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Quick Guide: How to Setup Multi-cell in SME VoIP Network

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Adding Multiple Base Stations to Network

(Multi-cell System)

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Document History

Revision	Author	Issue Date	Comments
0.7	JMG	01-Sep-2011	New feature update
0.6	MYA	20-Dec-2010	Review of all sections
0.5	MYA	29-Oct-2010	Minor corrections, Practical configuration chapter introduced, adding extensions to network.
0.4	MYA	15-Sep-2010	With Inputs from IFJ, new section: Summary of Procedure
0.3	MYA	07-Sep-2010	Update with new Base station features, new sections.
0.2	MYA	10-Jun-2010	With inputs from LH, added Time Server requirements
0.1	MYA	09-Jun-2010	Initial Version

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Introduction: Base station Installation

This document seeks to describe how to install, add and synchronize one or multiple base stations to the network. There are two main procedures involved:

1) Proper placement of the base stations (which is usually called network dimensioning). The present document does not address this issue. Please refer to accompanying document
2) Creating and adding base station profiles to the network via the SME Configuration Tool (to form a multi-cell system).

This document describes the second procedure.

This documentation is valid for Base station firmware version 01.00 and above.

Abbreviations

For the purpose of this document, the following abbreviations hold:

DHCP:	Dynamic Host Configuration Protocol
DNS:	Domain Name Server
HTTP:	Hyper Text Transfer Protocol
IOS:	Internetworking Operating System
NAT:	Network Address Translator
PCMA:	A-law Pulse Code Modulation
PCMU:	mu-law Pulse Code Modulation
SME:	Small and Medium scale Enterprise
STUN:	Session Traversal Utilities for NAT

References

[1]: SME VoIP System Description – Installation & Configuration; Network Deployment, V1.1
[2]:

Multi-cell System

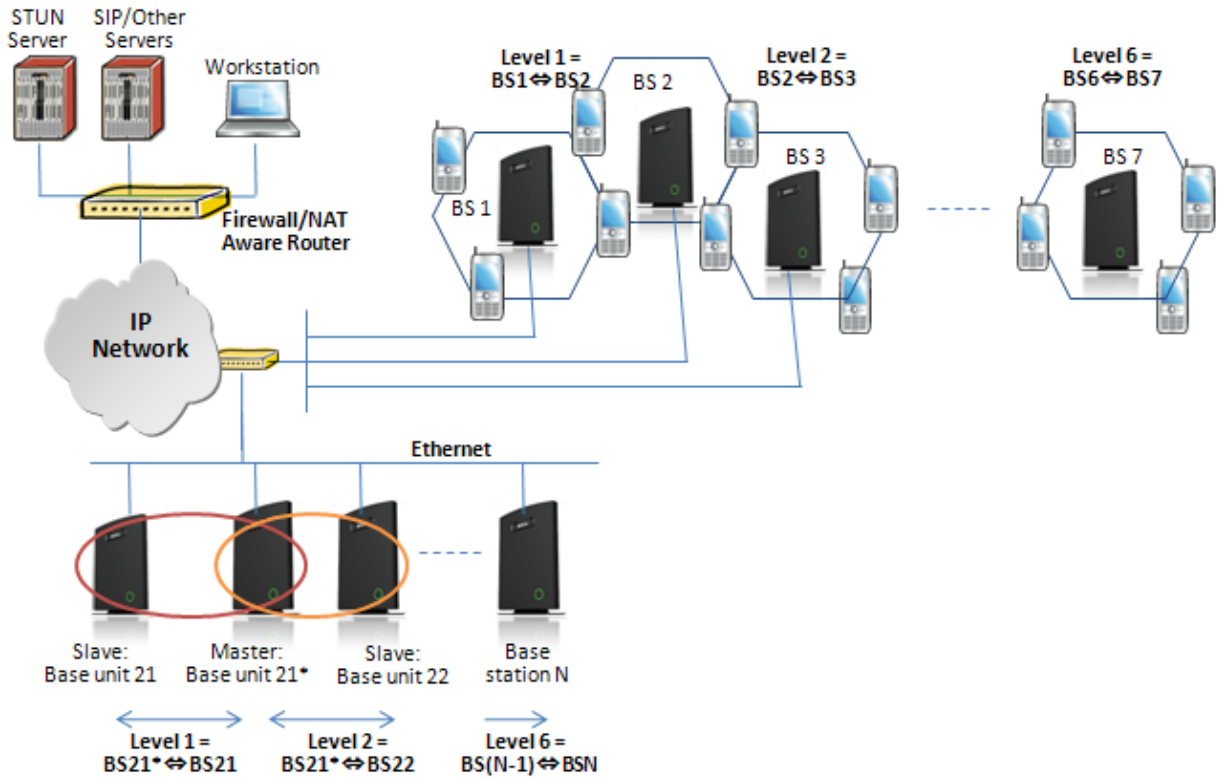
A multi-cell system has a coordinated installation of intra-system synchronized base stations, which enables seamless inter-cell handover for moving handsets.

It provides increased mobility, higher total capacity and higher quality than a corresponding number of standalone base stations.

All handsets subscribed to a multi-cell system will benefit from high voice quality and full coverage over the whole multi-cell system coverage area.

Multi-cell Configuration

A total of 40 Base stations can be hosted in a typical SME multi-cell system. At each time, a maximum of 6 levels can be formed in a multi-cell chain.
Level 1 is when Base unit 1 synchronizes to Master Base unit, and Level 2 is when Base unit 2 uses Base unit 1 as its synchronization source, in that order. We can illustrate the configuration with the figure below (Refer to STEP 13 to STEP 15 for details on how to actually set it up via SME HTTP web interface):



SME Configuration Interface

RTX have offered HTTP interface in base station that can be used as HTTP Web Server. The SME Configuration Interface can be retrieved from this HTTP Web Server in each Base station.

The HTTP Web Server is enabled in the base station by default.

NOTE This procedure is valid for Base station firmware version 01.00 and above. The system administrator must update the relevant Base station(s) to the latest firmware before proceeding to the next section. Refer to accompanied document **[1]**

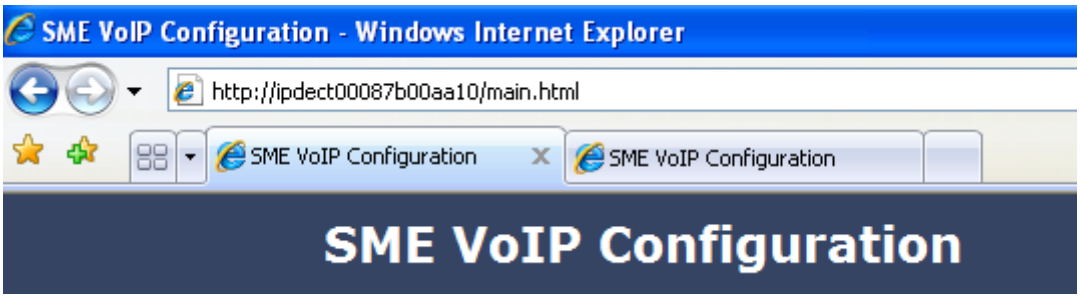
Adding Base stations via SME Configuration Interface

NOTE To use this method the network must support ipdect and the base station must be set to default state (either by web interface or hardware reset).

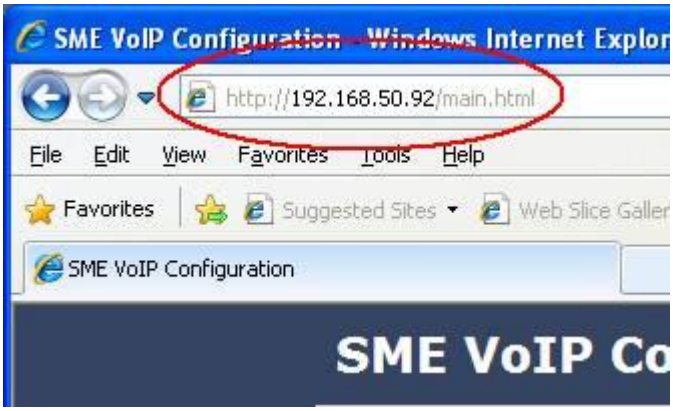
Here are the recommended steps to add Base stations to network:

STEP 1 Connect the Base station to a private network via standard Ethernet cable (CAT-5).

STEP 2 Open any standard browser and enter the address:
http://ipdect<MAC-Address-Base-Station>
for e.g. http://ipdect00087B00AA10. This will retrieve the HTTP Web Server page from the base station with hardware address **00087B00AA10**.

