

Configuring SPA303 and 5xxG IP Phones with Broadsoft's BLF



Check for updates of this document at:

<https://supportforums.cisco.com/docs/DOC-9977>

You only need **one** [reference document](#) for all SPA phone firmware, information, and utilities.

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1 Revision History

Date	Author	Comments
02/26/2010	Patrick Born	Initial version
11/05/2010	Patrick Born	Added: <ul style="list-style-type: none"> • SPA303 • TCP • SIPURI • Updated from 7.4.3 to 7.4.6 • Group Call Pickup • Directed Call Pickup
11/08/2010	Patrick Born	Added LED behavior section

2 Introduction

The BroadWorks Service Guide defines the Busy Lamp Field (BLF) as a service to support a SIP phone-based attendant console. BLF allows monitoring the hook status and remote party information of users via the IP phones' extension LEDs. BLF enables SIP attendant console phones to subscribe to a list of resources associated with users in order to monitor and receive notifications of the state of the monitored resources.

This document describes enabling Broadsoft's Busy Lamp Field (BLF) and Group Call Pickup on the BroadWorks server and configuring the SPA303 and SPA5xxG IP phone family to use BLF.

Note: Unused line keys of SPA IP Phones can manually be configured with BLF by inserting the same syntax used on the SPA500S. So even though the SPA30x IP Phones do not support the SPA500S, they can still perform BLF and call pickup functions.

Note: The BroadWorks servers use the SIP SUBSCRIBE and NOTIFY framework as described in *RFC3265* to provide monitored user status to the SPA303 and SPA5xxG IP phones. Keep in mind that SPA303 and SPA5xxG IP phones use UDP transport by default. Because UDP is not a guaranteed or reliable transport mechanism, there is a very real possibility that SIP NOTIFY messages sent to the phone via UDP will be lost by the network, causing the phone to not properly track BLF status.

BroadWorks servers send large SIP NOTIFY messages to the SPA303 and SPA5xxG IP phone. The initial NOTIFY sent after the BLF SUBSCRIBE will exceed the standard UDP MTU of 1500 bytes, causing the UDP to be fragmented. If the network between the BroadWorks server and SPA5xx IP phone does not support fragmented UDP, you must configure the SPA303 and SPA5xxG IP phone to register with a TCP contact to support this feature. Configure at phone's web-UI: Ext N > SIP Settings > SIP Transport: **TCP**

For these reasons, you should consider as mandatory, the recommendation to configure TCP as transport on phones that monitor status with BLF.

2.1 Scope

The scope of this document is limited to configuring BLF on SPA303 and SPA5xxG IP phones and on BroadWorks.

2.2 Audience

This application note is written for SPA303 and SPA5xxG IP phone and BroadWorks administrators charged with configuring BLF on Broadsoft and on the SPA303 and SPA5xxG IP phones.

2.3 Software Release Recommendations

Following is a list of equipment and related software releases that have been tested as part of the overall solution:

Device	Software Release
SPA509G	7.4.6
SPA504G	7.4.6
SPA303	7.4.6

2.4 Test Topology

The following equipment is configured:

- SPA509G with and without SPA500S:
This is the phone that uses BLF to monitor the status of the other two phones
- SPA504G
Being monitored with BLF
- SPA303
Being monitored with BLF

Configuring Cisco SPA 5xxG IP Phones w ith Broadsoft Busy Lamp Field (BLF)

