HA-5231M User Manual

Version 1.1 , Mar 2017

Service and usage information for

HA-5231M

Written by Raiden Lan

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1. Introduction

HA-5231M is a private branch exchange (telephone switching system) that switches calls between VoIP (voice over Internet Protocol or IP) users. It allows the phones to talk to each other by voice and video and provide call detail records. These phones can be an IP phone, software phone, the ICPDAS HA-401, SI-002 and so forth. In addition, we also provide the utility software for users to management the **HA-5231M**. By using this module, users can manage their SIP phone easier and more flexible.

1.1. Features

> ➢ VoIP Protocol : SIP (Session Initiation Protocol)
> ➢ Audio Codec: PCMU, PCMA, GSM, G.722
> ➢ Video Codec: H.263p, VP8, H.264
> ➢ Support pass through video call
> ➢ Up to 256 extensions
> ➢ Up to 8 SIP trunk
> ➢ Call Detail Records
> ➢ Flexible Extension manager
> ➢ Provide network firewall functionality
> ➢ Operating Temperature: -25 ~ +75°C

1.2. Specification

System Software	
OS	Linux Kernel 3.2.14
Embedded Service	SIP, SSH
CPU Module	
CPU	AM3354, 1 GHz
DDR3 SDRAM	512 MB
Flash	512 MB
EEPROM	64 KB
Expansion Flash Memory	microSD socket with one 4 GB microSD card (support up to 32 GB microSDHC card)
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year
64-bit Hardware Serial Number	Yes, for Software Copy Protection
LED indicator	5 LEDs(PWR、RUN 、L0、L1、L2)
Rotary Switch	Yes (0~9)
Communication Ports	
Ethernet	10/100 Based-T (Auto-negotiating, Auto MDI/MDI-X, LED indicators)

USB 2.0 (host)	1
Console Port	RS-232 (RxD, TxD and GND); Non-isolated
ttyO2	RS-485 (Data+, Data-); Non-isolated
ttyO4	RS-232 (RxD, TxD and GND); Non-isolated
ttyO5	RS-485 (Data+, Data-); 2500 VDC isolated
Power	
Input Range	+12 VDC ~ +48 VDC
Consumption	4.8 W
Mechanism	
Installation	DIN-Rail
Dimensions	72mm x 33mm x 119mm (W x L x H)
Environment	
Operating Temp.	-25 ℃ ~ +75 ℃
Storage Temp.	-30 ℃ ~ +80℃
Humidity	10 ~ 90% RH, non-condensing

1.3. Overview

Here is a brief overview of the components and its descriptions. The details of these items are as follows:

VGA Port

microSD Socket

LED Indicators

LAN

USB Host

Pin Assignment
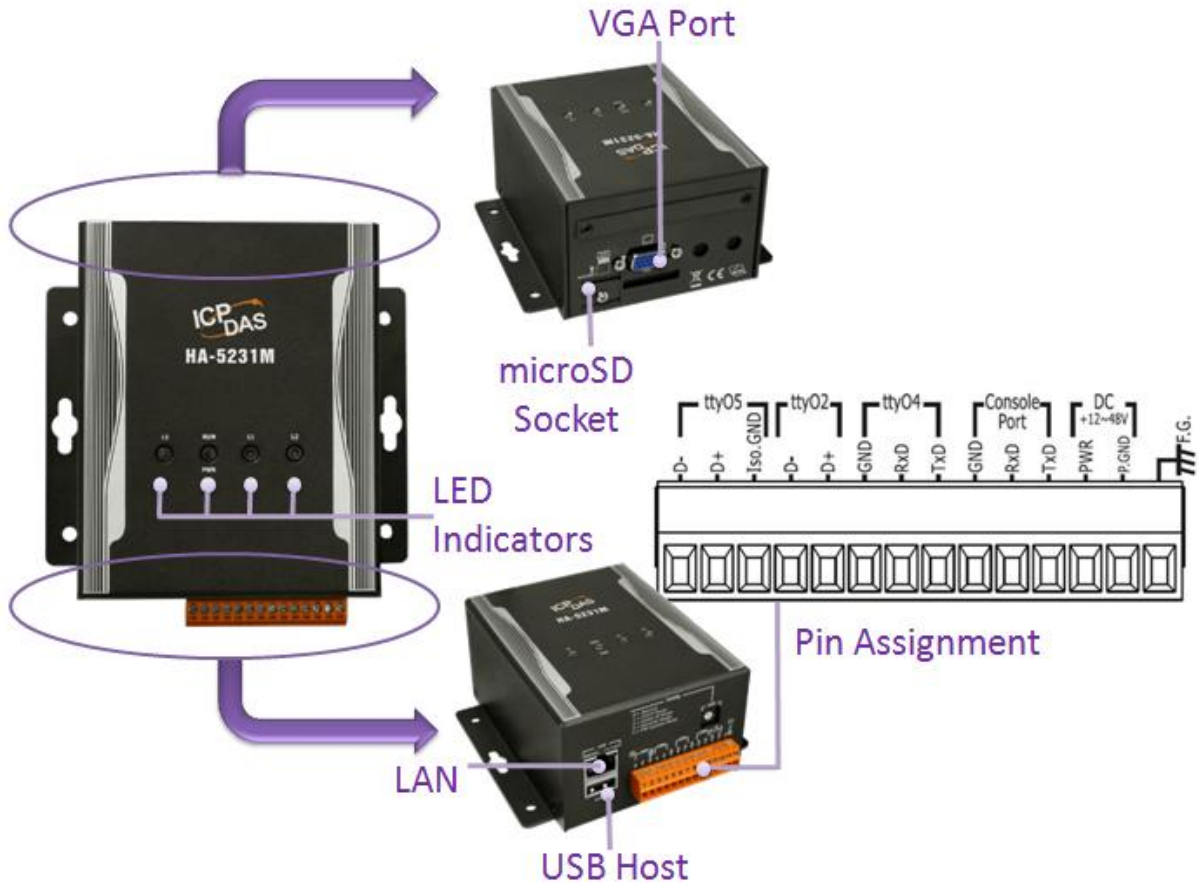
➤ LED Indicators

The HA-5231M module has 5 LED indicators. The details are shown as below..

LED Indicator	Color	Meaning
PWR	Green	Power is on
RUN	Red	Application is running

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L0	Green/Red	Reserve
L1	Green/Red	Reserve
L2	Green/Red	Reserve

➤ microSD Slot

The microSD slot can be used to restore the HA-5231M system, firmware update and expand the memory up to 32 GB.

➤ RSW (Rotary Switch)

Rotary Switch is an operating mode selector switch which provides seven functions related to the selection of the operating mode.


RSW Value	Function
0	Normal
1	Set network interface to DHCP mode
2	Set network interface to static IP mode. IP: 192.168.255.1 Mask: 255.255.0.0 Gateway: 192.168.0.254
3	Recover system settings

➢ Ethernet Port

The HA-5231M has an Ethernet port that can be connected to SIP communication network via an Ethernet cable. Ethernet ports accept cables with RJ-45 connectors.

