



# **IP Office Emergency Call Configuration**

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# Chapter 1: Introduction

This document provides an overview of the IP Office features and requirements for supporting emergency calls.

- You must understand that the emergency call requirements are unique to each specific customer's environment. You must review the planned configuration with the customer and ensure compliance with all local legislation or employee safety regulations.

Although we have used 911 as the example emergency number in this document, it represents any emergency number that you can define in the system dialing plan. For example: 112, 999 and 000.

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[Typical Emergency Call Operation](#) on page 5

[Dial Emergency](#) on page 5

[Large and Complex Sites](#) on page 6

[IP Office Locations](#) on page 6

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## Definitions

Term	Definition
<b>ALI</b>	<b>Automatic Location Identification</b> Each ELIN has an entry in the PSTN ALI database. The PSAP uses this display location information supplied for the ELIN.
<b>ESA</b>	<b>Emergency Services Access</b> A number used for emergency calls. For example: 911, 112, 999, or 000.
<b>NTE</b>	<b>Network Terminating Equipment</b> The interface between the carrier network and the customer PBX.
<b>ELIN</b>	<b>Emergency Location Identification Number</b> The number used by the PSAP to identify the probable response location for an emergency call.

*Table continues...*

Term	Definition
<b>ERL</b>	<b>Emergency Response Location</b> A location to which the PSAP can dispatch an emergency response team. The location must be specific enough to provide reasonable opportunity for the emergency response team to quickly locate a caller within it.
<b>OSN</b>	<b>On-Site Notification</b> A mechanism used to alert local on-site personnel about an emergency. Typically, a flashing button on a telephone, an audible sound, and display of location information.
<b>PSAP</b>	<b>Public Safety Answer Point</b> A designated agency that answers emergency calls from the public and dispatches emergency responders.
<b>VPC</b>	<b>Voice Positioning Carrier/Center</b> An 'umbrella' network provider capable of handling emergency calls. The VPC service reroutes calls to the appropriate local PSAP by matching information received with the call.

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## Typical Emergency Call Operation

When someone makes a call to the PSAP, the PSAP uses the *ANI* or *CallerID* information it receives to match the call to an associated address. When you use the *ANI* or *CallerID* in this way, it is called the "Emergency Location Identification Number" (*ELIN*).

- For analog or digital trunks, the trunk provider provides address details to the ANI/ALI database servicing that area.
- The same mechanism can operate for other trunk types such as SIP. However, you must ensure that is the case and that the ITSP sends any location changes and updates promptly.

**Related links**

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## Dial Emergency

The IP Office system uses short codes configured with the **Dial Emergency** feature for emergency call routing. The IP Office system treats calls made using **Dial Emergency** differently from calls made using any other **Dial** short code features:

- The call is not subject to call barring.

- Users can dial from locked phones and logged off phones.
- The IP Office system uses the **ARS** set in the extension's **Location** if set.
- If the IP Office routes the call to an **ARS** with no available trunks, the call immediately goes to the **Alternate Route** if configured.
- The IP Office can indicate the emergency call on phones with **911 View/Emergency View** programmable buttons.
- The IP Office can trigger an IP Office system alarm (see [Emergency Alerts and Alarms](#) on page 17).

#### Related links

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## Large and Complex Sites

For large or complex customer sites, you must indicate the particular building or area within a building from which an emergency call was made. For example:

- A car dealership fronted by an office and showroom, but with a separate workshop building on the same site.
- A company that spans several floors in an office building.

You must ensure the emergency call configuration matches indicates the call location with reasonable accuracy:

- The emergency services dispatcher will want to know the general area of the site or floor of the building from which the emergency call originated. Whilst a desk/cubical reference such as "2C-231" in an open plan office may be useful to internal first-aiders, it is meaningless to emergency service responders.
- Where local regulations depicting the size of a response zone exist, you must follow them or obtain an exception waiver. If there are no local regulations, use the National Emergency Number Association (NENA) recommendations for fire alarm zones as a starting point. See [NENA 06-502 MLTS E9-1-1 Caller Location Discovery and Reporting TID V1](#).

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## IP Office Locations

The IP Office configuration can include **Location** entries. Each extension on the system is then associated with one of those **Location** entries and the system associated with a default **Location**.

Each **Location** controls various system and extension behaviors. For emergency calls:

- Each **Location** record has an **Emergency ARS** setting. This sets the **ARS** the IP Office uses when an extension associated with the location makes an emergency call. The ARS should also contain **Dial Emergency** short codes.
- The **Emergency ARS** overrides any other routing. It controls which trunks the IP Office uses for the emergency call and, depending on the trunk type, the ELIN number sent with the call.
- When using SIP trunks that connect to an E911 service that supports RFC4119/RFC5139, the location can also specify the address information provided to the PSAP.

When using locations:

- You must set a location for each IP Office system in the network. You must create the same location record on each system in the network.
- You must configure each digital and analog extensions with a location or set them to use the location of their IP Office system.
- You must configure IP extension locations. You can configure them as above or by matching their IP address to IP address range configured in the **Location** records.
- For DECT R4, you can assign a location to each base station. When a DECT R4 extension makes an emergency call, the base station passes its location to the IP Office. See [Using DECT R4 Base Station Locations](#) on page 16.

 **Important:**

- It is the location of the extension that matters - not the user. Users can hot-desk between different extensions on the IP Office system. Users can also log onto multiple telephone devices simultaneously.
- You must provide details for each **Location** and its related ELIN to the ALI Database provider supporting the PSAP.

## Location API

The IP Office supports a Location API that allows the dynamic allocation of locations to extensions. See the [Avaya DevConnect](#) website.

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# Chapter 2: Emergency Calling Design Considerations

When working out the emergency call routing for an IP Office system, you must consider the following factors.

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[Moves and Changes](#) on page 8

[UPS/Standby Power](#) on page 8

[Automatic Power Fail Connections](#) on page 9

[Trunk Types](#) on page 10

[Testing Emergency Calling](#) on page 10

[Routing Incoming Calls to ELIN Numbers](#) on page 11

[Adding Additional Emergency Numbers](#) on page 11

[Networked IP Office Systems](#) on page 12

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## Moves and Changes

When an IP Office system includes **Location** entries, you must ensure that these updated maintained when making extension moves and changes. For example, when repatching phone cables, you must update the **Location** settings of affected extensions.

If IP extensions have had their locations manually configured, users must not move phones as they may inadvertently move into a different location. Best practices include using MAC address tables on switches or cable management locks that prevent users from unplugging cables.

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## UPS/Standby Power

Situations such as fire or flood require calls to the emergency services. Therefore, you must ensure that all parts of the system used for emergency calls are on protected power supplies.



That includes the PoE switches for IP extensions, intermediate switches and routers, the IP Office system and any trunk equipment.

