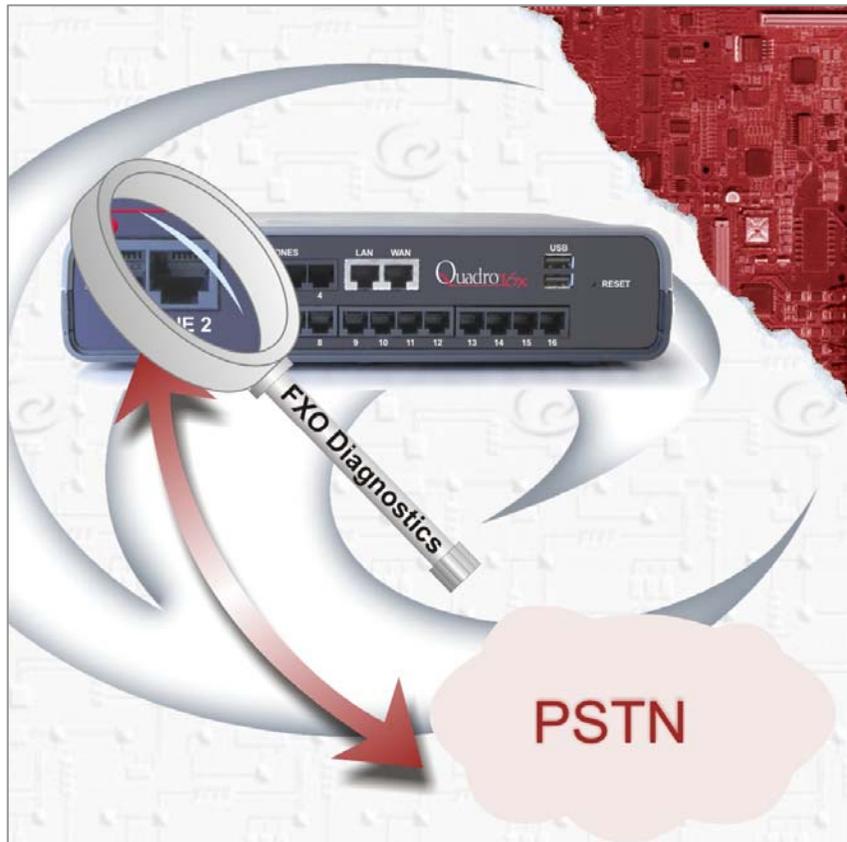

FXO Diagnostics Guide



Revision: 1.0

Abstract: This document describes how to customize the Quadro FXO settings to resolve problems on PSTN lines.

Document Revision History

Revision	Date	Revision	Valid for
1.0	20-Jan-07	Initial release	All Quadro IP PBXs

Table of Contents:

- 1 Introduction.....4**
- 2 Requirements.....4**
- 3 General4**
- 4 Possible Problems4**
 - 4.1 PSTN connection can not be detected.....4
 - 4.2 Disconnect problems5
 - 4.2.1 Capturing the disconnect signals from your CO7
 - 4.3 False disconnect7
 - 4.4 Caller ID functionality8

1 Introduction

This document describes how to troubleshoot problems with PSTN lines connected to the Quadro FXO ports.

The 'hidden' pages in this document are used for extended diagnostic purposes and for special settings. The hidden pages can be accessed by entering the URL manually in the address field of the browser.

After logging into a system e.g. by **http://172.30.0.1** you can access a hidden page by entering **http://172.30.0.1/systemlogs.cgi**.

2 Requirements

- It is assumed that the device is configured properly and the location field in the system configuration wizard matches the country in which the system resides.
- Valid for Software 3.1x and higher
- Valid for the Quadro IP PBXs and FXO Gateways

3 General

Depending on the country and even the local telephone company, the configuration of the PSTN lines may vary in a number of ways including; dial tone, busy tone, disconnect method and caller ID format (refer to your local telephone company for information regarding caller ID).

Due to variations in central office switches there are cases when the Quadro's default country settings may not work with the local PSTN service.

4 Possible Problems

4.1 PSTN connection can not be detected

The symptom is the following:

- The user tries to make a PSTN call, but the Quadro responds with the message:
"Check your external phone line"

The background to this is the following:

- Before making a call, the Quadro will check if a line is attached to its FXO port. If the settings to detect for an existing line do not match the actual line characteristics, this error may show up.

The user can dial out to PSTN in following modes:

1. User directly accesses the CO line (i.e. by dialing 9*1), hears the CO dial tone and starts dialing the number. In this mode Quadro checks the FXO line current to connect the user endpoint (FXS, IP, etc.) to the FXO. The current detection timeout (default is 50 ms) can be modified using the hidden `fxocfg.cgi` page.
2. User dials the FXO access code (9 by default) + PSTN number that will be sent to the CO. In this mode the Quadro will check the voice signal activity on the FXO line (dial tone in most cases) prior to sending the digits. The voice activity (dial tone) on the FXO line will be detected if the signal level of not less than the value **L** (default -30 db) is maintained for the

duration of the value **P** (default 400 ms). These values can be modified using the hidden `fxocfg.cgi` page.

Do not forget to set the correct caller ID detection system, as this is also done manually, after checking the **Custom FXO Data** checkbox.

4.2 Disconnect problems

The symptoms are the following:

- The user is on a PSTN call and the remote party goes on hook. The local user will hear the disconnect tone from the central office endlessly.
- If a PSTN caller is leaving a message in the VM system, the VM is filled with disconnect tones.

