

*Microsoft® Lync Server 2010
with CyberData Paging
Systems using Patton's
SmartNode™ Product Line*

Application Note

Document Part #930559A

CyberData Corporation
3 Justin Court
Monterey, CA 93940
(831) 373-2601

- 1 Introduction 1**
- 2 Supported features 1**
- 3 Limitations 2**
- 4 Configuration 2**
 - 4.1 General setup 2
 - 4.2 Lync Server 4
 - 4.2.1 Topology builder 4
 - 4.2.2 Management console 5
 - 4.2.3 Analog device configuration 6
 - 4.3 Patton SmartNode 7
 - 4.3.1 Concept 7
 - 4.3.2 Required information 7
 - 4.3.3 Configuration sample 8
 - 4.4 CyberData Configuration 10
 - 4.4.1 Configuration Theory 10
 - 4.4.2 Practical Configuration of a 2-Way Device 11
 - 4.4.3 Practical Configuration of a 1-Way Device 12

1 Introduction

This application note is a general overview of requirements and configuration basics to interconnect CyberData Paging Equipment and Microsoft® Lync Server 2010 using Patton SmartNode VoIP Gateways.

Discussed in this document:

- Presentation of the Patton SmartNode VoIP Gateway concept
- Basic Configuration of CyberData equipment
- Basics for a simple setup
- Provide a sample SmartNode configuration file working with Microsoft® Lync and CyberData

NOT discussed in this document:

- Detailed configuration of Microsoft® Lync Server 2010
- Detailed configuration capabilities of Patton SmartNode VoIP Gateways
- Detailed functionality of CyberData's product line

For verbose technical details on the Patton device, please visit the Patton SmartNode webpage (<http://www.patton.com/smartnode>). More configuration notes, samples and manuals are available.

For more technical information on CyberData's equipment please visit the CyberData product page (http://www.cyberdata.net/products/voip/digitalanalog/paging_endpoints). Individual product pages along with manuals and datasheets are available there.

2 Supported features

Patton's SmartNode allows CyberData's VoIP Endpoints to support the following Microsoft® Lync relevant features:

- REFER calls
- DNS load balancing
- Media bypass (enabled or disabled)
- Trust/untrust mediation server. The user of this document is familiar with NET equipment.