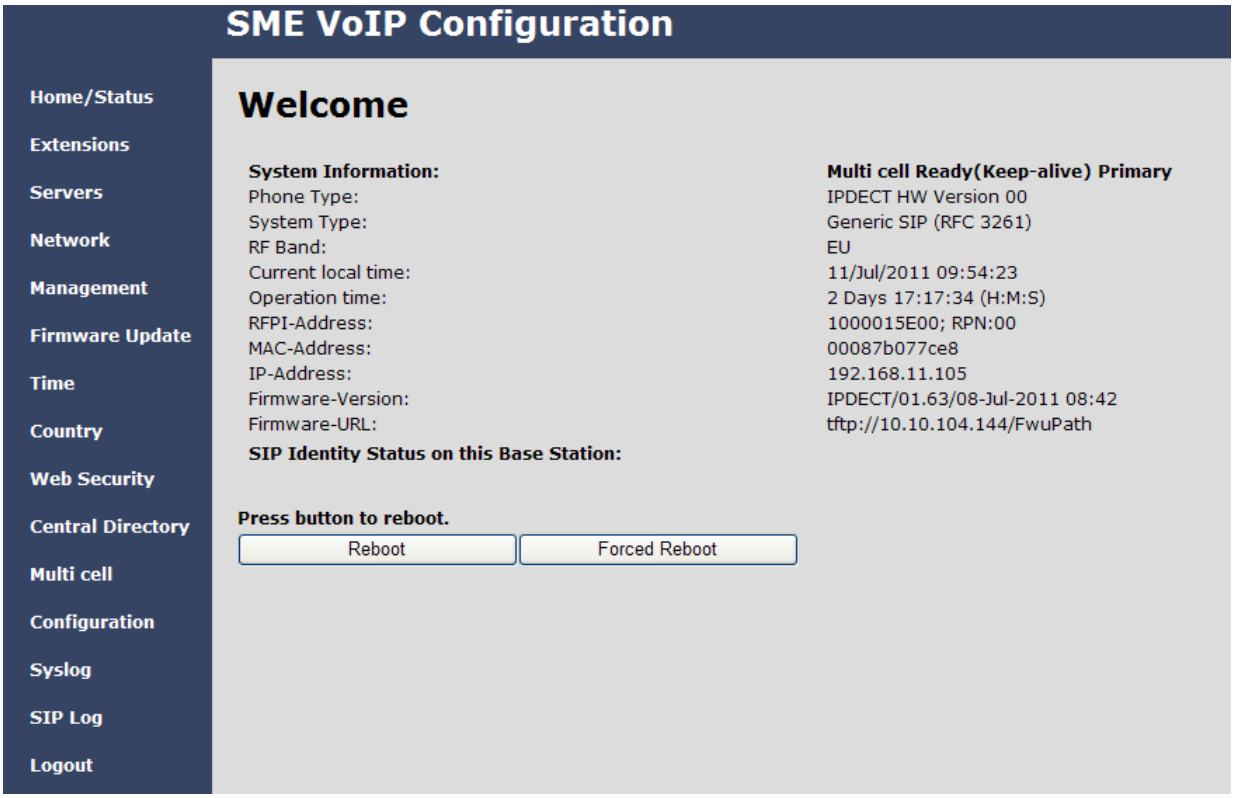


STEP 3 Skip this step if you were successful with STEP 2. If the **MAC-address** method as described above does not work, then use a standard network protocol analyzer (for e.g. **Wireshark**) to eavesdrop the IP address allocated to the base unit by the DHCP server. You can download Wireshark follow its documentation to know how it is done.
Enter the IP address into the address bar of the browser to retrieve base station HTTP Web Server Page.



STEP 4 On the Login page, enter your authenticating credentials (i.e. username and password is default “admin”). Click **OK** button.

STEP 5 Once you have authenticated, the browser will display front end of the SME Configuration Interface. The front end will show relevant information of the base station (in this case MAC-Addr: **00087B00AA10** as highlighted in the snap-shot below).



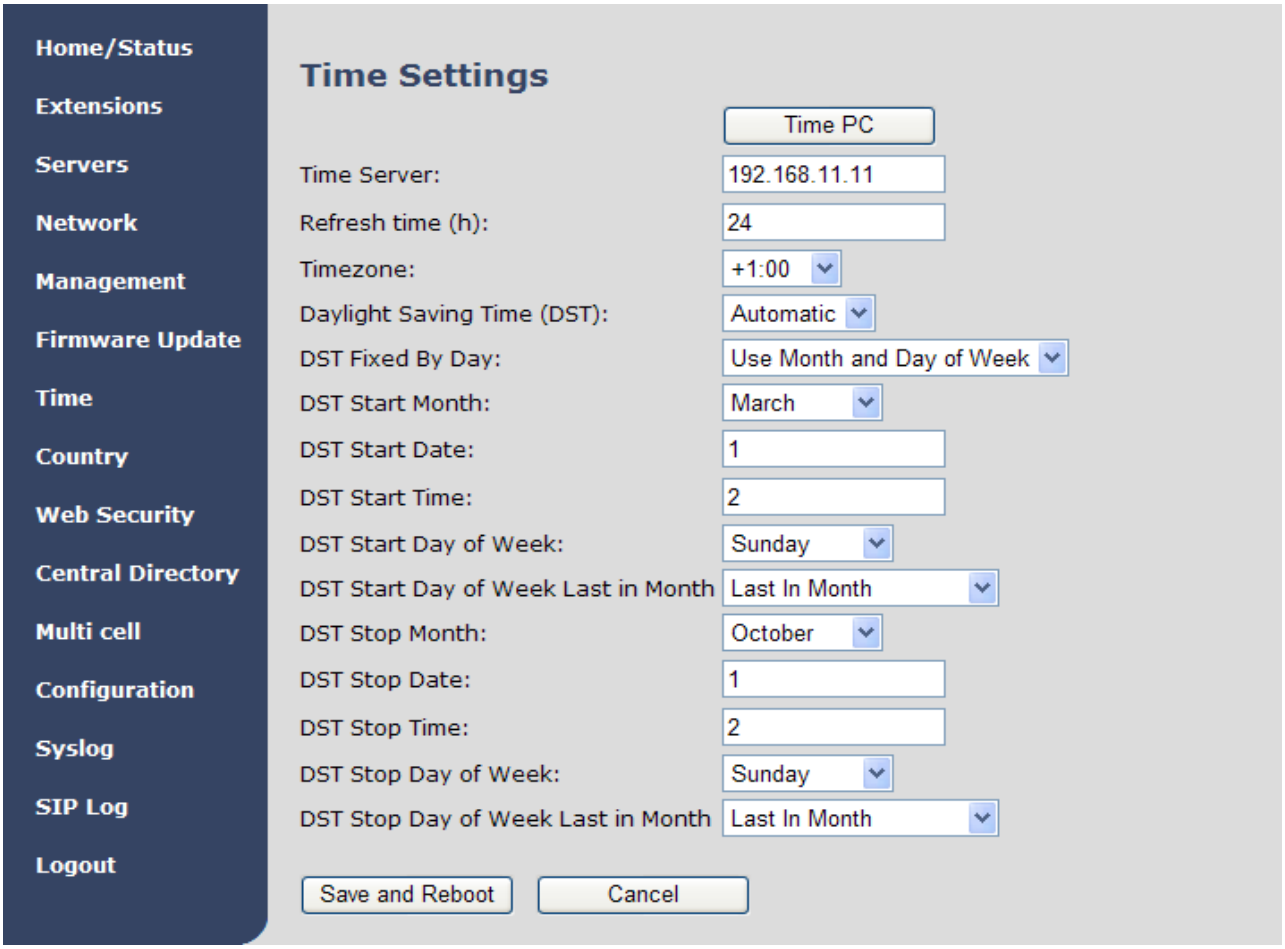
TIME SERVER SETUP

Set this Time Settings to synchronise the base station(s) time to the NTP server time or use your PC time setting.

STEP 6 Navigate to the Time settings and configure it. Scroll on the left column and click on **Time** URL link to Open the **Time Settings** Page. Enter the relevant parameters on this page and press the **Save and Reboot** button. Make sure there is contact to the "Time server" otherwise the Multi-cell feature will not work.
Alternatively use the Time PC button to get the time setting from your PC time.

Parameter	Description
Time Server	DNS name or IP address of NTP server. Enter the IP/DNS address of the server that distributes reference clock information to its clients including Base stations, Handsets, etc. **Valid Input(s):** AAA.BBB.CCC.DDD or URL (e.g. time.server.com) Currently only IPv4 address (32-bit) nomenclature is supported.
Refresh time (h)	The window time in hours within which time server refreshes. **Valid Inputs:** positive integer
Time Zone	Refers to local time in GMT or UTC format. **Min:** -12:00 **Max:** +13:00
Daylight Saving Time (DST)	Enter the start and stop dates if you select Automatic. The system administrator can Enable or Disable DST manually.

DST Fixed By Day	You determine when DST actually changes. Choose the relevant date or day of the week, etc. from the drop down menu.
DST Start Month	Month that DST begins **Valid Input(s):** Gregorian months (e.g. January, February, etc.)
DST Start Date	Numerical day of month DST comes to effect when DST is fixed to a specific date **Valid Inputs:** positive integer
DST Start Time	DST start time in the day **Valid Inputs:** positive integer
DST Start Day of Week	Day within the week DST begins
DST Start Day of Week, Last in Month	Specify the week that DST will actually start.
DST Stop Month	The month that DST actually stops.
DST Stop Date	The numerical day of month that DST turns off. **Valid Inputs:** positive integer (1 to 12)
DST Stop Time	The time of day DST stops **Valid Inputs:** positive integer (1 to 12)
DST Stop Day of Week	Day within the week DST ends
DST Stop Day of Week Last in Month	The week within the month that DST will turn off.



A successful reboot will reset the time in the base station (by pressing Save and Reboot).

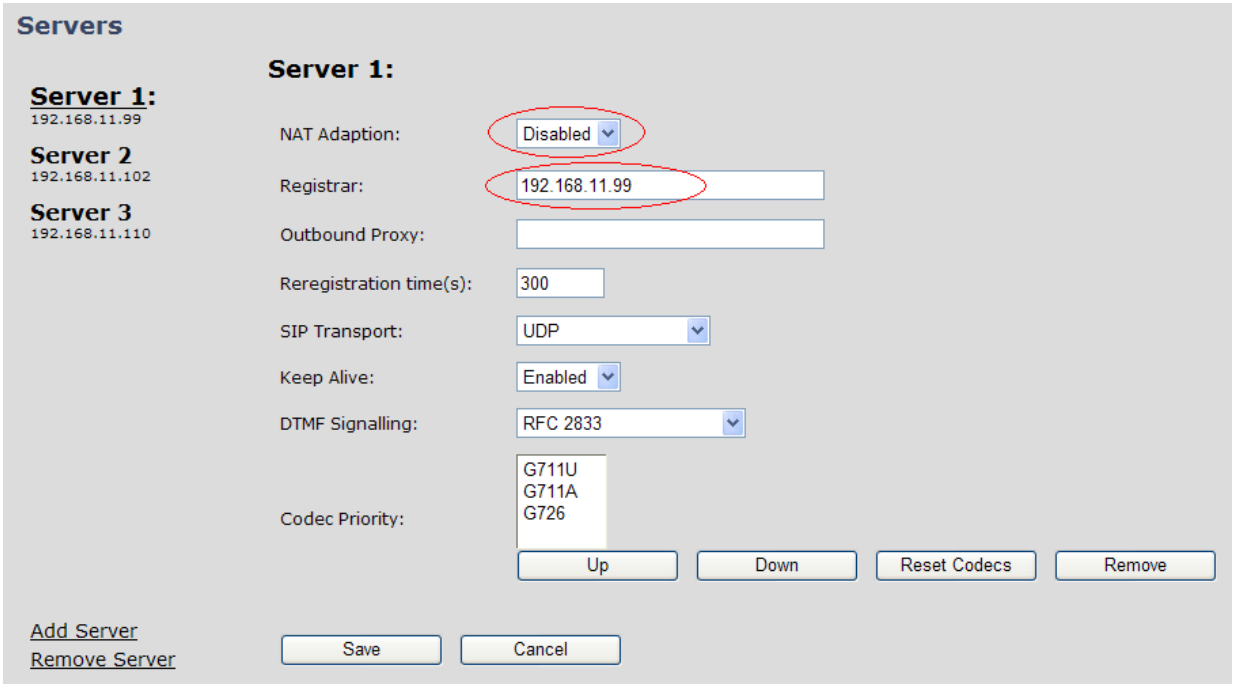
System Information:	**Multi cell Ready(Keep-alive) Primary**
Phone Type:	IPDECT HW Version 00
System Type:	Generic SIP (RFC 3261)
RF Band:	EU
Current local time:	11/Jul/2011 10:11:29
Operation time:	2 Days 17:34:39 (H:M:S)
RFPI-Address:	1000015E00; RPN:00
MAC-Address:	00087b077ce8
IP-Address:	192.168.11.105
Firmware-Version:	IPDECT/01.63/08-Jul-2011 08:42
Firmware-URL:	tftp://10.10.104.144/FwuPath

SIP SERVER (OR PBX SERVER) SETUP

STEP 7 Create the relevant SIP server (or PBX Server) information in the system. Each service provider/customer should refer SIP server vendor on how to setup SIP servers.
Click the link "**Server"** at the left hand column of home page, where you can add your SIP server for base station use.
Next, from the Server page, click on the **Add Server** URL and enter the relevant SIP server information (an example is shown below).

