

# **KX-NS PBX Remote IP Extension**

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PBX SE team

Specifications are subject to change without notice.

# 1. Overview

Built-in MRG feature supports remote IP extension without VPN.

MRG = Media Relay Gateway

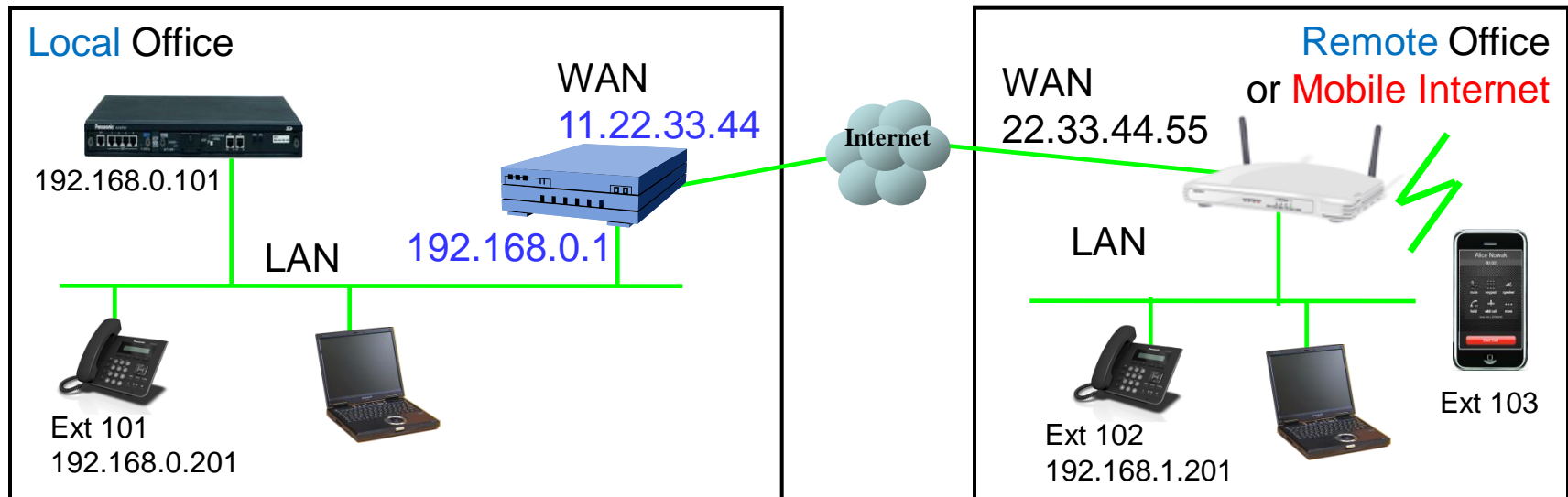
KX-NS1000 : Version 3 or later  
Other KX-NS PBX : Any Version

Following phones support this feature.

- KX-NT543/NT546/NT560 (Version up of phone software is required.)
- KX-NT511 and KX-NT550 series
- KX-UT series
- 3rd party SIP phone with Blank UDP transmit capability. (Video phone is also supported.)

Other phones do not support this feature.

KX-UDT / KX-NT300 series / KX-NT300 based software phone



## 2. Concept of Programming

Only 3 PBX programming are required for remote connection.

(1) PBX has to know global IP address of router. 11.22.33.44

(2) Do not forget setting of default gateway. 192.168.0.1

(3) PBX has to know location of each IP extension. Local or Remote

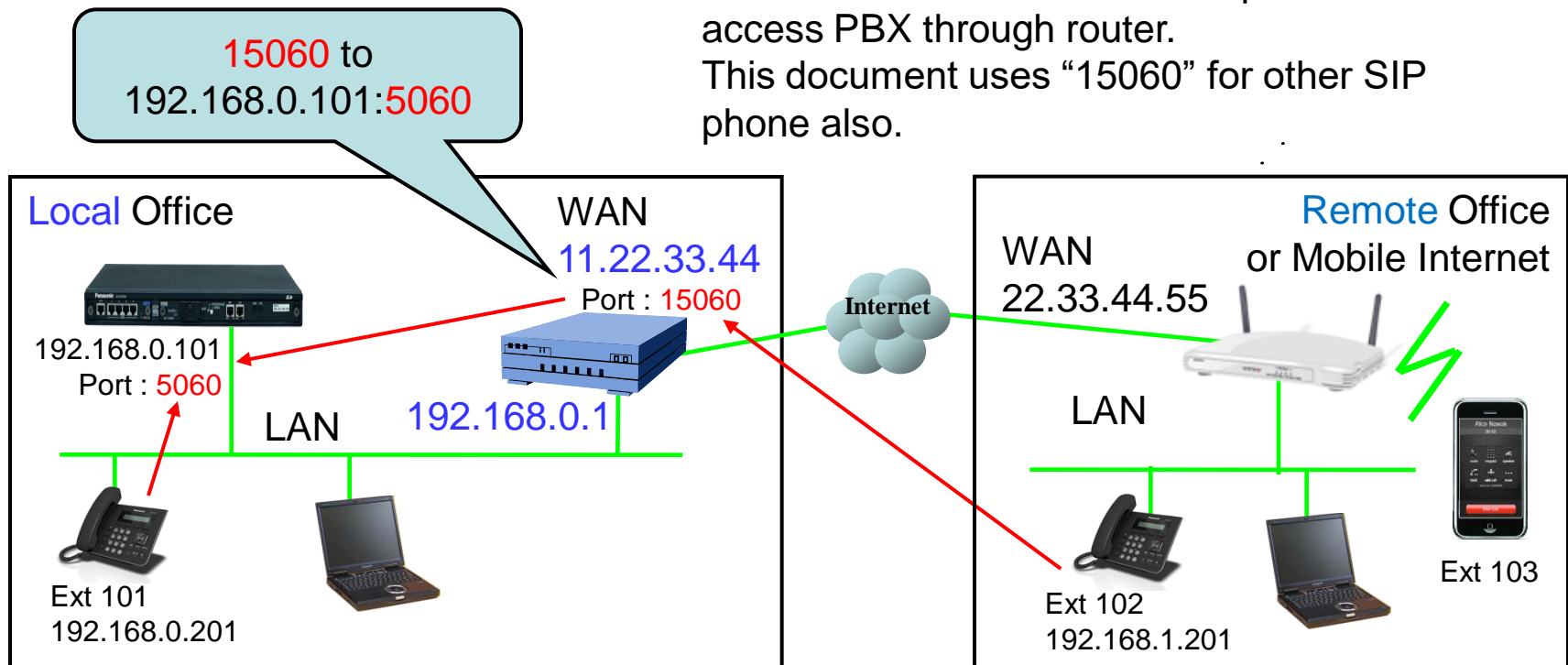
Port Fwd is required to router.  
(Not only 15060)

“5060” is too famous as port for SIP.