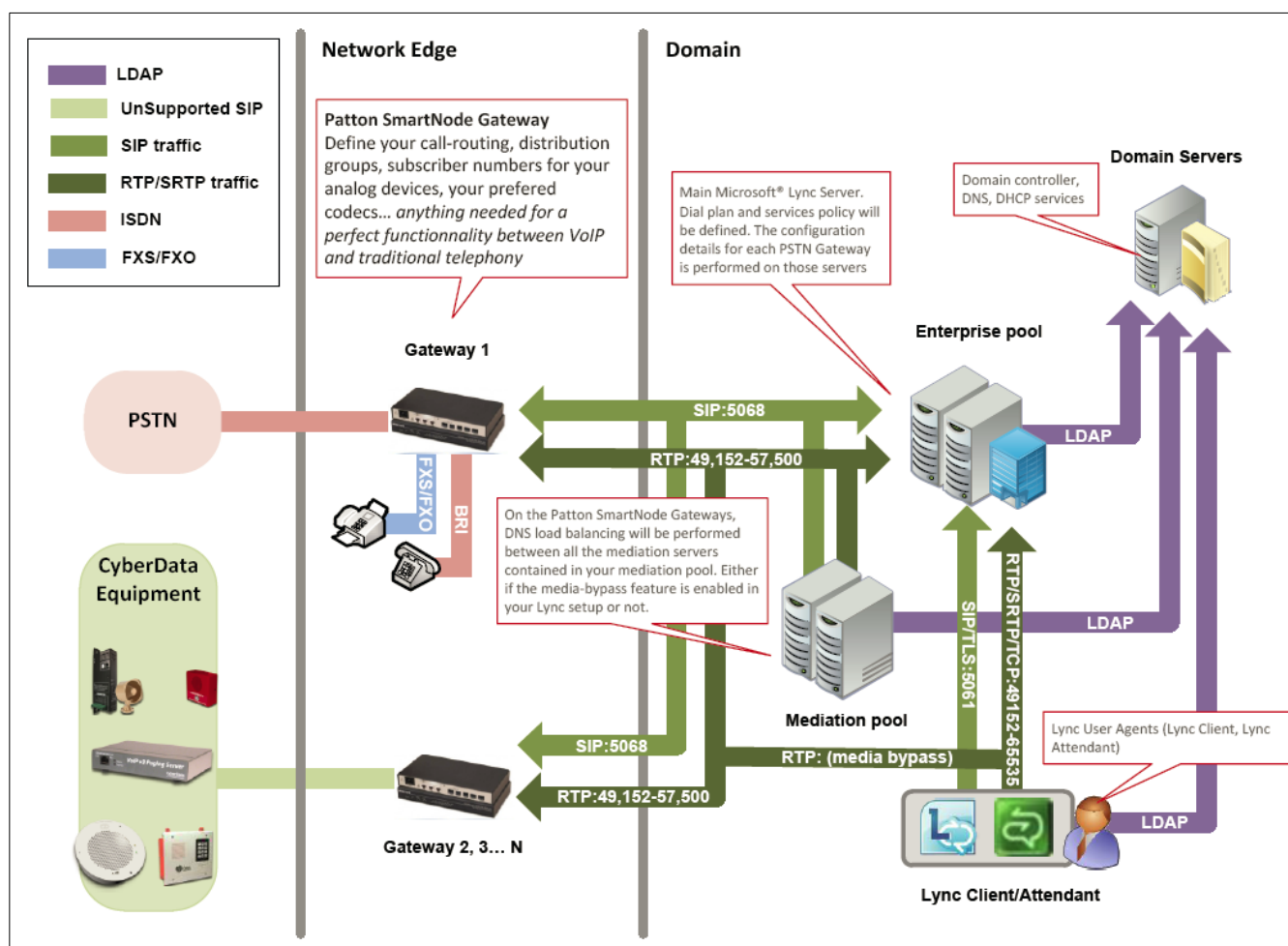
3 Limitations

Patton SmartNode does not support TLS or SRTP. Configure the Lync topology to use SIP over TCP to the PSTN Gateway. (CyberData's equipment does not need to utilize TCP for the SIP as the Patton Device will make the needed conversions.)

4 Configuration

4.1 General setup

Here is a basic setup for CyberData paging functionality along with Microsoft® Lync Server 2010.



The key points for a good configuration are separated as follows:

Patton SmartNode

- Define your call routing
- Define distribution groups, hunting groups
- Add security with the trust/untrust server and ACL feature
- Modify called/calling party numbers and any other relevant call parameters
- Define your codecs and other key point for a perfect functionality between VoIP and traditional telephony

Microsoft® Lync Server 2010

- Define your dial-plan
- Define trunks to PSTN
- Define call routing to PSTN
- Define voice policy
- Enable/disable call transfer (REFER)
- Enable/disable media-bypass (RTP traffic flowing between UAs and the PSTN gateway)

CyberData VoIP Paging Equipment

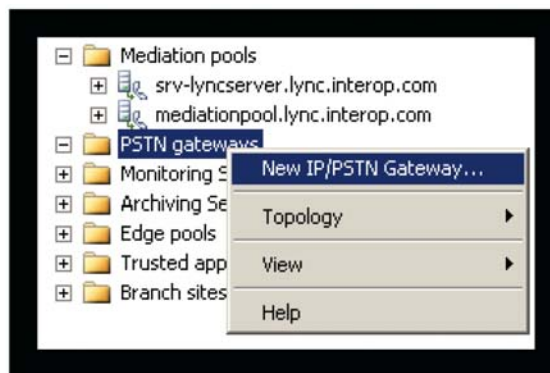
- Define your paging groups
- Define your extensions
- Understand your desired features

4.2 Lync Server

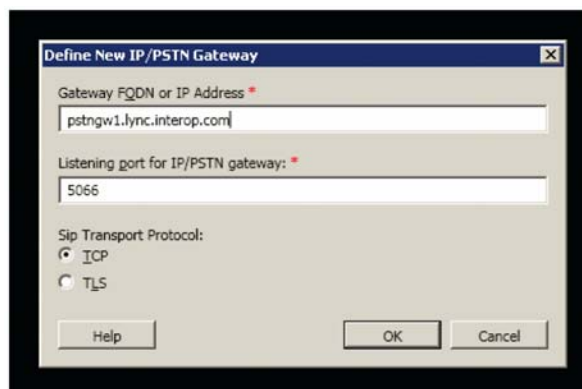
4.2.1 Topology builder

| Task | Screenshot |
|------|------------|
|------|------------|

In the Lync topology builder, add a new IP/PSTN Gateway.