➢ Pin Assignment

The pin assignments of the HA-5231M connector are as follows:
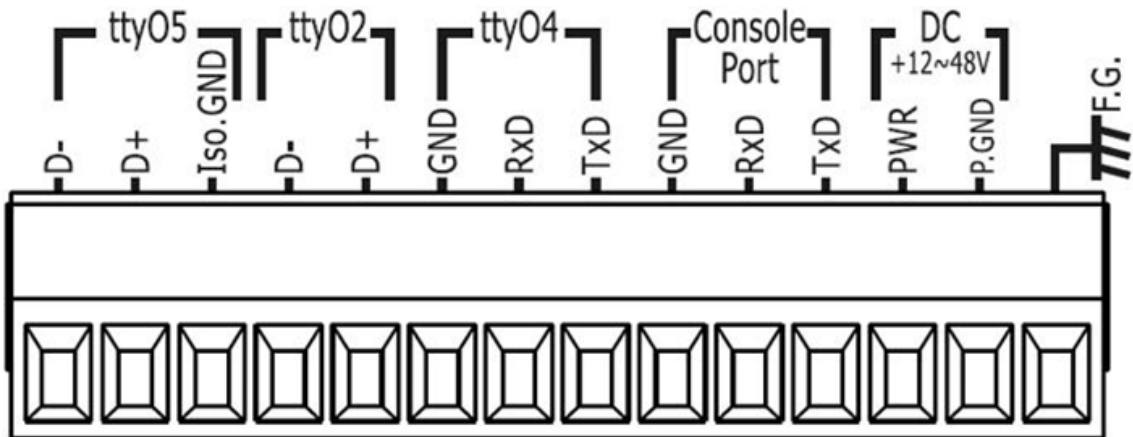
Pin	Name	Description
1	D-	
2	D+	ttyO5 (Reserve)
3	Iso.GND	
4	D-	ttyO2 (Reserve)
5	D+	
6	GND	
7	RxD	ttyO4 (Reserve)
8	TxD	
9	GND	Console Port
10	RxD	

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11	TxD	
12	PWR	V+ of Power Supply
13	P.GND	GND of Power Supply
14	F.G	Frame Ground

1.4. Dimensions

All dimensions are in millimeters.

Left Side View

Front View
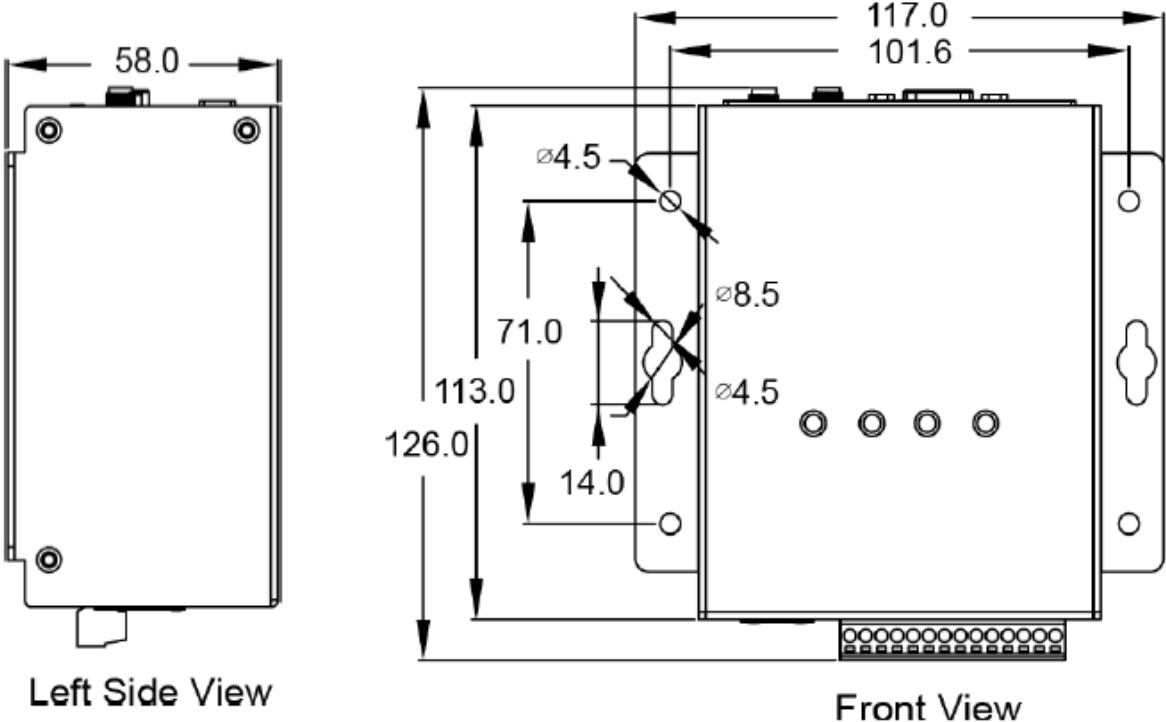
2. Getting Started

If you are a new user, begin with this chapter, it includes a guided tour that provides a basic overview of installing, configuring and using the HA-5231M.

Before starting any task, please check the package contents. If any of the following package contents are missing or damaged, contact your dealer, distributor.

HA-5231M   Software CD   CA-0910 Cable

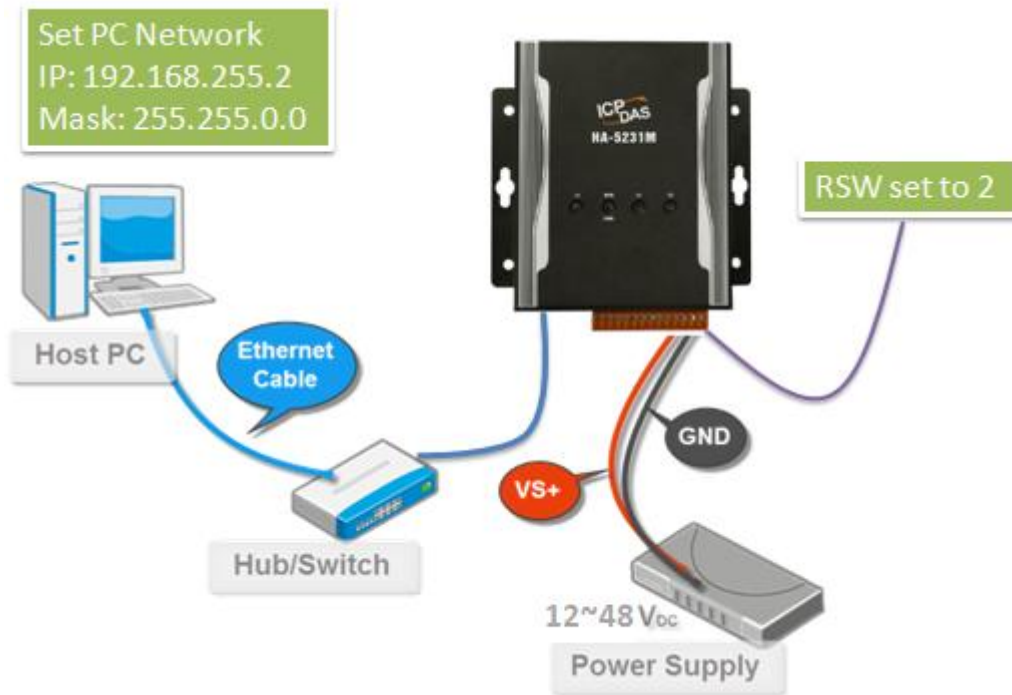Quick Start   Screw Driver   MicroSD Card