Analog trunks receive power from the line provider. Therefore, you can still use them to make emergency calls during a local power failure. See [Automatic Power Fail Connections](#) on page 9.

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## Automatic Power Fail Connections

Analog trunks receive power from the line provider. Therefore, you can still use them to make emergency calls during a local power failure.

- On IP Office systems with analog trunk and analog extension ports, the IP Office can automatically connect ports to each other when the IP Office system loses power.
- Analog extension power failure ports only with loop-start analog trunks. You must label any phones connected to these ports as power fail extensions, following national and local regulatory requirements.

### Switched Power Failure Ports

During normal IP Office system operation, users can use these ports for calls controlled by the IP Office configuration. During power failure, the ports connect directly to an analog trunk port.

This following IP Office cards support this type of power failure port:

- **IP500 Analog Phone 8 Card** and **IP500 Analog Trunk Card**

When an IP500 Analog Phone 8 base card is fitted with an IP500 Analog Trunk daughter card, during a power failure, extension port 8 is connected to analog trunk port 12.

- **IP500 ATM Combination Card/IP500 ATM Combination Card V2**

On these cards, during a power failure, extension port 8 is connected to analog trunk port 12.

### Emergency Only Power Failure Ports

Users cannot use these ports cannot during normal IP Office system operation. However, during a power failure the ports connect directly to an analog trunk port.

- **IP500 Analog Trunk Daughter Card** and **IP500 Analog Trunk Daughter Card V2**

Regardless of the base card hosting it, during a power failure, pins 4 and 5 of port 12 are connected to pins 7 and 8.

#### Related links

[Emergency Calling Design Considerations](#) on page 8

## Trunk Types

You can route emergency calls through all types of trunk supported by IP Office.

- That includes inter-IP Office trunks within an IP Office network. However, Avaya recommends that where possible, each IP Office has a local PSTN trunk for emergency calls.

There are pros and cons to the choice of trunk type for emergency calls:

- **Analog Trunks**

- Analog trunks do not allow configuration of the *CallerID* number sent on calls.
- In power-fail scenarios, extensions can connect directly to analog trunks. See [Automatic Power Fail Connections](#) on page 9.

- **PRI Trunks**

- PRI trunks usually allow configuration of the Caller ID number sent on calls, though that needs confirming from the line provider.
- PRI trunks require a standby power supply for the IP Office system and NTE equipment, to maintain operation during power failure scenarios. See [UPS/Standby Power](#) on page 8.

- **SIP Trunks**

- The flexibility with which you can assign SIP trunks between IP Office systems means you must be strict in ensuring that you update any address details that you provide to the line provider and emergency services.

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## Testing Emergency Calling

You must check the correct operation of emergency calls. Plan that in advance and with the cooperation of the PSAP. Do not make calls to the emergency number without prior arrangement, as this will cause the diversion of vital resources.

- The PSAP may have a specific number for testing. If that is the case, add the test number to the configuration used for routing emergency call numbers.
- When calling the PSAP, do not hangup immediately when answered. Instead, confirm with the PSAP that you are making a test call.
- You must confirm that the calling number sent matches that received by the PSAP. Never assume the caller ID displayed on a normal call is the same caller ID seen on an emergency call. Not checking can cause 'false positives' that later become troubles should the carrier change the configuration and stop modifying the ANI caller ID.
- Check the location information held by the PSAP.
  - If the PSAP has a test number, the test number may respond with an automatic announcement of the location details held by the PSAP.

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## Routing Incoming Calls to ELIN Numbers

If an emergency call unexpectedly drops, the PSAP emergency operator will attempt a callback. Therefore:

- For all ELIN numbers, you must configure a matching **Incoming Call Route** for callback calls.
- Route the callback calls to a suitable group of users rather than an individual user. For example, to a group that includes reception, building security, maintenance and other appropriate internal parties.

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[Emergency Calling Design Considerations](#) on page 8

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## Adding Additional Emergency Numbers

Whilst configuring the routing of emergency numbers, you must also consider any other numbers that users may dial. For example:

- **Overseas Visitors**

At sites where there are frequent visitors from other countries, add **Dial Emergency** short codes for their home country emergency numbers. For example, an American company with frequent visiting staff from Europe, add 112 as an emergency number.

- **Dialing Prefixes**

At sites which use a dialing prefix for external calls, add **Dial Emergency** short codes for emergency numbers dialed with and without the external dialing prefix. For example, configure both 9911 and 911 as emergency numbers.

- **Additional Emergency Services**

You must consider the routing of other additional local or national emergency numbers. For example, locales can use separate numbers for gas leaks, coastguard, and so on. You must ensure that the IP Office configuration routes those numbers to the correct PSAP for each number.

- **Emergency Test Numbers**

If the PSAP supports a specific number for test calls, add that number using the same routing.

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[Emergency Calling Design Considerations](#) on page 8

## Networked IP Office Systems

IP Office systems that are in a network require special consideration. You must take into account scenarios where any of the IP Office system in the network fails.

- Where possible, emergency calls from each system on the network should use an external trunk on that IP Office system. Avaya recommends this even if it means providing trunks purely for emergency calls.
- If the network configuration routes emergency calls from one IP Office system out on the trunks of another IP Office system, location identification through sending of the correct ELIN for the original IP Office system is essential.

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[Emergency Calling Design Considerations](#) on page 8

# Chapter 3: Remote and Mobile Users

There are an increasing number of ways of operating that are outside the traditional physical extension on a desk at a fixed location. These can present challenges to emergency location reporting;

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[Remote Extensions: NAT Traversal and VPN](#) on page 13

[Telecommuter Mode Users](#) on page 14

[Softphone Clients](#) on page 14

[Avaya Workplace Client Emergency Number Dialing](#) on page 15

[Cordless Phones \(DECT, Wi-Fi\)](#) on page 15

[Using DECT R4 Base Station Locations](#) on page 16

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## Remote Extensions: NAT Traversal and VPN

Using various methods, IP phone users at a remote location can make and answer calls as they are physically at the IP Office site. You must advise these users to use a local PSTN phone for calls to emergency services.

- If a remote user makes an emergency call through the IP Office, the IP Office still routes the call using its emergency number configuration. However, a VPC must provide location identification, doing otherwise can cause responders to go to the wrong location.

If using a VPC service, it is vital that remote workers do not move their VPN/Remote phone without informing the person responsible for updating the VPC service, or by using an online Location Management Dashboard provided by the VPC.

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## Telecommuter Mode Users

IP Office telecommuter functionality allows a user to, through either Avaya one-X Portal or mobile call control, to use their local PSTN phone as it is an extension on the IP Office.

