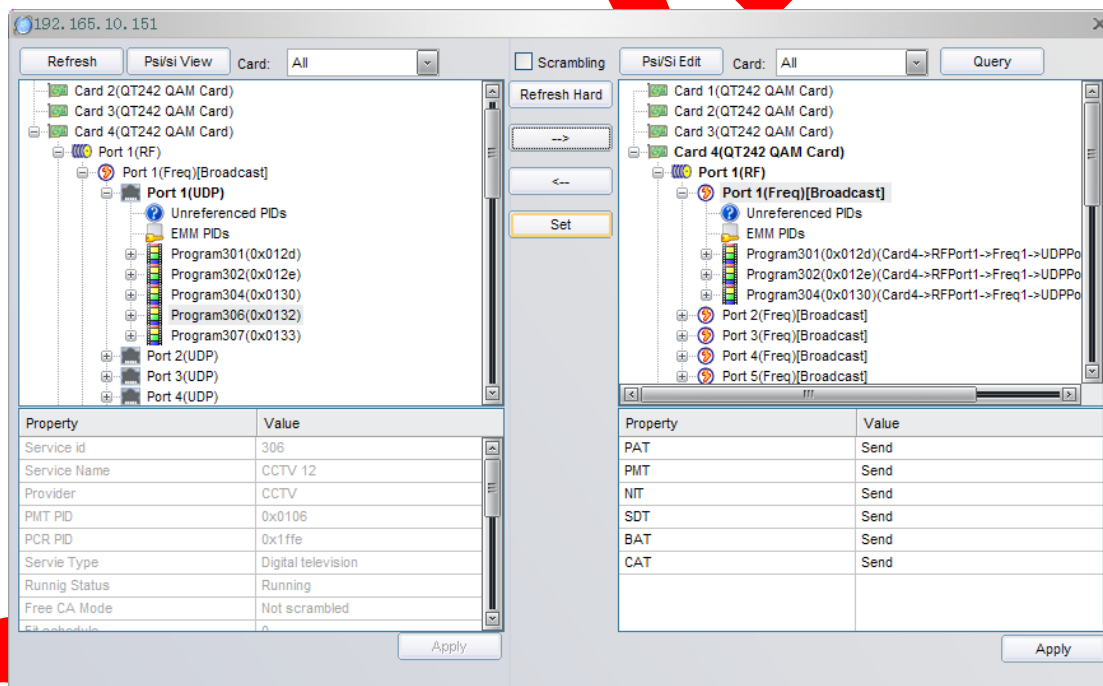
- c. Click the board card to be multiplexed, right click card tree node, and click refresh to refresh the parameters of the daughter card.



- d. Right click port to be multiplexed, click refresh to refresh the input list.



e. Select the program to be multiplexed, click on , multiplex the corresponding frequency point at the right, click on , click on inquiry button  at the right upper angle after setting to check for correct setting.



6.2.4 Backup function

IPQAM equipment of Beijing Sumavision Technologies Co., Ltd. provides so many backup functions, including input access backup, UDP port backup, RF output backup, modulation card backup and equipment backup. The backup function is implemented together with the front end equipment of Sumavision to realize relatively high stability and reliability. The setting of various backup functions of the equipment is described sequentially as follows.

6.2.4.1 Setting of input access backup

Input access backup is namely that two Gigabit accesses in one input group of IPQAM can realize backup. In case of abnormal transmission in main line, the backup line input can be adopted to ensure output stability.

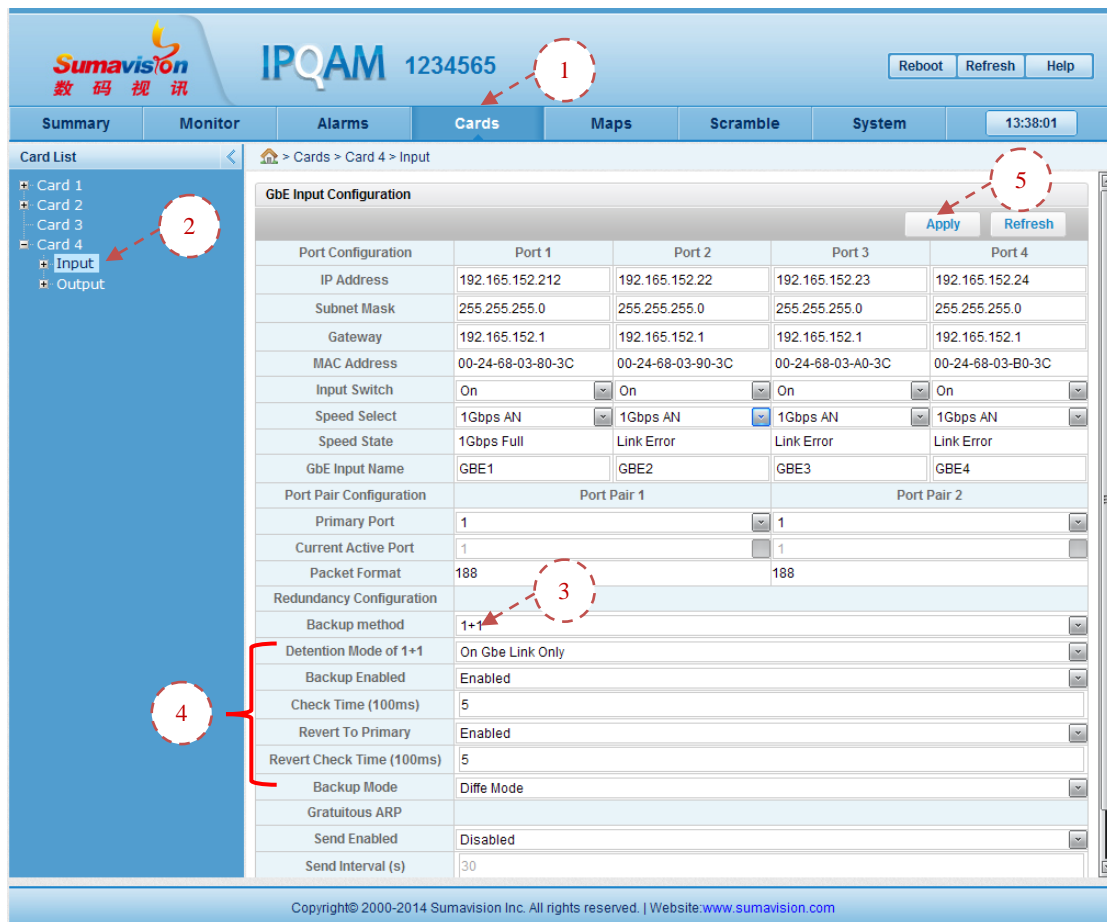


Figure 6-11 Setting of input access backup

- Step 1:** click [Card Setting] on WEB network management to enter card parameter setting page;
- Step 2:** click [Input] corresponding to modulation card in the tree list on the left of WEB network management;
- Step 3:** select 1+1 for backup mode;
- Step 4:** select switching condition for backup, select backup enable to be Yes, set failback main channel enable to be Yes, set switching time and failback time, and select different backup modes;
- Step 5:** Click [Setting] on the page to bring the parameter settings into effect.