DIN-Rail Clip   Screw * 4   Terminal * 16

2.1. Connecting to Network, PC and Power

The HA-5231M is equipped with an RJ-45 Ethernet port for connection to an Ethernet hub/switch and PC. Please set RSW of HA-5231M and PC Network as below.

2.2. Installing the MicroSIP Utility

The MicroSIP Utility is a open source portable SIP softphone based on PJSIP stack for Windows OS. The user can use this Utility to connect with HA-5231M.
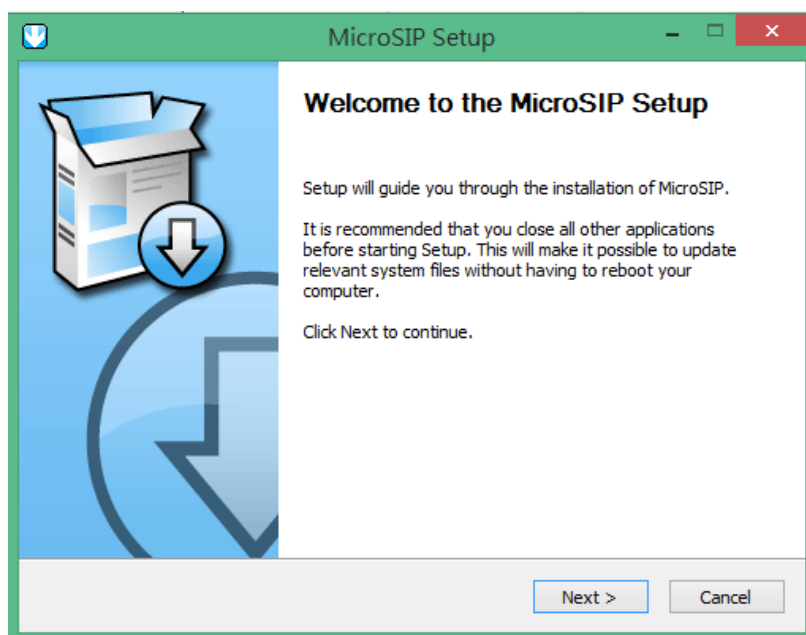
Step 1: Get the MicroSIP Utility tool

The MicroSIP Utility can be obtained from below link:
http://www.microsip.org/downloads

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Step 2: Follow the prompts to complete the installation
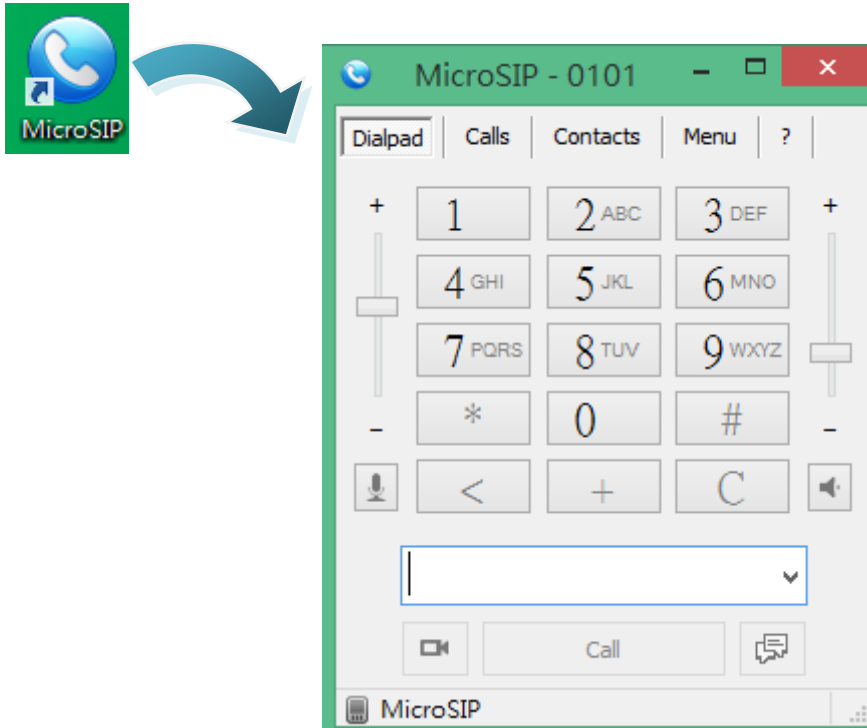

2.3. Using MicroSIP Utility connect to HA-5231M

When RSW of HA-5231M set to 7, HA-5231M will use a default IP settings to connect PC. The default IP settings are as follows:

HA-5231M	
IP Address	192.168.255.1
Subnet Mask	255.255.0.0

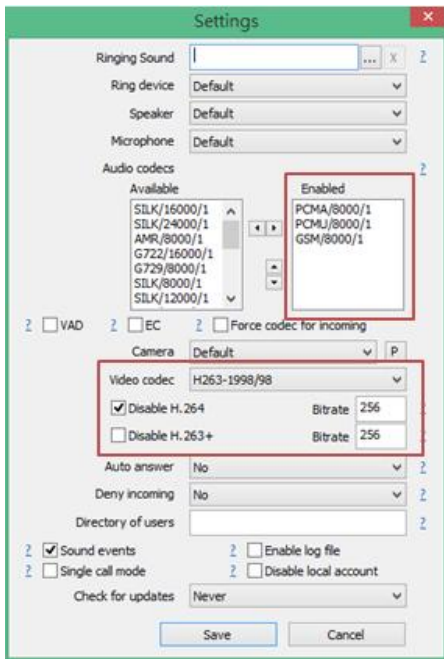| PC side	
IP Address	192.168.255.2
Subnet Mask	255.255.0.0