Select TCP as transport protocol. Choose the desired port to be used on the gateway.

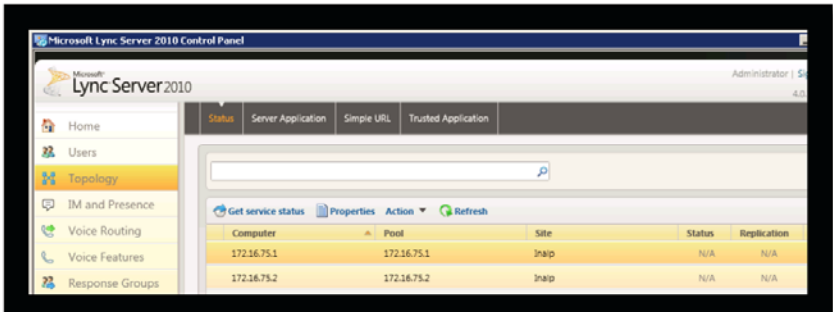


You can add multiple gateways on this panel.



Publish the topology.

4.2.2 Management console

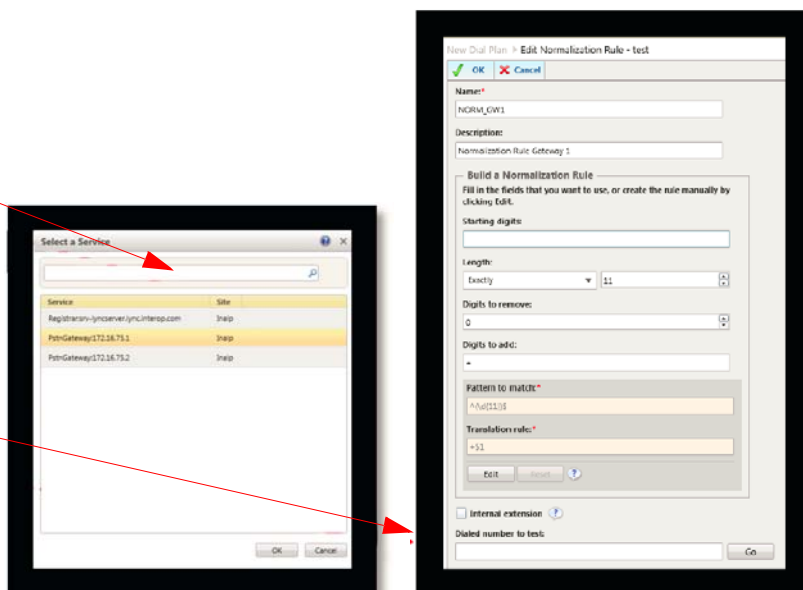
| Task | Screenshot | | | | | | | | | | | | | | | |
|---|---|----------|--------|-------------|--------|-------------|-------------|-------------|-------|-----|-----|-------------|-------------|-------|-----|-----|
| <p>Topology > Status.</p> <p>You should be able to see all the gateways listed.</p> <p>Note: The “N/A” in the Status and Replication column is normal.</p> |  <table><tr><th>Computer</th><th>Pool</th><th>Site</th><th>Status</th><th>Replication</th></tr><tr><td>172.16.75.1</td><td>172.16.75.1</td><td>Inapp</td><td>N/A</td><td>N/A</td></tr><tr><td>172.16.75.2</td><td>172.16.75.2</td><td>Inapp</td><td>N/A</td><td>N/A</td></tr></table> | Computer | Pool | Site | Status | Replication | 172.16.75.1 | 172.16.75.1 | Inapp | N/A | N/A | 172.16.75.2 | 172.16.75.2 | Inapp | N/A | N/A |
| Computer | Pool | Site | Status | Replication | | | | | | | | | | | | |
| 172.16.75.1 | 172.16.75.1 | Inapp | N/A | N/A | | | | | | | | | | | | |
| 172.16.75.2 | 172.16.75.2 | Inapp | N/A | N/A | | | | | | | | | | | | |

Voice Routing > Dial Plan (New Pool Dial plan)

Select the wanted Gateway.

