Synway®

Synway FXM Series

FXM-8A/PCI
FXM-16A/PCIe

User Manual

Version 1.0

Synway Information Engineering Co., Ltd

www.synway.net

Contents

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Revision History

Version	Date	Comments
Version 1.0	2008-7	Initial publication

Note: Only major revisions to this manual itself recorded herein.

Preface

Thank you for choosing the Synway AST series boards which are designed to fully support Asterisk platform. This series includes four subseries.

Subseries	Description
Synway FXM	Use of modular structure and analog lines
Synway FXS	Use of analog lines, equipped with much more on-board channels than FXM.
Synway TEJ	Use of digital trunks (E1/T1/J1)
Synway CDC	CODEC board

The Synway FXM series board is a perfect substitute for the 800 series analog voice cards such as AEX800 and TDM800P from Digium Inc. Since the FXM board integrates the capability of echo cancellation, when using it, there is no need to purchase an extra module of VPMADT032 (to enable echo cancellation) from Digium Inc.

The Synway FXM driver program, as a link between the board hardware and Asterisk, is only used to set up the Asterisk platform, but not applicable to secondary development. Each board model in the Synway FXM series has its corresponding driver package, which is elaborated in the following text. This manual, as the help file for hardware installation, software installation and configuration of the Synway FXM series, aims at those installation and maintenance technicians as well as the salesmen who are using the FXM boards to set up Asterisk application systems.

This document consists of the following chapters.

Chapter 1 introduces the Asterisk application model and scenario set up by the Synway FXM series boards and tells what is Asterisk.

Chapter 2 describes the on-board modules and jacks as well as the slot compatibility, and then tells how to install boards on PC by examples.

Chapter 3 elaborates the board configuration.

Chapter 4 emphasizes the FXO and FXS modules.

Appendix A and Appendix B give the technical specifications of the boards.

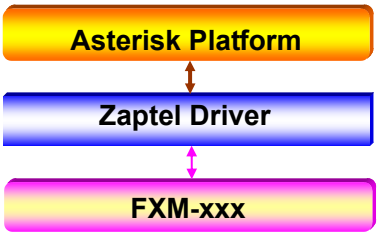
Appendix C shows the contact way of technical support and sales department in Synway.

Although Synway has scrupulously checked through this manual, but cannot guarantee the absence of errors and omissions. We sincerely apologize for any consequent inconvenience brought to you and will be very grateful if you kindly give your advice regarding amendments to this book.

Chapter 1 Overview

The driver for the Synway FXM series boards (hereinafter referred to as 'FXM'), which is compatible and must be used with the Zaptel driver, can smoothly and seamlessly support Asterisk system.

When using the FXM board to establish Asterisk platform, all that you should do is configure and operate the Asterisk platform, without secondary development by using FXM. See Figure 1-1 below for the set-up of the Asterisk application system with the FXM board.



xxx: represents the existing and future board models in the FXM series.

Figure 1-1 FXM Driver Set-up

Figure 1-2 is a typical application model with FXM.

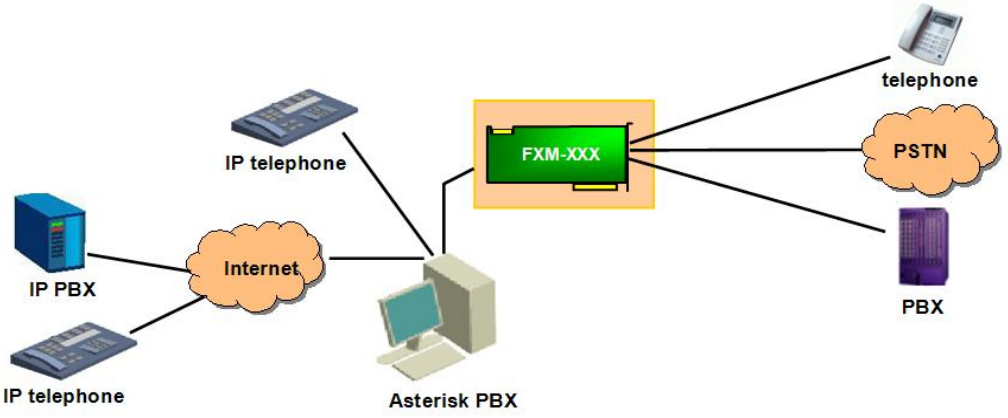


Figure 1-2 Application Model

1.1 What is Asterisk

Asterisk is the first Open Source PBX, which is developed, maintained and improved by Digium Inc. It can run on Linux and other Unix platforms. The name Asterisk is derived from the all-inclusive "wildcard" symbol (*) in UNIX (as well as Linux), a symbol that stands for one or more unspecified characters, used especially in searching text and in selecting multiple files or directories. It implies the wide applicability of this software.