Table 6-8 Access backup parameter list

Name of parameter	Parameter range	Default
Primary Port	1/2	1
Backup method	UDP/1+1/LOOP	1+1
Detention Mode of 1+1	On Gbe Link Only/ On Gbe Link With IP/ On Gbe Link With UDP	On Gbe Link Only
Backup Enabled	Enabled/Disabled	Disabled
Check Time	0~999	5
Revert To Primary	Enabled/Disabled	Disabled

Revert Check Time	0~999	5
Backup Mode	Diffe Mode/Same Mode	Diffe Mode

6.2.4.2 Setting of input UDP port backup

Input UDP port backup is namely that different UDP receiver ports in one input of IPQAM can realize backup. In case of abnormality in input of main UDP port, the input of the UDP port of the backup line can be used to ensure output stability.

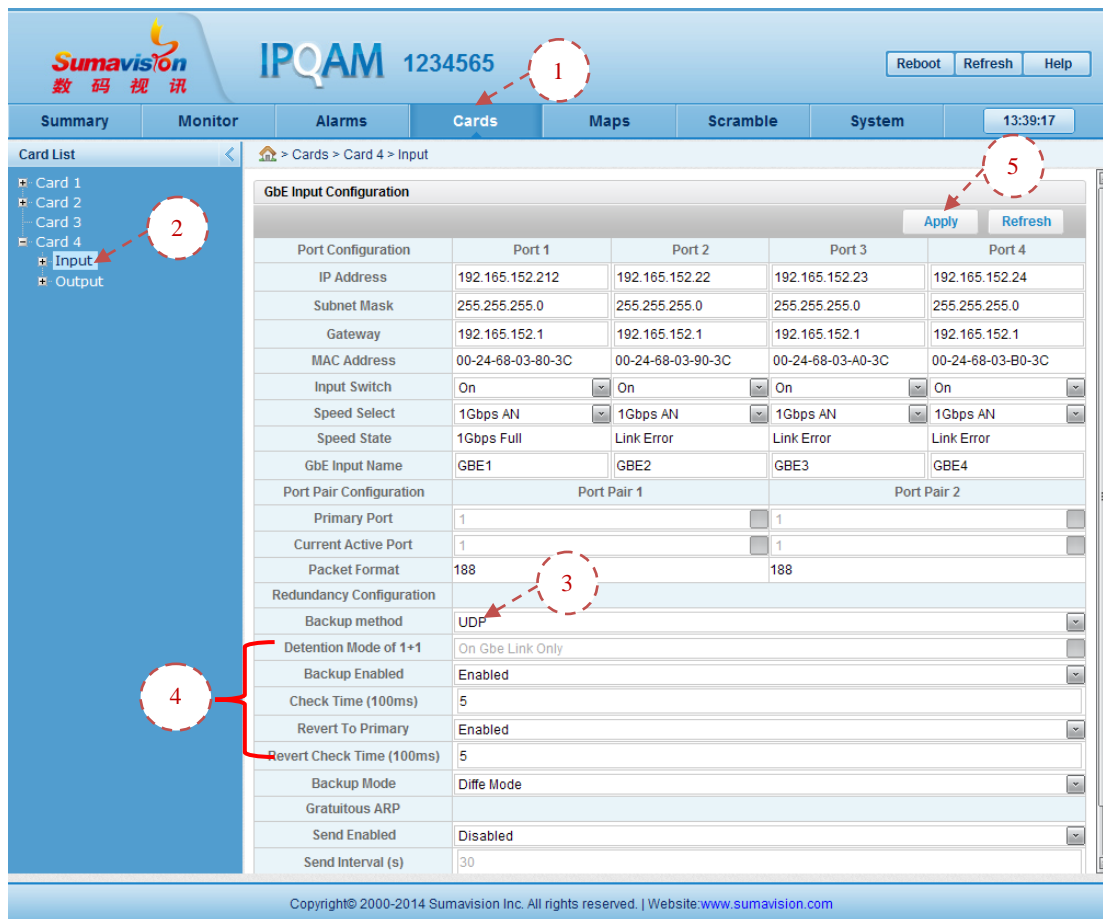


Figure 6-12 Setting of UDP port backup 1

- Step 1:** click [Card Setting] on WEB network management to enter card parameter setting page;
- Step 2:** click [Input] corresponding to modulation card in the tree list on the left of WEB network management;
- Step 3:** select UDP for backup mode;
- Step 4:** select backup enable to be Yes, set failback main channel enable to be Yes, set switching time and failback time, and select different backup modes;
- Step 5:** Click [Setting] on the page to bring the parameter settings into effect.

Table 6-9 UDP port backup parameter list 1

Name of parameter	Parameter range	Default
Primary Port	1/2	1
Backup method	UDP/1+1/LOOP	1+1
Detention Mode of 1+1	On Gbe Link Only/ On Gbe Link With IP/ On Gbe Link With UDP	On Gbe Link Only
Backup Enabled	Enabled/Disabled	Disabled

Check Time	0~999	5
Revert To Primary	Enabled/Disabled	Disabled
Revert Check Time	0~999	5
Backup Mode	Diffe Mode/Same Mode	Diffe Mode