“5060” has high risk for attacking by hacker.

KX-UT in remote location uses port “15060” to access PBX through router.

This document uses “15060” for other SIP phone also.



# Chapter 1

# PBX Programming

# 11. Assign Global IP Address of Router.

System Property - Site

Main VoIP-DSP Options Port Number LAN Status **Media Relay** SIP Extension Echo Cancellation

Common

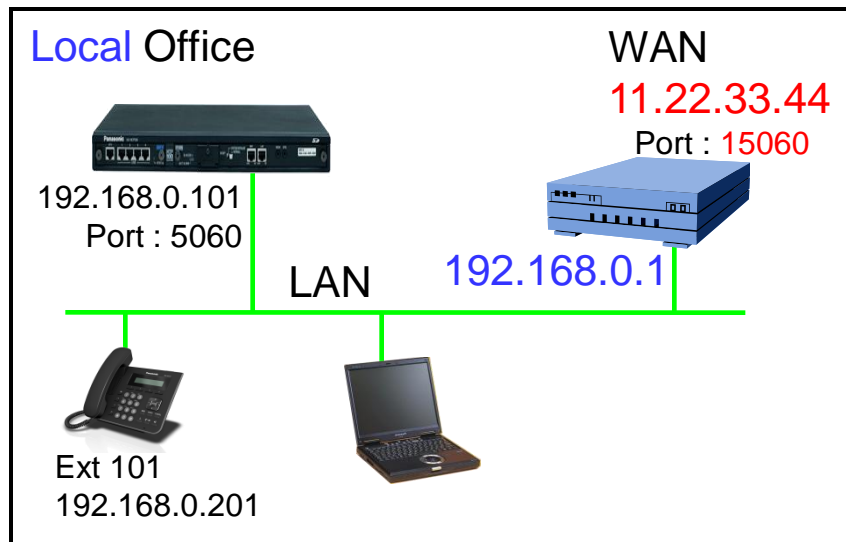
NAT - External IP Address : 11.22.33.44

IP Extension

SIP Extension / UT Extension

NAT - SIP Proxy Server Port No. : 15060

Default is OK.



# 12. Assign Default Gateway.

**IP Address/Ports**

**Basic Settings** | Advanced Settings | Reference

**LAN Setting**

DHCP Port Number : 68

☐ Obtain an IP address automatically

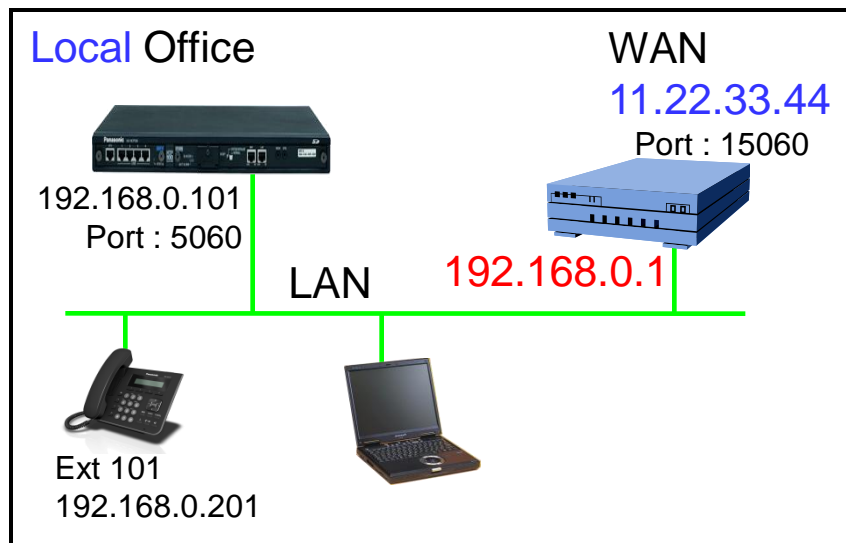
☒ Use the following IP address

IP Address : 192.168.0.101

MAC Address : 00:00:00:00:00:00

Subnet Mask : 255.255.255.0

**Default Gateway** : 192.168.0.1



Default gateway is required not only for remote IP extension but also for many other purpose.