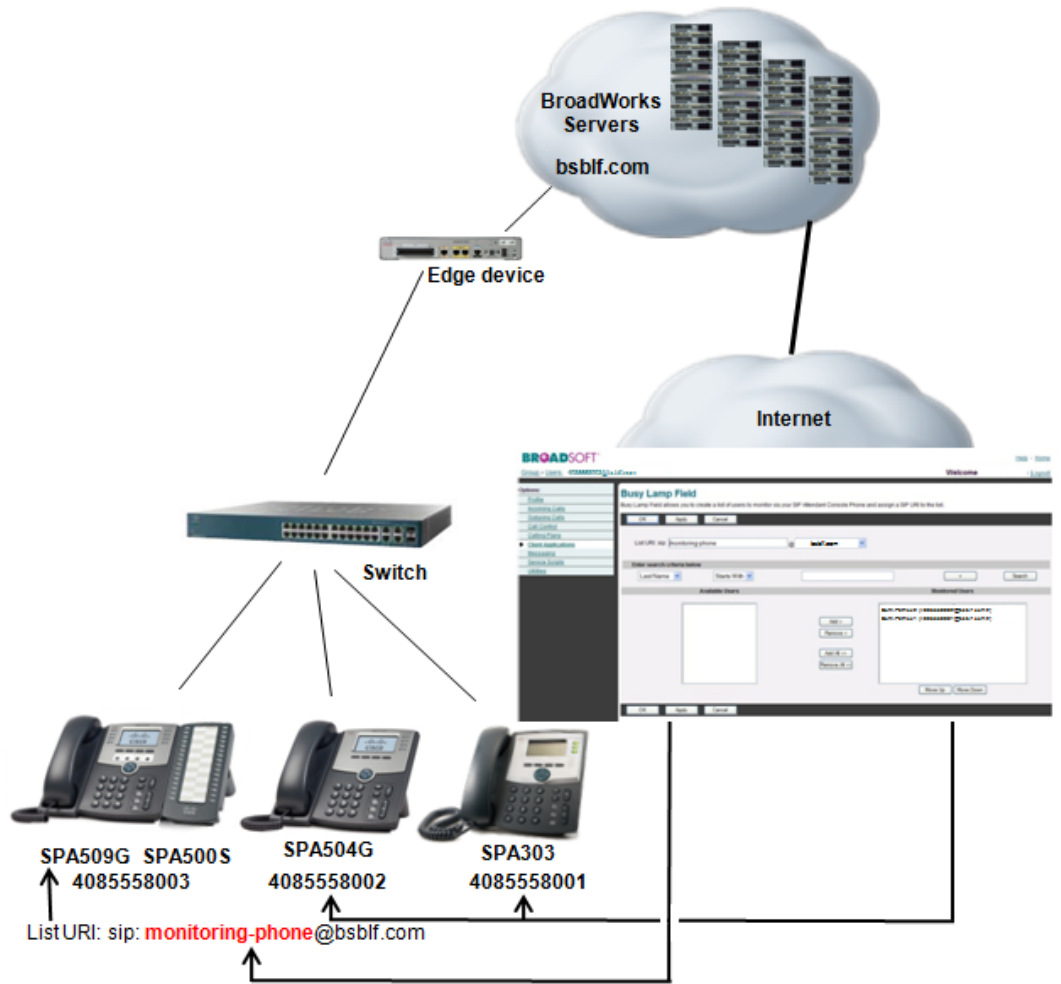


Figure 1: BLF Monitoring Environment

3 BLF LEDS: How They Behave

LED buttons configured w ith BLF behave in the follow ing w ays:

- **Green:** Available. The monitored phone is idle.
- **Red:** Busy on a call. There is no way to differentiate between inbound or outbound calls.
- **Red fast flash:** Ringing. The monitored phone is ringing.
- **Orange:** Problem:
 - **Orange solid:** Failed to subscribe (received 4xx response)
 - **Orange slow flash:** No response to SIP SUBSCRIBE.

Note: LED behavior describes default configuration. Phone administrators can modify a phone's LED Script in order to change the colors and flashing behavior of the LEDs. Refer to the [Phone Administration Guide](#) "LED Script" Section for additional details.

Note: Caller ID: The monitoring phone does not show Caller ID information for BLF calls that are not to it. The monitoring phone will show Caller ID if any phone calls it.

4 BLF Configuration: Broadsoft

The most difficult part of the entire process is deciding w hat name to use as the Broadsoft BLF List URI. Most people choose a URI based on some extension number, this tends to cause [human] confusion w hen configuring the fnc field in the IP phones.

In this document the follow ing w ill be configured:

- SPA509G IP phone 8003 w hich uses BLF to monitor 8001 and 8002.
- The Broadsoft List URI: sip: parameter w ill be "monitoring-phone".
- The Broadsoft Monitored Users w ill be 4085558001@bsblf.com and 4085558002@bsblf.com.

Configure BLF in Broadsoft as follows:

1. Navigate to Group > Users >
2. Search for a user. I searched on Last Name starts w ith "born"
3. Click an appropriate user

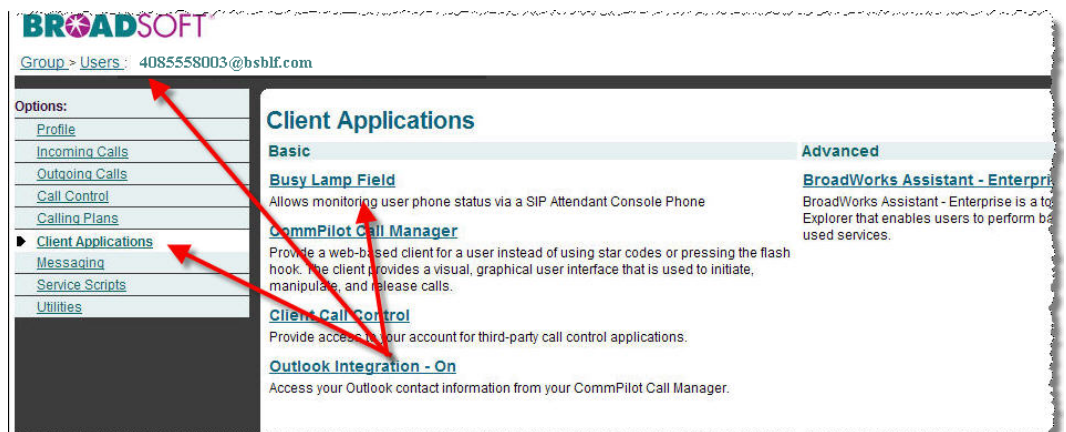


Figure 2: Broadsoft Client Applications page

4. > Click Client Applications
5. Click Busy Lamp Field
6. Search for a user. I searched on Last Name starts w ith "born"
7. Click an appropriate user
8. Click Add to add the user/s to the Monitored Users list
9. Type in a name for the List URI: sip: parameter. I use "monitoring-phone" in this example.