Choose "**Disabled**" on NAT adaption parameter if NAT function of the SIP aware router is not enabled. Enter the relevant parameters based on the description in the table below. Select **Save** button.

Parameter	Description
NAT Adaption	To ensure all SIP messages goes directly to the NAT gateway in the SIP aware router. NAT Adaption option should be **"Disabled"** or otherwise choose **"Enabled"** **Possible value(s):** Enabled, Disabled
Registrar	SIP Server proxy DNS or IP address **Permitted value(s): AAA.BBB.CCC.DDD:<Port-Number> or <URL>:<Port-###>** **Note:** Specifying the Port Number is optional.
Outbound Proxy	This is a Session Border Controller DNS or IP address (OR SIP server outbound proxy address) Set the Outbound proxy to the address and port of private NAT gateway so that SIP messages sent via the NAT gateway. **Permitted value(s): AAA.BBB.CCC.DDD or <URL> or <URL>:<Port-###>** **Examples:** "192.168.0.1", "192.168.0.1:5062", "nat.company.com" and "sip:nat@company.com:5065".
Re-registration time	The window period (in seconds) when base stations SIP registers with SIP server. **Permitted value(s):** Positive number (integer)
SIP Transport	SIP network protocol to use. **Possible option(s):** UDP, TCP, UDP and TCP
Keep Alive	This directive defines the window period (30 secs.) to keep opening the port of relevant NAT-aware router(s), etc. **Possible option(s):** Enabled, Disabled
DTMF Signaling	Conversion of decimal digits (and '*' and '#') into sounds that share similar characteristics with voice to easily traverse networks designed for voice **Possible option(s)** **In band:** Meta-data (e.g.: tone digits) and control information sent in the same voice band, using the same VoIP codec as the human voice (e.g. G.711, G.729, etc.) **SIP INFO:** Carries application level data along SIP signaling path (e.g.: Carries DTMF digits generated during SIP session OR sending of DTMF tones via data packets in the same internet layer as the Voice Stream, etc.). **RFC 2833:** DTMF handling for gateways, end systems and RTP trunks (e.g.: Sending DTMF tones via data packets in different internet layer as the voice stream) **Both:** Enables SIP INFO and RFC 2833 modes.
Codec Priority	Defines the codec priority that base stations uses for audio compression and transmission. **Possible option(s):** PCMU, PCMA, G726, G722.



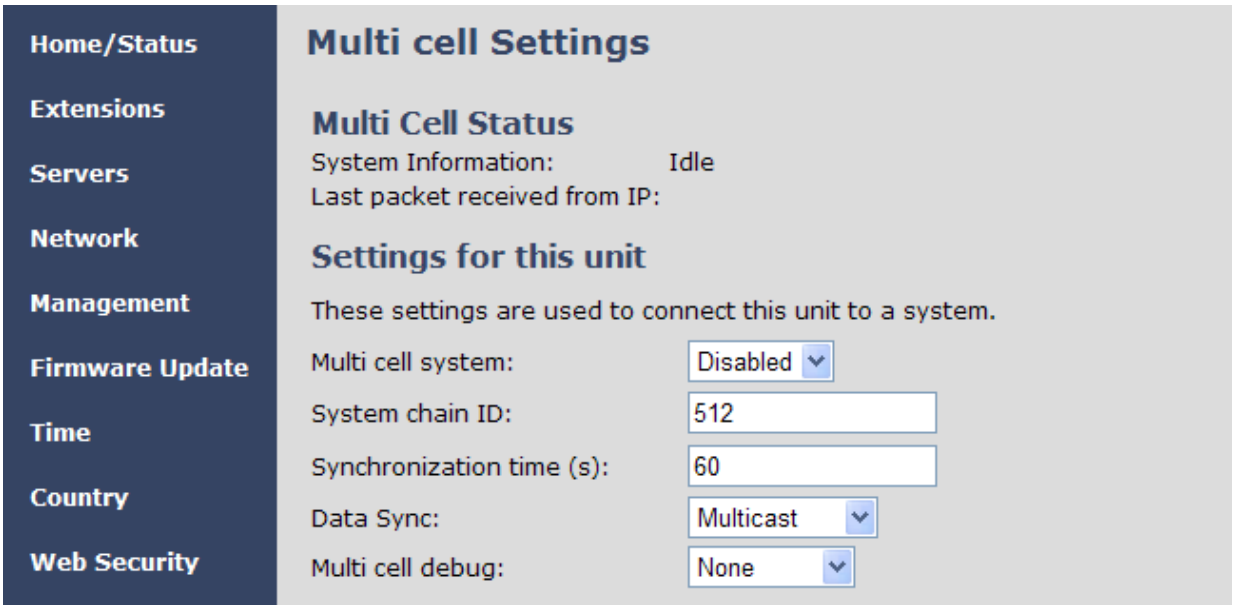
MULTI-CELL SETUP

STEP 8 Scroll down and Click on **Multi Cell** URL link in the **SME VoIP Configuration** to view the current **Multi cell settings** status of the current base station. Normally, most brand new base stations have **Multi cell system** feature disabled by default. Multi Cell Status shows the system information and last packet received from a base station in the chain.

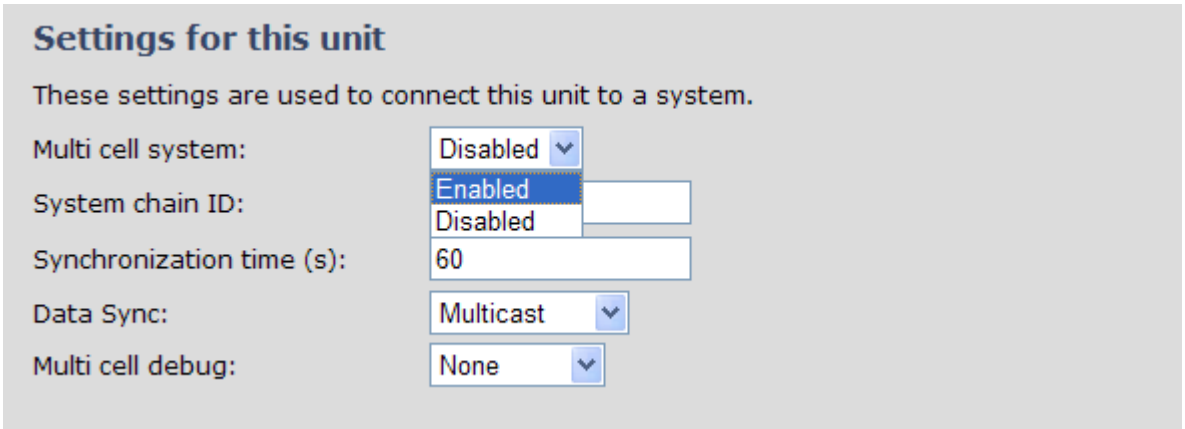
Description of Settings for Specific Base units is as follows:

Parameter	Description
Multi cell system	Enable this option to allow the Base unit to be set in multi-cell mode (can be set either as Primary or Secondary in the multi-cell chain system – refer to **MAC-units in Chain** section for details). **Possible options:** Enabled, Disabled
System chain ID	This is an identifier (in string format e.g. 12345) that is unique for a specific multi-cell system. **Note:** There can be several multi-cell systems in SME network. Up to 6 levels of base stations chains are permitted in a typical setup. Please refer to accompanied document **[2]** for further details and description. **Valid input:** 16 bit String length
Synchronization time (s)	This specifies the period in seconds when elements/nodes (e.g. Base units) in a specific Multi-cell should synchronize to each other. **Permitted value(s):** Positive number (integer)
Primary Data Sync IP	When Data Sync Peer-to-Peer is selected this option is visible. Enter the IP address of the base that should be primary synchronizing base (the one other base mainly sync. to). It is advisable to set this base to a static IP address. **Permitted value(s): AAA.BBB.CCC.DDD**