Step 1: Run the MicroSIP Utility

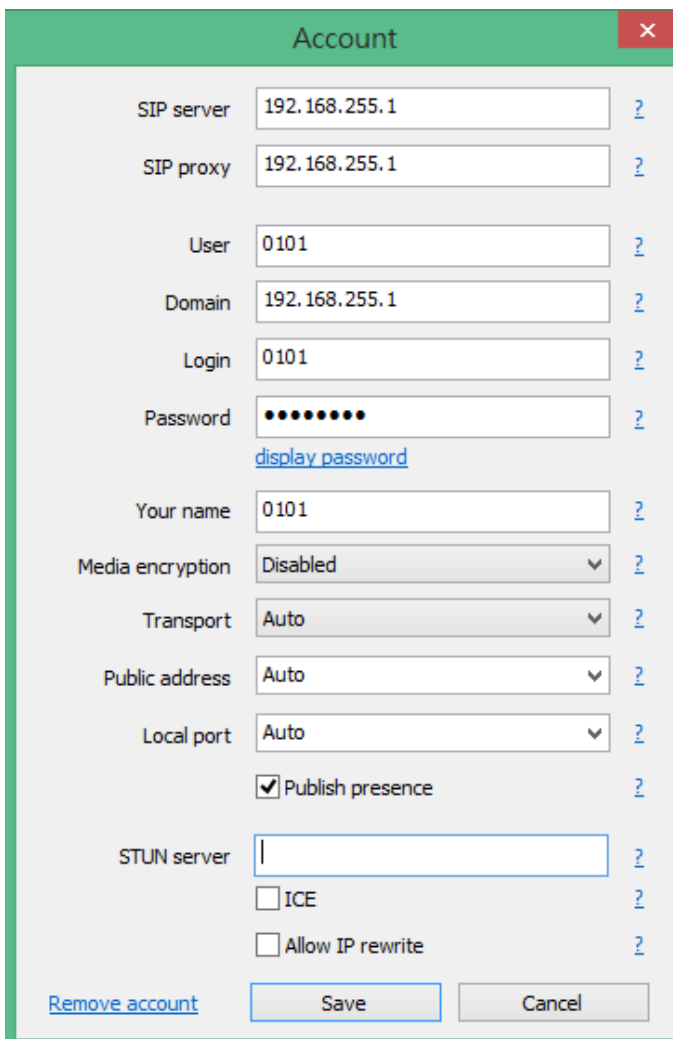Double-click theMicroSIP Utility shortcut on your desktop.

Step 2: MicroSIP settings

a. Click Menu => Settings
b. Select audio codec (enable PCMU, PCMA, GSM) and video codec (enable H.263+)
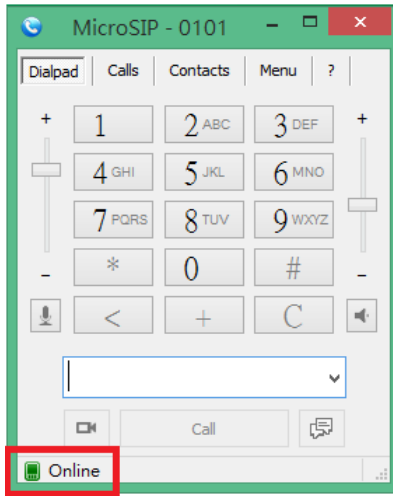c. Press the Save button to save the settings.

d. Client Menu => Add account

e. Input account settings, as shown in the below.

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f. Press the Save button to save the settings

g. After completing the above setting procedure, MicroSIP will register the user with HA-5231M and will show online status.

h. So far, the user has completed the connection procedure.

3. Software Tools

3.1. eSearch Utility

When user forgot IP settings of HA-5231M, eSearch utility can search network to find out current IP of HA-5231M.

3.1.1. Installing the eSearch Utility
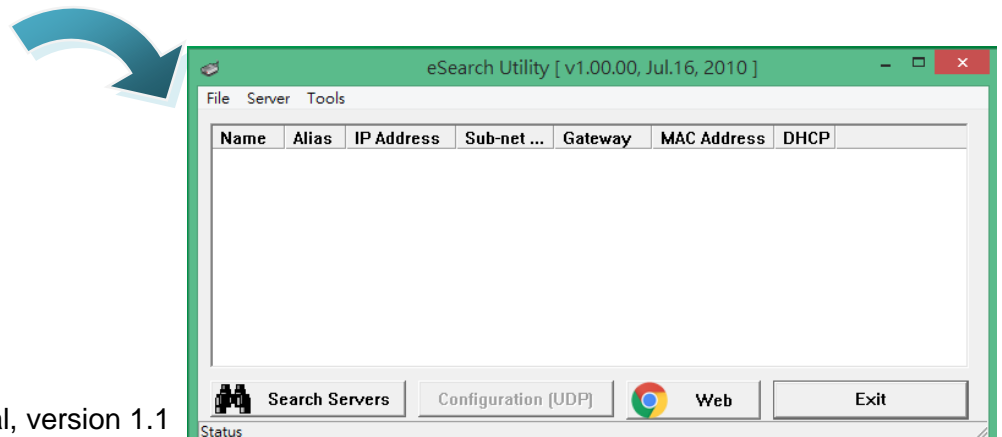
Step 1: Get the eSearch Utility tool

The eSearch Utility can be obtained from below link:
http://www.icpdas.com/root/product/solutions/software/utilities/vxcomm.html

Step 2: Run the eSearch Utility

Double-click the eSearch Utility shortcut.
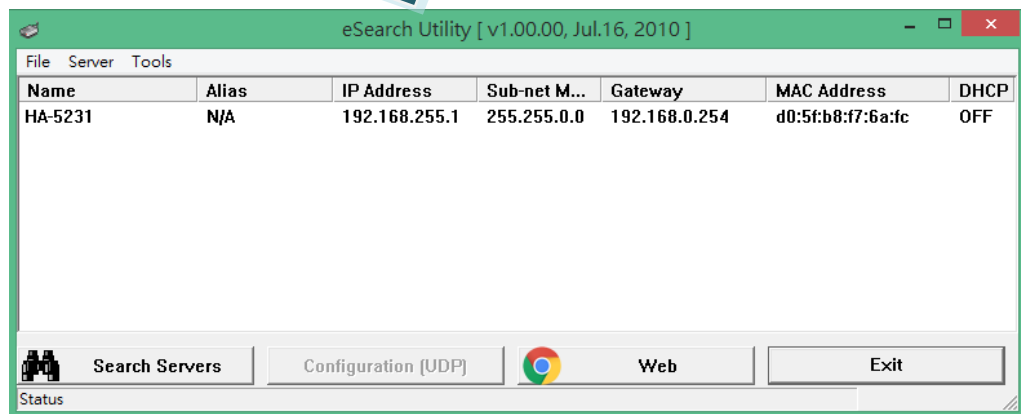
Step 3: Choose "Search Servers" button

After pressing "Search Servers' button, that will search all of the HA-5231M modules on your network.