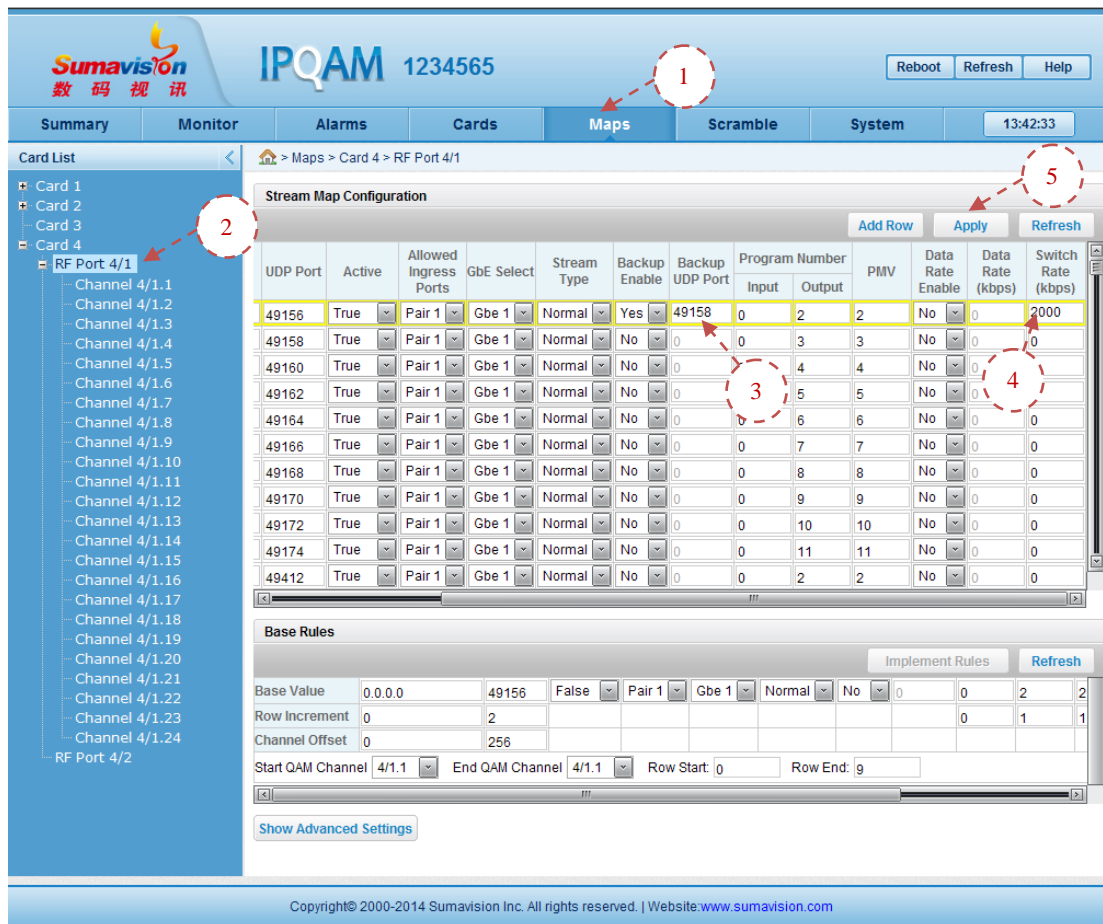


Figure 6-13 Setting of UDP port backup 2

- Step 1:** Click [Setting of Mapping Table] on WEB network management to enter mapping table setting page;
- Step 2:** click RF output port corresponding to modulation card in the tree list on the left of WEB network management;
- Step 3:** select backup line port (backup line UDP port) needing UDP backup, select backup enable to be Yes, fill backup UDP port value (UDP port value of main line);
- Step 4:** set backup switch code rate of UDP port;
- Step 5:** Click [Setting] on the page to bring the parameter settings into effect.


 The UDP port of which the backup enable is selected to be Yes serves as the backup line of the rear UDP port value, namely, UDP port 49158 as shown in Figure. 6-21 Setting of UDP port backup 2 serves as the main port, 49156 serves as the backup port; the input stream of the 49158 port of the main line is used for the output under normal condition. If the 49158 is abnormal, the input may switch to 49156. After the 49156 is returned to normal, automatic failback may be performed to use the input stream of 49158 port.

Table 6-10 UDP port backup parameter list 2

Name of parameter	Parameter range	Default
Backup Enable	Yes/No	No
Backup UDP Port	0~65535	0
Switch Rate	0~213000	0

6.2.4.3 Setting of access loop out

Access loop out is namely that the second line access in some input group of IPQAM may output the input stream of the first line access in the manner of loop-out, and the front end input stream may be analyzed without influencing later output.

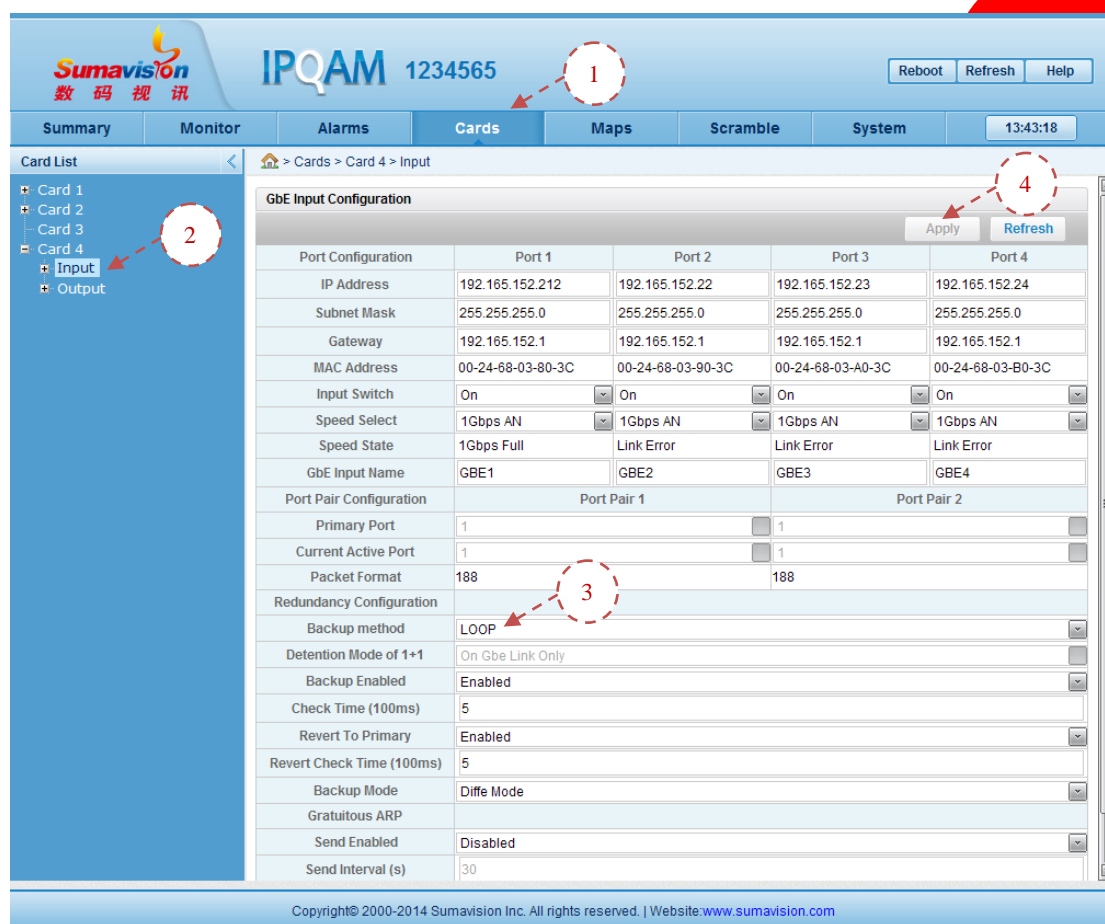


Figure 6-14 Setting of access loop out

- Step 1:** click [Card Setting] on WEB network management to enter card parameter setting page;
- Step 2:** click [Input] corresponding to modulation card in the tree list on the left of WEB network management;
- Step 3:** select LOOP for backup mode;
- Step 4:** Click [Setting] on the page,the input stream of GBE1 in some input group can be output through GBE2

Table 6-11 Access loop-out parameter list

Name of parameter	Parameter range	Default
Backup method	UDP/1+1/LOOP	1+1

Backup Enabled	Enabled/Disabled	Disabled
----------------	------------------	----------

6.2.4.4 RF Output port backup

RF output port backup is namely that RF output port of IPQAM may enable the RF output of the last line to be used as the backup line. In case of abnormality in output of main RF, the backup RF port output may be switched and put into use so as to ensure output stability.