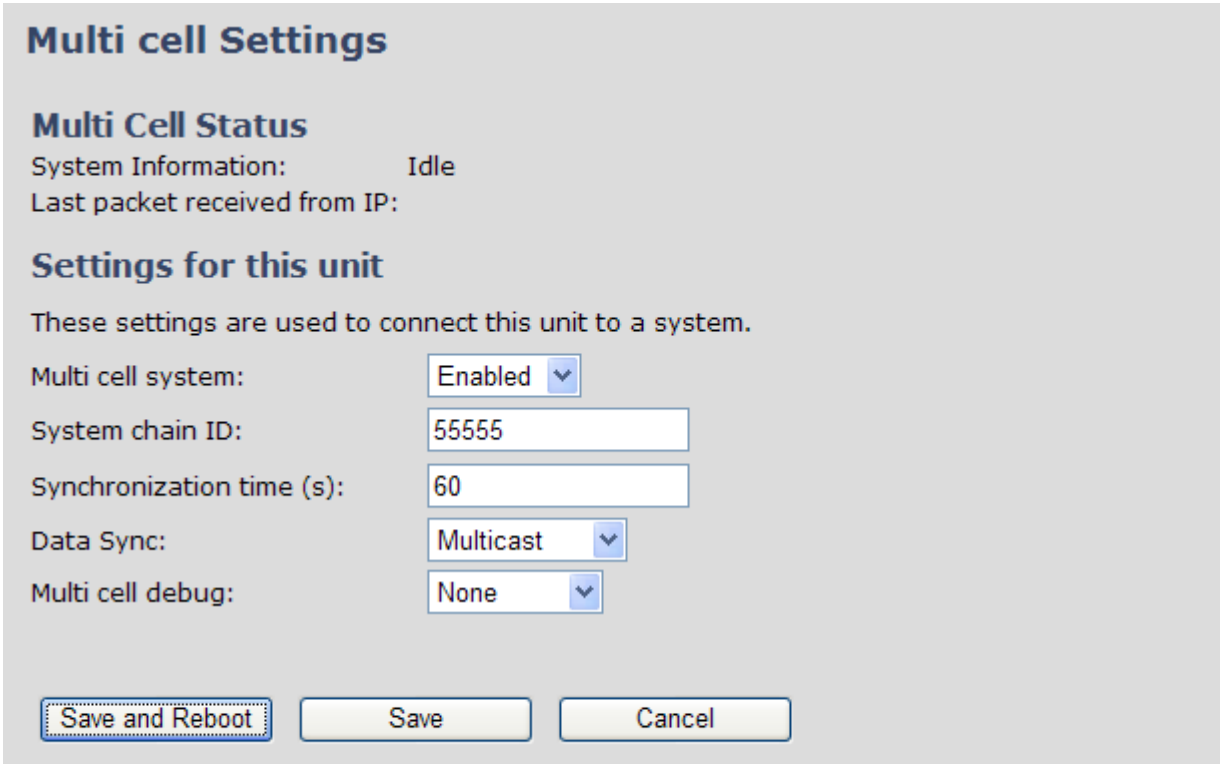
Data Sync	This specifies how the data is synchronized between base stations, multicast allows one primary and peer-to-peer allows several primaries. **Possible options:** Multicast, Peer-to-Peer
Multi cell debug	Enable this feature, if you want the system to catalogue low level multi-cell debug information or traces. **Possible options:** None, Data Sync, Auto Tree, Both



STEP 9 Next, the system administrator needs to create and Enable Multi Settings profile for the current base station. On the **Multi Cell settings** Page, choose **Enabled** option from the drop down menu of the **Multi cell system** parameter. Enable the **Multi cell debug** option if the system administrator wants some Multi-cell related logs to be catalogued by the system.



STEP 10 On the same **Multi Cell Settings** page > Enter the relevant values for **System chain ID** and **Synchronization time (s)** respectively. The **System chain ID** is a geographically unique DECT cell identity allocated to bridge several base stations together in a chain. An example is **55555**. The **Synchronization time (s)** parameter is defined as window/period of time in seconds a specific base station synchronises to the Primary base station unit (by default 60).



Click on **Save and Reboot** button to keep modified changes of multi cell settings into the base station.

NOTE The Multi Cell data synchronization ONLY works when the relevant **Time Server** is set in the system before Server/Subscriber profile is added or created. Refer to **STEP 6**.

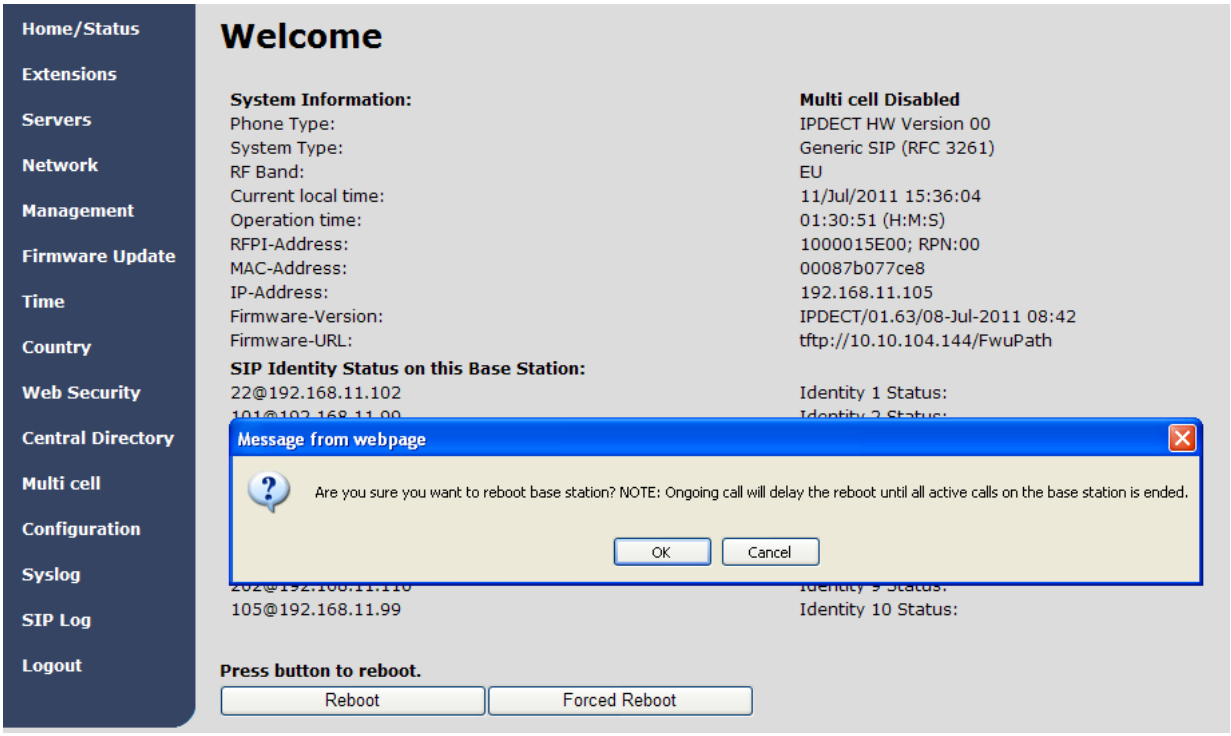
IMPORTANT:
Base stations must be rebooted after the time server has been set

STEP 11 Repeat **STEP 1-10** as explained above for each base stations.

IMPORTANT:
It takes up to 5 minutes (synchronization time) to add a new base station to a Multi Cell System.

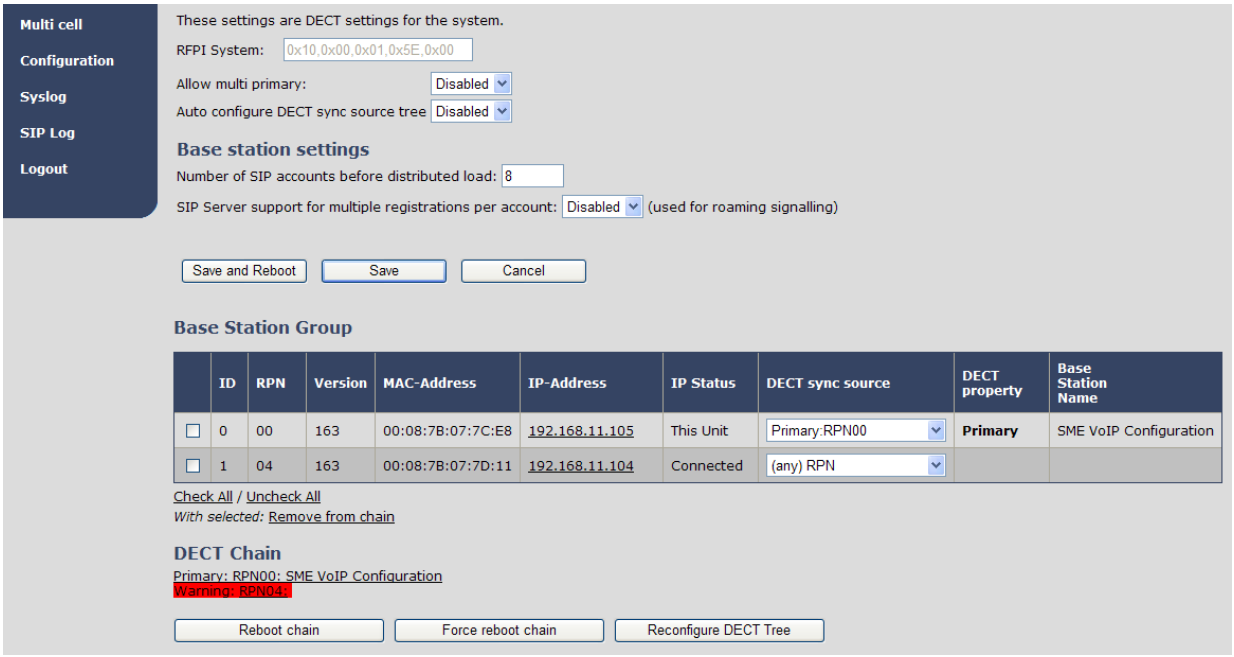
Synchronizing the Base stations

STEP 12 On each **SME VoIP Configuration** interface for the base station(s) navigate to the Home/Status page and Click the Reboot button.



This will trigger **Are you sure you want to reboot base station?** window. Click **OK** button on this window. A successful restart of the base stations will lead to a display of the page: **Base Station has been reset**.

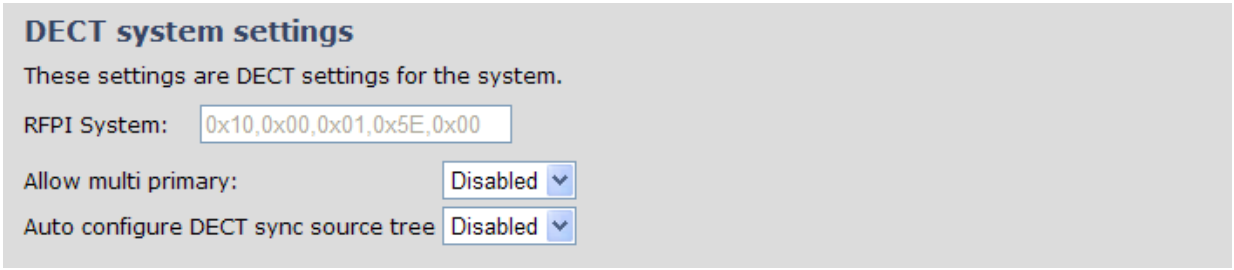
STEP 13 Navigate back to the **Multi cell settings** page by clicking **Multi-cell** URL link at the left column. The revised **Multi cell settings** page shows the relevant base stations synchronized together. By default, the system uses the first registered base station as the Primary base unit.