# 13. Assign Location of SIP Extension.

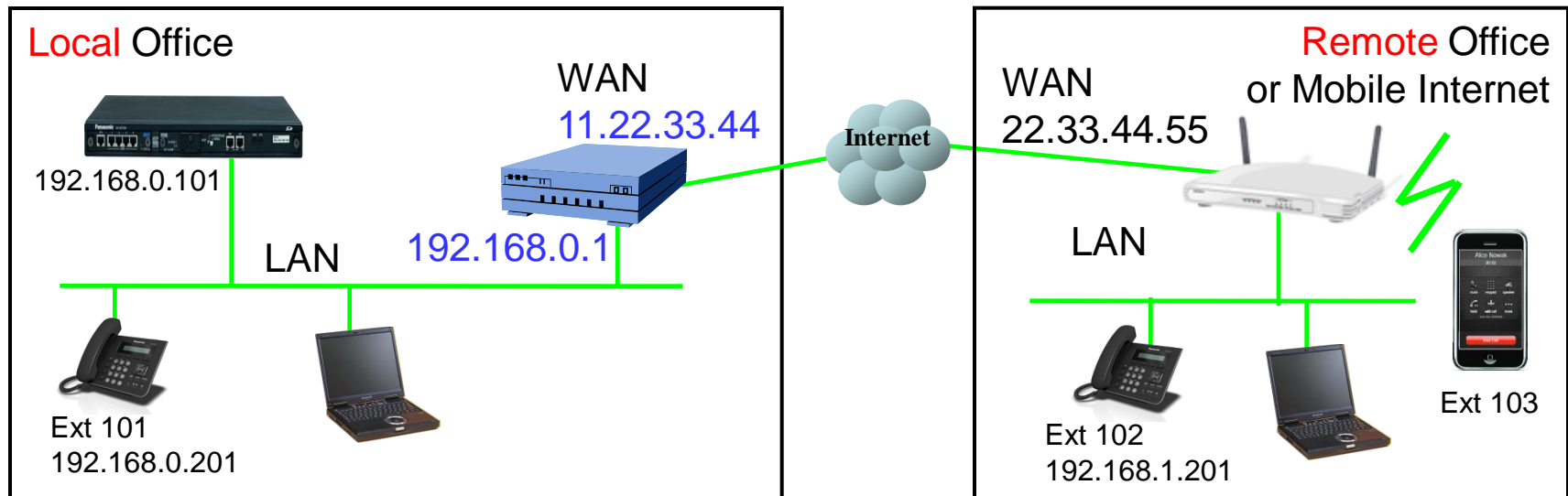
## < 3rd party SIP Phone >

**Port Property - Virtual SIP Extension**

Copy to

Main Option **Remote Place** FAX/T.38

No.	Site	Shelf	Slot	Port	Extension Number	Password	Connection	Phone Location
		ALL					ALL	ALL
1	1	Virtual	48	1	133		OUS	Local
2	1	Virtual	48	2	134		OUS	Local
3	1	Virtual	48	3	135		OUS	Local



# 14. Assign Location of KX-NT500.

## < KX-NT500 >

Users

PBX Configuration

1. Configuration

1. Slot

2. Portable Station

3. Option

4. Clock Priority

5. DSP Resources

2. System

3. Group

Port Property - Virtual IP Extension

RegistrationDe-registrationForced De-registration

MainOptionVoiceSecondary SettingRemote Place

No.	Shelf	Slot	Port	Extension Number	Extension Name (20 characters)	Connection	Phone Location
	ALL					ALL	ALL
1	Virtual	47	1	101		OUS	Local
2	Virtual	47	2	102		OUS	Local
3	Virtual	47	3	103		OUS	Local



# 15. Assign Location of KX-UT.

## < KX-UT >

**Port Property - Virtual UT Extension**

Registration De-registration Forced De-registration SIP-CS Web

Main Option Secondary Setting Remote Place

ID	Site	Shelf	Slot	Port	Extension Number	Extension Name	Connection	Phone Location	Web-MC Ability	Protocol for Remote SIP-MLT
		ALL					ALL	ALL	ALL	ALL
1	1	Virtual	49	1	165		OUS	Local	Enable	HTTP
2	1	Virtual	49	2	166		OUS	Local Remote (SBC)	Enable	HTTP
3	1	Virtual	49	3	167		OUS	Remote (MRG)	Enable	HTTP
4	1	Virtual	49	4	168		OUS	Local	Enable	HTTP

SBC : Session Boarder Controller  
(3rd party equipment is required.)



Secure communication is available using HTTPs for KX-UT.

- TR069(CWMP) is available with https.
- Maximum 20 KX-UT phone can use this feature.

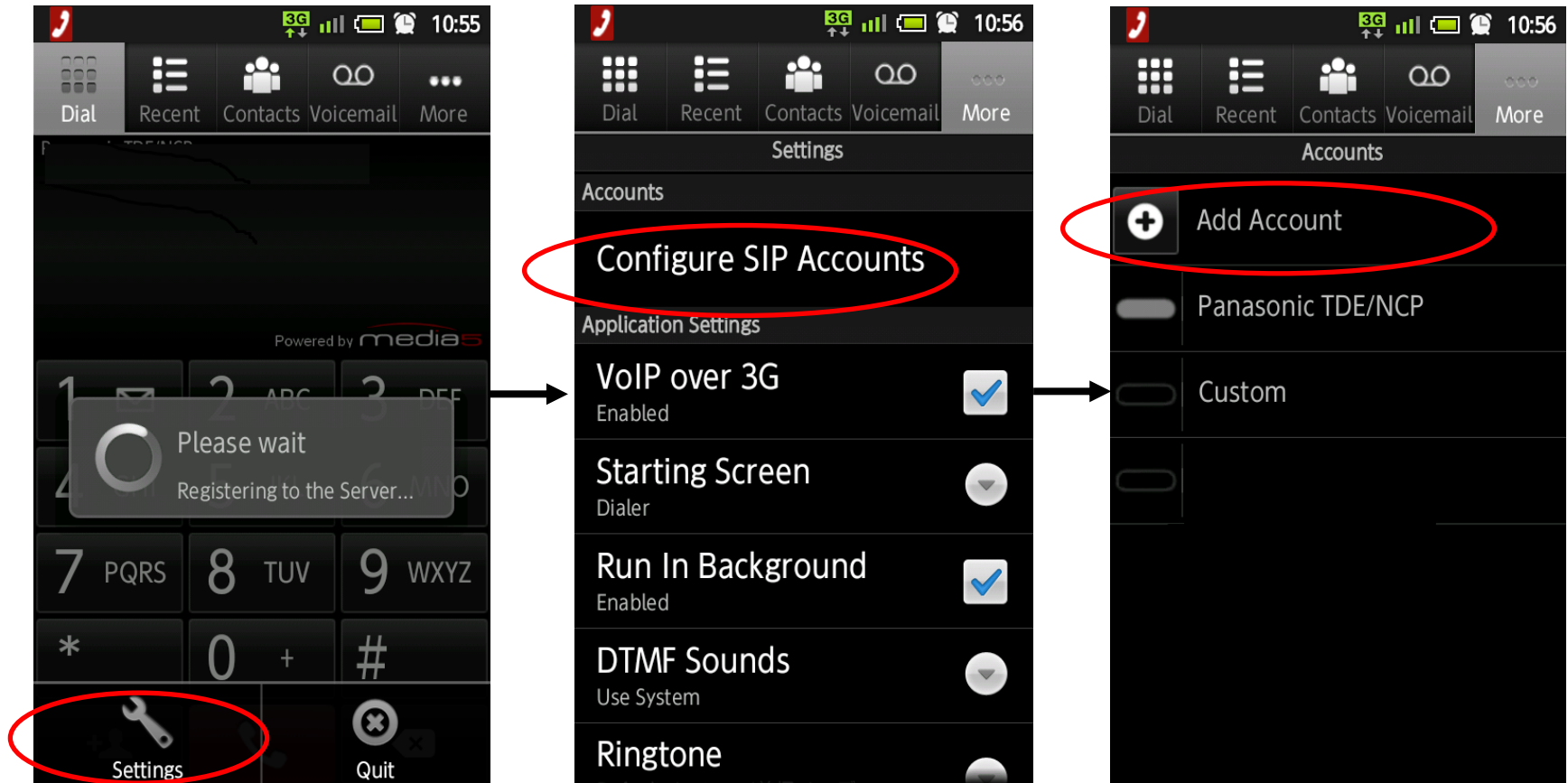
Each one KX-NS1000 in one-loop network supports 20 KX-UT with this feature.