The reason is that Quadro has not detected the disconnect from the CO so it keeps the line open. When the PSTN party hangs up first, the central office will typically send either a busy tone across the line or it will interrupt the battery current (also called battery reversal).

Disconnect notification by removing battery is usually done by briefly removing current on the line. The Quadro identifies the disconnect notification by its duration which is a time period typically around 200 ms (milliseconds). E.g. if the current disruption occurs on the line for more than 200 ms, then the Quadro identifies this as a disconnect notification (the other party has hung up).

Disconnect notification using a busy tone is done with a series of short tones and then silence. A tone combination with the frequencies 480 Hz and 625 Hz with the duration of 400 ms and then silence with a duration of 300 ms would be interpreted by the Quadro as a disconnect signal.

There are basically 5 well known scenarios of disconnect notification/busy tone configuration for the Quadro. These scenarios can be set in a hidden `cgi` page.

fxodisconnect.cgi

Try out all scenarios and see if any of them work

Scenario A – used for example in Germany

Frequency1	425
Frequency2	0
Duration	300
Duration Disp	100
Silence	300
Silence Disp	100
Pattern	3
Disconnect Duration	200

Scenario B – used for example in Australia

Frequency1	400
Frequency2	450
Duration	300
Duration Disp	100
Silence	300
Silence Disp	100
Pattern	3
Disconnect Duration	200

Scenario C – used for example in Guatemala

Frequency1	425
Frequency2	0
Duration	250
Duration Disp	100
Silence	250
Silence Disp	100
Pattern	3
Disconnect Duration	200

Scenario D – used for example in Israel

Frequency1	400
Frequency2	0
Duration	500
Duration Disp	100
Silence	500
Silence Disp	100
Pattern	3
Disconnect Duration	200

Scenario E – used for example in US

Frequency1	480
Frequency2	625
Duration	300
Duration Disp	100
Silence	300
Silence Disp	100
Pattern	3
Disconnect Duration	200

As mentioned before there is also a hidden cgi page where the configuration of busy tone detection can be set manually: **fxocfg.cgi**

Check the **Custom FXO Disconnect Settings** checkbox on this page to enable the manual configuration of disconnected notification/busy tone for the Quadro.

Please contact your telephone company for the correct disconnect settings to use. If they are unable to provide these values to you then continue with this document for customized options.

- Enter the values for frequencies in the **Frequency1** and **Frequency2** text box; in case there is only one frequency enter the value in **Frequency1** and **0** for the **Frequency2**.
- Enter the value of the tone duration in **Duration** text box. If the duration of the tone varies (and almost in all cases it does, it is not ideal) then enter an amount by which the tone signal may vary from its assigned duration in the **Duration Disp** text box.
- Enter the value of the silence duration in **Silence** text box, and the amount by which it may vary in the **Silence Disp** text box.

- Enter the number of patterns of tone/silence to count for identification of busy tone in the **Pattern Count** text-box.
- Type the value for disconnected duration in the **Disconnect Duration** text-box in case the PSTN sends a Disconnect notification.
- Click the **Save** button to save the configuration.

4.2.1 Capturing the disconnect signals from your CO

There is a hidden cgi that will assist with capturing the signals on the PSTN line.

The page is **dspcapture.cgi**

1. Type the line number in **Channel Number1** text box on this page.
 - For the Quadro4x and Quadro16x
 - FXS 1 is channel 0
 - FXS 2 is channel 1
 - ...
 - FXO 1 is channel 16
 - FXO 2 is channel 17
 - ...
 - For the Quadro2x
 - FXO is channel 2
 - For the Quadro FXO GW
 - FXO 1 is channel 0
2. Enter the time of capturing - not more then 30 seconds is recommended.
3. Make a PSTN call which uses the line that you want to capture. Press **Save** on the capturing page to start the capturing.
4. Terminate the call on the PSTN side and wait at least 10 seconds before terminating on the Quadro side as well
5. You can click to download and save the captured file(s) on your PC. Click and download all files to your PC and send them to Epygi Technical Support for processing and to determine the recommended values.

Note: To get the best values it is recommended to perform 2 to 3 captures.

4.3 False disconnect

The symptoms are the following:

- During a call the line happens to drop. This may happen more or less frequently. The reason is that some tones from the CO - like call waiting tone, or even speech of the caller, may be detected as disconnected tones.

- Again the FXO settings are incorrectly matched with the PSTN and they can be corrected in the same way as the previous topic, however, additional information is needed since the problem may not occur when capturing for a short period of time.

To do so follow the steps below:

1. Open the hidden page: **dspintcapture.cgi**
2. Enter the channel number as listed above. (On Quadro4x, 16x 16 for FXO 1.. , On Quadro2x: 2)
3. Check **Enable Tone + Enable Disconnect**
4. Press **Save**
5. After the first 'dropped' call go back to the page and press the **Download** button to get the recorded events just 2 seconds before the call dropped,

Along with this the system logs are needed.

4.4 Caller ID functionality

The symptoms are the following:

- CallerID from the CO is not shown in the Call Statistics of the Quadro.
- The Quadro supports 2 ways of Caller ID detection: FSK and DTMF
- The method will be selected based on the regional settings during the system configuration wizard.
- The method can be changed manually by the hidden page mentioned above: **fxocfg.cgi**
- If the correct method is selected, but still no CallerID is displayed, then the CallerID transported by the CO can be captured and analysed by EPYGI engineers.

To do so, follow the instructions made in the previous chapter, but this time enable the check-box labelled: **Enable CID**

1. Press the capture button below this checkbox
2. Make a call to the Quadro via this FXO line
3. In parallel download the system logs.