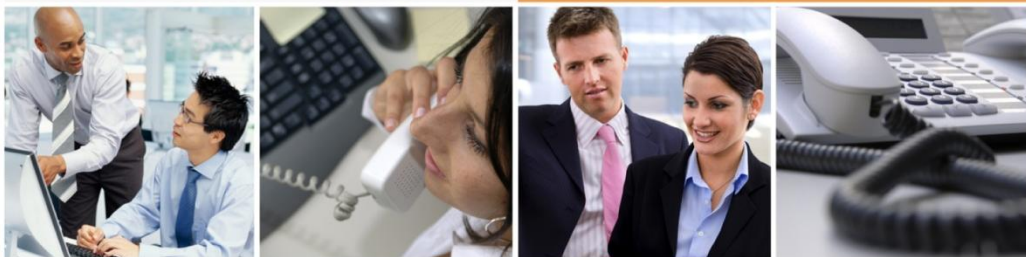


XO SIP Service

Customer Configuration Guide for
Allworx IP PBX with XO SIP



1. Overview

About This Document

This document describes interoperability between XO SIP Package 1 (G.711) and Package 2 (G.729a) and the Allworx IP PBX with software version 7.0.5.1 or higher, deployed with an XO-provided Cisco 2432 IAD as the router/demarcation device.

This document assumes the audience has a general understanding of network provisioning and the connectivity requirements of XO Communications SIP service offering.

Known Issues

While XO certifies interoperability between XO SIP service and the IP PBX as outlined herein, the following known issues were identified during Interoperability testing. The customer should be aware that certain features and functions may not be fully supportable. In some cases, special configurations and/or PBX software patches may be available from the vendor.

- 1) “302 Redirect” must be configured for calling line ID of the originating call to be passed along in all call forward and call transfer call scenarios. This is configured at the system level, as shown in the “Outside Lines - SIP Proxy settings (Trunk settings), continued” screen capture in this Configuration Guide.
- 2) In the following situations, Package 2 (G.729 codec) calls will fail over to Package 1 (G.711 codec). This should be taken into consideration for the customer’s network bandwidth calculation and design.
 - Inbound Package 2 calls to analog extensions of the Allworx IP PBX are delivered as G.711
 - Allworx IP PBX sends re-INVITE for call hold with G.711 even if for Package 2. This impacts some call transfers and conference calls.
 - Allworx Voice Mail and Auto Attendant only support G.711 codec, therefore calls made to Allworx Voice Mail and Auto Attendant are delivered as G.711 when using Package 2.
- 3) Outbound Fax (G3) and modem calls using Package 2 failed as Allworx IP PBX is not able to fall back to G.711 in these scenarios.
- 4) Allworx IP PBX does not have a fully supported hunt group feature. *Workaround:* An extension can be configured to forward call in sequence to simulate some of hunt group functionality.
- 5) T.38 fax is not supported

Registration Method

Static registration is utilized between the Allworx IP PBX and the XO call agent.

**XO SIP
Service
Packages
Supported**

Pkg	Codec	DTMF	Fax
1	G.711	RFC2833 (in-band RTP DTMF fall-back)	T.38; G.711 pass-through
2	G.729a	RFC2833	T.38; G.711 pass-through (see outbound fax limitations in Known Issues)

2. Testing of Allworx IP PBX

2.1. Software and Hardware Versions Tested

1. Cisco 2400 used as a router
Cisco IOS Software, 2400 Software (C2430-IS-M), Experimental Version 12.4(20060718:201451) [acphan-V124_4_T2_1 104]
System image file is "flash:c2430-is-mz.xo"
2. Allworx IP PBX Model no.: 24x
Software version: 7.0.5.1
3. IP Phones:
Model no.: Allworx 9224 & Allworx 9212