- For emergency calls, you must instruct these users to use the local phone to directly call the emergency services.
- If a remote user makes an emergency call through the IP Office, the IP Office still routes the call using its emergency number configuration. However, a VPC must provide location identification, doing otherwise can cause responders to go to the wrong location.

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## Softphone Clients

### Smart Phones

For IP Office softphone clients on mobile devices such as Avaya Workplace Client on iOS or Android:

- You must instruct the user to make emergency calls using the mobile device's native dialer application. This is especially important if the user is using the softphone client as a remote extension.
- If the user uses the IP Office softphone to make an emergency call, the call connects to the PSAP as if from the IP Office location. If the user uses the mobile device's native dialer to make an emergency call, the call connects to the PSAP using location information provided by the mobile/cellular network.
- For IP Office R11.1 FP2 SP2 and higher, you can configure the Avaya Workplace Client on iOS and Android devices to automatically dial emergency numbers using the device's native dialer. See [Avaya Workplace Client Emergency Number Dialing](#) on page 15.
- If a remote user makes an emergency call through the IP Office, the IP Office still routes the call using its emergency number configuration. However, a VPC must provide location identification, doing otherwise can cause responders to go to the wrong location.

### PC Softphones

You must advise users with an IP Office softphone client on a PC to only use the client to make emergency calls if there is no alternate local phone available.

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## Avaya Workplace Client Emergency Number Dialing

You must instruct Avaya Workplace Client users on mobile/cellular devices to use the device's native dialer application when connecting from a remote location. Doing otherwise associates the emergency call with the IP Office location rather than the mobile/cellular device user's true location.

### Using Cellular Direct Numbers for Emergency Calls

For Avaya Workplace Client users on mobile iOS/Android devices, you can configure a set of "cellular direct numbers" (CDN).

When an Avaya Workplace Client user dials a cellular direct number, the client prompts the user to allow the device's native dialer direct to make the call using the mobile/cellular public telephone network. The call location information is then determined by the mobile/cellular network provider's own services.

### The SET\_CDNL Source Number

For IP Office R11.1 FP2 SP2 and higher, you can use the **NoUser** source number SET\_CDNL= to add cellular direct number settings to the IP Office system's configuration. These settings add CDN commands to the auto-generated 46xxsettings.txt file.

- SET\_CDNL=DISABLED

This adds the following string to the auto-generated 46xxsettings.txt file. This disables cellular direct number operation.

```
- SET CELLULAR_DIRECT_ENABLED 0
```

- SET\_CDNL="911", "9911"

This adds the following strings to the auto-generated 46xxsettings.txt file. These enable cellular direct number operation and specify the numbers that will trigger the feature. Enclose each number in " " quotation marks. Separate multiple numbers with commas.

```
- SET CELLULAR_DIRECT_ENABLED 1
  SET CELLULAR_DIRECT_NUMBER_LIST "911", "9911"
```

- You can use multiple SET\_CDNL= source numbers.
- The maximum length of any individual SET\_CDNL= entry is 63 characters.
- The maximum length of the SET CELLULAR\_DIRECT\_NUMBER\_LIST string is 127 characters.

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## Cordless Phones (DECT, Wi-Fi)

It is possible for on-site cordless extensions, such as DECT and wireless IP phones (Wi-Fi), to report the correct general location based on the IP address of the base station or access point providing coverage.

You can use the following options to ensure more accurate location reporting when a cordless extension makes an emergency call.

### Using a Cordless Location

If it is not possible to ensure accurate reporting of cordless extension locations:

- Group all such devices into a cordless **Location** in the IP Office system configuration.
- Use a separate ELIN for cordless devices. In the descriptor field for that ELIN in the ANI/ALI database, identify that the device has no fixed location. For example, use a descriptor such as “WIRELESS USER – GET LOCATION” to prompt the emergency call receiver to ascertain the exact location information before dispatching emergency responders.

### DECT R4 Extension Locations

From IP Office R11.1 FP2 SP2, it is possible to associate an IP Office location with each separate DECT R4 base station. This location overrides that of the DECT extension when it makes a call via that base station. See [Using DECT R4 Base Station Locations](#) on page 16.

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## Using DECT R4 Base Station Locations

For IP Office R11.1 FP2 SP2 and higher, you can dynamically change the reported location of DECT R4 extensions based on the base station the extension is using.

In summary:

1. Create IP Office location and emergency ARS entries as required for routing of emergency calls to the appropriate external lines.
2. For each base station, assigned an IP Office location ID through the base station's configuration menus. This ID should match the IP Office location to use for routing emergency calls made by any phones connected to that base station.
3. Enable **Call based location information** on the IP DECT line.

When a DECT R4 extension makes an emergency call, the base station location overrides the extension's location setting. For full details, refer to [IP Office DECT R4 Installation](#).

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# Chapter 4: Emergency Alerts and Alarms

The IP Office system can provide details of emergency calls that are occurring or have occurred.

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## Emergency Call Indication

IP Office R11.1 SP1 added support for a **911 View** or **Emergency View** programmable button.

- A button set to this function indicates to users on the same system when the IP Office has routed an emergency call out one of its external PSTN trunks.
  - The button gives a ring and flashes when there is a connected emergency call in progress.
  - The button remains lit when there are details of previous emergency calls in the IP Office system's emergency call history.
- Pressing the button displays details of currently connected emergency calls (the first 10 such calls).
- After pressing the button, the **History** option displays details of any previously connected emergency calls (the first 30 such calls) and allows deletion of those call details.
- On J189 phones, the details include the location name if the IP Office used a **Location** record as part of the emergency call routing.
- All users on the IP Office share the same emergency call history information. Changes to the emergency call history affect the details shown on all phones on the same system.

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## System Alarm Output

You can configure the IP Office system to generate a system alarm for any call that uses a **Dial Emergency** short code. In addition to reporting connected calls, the alarms also report emergency call attempts that fail for reasons such as no available trunks.

Unlike SMDR call records which the IP Office system generates at the end of a call, the IP Office generates emergency call system alarms immediately a call matches a **Dial Emergency** short

code. This is important, as the PSAP emergency operator can stay on the line until the first responders arrive.

You can configure the IP Office to send system alarms to SNMP, syslog, or email. On-site notification applications can use the alarm message to offer a variety of features. For example:

- Email/IM/SMS/Pager alerts with escalation and acknowledgments.
- Location maps with additional information. For example; hazardous material warnings.
- Emergency call alert displays for reception/security desks.
- Printing of alerts for physical archiving.

### Alarm Information

The IP Office provides the following information in the alarm:

- The location name.
- The number dialed by the caller.
- If connected, the called number and ELIN presented on the call. Otherwise, the reason for failure.
- The extension's current logged in user, otherwise `NoUser`. For tandem calls, the *Trunk ID*.
- The extension details and system ID plus:
  - For digital and analog extensions, the physical port details.
  - For telecommuter and mobile call control users, the external phone number.
  - For IP phones and softphone clients, the MAC and IP Address details.