Add a new **Associated Normalization Rule**.

Note: You can decide if you need a specific dial plan for each gateway by defining a **Site Dial Plan**.

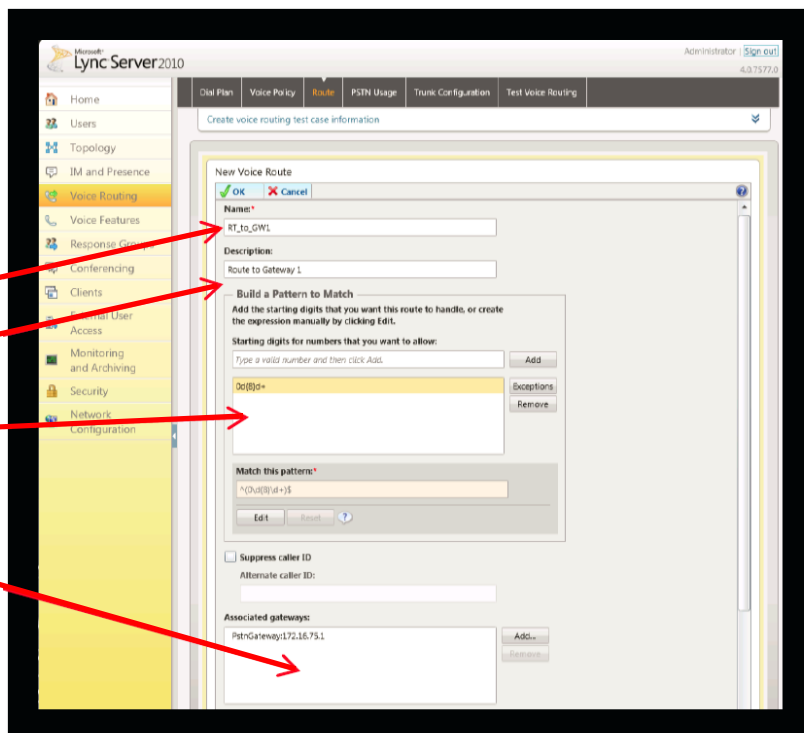


Task

Screenshot

Voice Routing > Route (New route)

1. Define a name
2. Add a description
3. Define the rule/pattern
4. Associate an existing Gateway



4.2.3 Analog device configuration

In order to add either analog Paging equipment with your network of both Lync and CyberData you will configure Microsoft® Lync is via commands in the Lync CMDlet. In the sample commands below, you will have to change the highlighted parts.