Asterisk provides a lot of functionalities which were supported only by expensive and proprietary

PBX before, such as voicemail, conferencing, interactive voice response (IVR) and auto call transfer, etc. Since Asterisk is an open source PBX, users can flexibly configure and extend this platform to have whatever functions needed, even can write programs to develop some functional modules they want. Therefore, Asterisk is now increasingly used to take the place of traditional proprietary PBX.

Chapter 2 Board Installation

2.1 Attention on Unpacking

When you unpack the board, please check if it is damaged or corrupted during transportation. In case of any loss, take your bill of documents and contact the seller or dial the phone number listed in Appendix C to consult.

Note: Only the trained and qualified service people are allowed to reinstall the board. Users had better not do it by themselves.

2.2 Outgoing Inspection

2.2.1 Board Classification

All board models in the FXM series are listed in the table below.

Series	Bus	Board Model	Note
FXM	PCI	FXM-8A/PCI	PCI-X Support
FXM	PCIe	FXM-16A/PCIe	PCI-E Support

Table 2-1 Board Models in FXM

All CODECs supported by the FXM boards for voice playback and recording are shown as follows:

Series	Board Model	PCM8		PCM16		A-law		μ-law		IMA ADPCM		VOX		MP3		GSM		G.729A	
		DEC	COD	DEC	COD	DEC	COD	DEC	COD	DEC	COD	DEC	COD	DEC	COD	DEC	COD	DEC	COD
FXM	FXM-8A/PCI	—	—	—	—	√	√	√	√	—	—	—	—	—	—	—	—	—	—
FXM	FXM-16A/PCIe	—	—	—	—	√	√	√	√	—	—	—	—	—	—	—	—	—	—

Legend: COD: Coder DEC: Decoder

√: Hardware-based —: Unsupported

Figure 2-2 FXM Supported CODEC

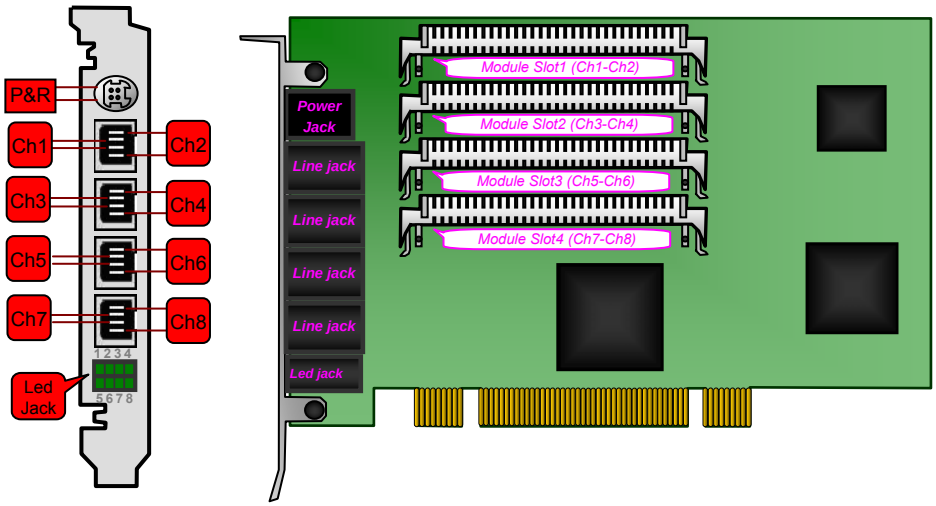
That how many channels are supported by the FXM board is decided by hardware. The following table shows the detail information.

Series	Bus	Board Model	Maximum Channel Number
FXM	PCI	FXM-8A/PCI	8
FXM	PCIe	FXM-16A/PCIe	16

Figure 2-3 FXM Supported Channels

2.2.2 Hardware Structure & Board Features

2.2.2.1 FXM-8A/PCI Board and Its Features



P&R: Ringing Current & Battery Feed Power Supply Jack
Ch1～Ch8: Jacks corresponding to Channel 1~Channel 8

Figure 2-1 FXM-8A/PCI (Left and Front Views)

Note: As shown in Figure 2-1 above, the numbers for led jacks from left to right are 1~4 on the top and 5~8 at the bottom. A light on means the corresponding channel is installed with a module; in contrast, a light off indicates no module is installed on the corresponding channel.