After search, it will show all of HA-5231M modules, the user can get IP of HA-5231M

Name	Alias	IP Address	Sub-net M...	Gateway	MAC Address	DHCP
HA-5231	N/A	192.168.255.1	255.255.0.0	192.168.0.254	d0:5f:b8:f7:6a:fc	OFF

eSearch Utility [v1.00.00, Jul.16, 2010]

File Server Tools

Search Servers   Configuration (UDP)   Web   Exit

Status

3.2. PBX Manager Utility

PBX Manager utility provides quick and convenient communication with the HA-5231M. Users can easily configure HA-5231M's account, firewall, network, extensions and so forth

3.2.1. Install .NET Compact Framework

It needs the runtime environment with .NET Framework 2.0 or above to execute the utility in the PC. If there has .NET Framework 2.0 or above in the PC, the section 3.2.1 can be omitted.
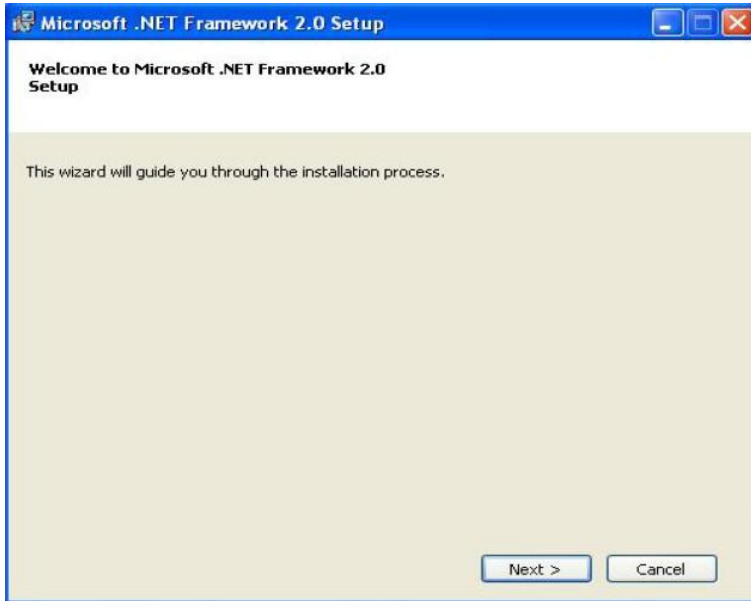
◆ Microsoft .Net Framework Version 2.0:

https://www.microsoft.com/en-US/download/details.aspx?id=1639

◆ Microsoft .Net Framework Version 4.5:

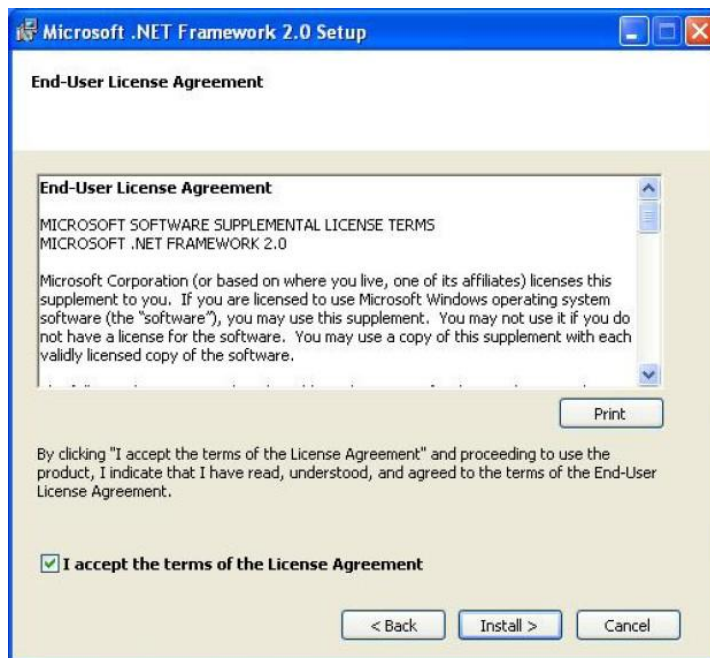https://www.microsoft.com/en-US/download/details.aspx?id=30653
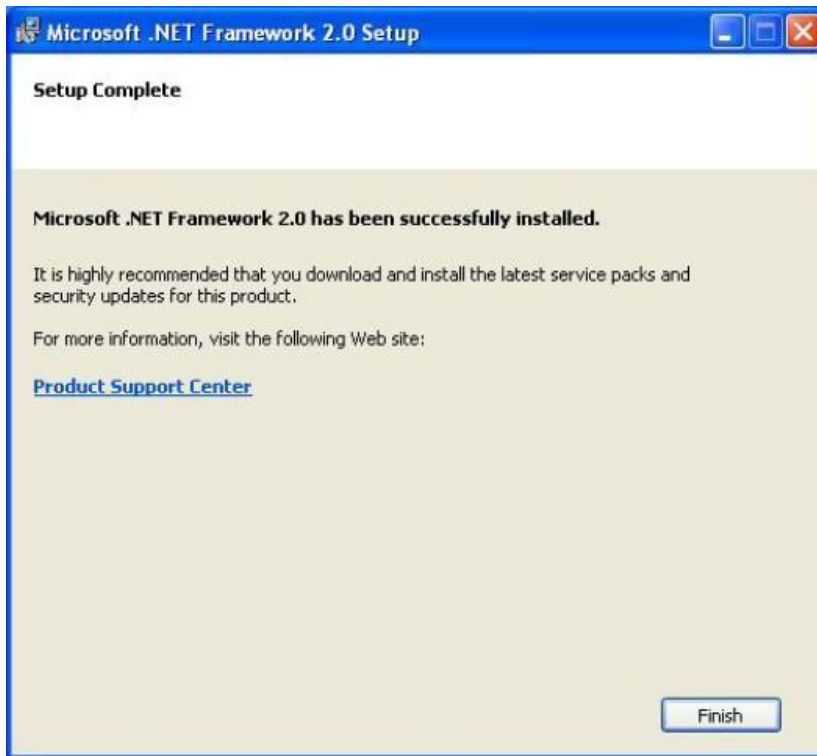
The install steps are shown in the below:

◆ Press "Next" to the next step.

◆ Select the "I accept the terms of the License Agreement" and "Install" to the

next step.