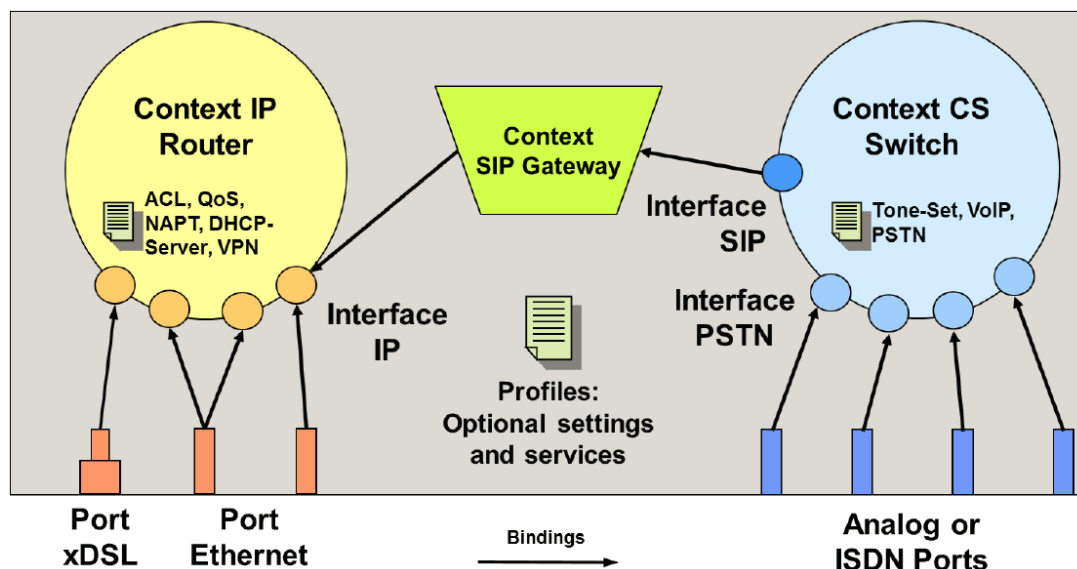
Analog phones:

```
New-CsAnalogDevice -AnalogFax $false -Gateway x.x.x.x/FQDN -LineUri  
tel:+xxxxxxxxxxxx -OU "CN=Users,DC=lync,DC=com" -SipAddress  
sip:+xxxxxxxxxxxx@lync.com -RegistrarPool lyncserver.lync.com
```

4.3 Patton SmartNode

4.3.1 Concept

This schema describes briefly the configuration concept of the Patton SmartNode PSTN gateway:



For more information on how to configure your Patton SmartNode PSTN Gateway, please refer to the official software configuration guide.

4.3.2 Required information

In order to configure your Patton SmartNode correctly, be sure to have all the required information:

- IP addresses
- DNS servers
- NTP server and port
- Subscriber numbers per FXS ports
- Routes for ISDN ports

4.3.3 Configuration sample

Note To make this configuration sample works with your current infrastructure, you will have to change the highlighted parts of it. There are three different colors of highlighted each representing a different part of the config.

The Yellow Highlighter means this is part of a standard SmartNode config and is needed no matter what.

The Pink Config concerns parts of the config that only effect CyberData.

The Darker Yellow signifies Lync Specific Configurations

Things to remember:

1. When part of the config is represented in all capital letters it is a name that can be changed.
2. This config (with slight modification) will work for any SmartWare based SmartNode.
3. In the config below the SmartNode acts as a SIP Server to the CyberData Equipment (CyberData's gear registers TO the SmartNode)
4. The SmartNode is a client of MS Lync.

```
#-----#
#
# SN/Model/Number
# R#. # YYYY-MM-DD H323 RBS SIP
# SN/00A0BAXXXXXX
# CYBER-Lync Sample Config
#
#-----#
```

```
cli version 3.20
gui type basic
banner "Banner text"
dns-client server x.x.x.x
dns-client cache-max-age 3600
webserver port 80 language en
snmp-client
snmp-client server primary x.x.x.x port 123 version 4
system hostname Device-name
```

Device Specific information is displayed here such as Model Number, Serial Number, and Configuration

```
system
```

```
ic voice 0
```

```
system
clock-source 1 bri 0 0
```

```
profile ppp default
```

```
profile tone-set default
```

```
profile voip VOIPLYNC
codec 1 g711ulaw64k rx-length 20 tx-length 20
codec 2 g711alaw64k rx-length 20 tx-length 20
dtmf-relay rtp
silence-suppression
```

```
profile voip VOIPCYBER
codec 1 g711alaw64k rx-length 20 tx-length 20
codec 2 g711ulaw64k rx-length 20 tx-length 20
```

```
profile pstn default
```

```
profile ringing-cadence default
play 1 1000
pause 2 4000
```

Profiles are configuration sets that can do nothing until called by a logical part of the SmartNode™ a Profile named 'default' is going to be used until another one is specifically configured by the SmartNode™

A 'voip profile' is the place where Codec's are selected along with a few other features. This profile is called "VOIPLYNC" and is later called by the SIP Interface.