STEP 14 On the Multi-cell settings page, scroll to the **DECT system settings** and Enable or Disable the "**Auto configure DECT sync source tree**" (See description in the table below). Usually the DECT system RFPI parameter is computed by the system (It's often greyed in a multi-cell system configuration).

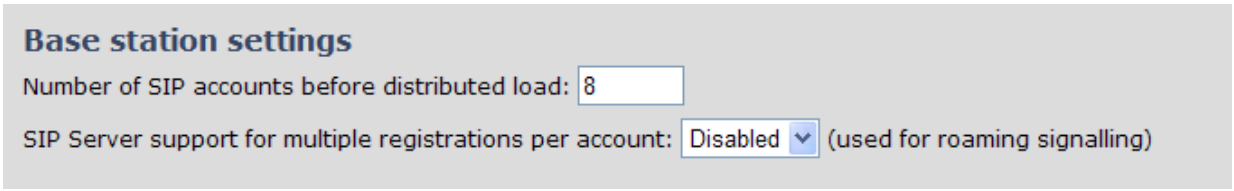
Parameter	Description
DECT system RFPI	This is a radio network identity accessed by all Base units in a specific multi-cell system. It composed of 5 octets. It is actually 5 different variables combined together. **RFPI Format:** XX XX XX XX XX (where XX are HEX values) **Note:** Only type e.g. 11 6E 60 49 04 the system reformats as 0x11 0x6E 0x60 0x49 0x04 **Access Rights Class (ARC):** Defines network identity structure used by terminals especially in multi-cell environment. **Fixed/default Value**=1 (Private multi-cell system). **RFPI:** 1X XX XX XX XX **Equipment Installer's code (EIC):** Code that allows terminals to distinguish between separate DECT networks. **Example_RTX_EIC:** 0x16E6 (May change in the future) **RFPI:** 11 6E 6X XX XX **Fixed Part Number(FPN):** Is a geographically unique identity transmitted to DECT networks to help PP distinguish between base station communications in different cells/multi-cell systems. **E.g. FPN:** 0x049 **RFPI:** 11 6E 60 49 XX **Location Area Length (Lal):** A unique code sent to the terminal during location registration to determine the size of the location or cell area. **Type:** 8-bit value (from 0x00 to 0xFF). **E.g Lal**=0x04 **RFPI:** 11 6E 60 49 04

Allow multi primary	Enable this to allow more than one primary in the DECT chain (when automatically configured). Note –this option will not block for multi primary if the chain is manually configured. **Possible options:** Enabled, Disabled
Auto create multi primary	When Allow multi primary is enabled this option is visible. Enabling this option will automatically create primary bases, but be aware that if this option is enabled it can create (in some situations) unwanted primary bases. **Possible options:** Enabled, Disabled
Auto configure DECT sync source tree	Enable this to allow the network to automatically synchronize the multi-cell chain tree – activating "Reconfigure DECT Tree" automatically. (Not available in some base station firmware(s)). **Possible options:** Enabled, Disabled



STEP 15 Scroll to the **SIP system settings** section, configure and save the parameter based on the description below:

Parameter	Description
## of SIP accounts before distributed load	The maximum number of handsets or SIP end nodes that are permitted to perform location registration on a specific Base unit before load is distributed to other base units. **Note:** A maximum of 8 simultaneous calls can be routed through each Base unit in a multi-cell setup. **Permitted Input:** Positive Integers (e.g. 6)
SIP Support for multiple registrations per account	Enable this option so it is possible to use same extension (i.e. SIP Account) on multiple phones (SIP end nodes). These phones will ring simultaneously for all incoming calls. When a phone (from a SIP account group) initiates a handover from Base X to Base Y, this phone will de-register from Base X, and register to Base Y after a call. **Note:** Choose **Enabled** when the SIP server supports this feature otherwise choose **Disabled** for the Sip server does not support this feature. **Permitted Input:** Enabled, Disabled

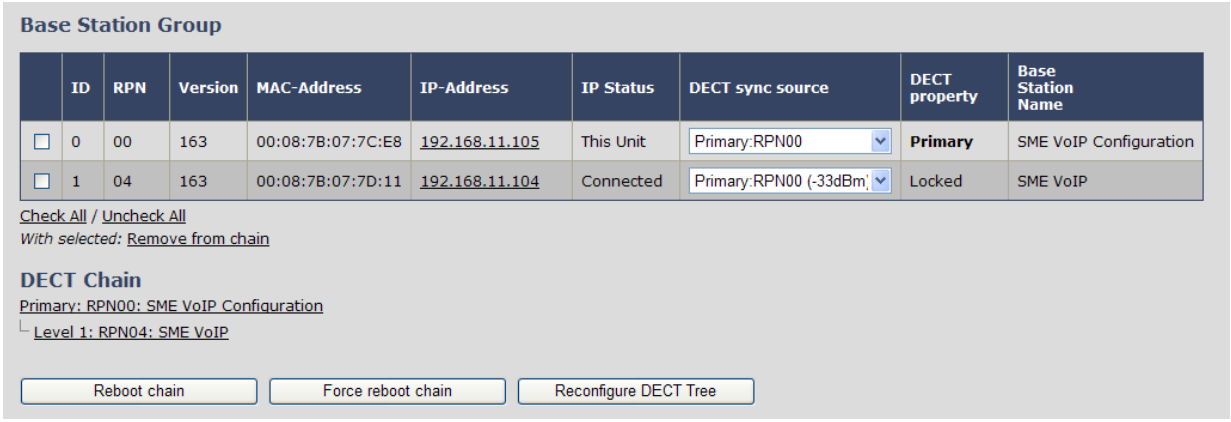


STEP 16 Next, on the **MAC-units in chains** section, you can manually configure the synchronisation source tree of the multi-cell system. Multi-cell settings page, scroll to the DECT system settings and Enable or Disable the "**Auto configure DECT sync source tree**" (See description in the table below). Usually the DECT system RFPI parameter is computed by the system (Its often grayed in a multi-cell system)

Parameters	Description
ID	Base unit identity in the chained network. **Permitted Output:** Positive Integers
RPN	The Radio Fixed Part Number is an 8-bit DECT cell identity allocated by the installer. The allocated RPN within the SME must be geographically unique. Base stations' and repeater's RPN must only differ on least significant bits that are masked out by the handover mask. **Permitted Output:** 0 to 255 (DEC) **OR** 0x00 to 0xFF (HEX)
Version	Base station current firmware version. **Permitted Output:** positive Integers (for e.g. 34)
MAC-Address	Contains the hardware Ethernet MAC address on the base station. It varies from Base station to Base stations. **Min. Value:** 0 (i.e. last 4 HEX digits of 0x00087B07**0000**, may change in the future) **Max. value:** 65535 (i.e. last 4 HEX digits of 0x00087B07**FFFF**, may change in the future)
IP-Address	Base station current IP address (static or assigned by DHCP server in network, depending on IP settings in Network settings page).
IP Status	Current Base station behaviour in the SME network. **Possible Outputs** **Connected:** The relevant Base station(s) is online in the network **Connection Loss:** Base station unexpectedly lost connection to network **This Unit:** Current Base station whose http Web Interface is currently being accessed
DECT Sync source	The administrator should choose the relevant "multi cell chain" level its wants a specific Base unit be placed. Maximum number of "multi-cell chain" levels is 6.
DECT Property	Base station characteristics in connection to the current multi cell network. **Possible Output(s)** **Primary:** Main Base station unto which all other nodes in the chain synchronises to. **Locked:** The Base unit is currently synchronized and locked to the Primary Base unit. **Searching:** Base unit in the process of locating to a Primary/Secondary as specified in Dect sync source **Free Running:** A locked Base unit that suddenly lost synchronisation to the Primary. **Unknown:** No current connection information from specific Base unit
Base Station Name	Name of the base station (from the Management settings page).

DECT Chain Buttons

Reboot chain: Reboots all the bases in the chain (do not reboot bases that are active).
Force reboot chain: Forcing a reboot of all the bases in the chain (used if calls must be interrupted).
Reconfigure DECT Tree: Reconfigure the network to synchronize the multi-cell chain tree once, depending on the settings in “DECT system settings”.



Summary of Procedure – Creating a Chain

We enumerate the short version of how to add 3 base stations units in a multi-cell setup. This can be applied for up to N number of base units. The procedure below is valid ONLY for base station firmware version 00.36 and above.

This procedure is divided into four (4) main stages. Apply this procedure if all base units are straight from production.

Stage 1

Skip this stage if relevant base stations are already in the network.

a) Add 3 base stations i.e. RFP1, RFP2, RFP3 > Disable the "Multi cell system" option and "Save"
b) RFP1, RFP2, RFP3: Reboot from the HTTP SME Configuration Main Page
c) RFP1, RFP2, RFP3: Default by pressing reset button 12-sec.

Stage 2

Choosing 1st base unit i.e. RFP1 as Primary

a) RFP1: Define Time server and "Save" from the **Time** page
b) RFP1: Reboot
c) RFP1: Press "Add server" and define SIP server IP and "Save" from the **Servers** page
d) RFP1: Multi cell system = enabled and "Save" from the **Multi-cell** page
e) RFP1: Reboot (Verify from Debug log "**SYNCMGR: This base is ready to be Primary in a Chain**")

Stage 3

Choose another base unit, RFP2 as Secondary1

a) RFP2: Multi cell system = enabled and "Save"
b) RFP2: Reboot (Verify from Debug log "**SYNCMGR: This base is ready to join into another Chain**")
c) RFP1, RFP2: Wait 2min for stable Primary-Secondary chain (check for the message: **SYNCMGR: Socket#10 creation success**)

Stage 4

Choose the 3rd base unit, RFP3 as Secondary2

d) RFP3: Multi cell system = enabled and "Save"
e) RFP3: Reboot (Verify Debug log "SYNCMGR: This base is ready to join into another Chain")
f) RFP1, RFP3: Wait 2min for stable Primary-Secondary chain (SYNCMGR: Socket#10 creation success)
g) RFP3: Check mark ID2/RPN08 and select dropdown "1 – RPN: 04" and "Save"
h) RFP3: Reboot (**SYNCMGR: Socket#8 creation success**)

Multi-cell chain of 3 base stations has been created successfully. Next step involves adding extensions to the system.