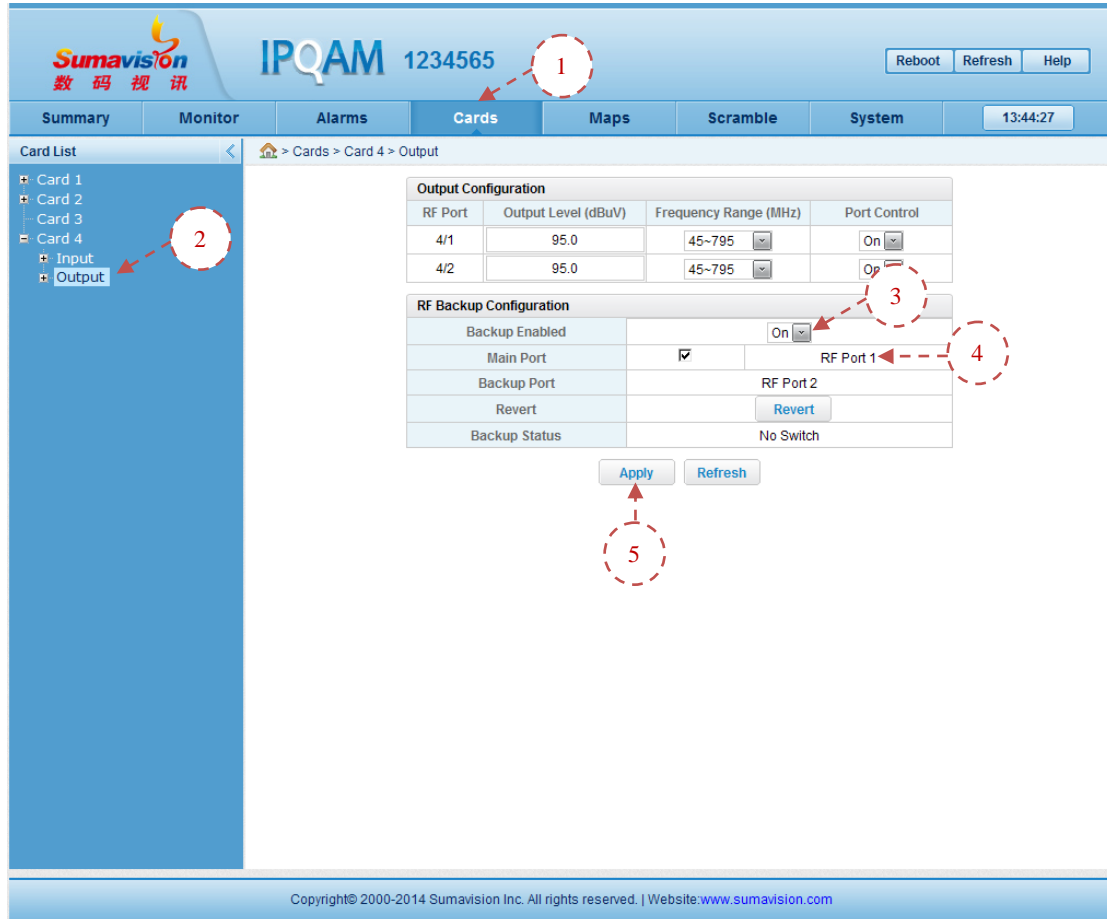


Figure 6-15 Setting of RF port backup

- Step 1:** click [Card Setting] on WEB network management to enter card parameter setting page;
- Step 2:** click [Output] corresponding to modulation card in the tree list on the left of WEB network management;
- Step 3:** select backup enable in the RF backup setting to be Yes;
- Step 4:** tick main port;
- Step 5:** Click [Setting] on the page to bring the parameter settings into effect.


 RF output backup may switch to use backup line output in case of abnormality in main line. After the main line is recovered, the equipment may not be automatically switched to use the main line output, the switch button as shown in Figure 6-23 Setting of RF port backup shall be manually clicked to manually switch to the main line.

Table 6-12 RF output port backup parameter list

Name of parameter	Parameter range	Default
Backup Enabled	On/Off	Disabled
Main Port	Option RF Port 1	Not ticked
Backup Port	RF Port 2	RF Port 2
Revert	Revert switch	Non-revert
Backup Status	Status indication	No Switch

6.2.4.5 Backup of board card

The backup of board card of IPQAM may realize 1+1 backup and 1+n backup at board card level.

1+1 backup of board card is namely that cards 1 and 2 (or 3 and 4) may be used as a backup group to realize backup at board card level. In case of abnormality in board card of the main line, the output of the backup line board card may be switched and put into use so as to ensure output stability.

1+n backup of board card is namely that the modulation card 4 is specified as the backup card, the board cards 1, 2 and 3 can be specified as the main cards for realizing backup. In case of abnormality in board card of the main line, the output of the backup line board card may be switched and put into use so as to ensure output stability.