This 'voip profile' is called "VOIPCYBER" and is later called by the SIP Interface.

```

profile sip default
  no autonomous-transitioning

profile aaa default
  method 1 local
  method 2 none

context ip router

interface CYBERSIDE
  ipaddress x.x.x.x m.m.m.m

interface LYNCSIDE
  ipaddress x.x.x.x m.m.m.m

context ip router
  route 0.0.0.0 0.0.0.0 x.x.x.x

context cs switch

  routing-table called-e164 RT_TBL
  route 0000 dest-interface IF_FXS_00
  route 3... dest-service SLS
  route [124-9].. dest-interface IF_SIP_LYNC

  interface sip IF_SIP_LYNC
  bind context sip-gateway GW_SIP_LYNC
  route call dest-table RT_TBL
  remote mediationpool.lync.interop.com 5068
  hold-method direction-attribute sendonly
  use profile voip VOIPLYNC
  early-disconnect
  call-reroute accept
  call-reroute emit
  session-timer 3600
  trust remote

  interface sip IF_SIP_CYBER
  bind context sip-gateway GW_SIP_CYBER
  use profile voip VOIPCYBER
  route call dest-table RT_TBL
  local 10.0.0.1

  service sip-location-service SLS
  bind location-service SER_CYBER

  interface fxs IF_FXS_00
  route call dest-table RT_TBL

context cs switch
  no shutdown

authentication-service AUTH_SRV_CYBER
realm 1 10.0.0.1
username 100 password patton
username 101 password patton
username 102 password patton
username 103 password patton
username 104 password patton
username 105 password patton

location-service SER_LYNC
match-any-domain

identity-group default

call outbound
  preferred-transport-protocol tcp

```

The 'context cs switch' is where call control is done in the gateway.

This 'routing-table' handles calls that have been pointed to it. (Every Interface has a 'route' command that points calls coming from that interface)

This 'sip interface' is called **IF_SIP_LYNC** and it is the logical entry/exit point for all calls coming from or heading to MS Lync. You can also see some communication settings are set here such as remote server.

This 'sip interface' is called **IF_SIP_CYBER** and it is the logical entry/exit point for all calls coming from or heading CyberData's Equipment.

This 'sip-location-service' is named **SLS** and it is the database where the IP's of all users registered to the SmartNode are stored. If a call is routed to this service it will poll its database for a match of the 'called number' and route the call to the matching IP Address.

This 'fxs interface' is called **IF_FXS_00** and it is the logical entry/exit point for all calls of the bound Physical Analog Port.

Routing Tables control call flow, refer to SmartNode Configuration Guide or contact PATTON support for further information.

```

call inbound

location-service SER_CYBER
domain 1 10.0.0.1

identity-group default

authentication inbound
authenticate 1 authentication-service AUTH_SRV_CYBER

registration inbound


context sip-gateway GW_SIP_LYNC

interface SIP
bind interface LYNCSIDE context router port 5060

context sip-gateway GW_SIP_LYNC
bind location-service SER_LYNC
no shutdown

context sip-gateway GW_SIP_CYBER

interface SIP
bind interface CYBERSIDE context router port 5060

context sip-gateway GW_SIP_CYBER
bind location-service SER_CYBER
no shutdown

port ethernet 0 0
encapsulation ip
bind interface LYNCSIDE router
no shutdown

port ethernet 0 1
encapsulation ip
bind interface CYBERSIDE router
no shutdown

port fxs 0 0
encapsulation cc-fxs
bind interface IF_FXS_00 switch
no shutdown

```

4.4 CyberData Configuration

4.4.1 Configuration Theory

CyberData's paging equipment mimics an IP Phone in standard setup with only a few slight differences. The first being the "Dial Out Settings". This is for the devices made by CyberData that do not allow dialing (Such as an indoor or outdoor intercom). In this case you set up the SIP Registration just like you would any phone to any standard PBX and then you add the Dial Out Extension which is the 'hotline' number to dial anytime the intercom button is pushed. The second outstanding feature is the Nightringer, (this does not need to be implemented). When the Nightringer is enabled, the Intercom will register as a second SIP extension. Registration does not have to be to the same SmartNode as the primary registration. Any calls made to the Nightringer extension will cause the Intercom to play a ringtone. There is no way to answer this call. The Nightringer is designed to be used in buildings where calls made after hours are directed to a ring group. For more information on the Nightringer functionality and purpose feel free to contact CyberData.