3. Allworx IP PBX Configuration

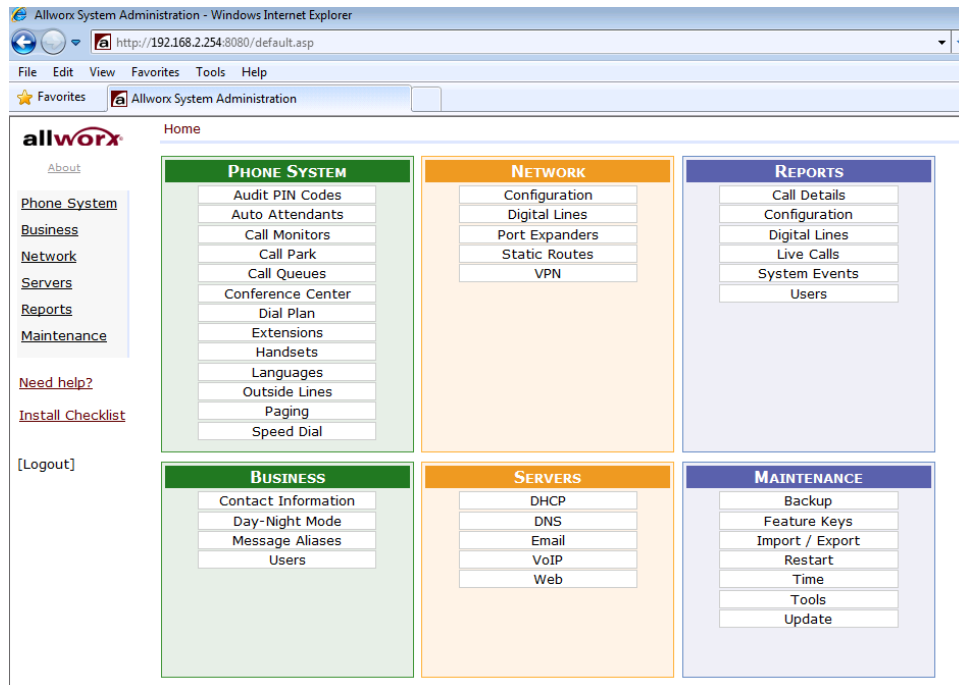
In This Section XO performed the minimum amount of configuration required to achieve successful completion of test calls over XO SIP. It is beyond the scope of this document and the testing efforts to show a complete configuration, therefore screenshots of the GUI interface are provided only for the details of the SIP trunk configuration that are relevant to interfacing with XO's SIP product.

This section contains screenshots which detail the SIP trunk configurations.

Allworx main screen:

Login:


Password - admin



Network Configuration:

[★ Favorites](#)
[Allworx System Administration](#)

[Home](#) > [Network](#) > [Configuration](#)



[About](#)

[Phone System](#)
[Business](#)
Network
[Configuration](#)
[Digital Lines](#)
[Port Expanders](#)
[Static Routes](#)
[VPN](#)
[Servers](#)
[Reports](#)
[Maintenance](#)

[Need help?](#)
[Install Checklist](#)

[Logout]

Configuration [modify](#)

	Current Value
Network Mode	NAT/Firewall with DMZ
LAN IP Address	192.168.2.254
LAN Subnet Mask	255.255.255.0
WAN Settings Method	Static
WAN IP Address	202.1.245.5
WAN IP Subnet Mask	255.255.255.0
Gateway	202.1.245.1
PPPoE Username	
PPPoE Service Name	
PPPoE MTU	1492
LAN Addresses and Ports exposed through Firewall	
DNS Server (53)	enabled
DNS Client (4069)	enabled
FTP (20,21)	disabled
HTTP (80)	enabled
POP3 (110)	enabled
IMAP4 (143)	disabled
Communications Center (1112,2112,2113)	disabled
PPTP (1723)	enabled
Remote Allworx Handsets (2088,8081)	enabled
SIP (5060)	enabled
SMTP (25)	enabled

Phone System > Dial Plan

45xxxx call forwarding	
46n paging	

External Dialing Rules

North American Numbering Plan Administration (NANPA) enabled [Modify](#)


Area Code	Exchange	Number Dialed	Service Group	Action
Home 972		9+972-xxx-nnnn 9+1+972-xxx-nnnn	All SIP Proxies	Modify
all others		9+1+aaa-xxx-nnnn	All SIP Proxies	

aaa - area code xxx - exchange nnnn - number

Type	Number Dialed	Service Group	Action
Emergency	9+911	All SIP Proxies	Modify
Phone Services <small>(211,311,411,511,611,711,811)</small>	9+n11	All SIP Proxies	
Operator	9+0	All SIP Proxies	
Long Distance Services	9+1010...	All SIP Proxies	
International Calls	9+011...	All SIP Proxies	
Public SIP Directory	8+nnnn <small>(4 digits)</small>	All SIP Proxies	
PIN Code	78+nnnnn	All SIP Proxies	
Outside Line Seizure	9#	All SIP Proxies	

NOTE
If you are using a SIP Proxy to complete "Emergency" calls, you must contact your ITSP and verify that your account is correctly setup to handle the calls.