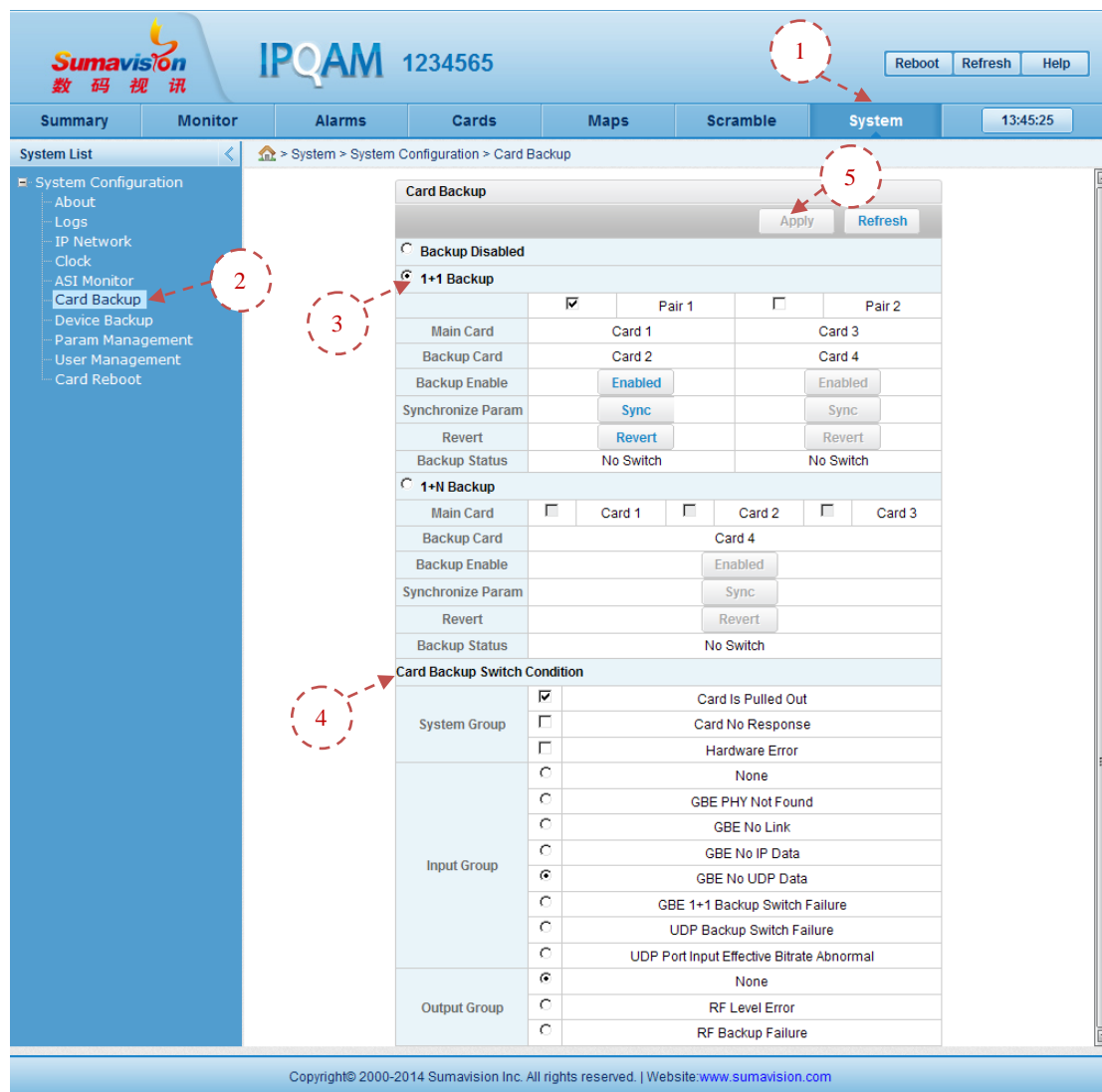


Figure 6-16 Setting of 1+1 backup of board card

Step 1: click [System Setting] on WEB network management to enter system parameter setting page;

Step 2: click [Card Backup] in system configuration tree list;

Step 3: click to select [1+1 Backup]

Step 4: tick switch condition for 1+1 backup of board card;

Step 5: Click [Setting] on the page to bring the parameter settings into effect.

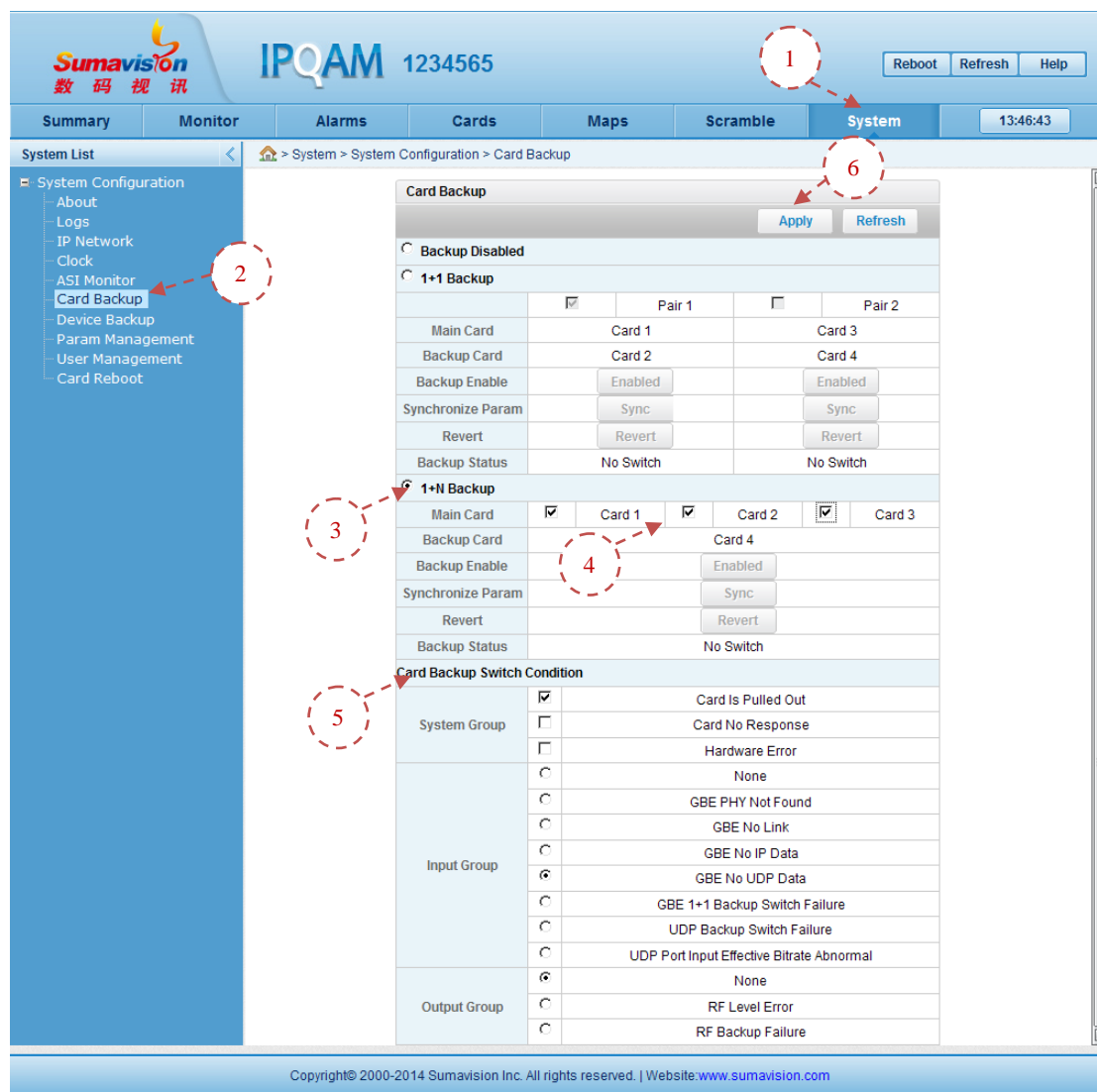


Figure 6-17 Setting of 1+n backup of board card

- Step 1:** click [System Setting] on WEB network management to enter system parameter setting page;
- Step 2:** click [Card Backup] in system configuration tree list;
- Step 3:** click to select [1+n Backup]
- Step 4:** tick main line board card;
- Step 5:** tick switch condition for 1+1 backup of board card;
- Step 6:** Click [Setting] on the page to bring the parameter settings into effect.


