



**HitronTechnologies**

**NGAG-2000**

**VOPU Installation Guide**  
**Release 1.0**

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**Change History**

Document Description

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Table of Changes

| Description of Change | Doc. Ver. | Date         |
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| Initial release       | 1.0       | August, 2006 |
|                       |           |              |
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|                       |           |              |
|                       |           |              |

# 1. Introduction

This document is intended for giving the installation guideline for Hitron's VOPU, VoIP Processor Unit card.

VOPU is a service control module which is used to centralize managing DSP pools and to responsible for interacting with Call Agent/Softswitch from Access Gateway. For managing the delivery of voice over IP service at Hitron's NGAG-2000 Next Generation Access Gateway, it needs to interconnect with RI-POTS, CPU, and VOP cards to implement within the system.

The RI-POTS card at RST (Remote Subscriber Terminal) side is exactly same to original RI-POTS card and responsible to report the phone status, such as off-hook, to VOP card through cross connection over access network.

The other one is VOP card at LET (Local Exchange Terminal) or RST side. This whole new line card will behave as an 8 channels stand along MTA (Multimedia Terminal Adaptor) or IAD (Integrated Access Device) except the telephone interface. It needs to accept the VoIP signaling protocol (such as MGCP or H.248/MEGACO), support and manage DSP channels, handle voice and messages over TDM (Time Division Modulation) bus on the system, and handle voice payload packets over IP network. To enable the service, the VOP card supports 10/100 BaseT Ethernet interface and configured a static IP address to connect to IP network. Depending on the installation requirement, VOP card can load different Software codes for supporting MGCP signaling protocol or H.248/Megaco signaling protocol.

## Features

- Availability with NGAG-2000 shelf - allows used in all 22 general purpose slots
- Provides IP Ethernet interface in VOP that complies IEEE 802.3 10Base-T, IEEE 802.3 100Base-TX/FX with auto- negotiation function.
- Enable NGAG-2000 to connect with Call Agent/ Softswitch centralized with redundancy solution.
- Support VOP load sharing management function to centralize control DSP pool resource.
- Enable NGAG-2000 to connect up to 3 different Call Agent/ Softswitches

## 2. System Requirement

### Configuration of VOPU

#### Provisioning

##### Setup VOPU service flow:

Install VOPU and VOP card into system first then follow the following steps to enable VOPU service.

- (1) VOPU Interface Setup: Perform CID "Provisioning Menu > VOPU Interface Menu > Modify/Delete Group setting". This function can be used to define basic VOIP interface configuration.
- (2) VOPU DSP Pool Setup: Perform CID "Provisioning Menu > VOPU Interface Menu > Add VOP cards To Group". This function specifies the VOP cards to support voice transmission.
- (3) VOPU subscriber setup: Perform CID "Provisioning Menu > Cross-Connect Menu > 8. Modify VOPU->Ckt Cross-Connects". This function connect remote subscriber to the VOPU interface.

##### Remove VOPU service flow:

- (1) VOPU subscriber removing: Perform CID "Provisioning Menu > Cross-Connect Menu > Delete VOPU->Ckt Cross-Connects". This function disconnects remote subscribers with VOPU interface.
- (2) VOPU DSP Pool removing: Perform CID "Provisioning Menu > VOPU Interface Menu > Remove VOP from Interface Group". This function removes VOP cards from some VOPU interface.
- (3) VOPU interface removing: Perform CID "Provisioning Menu > VOPU Interface Menu > Modify/Delete Group setting". This function can delete the VOPU interface.

**Modify/Delete Group Provision:**

To provision Modify/Delete Group, goes to “Provisioning Menu > VOPU Interface Menu > Modify/Delete Group setting”:

Here is a list of definition for each setting:

| Item                          | Description  |
|-------------------------------|--|
| Group Number                  | The target VOPU group number.  |
| Operation Type                | Select modification or deletion operation.   |
| VOPU Card Location            | Primary VOPU card location.  |
| Standby VOPU Card Location    | Secondary VOPU card location.  |
| Card Status                   | <b>Enable:</b> VOPU card enabled, be able to provide VoIP service.<br><b>Disable:</b> VOPU card disabled.  |
| <b>2. Basic IP Setting</b>    |  |
| IP Address                    | Assign IP address to VOPU card. If you don't know how to assign this value, please ask your network administrator.<br><i>NOTE: VoIP Protocol IP Address change will reboot VOP card.</i> |
| Subnet Mask                   | Assign subnet mask to VOPU card. If you don't know how to assign this value, please ask your network administrator.  |
| Default Gateway               | Assign default gateway of network to VOPU card. If you don't know how to assign this value, please ask your network administrator.   |
| <b>Access Gateway Setting</b> |  |
| Call Agent IP or Domain Name? | Call Agent IP: assign Softswitch with IP address.<br>Domain Name: assign Softswitch with domain name.  |
| Call Agent Name               | The identification of Call Agent for MGCP protocol. If you don't know how to assign this value, please ask your Call Agent administrator.  |
| Call Agent IP                 | Assign IP for Softswitch. If you don't know how to assign this value, please ask your Call Agent administrator.  |
| DNS Server IP Address         | (Option) Assign Domain Name Server IP address to VOPU card. If user assign Call Agent name with domain name, VOPU card need a DNS server to resolve this domain name.                    |

