# Com.X

# Hybrid IP PBX / Gateway

# Troubleshooting Guide

*(Com.X 1.2 product release)*

Version 1.26, 25 April 2012

# Document History

| Version | Date | Description of Changes |
|---------|------|------------------------|
| 1 | 09/06/10 | Branched from the Com.X Administrator's guide 1.1 release, troubleshooting section. |
| 1.1 | 09/06/10 | Added Snom-specific troubleshooting entries. |
| 1.2 | 12/09/10 | Added one-way audio VPN entry as well as BRI connection debugging instructions and additional FXO troubleshooting, as well as acpi troubleshooting Various updates. |
| 1.3 | 01/24/11 | Added a section on electrical issues (noise and system restart), as well as PRI trouble-shooting instructions. |
| 1.4 | 03/28/11 | Added nmap examples for port scanning on one-way audio scenario |
| 1.5 | 04/15/11 | Added srvlookup and usedistinctiveringdetection. Restructured the document. |
| 1.6 | 05/13/11 | Provided more detail on PRI diagnosis as well as DNS proxy |
| 1.7 | 05/16/11 | Added a section on manual fsck |
| 1.8 | 05/25/11 | Added sections on submitting a support request, PRI diagnostics and logs, updated timezone item, added large phonebook imports item |
| 1.9 | 06/01/11 | Added a section on creating a USB recovery disk |
| 1.10 | 06/16/11 | Added section on cause code 88 and SPEECH capability |
| 1.11 | 06/27/11 | Improved realtime problem resolution. |
| 1.12 | 07/08/11 | Added a section on system automated auditing |
| 1.13 | 07/12/11 | Improved voltage guidelines on FXO provisioning trouble-shooting |
| 1.14 | 07/14/11 | Added a section on earthing a Com.X |
| 1.15 | 07/20/11 | Added a section on clearing the browser cache re: panel load errors. |
| 1.16 | 08/01/11 | Added a section on RPID support |
| 1.17 | 08/04/11 | Expanded section on distinctive ring cadence |
| 1.18 | 08/05/11 | Added a section on hook flash |
| 1.19 | 08/25/11 | Removed previous USB recovery section and added a section on system recovery and recovery kits |
| 1.20 | 09/07/11 | Added a chapter on tools and common commands |
| 1.21 | 09/09/11 | Added a chapter on recovery installation, as well as the extension-rings-only-once problem. |
| 1.22 | 09/28/11 | Made usage of t1e1 diag t1e1_loop=param clearer |
| 1.23 | 03/07/12 | Added X.10 console cable pin-out |
| 1.24 | 03/15/12 | Added section on trunk qualification and providers that do not support it |
| 1.25 | 03/20/12 | Added a section on BRI trunk port fail-over (requires trunk group) |
| 1.26 | 04/25/12 | Added a section on busy (interpreted as call drop) on transfer |

# Table of Contents

# 1  Introduction

## 1.1  Overview

This document is intended for the Com.X PBX and Gateway administrator and details discussions of and solutions to common technical questions around the Com.X range of products, release 1.2, including the Com.X1, Com.X2 and Com.X10 products. It forms part of a suite of manuals and guides for the Com.X product range, which also includes the Com.X End User manual, the Com.X installation guide and the Com.X Administrator's guide.

## 1.2  Submitting a support request

Support requests submitted to support@farsouthnet.com are automatically assigned case numbers and distributed to Far South Networks and distributor XCT engineers. XCT certified engineers also have direct access to the Far South Networks third line support call center by means of a distributor / XCT pin code.

Please ensure that the relevant sections of the support RFI has been completed (http://archive.farsouthnet.com/support/SupportInformationSheet.html) The form can be filled in, print and attached to the support request sent to the email address detailed above.

## 1.3  Submitting logs for analysis

A support engineer might request Com.X logs for analysis in the course of troubleshooting a support case. To obtain the necessary logs, log into the system shell and execute the following commands:

```
cd /var/log
sudo tar cvfz ~/syslog.tgz syslog*
sudo tar cvfz ~/comma.tgz comma*
sudo tar cvfz ~/asterisk.tgz asterisk/messages*
sudo tar cvfz ~/kernel.tgz kern* dmesg*
```

The `log .tgz` files then reside in the `/home/comma` directory and can be copied or emailed as appropriate.

## 1.4  System recovery

Far South Networks distributors possess USB recovery kits that can be used to repair and reinstall (factory default) Com.X devices.

Using a USB recovery disk and then restoring a backed up configuration provides a quick (~30 minutes), seamless route to service restoration in case of Com.X.

Additionally, the recovery disk can install to a secondary device (e.g. the second USB port on the Com.X) allowing the creation of an operational Com.X boot device.  This provides continued service operation on secondary media in case of Com.X media failure. Full system operation is possible while running off secondary media.

In cases where call recording is required during this period, we recommend configuring an NFS storage solution until the Com.X can be swapped out, if secondary the media does not have sufficient performance for call recording.

Please contact your distributor for walk-in recovery functionality, or for pricing on purchasing your own Com.X recovery kit.

Please refer to section 3 for detailed recovery instructions.

## 1.5  Auditing a system

The audit.sh script provides technicians with a collection of auditing checks that can drastically improve the turn-around on support issues. This script incorporates heuristics of some of the most frequent causes of Com.X support requests. By auditing a system before submitting a support request, a significant percentage of problems can be detected easily and resolved speedily. We recommends that all installations should be concluded with a system audit.

To audit a system, from the GUI, select Monitoring – System – Audit. On systems that shipped before this feature was released, the audit.sh script can be downloaded from the Far South Networks archive:

```
wget http://archive.farsouthnet.com/support/audit.sh
chmod +x ./audit.sh
```

Run the script from the shell:
```
sudo ./audit.sh
```

Start ▾  Advanced ▾  Monitoring ▾  Reports ▾  Review/Apply…                    Logout

| Status | Setup | Ha | | Trunks | Outbound | Inbound | FlexPath |

**Status**

| Asterisk ▶ |
| Configuration ▶ |
| Reload ▶ |
| System ▶ | Audit |
| Telephony ▶ | Disk usage |
| Web server ▶ | Network status |
| GUI client log | Performance |
| | System Log |

| Name | | Detail | Additional | Status |
| Configuration | | | | SYNCHRONIZED |

**Audit**                                                                 ▢ ✕

Entries

Far South Networks (Pty) Ltd

Starting Com.X audit...

[WARN] Of 1 iTAs, only 0 have timing other than local. This could cause signalling errors due to electrical timing jitter / drif…

[WARN] No DNS servers configured

[WARN] Queue 62003 routes to itself. When no agents in the queue are available, this could spin the CPU in rapid queue iteration…

[WARN] This Com.X1 system has a potential transcoding index of 15, which is out of spec for the system (maximum recommended: 12)…

[WARN] The default comma login password is still active. Please change the comma user's password using the 'passwd' command

[WARN] The default admin GUI login password is still active. Please change the admin user's password from the GUI (Start - Chang…

[ERROR] SIP peer 3003 has its password set the same as its username. This is very insecure.

[ERROR] IAX peer ernsttest has its password set the same as its username. This is very insecure.

Audit completed. 2 error(s) and 6 warning(s)

|◁  ◁  | Page 1  of 1 |  ▷  ▷|  ⟳

Reload

# 2  Essential tools and commands

## 2.1  Tools

When trouble-shooting a Com.X (not using the GUI) the following tools are useful additions to your operating system toolkit. Many of these tools are natively available on Linux and OS.X.

Ensure that these files are placed on the system path (e.g. in c:\windows\system32). This allows the commands to be executed without needing to specify the path to the executable.

| Resource | Download from | Description |
|---|---|---|
| putty (ssh on Linux) | *http://archive.farsouthnet.com/support/tools/putty.exe*  *http://www.putty.org* | Secure shell and serial access utility |
| pscp or winscp (scp on Linux) | *http://archive.farsouthnet.com/support/tools/pscp.exe*  *http://archive.farsouthnet.com/support/tools/winscp434setupnocandy.exe*  *http://www.putty.org*  *http://winscp.net* | Secure shell copy utilities |
| nmap | *http://archive.farsouthnet.com/support/tools/nmap-5.51-setup.exe*  *http://nmap.org/* | Port mapper |
| wireshark | *http://archive.farsouthnet.com/support/tools/wireshark-win32-1.4.6.exe*  *http://www.wireshark.org* | Ethernet packet analyzer |

## 2.2  Commands

The following list of command are useful in Com.X configuration, diagnostics and maintenance.

| Command | Description | Example |
|---|---|---|
| `aptitude` | Package manager. Use search to search for a package, install to install and remove to remove. The update parameter obtains a list of the latest packages from the upstream repositories | `aptitude update`<br>`aptitude install comx-base comx-gui`<br>`aptitude install commaimg` |
| `asterisk -rx` | Log into the Com.X PBX command-line interface (CLI) | `sudo asterisk -vvvr` |
| `cp` | Copy a file | `sudo cp /etc/comma.conf`<br>`/etc/comma.conf.backup` |
| `df` | Display information on mounted drives. Use the -h flag to display information in human readable format | `df -h` |
| `dpkg` | Manipulate Com.X packages. Use the -l flag to list packages and -i to install a .deb package file | `dpkg -l | grep comma-gui` |
| `/etc/init.d/X` | Manages a Com.X service. Use start and start to start and stop the service, restart to restart the service and status to view the service status | `sudo /etc/init.d/comma-gui status` |
| `grep` | Searches for a pattern inside files. Use the -r flag to include files in subdirectories in the search and the -i flag to make the search case insensitive. | `grep -ri faxdetect /etc/asterisk/*` |
| `jed` | Edit system files | `sudo jed`<br>`/etc/asterisk/sip_additional.conf` |
| `less` | Views and navigates a file's contents. Navigate to the beginning (<) and end (>) of the file and search forwards (/) and backwards (?). Repeat the search forwards (/) | `sudo less /var/log/comma/comma.log` |

| Command | Description | Example |
| --- | --- | --- |
| | and backwards (?) Quit the viewer (q) | |
| mount | Mount a storage medium. Use -t to specify the storage type. | `mount /dev/sda1 /mnt` |
| mv | Move a file | `sudo mv /tmp/testfile /tmp/testfile2` |
| ps | Display the current process list. A common format to use includes the flags a, u and x | `ps -aux | grep commamgr` |
| rm | Remove a file | `sudo rm /tmp/testfile` |
| sudo | Perform a command with root privileges | `sudo asterisk -vvvr` |
| top | Measure system performance. Specify a time delay between samples with the -d flag.<br><br>Note that the most important indicators here are load average (should be < 5) and swap space usage (should be close to 0) | `top -d0.5` |
| umount | Unmount a mounted storage device. Note the command is 'umount'. | `umount /mnt` |

# 3  Recovery installation of a Com.X

The Com.X operating system and software can be installed using a USB recovery disk provided by your distributor by following the procedure below:

## 3.1  Configure the BIOS for recovery

- Put the USB flash drive into a usb port on the unit and reboot.
- On startup, press tab twice to enter the BIOS setup. Select the "Advanced" tab and then "USB configuration" and ensure that the USB 2.0 controller mode is set to full speed.
- Select the "Boot" tab and configure the boot device priority so that the USB flash drive is the 1st boot device.
- Save changes and exit the BIOS setup. Boot the unit from the USB flash drive.