Extension configuration:



[About](#)

Phone System

- [Audit PIN Codes](#)
- [Auto Attendants](#)
- [Call Monitors](#)
- [Call Park](#)
- [Call Queues](#)
- [Conference Center](#)
- [Dial Plan](#)
- Extensions**
- [Handsets](#)
- [Languages](#)
- [Outside Lines](#)
- [Paging](#)
- [Speed Dial](#)

Home > [Phone System](#) > Extensions

Extensions [add new Extension](#) (24 system extensions may be added)

Ext.	Description	Action
0	Operator	View Call Routes
1100	XO Test Lab 1 (XO_Test_lab_1)	View Call Routes
1101	XO Test Lab 2 (XO_Lab_Test_2)	View Call Routes
1102	XO Test Lab 3 (XO_Test_lab_3)	View Call Routes
1199	System Administrator (admin)	View Call Routes

User configuration:

allworx [Home](#) > [Business](#) > [Users](#) > [Modify](#)

[About](#)

Phone System

Business

[Contact Information](#)

[Day-Night Mode](#)

[Message Aliases](#)

Users

[Network](#)

[Servers](#)

[Reports](#)

[Maintenance](#)

[Need help?](#)

[Install Checklist](#)

[Logout]

User

Identification

Login Name: XO_Test_lab_1

Full Name XO Test Lab 1

Password ●●●●●● **Confirm Password** ●●●●●●

Primary Extension 1100 (may change to an unused extension from 1000 to 2999) [show unused](#)

User Presence In Office

User Template Options

System User (Default) was the last template applied to this user.

Select a new template to apply:

Then choose [Set](#) or [Merge](#) to change the settings below.

System Features

Enable Voicemail

Maximum number Voicemails 50

User has permission for Off-Site Access to outside lines (from Message Center Main M

User has permission to send voicemail to all users (by dialing 9 from the Message Cent

User has permission to modify extension's call routes

User has permission to create conferences


User has permission to reset Call Queue statistics

Call Assistant Active Calls Brief Display (no Caller ID)

Maximum size Universal Inbox 200 MBytes

Operator Extension 0 - Operator (used when caller dials 0, does not work with call...

Extension (Call routes):



About

Phone System

- [Audit PIN Codes](#)
- [Auto Attendants](#)
- [Call Monitors](#)
- [Call Park](#)
- [Call Queues](#)
- [Conference Center](#)
- [Dial Plan](#)
- [Extensions](#)
- [Handsets](#)
- [Languages](#)
- [Outside Lines](#)
- [Paging](#)
- [Speed Dial](#)

Business

- [Network](#)
- [Servers](#)
- [Reports](#)
- [Maintenance](#)

[Need help?](#)

[Install Checklist](#)

Home > Phone System > Extensions > View Call Routes

Call Routes For Extension 1100 - XO Test Lab 1 (XO_Test_Lab_1)

Presence: In Office [ACTIVE] [add new Call Route](#)

On calls from all callers:

<i>First connection attempt:</i> XO Test Lab 1 (Login ID:5101) for 4 rings (Single (int), Double (ext))	
<i>Finally:</i> transfer to Voicemail for XO Test Lab 1 (XO_Test_Lab_1)	Modify
<i>If a connection attempt in the route above is busy then...</i> dial 9 (972) 578-6576	

Presence: At A Meeting [add new Call Route](#)

On calls from all callers:

transfer to Voicemail for XO Test Lab 1 (XO_Test_Lab_1)	Modify
---	------------------------

Presence: On Vacation [add new Call Route](#)

On calls from all callers:

dial 9 (972) 578-6576	Modify
-----------------------	------------------------

Presence: On Business Trip [add new Call Route](#)


On calls from all callers:

transfer to Voicemail for XO Test Lab 1 (XO_Test_Lab_1)	Modify
---	------------------------

Configuration Guide for Allworx IP PBX and XO SIP

PAGE 8 of 17

Handset configuration:


Home > Phone System > Handsets

[Analog Handsets](#)
[SIP Handsets](#)
[Handset Preference Groups](#)
[Handset Configuration Templates](#)