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# Chapter 5: Emergency Call Configuration Example

This section of the documentation provides an example of emergency call routing for a small business. It demonstrates how you can use different IP Office system configuration features to achieve the solution required by the customer and to meet local emergency call requirements.

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## Emergency Call Configuration Example

This example assumes a small company. They occupy a site with two buildings and have users who move around the site using cordless phones.

- The company has a mix of phone types:
  - Wi-Fi Cordless phones on a 192.0.2.0/255.255.255.0 subnet.
  - Digital extensions.
  - The reception also has an analog emergency phone.
- The customer has the following DID numbers which you can assign as ELIN numbers:
  - Office Building: 650-555-0199
  - Workshop Building: 650-555-0198

- Cordless Phones: 650-555-0197
- The following trunks are available:
  - The customer uses a group of PRI trunks for most calls (**Line Group ID 0**).
  - The customer also has analog trunks (**Line Group ID 1**). During power-fail, one of those trunks automatically connects to the analog emergency phone in reception.

## Objectives

The objective agreed with the customer are:

- Have outgoing emergency calls use the ELIN appropriate to building unless the phone is cordless.
- If those emergency calls cannot use the businesses normal PRI trunks for any reason, they should attempt to use an analog trunk.
- To direct PSAP callbacks to the ELIN numbers to an internal group of first-responders.

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# Emergency Call Fallback ARS

The default and location specific **ARS** forms all attempt to use one of the PRI trunks in line group 1 for emergency calls. However, if the no PRI channel is available for the call, **Dial Emergency** calls can immediately use the **ARS** forms **Alternate Route** setting.

The fallback **ARS** created for this uses short codes that route emergency calls to use one of the customer's analog lines (line group 1) if available. Since analog lines do not allow the sending of specific number, the short codes are simpler than those used for the PRI trunks. This can result in the PSAP sending emergency responders to the location registered in the ANI/ALI database for the analog trunks.

ARS

ARS Route Id: 51

Route Name: Fallback 911

Dial Delay Time: System Default (4)

Description:

In Service:  → Out of Service Route: <None>

Time Profile: <None> → Out of Hours Route: <None>

Secondary Dial tone: SystemTone

Check User Call Barring:

Code	Telephone Number	Feature	Line Group ID
11	911	Dial Emergency	1
911	911	Dial Emergency	1

Add...  
Remove  
Edit...

### Related links

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## The Default Outgoing Call Routing

The system has been initially setup using the default US locale configuration. That uses a **9N** short code for all outgoing external calls. The short code removes the external dialing prefix 9 and passes any following digits to an **ARS** entry (50: Main) for further short code matching against those following digits.

Short Code

Code: 9N

Feature: Dial

Telephone Number: N

Line Group ID: 50: Main

**ARS 50 “Main”** contains short codes for routing the customer's normal calls. The short codes should also contain **Dial Emergency** short codes to match user dialing 911 or 9911.

## Emergency Call Configuration Example

The screenshot shows the 'ARS' configuration window. The 'ARS Route Id' is set to 50, and the 'Route Name' is 'Main'. The 'Dial Delay Time' is set to 'System Default (4)'. The 'Description' field is empty. The 'In Service' checkbox is checked. The 'Time Profile' is set to '<None>'. The 'Out of Service Route' and 'Out of Hours Route' are both set to '<None>'. The 'Secondary Dial tone' is set to 'SystemTone', and the 'Check User Call Barring' checkbox is checked.

Code	Telephone Number	Feature	Line Group ID
11	911S6505550199	Dial Emergency	0
911	911S6505550199	Dial Emergency	0
0N;	0N	Dial 3K1	0
1N;	1N	Dial 3K1	0
XN;	N	Dial 3K1	0
XXXXXXXXXN	N	Dial 3K1	0

For this customer scenario, the IP Office uses separate **ARS** forms for each customer location to route emergency calls. However, it is still possible that an emergency call may fail back to the original **ARS**. Therefore, this ARS still needs to correctly route emergency calls.

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[Emergency Call Configuration Example](#) on page 19

## Location ARS Entries

We are going to create 3 **Location** entries for the customer site. Before doing that, we need to also create an **ARS** for each of those.

The following is the **ARS** for the office building.

**Offices 911**

ARS

ARS Route Id: 52

Route Name: Offices 911

Dial Delay Time: System Default (4)

Description:

In Service:  Out of Service Route: <None>

Time Profile: <None> Out of Hours Route: <None>

Code	Telephone Number	Feature	Line Group ID
11	911S6505550199	Dial Emergency	0
911	911S6505550199	Dial Emergency	0

Alternate Route Priority Level: 3

Alternate Route Wait Time: 30

Alternate Route: 51: Fallback 911

- The 2 short codes match users who have dialed either 911 or 9911 (remember, the initial 9 was stripped by the IP Office system short code that routed the call to ARS).
- The short codes route matching calls to whichever PRI trunk has an available channel by using the line group containing the PRI trunks (line group 0).
- Since the IP Office is using PRI trunks, we have used the short code character *S* to set the Caller ID sent with the calls. This matches the ELIN number (650-555-0199) we have registered for the office building.
- We set the **Alternate Route** to the fallback ARS. For **Dial Emergency** calls, this ignores the **Alternate Route Priority Level** and **Alternate Route Wait Time** settings.

We created similar **ARS** forms for **Workshop 911** and **Cordless 911**. We configured those the same except they set the caller ID number to 650-555-0198 and 650-555-0197 respectively.

### Related links

[Emergency Call Configuration Example](#) on page 19

## Create Locations

The customer needs 3 **Location** entries. For each, the **Emergency ARS** settings sets which **ARS** form the IP Office uses when an extension associated with the location makes an emergency call.

The screenshot shows the 'Offices' location configuration form. The 'Emergency ARS' dropdown menu is highlighted with a red box and contains the value '52: Offices 911'. Other fields include Location Name (Offices), Location ID (2), Subnet Address (0 . 0 . 0 . 0), Subnet Mask (0 . 0 . 0 . 0), and Parent Location for CAC (<None>).

The **Location** form for the cordless phones differs slightly. It includes the details for the IP address range used by the cordless phones. That allows the IP Office to automatically associate those phones with the location.

The screenshot shows the 'Cordless' location configuration form. The 'Subnet Address' (192 . 0 . 2 . 0) and 'Subnet Mask' (255 . 255 . 255 . 0) fields are highlighted with a red box. Other fields include Location Name (Cordless), Location ID (4), Emergency ARS (54: Cordless 911), and Parent Location for CAC (<None>).