## 3.2  Performing installation

- Log in via SSH or Putty and issue the following command:

```
sudo comma-recovery
```

- Select options by pressing the option number followed by ENTER. If you press an invalid key and end up at the Operating System shell, you will need to run `sudo comma-recovery` again.
- Select option 1.
- Select target drive and perform maintenance. Select the appropriate hard drive.
- Select the "Check and Repair filesystem" menu option.
- Select the option to manually install the comX system. Select the full Com.X installation when prompted.
- Follow the menu steps in sequence. The "Configure dual boot" and "Make bootable anywhere" configuration steps are not required.
- Optionally configure networking and reset the password from the recovery menu. This can also be done from the Com.X GUI or shell after installation.
- During installation, if an installation step fails, restart the system, enter the recovery menu and resume the installation at the point of failure.

## 3.3  Post installation steps

- Enter the BIOS and make the SSD drive the first hard drive.
- Remove the USB drive from the system and restart.

## 3.4  Error 21

- Should subsequent boot present Grub error 21, re-insert the USB drive and reboot. The system should now boot from the *solid state drive*. Log in and edit the boot configuration as follows:
- cd /boot/grub
- sudo vi menu.lst

- Change hdd(1,0) to hdd(0,0)
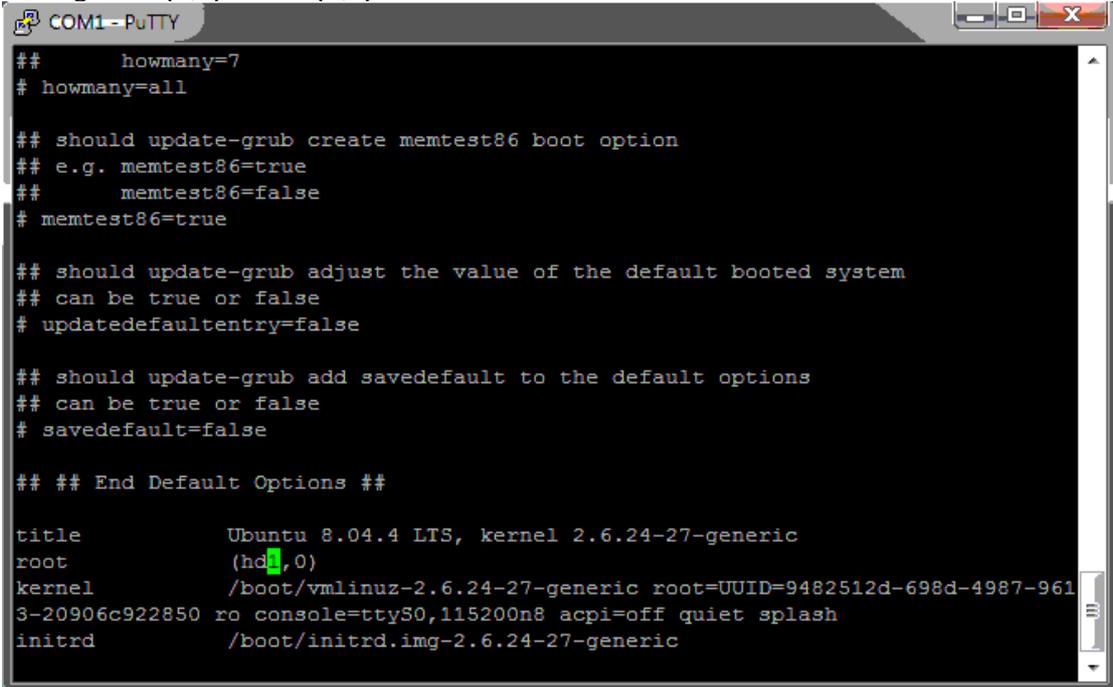
```
##      howmany=7
# howmany=all

## should update-grub create memtest86 boot option
## e.g. memtest86=true
##      memtest86=false
# memtest86=true

## should update-grub adjust the value of the default booted system
## can be true or false
# updatedefaultentry=false

## should update-grub add savedefault to the default options
## can be true or false
# savedefault=false

## ## End Default Options ##

title           Ubuntu 8.04.4 LTS, kernel 2.6.24-27-generic
root            (hd1,0)
kernel          /boot/vmlinuz-2.6.24-27-generic root=UUID=9482512d-698d-4987-961
3-20906c922850 ro console=ttyS0,115200n8 acpi=off quiet splash
initrd          /boot/initrd.img-2.6.24-27-generic
```

- Save the file and reboot (ensure the USB Flash drive is removed during restart):

```
sudo reboot
```

# 4  Troubleshooting

This chapter discusses some of the common problems encountered by administrators using the Com.X system and explanations around the circumstances and solutions for these problems.

## 4.1  Status indicators

### 4.1.1  LED indicators

| Port | Diagnostics |
|------|-------------|
| PRI | LED **green**: <br> o  On – Signal present <br> o  Off – Loss of Signal indication active <br> LED **yellow**: <br> o  On – Remote Alarm Indication (RAI) transmitted <br> o  Flashing – Remote Alarm Indication (RAI) received <br> o  Off – RAI off |
| LAN1-3 | LED **green**: LAN Speed indication <br> •On – 100Mbps <br> •Off – 10Mbps <br> LED **yellow**: Link active status <br> o  On – LAN connecting <br> o  Flashing – Data is accessing <br> o  Off – LAN disconnect |

### 4.1.2  Front Panel Description

The Com.X front panel includes a diagnostic LED and product vendor and model labels.

#### 4.1.2.1  Front panel LED indications

o  **Green**: Healthy system

o  **Yellow**: Platform boot mode

o  Flashing **Red**: Network fault

o  Flashing **Green**: Platform booted, but TDM stream application not started.

o  Flashing **Green** then **Red**: Software alarm. Typically one of: PRI down, TDM stream down, Contact with Comma Manager unavailable

### 4.1.3  Power-up BEEP codes

In case of memory / motherboard failure, the Com.X1 emits multiple beeps on start-up.

The Com.X1 uses DDR2, 667MHz DIMMS. We recommend the Kingston KVR667D2N5/1G DIMM. Some other makes and models may not be compatible with the Lanner motherboard.

If a Com.X2 beeps a code on power-up, please contact Far South Networks for support.

## 4.2  Earthing a Com.X

The Com.X should be earthed star formation, i.e. directly to the earthing point (please refer to the Com.X installation guide). If this is not the case, this could result in an earthing loop. I.e. the Com.X may be earthed to the cabinet, and the Com.X may also earthed through the power adapter to building earth. One of these earthing channels would have lower resistance than the other, resulting in additional current (potentially all the electrical noise from all the equipment in the cabinet) being conducted through the Com.X from the source of electrical noise (likely the cabinet). These are invalid operating conditions for a Com.X and could result in system damage.

In keeping with the star formation requirement, one of the following earthing paradigms could be follows:

a) swap out the Com.X power cord (kettle cord, i.e. from the multi-plug to the power brick) for one that does not have earth and keep the Com.X earthed via the cabinet.

or

b) Remove the earthing strap from the Com.X so that it is earthed only through its power adapter.

Far South Networks recommend option a) as with option b) it may be difficult to ensure that the Com.X is isolated from the cabinet (if screwed into the cabinet and isolation washers / screws are not used). Placing the Com.X on mounting rubber feet (supplied with the unit) and ensuring the unit does not touch sides should provide sufficient isolation to make b) a feasible option as well.

In both cases (a or b), the point the Com.X is earthed to should be a good earthing point. One can test the quality of the earthing strap / power cable by measuring the resistance from the Com.X to the earthing point with a multimeter. A good earthing cable would be < 0.5 ohms, preferably around 0.2 ohms.

One can also measure the efficacy of the earthing point itself by measuring from the Com.X earthing nut to a separate earth (not the same as the cabinet earth, take care that this second earthing point does not end up at the same earthing point or this test would have limited value. For example, with the Com.X connected to building earth, measure to the cabinet / telco earth stud / buzz bar). If there is a significant Voltage difference between the two earths this could be indicative of insufficient earth.

Also, in some cases one can physically feel (when not wearing isolated shoes) or hear mains hum (50 Hz) when insufficient earth is present. Please note that power spikes or the accumulation of their effects may be intermittent.

Please also note (as per the installation guide) that Comma iTAs do not have earthing in their power adapters and always require an earthing strap. All Com.Xs and iTAs at an installation site should be earthed in star formation.

## 4.3  Call Monitoring

### 4.3.1  Too many files

#### 4.3.1.1  Symptom:

When navigating to a user's Call Monitor, the following error might occur:

"Too many files in <recording-directory> Not all files processed"

#### 4.3.1.2  Detail:

The Com.X system ships with a limit of 3000 recorded files by default. For systems that have higher call volumes, this limit can be adjusted.

Care should be taken, since 64 bytes of RAM is used for each file when processing the file list, and CPU resources are used during the processing of call lists.

#### 4.3.1.3  Solution:

To increase this file limit, edit the /usr/share/freepbx/recordings/includes/main.conf.php file and change the following variable to a higher value:

```
$SETTINGS_MAX_FILES=160000;
```

Save. the file. The change should take effect immediately.

To archive calls and remove them from the system, use zip or tar to compress the older call recordings into an archive, move the archive to external storage and delete the archived files from the system.

### 4.3.2  On-demand recording not working

#### 4.3.2.1  Symptom:

While mid-call, a user presses *1. The recording does not appear on the user's call monitor.

#### 4.3.2.2  Detail:

SIP phones should be configured to relay DTMF using the correct RFC setting. Please see the Com.X Administrator's guide for more detail.

Some analogue phones do not relay DTMF properly to the PBX, in which case call recording may not work. For such phones, configuring recording to always be on is a work-around.

Some configuration permutations disallow call recording re: privacy issues. Please see the Com.X Administrator's guide for more detail.

Pressing *1 too fast or too slowly might result in the on-demand activation not being recognized.

## 4.4 Basic Rate ISDN (BRI) connection problems

### 4.4.1 Cannot call second DID on BRI (incoming)

#### 4.4.1.1 Symptom:

BRI port shows up in monitoring. The main BRI DID on the port can be dialled successfully. Dialing the DID associated with the second BRI channel fails (incoming).

#### 4.4.1.2 Detail:

If the BRI port is configured as PTP and the telco NTU configured as PTMP, only the main BRI DID number is addressable by the telco to the PBX.

#### 4.4.1.3 Solution:

Configure the BRI port to PTMP.

### 4.4.2 Calls intermittently fail

#### 4.4.2.1 Symptom:

Placing a call over BRI is sometimes successful, other times not, or always fails. A call trace reveals that the call is routed over BRI, but the BRI channel does not succeed in placing the call

#### 4.4.2.2 Detail:

Timing problems, physical line / cable or telco problems could present as the symptoms described.

#### 4.4.2.3 Solution:

The following diagnostic procedure is designed to find the shortest path to resolution:

- Confirm you are running the latest firmware
  - On Com.X:
    ```
    sudo aptitude update
    sudo aptitude install commaimg
    ```
  - On iTA:
    - Download the latest from
  http://archive.farsouthnet.com/comma/firmware/

- Dial-plan: from the CLI, confirm that your dial plan is routing the call across the BRI port

- PBX: from the CLI, do 'misdn show stacks'. Are all ports up on L1?