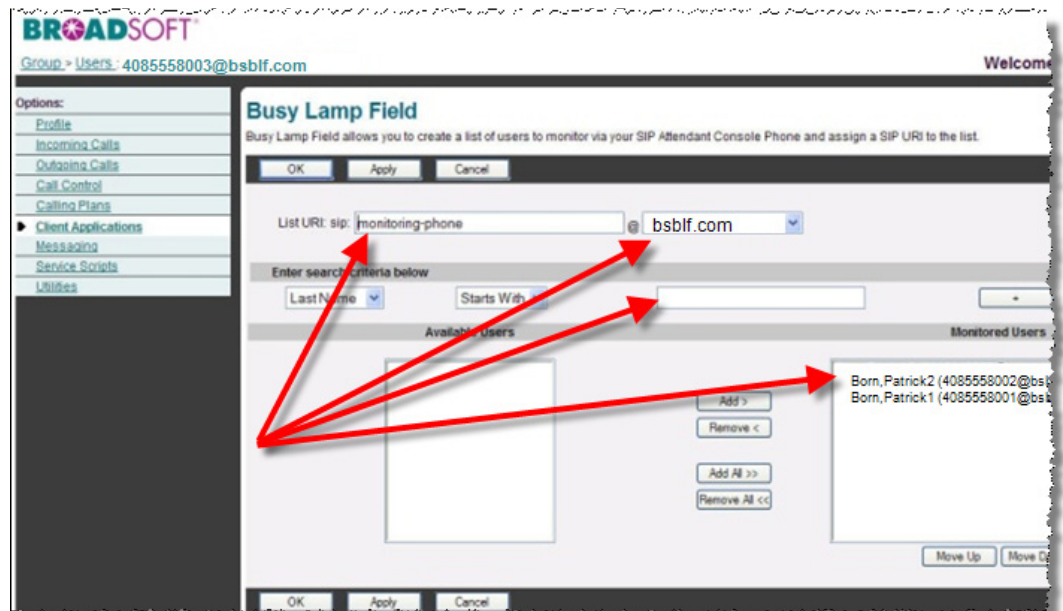


Figure 3: Broadsoft Busy Lamp Field page

10. Document the: List URI: sip: parameter @ domain name. You w ill need this **exact** name when you configure the 8003 phone that performs BLF monitoring. I had to document: **monitoring-phone@bsblf.com**
11. Document the exact names of the Monitored Users. You w ill need these **exact** names when you configure the 8003 phone that performs BLF monitoring. I had to document:
4085558002@bsblf.com
4085558001@bsblf.com
12. Click OK

This concludes the Broadsoft configuration. You must now config the phone that w ill be performing the BLF monitoring, The SPA 509G, extension 8003 in this example. The phones being monitored do not require any configuration.

4.1 BLF Configuration on the Monitoring Phone

There are tw o ways to configure BLF on the monitoring phone

1. Automatic configuration
2. Manual configuration

You only need to use one of the configuration options to configure your SPA 500S Attendant Console. If you do not have an attendant console (sidecar) you must use the manual method to configure BLF on unused line keys.

4.1.1 Automatic BLF Phone Configuration

Automatic configuration is only available if you have a SPA500S Attendant Console (sidecar) attached to a SPA5xxG IP phone. There is only one step needed on the monitoring phone if you are using the automatic method.

Use either the phone's configuration file or the phone's Web-UI to auto-configure BLF.

4.1.1.1 Configuration File:

Edit the BLF_List_URI parameter by adding the List SIPURI that you defined and then documented in step 10 of the BLF Configuration: Broadsoft section.