| Item                   | Description   |
|------------------------|---|
| Access Gateway Name    | The identification of Access Gateway (VOPU card, MGCP client) for MGCP protocol. The default value is “[IP address]”. If you don’t know how to assign this value, please ask your Call Agent administrator.   |
| TFTP Server IP Address | (Option) Assign TFTP Server IP address to VOPU card. If you want to auto-config VOPU card with more detail parameters, user can assign TFTP Server IP address to download configuration file from it.   |
| Config File Name       | (Option) Assign configuration file name to VOPU card. Keep it to empty or space to disable TFTP function. If wants to auto-config VOPU card with more detail parameters, user can write a config file for those parameters and put it at TFTP server. |
| Soft Switch Type       | To meet special requirement between different Call Agents.<br><b>Default:</b> support standard MGCP 1.0 Call Agent, no special requirement.<br>Others: reserve to support other Call Agent with special requirement.                                  |
| Country                | To meet special requirement between different countries.<br><b>Taiwan:</b> support Taiwan’s telecom spec, such as call progress tone.<br>Others: reserve to support other countries.  |
| Hook Flash Time        | The time to recognize hook flash. Default is 850 ms.  |
| <b>Other Setting</b>   |   |
| DSP Allocation Method  | The allocation method for VOP DSP usage. There are 3 methods supported, Load Balance, Serial, and Queue.  |

VOPU Interface Menu

>>> [2]: 2

Modify/Delete Group setting

Group Number [Group1]: Group1

Current VOPU is LET-1-17

Protocol: MGCP 1.0 / NCS 1.0

Status: Enable

Basic IP Setting:

-----

Provision Mode: CPU Mode

IP Address: 192.168.100.1

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.100.254

Access Gateway Setting:

-----

Call Agent name: 0.0.0.0

DNS IP Address: 0.0.0.0

Access Gateway Name: [172.25.168.20:100]

TFTP Server IP Address: 0.0.0.0

Config File name: ivory

Soft Switch Type: Default

Country: Taiwan

Hook flash time(ms) : 850

Change the provisioning of this VOPU? [No]: Yes

Modify or Delete this VOPU provisioning? [Modify]: Modify



**Add VOP cards to Group Provision:**

To provision Add VOP cards to Group, goes to “Provisioning Menu > VOPU Interface Menu > Add VOP cards To Group”:

Here is a list of definition for each setting:

| Item                       | Description   |
|----------------------------|---|
| Group Number               | The target VOPU group number.   |
| VOP Card Location          | The target VOP card location. This VOP card will be put into VOPU interface DSP pool.   |
| Card Status                | <b>Enable:</b> VOP card enabled, be able to provide VoIP service.<br><b>Disable:</b> VOP card disabled.   |
| <b>3. Basic IP Setting</b> |   |
| IP Address                 | Assign IP address to VOP card. If you don't know how to assign this value, please ask your network administrator.<br><i>NOTE: VoIP Protocol IP Address change will reboot VOP card.</i>   |
| Subnet Mask                | Assign subnet mask to VOPU card. If you don't know how to assign this value, please ask your network administrator.   |
| Default Gateway            | Assign default gateway of network to VOPU card. If you don't know how to assign this value, please ask your network administrator.  |
| DNS Server IP Address      | (Option) Assign Domain Name Server IP address to VOP card. If user assign Call Agent name with domain name, VOP card need a DNS server to resolve this domain name.   |
| Access Gateway Name        | The identification of Access Gateway (VOP card, MGCP client) for MGCP protocol. The default value is “[IP address]”. Just keep it as default value.   |
| Config File Name           | (Option) Assign configuration file name to VOPU card. Keep it to empty or space to disable TFTP function. If wants to auto-config VOPU card with more detail parameters, user can write a config file for those parameters and put it at TFTP server. |

```

VOPU Interface Menu
>>> [?]: 3
Add VOP cards To Group
Group Number [Group1]: Group1
Primary VOPU Location: LET-1-17
Secondary VOPU Location: LET-1-19
Resource Allocation Method: Load Balance
The VOP assigned to this Group Segment:
Card Location          Capacity
-----
LET-1-9                8 Lines
LET-1-12              8 Lines
-----
Enter VOP Card Location [LET-1-1]: LET-1-11
This is LET-1-11
    VOP mode: VOPU Interface
    Protocol: MGCP 1.0 / NCS 1.0
    Status: Enable
    Basic IP Setting:
    -----
    Provision Mode: CPU Mode
    IP Address: 192.168.100.1
    Subnet Mask: 255.255.255.0
    Default Gateway: 192.168.100.254
    Access Gateway Setting:
    -----
    Call Agent name:
    DNS IP Address: 0.0.0.0
    Access Gateway Name: [192.168.100.1]
    TFTP Server IP Address: 0.0.0.0
    Config File name:
    Soft Switch Type: Default
    Country: Taiwan
    Hook flash time(ms) : 850
Add this card to this Group?: [Yes]: Yes
    
```