Analog Handsets

Handset	Owner	Caller ID	Port	Action
XO Middle Test Lab 3	XO_Test_lab_3	XO Middle Test Lab 3	05	Modify Delete Ring
			04	New Analog Handset
			06	New Analog Handset
			07	New Analog Handset
			08	New Analog Handset


SIP Handsets [add new SIP Handset](#)

Handset	Line	Owner	Caller ID	Identification	Action
Allworx 9224			View Configuration	Add Call Appearance	Reboot Replace
XO Test Lab 1 Handset Preference Group: Copy of PBX Station (Default)	1	XO_Test_lab_1	XO Test Lab 1	MAC: 00-0A-DD-82-F2-FC User ID: 5101 Login ID: 5101 192.168.2.1 :5060 (expires: Nov 10, 2009 02:35 pm)	Modify Delete Ring
Allworx 9212			View Configuration	Add Call Appearance	Reboot Replace
XO Test Lab 2 Handset Preference Group: Copy of PBX Station (Default)	1	XO_Lab_Test_2	XO Test Lab 2	MAC: 00-0A-DD-82-60-10 User ID: 5100 Login ID: 5100 192.168.2.2 :5060 (expires: Nov 10, 2009 02:35 pm)	Modify Delete Ring

Phone System

- [About](#)
- [Audit PIN Codes](#)
- [Auto Attendants](#)
- [Call Monitors](#)
- [Call Park](#)
- [Call Queues](#)
- [Conference Center](#)
- [Dial Plan](#)
- [Extensions](#)
- Handsets**
- [Languages](#)
- [Outside Lines](#)
- [Paging](#)
- [Speed Dial](#)
- [Business](#)
- [Network](#)
- [Servers](#)
- [Reports](#)
- [Maintenance](#)
- [Need help?](#)
- [Install Checklist](#)

Handset configuration (IP Phone):



[Home](#) > [Phone System](#) > [Handsets](#) > [Modify Handset](#)

[About](#)

Phone System

- [Audit PIN Codes](#)
- [Auto Attendants](#)
- [Call Monitors](#)
- [Call Park](#)
- [Call Queues](#)
- [Conference Center](#)
- [Dial Plan](#)
- [Extensions](#)
- Handsets**
- [Languages](#)
- [Outside Lines](#)
- [Paging](#)
- [Speed Dial](#)

Business

- [Network](#)
- [Servers](#)
- [Reports](#)
- [Maintenance](#)

[Need help?](#)

[Install Checklist](#)

Call Appearance

Call Forwarding: disabled

Phone Type: SIP **Model:** Allworx 9224
MAC Address: 00-0A-DD-82-F2-FC
Owner: XO Test Lab 1 (XO_Test_lab_1) ▼

Internal Caller ID Name: XO Test Lab 1 (up to 47 ch)
Internal Caller ID Number: use owner's extension ▼
External Caller ID Name: XO Test Lab 1 (up to 47 ch)
External Caller ID Number: 4693873351 (up to 24 digits)
Description: XO Test Lab 1
Dialing Privileges Group: Dialing Privileges (Default) ▼

SIP Registration

User ID: 5101
Binding: 5101@192.168.2.1:5060
Login ID: 5101
Password: ●●●●●●
(expires: Nov 10, 2009 02:35 pm)

Call Appearance Features

Provide Hold Music
 Can place calls
 Can receive calls

Handset configuration (Analog):

allworx [Home](#) > [Phone System](#) > [Handsets](#) > [Modify Handset](#)

About

Phone System

- [Audit PIN Codes](#)
- [Auto Attendants](#)
- [Call Monitors](#)
- [Call Park](#)
- [Call Queues](#)
- [Conference Center](#)
- [Dial Plan](#)
- [Extensions](#)
- Handsets**
- [Languages](#)
- [Outside Lines](#)
- [Paging](#)
- [Speed Dial](#)
- [Business](#)
- [Network](#)
- [Servers](#)
- [Reports](#)
- [Maintenance](#)

[Need help?](#)
[Install Checklist](#)

Handset

Do Not Disturb: disabled Call Forwarding: disabled

Phone Type: Analog
Port: 05
Owner: XO Test Lab 3 (XO_Test_lab_3) ▼

Internal Caller ID Name: XO Middle Test Lab 3 (up to 47 characters: letters)
Internal Caller ID Number: 1102 - XO Test Lab 3 ▼
External Caller ID Name: XO Test Lab Analog (up to 47 characters: letters)
External Caller ID Number: 4693873353 (up to 24 digits)
Description: XO Middle Test Lab 3
Call Assistant Display Mode: Normal ▼
Dialing Privileges Group: Dialing Privileges (Default) ▼