# Chapter 2

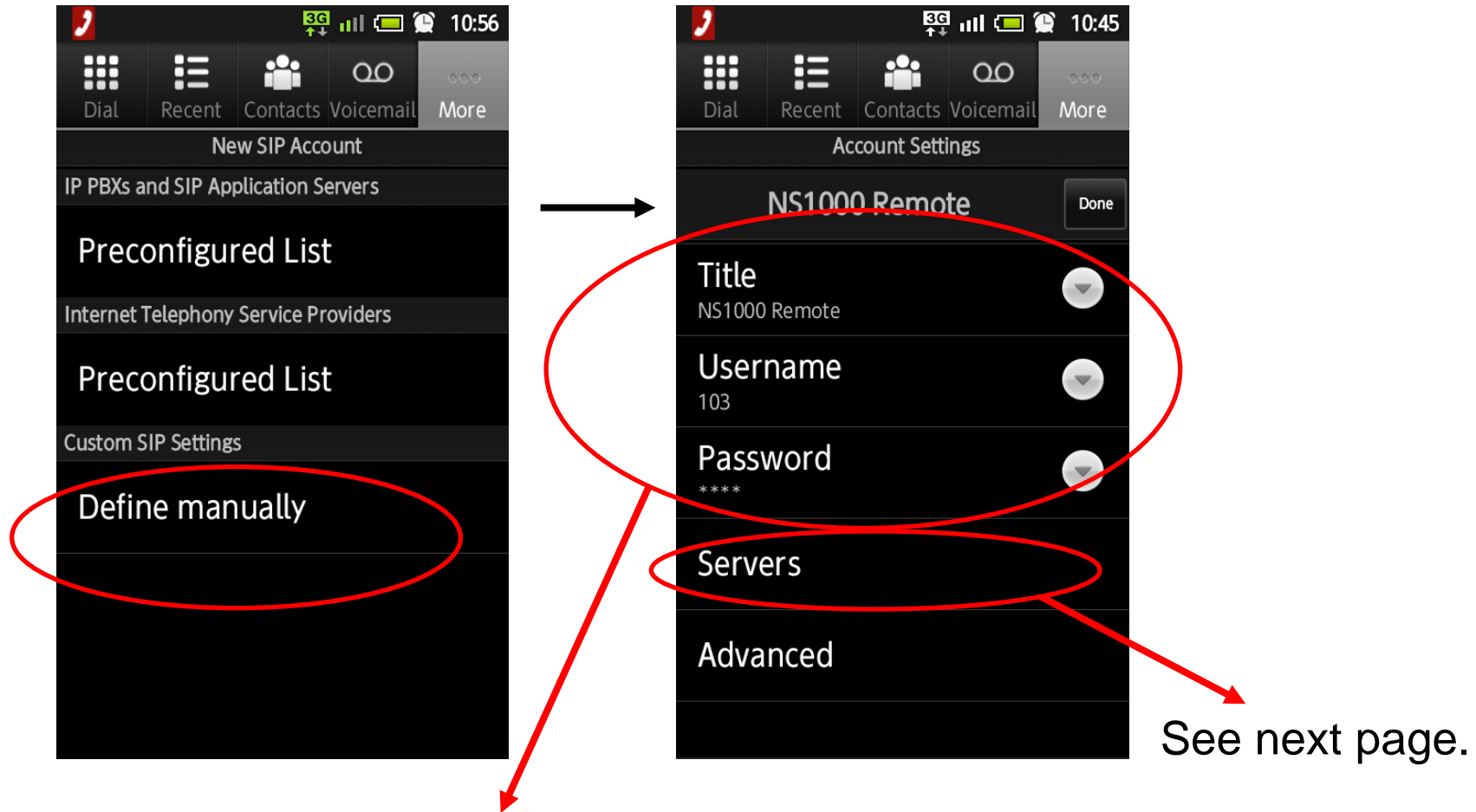
## SIP Phone Setting

SIP Software Phone for Smart-phone by Media5 is used in this chapter as example.