- On the (internal) iTA (slips indicate a timing issue):
  do `comma-ls` to determine the IP of the iTA in question
  ```
  comma-console i <ip> "bri d1-* status"
  ```
  Wait 5 seconds
  ```
  comma-console i <ip> "bri d1-* status"
  ```
  If there are slips, this may indicate a timing problem
  If the port state is not F7-ACT, or there is a disconnect in the state reported here and by the PBX, restart the misdn driver, restart the PBX, or the iTA in aid of diagnosis.

- Ensure that the correct port type (PTP or PMP) is configured. If the telco is expecting PMP, on the CLI you should see layer 2 management messages, such as:

  ```
  MGMT: SSTATUS: L2_RELEASED
  ```

  If these are absent at call setup / release, the link should be configured as PTP

- Ensure that timing is properly configured for the system. If BRI is the primary trunk, confirm that the hardware entry's timing in the Com.X GUI is configured to Line 1 or Line 2. On a host server, ensure that `/etc/comma.conf` has a config line with `sync config digital`

- In /var/log/comma.log, look for any BRI port errors

- Increase the mISDN log level and look for problems in the bri communication:
  ```
  sudo asterisk -rx "misdn set debug 6"
  ```
  Wait for an anomalous event to occur
  ```
  less /var/log/asterisk/misdn.log
  ```
  If you see entries of the following form:

  ```
  Tue Oct 26 12:18:47 2010: P[ 1] I IND :TIMEOUT oad:105 dad:0314674574 pid:263
  state:CLEANING
  ```

  confirm whether these errors occur predominantly on the same port - if so, remove the port from your configuration and determine whether the problems disappear - if so, contact your telco for BRI link support
  - connect an analogue phone to the telco BRI device and see whether you can place a call.

- If the telco is providing ring when dialing an incoming DID routed over BRI, but signalling is not presenting on the CLI, ensure that the telco NTU does not have a phone connected to it, and is not powered off mains. Doing so would ensure that the NTU is not intercepting and responding to the telco's signalling, but passing it through to the Com.X.

If these investigations do not lead to resolution, please send the logs / content of the items above to your distributor for analysis. They may suggest further tests and diagnosis in order to narrow in on the problem.

### 4.4.3  BRI trunk-failover not working

#### 4.4.3.1  Symptom:

The Com.X has an outbound route that is serviced by more than one Basic Rate ISDN trunk. When the first trunk listed in the outbound route is disconnected or problematic, the call does not fail over to the second trunk in the outbound route as expected.

#### 4.4.3.2  Detail:

When BRI trunks are added to an outbound route as individual trunks, and the first trunk becomes unavailable, the fail-over process does not check the next trunk in the list. In order for fail-over to evaluate all BRI ports for trunking, the ports need to be in a trunk group.

### 4.4.3.3 Solution:

Place the BRI ports to be used in the outbound route in a BRI trunk group and then configure the outbound route make use of the trunk group, rather than the individual trunks.

## 4.4.4 Cable problems / CRC errors

### 4.4.4.1 Symptom:

`/var/log/comma/comma.log` shows CRC errors as below:

```
comma-1 WARNING 1865487262 XHFCS: card 0 port 0 received frame with CRC error:
rx_inp=5 rcnt=2 data=0xFD
comma-1 WARNING 1865487266 XHFCS: card 0 port 0 received frame less than minimum size
comma-1 WARNING 1865487294 XHFCS: card 0 port 0 received frame with CRC error:
rx_inp=5 rcnt=3 data=0xFF
comma-1 INFO 1865487326 XHFC card 0 port 0 leaving active state
comma-1 INFO 1865487386 XHFC card 0 port 0 entering active state<
comma-1 INFO 1865487386 XHFCS card 0 switching sync source to port 0
comma-1 WARNING 1865488482 XHFCS: card 0 port 0 received frame with CRC error:
rx_inp=5 rcnt=2 data=0xFF
comma-1 WARNING 1865488486 XHFCS: card 0 port 0 received frame with CRC error:
rx_inp=8 rcnt=8 data=0xFF
comma-1 WARNING 1867388977 XHFCS: card 0 port 0 received frame with CRC error:
rx_inp=43 rcnt=7 data=0xFD
comma-1 WARNING 1873328375 XHFCS: card 0 port 0 received frame with CRC error:
rx_inp=6 rcnt=4 data=0xFC
comma-1 WARNING 1880674827 XHFCS: card 0 port 0 received frame with CRC error:
rx_inp=6 rcnt=2 data=0xFC
comma-1 WARNING 1957580192 XHFCS: card 0 port 0 received frame with CRC error:
rx_inp=6 rcnt=6 data=0xFC
```

### 4.4.4.2 Detail:

The log entries are showing corruption of the layer 1 signal.

Probably causes include:

1.  Noisy environment - earthing, other signals

2.  Incorrect wiring between NTU and Com.X

3.  Bad Telco lines

### 4.4.4.3 Solution:

1.  If the environment is very noisy, consider using shielded cable (CAT6) and a shielded type RJ-45 connector. Ensure that Com.X is earthed well (< 0.5 ohm measured from the Com.X stud to the earthing point, preferably to telco or failing that building earth) via its earth stud.

2.  Ensure correct wiring. Pins 3+6 and 4+5 form the twisted pairs on the RJ-45 for BRI. I.e. a normal CAT5 Ethernet cable is ideal. If the cable is wired with 3+4 and 5+6 paired, signal integrity could be affected.

3.  Contact your telco for diagnostics and support.

## 4.5 Primary Rate ISDN (PRI) connection problems

### 4.5.1 PRI diagnostics elements

The Primary rate ISDN protocol manages two separate data streams. This matches the physical cabling which has separate wiring for each communication direction.

#### 4.5.1.1 Electrical

| Type | Procedure | Diagnostic |
|------|-----------|------------|
| Layer 1 (physical) | | |
| Earthing | iTAs should be earthed in a star pattern. Resistance measured in the earthing strap while operational should be about 0.2 Ohms. | Earthing loops and electrical noise can adversely affect clocking and signalling, resulting in loss of signal and loss of frame. Under extreme adverse conditions equipment could sustain damage. |
| Cabling | PRI connections should be established using CAT-6 shielded cabling, with the shielding sheath crimped (or wired) to an earthing connector on one side only. | Not earthing the cable could result in electrical interference. Earthing the cable at both ends could result in an earthing loop. Not shielding the cable could result in electrical interference. These conditions could result in CRC and frame errors, leading to loss of signal and loss of frame. |
| Loop cable | One can create a short loop cable to test the iTA's PRI port by looping pin 1 to 4 and pin 2 to 5. Connect this short loop to the PRI port and from the comma-console run 't1e1 diag t1e1_loop=liu') Confirm whether consecutive 't1e1 status' results show frame or crc errors | |
| Connectors | Transmit and receive connectors on the PRI devices should be examined for errors | Use of an oscilloscope might indicate problems with transmit and receive connectors. |

| | PRBS (assumes remote side looped) | |
|---|---|---|
| t1e1 resync | Re-synchronized clocking (resets the clock recovery state machine) | If resyncing corrects a problem, this could be indicative of clocking issues. |
| Clocking (timing) | | |
| NT / TE | One side of the PRI link should be providing timing and theother slaving off it. | If timing is not configured correctly, slips could occur, resulting in loss of signal and frame. |
| Multi-pri | Confirm that only one PRI is deriving timing from the network. The other PRIs need to either be configured to network, or local. | The Com.X system can only recover timing from the telco interface for one PRI. Additional PRI ports managed by the same Com.X need to recover timing from this primary PRI port (network clocking) or need to be the source of their own clocking (local, in which case slips might occur, but this should not affect service as the Layer 2 protocol should be robust enough.) |
| Monitoring / Statistics | | |
| app status | The PRI stream (typically stream 1) should be started and up. This indicates that the iTA is communicating the stream to the host server. | If the stream is down or not started, check the Com.X configuration and ensure the iTA and manager can communicate. |
| stream p status | Receive (rx) under or overruns should remain stable when 'stream p status' is executed a number of times. Initial values can be ignored. | If under or overruns are increasing, a clocking issue might be present. |
| stream p status | rxseqerror should remain stable. Initial values can be ignored. | If receive sequence number errors are increasing, this could indicate timing or physical layer problems. |
| t1e1 status | Confirm that cabledb is with-in specification. | If cabledb is out of specification, signal strength and quality might be a problem, resulting in sporadic or constant errors. Nominal operation would have cabledb in the 2 – 6 dB range, depending on cable length and signal strength. cabledb would be around 15 dB if no cable is connected. |

| t1e1 status | frmerrors and crcerrors should be 0 when t1e1 status is called consecutively. When this command is run, the stats are cleared. Running the comand a minute or two later gives one an idea of the rate of error incident. | CRC and frame errors likely point to an electrical issue of some sort.<br><br>An occasional CRC error is to be exptected and may result in errored seconds, but should be corrected by the layer 2 protocol. |
|---|---|---|
| t1e1 status | Transmit (tslips) and receive (rslips) should remain constant over consecutive calls to t1e1 status | If slips are increasing, there could be a clocking issue. |
| Layer 2 (ISDN) | | |
| Asterisk | Restarting the asterisk service would restart the layer 2 PRI signalling protocol. | If restarting asterisk fixes a condition, it is an indication of a layer 2 state machine problem at one of the ends of the connection. The Com.X is TBR4 compliant. Check for compliance on the remote end. |
| Protocol level debug messages | pri intense debug <span id> | ISDN call setup and debug messages |
| Timer expiry | Specific timers expire as per Q.921 | Timer expiry analysis could lead to insight into the source of the problem. |
| Remote end diagnostics | | |
| t1e1 diag t1e1_ins=rai\|ais | Insert alarm | Insert an alarm indication to the remote side (RAI or AIS) or clear remote alarm. Enabling / disabling remote alarms and then not observing them on the remote end could provide meaningful diagnostic information. |
| t1e1 inserr<br>t1e1 insberr | Insert CRC or bit errors | Inject a random error into the PRI transmit data stream. This could be useful in testing the remote PRI stack and state machine. |
| t1e1 diag t1e1_loop=none\|both\|remote\|local\|liu | remote loops at the framer back to the remote NTU<br><br>local loops at the framer back to the iTA MPC<br><br>liu loops at the line interface unit chipset back to the iTA MPC | Loops the iTA. The signal received from the remote end is looped back to the remote end. |

| | both loops at the framer in both directions<br><br>none disables loop | |
|---|---|---|
| Proprietary statistics | The following statistics should be available at the remote end device:<br><br>rx / tx slips<br><br>CRC and bit error counts<br><br>Alarm indications<br><br>Layer 2 protocol level debug messages | Examining the remote end statistics could shed light on the receive direction of the PRI link from the remote end's perspective. |

### 4.5.2 Timing and electrical problems

#### 4.5.2.1 Symptom:

PRI service is intermittent or call setup is delayed noticeably. With asterisk PRI debugging enabled (`pri intense debug <span id>`, T20X errors are observed.