Handset Features

- Provide Hold Music
- Can place calls
- Can receive calls
 - Second Call Handling: Busy ▼
- Message Waiting Stutter Dialtone
- Message Waiting Light (requires SDMF and/or MDMF below)
- Caller ID Display (requires SDMF and/or MDMF below)
 - Caller ID Type I (SDMF)
 - Caller ID Type II (MDMF)

Handset Preference Group (SIP Settings):

allworx [Home](#) > [Phone System](#) > [Handsets](#) > View Handset Preference Group

[About](#)

Phone System

- [Audit PIN Codes](#)
- [Auto Attendants](#)
- [Call Monitors](#)
- [Call Park](#)
- [Call Queues](#)
- [Conference Center](#)
- [Dial Plan](#)
- [Extensions](#)
- Handsets**
- [Languages](#)
- [Outside Lines](#)
- [Paging](#)
- [Speed Dial](#)
- [Business](#)
- [Network](#)
- [Servers](#)
- [Reports](#)
- [Maintenance](#)

[Need help?](#)

[Install Checklist](#)


[Logout]

Copy of PBX Station (Default) [Handsets Assigned To Group](#)

Handset Preference Group [Modify](#)

	Value
Name	Copy of PBX Station (Default)
Station Mode	PBX Behavior
Call Assistant / TSP Driver (TAPI) Display	Caller ID *
Call Assistant Display Mode	Normal
Call History Size	99 *
Clock Mode	12 Hour *
Codec Preference Order	G.729A, G.711
Daylight Saving Time	use current server setting
Hold Button Mode	Hold Calls, Park Lines *
Hold Reminder Mode	Timer *
Hold Reminder Timeout	300 *
Jitter Buffer Size	80ms
Message Waiting Indication	Visual
Off Hook Digits Dialed	
Paging Mode	Pages always accepted *
Redial Memory	Forever *
RTP Media Port Range	16384 to 32767
SIP NAT Keep-alive Interval	20
SIP Port	5060
Time Zone	use current server setting
Audible Dialing	enabled *
Auto On Hold	disabled *

Outside lines:



[About](#)

Phone System

- [Audit PIN Codes](#)
- [Auto Attendants](#)
- [Call Monitors](#)
- [Call Park](#)
- [Call Queues](#)
- [Conference Center](#)
- [Dial Plan](#)
- [Extensions](#)
- [Handsets](#)
- [Languages](#)
- Outside Lines**
- [Paging](#)
- [Speed Dial](#)

Business

Network

- [Servers](#)
- [Reports](#)
- [Maintenance](#)

[Need help?](#)

[Install Checklist](#)

[Home](#) > [Phone System](#) > [Outside Lines](#)

[Digital Lines](#) [DID Blocks](#) [DID Routing Plans](#) [Remote Allworx](#) [SIP Gateways](#) [SIP Proxies](#)

Analog Outside (CO) Lines

Outside (CO) Line	Type	Port	Action
	---	01	New FXO Line
	---	02	New FXO Line
	---	03	New FXO Line

Digital Lines

NOTE
 Digital Line 1 (Port:T1-A) is currently disabled! Changes made to digital lines will not take effect until Line 1 (Port:T1-A) has been enabled.

No Digital Lines with Voice capability have been defined.

Direct Inward Dial Blocks [add new DID Block](#)

Block	Action
(214) 635-5863 Numbers: 1 Plan: Routing Plan 1	Modify Delete
(469) 387-3350 Numbers: 9 Plan: Routing Plan 1	Modify Delete

Direct Inward Dial Routing Plans

Routing Plan	Action

Outside lines, continued:

[Install Checklist](#)

[Logout]

Direct Inward Dial Routing Plans

Routing Plan	Action
Routing Plan 1	Details Delete

Remote Allworx ?

[add new Remote Allworx](#)

No Remote Allworx have been defined.

SIP Gateways ?

[add new SIP Gateway](#)


No SIP Gateways have been defined.

SIP Proxies ?