 Board card backup may switch to backup line board card to output in case of abnormality of main line board card. After the main line is recovered, the equipment may not automatically switch to main line to output, and the failback button as shown in Figure 6-24 Setting of 1+1 backup of board card shall be manually clicked to manually switch to the main line.

Table 6-13 Card backup parameter list

Name of parameter	Parameter range	Default
Card Backup Mode	Backup Disabled/1+1 Backup/1+n Backup	Backup Disabled
1+1 Backup Pair	Pair 1/Pair 2	Not ticked
1+n Backup Main Card	Card 1/ Card 2/ Card 3	Not ticked
Backup Enable	Option Enabled	Not ticked
Synchronize Param	Option Sync	Not ticked
Revert	Option Revert	Not ticked
Backup Status	Status indication	No Switch
Card Backup Switch Condition	System Group/Input Group/Output Group	Not ticked

6.2.4.6 Equipment backup

The equipment backup is namely that two IPQAM with the same configuration can realize backup at equipment level. In case of abnormal transmission of main equipment, the backup line equipment may be switched and put into use so as to ensure input/output stability at modulation level.

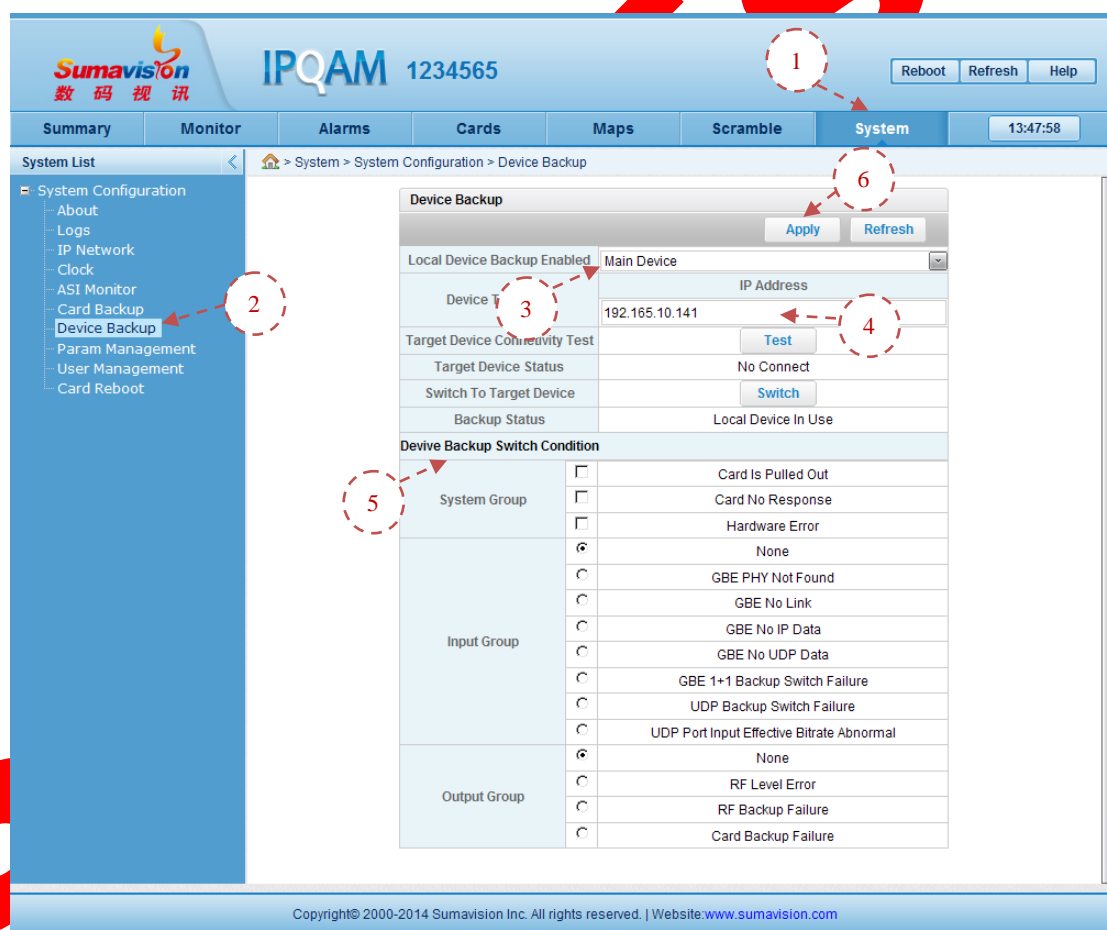


Figure 6-18 Setting of equipment backup

Step 1: click [System Setting] on WEB network management to enter system parameter setting page;

Step 2: click [Equipment Backup] in system configuration tree list;

Step 3: select main equipment for main line equipment, backup equipment for backup line equipment, according to the local backup enable;

Step 4: fill IP address of target equipment, fill IP address of backup line equipment for main line equipment, and fill IP address of main line equipment for backup line equipment;

Step 5: tick switch condition for equipment backup;

Step 6: Click [Setting] on the page to bring the parameter settings into effect.


 Equipment backup may switch to use the backup line equipment to output in case of abnormality of main line equipment. After the main line equipment is recovered, the equipment may not automatically switch to main line equipment to output, the switch button as shown in Figure 6-26 Setting of equipment backup shall be manually clicked to manually switch to the main equipment.

Table 6-14 Equipment backup parameter list

Name of parameter	Parameter range	Default
Local Device Backup Enabled	Disabled/Main Device/Backup Device	Disabled
Device To Switch IP Address	IP address of target equipment	0.0.0.0
Target Device Connectivity Test	Option Test	Not ticked
Target Device Status	Indication of connection state of target equipment	No Connect
Switch To Target Device	Option Switch	Not ticked
Backup Status	Indication of equipment backup state	Local Device In Use
Device Backup Switch Condition	System Group/Input Group/Output Group	Not ticked

Chapter 7 Fault analysis and troubleshooting

7.1 Alarm information

When the modulator operates abnormally, the status indicating lamp on the front panel turns to red for indicating the user. The user can preliminarily judge the reason for the alarm of the modulator through various parameters of [Alarms] menu on the WEB page and take corresponding treatment measures. When the user fails to solve the abnormal problem of the modulator, call the user service department of Beijing Sumavision Technologies Co., Ltd.