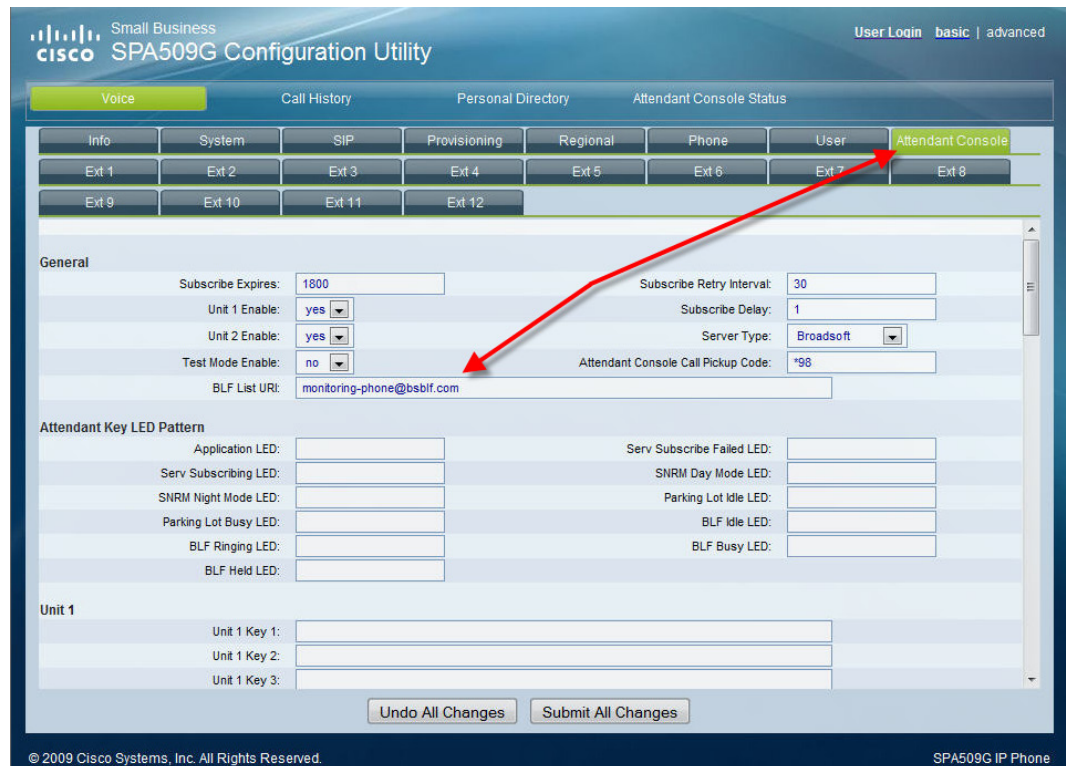
```
<BLF_List_URI ua="na">monitoring-phone@bsblf.com</BLF_List_URI>
```

Save the phone's configuration. The phone will now auto-configure its attached SPA500S when the phone next resyncs or reboots and receives its configuration file containing the changes you just made.

4.1.1.2 Web User Interface (Web-UI)

Access the phone's Web-UI and edit:

BLF List URI: **monitoring-phone@bsblf.com**



Click Submit All Changes to save the phone's configuration. The phone will reboot and auto-populate the SPA500S' keys, starting at Unit 1 Key 1:

The screenshot shows the configuration page for a Cisco SPA 5xxG IP Phone. At the top, there are fields for 'Test Mode Enable' (set to 'no'), 'Attendant Console Call Pickup Code' (set to '*98'), and 'BLF List URI' (set to 'monitoring-phone@bsblf.com'). Below this is a 'Pattern' section with various LED status indicators, each with an empty input field: Application LED, Serv Subscribing LED, SNRM Night Mode LED, Parking Lot Busy LED, BLF Ringing LED, BLF Held LED, Serv Subscribe Failed LED, SNRM Day Mode LED, Parking Lot Idle LED, BLF Idle LED, and BLF Busy LED. At the bottom, there are three 'Unit 1 Key' fields. The first two contain the same URL: 'fnc=sd+blf+cp;sub=monitoring-phone@bsblf.com;usr=2142148002@bsblf.com' and 'fnc=sd+blf+cp;sub=monitoring-phone@bsblf.com;usr=2142148001@as.bsblf.com'. A callout box with a blue border and a white background points to these fields, containing the text 'Automatically inserted after phone boots'.

Note: The details of the auto-inserted parameters are described in the BLF Configuration with Phone's Web-UI (2.6.2.1) section.

4.1.2 Manual BLF Phone Configuration

The second-most difficult task is deciding which phone extension LEDs to use for BLF monitoring. In this document, I first demonstrate configuring extensions 11 and 12 of the SPA509G for BLF monitoring of 8001 and 8002 respectively. I then demonstrate how to configure buttons 8 and 19 of a SPA500S attendant console attached to the SPA 5009G.

4.1.2.1 BLF Configuration with Phone's Web-UI

Use either the phone's web-UI or XML configuration file to configure the phone to use Line Keys 11 and 12 to BLF monitor the two phones identified in the BLF Configuration: Broadsoft section as follows:

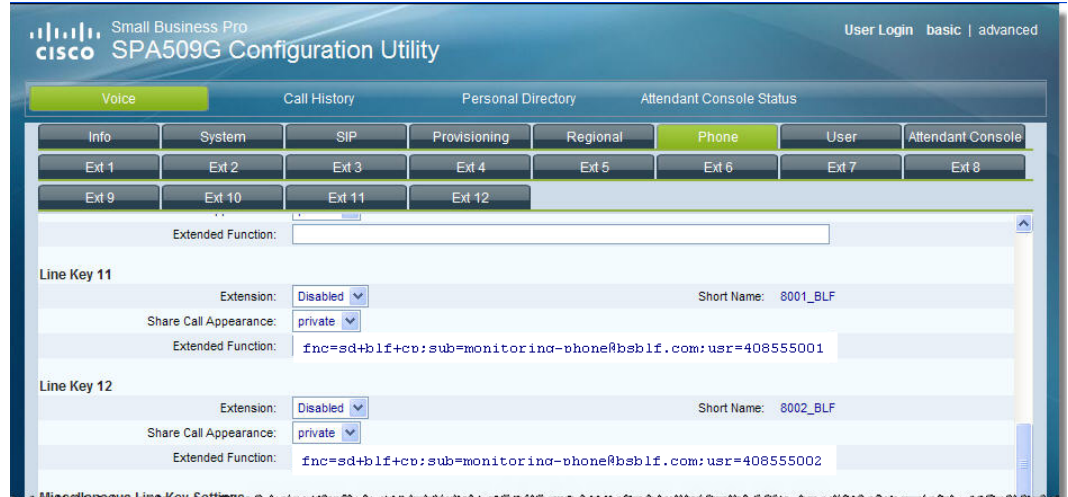


Figure 4: SPA50xG Voice > Phone page

Use either the phone's web-UI or XML configuration file to configure the phone to use Key 8 and key 19 of an attached SPA500S to BLF monitor the two phones identified in the BLF Configuration: Broadsoft section as follows:

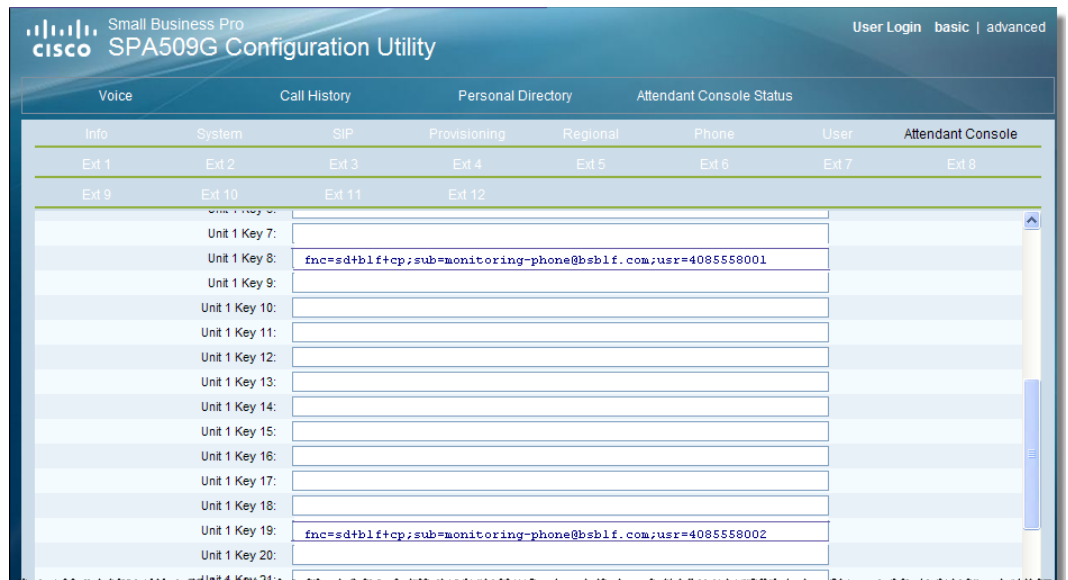


Figure 5: SPA50xG Voice > Attendant Console page

Edit the appropriate line key parameters as follow s:

- Extension:--**Disabled**
- Short Name:-- This is the name that displays next to LED button, not applicable for lines 9-12 on the SPA509G that do not have associated space on the phone's display.

- Share Call Appearance N: -- not applicable
- Extended Function:--
`fnc=sd+blf+cp;sub=monitoring-phone@bsblf.com;`
`usr=4085558001@bsblf.com`

where:

- fnc—Function for associated button
- sd—Speed dial. This is optional, leave out if speed dial functionality is not desired
- +—Delimiter
- blf—Busy Lamp Field
- cp—Call Pickup. This is function is mandatory for BLF functionality.
- sub=—This is the subscribing phone, the phone that monitors the status of other phones w ith BLF. This name **must be identical** to the name defined in the **List URI: sip:** parameter.
- monitoring-phone@bsblf.com—This name **must be identical** to the name defined in the **List URI: sip:** parameter.
- ;—Delimiter
- `usr=4085558001@bsblf.com`—This is the Broadsoft user being monitored by BLF. This name **must be identical** to the name selected in the Broadsoft Busy Lamp Field Monitored Users section.

4.1.2.BLF Configuration with XML File

Edit the phone's XML configuration file as follow s:

Example for Line Keys 11 and 12

```
<!-- Line Key 11 -->

<Extension_11_ ua="na">Disabled</Extension_11_>

<Short_Name_11_ ua="na">8001_BLF</Short_Name_11_>

<Share_Call_Appearance_11_ ua="na">private</Share_Call_Appearance_11_>

<Extended_Function_11_ ua="na">fnc=sd+blf+cp;sub=monitoring-
phone@bsblf.com;usr=4085558001@bsblf.com</Extended_Function_11_>

<!-- Line Key 12 -->

<Extension_12_ ua="na">Disabled</Extension_12_>

<Short_Name_12_ ua="na">8002_BLF</Short_Name_12_>

<Share_Call_Appearance_12_ ua="na">private</Share_Call_Appearance_12_>

<Extended_Function_12_ ua="na">fnc=sd+blf+cp;sub=monitoring-phone@bsblf.com;
usr=4085558002@bsblf.com</Extended_Function_12_>
```

