

Ringling and Idle Voltages on Cisco FXS Interfaces

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Introduction

Telephone exchanges and Foreign Exchange Stations (FXS) need to supply DC battery and AC ringling to enable the connected telephone equipment to transmit speech energy and to power the telephone equipment's ringling device. This document discusses what voltages are supplied by various Cisco FXS interfaces and how to overcome some known issues about voltage levels.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

This document is not restricted to specific software and hardware versions.

Ringling Voltages

The industry standard for PBX and Key Systems requires that the ring detection circuit be able to detect a ringling signal as low as 40Vrms. This voltage takes into account the effects of load and cabling voltage drop on a ringling signal generated from a Central Office (CO). Conversely, the CO (exchange) must supply ringling with enough power to drive the maximum load over the maximum cable length. In order to meet this requirement, a CO-based unit must present a ringling signal with an amplitude of approximately 85 to 100Vrms. Cisco voice gateways are intended for use as On Premise Services (ONS) equipment that is co-located or fairly close to equipment that detects ringling. Therefore, it can use a lower ringling voltage and still meet the 40Vrms 5 Ringer Equivalence Number (REN) requirement.

Idle Battery Voltage

Cisco voice gateways were designed for ONS connections and by default the FXS interface supplies either -24Vdc or -36vdc idle battery. Off Premise Services (OPS), such as a CO, require voltages of -48v because

it might have to interconnect over much greater cable lengths. Certain Cisco FXS interfaces can be configured to supply higher voltages.

Idle Line Voltages

This table shows idle line voltages supplied by various Cisco gateway FXS interfaces:

FXS Interface	Idle Voltage
VG248	-36 Volts
VIC-2FXS	-26 Volts
VIC-2DID	-24 Volts (low) -48 Volts (high)
ASI 81 and ASI 160	-24 Volts (low) -48 Volts (high)
IAD 24xx-FXS	-24 Volts (low) -48 Volts (high)
1730 IAD	-24 Volts (low) -48 Volts (high)
VIC-4FXS/DID	-24 Volts (low) -48 Volts (high)
VIC2-2FXS	-48 Volts
NM-HDA	-36 Volts
VG224	-24 Volts (low) -43 Volts (high)

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Problem

Voltage problems can cause answering and call initiation, and ringing problems.

Certain automated devices, such as fax machines, answer machines, multi-line phones and voice mail systems, look at the line voltage in order to deduce if the line is busy or idle. If another device is off hook, then the line voltage drops, and the automated system will not answer or initiate a call. If the threshold being used is close to -24v or higher, this can cause the device not to work as expected.

Certain phones might not ring when the default ring voltage and ring frequency is applied from the Cisco FXS interface.

Solutions

Resolving Answering and Call Initiation Problems with Automated Telephony Devices

Configure this command on the voice port of the FXS to increase idle battery voltage from -24 volts to -48 volts:

```
Router(config-voiceport)#idle-voltage {low | high}
```

Note: This option is not available on the VG248, VIC-2FXS, and WS-x6624 FXS interfaces.

Resolving Ringing Problems

Phone manufacturers sometimes use frequency filters to prevent the ringer devices from sounding while the user is dialing (known as anti-tinkle circuits). It might be necessary to adjust the frequency of the ring to suit the connected device.

Configure the ring frequency for 17xx, 26xx, 36xx, and 37xx platforms by issuing this command:

```
Router(config-voiceport)#ring frequency ?
25 ring frequency 25 Hertz
50 ring frequency 50 Hertz
```

Configure the ring frequency for the 3810 platform by issuing this command:

```
Router(config-voiceport)#ring frequency ?
20 ring frequency 20 Hertz
30 ring frequency 30 Hertz
```

Configure the ring frequency for the Integrated Access Device (IAD) IAD2400 platform by issuing this command:

```
Router(config-voiceport)#ring frequency ?
20 ring frequency 20 Hertz
25 ring frequency 25 Hertz
30 ring frequency 30 Hertz
50 ring frequency 50 Hertz
```

Another method to prevent the ringer devices from sounding is to provide some voltage threshold so as to ignore the lower voltages that can be produced when dialing. An increase in the voltage can overcome this.

Configure the DC offset voltage on IAD24xx routers by issuing this command:

```
Router(config-voiceport)#ring dc-offset ?
10-volts Ring DC offset 10 volts
20-volts Ring DC offset 20 volts
24-volts Ring DC offset 24 volts
```

Note: This command sequence can only be used for IAD24xx routers. The 24-volts Ring DC offset 24 volts setting is available for Cisco IOS® Release Software 12.2.11T and later.

Related Information

- [Understanding Foreign Exchange Station \(FXS\) Voice Interface Cards](#)
- [Understanding 2 Port Direct Inward Dial \(2 DID\) Voice Interface Cards](#)
- [Voice Technology Support](#)
- [Voice and Unified Communications Product Support](#)
- [Recommended Reading: Troubleshooting Cisco IP Telephony](#)
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