#### 4.5.2.2 Detail:

At the user level calls may fail intermittently or call setup may be delayed significantly if the PRI stack is experiencing signalling (D-channel) problems. Time limits in the PRI state machine are defined in Q.921 with default values as follows:

| Time-limit | Designation | Value |
|---|---|---|
| T200 | Maximum time authorized for receiving acknowledgement of a frame | 1 |
| T201 | Maximum time between the identity check message | 1 |
| T202 | Maximum time between the identity request messages | 2 |
| T203 | Maximum time allowed without frames being exchanged | 10 |

The cause of signalling problems could be either timing related, in which case on the comma-console the `t1e1 status` and `stream p status` commands would show slips.

Alternatively the cause could be electrical in nature, in which case on the comma-console the `t1e1 status` and `stream p status` commands would show frame errors.

Restarting the iTA would also reset the remore PRI stack. As a result, operation after a restart is not necessarily indicative of a problem with the iTA.

Increasing the value for T203 might resolve problems on longer distance / delay PRI connections.

#### 4.5.2.3 Solution:

If timing problems are present, adjust the timing configuration accordingly.

If adverse electrical conditions are indicated, correct cabling, earthing and the electrical environment in order to resolve the problem.

### 4.5.3 Cable problems

#### 4.5.3.1 Symptom:

The PRI span is down and the Com.X PRI port LED is solid yellow.

On the comma-console the `t1e1 status` and `stream p status` commands show tslips, frame errors, netrxunder and rxseqerr increasing and lof and lom alarms.

#### 4.5.3.2 Detail:

PRI connectivity uses the following topology:

```
Com.X PRI <-> PRI cable <-> Telco PRI NT <-> Telco PRI cable <-> Telco PRI NT
```

Different phsycial wires carry the two directions of PRI traffic. It is possible to have LOS (loss of signal) in one direction and not the other.

Solid yellow on the Com.X PRI port indicates that the Com.X is sending RAI (remote alarm indication) to the Telco NT.

LOF (loss of frame) and LOM (loss of margin) indicates that T1/E1 frames could not be recovered from the signal.

The Com.X would not present LOS (loss of signal) unless the cable is physically unplugged, or the Telco NT at the client site is faulty.

### 4.5.3.3 Solution:

Request the Telco to physically test the Telco PRI cable between the Telco NT devices.

Loop the PRI cable at the Telco NT on the client site and confirm that the Com.X can recover its own frame. This should verify the Com.X state.

## 4.5.4 Configuration problems

### 4.5.4.1 Symptom:

The PRI span is down and the Com.X PRI port LED is flashing yellow.

On the comma-console the `t1e1 status` show lof and lom alarms.

### 4.5.4.2 Detail:

Flashing yellow on the Com.X PRI port indicates that the Telco NT (central office) is sending RAI (remote alarm indication) to the Com.X.

LOF (loss of frame) and LOM (loss of margin) indicates that T1/E1 frames could not be recovered from the signal.

Probably cause is a configuration problem (cable wiring, physical interface, switch type or signalling role)

### 4.5.4.3 Solution:

Confirm with the Telco which settings should be used for the physical interface and switch type.

Ensure that the signalling role is TE for PSTN installations, and the correct role (TE / NT) in gateway installations. Signalling role inconsistencies would result in an alarm being logged on the Asterisk PBX CLI.

Confirm correct wiring of the PRI cable connectors as per the Com.X installation guide.

## 4.6 VoIP problems (SIP/IAX2)

## 4.6.1 SIP trunk fails registration, DNS resolves two different IPs

### 4.6.1.1 Symptom:

A SIP trunk fails to register. The `sip show peers` command shows an IP address for the SIP trunk that differs from the IP address returned when doing a dnslookup using `nslookup`.

### 4.6.1.2 Detail:

The nslookup command resolves the domain name using the A record for the domain name. The Com.X PBX by default resolves the trunk provider domain name using the

SRV entry in the name server record (if one exists), or the A record should the SRV record not exist.

If the A and SRV DNS record entries differ, this may present problems registering the trunk.

### 4.6.1.3 Solution:

Edit `/etc/asterisk/sip.conf` and in the `[general]` section, add `srvlookup=no`

This prevents SRV lookups from taking place, and uses A record lookups instead.

Restart the PBX, or issue sip reload for the setting to take effect.

## 4.6.2 SIP trunks and phone registration fails when internet connectivity is lost, calls take a long time to setup, or calls fail.

### 4.6.2.1 Symptom:

During internet access outages, SIP trunks and SIP phones configured on the Com.X loses registration and calls fail. When internet connectivity is restored, registration and service is restored. On the CLI, when the call is placed, the call trace is absent until about 30 seconds later, when the trace scrolls on the CLI.

### 4.6.2.2 Detail:

The Com.X ships with the pdnsd and resolvconf packages installed (DNS proxy) This allows the Com.X to service DNS lookups locally, regardless of internet connectivity status.

When the Com.X is how-ever configured with primary and secondary DNS servers on the internet (external to the internet routing device), the Com.X, when unable to reach these DNS servers, will incur significant registration and call processing delays due to the nature of the open-source DNS lookup library used.

### 4.6.2.3 Solution:

Configure the Com.X's primary DNS server as the internet router device's IP addres. When internet connectivity is unavailable, the router would inform the Com.X DNS proxy and the DNS Proxy would service local DNS requests without incurring registration and processing delay.

## 4.6.3 Remote SIP extension can place, but not receive calls

### 4.6.3.1 Symptom:

A remote extension is configured for use with the Com.X. Calls can be placed from the remote extension, but incoming calls destined for the extension do not ring the extension.

### 4.6.3.2 Detail:

The remote extension is configured with the Com.X IP address, and so can successfully place calls. In order for the Com.X to route calls to the remote phone, the phone needs to be registered with the Com.X for the PBX to know what the IP address of the phone is. This registration is not taking place.

If the PBX has dynamic DNS name and not a static IP, older firmware on the phone could keep a stale reference to an old IP for the PBX, which could prevent registration. Restarting the phone should work around this problem, but a firmware update is recommended.

### 4.6.3.3 Solution:

Please ensure both parties' phones have the latest firmware updates installed. Check the phone's login credentials and ensure the phone is registering with the PBX

## 4.6.4 One-way audio on a SIP call

### 4.6.4.1 Symptom:

A SIP call is established between an extension and a remote party. One of the parties can hear the other and the other cannot.

### 4.6.4.2 Detail:

The audo (RTP) stream is not routed to the party that cannot hear the other party. This could be a firewall or NAT issue.

### 4.6.4.3 Solution:

Please ensure both parties' phones have the latest firmware updates installed.

The PBX firewall should be configured to forward ports 5060 and ports 10,000 – 20,000 (UDP) to the Com.X.

If there is a NAT server in the network path, the SIP extension should be configured with NAT support (available from the SIP extension configuration form's Advanced tab.)

If the call is placed over a VPN, where the extension client is on a VPN subnet, which is not configured on the PBX, add a localnet entry for the VPN subnet to /etc/asterisk/sip_general_custom.conf as below:

```
localnet=10.211.32.0/255.255.255.0
```

The nmap command can be used to see whether the ports in question are available from the router's public IP address to the Com.X:

```
sudo nmap 196.212.85.36 –n –sU –p10000-10010 --open (scans the first 10 RTP ports)
sudo nmap 196.212.85.36 –n –sU -p5060 --open (scans the SIP signalling port)
```

## 4.6.5 IAX registration problems

### 4.6.5.1 Symptom:

An IAX provider and trunk combinaton is not registering.

### 4.6.5.2 Detail:

The network connection between the provider and the client might have problems, such as firewall or routing issues. Also, the registration credentials may be incorrect.

### 4.6.5.3 Solution:

Perform basic networking diagnostics. Enable IAX2 debugging on the CLI using

```
iax2 set debug
```

Reload IAX2 on the provider system, followed by an IAX2 reload on the client system. If no registration attempts become apparent at the provider, there is probably a networking, routing or firewall issue of some sort. If registration is attempted, but fails, ensure the credentials and codec configurations are compatible.

### 4.6.6 IAX call rejected, CallToken Support required

#### 4.6.6.1 Symptom:

Incoming IAX calls are rejected with an error message on the PBX CLI:

```
Nov 2 15:58:47 ERROR[823]: chan_iax2.c:4040 handle_call_token: Call rejected,
CallToken Support required. If unexpected, resolve by placing address 192.168.1.1 in
the calltokenignore list or setting user iaxhorst requirecalltoken=no
```

#### 4.6.6.2 Detail:

Older clients placing IAX calls with the Com.X might not support call tokens.

#### 4.6.6.3 Solution:

Call tokens can be marked as optional on individual subnets of the PBX by adding an entry for the subnet(s) as below in the /etc/asterisk/iax_general_custom.conf configuration file:

```
calltokenoptional = network/netmask
```

E.g.

```
calltokenoptional = 192.168.1.0/255.255.255.0
```

To mark as optional on all subnets, use:

```
calltokenoptional = 0.0.0.0/0.0.0.0
```

### 4.6.7 SIP call rejected with 480 using Anonymous@anonymous.invalid

#### 4.6.7.1 Symptom:

When calls are placed across a SIP trunk (not registering with the provider), sip set debug peer <peer> shows that the From: header specifies `Anonymous@ananymous.invalid`

The SIP server returns error 480 (Temporarily not available or No route)

#### 4.6.7.2 Detail:

Some SIP providers make use of the caller ID to authenticate calls through the network. The caller device might how-ever restrict caller ID, in which case the Com.X can only present itself as Anonymous@anonymous.invalid

#### 4.6.7.3 Solution:

The com.X can be configured to trust the remote peer Id and also to send the remote peer ID to the provider. This results in the correct caller ID information being communicated to the provider, despite the calling device's request for caller id supression.

Edit /etc/asterisk/sip_additional.conf and for the trunk in question configure:

```
trustrpid = yes
```

```
sendrpid = yes
```

Reload the sip configuration:

```
sudo asterisk -rx "sip reload"
```

### 4.6.8  SIP calls drop at unpredictable interfals due to RTP timeout

#### 4.6.8.1  Symptom:

Calls placed over a SIP trunk lose audio mid-call and eventually terminate. On the CLI a nice message appears:

```
[Mar 14 16:51:42] NOTICE[5285] chan_sip.c: Disconnecting call 'SIP/provider-00000001'
for lack of RTP activity in 91 seconds
```

#### 4.6.8.2  Detail:

The Com.X offers an additional (non-standards-based) qualification feature which allows for monitoring of SIP trunks. Not all SIP providers support this additional Asterisk feature. For providers that do not support this add-on feature, the standard SIP trunking configuration is recommended (Qualify turned off)

In the case where qualification is not supported by a provider, behaviour may vary. Essentially the interactions of the Com.X and provider state machines result in the provider at some point no longer responding to the Com.X's qualification requests, as a result of which the SIP trunk is flagged as problematic.

New calls are not allowed on the trunk and the SIP dialogs of existing calls are unlinked from the SIP trunk. This results in audio for existing calls and subsequently the calls themselves terminating (once the RTP timeout threshold has been exceeded.)

The frequency of occurrence and the call duration before this problem occurs is undefined and depends on the various state machines and network conditions.

#### 4.6.8.3  Solution:

Disable trunk qualification for the provider.