Use either the phone's web-UI or XML configuration file to configure the phone to use Key 8 and key 19 of an attached SPA500S to BLF monitor the two phones identified in the BLF Configuration: Broadsoft section as follows:

```
<Unit_1_Key_8 ua="na">fnc=sd+blf+cp;sub=monitoring-phone@bsblf.com;  
usr=4085558001@bsblf.com</Unit_1_Key_8>
```

```
<Unit_1_Key_19 ua="na">fnc=sd+blf+cp;sub=monitoring-phone@bsblf.com;  
usr=4085558002@bsblf.com</Unit_1_Key_19>
```

5 Call Pickup

Call pickup (CP) is mandatory in the BLF function syntax. Two call pickup options are available:

- Group Pickup
- Directed Call Pickup

5.1 Group Call Pickup

Group call pickup allows the monitoring phone user to press a flashing LED to pick up the other phone's call on behalf of the other phone's user.

Once you have configured BLF as described in the previous sections, no additional phone configuration is needed to use call pickup. You do however need to configure Group Call Pickup on Broadsoft.

5.1.1 How Group Call Pickup Works

The monitoring phone which hosts the SPA500S sends a SIP INVITE with SDP to Broadsoft Feature Access Code (FAC) *98 (by default) when the flashing BLF LED button is pressed.

For example, if the BLF LED for extension 8002 is flashing, pressing it will result in a SIP with SDP INVITE being sent from the monitoring SPA5xxG IP Phone to the Broadworks Application Server for *98@<application.server>

5.1.2 Group Call Pickup Configuration

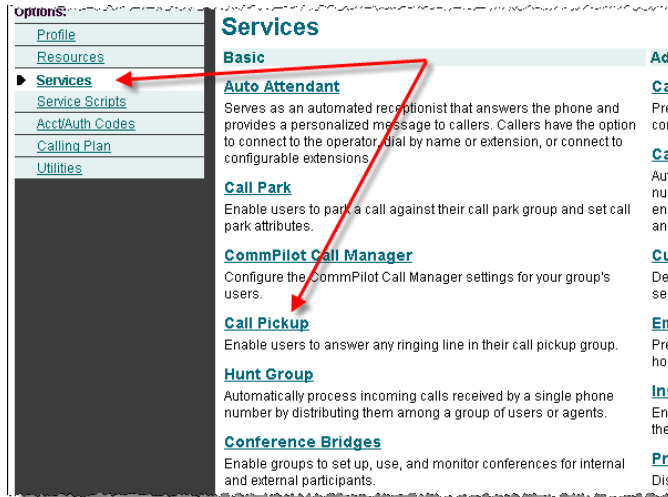
In order to use Group Call Pickup, you must first, on Broadsoft:

1. Define a Call Pickup Group
2. Assign individual users to the defined Call Pickup Group

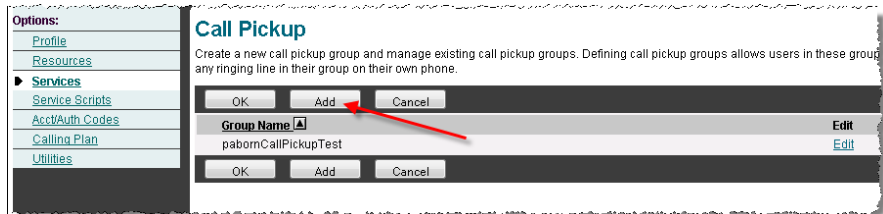
5.1.2.1 Call Pickup Group Configuration

You must define a Call Pickup Group on Broadsoft before trying to use directed call pickup.