### Related links

[Emergency Call Configuration Example](#) on page 19

## Set the Default System Location

To use locations, you must associate the IP Office system with one of the **Location** entries. That acts as the default location for any extensions on the system not specifically configured with a location.

The screenshot shows the IP Office system configuration form. The 'Location' dropdown menu is highlighted with a red box and contains the value '2: Offices'. Other fields include Name (IPOffice) and Locale (United States (US English)).



In this case, the scenario uses the `Offices` entry as this is where the reception desk is located. The receptionist can meet and direct the first responders.

### Related links

[Emergency Call Configuration Example](#) on page 19

## Assigning Locations to Extensions

For each extension, you can now assign the appropriate **Location**.

The screenshot shows the configuration page for a Digital Extension with ID 1 201. The 'Location' dropdown menu is highlighted with a red box and is set to '2: Offices'. Other fields include Extension Id (1), Base Extension (201), Caller Display Type (On), Reset Volume After Calls (checkbox), Device Type (Unknown digital handset), Module (BD1), and Port (1).

- You must do this for all extensions, even if the extension is in the default location (the office building).
- If required, you can set the cordless extensions **Location** to **Automatic**. The IP Office system looks for a location match using the phone's IP address.

The screenshot shows the configuration page for a SIP Extension with ID 8000 300. The 'Location' dropdown menu is highlighted with a red box and is set to 'Automatic'. Other fields include Extension Id (8000), Base Extension (300), Phone Password (masked), Confirm Phone Password (masked), Caller Display Type (On), Reset Volume After Calls (checkbox), Device Type (Unknown SIP device), and Fallback As Remote Worker (Auto).

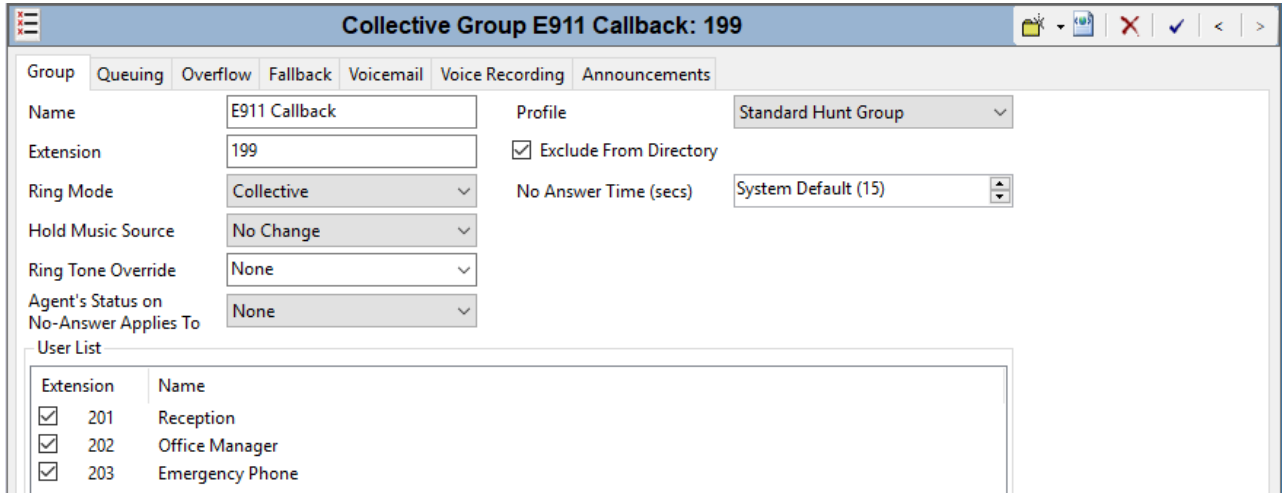
### Related links

[Emergency Call Configuration Example](#) on page 19

---

## Create a Hunt Group for Callback

For the scenario, create a single collective hunt group for callback calls from the emergency services. The group contains the receptionist, the emergency phone that is in the reception area, and various managers.



We configured the group so that unanswered calls do not go to voicemail or any other destination.

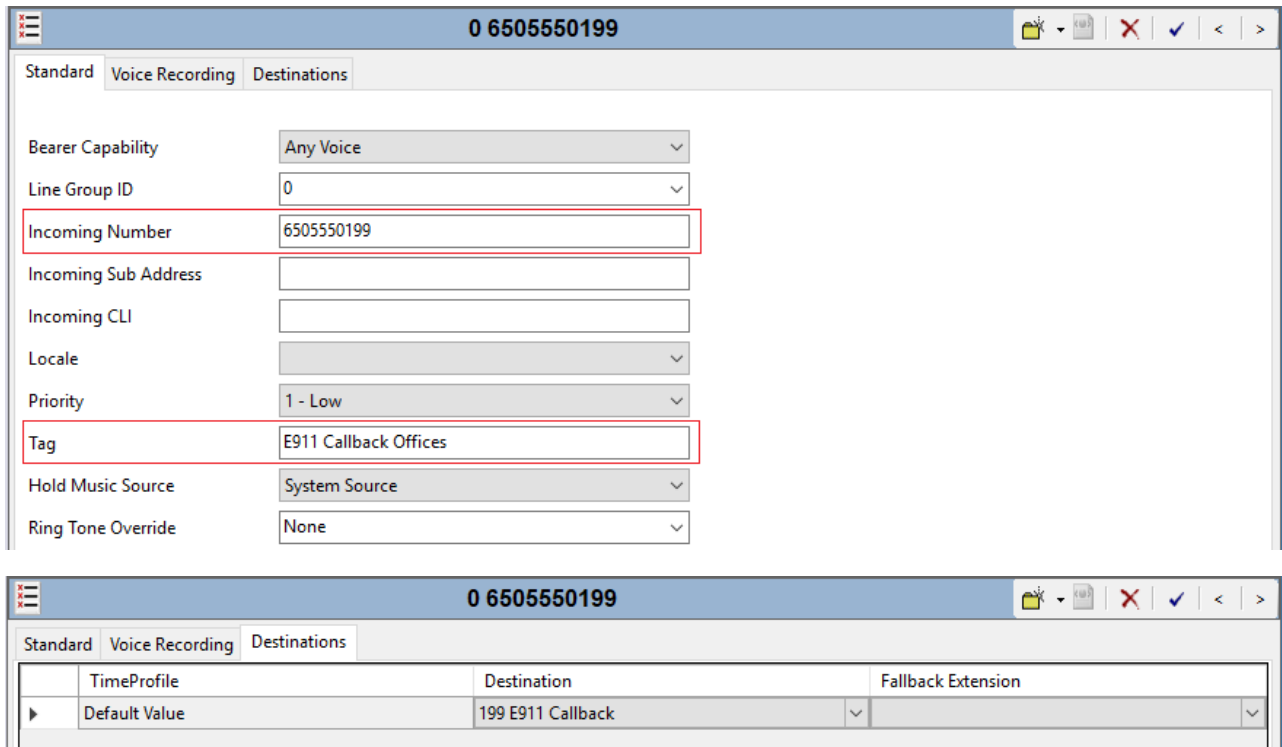
### Related links

[Emergency Call Configuration Example](#) on page 19

---

## Callback Incoming Call Routing

We created an **Incoming Call Route** for each ELIN number. The following example is for callbacks to the number registered to the office building.