7.1.1 Alarm of backstage WEB network management

7.1.1.1 Backstage WEB network management fails to be in correct connection with the equipment

Fault cause:

- 1) The PC machine with the backstage WEB network management is not communicated with the network;
- 2) The equipment is not communicated with the network;

Solution:

- 1) Check the setting of the computer

Check whether the network connection is established via ping order that is in the form of "IP address (xxx.xxx.xxx.xxx) of ping equipment)".First, connect IP address of ping network management " ping xxx.xxx.xxx.xxx", if it is not communicated (return result is "Request time out"), it indicates the software and hardware of the computer are broken down; check whether the network adapter in WIN2000 "network" attribute is installed correctly and whether TCP/IP protocol is installed correctly. Check whether the network adapter is installed correctly through "equipment management", in "system" icon of WIN2000 "control panel", if the equipment has "exclamation mark" or "question mark", it indicates the equipment is not operated normally; reset the network adapter and the TCP/IP protocol, and restart the computer.(if change the network card configuration, restart the computer).

If possible, connect the two computers with PING opposite with cross-over cable; if successful, it indicates the network management computer and the reticle are correct.

- 2) Connect the reticle, the ETN light of the modulator shall turn on, the green light of the network card on the computer will turn on and the red light thereof will turn off.

If no, check the reticle firstly. Check the reticle through a multimeter to measure whether both ends of the recticle are communicated, pay attention to the difference between

cross-over cable and the standard reticle. (Note: reticles 1 and 2 shall be a pair of twisted pair cable, reticles 3 and 6 shall be a pair of twisted pair cable, which can transmit 60m generally; otherwise, the transmission distance will be limited greatly.)

If the reticle test is right, the reticle connector may not be contacted well, considering making it again.

For the system connected by a hub, check whether the hub works in order, for example whether the hub power supply is connected normally; the reticle connecting the network management or the modulator fails to insert into the port marked with "UPLINK"; if linking normally, the indicating light of the corresponding port on the hub shall turn on; otherwise, exchange the other jack to try again.

3) IP address of PING modulator on network management computer.

After the above two steps of test have been passed through, check the IP address of the PING modulator on the network management computer. If PING is not communicated, check whether the IP address of the equipment has been amended manually.

If PING order is normal but it fails to log in, the problem should occur on the main control panel or the host software.

7.1.1.2 Alarm information displaying: MainBoard SNTP Sync Error

Fault cause:

- 1) The SNTP Server IP Address isn't set correctly, when the clock synchronization is enabled;
- 2) The SNTP Server does not provide time synchronization.

Solution:

- 1) Modify the network management PC settings to provide time synchronization services to other devices within the network;
- 2) Click and enter the [System] page, click on the Clock at the left side, set the Main SNTP Server IP Address and Backup SNTP Server IP Address.

7.1.1.3 Alarm information displaying: Fan 1 Speed Too Low

Fault cause:

- 1) The cooling fan is not working properly;

Solution:

- 1) Click and enter the [Monitor] page, click on the Device Information at the left side, s check the fan speed, and then please contact with the customer service of Sumavision.

7.1.1.4 Alarm information displaying: Card 1 GBE1 PHY Not Found

Fault cause:

- 1) Card 1 channel 1 switch is open, but there is no module in the module socket 1;
- 2) The module in Card 1 channel 1 slot is damaged.

Solution:

- 1) Insert a SFP module for card 1 channel 1;
- 2) Replace with a new SFP module and observe whether the alarm disappears, if there is still an alarm, please contact with the customer service of Sumavision.

7.1.1.5 Alarm information displaying: input code rate is too high

Fault cause:

- 1) The effective input TS stream code rate of the equipment is too high;
- 2) The parameter setting of the equipment is incorrect.

Solution:

- 1) Recalculate the containable maximum code rate according to the setting of the different QAM modes and the symbol rates;
- 2) Confirm whether the selection of the modulator QAM mode and the setting of the symbol rate are reasonable;
- 3) Amend the front end equipment and set the reasonable input TS stream code rate.

7.1.1.6 Network management indicates that the temperature of the QAM card is too high

It is extremely possible that the cooling fan of the equipment stops working; please do troubleshooting in time.

7.1.2 Modulator part

7.1.2.1 Indicating light does not display after starting up

Fault cause:

- 1) The power line is not connected well;
- 2) The fuse on the power socket is blown out.

Solution:

- 1) Reconnect the power line;
- 2) Replace the fuse.

7.1.2.2 Alarm information display: no Gb input data

Fault cause:

- 1) Selection of the main channel of the Gb input interface of the equipment is wrong;
- 2) The Gb input signal line of the equipment is not connected or contacts worse;
- 3) Gb SFP receiving module is damaged;
- 4) The signal of the front-end equipment is broken down.

Solution:

- 1) Select correct main channel of the Gb input interface;
- 2) Collect or replace input Gb reticle;
- 3) Replace the SFP receiving module;
- 4) Confirm the Gb reticle is connected with effective program signal.

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Chapter 8 Maintenance

This chapter describes the troubleshooting methods of IPQAM 10K511 Modulator. In the routine maintenance, refer to the analysis method and processing method in this chapter for quick analysis, addressing, processing and troubleshooting. If a special failure cannot be solved according to the method described in this guidance, please contact the the Customer Service Department of Sumavision Technologies Co., LTD. for further technical support.

8.1 Maintenance method

To make the IPQAM modulator operate under the best operating status, extend the service life of device, discover and eliminate the potential problems in time, and ensure normal operation of the device, the routine maintenance must be carried out regularly.

The IPQAM modulator should be maintained according to the following rules.

- Must prepare for the detailed device maintenance target plan.

The IPQAM modulator should be checked and maintained every day. If not, some small failures will develop into worse, so proper daily inspection, monthly inspection, quarterly inspection and annual inspection plans should be developed according to the operation features of the device, including the maintenance and inspection class in every period (class I maintenance, class II maintenance and class III maintenance) and detailed maintenance contents.

- Appoint the maintenance person.

It is the key for the device maintenance. The combination mode of “one person inspection and several persons’ inspection” is recommended for the IPQAM modulator maintenance.

- Establish the device maintenance archive.

The individual maintenance archive should be kept since the IPQAM modulator is purchased till it is abandoned. The maintenance and repair should be recorded in details. The replaced and changed parts and wire should be marked on the circuit diagram and device maintenance archive, so the diagram is consistent with the actual device. Meanwhile, it can facilitate others to maintain and repair the device.

8.2 Maintenance details

The following details should be paid attention to in the routine maintenance of the IPQAM modulator device.

- The transmission device is of great importance, and should have trained person for the routine maintenance.