# 21. Configure SIP Account.



## 22. Assign Ext Number & PIN to log-in.

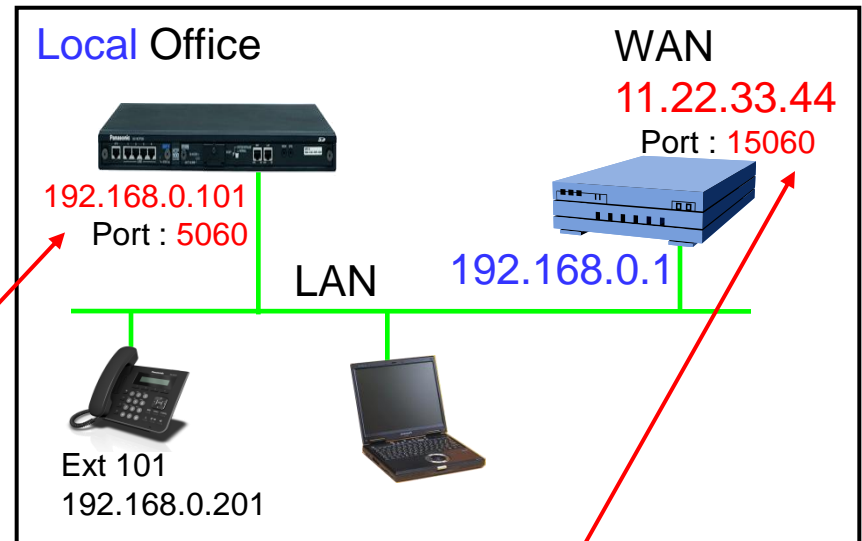
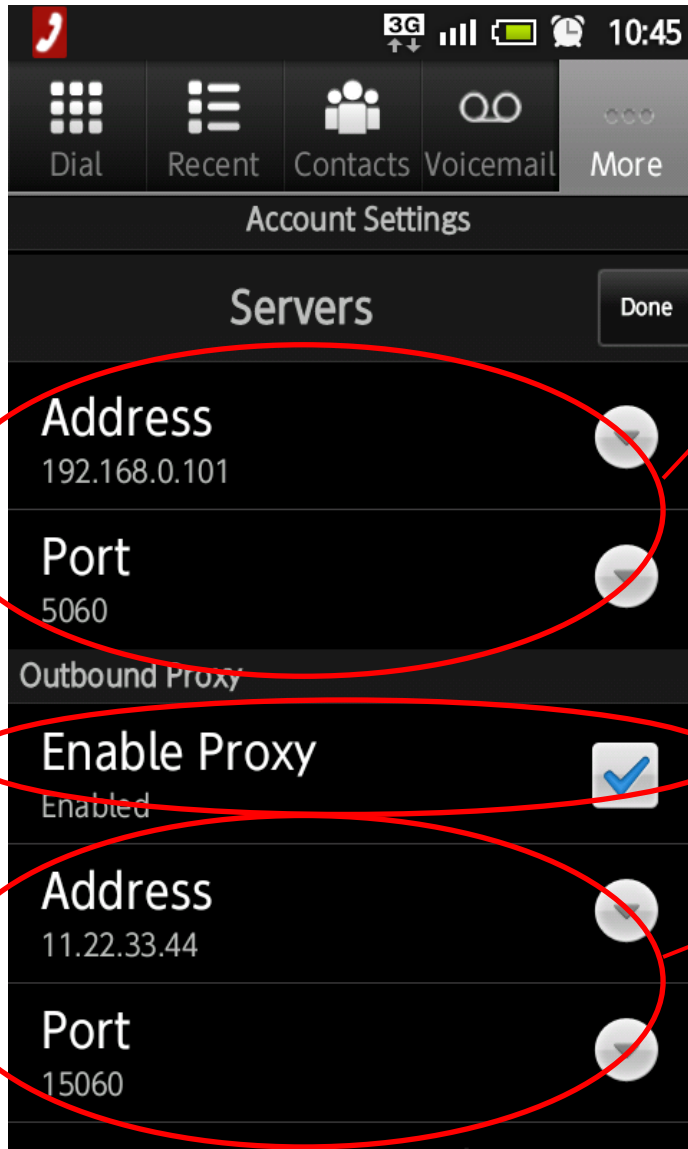