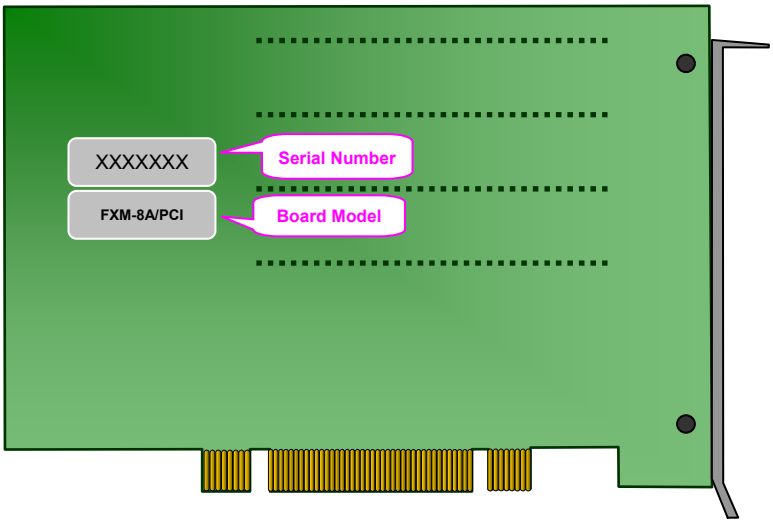


Figure 2-2 FXM-8A/PCI (Rear View)

See below for characteristic features of FXM-8A/PCI.

1. **PCI 2.2 Bus Support**

   Includes PCI 2.2 bus with burst data transmission rate up to 132 MB/s; PNP (plug and play) feature eliminates the need for jumper leads; General PCI design supports 3.3V/5V PCI slot and PCI-X slot.

2. DMA Read and Write

The use of PCI-based DMA technique for data reading and writing helps minimize the cost of the host CPU.

3. Compatible with Asterisk

Entirely compatible with Asterisk at the hardware/driver level, with all source codes open.

4. On-board SIMM Slots

Fit modules to board. Contacts on both sides greatly improve connection and ease installation.

5. Module Configurable

4 on-board dual-channel modules can be freely arranged in pairs or groups for various complex, multi-functional applications.

6. RJ11 Jack

The on-board RJ11 jack can connect directly or via a proper 2-way hub with telephone lines, making connection easy and malfunctions rare.

7. External Ringing Current & Battery Feed Power Supply

Provides station modules with battery feed, and enables the phones which are linked to station channels to ring.

8. Echo Cancellation

The self-adaptive echo cancellation feature gives the board the capability of 128ms echo cancellation so as to effectively eliminate echoes under various conditions, canceling out the effect of voice playback on DTMF and busy tones detection, avoiding self-excited oscillation and howling, and minimizing the possibility of registering wrong DTMF and busy tones in a conference call, designed especially for VoIP application environments.

9. Voice CODEC Support

Supports the hardware-based A-law, μ-law codecs. The recorded voice files can be edited and played by audio tools such as Cooledit.

2.2.2.2 FXM-16A/PCIe Board and Its Features

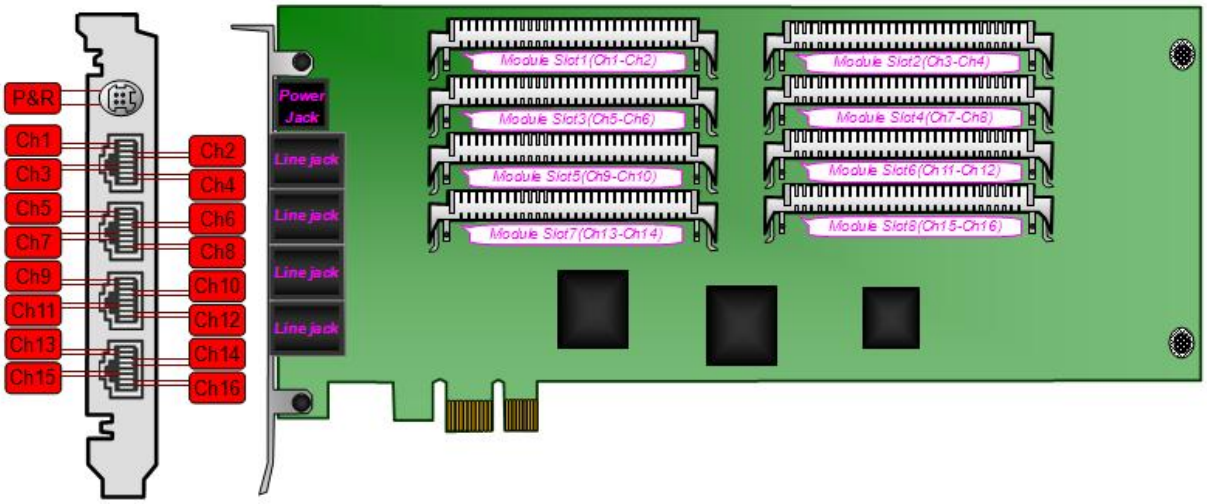


Figure 2-3 FXM-16A/PCIe (Left and Front Views)