- Keep the site room clean, dustproof and damp-proof.
- Follow the “Device Maintenance Target Plan” for routine inspection and test of the device, and record the checking results.
- Wipe the dustproof mesh of the fan every week. If the surface temperature of the device is too high, check whether the dustproof mesh of the fan is blocked.
- The device is inspected according to the specifications & instruction manual of Sumavision Technologies Co., Ltd. The man-made accident should be prevented.
- Wear the anti-static bangle when operating the device hardware.
- The connection between other devices in the cabinet and the IPQAM modulator should not be plugged-in or unplugged freely; to plug-in or unplug the connection, you’re required to mark the original location for plugging.
- If the IPQAM modulator can be controlled in the control center by using the network management software, the network management password of the IPQAM modulator should be strictly managed and regularly changed, which is only distributed to the responsible maintenance person. The administrator password can only be known by the responsible maintenance person.
- Installing other software in the computer for network management system transmission and playing games with such computer are strictly prohibited; the computer with network management system should be installed the real-time virus detection software for regular virus killing.
- The computer with network management system uses UPS for power supply and regular data backup will be conducted.
- Don’t reset the device easily and change the service data.
- For any alarm with unidentified reasons, please contact the After-sales Technical Support Department of Sumavision Technologies Co., Ltd.

8.3 Routine maintenance

Refer to Table 8-1 for routine maintenance.

Table 8-1 Routine maintenance

Maintenance type	Maintenance contents	Operation guide	Reference standard	Reference maintenance hour (manxhour)
Inspect external environment	Power supply in site room (DC/AC)	Check the power monitoring system or test the power output voltage.	The voltage output is normal. The power gives no abnormal alarm.	0.05
	Temperature in site room	Measure temperature.	Temperature range: 5 °C-40 °C; 15 °C-30 °C is recommended	
	Humidity in site room	Measure relative humidity.	Relative humidity: 20%-80%; 40%-65% is recommended.	
Inspect the device operation status.	Indication status of the device panel	Observe the indicator of the device panel.	Normally the power indicator, operation indicator and Gigabit indicator keep on.	0.1
Inspect the device operation status.	State of official telephone (2-3 times a month)	Test call situation.	Site selection call and conference call can be normal.	0.1
Network management maintenance contents	Log on the network management system	Low-level users log on the network management system, and it is proposed each maintenance personnel have an account.	Network management system can log in normally.	0.1
	Alarm inspection	The alarm query and view function of the network management system are used to view current and historical alarm.	Unknown alarm in the system.	0.3
	Monitoring of performance events	The performance data query of the network management system is used to inquire the current and historical performance data.	The performance of equipment is reported normally.	0.5

Maintenance type	Maintenance contents	Operation guide	Reference standard	Reference maintenance hour (manxhour)
	Log query	Use the operation log query of the network management system.	No attempt to log on the network management system; No unknown data change operations.	0.05

8.4 Monthly maintenance

Refer to Table 8-2 for monthly maintenance.

Table 8-2 Monthly maintenance

Maintenance type	Maintenance contents	Operation guide	Reference standard	Reference maintenance hour (manxhour)
Inspect external environment	State the cooling holes in the cabinet	View the state of cooling holes	It should be clean around the cooling holes, with no debris	0.1
Network management maintenance content	Inspect the start-up and closing of the network management system	Start, shut down network management software and computer.	It should be in both normal start-up and shutdown.	0.05
	Change the login password of the network management users	Change the user's password every month.	Change the password every month.	0.05
	Maintenance of network computers	Check the directory and the hard disk space, and antivirus.	Contents and documents are normal, with no illegal files (such as games), and the hard disk space is sufficient.	0.5
	Status of a variety of hardware interface	Check the working conditions of the mouse, keyboard, monitor, printer and others.	It can be normally used.	0.05

8.5 Quarterly Maintenance

Refer to Table 8-3 for quarterly maintenance.

Table 8-3 Quarterly maintenance

Maintenance type	Maintenance contents	Operation guide	Reference standard	Reference maintenance hour (manxhour)
Inspect the cabinet cleanness	Inspect the cabinet cleanness	Observe the inside and outside the cabinet.	The cabinet surface is clean. There is no much dust inside the cabinet. Otherwise, the cabinet should be cleaned	0.5
Inspect the device cleanness	Inspect the device cleanness	Observe device surface	There no much dust outside the device. Otherwise, it should be cleaned. Watch out the external wiring of the device in cleaning.	0.5

8.6 Annual Maintenance

Refer to Table 8-4 for annual maintenance.

Table 8-4 Annual maintenance

Maintenance type	Maintenance contents	Operation guide	Reference standard	Reference maintenance hour (manxhour)
Inspect grounding, ground cable and power lead connection	Check the earth resistance	Use the earth resistance tester for testing.	The joint grounding resistance is less than 1 ohm.	1
	Check the ground cable connection.	Inspect whether the ground cable is reliably and securely connected to the ground cable group of the office.	(1) The connection is secure and reliable. (2) No wire aging exists. (3) No erosion exists on the ground cable group, with proper anti-corrosion.	0.2
	Inspect the power lead connection	Inspect whether the power lead is reliably and securely connected to the power lead of the office.	(1) The connection is secure and reliable. (2) No wire erosion and aging exist.	0.2

8.7 Clean-up and maintenance

Pay attention to the following contents for the clean-up and maintenance of the device.

- Clean the working site; wipe the device shell with a soft cloth. The water can not be penetrated into the device.
- Do not plug in and out all connection cables with current without instructions.
- Check whether the cable is pressed or pulled by the heavy object, whether the plug and socket are connected tightly, ensure that the cable is not extruded by the external force and is placed in order. The connection part is under good contact.
- Check whether the device and cable label are missing and incorrect. Keep the label intact and correct.
- Check whether the engineering document is complete and correct. Keep the

engineering document complete for check at any time.

8.8 Operation and maintenance

Pay attention to the following contents for the maintenance when the device is operating.

- Check whether the ground cable and power supply are normal. Ensure the power supply works properly before turning on the power.
- Sequence for starting the device: start the power supply of peripheral devices, and power on the cabinet, and ensure the device for signal input works normally before starting the IPQAM modulator.
- Sequence for device shutdown: contrary to the sequence for starting the device. Power off the IPQAM modulator, and then other devices.
- Observe the indicators on front panel of the IPQAM modulator and observe the system running in the studio and the control room. In case of any abnormality, the maintenance instructions in this chapter can be referred for solution as soon as possible.
- Before the system is used, power on and inspect the system, adjust the peripheral device, and guarantee that the IPQAM modulator functions are normal.
- The local configuration can't be changed without instructions. The configuration can only be changed by the professional operator.
- Do not place the IPQAM modulator in highly noisy environment.

Chapter 9 Storage and Transport

9.1 Storage

Requirement:

Humidity: $\leq 95\%$ (20°C) ;

Temperature: -20°C ~ 60°C

Don't store with corrosive liquids and gases.

Don't place the device nearby strong electromagnetic fields.

Prohibit infection by radioactive substances.

9.2 Transport

The IPQAM modulator is packaged by using the special packaging of Sumavision. In case of intact packaging, such transportation modes like highway, railway, airline and shipping are acceptable. In case of damaged packaging, the device should be transported after being packaged by professional electronic product transportation companies.

During the transportation, the device should be handled gently to avoid throwing, falling or severe collision, and kept the labeling on the package upward.

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