Title = Reference

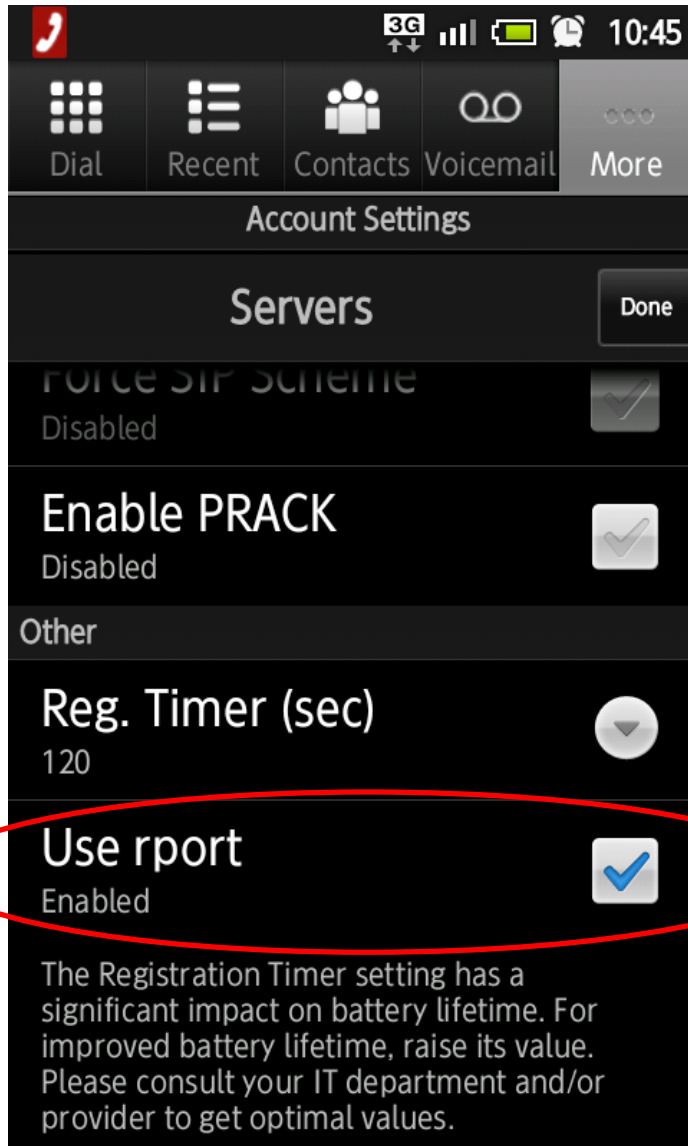
Username = Extension Number

Password = SIP Password of PBX

## 23. Assign Destination to log-in.



## 24. Enable “rport”.

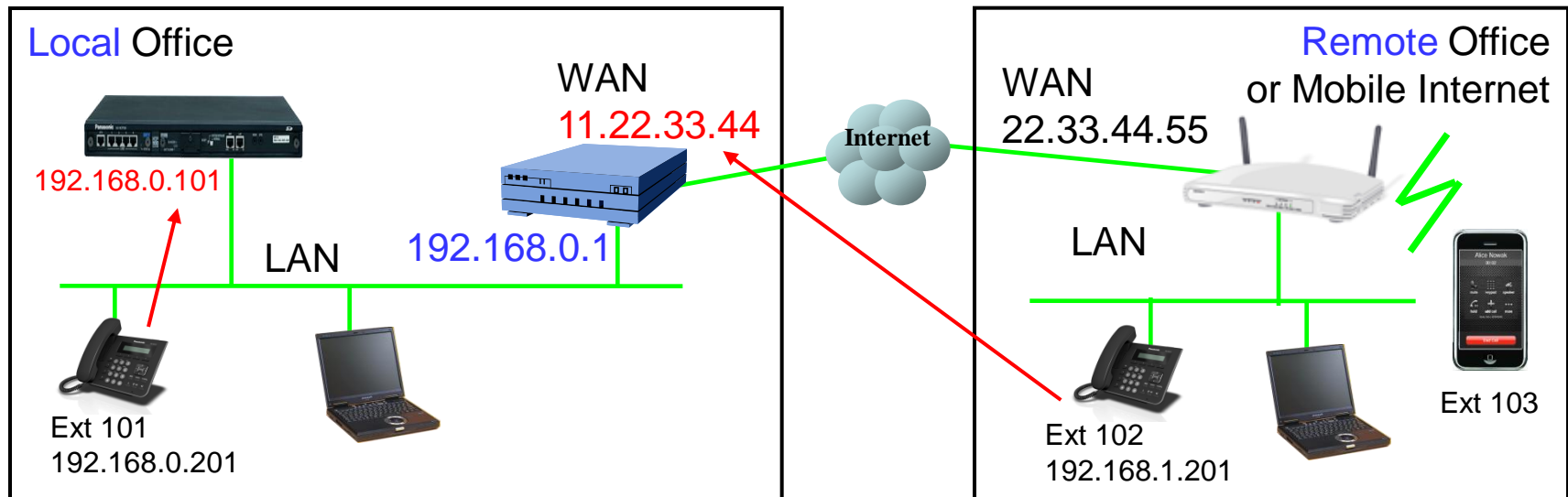


# **Chapter 3**

## **KX-NT/UT Phone Setting**

# 31. KX-NT500 : Assign Router as Destination.

Assign global IP address of router (11.22.33.44 for example) as destination instead of PBX local address (192.168.0.101 for example), when KX-NT phone is installed in remote office.



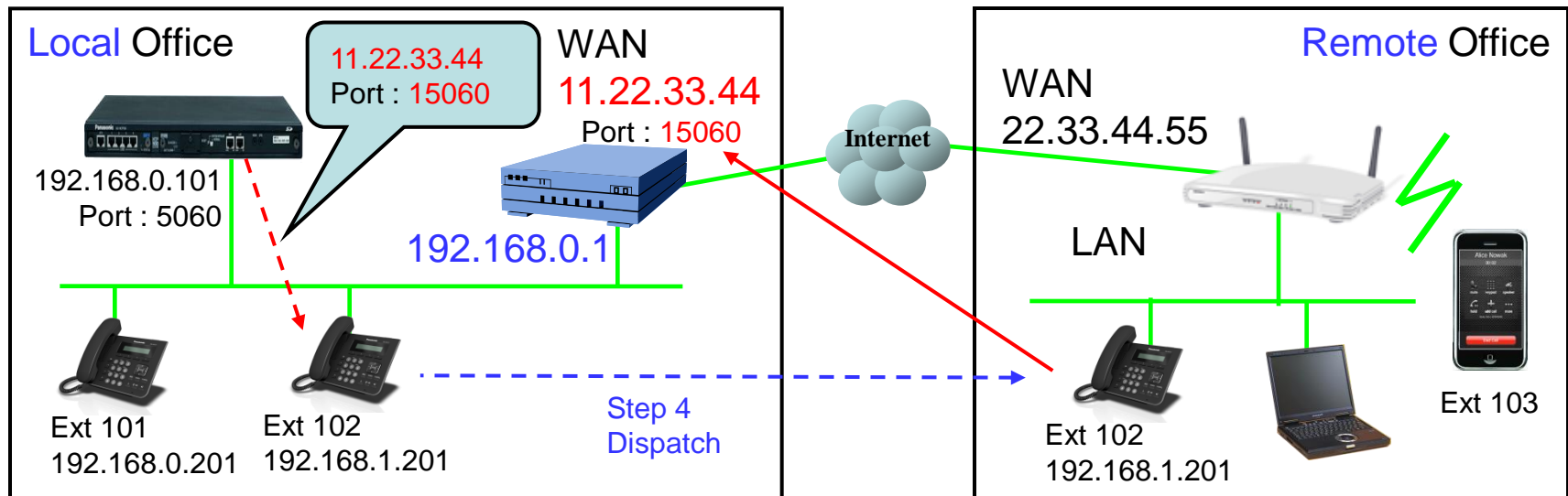


## 32. KX-UT : Connect in Local Office.

1. Connect KX-UT phone in local office. (Not remote office)
2. Change PBX setting for this extension from “Local” to “Remote”.
3. Restart KX-UT by power off and on again. Error may display but OK.
4. Dispatch KX-UT to remote office.



Destination from remote office (11.22.33.44:15060 for example) is automatically informed to KX-UT phone from PBX at step 3.



Operation is not required in remote office to connect KX-UT phone to PBX.  
All you have to do is to connect KX-UT phone to LAN in remote office.

# Chapter 4

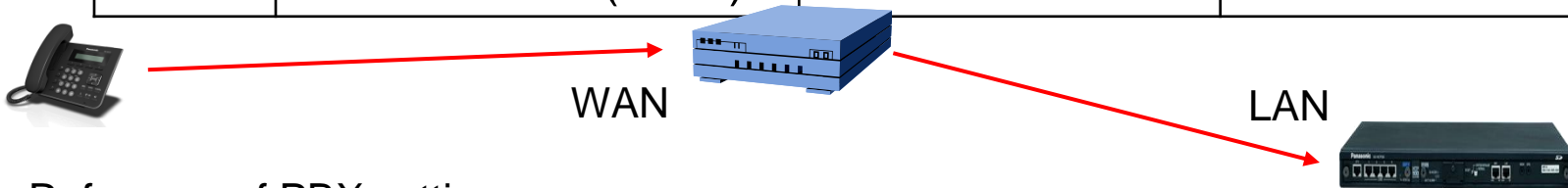
## Router Programming

Port forwarding is required for router.