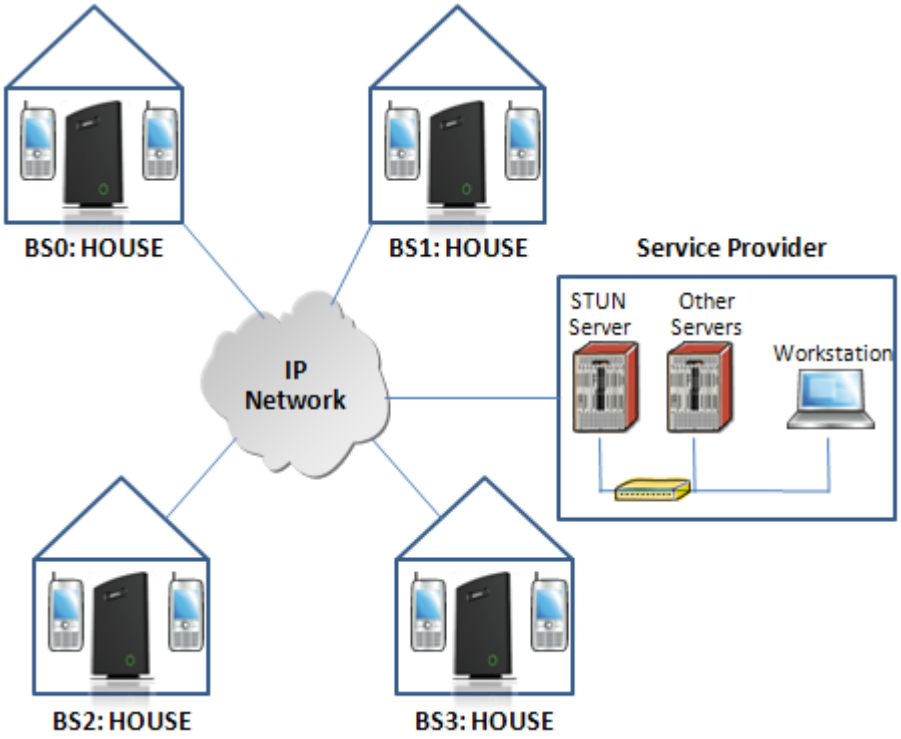
Practical Configuration of Multi-Cell System

In this chapter we describe what exactly to configure in the SME VoIP Configuration Interface ensure these scenarios really work.

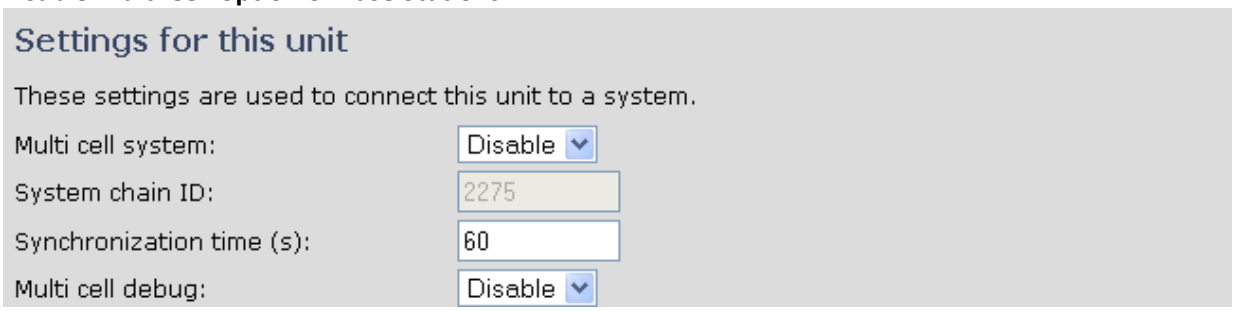
Case ##1: Isolated Buildings

Example includes Branch or small office, Retail outlet or store, etc. The optimal configuration for isolated buildings is standalone base stations setting. In this setting, you must:

A. Using the figure below as illustration, log into the Configuration Interface of each base station.
B. Configure the Time Server, SIP Server, Extensions as described in the previous chapters.
C. On the main page of the configuration interface, click **Network** URL > disable the Multi-cell parameter of each base station > Save and Reboot each base to complete the Case ##1 setup.



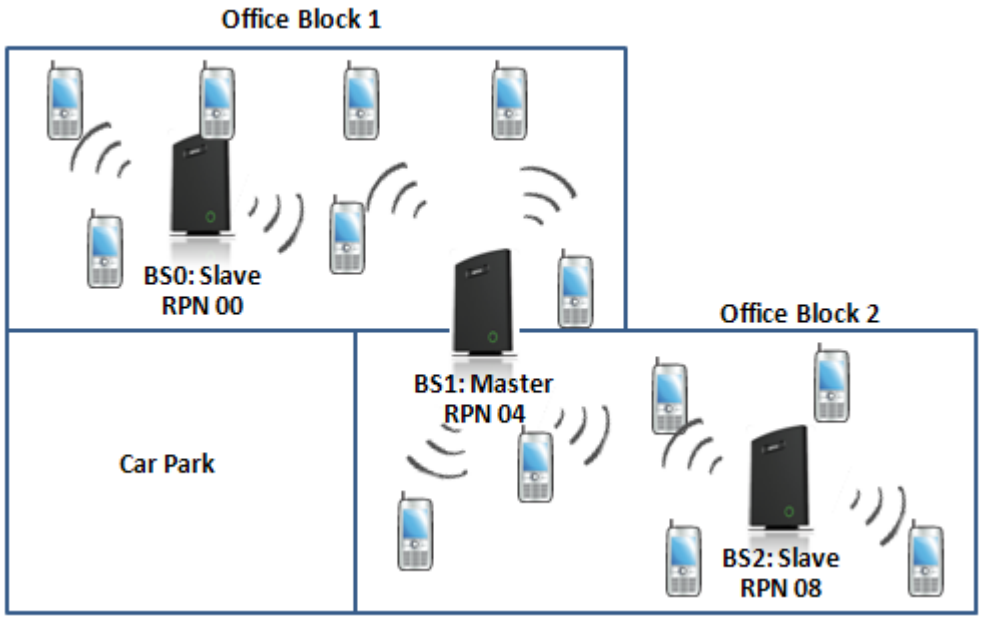
Disable Multi Cell option of Base Stations



Case ##2: Location with co-located partners

Example includes Department shops, Retail location with co-located photo kiosk or pharmacy, etc.
To illustrate this setup, two Secondary base stations are synchronised to one Primary base in the two office blocks.
It is not necessary to deploy a dedicated Base unit at the car park area because it is likely no telephony traffic or call will be placed at the area. Here is diagram to illustrate Case ##2.

Here is diagram to illustrate Case ##2.



The procedure:

STEP 1 Follow the steps described in STAGES 1 to 4
STEP 2 On the **Network** page of each base define the **DECT sync source** settings as illustrated in the table below.

Save and reboot each base to complete case ##2 setup

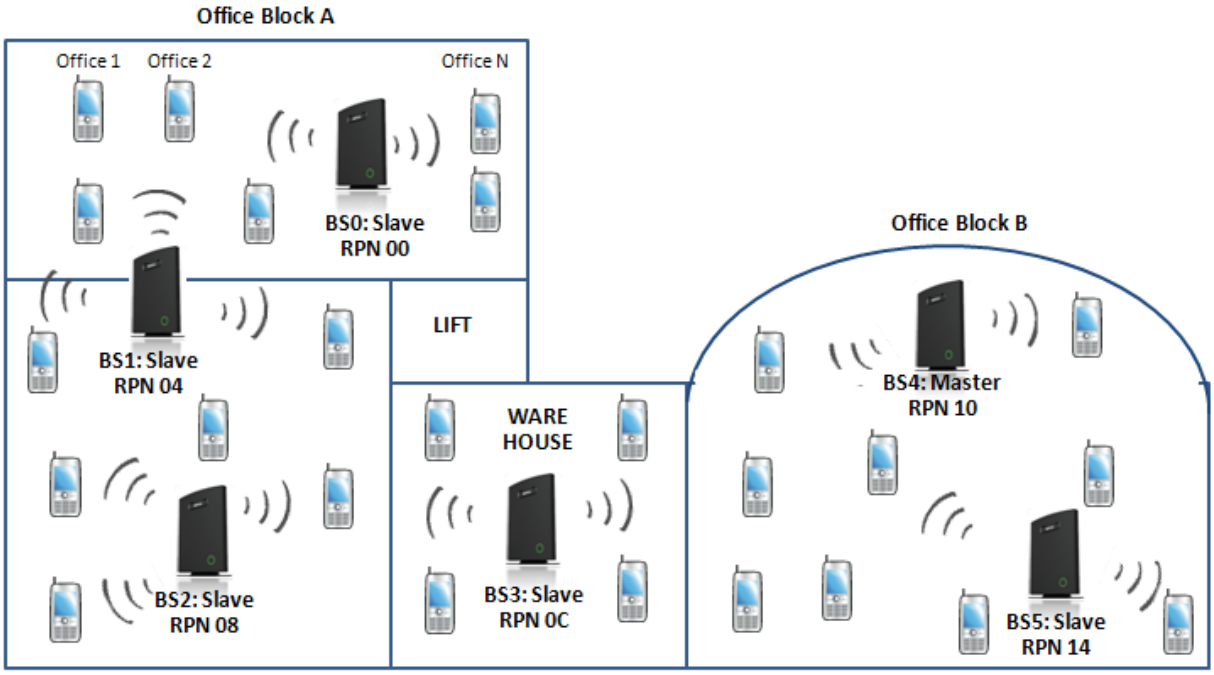
Multi Cell Page of Base Stations

Recommended settings of MAC-units in Chain section of page (Other different settings exist):

ID	RPN	Version	MAC-Address	IP-Address	IP Status	DECT sync source	DECT Property	Base Station Name
0	00	XX	XX:XX:XX…	XXX.XXX…	Connected	Primary: RPN04	Locked	Base1
1	04	XX	XX:XX:XX…	XXX.XXX…	This Unit	Primary: RPN04	Primary	Base2
2	08	XX	XX:XX:XX…	XXX.XXX…	Connected	Primary: RPN04	Locked	Base3