## 4.7  Call problems

### 4.7.1  Problems dialing certain numbers, but others succeed

#### 4.7.1.1  Symptom:

When dialing out over Basic Rate ISDN or Primary Rate ISDN, most calls succeed. Calls to certain numbers how-ever consistently fail, with the network returning cause code 88.

#### 4.7.1.2  Detail:

Some telephony devices / switches might explicitly require SPEECH capability in order to accept / route calls as opposed to the Com.X default 3K1AUDIO.

#### 4.7.1.3  Solution:

The dial-plan for the Com.X needs to be updated to explicitly allow `SPEECH` fpr the numbers in question. In order to avoid the changes made being over-written by a GUI apply, place the entry in one of the `_custom` configuration files provided for this purpose in `/etc/asterisk/`

As an example, to allow `SPEECH` capability on all calls starting with `0`, place in `extensions_custom.conf` an entry for '`_0.`' to enable `SPEECH` capability and then route the call over the appropriate trunk. The routing entry can be obtained from the dial-plan generated by the Com.X on GUI apply.

Remember to remove the dial rule from the Com.X outbound routes or flexpath configurations, or the Com.X generated dial-plan might take precedence over the custom configuration provided.

An example of a GUI generated dial-plan entry in
`/etc/asterisk/extensions_additional.conf`:

```
exten => _0.,1,Goto(outrt-001-OUT_2_telco,${EXTEN},1)
```

An example of a custom dial-plan allowing SPEECH for a flexpath in
`/etc/asterisk/extensions_custom.conf`:

```
[flexpath-out_from_PBX-custom]
exten => _0.,1, SetTransferCapability(SPEECH)
exten => _0.,2,Goto(outrt-001-OUT_2_telkom,${EXTEN},1)
```

### 4.7.2 Slow dialout (delay before dialing out)

#### 4.7.2.1 Symptom:

Placing a call takes a number of seconds for the call to be dialed.

#### 4.7.2.2 Detail:

Slow dial-out could be the result of a number of causes:

- Digits are collected for dialing (analogue) according to the match digit timeout setting. This delay is introduced before dialing the call to confirm no further digits are forthcoming.

- If BRI trunks are allocated to an outbound route, and some of these trunks are unavailable (e.g. disconnected), some delay could be introduced when stepping through (failing over) the prioritized list of outbound trunks for the outbound route

- Call setup includes accessing physical interfaces, negotiations on various protocols (e.g. ISDN, SIP), CDR logging and billing, authentication and call recording. Any one of these sub-systems could result in call setup delays.

#### 4.7.2.3 Solution:

Use exact numbering patterns in outbound routes (e.g. 021XXXXXXX) instead of '021.' This results in immediate dialled number processing when the last digit is received as opposed to waiting for the match digit timeout. Alternatively, configure the match digit timeout setting to something shorter in the Global Settings configuration (Please see the Com.X Administrator's guide for more detail.)

Note that this will give users less time to dial the number before assuming the number is complete.

Ensure that any disconnected BRI ports are excluded from the prioritized outbound route or trunk groups included in the prioritized outbound route.

Verify that all services interacting with the system (e.g. external billing servers) are not causing a delay and that network performance is of sufficient quality (e.g. for SIP trunks). In systems under heavy load, disable call recording where not required.

### 4.7.3 Calls drop, channels reset mid-call, "All circuits are busy" under low call load

#### 4.7.3.1 Symptom (PRI):

While under low call load, the system presents "All circuits are busy", or calls in progress drop. The CLI might display ISDN cause 31 in the call traces. Analysis of the system and comma logs and PRI statistics show the PRI link dropping and reconnecting, and bursts of frame errors.

#### 4.7.3.2 Symptom (FXO):

While calls were in progress, all calls drop and the /var/log/comma/comma.log file is similar to the excerpt below at the time of the service failure:

```
[Apr 12 12:28:51] WARNING[899] chan_dahdi.c: Detected alarm on channel 1: Red Alarm
[Apr 12 12:28:51] WARNING[899] chan_dahdi.c: Detected alarm on channel 4: Red Alarm
[Apr 12 12:28:51] WARNING[899] chan_dahdi.c: Detected alarm on channel 5: Red Alarm
[Apr 12 12:28:51] WARNING[899] chan_dahdi.c: Detected alarm on channel 6: Red Alarm
[Apr 12 12:28:51] WARNING[899] chan_dahdi.c: Detected alarm on channel 7: Red Alarm
[Apr 12 12:28:51] WARNING[899] chan_dahdi.c: Detected alarm on channel 8: Red Alarm
[Apr 12 12:28:51] WARNING[899] chan_dahdi.c: Detected alarm on channel 14: Red Alarm
[Apr 12 12:28:51] WARNING[899] chan_dahdi.c: Detected alarm on channel 16: Red Alarm
[Apr 12 12:28:51] WARNING[899] chan_dahdi.c: Detected alarm on channel 13: Red Alarm
[Apr 12 12:28:51] WARNING[1809] chan_dahdi.c: Detected alarm on channel 3: Red Alarm
[Apr 12 12:28:51] WARNING[1861] chan_dahdi.c: Detected alarm on channel 15: Red Alarm
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 1
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 2
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 3
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 4
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 5
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 6
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 7
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 8
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 13
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 14
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 15
[Apr 12 12:29:07] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 16
[Apr 12 12:29:07] WARNING[899] chan_dahdi.c: Detected alarm on channel 13: Red Alarm
[Apr 12 12:29:07] WARNING[899] chan_dahdi.c: Detected alarm on channel 14: Red Alarm
[Apr 12 12:29:07] WARNING[899] chan_dahdi.c: Detected alarm on channel 15: Red Alarm
[Apr 12 12:29:07] WARNING[899] chan_dahdi.c: Detected alarm on channel 16: Red Alarm
[Apr 12 12:29:08] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 16
[Apr 12 12:29:09] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 13
[Apr 12 12:29:09] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 14
[Apr 12 12:29:09] NOTICE[899] chan_dahdi.c: Alarm cleared on channel 15
```

#### 4.7.3.3 Detail:

These conditions are indicative of the hardware watch-dog on the Com.X media processor card resetting the media processor card (FXO), or channels going down and then up (FXO) or noise introducing errors on the PRI link (PRI).

The most likely cause of these conditions is low quality power mains or incorrect (or lack of) earth wiring, resulting in power fluctuations outside the operating range of the telephony cards and PRI telco standard.

On systems where iTAs are present, some of these symptoms could also occur if the network connection to an iTA is lost.

#### 4.7.3.4 Solution:

Ensure that the Com.X and iTAs are connected to an outlet with clean power (e.g. a UPS or good quality intra-building or municipal supply) and not at the end of a chain of devices sharing the same power supply.

Also ensure that the Com.X and iTAs are properly earthed (< 0.5 ohm measured from the Com.X stud to the earthing point, preferably to telco or failing that building earth) as described in the Com.X installation guide. This earth should be to a proper telco panel stud that terminates underground, or a proper building / power company earth.

In the case of network failure, resolve the network issue.

### 4.7.4 Voltage problems

#### 4.7.4.1 Symptom:

Calls using FXS extensions / FXO trunks are intermittent, or not possible. The /var/log/comma/comma.log file shows power alarm errors of the form:

```
2009-07-27 13:32:16,053 comma-1 WARNING 07435 Si3241 power alarm card=2 chan=7 alm=1
2009-07-27 13:32:45,653 comma-1 WARNING 37455 Si3241 re-enable card=2 chan=7
2009-07-27 13:32:49,153 comma-1 WARNING 40880 Si3241 power alarm card=2 chan=7 alm=1
2009-07-27 13:33:19,053 comma-1 WARNING 70955 Si3241 re-enable card=2 chan=7
```

#### 4.7.4.2 Detail:

It is likely that there is an electrical fault on the port or line.

#### 4.7.4.3 Solution:

Use the comma-ls command to determine the IP address of the iTA in question. Then perform a line test on the port in question, with the trunk line connected:

```
comma-console -i <ip> "fxs a1-4 linetest"
```

or

```
comma-console -i <ip> "fxo a2-2 status"
```

The output of the FXS line test should take the following format:

```
rgDC=-49715 tgDC=-49686 rgAC=0 tgAC=0
Rtg=1000000000 Rrg=1000000000 Rrt=555
roh=128
```

In this example the FXS line is sitting at -49VDC This is an indication that the line is being pulled down by some electrical anomaly.

Try physically disconnecting the port in question and perform tha line test again. Nominal would be rgDC (ring) ~ 0 and tgDC (tip) ~ 0 since the electrical circuit is "open" during the test.

If the open circuit test results are as expected. this indicates a wiring fault. I.e. voltage is leaking into the comma port when the wire is connected, and disappears when the wire is disconnected.

FXS ports are "clamped" / protected with diodes which have an upper limit of 0 and a lower limit of ~ -50 V

If the problem is present with an open circuit, check the earthing on the system. If the problem persists with proper earthing (< 0.5 ohm measured from the Com.X stud to the earthing point, preferably to telco or failing that building earth), the unit might need replacement.

The output of the FXO status should take the following format:

```
a2-2.loop_power=no

a2-2.loopI=0

a2-2.loopV=0

a2-2.loop_status=on_hook
```

Similar to the FXS case, FXO current and voltage measurements can be used to diagnose wiring problems. Nominal FXO voltage may vary dependent on the remote FXS provider, loop quality and length, with the sign of the measurment dependant on polarity. Telco providers provide ~50 V, and PBXs may provide voltage as low as 20 V and be fully operational, as long as constant voltage is provided.

### 4.7.5  All circuits are busy when using FXO trunks

#### 4.7.5.1  *Symptom:*

When a system is configured with FXO trunks, and the trunks are not in use, the systems works for a while, then periodically users get an 'all circuits are busy' message.

Logging into the asterisk CLI and executing 'dahdi show channel <n>' on the FXO channels shows that the InAlarm field is 1.

Restarting the Com.X device may or may not solve the problem.

```
comx*CLI> dahdi show channel 9
Channel: 9
File Descriptor: 9
Span: 1
Extension:
Dialing: no
Context: from-zaptel
Caller ID:
Calling TON: 0
Caller ID name:
Destroy: 0
InAlarm: 1
Signalling Type: FXS Kewlstart
Radio: 0
Owner: <None>
Real: <None>
Callwait: <None>
Threeway: <None>
Confno: -1
Propagated Conference: -1
Real in conference: 0
DSP: no
Relax DTMF: no
Dialing/CallwaitCAS: 0/0
Default law: alaw
Fax Handled: no
Pulse phone: no
Echo Cancellation: 0 taps unless TDM bridged, currently OFF
Actual Confinfo: Num/0, Mode/0x0000
```

```
Actual Confmute: No
Hookstate (FXS only): Onhook
```

Performing comma-ls shows the iTA is active.

```
comma@comx:~$ comma-ls
Probing for devices...
MAC Address        Device Name   IP Address      Subnet Mask     Default GW
00:50:c2:97:91:a5 iTA            192.168.103.2   255.255.255.0   Unassigned  File
```

Checking the voltage on the FXO lines shows either low voltage or no voltage (0 V). Telco providers provide ~50 V, and PBXs may provide voltage as low as 20 V and be fully operational, as long as constant voltage is provided.

```
comma@comx:~$ comma-console 192.168.103.2
```
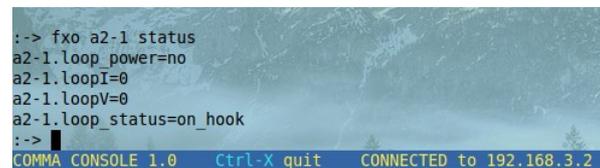
```
:-> fxo a2-1 status
a2-1.loop_power=no
a2-1.loopI=0
a2-1.loopV=0
a2-1.loop_status=on_hook
:->
COMMA CONSOLE 1.0    Ctrl-X quit    CONNECTED to 192.168.3.2
```

### 4.7.5.2  Detail:

These symptoms indicate one of four conditions:

1. The telco FXO lines are not connected to the Com.X FXO ports.

2. Hang-up detection is not properly configured for the busy tone provided by the telco or equipement connected to the FXOs.