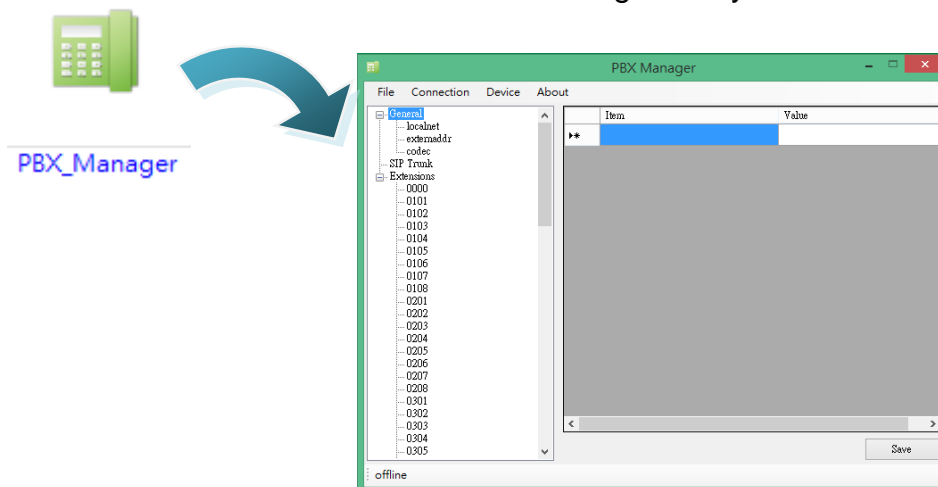◆ After finishing the installation, press "Finish" to exit the program.

3.2.2. Run PBX Manager

The PBX Manager Utility can be obtained from below link:
http://ftp.icpdas.com/pub/cd/ba-ha/ha-5231m/utility/

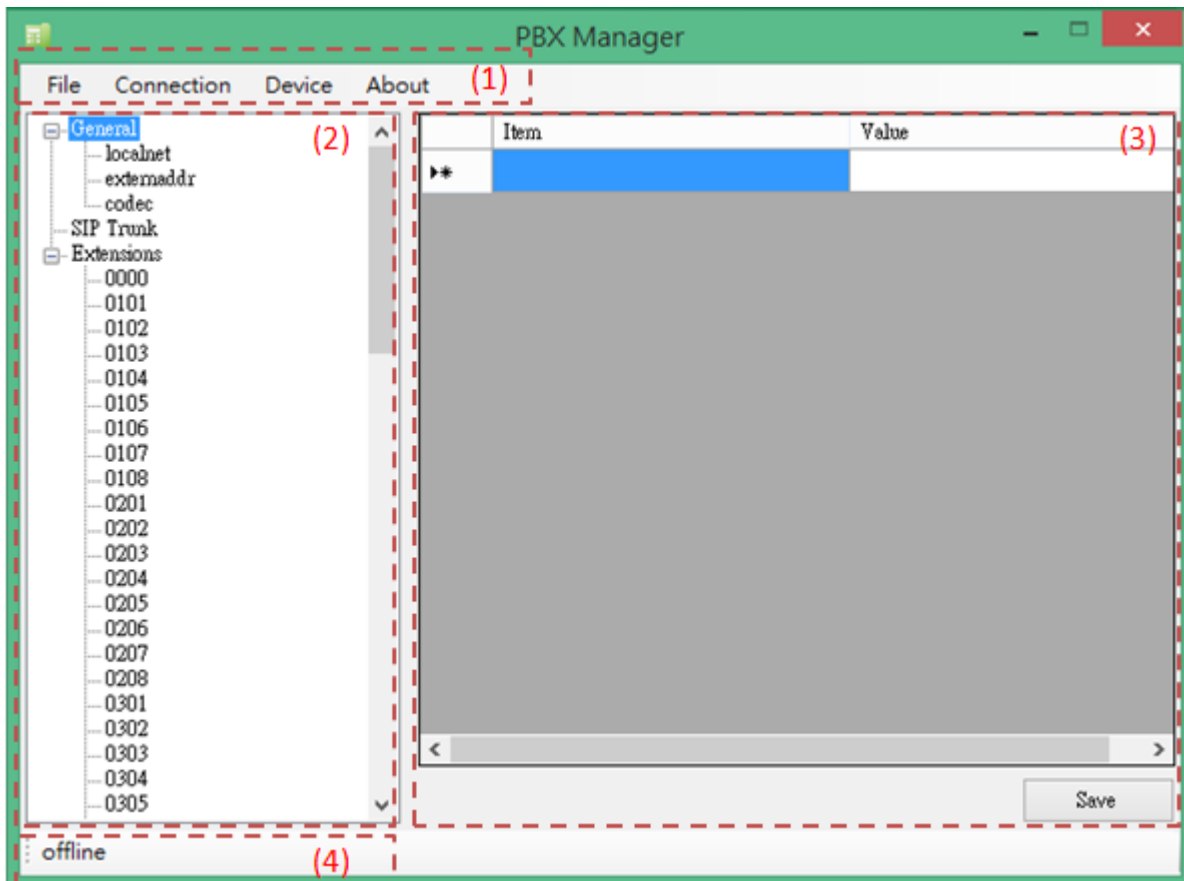Double-click the PBX_Manager Utility.

3.2.3. PBX Manager Introduction

Main window of the utility has 4 parts, they are (1)Menu、(2)Node List、(3)Node Information、(4)Communication Status, as shown in the below.

---

(1)Menu

1. File
   - ➤ Load default: Load default dial plan by this item.
   - ➤ Load from file: Load dial plan from file.
   - ➤ Load from server: Load dial plan form HA-5231M.
   - ➤ Save to file: Save current dial plan to file
   - ➤ Save to server: Save current dial plan to HA-5231M
   - ➤ Exit: Exit the program.

2. Connection

➢ Settings: device communication settings, as shown in the below.

- ● Server IP: please input IP of HA-5231M(default is 192.168.255.1)
- ● User Name: the account name for login (default is admin)
- ● Password: the password for login (default is admin)

➢ Connect: establish communication button

3. Device: after connect to HA-5231M, these menu will enable (default is disable).

   ➢ Account Manager: it will show account name, password and right for login. The administrator can edit this table.

- ● User Name: account name
- ● User Password: account password
- ● User Rights: account right, it has "Administration", "Read & Write" and "Read Only".

➢ Firewall Manager: the user can accept or reject a signal IP or a network segment by this function. The firewall rules will be processed in line order of the configuration, so the first line has highest priority.