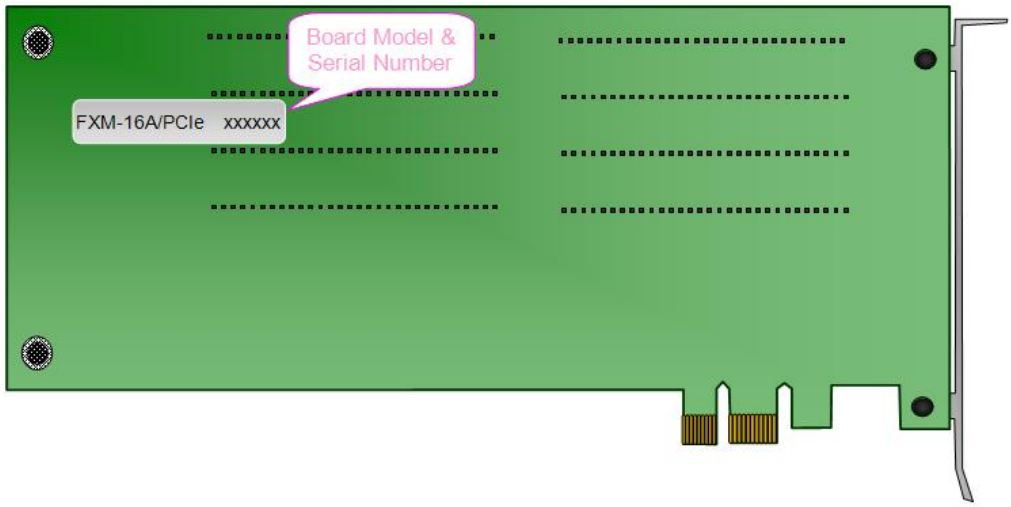


Figure 2-4 FXM-16A/PCIe (Rear View)

See below for characteristic features of FXM-16A/PCIe.

1. **PCI Express Bus Support**

   Includes PCI Express 1.0a bus with the single-way transmission rate up to 2.5Gb; supports PCI Express X1, X2, X4, X8, X16 slots and DMA transfer.

2. **On-board SIMM Slots**

   Fit modules to board. Contacts on both sides greatly improve connection and ease installation.

3. **Module Configurable**

   8 on-board dual-channel modules can be freely arranged in pairs or groups for various

complex, multi-functional applications, such as call center and recording functions available on a single board.

4. **RJ45 Jack**

   A single board has 4 8-pin RJ45 jacks, each of which can be converted to 4 2-pin RJ11 jacks via a four-way hub so as to connect with analog phone lines, making connection easy and malfunctions rare.

5. **External Ringing Current & Battery Feed Power Supply**

   Provides station modules with battery feed, and enables the phones which are linked to station channels to ring.

6. **Echo Cancellation**

   The self-adaptive echo cancellation feature gives the board the capability of 128ms echo cancellation so as to effectively eliminate echoes under various conditions, canceling out the effect of voice playback on DTMF and busy tones detection, avoiding self-excited oscillation and howling, and minimizing the possibility of registering wrong DTMF and busy tones in a conference call, designed especially for VoIP application environments.

7. **Voice CODEC Support**

   Supports the hardware-based A-law, μ-law codecs. The recorded voice files can be edited and played by audio tools such as Cooledit.

2.3 Module Identification

An FXM series board can have either FXO or FXS modules only, or be equipped with both FXO and FXS modules.

2.4 Interface Identification

It's quite important to recognize different kinds of interfaces, as such information is necessary for configuration of Asterisk platform. In real practice, not all interfaces on the board are used at a same time. When to use which interface depends on the installed modules and their particular positions on the board.

2.4.1 RJ11

Each FXM-8A/PCI board has 4 RJ11 jacks on the bracket and each jack connects with an independent module interface (may be FXO or FXS). Jacks 1~4 from top to bottom correspond to Modules 1~4.

A single board of FXM-8A/PCI can be equipped with up to 4 dual-channel modules and supports 8 voice channels. The pin layout of the 4-pin RJ11 jack is shown as follows.