4.4.2 Practical Configuration of a 2-Way Device

The screenshot shows the 'SIP Configuration' page of the CyberData Intercom web interface. The page has a sidebar with navigation links: Home, Device Config, Networking, SIP Config, Nightringer, Sensor Config, Multicast Config, Audio Config, Event Config, Autoprovisioning, and Update Firmware. The main content area is titled 'SIP Configuration' and includes a section for 'SIP Settings' and 'RTP Settings'.

Annotations with red arrows point to specific fields:

- IP address of the SmartNode**: Points to the 'SIP Server' field.
- UDP Port of the SmartNode**: Points to the 'Remote SIP Port' field.
- Username (Must match the one configured on the SmartNode)**: Points to the 'SIP User ID' field.
- Password (Must match the one configured on the SmartNode)**: Points to the 'Authenticate Password' field.
- Extension Number and Name of the desired destination when intercom is pushed**: Points to the 'Dial out Extension' and 'Extension ID' fields.

The 'SIP Settings' section includes the following fields and options:

- Enable SIP operation: ☒
- SIP Settings:
 - SIP Server:
 - Backup SIP Server 1:
 - Backup SIP Server 2:
 - Remote SIP Port:
 - Local SIP Port:
 - Outbound Proxy:
 - Outbound Proxy Port:
 - SIP User ID:
 - Authenticate ID:
 - Authenticate Password:
- Register with a SIP Server: ☒
- Re-registration Interval (in seconds):
- Unregister on Reboot: ☐

The 'Call disconnection' section includes:

- Call disconnection: ☐
- Terminate call after delay (in seconds):
- Note: A value of 0 will disable this function

The 'RTP Settings' section includes:

- RTP Port (even):

The 'Dial Out Settings' section includes:

- Dial out Extension:
- Extension ID:

At the bottom, there is a note: '* You need to reboot for changes to take effect' and two buttons: 'Save' and 'Reboot'.

4.4.3 Practical Configuration of a 1-Way Device

The screenshot shows the 'SIP Configuration' page of the CyberData Ceiling Speaker web interface. The page has a left sidebar with navigation buttons: Home, Device Config, Networking, SIP Config, Nightringer, Multicast Config, Audio Config, Clock Config, Event Config, Autoprovisioning, and Update Firmware. The main content area is titled 'SIP Configuration' and includes the following sections:

- Enable SIP operation:** A checkbox that is checked.
- SIP Settings:**
 - SIP Server:** A text input field with a red arrow pointing to it from the label 'IP address of the SmartNode'.
 - Backup SIP Server 1:** A text input field with a red arrow pointing to it from the label 'UDP Port of the SmartNode'.
 - Backup SIP Server 2:** A text input field.
 - Remote SIP Port:** A text input field.
 - Local SIP Port:** A text input field.
 - Outbound Proxy:** A text input field.
 - Outbound Proxy Port:** A text input field.
 - SIP User ID:** A text input field with a red arrow pointing to it from the label 'Username (Must match the one configured on the SmartNode)'.
 - Authenticate ID:** A text input field.
 - Authenticate Password:** A text input field with a red arrow pointing to it from the label 'Password (Must match the one configured on the SmartNode)'.
- Register with a SIP Server:** A checkbox that is checked.
- Re-registration Interval (in seconds):** A text input field with the value '360'.
- Unregister on Reboot:** An unchecked checkbox.
- Buffer SIP Calls:** An unchecked checkbox.
- Beep on page:** An unchecked checkbox.
- Call disconnection:**
 - Terminate call after delay (in seconds):** A text input field with the value '0'.
 - Note:** A value of 0 will disable this function.
- RTP Settings:**
 - RTP Port (even):** A text input field with the value '10500'.

At the bottom of the page, there is a note: '* You need to reboot for changes to take effect'. Below this note are two buttons: 'Save' and 'Reboot'.

Annotations on the right side of the image:

- IP address of the SmartNode
- UDP Port of the SmartNode
- Username (Must match the one configured on the SmartNode)
- Password (Must match the one configured on the SmartNode)
- No dialed extension number as this is a one way device.