Case ##3: Large to Medium Sized Enterprises

In this scenario, we have five Secondary bases synchronized to one Primary base. The Primary base is located in office block B while the Secondary bases are spread across the whole enterprise. No base station is deployed in the lift because it has high attenuation properties that will drastically reduce radio signals. Example of this deployment Corporate headquarters, Harbor areas, Campus



The procedure:

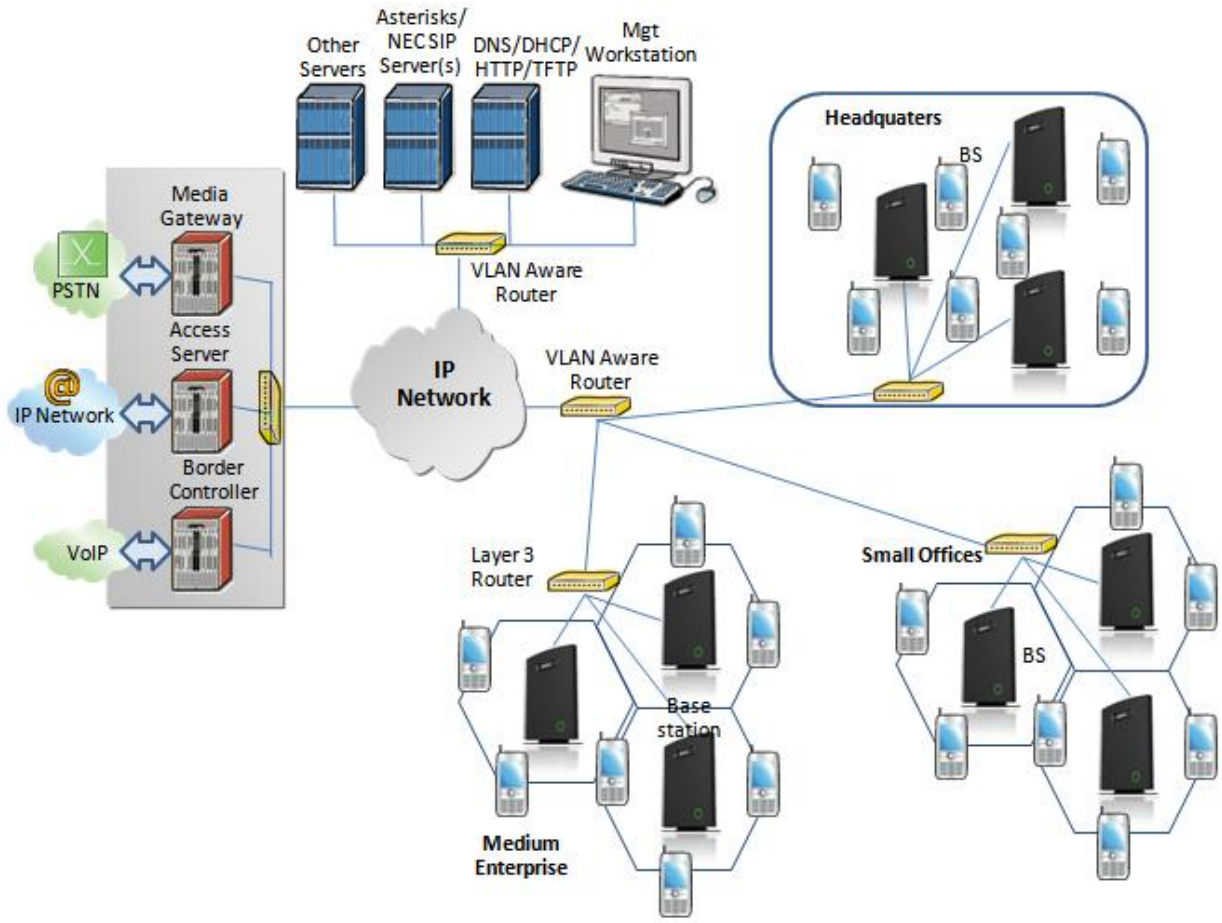
A. Follow the steps described in STAGES 1 to 4
B. On the **Network** page of each base define the **DECT sync source** settings as illustrated in the table below.
C. Save and reboot each base to complete case ## 3 setup

Multi Cell Page of Base Stations
Recommended settings of MAC-units in Chain section of page (Other valid setting exists):
Note: The number of chains cannot exceed 6 levels.

ID	RPN	Version	MAC-Address	IP-Address	IP Status	DECT sync source	DECT Property	Base Station Name
0	00	XX	XX:XX:XX…	XXX.XXX…	Connected	Level 3: RPN04	Locked	Base1
1	04	XX	XX:XX:XX…	XXX.XXX…	Connected	Level 2: RPN08	Locked	Base2
2	08	XX	XX:XX:XX…	XXX.XXX…	Connected	Level 1: RPN0C	Locked	Base3
3	0C	XX	XX:XX:XX…	XXX.XXX…	Connected	Primary: RPN10	Locked	Base4
4	10	XX	XX:XX:XX…	XXX.XXX…	This Unit	Primary: RPN10	Primary	Base5
5	14	XX	XX:XX:XX…	XXX.XXX…	Connected	Primary: RPN10	Locked	Base6

Case ##4: Large Enterprises at Different Locations

In this scenario, multi-cell systems are deployed at different locations; geographically separated from each other. Each location has a Primary base station with more than one Secondary base synchronize to it.



The procedure:

- **A.** Follow the steps described in STAGES 1 to 4
- **B.** On the **Network** page of each base define the **DECT sync source** settings as illustrated in the table below.
- **C.** Save and reboot each base to complete case ## 4 setup

Multi Cell Page of Base Stations

Recommended settings of MAC-units in Chain section of page (Other valid setting exists):

ID	RPN	Version	MAC-Address	IP-Address	IP Status	DECT sync source	DECT Property	Base Station Name
0	00	XX	XX:XX:XX…	XXX.XXX…	This Unit	Primary: RPN00	Primary	Base1
1	04	XX	XX:XX:XX…	XXX.XXX…	Connected	Primary: RPN00	Locked	Base2
2	08	XX	XX:XX:XX…	XXX.XXX…	Connected	Level 1: RPN04	Locked	Base3
3	0C	XX	XX:XX:XX…	XXX.XXX…	Connected	Primary: RPN0C	Primary	Base4
4	10	XX	XX:XX:XX…	XXX.XXX…	Connected	Primary: RPN0C	Locked	Base5
5	14	XX	XX:XX:XX…	XXX.XXX…	Connected	Level 1: RPN10	Locked	Base6
6	18	XX	XX:XX:XX…	XXX.XXX…	Connected	Primary: RPN18	Primary	Base7
7	1C	XX	XX:XX:XX…	XXX.XXX…	Connected	Primary: RPN18	Locked	Base8
8	20	XX	XX:XX:XX…	XXX.XXX…	Connected	Level 1: RPN1C	Locked	Base9

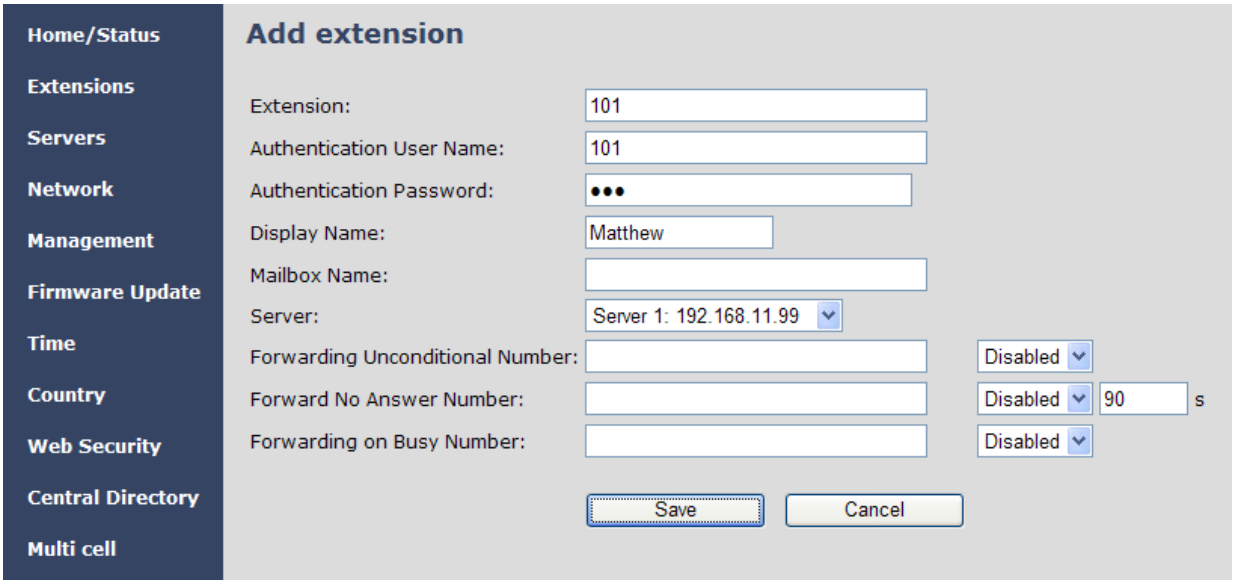
Adding Extension/Handset Registration

Here is the recommended procedure of adding extension(s) and registering one or more handsets to the Multi-cell system which was just created.

ADDING EXTENSIONS TO SYSTEM

STEP 17 Choose the "**Extensions**" URL at the left hand column of home page.

STEP 18 Select the **Add Extension** URL and enter the relevant entries (an example is shown below with 3020 as the extension). Click on the **Save** button.