1. Log into Broadsoft as a Group Administrator.
2. Navigate to Services > Call Pickup



3. In Call Pickup, click Add to add a Call Pickup Group

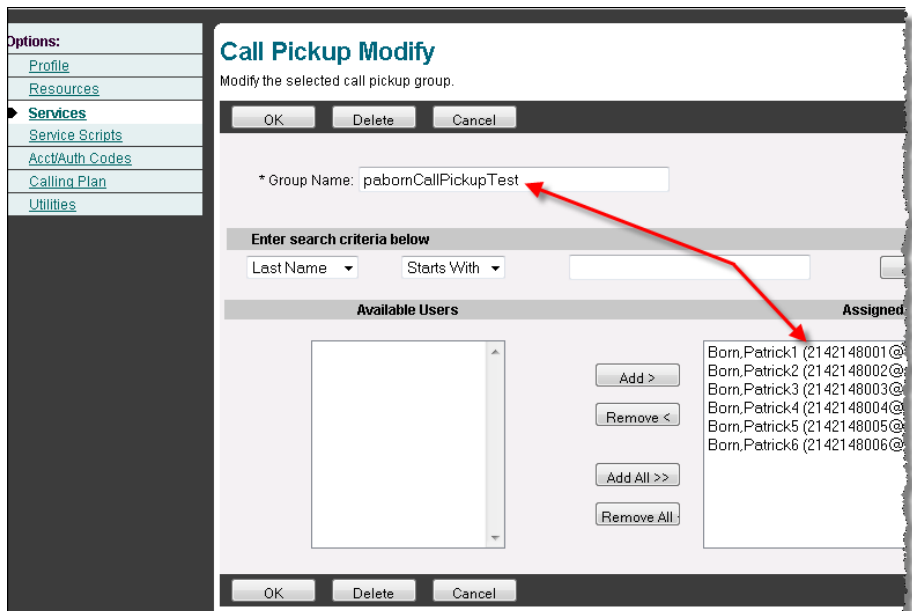


4. Enter a Group Name. I used pabornCallPickupTest

5.1.2.2 Call Pickup Group User Assignment

You must assign individual users to the call pickup group as follow s:

1. Search for and assign users that you want to add to the Call Pickup Group



2. Click OK to conclude the Call Pickup Group configuration on Broadworks.

5.1.3 Using Group Call Pickup

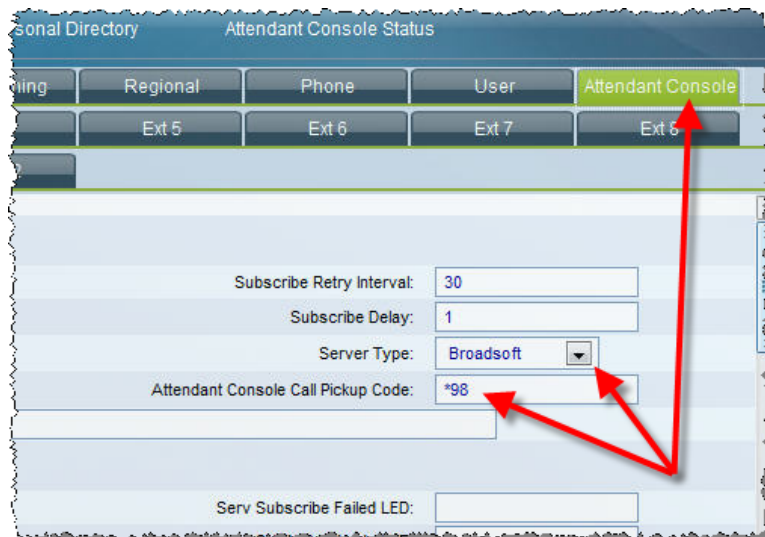
When a monitored phone is called, the BLF on the monitoring phone will flash.

The monitoring phone user can pick up the call by simply pressing the flashing LED on the SPA500S. [Or dialing *98 <ext>]

5.1.4 Changing the Attendant Console Call Pickup Code [Optional]

The SPA500S by default uses the *98 Broadsoft **Group Call Pickup** Feature Access Code (FAC). You can change the value on the phone change at:

Attendant Console tab > General > Attendant Console Call Pickup Code: ***98**



```
<Attendant_Console_Call_Pickup_Code ua="na">*98</Attendant_Console_Call_Pickup_Code>
```

5.1.5 Changing the Broadsoft Call Pickup FAC [Optional]

You can change the Broadsoft FAC for Call Pickup on the Broadsoft Interface at:

System > Group > Utilities > Feature Access Codes: Call Pickup: ***98**

Options:
[Profile](#)
[Resources](#)
[Services](#)
[Service Scripts](#)
[Acct/Auth Codes](#)
[Calling Plan](#)
Utilities

Feature Access Codes

If "Use FAC codes" radio buttons are set to "Group FAC codes", configure two feature access codes prefixes that are used for authorized services for the group. Otherwise Service Provider FAC codes will be used. If Speed Dial 100 is used, the prefix for that service may be set. Be careful to avoid conflicts between Feature Codes, Speed Dial Codes, Extensions, and Emergency Numbers.

OK Apply Cancel

* Speed Dial 100 Prefix: #

Use FAC codes: Service Provider FAC codes Group FAC codes

[Revert Back to Default FAC Setting](#)

Feature Access Code Name	Main (Required)	Alternate (Optional)
Anonymous Call Rejection Activation	*77	
Anonymous Call Rejection Deactivation	*87	
Automatic Call Forward Deactivation	*90	
Calling Line ID Delivery per Call	*85	
Call Park	*68	
Call Park Retrieve	*86	
Call Pickup	*98	
Call Retrieve	*11	
Call Return	*69	
Call Return Number Deletion	#92#	
Call Waiting Persistent Activation	*43	
Call Waiting Persistent Deactivation	#43	

5.2 Directed Call Pickup

Broadsoft's Directed call pickup allows a user to dial a feature access code (*97 by default) followed by an extension in order to pick up a call on another phone that is ringing. For example extension 8002 is ringing. From any phone, go off hook dial *97 8002# and you will immediately be connected with the call that was destined for extension 8002.

A SPA phone with a SPA500S Attendant Console makes Directed Call Pickup as easy as pressing only one flashing LED button. When a phone is ringing, identify the phone's flashing LED on the SPA500S, press the LED and you are connected with the caller.