3. If the voltage measured is > 0 but < 30 V, though the Com.X will provide best-effort service, the voltage may not be enough to place calls and the line might be excluded from use in outbound routing.

4. If the voltage measured is 0, but connecting an analogue phone directly to the FXO trunk shows the trunk is available for use, the problem is most likely an earthing issue. The Com.X FXO card has lost sync as a result of electical noise that was not properly dissipated by the mains earth, or the iTA earth.

### 4.7.5.3  Solutions:

1. Please check the wiring and confirm that the telco FXO lines are properly connected to the Com.X FXO ports.

2. Configure the correct hang-up detection duty cycle for the ports on the hardware panel.

3. Please ask your provider to check and correct any wiring issues.

4. Please ensure proper earthing (< 0.5 ohm measured from the Com.X stud to the earthing point, preferably to telco or failing that building earth) using the earthing pin at the back of the Com.X or iTA unit.

### 4.7.6  Calls incoming on FXO trunks ring intermittently

#### 4.7.6.1  Symptom:

When incoming calls are routed from an FXO trunk to a SIP extension, the extension rings, but picking up results in a dead call. If pickup happens during a ring, two-way audio is avaliable. The PBX CLI shows the FXO trunk indicating Ring followed by Hangup, followed by Ring, etc.

```
-- Called 205

-- SIP/205-00000009 is ringing

-- Hungup 'Zap/2-1'

-- Starting simple switch on 'Zap/2-1'

-- Called 205

-- SIP/205-0000000a is ringing

-- Hungup 'Zap/2-1'

-- Starting simple switch on 'Zap/2-1'

-- Called 205

-- SIP/205-0000000b is ringing

-- Hungup 'Zap/2-1'
```

#### 4.7.6.2  Detail:

This may occur in cases where the Com.X is used as a port extender. The 3$^{rd}$ party system connected to the Com.X FXO port via its FXS ports provides ringing to the Com.X to indicate a call. If the ring cadence provided has too long a silent period, the Com.X (compliant with TE-001) interprets this as the caller terminating the call, resulting in a hang-up. When the next ring comes through, the Com.X PBX sees it as a new call and rings the SIP phone again.

#### 4.7.6.3  Solution:

Configure the incoming call provider (3$^{rd}$ party system) to provide ring cadence compatible with TE-001 (South Africa)

Alternatively, configure the Com.X to detect and correctly interpret the additional ring cadences:

Edit `/etc/asterisk/zapata.conf` by adding the following to the `[channels]` section:

```
usedistinctiveringdetection=yes  (this allows detection and CLI tracing of ring
cadences on ring)
dring1=a,b,c (replace a,b,c with the detected ring cadence here)
dring1context=from-zaptel (configure the appropriate context or flexpath here)
```

After configuration, restart Asterisk with `sudo /etc/init.d/asterisk restart`

Up to 3 such distinctive cadences are supported in this manner.

> **Note:** this configuration is not supported by Far South Networks and **may void your software warranty**.

### 4.7.7 Extension rings only once

#### 4.7.7.1 Symptom:

An extension that has follow-me enabled rings only once when called, both for internal and externally incoming calls. The called hears continual ringing.

#### 4.7.7.2 Detail:

The follow-me configuration seems to be incomplete or incorrectly applied.

#### 4.7.7.3 Solution:

Edit the follow-me settings for the extension and disable follow-me. Apply.

Re-enable follow-me. Apply.

### 4.7.8 Busy (call drop) on transfer

#### 4.7.8.1 Symptom:

Party A phones party B, who then transfers to party C. If C is busy, B hears busy, or if B has already transferred the call, A hears busy. A and B may interpret the event as a dropped call.

#### 4.7.8.2 Detail:

If extension C is configured without call-waiting enabled, and is on the phone when B attempts a transfer to C, voicemail and follow-me settings are ignored and busy tone presented to B or A.

#### 4.7.8.3 Solution:

Enable call-waiting on extension C.

## 4.8 Analogue data services

### 4.8.1 FXO port lock-up

#### 4.8.1.1 Symptoms:

Calls can be made successfully over FXO trunks. The FXO trunks how-ever intermittently "lock up". Calls can be placed over other FXO trunks, but some ports become unavailable.

#### 4.8.1.2 Detail:

When users of the system terminate calls that were routed over FXO trunks, the system knows that the call has ended and the FXO trunk is freed up for additional calls. When the call is terminated by the remote party, the telco issues an end-of-call (busy) tone. The Com.X needs to be configured to detect this tone in order for it to detect the end of the call (hang-up) and free up the FXO port for additional calls.

#### 4.8.1.3 Solution:

On the hardware panel in the Com.X GUI, edit the FXO ports and configure the correct hang-up detection duty cycle. A simple test is to place a call and ask the remote party to hang up, and then listen to the telco tone to determine the duty cycle.

### 4.8.2 FXO port lock-up with different tones or quick termination

#### *4.8.2.1 Symptom:*

When calls are received on, or placed on FXO trunks, after the remote party has terminated the call, the telco busy tone can be heard. If the call is not terminated at the near-end timeously, the port "locks up" and no further calls can be sent or received on it.

#### *4.8.2.2 Detail:*

In order for the Com.X to detect remote party call termination on FXO trunks, the correct hang-up detection setting needs to be configured on the port, from the hardware panel in the GUI.

The number of times the tone is detected before hanging up defaults to 4, but could also be too high in some cases, where the telco terminated before the Com.X recognizes the tone pattern.

#### *4.8.2.3 Solution:*

If the tone is not detected using the standard duty cycle options, or if a different tone is heard when an incoming call is terminated than that heard when an outgoing call is terminated, select the "Any regular pattern" setting for hang-up detection.

If the call terminated too quickly for default tone detection, edit the file /etc/asterisk/zapata-channels.conf on the Com.X and configure the busycount field to a lower value (e.g. 3) for the channels in question. Restart the PBX after making this change.

### 4.8.3 Hook flash problems

#### *4.8.3.1 Symptom:*

When using hook-flash to effect a transfer, the other party is hung up.

#### *4.8.3.2 Detail:*

A "flash" ("switch-hook-flash", "hook flash" or "link") is a short depressing of the hook switch on an analog telephone for between 80 and 500 milliseconds used as a signalling method to provide feature control for simple analog telephone hand-sets (e.g. transfer).

If the phone's flash period is too short or too long for the Com.X configuration, the flash is interpreted as a pulse dialing digit or as a hangup.

#### *4.8.3.3 Solution*

The flash time may be adjusted for all FXS channels in `/etc/asterisk/chan_dahdi.conf` by setting the `flashrx` parameter to the appropriate value in ms.

Most problems occur with phones that require a longer flash detection period (increased `flashrx`)

### 4.8.4 End-of-call tone problems

#### *4.8.4.1 Symptom:*

A device expects a region-specific end-of-call tone and is not receiving it.

### 4.8.4.2  Detail:

Some devices may be listening for an end-of-call tone to determine transaction success, or may be receiving an unexpected end-of-call tone and trying to interpret it as data.

### 4.8.4.3  Solution:

Configure the Com.X to give end-of-call tones appropriate to the country and region the unit is deployed in. This is done by selecting the correct tone zone in
`/etc/dahdi/system.conf`

```
loadzone = zj

defaultzone = zj
```

For South Africa, select "zj" for Johannesburg and other locales that require a longer tone, and "za" for other South African locales.

| Code | Locale |
| --- | --- |
| ar | Argentina |
| at | Austria |
| au | Australia |
| be | Belgium |
| bg | Bulgaria |
| br | Brazil |
| ch | Switzerland |
| cl | Chile |
| cn | China |
| cz | Czech Republic |
| de | Germany |
| dk | Denmark |
| ee | Estonia |
| es | Spain |
| fi | Finland |
| fr | France |

| Code | Locale |
|------|--------|
| gr | Greece |
| hu | Hungary |
| il | Israel |
| in | India |
| it | Italy |
| jp | Japan |
| lt | Lithuania |
| mx | Mexico |
| my | Malaysia |
| nl | Netherlands |
| no | Norway |
| nz | New Zealand |
| ph | Philippines |
| pl | Poland |
| pt | Portugal |
| ru | Russian Federation |
| se | Sweden |
| sg | Singapore |
| th | Thailand |
| tr | Turkey |
| tw | Taiwan |
| uk | United Kingdom |
| us | United States / North America |
| us-old | United States Circa 1950 / North America |
| ve | Venezuela |
| za | South Africa |
| zj | South Africa (long busy tone) |

### 4.8.5  Fax, modem and credit card device problems

#### *4.8.5.1  Symptom:*

Faxes fail intermittently, or faxes are successful in one direction, but fail in the other direction. Modem negotiation fails. Credit card transactions succeed intermittently or not at all. The Fax machine receives an 'all circuits are busy' message.

#### *4.8.5.2  Detail:*

Echo cancellation and line characteristics can affect fax transmission that occur at higher speeds. "Loud" fax machines could introduce noise in transmission. Telco FXO connectivity, cable distance and environment, etc. introduces additional signal to noise ratio and impedance elements into the equation and may not support high fax baud rates.

If an outbound route exists with dial pattern '.', faxes may fail. When a fax tone is detected in the PBX, the work 'fax' is prepended to the dial string for internal handling, and later removed when the call is placed. It is possible how-ever that this internal handling might match outbound routes with dial pattern '.' resulting in the call failing, since the destination starting with 'fax' is invalid.

#### *4.8.5.3  Solution:*

Disable echo cancellation and enable jitter buffering on analogue ports on which faxes are received and sent by flagging the channels as fax channels. Please see the Com.X Administrator's guide for more detail on fax compatability on FXS ports.

Enable fax detection on all BRI and PRI ports that service fax calls. Please see the Com.X Administrator's guide for more detail.

Try and lower the gain on the FXS port (e.g. -3 dB).

Decrease the fax transmission baud rate on the fax machine or credit card device.

Ensure outbound route dial patterns match numbers, e.g. 'X.' , '0.' , etc.

## 4.9  Device access and networking problems

### 4.9.1  Serial console messages appear, but cannot login

#### *4.9.1.1  Symptom:*

Connecting a serial cable to the Com.X and setting the baud-rate to 115200,8,n,1 shows the system booting, but the login prompt either does not appear, or keystrokes are not collected and login is disabled.