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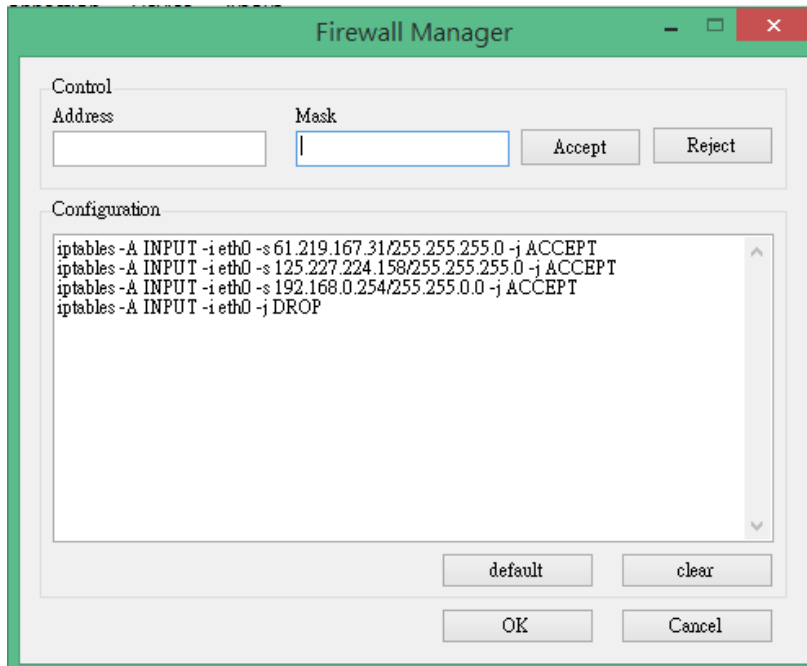
> ➢ Network Manager: the user can set network configuration of HA-5231M by this function.
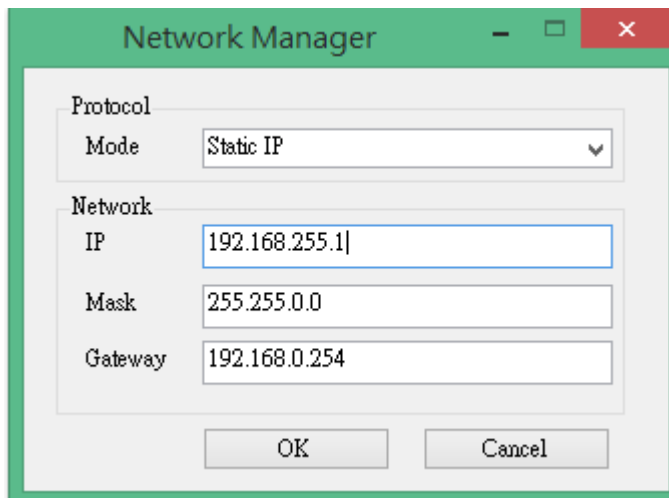
- ● Mode: it can be "Static IP" or "DHCP".
- ● IP: IP address, if mode is "DHCP", please ignore this setting.
- ● Mask: Network mask, if mode is "DHCP", please ignore this setting.
- ● Gateway: Network gateway address, if mode is "DHCP", please ignore this setting.

> ➢ Update Extensions Status: click this button, the node list will update extension's status. Online extensions will show blue font, offline extensions will show black font.

➢ Log File =>
  ● Show Log File: it will show call record.
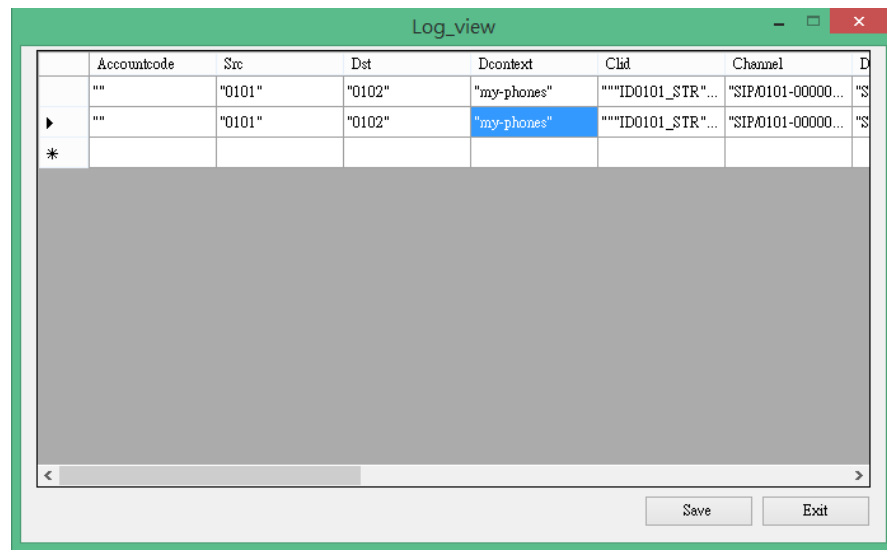
  a. Save button: the user can save call record to file.
  b. Exit button: exit this form.
  ● Clear Log File: the user can clear call record by this function.

➢ Reboot: send reboot command to HA-5231M.
➢ Information: show version information and current network configuration of HA-5231M.

Information	
OS Version	3.2.14 (1.00)
APP Version	1.00
Runtime Version	0x0100
IP	125.227.224.160
Mask	255.255.255.0
Mac Address	68:C9:0B:E4:E5:9C
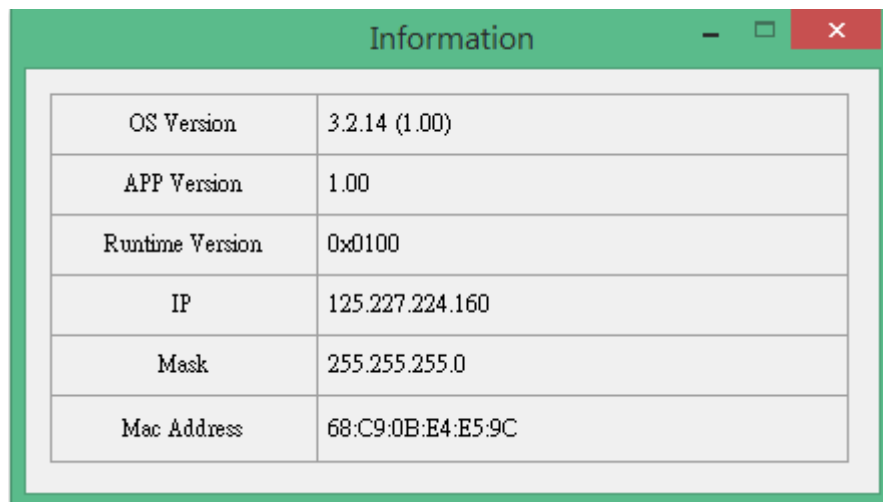
4. About: show this utility version and copyright.

(2)Node List

1. General:
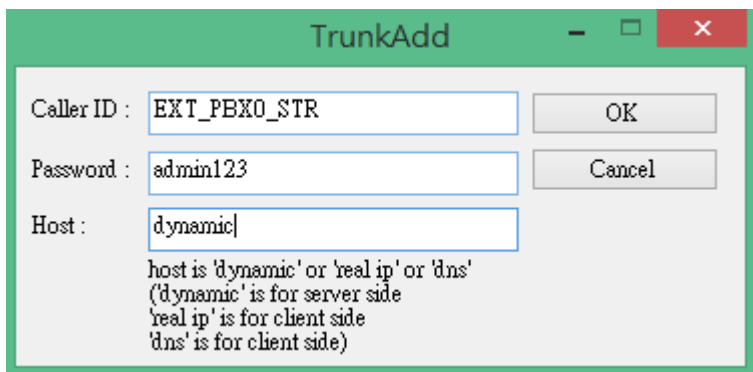   - ➢ localnet: whether it is talking to someone "inside" or "outside" of the NAT network. This is configured by assigning the "localnet" parameter with a list of network addresses that are considered "inside" of the NAT network.
     - Network: local net address (default is 192.168.0.0).
     - Netmask: local net mask (default is 255.255.0.0).
   - ➢ externaddr: This is configured by assigning the "externaddr" parameter with a list of network addresses that are considered "outside" of the NAT network.
   - ➢ codec: this is about audio and video codec (default is "ulaw,alaw,gsm,g722,h263p,vp8,h264"). If you are unsure, leave the default.