Enter "Yes" to add VOP card to VOPU interface

```
Status [Enable]: Enable

Basic IP Setting:
-----

IP Address [192.168.100.1]: 192.168.100.1

Subnet Mask [255.255.255.0]: 255.255.255.0

Default Gateway [192.168.100.254]: 192.168.100.254

Config File name []:

DNS IP Address [0.0.0.0]: 0.0.0.0

Access Gateway Name [[192.168.100.1]]: [192.168.100.1]

Effect Changes? [Yes]: Yes

VOPU Interface Menu
MJ>
>> [3]:
```

### CKt Cross-Connects Provision:

To provision Ckt Cross-Connects, goes to "Provisioning Menu > Cross-Connect Menu > 8. Modify VOPU->Ckt Cross-Connects":

Here is a list of definition for each setting:

| Item                            | Description                                    |
|---------------------------------|--|
| VOPU Interface Group Number     | Target VOPU interface group.                   |
| Enter Starting VOPU Port Number | Start target VOPU port number.                 |
| Enter Start Dlc-Ckt location    | Start circuit location for remote subscribers. |
| Number of Ports                 | Total port(circuit) number for cross connect.  |

```

Cross-Connect Menu
CR>>> [1]: 8

Modify VOPU->Ckt Cross-Connects
VOPU Interface Group Number [Group1]: Group1
Enter Starting VOPU Port Number [0]: 0
Enter Start Dlc-Ckt location [LET-1-1-1]: LET-1-1-1
Enter Number of Ports [1]: 6

Ckt LET-1-1-1 to LET-1-1-5 <--> VOP2 [0000] to [0004]
Ckt LET-1-1-6 Unassigned

Do You Wish To Proceed? [No]: Yes

Ckt LET-1-1-1 to LET-1-1-6 <--> VOP1 [0000] to [0005]

Cross-Connect Menu
CR>>> [8]:
    
```

**Delete VOPU**

“Provisioning Menu > Cross-Connect Menu > Delete VOPU->Ckt Cross-Connects”:

Provision items:

| Item                            | Description   |
|---------------------------------|---|
| VOPU Interface Group Number     | Target VOPU interface group.                            |
| Enter Starting VOPU Port Number | Start target VOPU port number.                          |
| Number of Ports                 | Total port (circuit) number for cross connect removing. |

```

Cross-Connect Menu
>>> [9]: 9

Delete VOPU->Ckt Cross-Connects

VOPU Interface Group Number [Group1]: Group1
Enter Starting VOPU Port Number [0]: 0
Enter Number of Ports [1]: 1

VOP1 [0000]                               <--> Ckt  RST1-1-4-1

WARNING - This command will overwrite current cross-connect mappings.
          Traffic may be affected.

Do You Wish To Proceed? [Yes]: Yes

Cross-Connect Menu
>>> [9]:
    
```

**Remove VOP from Interface Group**

“Provisioning Menu > VOPU Interface Menu > Remove VOP from Interface Group”:

a. Provision items:

| Item              | Description   |
|-------------------|---|
| Group Number      | The target VOPU group number.   |
| VOP Card Location | The target VOP card location. This VOP card will be put into VOPU interface DSP pool. |

```

VOP Interface Configuration Menu
MJ>>> [3]: 4

Remove VOP from Interface Group
VOPU Interface Group Number [Group1]: Group1

VOPU Location: LET-1-1
Standby VOPU Location: LET-1-2
Resource Allocation Method: Load Balance
The VOP assigned to this Group Segment:
Card Location          Capacity
-----
LET-1-6                8 Lines
-----

Enter VOP Card Location [LET-1-1]: let-1-6
This is LET-1-6
  VOP mode: VOPU Interface
  Protocol: MGCP 1.0 / NCS 1.0
  Status: Enable

  Basic IP Setting:
  -----
  Provision Mode: CPU Mode
  IP Address: 192.168.100.1
  Subnet Mask: 255.255.255.0
  Default Gateway: 192.168.100.254

  Access Gateway Setting:
  -----
  Call Agent name:
  DNS IP Address: 0.0.0.0
  Access Gateway Name:
  TFTP Server IP Address: 0.0.0.0
  Config File name:
  Call Agent Type: Default
  Country: Taiwan
  Hook flash time(ms) : 850

Remove this card from this interface?: [Yes]: Yes
Effect Changes? [Yes]: Yes

VOP Interface Configuration Menu
MJ>>> [4]:
    
```