#### *4.9.1.2  Detail:*

In some Com.X shipments, the serial driver is not initialized for the serial port.

#### *4.9.1.3  Solution:*

Log into the system using one of the network ports, and place the following file with permissions -rw-r--r-- in /etc/event.d/ttyS0

```
# ttyS0 - getty
```

```
#
# This service maintains a getty on ttyS0 from the point the system is
# started until it is shut down again.

start on runlevel 2
start on runlevel 3

stop on runlevel 0
stop on runlevel 1
stop on runlevel 4
stop on runlevel 5
stop on runlevel 6

respawn
exec /sbin/getty 115200 ttyS0
```

Restart the system.

## 4.9.2 Lost the IP addresses configured on all network ports

### 4.9.2.1 Symptom:

The Com.X device's LAN interfaces have been reconfigured and the IP addresses are not known.

### 4.9.2.2 Solution:

A variety of methods are available to resolve this problem:

- Connect a null-modem serial cable to the Com.X1 serial port orconsole cable to an Com.X10 console port and log into the system. Configure the network IPs in /etc/network/interfaces as desired and restart the system.

  The Com.X1 serial cable should be a "null modem" serial cable, with pin 2 (RxD) and pin 3 (TxD) crossed and pin 5 (ground signal) connected to pin 5 (ground signal).

  The Com.X10 console cable should be a serial to RJ-45 cable with serial port pins mapping to RJ-45 pins as follows: 3 -> 3, 5 -> 6, 8 -> both pins 4 & 5

- Connect the Com.X to a network serving DHCP on all LAN ports that may have been configured for DHCP and restart the system. Connect a serial cable to the Com.X and follow the boot messages to see which IP was assigned, or check on the DHCP server to see which IP was assigned. This approach will only be successful if the LAN port is listening for DHCP.

- Connect a cross-over LAN cable to LAN 2 and LAN 3 and attempt connecting to the default static IPS as described in the Com.X Administrator's guide.

- If the IP range is suspected, e.g. somewhere on 192.168.0.X for example, on an interface, connect a cross-over LAN cable to that LAN port and use nmap to find the IP:

  ```
  comma@comx1:~$  nmap -sP 192.168.102.0/24

  Starting Nmap 4.53 ( http://insecure.org ) at 2010-07-12 12:08 SAST
  Host 192.168.102.1 appears to be up.
  Nmap done: 256 IP addresses (1 host up) scanned in 1.799 seconds
  ```

  Alternatively, scan for the ssh port:

  ```
   nmap 192.168.102.0/24 -n -p22 --open
  ```

- If it is suspected that the device is listening for DHCP on a LAN port, this can be confirmed as follows: Run a packet capture on a machine connected via cross-over to the Com.X on the suspected port and look for DHCP broadcast requests. On linux:

```
$ sudo tcpdump -w out.out -s 0 -i eth0
```

(power cycle the Com.X and wait 2 – 5 minutes)

```
$ wireshark out.out
```

If the interface is configured for DHCP, requests should be in the capture. If so, connect the interface to a network serving DHCP. You could again use packet capture to determine which IP was allocated, or query the DHCP server.

### 4.9.3 Unable to resolve host names (DNS)

#### 4.9.3.1 Symptom:
The Com.X cannot resolve hostnames.

#### 4.9.3.2 Detail:
The Com.X product runs a local DSN server, which slaves off the configured primary and secondary DNS server entries. Please see the Com.X Administrator's guide for more detail.

#### 4.9.3.3 Solution:
Use the nslookup command to debug:

```
nslookup -query=hinfo farsouthnet.com
```

The tracepath command can be useful to determine which network providers are in the provider chain:

```
tracepath hostname
```

1. Ensure that the unit can ping farsouthnet.com. If not, correct the gateway configuration to enable correct IP routing.

2. Check that the DNS servers configured are correct. The output from the nslookup command would indicate whether:

    - The DNS servers configured might be incorrect (connection timed out; no servers could be reached)

    - The DNS servers configured may not be accessible (REFUSED if the DNS server can be reached, but is not allowed to serve requests from your service provider's network)

    - The hostname queried may be incorrect (server can't find <hostname>)

### 4.9.4 Devices cannot obtain time from Com.X NTP services

#### 4.9.4.1 Symptom:
Devices (e.g. phones or laptops) configured to obtain time from the Com.X system do not receive updated time.

### 4.9.4.2 Detail:

If NTP services are not enabled, incorrectly configured, or DNS resolution is not available, devices may be unable to obtain time from the Com.X. The Com.X looks to upstream time servers to provide it with a time reference (unless configured as a local master NTP server). If internet access is available, the Com.X should ideally receive time from an upstream NTP server.

When the NTP service is started (`sudo /etc/init.d/ntp start`), it defaults to stratum 16. Over time, as consistent stable timing information is received from an upstream NTP master server, the stratum decreases to stratum 3 or higher, depending on the configuration. This process can take anything from 10 minutes to several hours, depending on network and upstream NTP server availability.

If the Com.X cannot DNS resolve the upstream NTP server (default ntp.ubuntu.com), the stratum may remain high, and devices may fail to synchronize with the Com.X NTP server.

### 4.9.4.3 Solution:

Ensure that NTP services are enabled and correctly configured as described in the Com.X Administrator's guide.

Ensure that the upstream NTP server can be resolved. Please see the Com.X Administrator's guide and this trouble-shooting guide for detail on correcting DNS resolution failure.

Use the `ntptrace` command to view the current stratum.

Use the `ntpq -pn` command to view the status of synchronization with upstream NTP servers.

## 4.9.5 Com.X Server locks up / freezes intermittently

### 4.9.5.1 Symptom:
The Com.X server

### 4.9.5.2 Detail:
On

### 4.9.5.3 Solution:
Di

## 4.9.6 Com.X1 Server locks up / freezes intermittently

### 4.9.6.1 Symptom:

The Com.X1 server sporadically (could be days, could be daily) freezes up. The server cannot be reached via the GUI, ping or ssh. Telephony service is down. After reboot, the `/var/log/syslog` file shows no activity and no indication of a catastrophic event prior to the lock-up / freeze. The LED on the Com.X1 flashes red-green or orange.

### 4.9.6.2 Detail:

On some systems, the Ubuntu kernel used by the Com.X presents problems if ACPI is enabled. Also, running the Asterisk PBX process in realtime can present this

problem in specific call scenarios involving local channels. The realtime problem is only present on Com.X1 systems, as they are single-processor systems.

### 4.9.6.3 Solution:

Disably ACPI by editing the `/boot/grub/menu.lst` file, and appending the items below to the `kernel` boot entry for the selected boot option. The boot option can be determined by looking at the `default` entry (typically `default=0`, indicating the first `kernel` entry.)

Append:

```
acpi=off noapic
```

For example:

```
kernel        /boot/vmlinuz-2.6.24-27-generic root=/dev/md0 ro quiet splash
console=ttyS0,115200n8 acpi=off noapic
```

Also, disable real-time Asterisk processing by editing `/etc/defaults/asterisk` and setting `AST_REALTIME="no"`

(On systems with earlier serial numbers, you might need to disable real-time Asterisk processing by editing `/etc/asterisk/init.d` and setting `AST_REALTIME="no"`)

Restart the Asterisk server:

```
sudo /etc/init.d/asterisk restart
```

## 4.9.7 Com.X2 Server locks up / freezes intermittently

### 4.9.7.1 Symptom:

The Com.X2 server sporadically (could be days, could be daily) freezes up. The server cannot be reached via the GUI, ping or ssh. Telephony service is down. After reboot, the `/var/log/syslog` file shows no activity and no indication of a catastrophic event prior to the lock-up / freeze.

### 4.9.7.2 Detail:

On some systems, the Ubuntu kernel used by the Com.X presents problems if ACPI is enabled.

### 4.9.7.3 Solution:

Disably ACPI by editing the `/boot/grub/menu.lst` file, and appending the items below to the `kernel` boot entry for the selected boot option. The boot option can be determined by looking at the `default` entry (typically `default=0`, indicating the first `kernel` entry.)

Append:

```
acpi=off noapic
```

For example:

```
kernel        /boot/vmlinuz-2.6.24-27-generic root=/dev/md0 ro quiet splash
console=ttyS0,115200n8 acpi=off noapic
```

# 4.10 Advanced features

## 4.10.1 System recording gives an error

### 4.10.1.1 Symptom:

When making a system recording, I get the following error when trying to give the recording a name and save it:

```
[ERROR] The Recorded File Does Not exists:

/tmp/<extension>.wav
```

### 4.10.1.2 Detail:

The system recording is associated with the extension specified when initiating the recording. If the recording takes place from an extension other than the extension specified, the PBX might not be able to find the recorded wav file.

> Note that it is also important to signal the end of the recording to the PBX by pressing the # key at the end of the recording.

### 4.10.1.3 Solution:

Ensure that *77 is dialled from the extension specified on the recording page,

Ensure that # is pressed at the end of the recording before giving the recording a name and saving it.

Try dialling *99 to confirm that the recording was indeed recorded. If not, re-record from the *99 menu and end the recording by pressing the # key.

# 4.11 GUI Operational Problems

Due to variety in browser platforms and other causes, the Comma GUI might exhibit the following issues:

## 4.11.1 Technical error message displayed

### 4.11.1.1 Symptom:

While using the GUI, an error box appears with a technical message, or simply saying an exception has occurred.

### 4.11.1.2 Detail:

The GUI has encountered an unexpected internal condition. Future releases of the GUI software could fix the problem. Reloading the GUI refreshes the GUI configuration and program state.

### 4.11.1.3 Solution:

Close the error message and review and Apply any changes that might be outstanding. Log out from the GUI and log in again. Check that the configuration is correct re: recent changes and correct where appropriate. Apply again.

### 4.11.2 Apply reports a problem with restarting Dahdi, mISDN, or JDBC

#### 4.11.2.1 Symptom:

While applying, the Dahdi or mISDN steps fail, or a JDBC error is shown in the apply task list. The Apply indicates success. After such an apply, some apply tasks are still listed, but trying to apply them again results in an error that there are no changes to apply.

#### 4.11.2.2 Detail:

The GUI has encountered an unexpected internal condition. Future releases of the GUI software could fix the problem. Reloading the GUI refreshes the GUI configuration and program state.

#### 4.11.2.3 Solution:

Make a small change somewhere (e.g. adding and deleting an extension) and attempt to apply again. This will cause the GUI to realize that some tasks are outstanding. If the apply fails again, take careful not of recent configuration changes, log out of the GUI and log in again, fixing any changes that were not properly applied.

### 4.11.3 GUI reports an error when trying to open one of the panels

#### 4.11.3.1 Symptom:

Selecting Start – Configuration and then one of the panels (e.g. Hardware, Flexpath, etc.) results in a GUI error and the panel is not opened.

#### 4.11.3.2 Detail:

The Com.X GUI runs in the browser using javascript. When the same browser is used to access multiple Com.X GUIs, the version of the Com.X GUI software and thus the javascript may differ. The browser how-ever caches the javascript between access sessions. As a result, if the browser cache references older javascript, the communication request to the Com.X server might fail and the panel fails to load.