# 41. Port Fwd to DSP

< for 3rd party SIP Phone / KX-NT500 / KX-UT >

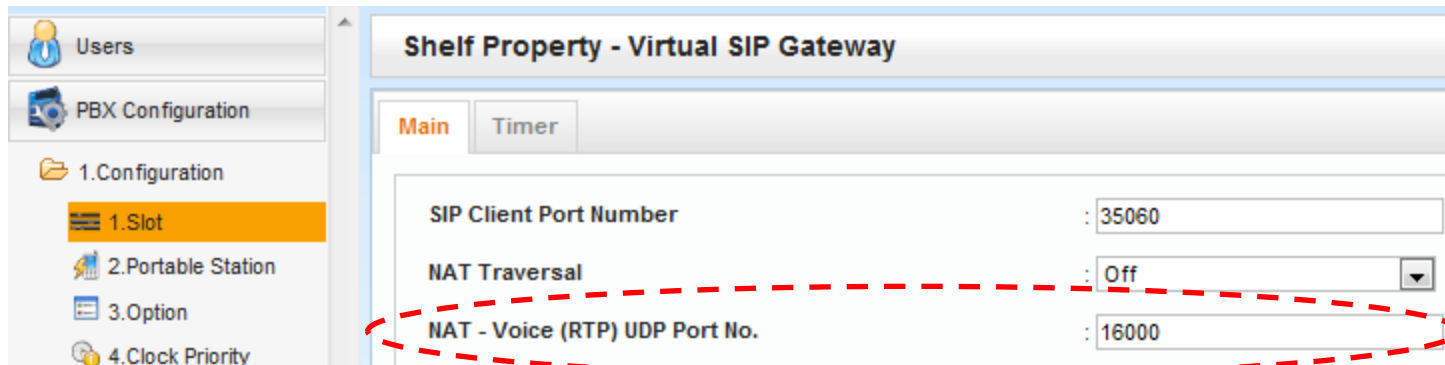
Protocol	Range of port number (WAN)	Destination	Description
RTP	16000-16511(UDP)	192.168.0.102	to DSP#1-1
	16512-17023(UDP)	192.168.0.103	to DSP#1-2
	17024-17535(UDP)	192.168.0.104	to DSP#2-1
	17536-18047(UDP)	192.168.0.105	to DSP#2-2



< Reference of PBX setting >

Default is OK.

This parameter is common for IP trunk and IP extension.



## 42. Port Fwd to PBX LAN : SIP

< for 3rd party SIP Phone >

Protocol	Port number	Destination
SIP	15060(UDP)	192.168.0.101:5060(UDP)

Port number conversion is required from 15060 to 5060.

< Reference of PBX setting >

Default is OK.

The screenshot displays the 'System Property - Site' configuration window. The left sidebar shows a tree view with 'PBX Configuration' expanded, and '1. Slot' selected under '1. Configuration'. The main panel has tabs for 'Main', 'VoIP-DSP Options', 'Port Number' (active), 'LAN Status', 'Media Relay', 'SIP Extension', and 'Echo Cancellation'. The 'Port Number' tab contains several port configuration fields:

Configuration Item	Value
Voice (RTP) UDP Port No. (Server)	12000
Voice (RTP) UDP Port No. (IP-PT / SIP-MLT)	8000
UDP Port No. for SIP Extension Server	5060
CWMP (HTTP) Port No. for SIP-MLT	7547
CWMP (HTTPS) Port No. for SIP-MLT	37547
Data Transmission Protocol (HTTP) Port No. for SIP-MLT	7580
Data Transmission Protocol (HTTPS) Port No. for SIP-MLT	37580
LOGIN Port Number	33321
CTI Port Number	33333
Built-in Communication Assistant Server	33334

A red dashed oval highlights the 'UDP Port No. for SIP Extension Server' field, which is set to 5060.

# 43. Port Fwd to PBX LAN : KX-NT500

< for KX-NT500 >

Protocol	Port number	Destination
MGCP	2727(UDP)	192.168.0.101
PTAP	9300(UDP)	192.168.0.101

< Reference of PBX setting >  
Default is OK.

The top screenshot shows the 'System Property - Site' configuration page. The left sidebar contains a tree view with 'Users' and 'PBX Configuration'. Under 'PBX Configuration', there is a folder '1. Configuration' which contains '1. Slot' (highlighted), '2. Portable Station', '3. Option', and '4. Clock Priority'. The main area has tabs: 'Main', 'VoIP-DSP Options', 'Port Number', 'LAN Status', 'Media Relay' (selected), 'SIP Extension', and 'Echo Cancellation'. Under the 'Media Relay' tab, there is a section 'IP Extension' with three settings: 'NAT - MGCP Server Port No.' set to '2727', 'Keep Alive Packet Type' set to 'Blank UDP' (via a dropdown), and 'Keep Alive Packet Sending Interval Time (s)' set to '20' (via a spinner).

The bottom screenshot shows the 'Card Property - Virtual IP Extension' configuration page. The left sidebar is similar to the top one, but '3. Option' is highlighted. The main area shows 'Shelf : Virtual' and 'Slot : 6'. There is a 'Common Settings' tab. Below it, there are two settings: 'Signalling (PTAP) UDP Port No. (Server)' set to '9300' and 'Signalling (MGCP) UDP Port No. (Server)' set to '2727'.

# 44. Port Fwd to PBX LAN : KX-UT

< for KX-UT >

Protocol	Port number	Destination
SIP	15060(UDP)	192.168.0.101:5060(UDP)
CWMP (HTTP)	7547(TCP)	192.168.0.101
CWMP (HTTPS)	37547(TCP)	192.168.0.101
SIP-MLT Data Download (HTTP)	7580(TCP)	192.168.0.101
SIP-MLT Data Download (HTTPS)	37580(TCP)	192.168.0.101
NTP	123(UDP)	192.168.0.101

< Reference of PBX setting >      Default is OK.