[add new SIP Proxy](#)

Proxy	Action
XO Test Lab User ID: 4693873350	Modify Delete

Outside Lines - SIP Proxy settings (Trunk settings):


Home > Phone System > Outside Lines > Modify SIP Proxy

SIP Proxy ?

Description

User ID

SIP Server **Port**
(customer domain/realm) (enter IP Address or Domain Name)

Outbound Proxy **Port**
(if different from SIP Server) (enter IP Address or Domain Name)

SIP Registration required

Login ID

Password

Registrar **Port**
(if different from Outbound Proxy) (enter IP Address or Domain Name)

Caller ID Name (up to 47 characters: letters digits , \ _ ' -)

Use External Caller ID Name from handset (if specified)

Use Caller ID Name from external sources (if received)

Caller ID Number (up to 24 digits)

Use External Caller ID Number from handset (if specified)

Use Caller ID Number from external sources (if received)

Maximum Active Calls (1 to 99, should not exceed proxy capabilities or available bandwidth)

Number of Line Appearances (0 to Maximum Active Calls)

Send digits as dialed (without prepending 1 and/or area code)

Digits Sent (digits from the full number, 1-XXX-XXX-XXXX, to send to the proxy)

[Need help?](#)

Outside Lines - SIP Proxy settings (Trunk settings), continued:

Default Auto Attendant

Select the attendant used to answer when calls received from this source are routed to an Auto Attendant.

Auto Attendant 1 (x431) ▼

Advanced Settings ?

Pad DTMF RTP Packets

Enable Early Media (allow audio from 183 Session Progress responses)

Supports Symmetric Response Routing (RFC 3581 - include "rport" in requests)

Use SIP Diversion for deflected calls (draft-levy-sip-diverison-08.txt)

Supports SIP REFER (when calls from this proxy are transferred back to this proxy)

Supports SIP Redirect (when call requests from this proxy are routed back to the proxy)

Use E.164 format for phone numbers

Offer '100rel' support (RFC 3262 - PRACK)

Obtain DID/DNIS number from SIP Request URI ▼

Use dialed number ▼ in Request URI of outbound calls

Features ?

Prefix String (digits/characters sent by the Allworx to proxy before sending number dialed)

Call Route ?

Proxy is an "Enterprise Server" (calls received from this proxy follow the server's internal dial plan)

Calls received from this SIP Proxy go to:

Extension

Auto Attendant

Voicemail for user

Routed using DID Block(s):

[check all](#) [uncheck all](#)

(214) 635-5863 / 1 Numbers / Routing Plan 1

(469) 387-3350 / 9 Numbers / Routing Plan 1

Outside Lines – DID Routing Plan:

allworx

[About](#)

Phone System

- [Audit PIN Codes](#)
- [Auto Attendants](#)
- [Call Monitors](#)
- [Call Park](#)
- [Call Queues](#)
- [Conference Center](#)
- [Dial Plan](#)
- [Extensions](#)
- [Handsets](#)
- [Languages](#)
- [Outside Lines](#)
- [Paging](#)
- [Speed Dial](#)

Business

- [Network](#)
- [Servers](#)
- [Reports](#)
- [Maintenance](#)

[Home](#) > [Phone System](#) > [Outside Lines](#) > DID Routing Plan

Routing Plan Information [modify](#)

Description	Routing Plan 1
Default Extension	0 - Operator
Default DNIS Name	
DID Blocks using this plan	(214) 635-5863 / 1 numbers (469) 387-3350 / 9 numbers

Phone Number to Extension Mapping [add number to table](#)

Phone Number	Extension	DNIS Name	Action
(214) 635-5863 (469) 387-3350	431 - Auto Attendant 1		Modify
(469) 387-3351	1100 - XO Test Lab 1		Modify
(469) 387-3352	1101 - XO Test Lab 2		Modify
(469) 387-3353	1102 - XO Test Lab 3		Modify
(469) 387-3354	404 - Voicemail		Modify

TIP
Phone Numbers that do not appear in the table above use the Default Extension above.

To remove a phone number from the table, select Modify, then change the n

Outside Lines – DID block:

allworx

[About](#)

Phone System

- [Audit PIN Codes](#)
- [Auto Attendants](#)
- [Call Monitors](#)
- [Call Park](#)
- [Call Queues](#)

[Home](#) > [Phone System](#) > [Outside Lines](#) > Modify DID Block

DID Block

Starting Phone Number (include .)

Total number of phone numbers in DID Block

DID Routing Plan ▼