#### 4.11.3.3 Solution:

Clear the browser cache for the Com.X GUI page. This can be done on Mozilla Firefox for example, by holding down shift and clicking the Refresh button on the page. Each browser offers a mechanism for clearing the cache and the mechanism may differ from browser to browser.

### 4.11.4 GUI becomes unresponsive while adding extensions

#### 4.11.4.1 Symptom:

While applying after adding extensions, the GUI becomes unresponsive. The browser presents a message asking whether the script on the GUI page should be allowed to continue running.

### 4.11.4.2Detail:

You may have added a large number of extensions which is taking a while to process. The extension range form has fields for the extension start number and the number of extensions. E.g. entering 1000 and 1050 will in fact add 1050 extensions (1000 - 2050). The correct configuration would be: 1000 and 50, adding extensions 1000 – 1050.

### 4.11.4.3Solution:

If the number of extensions is large, but correct, give the GUI time to process the extensions. If the number of extensions was incorrect, restart the server as described in the Com.X Administrator's guide. After restart, login to the GUI and remove the superfluous extensions. Wair for the apply following removal of the extensions to complete. Allow the script on the GUI page to continue running as many times as necessary if prompted to do so.

## 4.11.5GUI Apply button stays lit up

### 4.11.5.1Symptom:

After applying, when I log into the GUI next, or after reverting, the Apply button remains high-lighted.

### 4.11.5.2Detail:

The GUI Apply button will light up when the GUI has detected that a configuration item is no longer in the state that it was configured to be. Reasons this could be include:

a) Applying while someone is on a call, and the apply included a notice that service will be disrupted. In this case, the restart of the underlying telephony driver could not be performed, since the channel was locked and service would have been affected had the issue been forced.

b) An iTA (or iTAs) connected to the Com.X reside on one LAN port, which is connected to a switch, but another Com.X LAN port is also connected to the switch. In this case, the ethernet broadcast messages for device discovery may be answered on either of the ports connected to the switch, resulting in the interface on which the iTA(s) is / are detected being different from the interface on which the iTA (s) was / were configured.

### 4.11.5.3Solution:

a) Wait until no calls are active and restart the PBX (Please see the Com.X Administrator's guide for more detail.)

b) iTAs should be connected to a separate switch which facilitates a separate LAN, or each iTA should be connected directly to a different LAN port on the Com.X

### 4.11.6 Cannot import a large CSV phonebook database

#### *4.11.6.1 Symptom:*

When trying to import a large phonebook CSV file, the GUI indicates that 0 entries have been uploaded, and that the maximum CSV filesize may have been exceeded. No entries are added to the phonebook.

#### *4.11.6.2 Detail:*

Uploading large phonebook databases can take a significant period of time. The Com.X phonebook import function is limited by default to files <= 100,000 bytes.

#### *4.11.6.3 Solution:*

In order to import a larger file, edit `/usr/share/freepbx/modules/phonebook/page.phonebook.php` and modify the following line:

```
<input type="hidden" name="MAX_FILE_SIZE" value="100000">
```

Increase the `MAX_FILE_SIZE` from `100000` to the size of the required CSV database.

Note that this import process may take 10s of minuted to complete. After upload, for large databases, all entries may not be listed on the GUI phonebook page (only the first 2000 entries are listed). To confirm that all entries have been imported, from the Com.X shell, execute the following commands:

```
sudo asterisk -rx "database show cidname"
sudo asterisk -rx "database show sysspeeddials"
```

If the database is sufficiently large, the Com.X webserver might lock down the PHP script performing the import after 30 seconds, and an error to the effect of "`Fatal error: Maximum execution time of 30 seconds exceeded`" might appear. To allow the script enough time to complete the import, edit `/etc/php5/apache2/php.ini` and `/etc/php5/cli/php5.ini` and set `max_execution_time = 60` (or higher if required). Then restart apache:

```
sudo /etc/init.d/apache2 restart
```

## 4.12 Yealink issues

### 4.12.1 Transfer problems

#### *4.12.1.1 Symptom:*

When using the transfer button on a Yealink phone, the call is not transferred.

#### *4.12.1.2 Detail:*

The behaviour the user is expecting might be different from what the phone provides.

#### *4.12.1.3 Solution:*

To perform an unattended transfer using a Yealink, select Transfer and dial the desired number.

To perform an attended transfer using a Yealink, select Line 1 (the active call line) and dial the desired number. Announce the call to the person and press Transfer. Depending on the phone model, you may be prompted to confirm the person to transfer. High-light the person and select OK.

# 4.13 Snom issues

## 4.13.1 Transfer problems

### 4.13.1.1 Symptom:

When using the transfer button on a Snom phone, the call is not transferred.

### 4.13.1.2 Detail:

A number of reasons could exist for this problem, including different behaviour from that expected for the specific Snom model's transfer button, outdated phone firmware and an incorrectly configured transfer button.

### 4.13.1.3 Solution:

The transfer procedure is different on different models of Snom phones. Please check that you are using the correct procedure for the phone in question (http://wiki.snom.com/Features/Call_Transfer)

Download and upgrade the Snom phone to the latest available firmware

Confirm that the function configuration of the Snom transfer button is correct (please refer to the relevant Snom phone configuration manual)

## 4.13.2 Snom 370 with sidecar / panel unresponsive

### 4.13.2.1 Symptom:

When the sidecar / panel buttons are associated with extesions on the PBX system, the phone becomes unresponsive. Removing the side panel and rebooting the phone solves the problem. Looking at the phone's log, a large number of SIP authentication requests are received from the PBX at a high rate.

### 4.13.2.2 Detail:

The Com.X sends a challenge when a snom button registers for information events associated with an extension. The phone should stop requesting registration once the extension information listeners have registered.

The standard Snom configuration how-ever by default attempts to register each button for each identity on the phone, causing a large number of registration requests, to which the Com.X PBX responds with an authentication challenge.

The Snom's performance degrades as a result of having to handle the origination and response to all these registration and authentication requests.

Example of the standard Snom configuration entries:
fkey_context0!: active

fkey_context1!: active
fkey_context2!: active
fkey_context3!: active
fkey_context4!: active
fkey_context5!: active
...

### 4.13.2.3 Solution:

Configure the Snom buttons to only use applicable identities, decreasing the number of registration requests to the actual number required. The phone performance should improve significantly:

```
fkey_context0!: 1
fkey_context1!: 1
fkey_context2!: 1
fkey_context3!: 1
fkey_context4!: 1
fkey_context5!: 1
...
```

## 4.14 Electrical issues

### 4.14.1 Noise problems and unpredictable system restarts

#### 4.14.1.1 Symptoms:

During call, noise (buzzing) might occur. At the end of a call, a long, loud noise might occur. The system may restart by itself at unpredictable times, or in conjunction with power events (e.g. restarting an iTA or another device on the same power line.)

#### 4.14.1.2 Detail:

Electrical noise can be introduced into the system at any electrical connection. Without proper earth connections this noise is distributed through-out the system, and can lead to unpredictable results and effects.

#### 4.14.1.3 Solution:

Ensure the latest firmware is installed on the system.

Follow the instructions in the Com.X Administrator's guide re: earthing the Com.X and iTAs.

The Com.X provides an earth connection in its power brick and cable.

The iTA does not have an earth connection in its power brick and must be earthed using an earth strap and its earth stud.

It is important that Com.X and iTA devices are earthed in a "star" pattern to a single earthing point. Do not wire an iTA to a Com.X's earth stud or vice versa.

Be careful not to create earth loops which may induce noise into the system. Ensure high quality multi-adapters (multi-plugs ) are employed, and do not place the Com.X at the end of a chain of devices chained on the same multi-adapter.

## 4.15 Miscellaneous problems

### 4.15.1 Hard drive check required

#### 4.15.1.1 Symptoms:

The Com.X system does not start up to the point of offering telephony and PBX services. When connecting a serial cable to the Com.X, some services fail to start and the system recommends a manual fsck file system check.

### 4.15.1.2Detail:

Thought the Com.X employs a journaling file system, which is more robust and stable in the face of unexpected powerfailures and shutdowns, a series of brown-outs or an unexpected shutdown could result in the need to check and correct the file system.

### 4.15.1.3Solution:

Restart the Com.X and select ESC from the boot menu.

Select recovery mode.

Unmount the root file system:

```
umount /dev/sda1
```

Perform the system check, automatically fixing any problems encountered:

```
fsck -t ext3 -y /dev/sda1
```

Restart the system:

```
reboot
```

## 4.15.2 Hard drive failure

### 4.15.2.1Symptoms:

The Com.X system sporadically runs slowly or takes a long time to execute a command. On start-up the system might start up intermittently, mounting the root file system read-only. This is soon followed by a complete inability to start up. The system log file (`/var/log/syslog`) shows entries containing the `DRDY` keyword.

### 4.15.2.2Detail:

Statistically 3% of hard drives fail, most with-in the first 4 months of use. Dust environments and shocks, bumps and jolts to the Com.X can contribute to hard drive failure.

### 4.15.2.3Solution:

While the file system is accessible, make a backup of the existing configuration, CDR and voicemail databases using the Com.X GUI. Store the back-up on an external drive or download it from the Com.X GUI.

Contact your distributor in order to arrange for a swap-out unit. The distributor would then follow and RMA process for return of the faulty unit to Far South Networks.

## 4.15.3 CDR database corruption

### 4.15.3.1Symptoms:

On the PBX CLI, messages such as below are logged. New CDR records may not be recorded in the database and may not appear in TMS systems:

```
mysql_log: mysql_cdr: Failed to insert into database: (145) Table './database-
name/table-name' is marked as crashed and should be repaired
```

### 4.15.3.2Detail:

Power loss or other conditions may result in database indexes becoming corrupted.

### 4.15.3.3Solution:

Make a backup of the existing CDR database using the Com.X GUI

Log into the system using ssh and issue the following command in order to repair the database indexes, using the table name reported in the log:

```
echo "repair table <table-name>" | mysql -u root <database-name>
```

## 4.15.4 Syslog message regarding time zone

### 4.15.4.1 Symptoms:

The syslog quite regularly reports the warning below:

```
It is not safe to rely on the system's timezone settings. Please use the date.timezone
setting, the TZ environment variable or the date_default_timezone_set() function. In
case you used any of those methods and you are still getting this warning, you most
likely misspelled the timezone identifier.
```

### 4.15.4.2 Detail:

The PHP package is unable to determine the correct timezone and its logging level is set at a level high enough to issue a warning in lieu if the uncertain timezone. This should not affect functionality, but can lead to the syslog growing to significant size.

### 4.15.4.3 Solution:

Configure the Com.X date and timezone as per the Com.X Administrator's manual.

## 4.15.5 Directed Pickup Fails when Extensions are in a Flexpath

### 4.15.5.1 Symptoms

A user is unable to make use of the directed pickup function (**) to answer calls to an extension if the called extension is in a flexpath.

### 4.15.5.2 Detail

The pickup function, activated by **<exten>, browses through a series of contexts to locate a call to the extension <exten>. Until recently the list of contexts to check did not include "from-internal-flexpath", which resulted in the call to <exten> not being found and the directed pickup failing.

### 4.15.5.3 Solution

Updates to the freepbx modules have been made. This function is repaired in freepbx version 2.5.1-cma5877 (The freepbx-comma-gui and freepbx-modules-comma-gui packages contain the update).