In each:

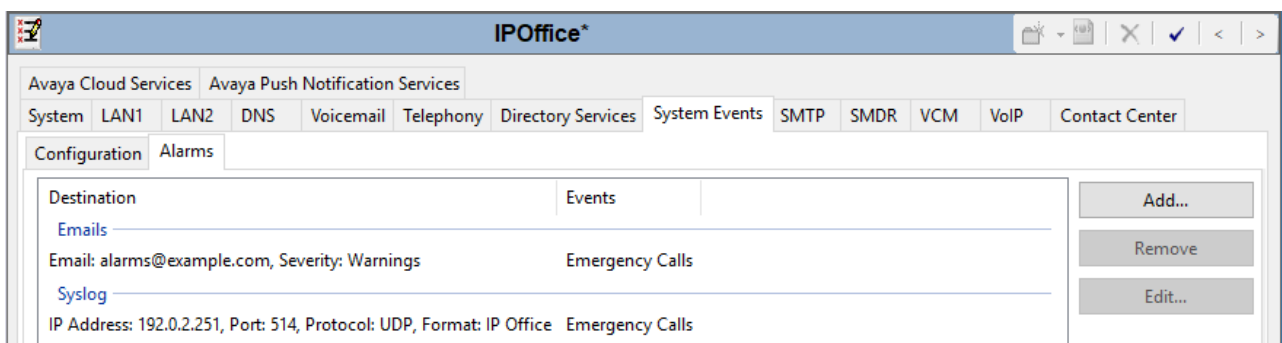
- The **Tag** field indicates the reason for the call.
- The destination is set to the emergency callback group.

### Related links

[Emergency Call Configuration Example](#) on page 19

## Enable a System Alarm

We have configured the **System Events** menu to report calls that use a **Dial Emergency** short code. For this example, the IP Office sends alarm reports to both Syslog and to an email address.



## Alarm Information

The IP Office provides the following information in the alarm:

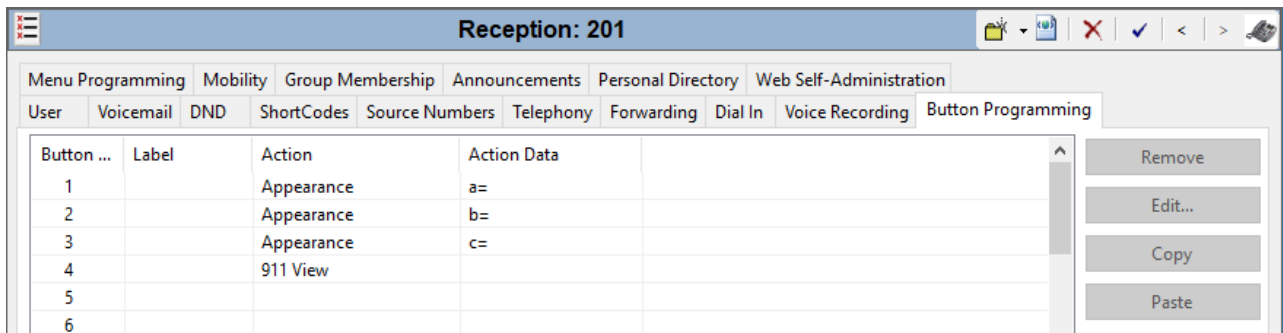
- The location name.
- The number dialed by the caller.
- If connected, the called number and ELIN presented on the call. Otherwise, the reason for failure.
- The extension's current logged in user, otherwise `NoUser`. For tandem calls, the *Trunk ID*.
- The extension details and system ID plus:
  - For digital and analog extensions, the physical port details.
  - For telecommuter and mobile call control users, the external phone number.
  - For IP phones and softphone clients, the MAC and IP Address details.

### Related links

[Emergency Call Configuration Example](#) on page 19

## Adding Alert Buttons

IP Office R11.1 SP1 added support for a **911 View** or **Emergency View** programmable button.



- A button set to this function indicates to users on the same system when the IP Office has routed an emergency call out one of its external PSTN trunks.
  - The button gives a ring and flashes when there is a connected emergency call in progress.
  - The button remains lit when there are details of previous emergency calls in the IP Office system's emergency call history.
- Pressing the button displays details of currently connected emergency calls (the first 10 such calls).
- After pressing the button, the **History** option displays details of any previously connected emergency calls (the first 30 such calls) and allows deletion of those call details.
- On J189 phones, the details include the location name if the IP Office used a **Location** record as part of the emergency call routing.

- All users on the IP Office share the same emergency call history information. Changes to the emergency call history affect the details shown on all phones on the same system.

### Related links

[Emergency Call Configuration Example](#) on page 19

---

## Emergency Call Example Callflow

For the scenario we have configured, the IP Office processes an emergency call attempt as follows:

1. An extension user in the workshop dials 911.
2. The leading 9 matches the 9N system short code used for all outgoing external calls. That short code removes the leading 9 and passes the remaining digits to the **ARS** form 50:Main for further matching.
3. The remaining digits dialed (11) match a **Dial Emergency** short code in the **ARS** form 50:Main.
4. The match to a **Dial Emergency** short code causes the system to check whether the extension's associated **Location** has a specific **Emergency ARS** set.
5. It does, so matching for the digits 11 is transferred to the **ARS** configured for emergency calls from the workshop location.
6. The matching short code in that **ARS** sets the caller ID to 6505550198 and dials 911 on the first available trunk in line group 0 (the customer's PRI trunks).
  - In no PRI trunk channel is available for the call, the call immediately switches to the fallback ARS which matches the call to a short code using the trunks in line group 1 (the customer's analog trunks).

### Alternate location processing

In the example above, the extension's **Location** determines the **ARS** used for its emergency calls. However, there are scenarios where that may differ:

- If the extension's **Location** is set to **Automatic**, the system searches for a **Location** whose IP subnet settings match the extension's IP address.
- If the matched **ARS** short code cannot make the call because no trunk channels are available, the call is immediately sent to the **Alternate Route** specified by the **ARS**.
- If the extension's **Location** is blank or there is no match for automatic IP address matching, the IP Office uses the system's **Location** setting.
- If the system's **Location** setting is blank, emergency calls use the routing applied by the original **Dial Emergency** short code match.