2. SIP Trunk: if the user want to connect other PBX or be connected to another PBX. The user need add SIP trunk.

   If the user select SIP Trunk and right click, it will show "add trunk" button.

   - ➢ Add trunk:

   - Caller ID: Caller ID of this trunk.
   - Password: Password of this trunk.
   - Host: it support "dynamic" or "real ip" or "dns". "dynameic" is for server side only, "real ip" and "dns" is for client side only.
     (
     PS:
     If HA-5231M want to connect other PBX, it is client side. If HA-5231M is be connected to another PBX, it is server side.
)

3. Extensions: here will show all extensions.

   If the user select Extensions and right click, it will show "add extension" button.

   ➢ Add extension:

   - Caller ID: Caller ID of this extension.
   - Extension: Extension ID of this extension.
   - Password: Password of this extension.
   - Video: Video Support / Unsupported

   ➢ Extension:

Item	Value
Caller ID	ID0000_STR
Extension	0000
Password	admin123
Video Support (yes | NO)	yes
Ring Time (unit: second)	180
Call transfer to ID (null: disable)	null

   - Caller ID: Caller ID of this extension.
   - Extension: Extension ID of this extension.
   - Password: Password of this extension.
   - Video: Video Support / Unsupported
   - Ring Time: timeout value of ring, unit is second.
   - Call transfer to ID: please input extension number for call transfer. null means disable.

(3)Node Information

If the user select node, here will show node configuration. The user can edit

these configuration and click "Save" button to save configuration.

| Item	Value
Caller ID	ID0000_STR
Extension	0000
Password	admin123
Video Support (yes NO)	yes
Ring Time (unit: second)	180
▶* Call transfer to ID (null: disable)	null

Save

(4)Communication status

here will show communication status between PC and HA-5231M.

4. Network Application Architecture

If all your sip client, HA-5231M are at the same local network, please refer to 4.2 Local Area Network. If you want your HA-5231M to be connected by other PBX or want to connect to other PBX or sip client on different network, please refer to 4.1 Global network architecture.

4.1. Global Network Architecture

If HA-5231M want to connect to other PBX or HA-5231M and sip client on different network, please add a gateway/router before HA-5231M to avoid network attacks, as shown in the below.
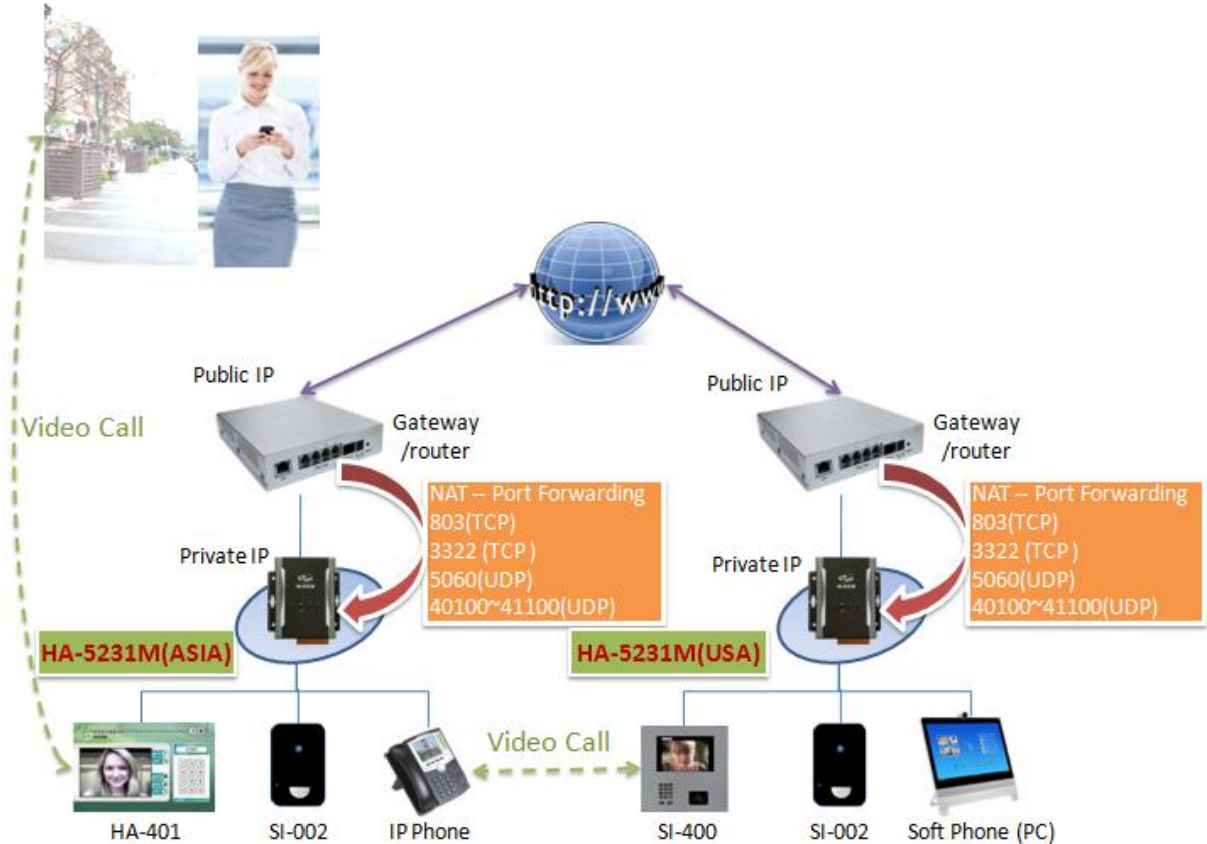
About gateway/router, the user need to do below settings :

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1. NAT : Port Forwarding

The gateway/router need to set below port number to forward to HA-5231M.

Service	Port Number
TCP	803
TCP	3322
UDP	5060
UDP	40100~41100

2. Enable SIP ALG

Some gateway/router have ALG (Application Layer Gateway) function to allow certain NAT un-friendly application (such as SIP) to operate properly.

4.2. Local Area Network Architecture

In this architecture, HA-5231M and all sip client are at the same local network, as shown in the below. This is closed network, you can't receive call from other network and dial to other network.