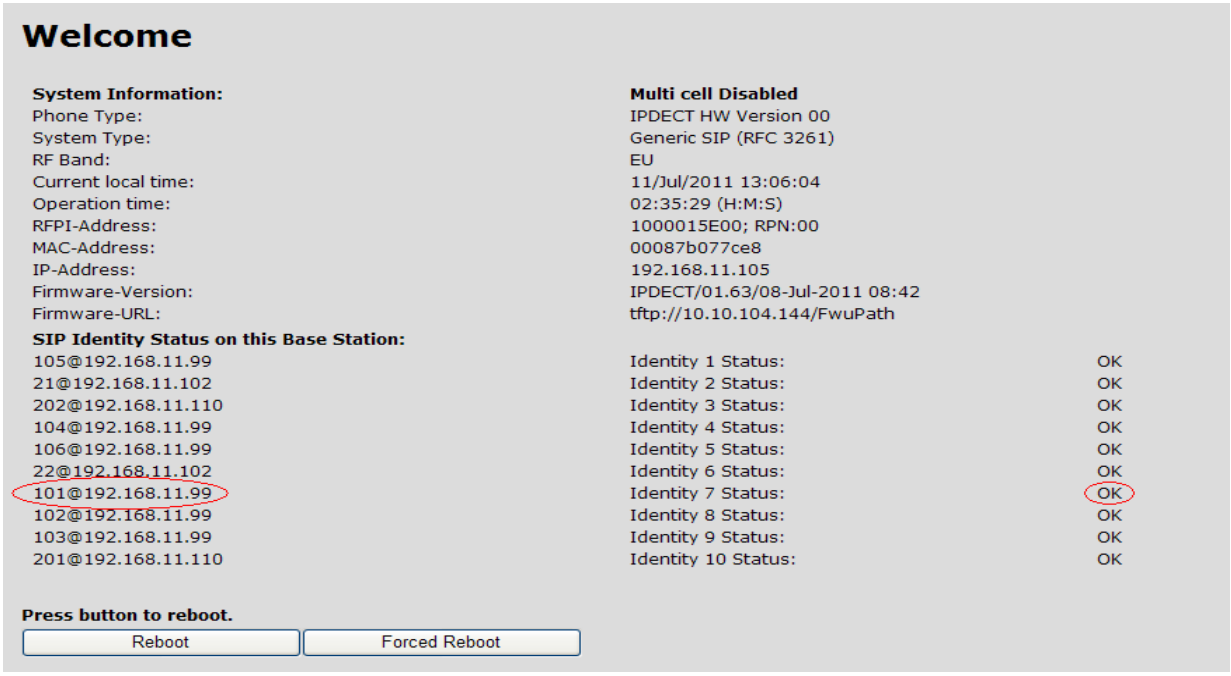
HANDSET REGISTRATION

STEP 19 The extension page will show the figure below, if you save successfully the entries safely. Enable the check option and choose the option **"Register Handset"** URL.

STEP 20 Next, take the handset you will like to register > power it up > in the idle mode navigate to the Menu > Choose **Connectivity** > Select **Register**.

STEP 21 On the Connectivity dialog and after choosing Register option > Enter the **Access code** (by default is 0000) > Press **OK >** Successful registration displays Extension(s) registered.

STEP 22 Open the HTTP interface of relevant base unit > On the **Home/Status** page, you can check the current status of the SIP end node (which is the same as the handset). (In the example below you can check the status of an extension 101)



Welcome

System Information:	**Multi cell Disabled**	
Phone Type:	IPDECT HW Version 00	
System Type:	Generic SIP (RFC 3261)	
RF Band:	EU	
Current local time:	11/Jul/2011 13:06:04	
Operation time:	02:35:29 (H:M:S)	
RFPI-Address:	1000015E00; RPN:00	
MAC-Address:	00087b077ce8	
IP-Address:	192.168.11.105	
Firmware-Version:	IPDECT/01.63/08-Jul-2011 08:42	
Firmware-URL:	tftp://10.10.104.144/FwuPath	
SIP Identity Status on this Base Station:		
105@192.168.11.99	Identity 1 Status:	OK
21@192.168.11.102	Identity 2 Status:	OK
202@192.168.11.110	Identity 3 Status:	OK
104@192.168.11.99	Identity 4 Status:	OK
106@192.168.11.99	Identity 5 Status:	OK
22@192.168.11.102	Identity 6 Status:	OK
101@192.168.11.99	Identity 7 Status:	OK
102@192.168.11.99	Identity 8 Status:	OK
103@192.168.11.99	Identity 9 Status:	OK
201@192.168.11.110	Identity 10 Status:	OK

Press button to reboot.

Reboot | Forced Reboot

Example: Creating Multi-Cell Using 2 Bases/Handsets

In this chapter, we assume a user have single functioning standalone Base unit and will like to add another base unit. Here is the procedure:

The multi-cell system contains one Primary and can have more than one Secondary. Secondary will have the information synchronized with Primary.

BEFORE CONFIGURING THE BASE STATIONS

STEP 1 Reset the relevant bases (BS1 and BS2) to the default state.

STEP 2 Take each base station and long press on the side a small button (after the bases restart or powers up) until the LED in front lit **RED** for 5 sec (continue pressing even when you see **ORANGE**):

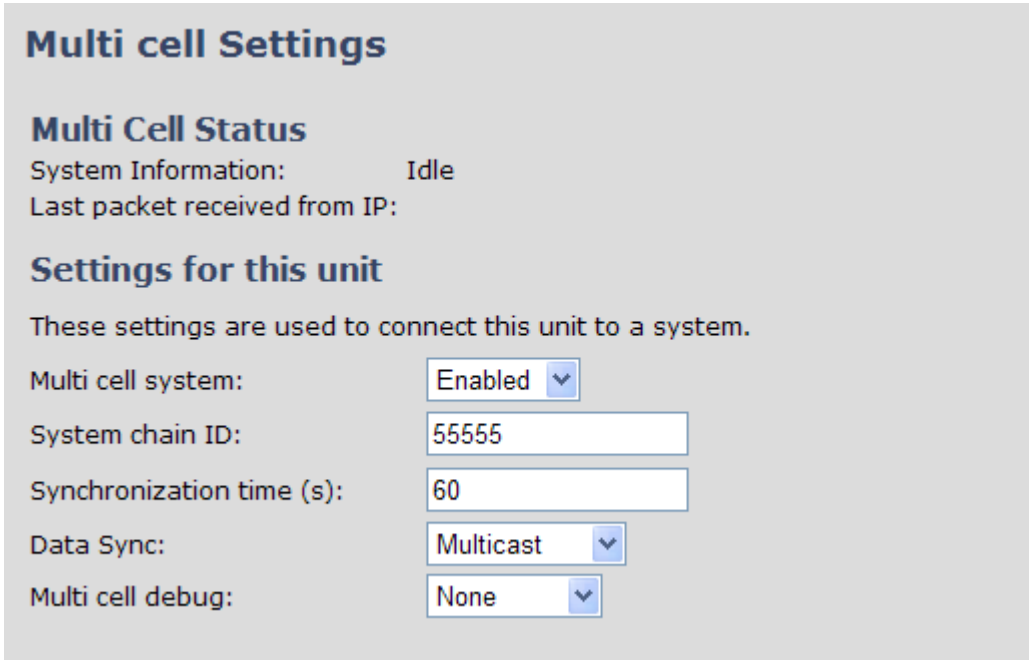
-> Long press reset button ->

-> Wait until LED stay to **RED** for 5 secs. (no flashing) ->

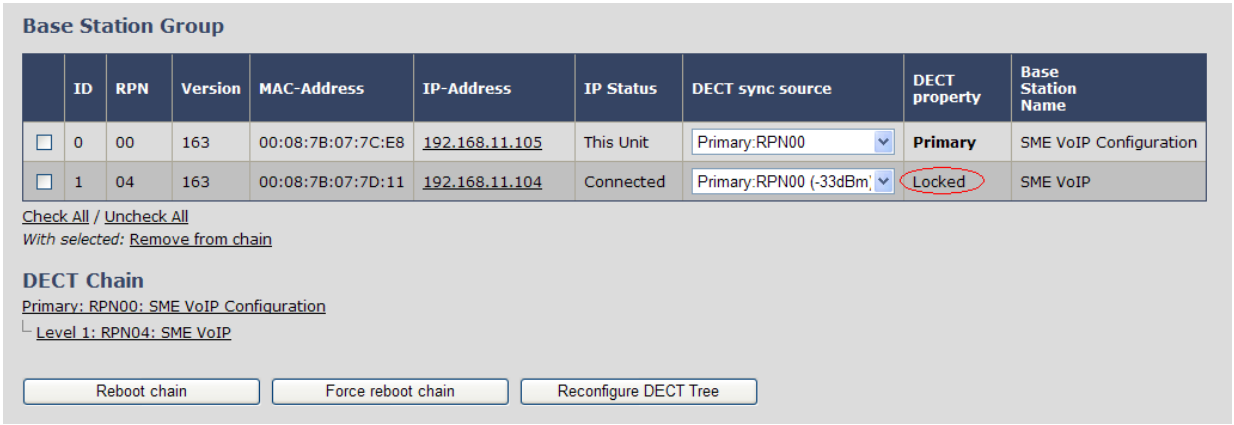
-> Power down and up the BS again to finish.

CONFIGURATION OF BASE STATIONS

STEP 3 For each base station [BS 1 and BS 2] navigate to multi-cell configuration page by clicking "**Multi-cell**" > On this page select the "**Enabled**" option for Multi cell system parameter and fill in a number for System chain ID, press Save and Reboot button to reboot base station and wait for 1 to 3 minutes. If a reboot warning pops up press OK to confirm.



STEP 4 After a successful restart, on each base [BS 1 and BS 2] Multi-cell page you will find the other base connected and synchronized (the IP status shows **This Unit** or **Connected**) to the system as illustrated below.



STEP 5 For [BS 1] Add server and extension to BS 1 similar to earlier sections.

STEP 6 [BS 1] Register HS to the extension and verify whether its successful from the “Home” page and Handset UI

Welcome

System Information:	**Multi cell Ready(Keep-alive) Primary**	
Phone Type:	IPDECT HW Version 00	
System Type:	Generic SIP (RFC 3261)	
RF Band:	EU	
Current local time:	11/Jul/2011 13:35:10	
Operation time:	00:19:52 (H:M:S)	
RFPI-Address:	1000015E00; RPN:00	
MAC-Address:	00087b077ce8	
IP-Address:	192.168.11.105	
Firmware-Version:	IPDECT/01.63/08-Jul-2011 08:42	
Firmware-URL:	tftp://10.10.104.144/FwuPath	
SIP Identity Status on this Base Station:		
105@192.168.11.99	Identity 1 Status:	OK
202@192.168.11.110	Identity 2 Status:	OK
106@192.168.11.99	Identity 3 Status:	OK
103@192.168.11.99	Identity 4 Status:	OK
102@192.168.11.99	Identity 5 Status:	OK
104@192.168.11.99	Identity 6 Status:	OK
22@192.168.11.102	Identity 7 Status:	OK
101@192.168.11.99	Identity 8 Status:	OK
21@192.168.11.102	Identity 9 Status:	OK
201@192.168.11.110	Identity 10 Status:	OK