### Related links

[Emergency Call Configuration Example](#) on page 19

# Chapter 6: Emergency Alarm Information Format

This section details the information format used for emergency call alarms.

- The IP Office can send alarms to a variety of destinations. For example: SysLog, SNMP, and email. The System Status Application also displays alarms.
- For emergency calls, the IP Office generates emergency call alarms at the start of the emergency call rather than when the call ends.

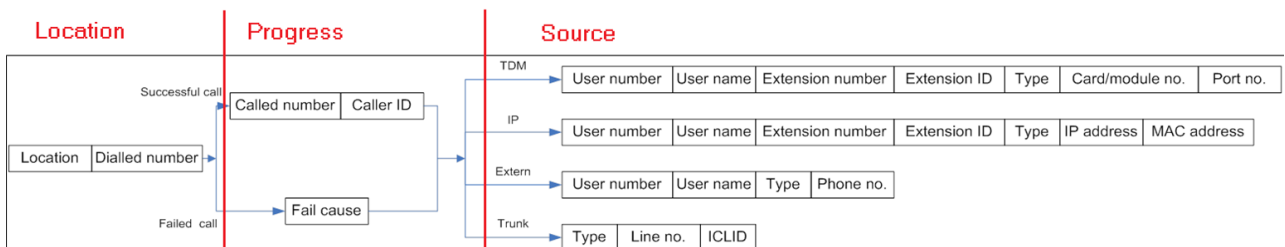
## Related links

- [Alarm Format](#) on page 30
- [Alarm Location and Dialed Number Indication](#) on page 31
- [Alarm Progress Indication](#) on page 31
- [Alarm Source Indication](#) on page 32
- [Alarm String Maximum Length](#) on page 35
- [Emergency Alarm String Examples](#) on page 35

---

## Alarm Format

The text string for emergency alarms has three main sections: Location, Progress, and Source. Each section can contain the information indicated in the following diagram.



Within the text strings:

- Fixed parts are always in English.
- Variable parts appear between " " quotation marks.

## Related links

- [Emergency Alarm Information Format](#) on page 30

---

## Alarm Location and Dialed Number Indication

The first parts of all emergency call alarms are the location and dialed number details.

1. Fixed string `Emergency call!` to signify the alarm and provide an anchor for string processing of e-mails for example.
2. Space
3. Fixed string `Location:`
4. IP Office system **Location** name in " " quotation marks.
5. Space
6. Fixed string `Dialled:`
7. The dialed number that triggering the **DialEmergency** call.

### Example

```
Emergency call! Location:"TDM_Loc" Dialled:112
```

### Related links

[Emergency Alarm Information Format](#) on page 30

---

## Alarm Progress Indication

Following the location and dialed number details (see [Alarm Location and Dialed Number Indication](#) on page 31), the emergency call alarm indicates if the emergency call connected.

- Analog trunks do not provide call progress indication. Therefore, if the IP Office seizes an analog trunk, the IP Office always treats the call as successful.

### Successful (Connected) Emergency Call

If the IP Office seizes a line (even if not necessarily answered at this stage), the progress section of the alarm includes the following:

1. Space
2. Fixed string `Called:`
3. Digits sent to line
4. Space
5. Fixed string `CallerID:`
6. CallerID sent to line

- Note that this is the number presented to the trunk interface. Some trunks, for example analog trunks, do not send *CallerID*, and on others the line provider may overwrite the *CallerID*.

### Example

```
Called:911 CallerID:789
```

## Failed (Not Connected) Emergency Call

If IP Office cannot seize a line, the progress section of the alarm contains the reason for failure if known.

1. Space
2. Fixed string `FailCause`:
3. Description of the failure: `Call Barred`, `Call Rejected`, `No channel`, `Unspecified`

### Example

```
FailCause:"No channel"
```

### Related links

[Emergency Alarm Information Format](#) on page 30

---

## Alarm Source Indication

The source details included in the emergency call alarm vary depending on the type of phone making the emergency call.

### Related links

[Emergency Alarm Information Format](#) on page 30

[TDM/Analog Extensions](#) on page 32

[IP Extension Alarm \(SIP, H.323, IP DECT\)](#) on page 33

[External Alarm](#) on page 34

[Trunk Alarm](#) on page 34

## TDM/Analog Extensions

Analogue (POTS) or Digital (TDM) extension plugged in to an IP Office Expansion Card or Module.

1. Space
2. Fixed string `USR`:
3. Extension number of user assigned to that phone - may be blank/null
4. Colon :
5. User Name, in quotes
6. Space
7. Fixed string `EXTN`:
8. Base Extension
9. Colon :
10. Extension ID



11. Fixed string :TDM: or :POTS:
12. Port location:
  - B indicates an IP500 plug in card followed by its number.
  - M indicates an expansion module followed by its number.
  - Then P followed by the socket (port) number on the card/module

### Example

```
Usr:207:"Extn207" Extn:201:1:TDM:B1P1
```

### Related links

[Alarm Source Indication](#) on page 32

## IP Extension Alarm (SIP, H.323, IP DECT)

IP extensions such as typically H323 feature phones (H323), SIP extensions (SIP), DECT R4 (IPDECT) or D100 (SIPDECT).

1. Space
2. Fixed string `Usr:`
3. Extension number of user assigned to that phone
4. Colon :
5. User Name, in quotes
6. Space
7. Fixed string `Extn:`
8. Base Extension
9. Colon :
10. Extension ID
11. Fixed string `:SIPDECT: or :IPDECT: or :SIP: or :H323:`
12. IP Address for the extension, in Hex (for example C0A82AE1 = 192.168.42.225)
13. Colon :
14. MAC address of the extension if known (from registration for example)

### Example

```
Usr:225:"Extn225" Extn:282:8003:H323:C0A82AE1:001B4F5C8E2F
```

### Related links

[Alarm Source Indication](#) on page 32

## External Alarm

This covers scenarios where the user is not using an IP Office extension but gets telephony services from the IP Office using a feature such as Telecommuter or Mobile Call Control.

1. Space
2. Fixed string `Usr:`
3. Extension number of user assigned to that phone
4. Colon :
5. User Name, in quotes
6. Space
7. Fixed string `Extern:`
8. External Number/CallerID

### Example

```
Usr:202:"Extn202" Extern:109109
```

### Related links

[Alarm Source Indication](#) on page 32

## Trunk Alarm

This covers scenarios where the emergency call originates on an incoming trunk. For example; on a private trunk from another telephone system.