## 4. Troubleshooting

### Troubleshooting Guide

| Trouble                            | Action  | Possible cause   |
|------------------------------------|---|--|
| LINK LED always off                | Check the Ethernet cable connection at the faceplate.   | The Ethernet link between VOP (H.248 TYPE) and hub switch is broken.                                     |
| ACTV LED off when off-hook         | Log in CID and make sure the cross-connect between the VOP (H.248 TYPE) and LI-EPOTS has been provisioned fine.   | The cross-connect between RI-EPOTS and VOP (H.248 TYPE) is not correct.                                  |
| No dial tone                       | <ol style="list-style-type: none"> <li>Log in CID and make sure the VOP (H.248 TYPE) has been provisioned fine.</li> <li>Make sure the Call Agent is working fine for this endpoint.</li> </ol> | The configuration of VOP (H.248 TYPE) or Call Agent is not correct.                                      |
| FAIL LED is on at VOP (H.248 TYPE) | Log in CID and do list plug-in. If CPU card does not see this card, replace with a new CPG.   | If CPU card does not see this card, it means some of the major components on this card are out of order. |

### Alarm Definition

New alarms are used to indicate the system failure when VOP (H.248 TYPE) experiences any system failure:

| Alarm Name             | Alarm Level | Description  |
|------------------------|-------------|--|
| VOPU No Capacity       | Major       | There is no VOP DSP pool (VOP cards) configured in the VOPU interface. |
| VOPU Protection Switch | Major       | Protection Switch for VOPU interface,                                  |
| VOPU Switch Failed     | Event       | Fail to do protection switch.  |
| VOPU Not Provisioned   | Event       | Detect VOPU card but not provision yet                                 |
| VOPU IntF Fail         | Major       | VOPU card does not exist for some VOPU interface.                      |

### Performance Report

Here is a list of definition for each performance item:

2. Performance UI and description:

(1) Performance items:

| Item            | Description   |
|-----------------|---|
| Packet Send     | The total number of packets for voice payload that had sent out for specific subscriber line.   |
| Byte Send       | The total number of bytes for voice payload that had sent out for specific subscriber line..    |
| Packet Received | The total number of packets for voice payload that had received for specific subscriber line.   |
| Byte Received   | The total number of bytes for voice payload that had received for specific subscriber line.     |
| Packet Lost     | The total number of voice payload packet that lost at network for specific subscriber line.     |
| Average Jitter  | The average jitter time (ms) for in coming voice payload packets for specific subscriber line.  |
| Average Latency | The average latency time (ms) for in coming voice payload packets for specific subscriber line. |
| Incoming call   | The total incoming call amount.   |
| Outgoing call   | The total outing call amount.   |

(2) UI: To check out the performance report about the VOPU, goes to “Provisioning Menu > VOPU Interface Menu > Query VOPU Performance”.



```
VOPU Interface Menu
MJ>>> [1]: 5

Query VOPU Performance
Select The Type of Performance Data [Port]: Port
VOPU Interface Group Number [Group1]: Group1
Enter Starting VOP Port Number [0]: 0
Enter Number Of Ports [1]: 1
PortNum |Packet |Byte |Packet |Byte |Packet |
        |Send |Send |Received |Received |Lost |
-----|-----|-----|-----|-----|-----|
        0 |    1 |    2 |    3 |    4 |    5 |
-----|-----|-----|-----|-----|-----|

Press Any Key
PortNum |Average |Average |Incoming |Outgoing |Total |
        |Jitter |Latency |Call     |Call     |Call|
-----|-----|-----|-----|-----|-----|
        0 |    5|    6|    7|    8|   15|
-----|-----|-----|-----|-----|-----|

VOPU Interface Menu
MJ>>> [5]:
```

## 5. Related Documentation

- NGAG-2000 Installation and Maintenance Guide
- NGAG-2000 Craft Interface Description

Please contact your Hitron service representative for more information regarding to Hitron NGAG-2000 VoIP Solution.

## 6. Obtaining Technical Assistance

For this VOP (H.248 TYPE) installation procedures, please write to [hitron\\_cs@hc.hitrontech.com](mailto:hitron_cs@hc.hitrontech.com) for further assistance.

## 7. H/W Specification

- Operating temperature 0° C to +60° C
- Humidity (relative) 95%
- Maximum power consumption 7.277 watt