5.2.1 How Directed Call Pickup Works

The monitoring phone which hosts the SPA500S sends a SIP INVITE with SDP to Broadsoft Feature Access Code (FAC), *97 (by default) with the target phone's extension. For example, if the BLF LED for extension 8002 is flashing, pressing it will result in a SIP with SDP INVITE being sent from the monitoring SPA5xxG IP Phone to the Broadworks Application Server for *978002@<application.server>

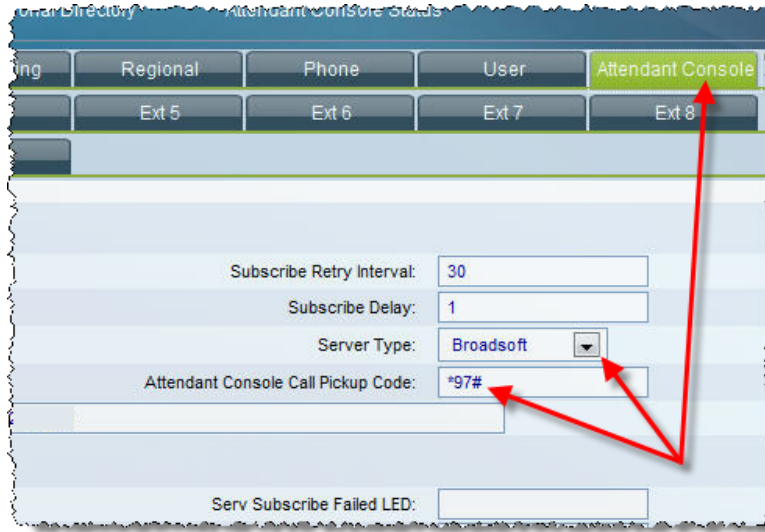
5.2.2 Directed Call Pickup Broadsoft Configuration

No configuration is needed in a Broadsoft environment.

5.2.3 Directed Call Pickup SPA5xxG Configuration

The SPA500S by default uses the *98 Broadsoft Group Call Pickup Feature Access Code (FAC). To use Directed Call Pickup, you **must** change the Attendant Console Call Pickup Code from *98 to *97# on the phone as follows:

Attendant Console tab > General > Attendant Console Call Pickup Code: *97#



<Attendant_Console_Call_Pickup_Code ua="na">*97#</Attendant_Console_Call_Pickup_Code>

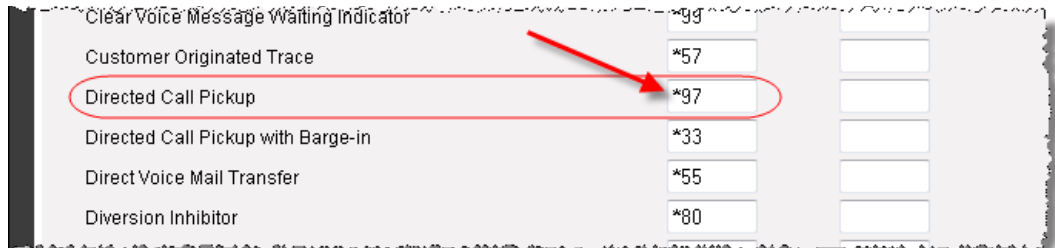
5.2.4 Using Directed Call Pickup

When a monitored phone is called, the BLF on the monitoring phone will flash.

The monitoring phone user can perform a directed call pick up of the call by simply pressing the flashing LED on the SPA500S. [Or dialing *97 <ext> #]

5.2.5 Changing the Broadsoft Directed Call Pickup FAC [Optional]

You can change the FAC from *97 if you choose.



6 Troubleshooting

6.1 LED is not Lit

Monitored phone may not be powered on.

6.2 LED is Orange

Another button already subscribed? Only one button per phone being monitored, don't try monitor the same phone with more than one button.

Make sure that the subscriber field in the fnc parameter describes the exact name and domain defined in the Broadsoft BLF List URI: sip: parameter.

6.3 BLF is Green and Does not Change

Verify that the SPA5xxG IP phone hosting the SPA500S is using TCP as the transport and not UDP. Recall that UDP by its nature is not reliable, therefore if any BLF related data is lost on the network, the BLF state will become confused and unreliable.

6.4 SUBSCRIBE 404 Not Found

Make sure that the subscriber field in the fnc parameter describes the exact name and domain defined in the Broadsoft BLF List URI: sip: parameter.

7 Gathering Information for Support

Collect the information listed in this section when contacting support.

7.1 Problem Replication

Provide a detailed description of how to replicate issue/s.

7.2 Phone Configuration

Web-UI > Admin Login > Advanced >

Browser > File > Save As > [save entire page as SPA5xxVoice.html]

7.3 Phone syslog Log from Debug Output:

Web-UI > Admin Login > Advanced >

System tab > Syslog & Debug Server: and Debug Level: 3

Configuring this is described fully at: <https://www.myciscocommunity.com/docs/DOC-5405>

7.4 Network Trace

Collect a WireShark trace that captures the sequence of events.