For IP Office lines in a small community network (SCN):

- The alarm includes the **Location** setting of the originating IP Office if set. Otherwise, the alarm uses the **Location** setting of the local trunk that received the call.
  - Each IP Office system that processes the call as a **DialEmergency** call, generates a system alarm.
1. Space
  2. Fixed string `Trunk:`
  3. The Trunk ID in the IP Office config
  4. Space
  5. Fixed string `ICLID:`
  6. Received CallerID

### Related links

[Alarm Source Indication](#) on page 32

## Alarm String Maximum Length

The longest expected alarm string is 227 Characters;

Field	Maximum Length
Emergency call! Location:"	26
• Location name max size	20
Dialled:	10
• Maximum Number length	34
Called:	8
• Maximum Number length	34
CallerID:	10
• Maximum Number length	80
Usr:	5
• Maximum Extension Number length	16
:"	2
• Maximum Name length	16
" Extern:	9
• Maximum Number length	80
<b>TOTAL</b>	<b>350</b>

### Related links

[Emergency Alarm Information Format](#) on page 30

## Emergency Alarm String Examples

The following are example alarm strings.

### TDM Alarm

```
Emergency call! Location:"TDM_Loc" Dialled:112 Called:911 CallerID:789
Usr:207:"Extn207" Extn:201:1:TDM:B1P1
Emergency call! Location:"TDM_Loc" Dialled:112 Called:911 CallerID:789 Usr: "NoUser"
Extn:201:1:POTS:B1P7
Emergency call! Location:"TDM_Loc" Dialled:112 FailCause:"No channel" Usr:207:"Extn207"
Extn:201:1:TDM:B1P1
```

### IP Extension

```
Emergency call! Location:"IP_Loc" Dialled:112 Called:911 CallerID:789 Usr:225:"Extn225"
Extn:282:8003:H323:C0A82AE1:001B4F5C8E2F
Emergency call! Location:"IP_Loc" Dialled:112 Called:911 CallerID:789 Usr: "NoUser"
Extn:282:8003:IPDECT:C0A82AE1:001B4F5C8E2F
Emergency call! Location:"IP_Loc" Dialled:112 FailCause:"No channel" Usr:225:"Extn225"
Extn:282:8003:SIP:C0A82AE1:001B4F5C8E2F
```

## Emergency Alarm Information Format

### External

```
Emergency call! Location:"System_Loc" Dialed:112 Called:911 CallerID:789  
Usr:202:"Extn202" Extern:109109  
Emergency call! Location:"System_Loc" Dialed:112 FailCause:No channel  
Usr:202:"Extn202" Extern:109109
```

### Trunk Alarm

```
Emergency call! Location:"System_Loc" Dialed:112 Called:911 CallerID:789 Trunk:9  
ICLID:456  
Emergency call! Location:"System_Loc" Dialed:112 FailCause:"No channel" Trunk:9  
ICLID:456
```

### Related links

[Emergency Alarm Information Format](#) on page 30

# Chapter 7: Additional Help and Documentation

The following pages provide sources for additional help.

## Related links

[Additional Manuals and User Guides](#) on page 37

[Getting Help](#) on page 37

[Finding an Avaya Business Partner](#) on page 38

[Additional IP Office resources](#) on page 38

[Training](#) on page 39

---

## Additional Manuals and User Guides

The [Avaya Documentation Center](#) website contains user guides and manuals for Avaya products including IP Office.

- For a listing of the current IP Office manuals and user guides, look at the [Avaya IP Office™ Platform Manuals and User Guides](#) document.
- The [Avaya IP Office Knowledgebase](#) and [Avaya Support](#) websites also provide access to the IP Office technical manuals and users guides.
  - Note that where possible these sites redirect users to the version of the document hosted by the [Avaya Documentation Center](#).

For other types of documents and other resources, visit the various Avaya websites (see [Additional IP Office resources](#) on page 38).

## Related links

[Additional Help and Documentation](#) on page 37

---

## Getting Help

Avaya sells IP Office through accredited business partners. Those business partners provide direct support to their customers and can escalate issues to Avaya when necessary.

If your IP Office system currently does not have an Avaya business partner providing support and maintenance for it, you can use the Avaya Partner Locator tool to find a business partner. See [Finding an Avaya Business Partner](#) on page 38.

#### Related links

[Additional Help and Documentation](#) on page 37

---

## Finding an Avaya Business Partner

If your IP Office system currently does not have an Avaya business partner providing support and maintenance for it, you can use the Avaya Partner Locator tool to find a business partner.

#### Procedure

1. Using a browser, go to the [Avaya Website](#) at <https://www.avaya.com>
2. Select **Partners** and then **Find a Partner**.
3. Enter your location information.
4. For IP Office business partners, using the **Filter**, select **Small/Medium Business**.

#### Related links

[Additional Help and Documentation](#) on page 37

---

## Additional IP Office resources

In addition to the documentation website (see [Additional Manuals and User Guides](#) on page 37), there are a range of website that provide information about Avaya products and services including IP Office.

- [Avaya Website](#) (<https://www.avaya.com>)

This is the official Avaya website. The front page also provides access to individual Avaya websites for different regions and countries.

- [Avaya Sales & Partner Portal](#) (<https://sales.avaya.com>)

This is the official website for all Avaya business partners. The site requires registration for a user name and password. Once accessed, you can customize the portal to show specific products and information type that you want to see.

- [Avaya IP Office Knowledgebase](#) (<https://ipofficekb.avaya.com>)

This site provides access to an online, regularly updated version of IP Office user guides and technical manual.

- [Avaya Support](#) (<https://support.avaya.com>)

This site provide access to Avaya product software, documentation and other services for Avaya product installers and maintainers.

- [Avaya Support Forums](https://support.avaya.com/forums/index.php) (<https://support.avaya.com/forums/index.php>)

This site provides forums for discussing product issues.

- [International Avaya User Group](https://www.iuag.org) (<https://www.iuag.org>)

This is the organization for Avaya customers. It provides discussion groups and forums.

- [Avaya DevConnect](https://www.devconnectprogram.com/) (<https://www.devconnectprogram.com/>)

This site provides details on APIs and SDKs for Avaya products, including IP Office. The site also provides application notes for third-party non-Avaya products that interoperate with IP Office using those APIs and SDKs.

- [Avaya Learning](https://www.avaya-learning.com/) (<https://www.avaya-learning.com/>)

This site provides access to training courses and accreditation programs for Avaya products.

#### Related links

[Additional Help and Documentation](#) on page 37

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## Training

Avaya training and credentials ensure our Business Partners have the capabilities and skills to successfully sell, implement, and support Avaya solutions and exceed customer expectations. The following credentials are available:

- Avaya Certified Sales Specialist (APSS)
- Avaya Implementation Professional Specialist (AIPS)
- Avaya Certified Support Specialist (ACSS)

Credential maps are available on the [Avaya Learning](#) website.

#### Related links

[Additional Help and Documentation](#) on page 37

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