The screenshot shows the 'System Property - Site' configuration window. The 'Media Relay' tab is active. Under the 'UT Extension' section, the following settings are visible:

- NAT - CWMP Server (HTTP) Port No. : 7547
- NAT - CWMP Server (HTTPS) Port No. : 37547
- NAT - CWMP Server (HTTP) Port No. for Network Survivability : 7547
- NAT - CWMP Server (HTTPS) Port No. for Network Survivability : 37547
- NAT - SIP-MLT Data Download Server (HTTP) Port No. : 7580
- NAT - SIP-MLT Data Download Server (HTTPS) Port No. : 37580
- NAT - NTP Server Port No. : 123
- Keep Alive Packet Type : Blank UDP

# 45. Port Fwd to PBX LAN : KX-UT

< Reference of PBX setting >

Default is OK. (These should be blank.)

**System Property - Site**

Main VoIP-DSP Options Port Number LAN Status **Media Relay** SIP Extension Echo Cancellation

**Option**

NAT - RTP IP Address :

NAT - SIP Proxy Server IP Address :

NAT - CWMP Server IP Address :

NAT - CWMP Server IP Address for Network Survivability :

NAT - NTP Server IP Address :

\*) Perform System Reset for changes to take effect

Main VoIP-DSP Options Port Number LAN Status **Media Relay** S

**Common**

NAT - External IP Address : 11.22.33.44

This is applied to above,  
if above is blank.

## 46. Condition for External Router

Condition for external router is only as follows.

- Many port fwd setting is required as previous pages.  
But some router does not have enough number of port fwd setting.  
(Range setting is not possible.)
- New router has "SIP ALG" feature.  
But this feature should be disabled by programming.
- Some router by Cisco (Not all router by Cisco) does not have compatibility for KX-NT500 remote connection.  
When MRG feature does not work for KX-NT500, please contact us.



# Chapter 5

## KX-NS1000 Built-in Router

MRG feature can work with KX-NS1000 built-in router.

# 51. Concept of Programming

Programming (1) and (3) are required for remote connection.

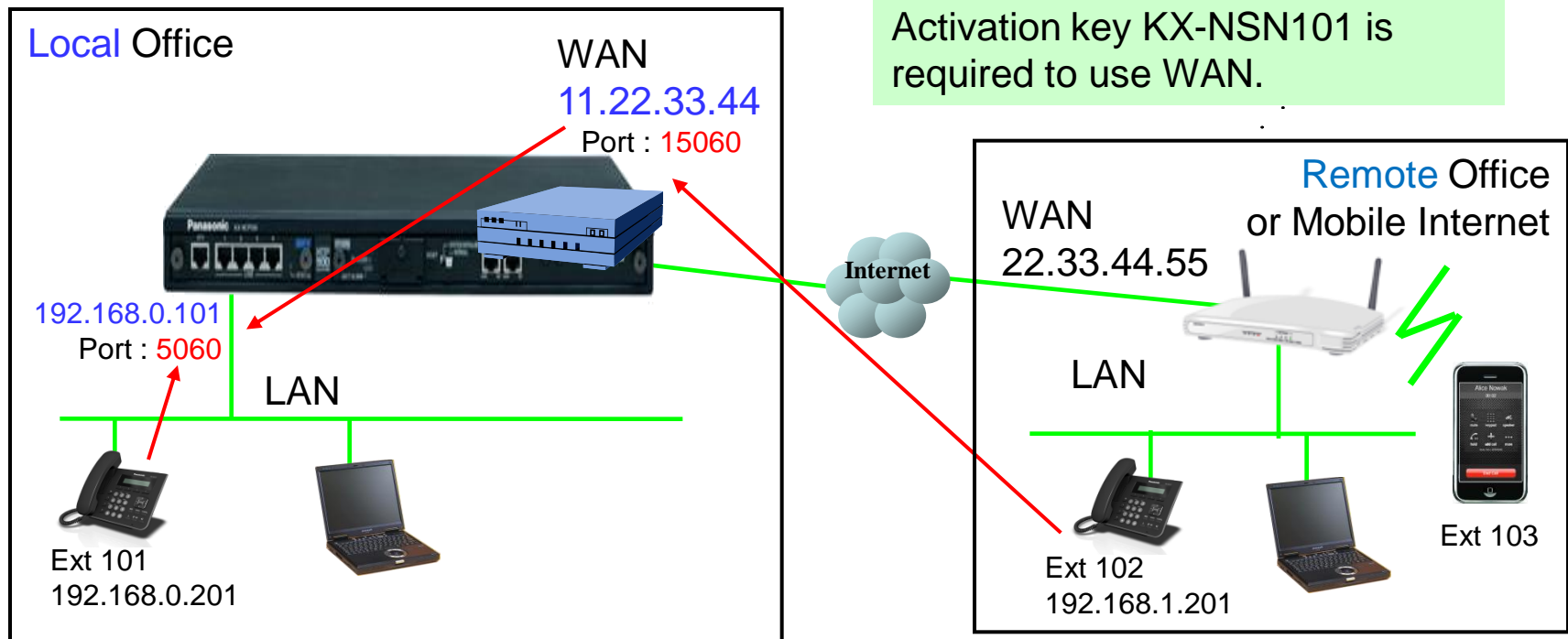
(1) PBX has to know global IP address of router. 11.22.33.44

(2) Default gateway programming 192.168.0.101 (No need)

(3) PBX has to know location of each IP extension. Local or Remote

Fixed global IP address for WAN is required as next page. 11.22.33.44

Other settings such as Port Fwd are NOT required.



## 52. IP Address for WAN

**Users**

**PBX Configuration**

**UM Configuration**

**Router Configuration**

**1.Setup**

**2.WAN**

**1.Connection Settings**

**2.Network Monitor**

**3.Protocol Bridge**

**4.Dynamic DNS**

**3.LAN**

### Connection Settings

**Connection Mode**

: Static IP

**Static IP**

**WAN IP Address**

:

**Subnet Mask**

:

**Gateway**

:

**Preferred DNS IP Address**

:

**Alternative DNS IP Address**

:

**Thank you !**

# Revision

Date	No.	Change
April 17	All	First release
May 5	46 (Page 24)	Condition for Cisco router was added.
June 2	46 (Page 24)	Condition for Cisco router was revised.