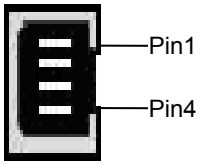
	Pin	Note
	1	Tip2
	2	Tip1
	3	Ring1
	4	Ring2

Table 2-4 RJ11

2.4.2 RJ45

Each FXM-16A/PCIe board has 4 RJ45 jacks on the bracket

A single board of FXM-16A/PCIe can be equipped with up to 8 dual-channel modules and supports 16 voice channels. The pin layout of the 8-pin RJ45 jack is shown as follows.

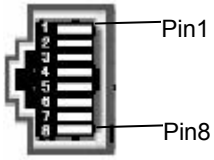
	Pin	Note
	1	Tip1
	2	Ring1
	3	Tip2
	4	Ring2
	5	Tip3
	6	Ring3
	7	Tip4
	8	Ring4

Table 2-5 RJ45

2.5 Slot Compatibility

Make sure it compatible with PCI slots when using an FXM board. Users may choose whichever suitable according to the slot patterns illustrated in Figure 2-5 below.

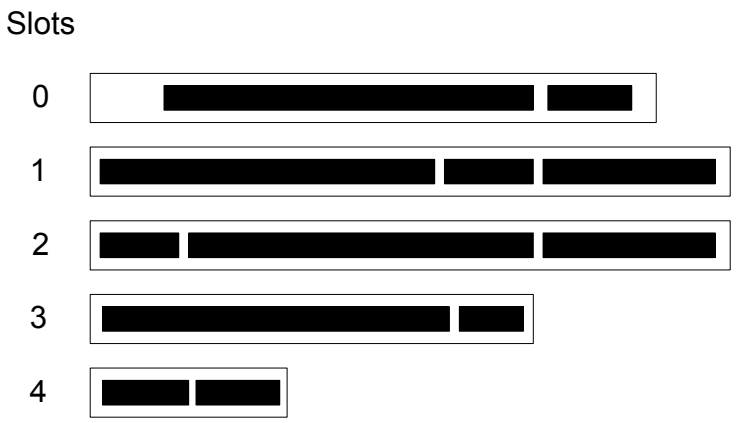


Figure 2-5 Board with PCI Slot

Slot Number:

0: AGP Pro Slot
1: 64-bit 5.0V PCI Slot
2: 64-bit 3.3V PCI Slot
3: 32-bit 5.0V PCI Slot
4: PCI-E Slot

The FXM-8A/PCI board includes PCI 2.2 bus with burst data transmission rate up to 132 MB/s; supports the PNP (plug and play) feature which eliminates the need for jumper leads; uses the general PCI design which supports the slots numbered 1, 2 and 3 in Figure 2-5.

The FXM-16A/PCIe board includes PCI-E 1.0a bus and supports PCI-E X1, X2, X4, X8, X16 slots, i.e. the slot numbered 4 in Figure 2-5.

2.6 Hardware Installation

Note: Always turn off the power before installation!

Step 1: Plug the desired modules into the module slots on the board, and fit the board into the PC chassis.

Fix the screws on the L-bracket and then go to the next step

Step 2: Connect to analog phone lines or telephones.

- **FXM-8A/PCI**

A single board has four RJ11 jacks, each of which connects to a 4-lead line that corresponds to 2 channels. The two leads in the middle constitute a port and the outer two leads set up another. See Table 2-4 above for the pin layout and the corresponding channel number.

Each RJ11 jack can be converted via a special 2-way hub or constructed by yourself to connect with 2 analog channels. See Figure 2-6 below for the structure of the 2-way hub.

Figure 2-6 2-way Hub

See Table 2-6 for the correspondence between the on-board channels, the 4 pins in an RJ11 jack and the 2 interfaces of a 2-way hub.

Jack	Channel No.	Pins in RJ11	2-way Hub
RJ11	1	2nd and 3rd pins	1st interface
	2	1st and 4th pins	2nd interface

Table 2-6 Correspondence between Channels, Pins in RJ11 and Interfaces of 2-way Hub

Note: When connecting to an RJ11 jack, you can use a special 2-way hub to convert it to two independent jacks. If you want to construct lines by yourself, please follow Figure 2-1 to connect each channel with corresponding pins.

- **FXM-16A/PCIe**

A single board has four RJ45 jacks, each of which can be converted via a special 4-way hub or constructed by yourself to connect with 4 analog channels. See Figure 2-7 below for the structure of the 4-way hub.

Figure 2-7 4-way Hub

See Table 2-7 for the correspondence between the on-board channels, the 8 pins in an RJ45 jack and the 4 interfaces of a 4-way hub.

Jack	Channel No.	Pins in RJ45	4-way Hub
RJ45	1	1st and 2nd pins	1st interface
	2	3rd and 4th pins	2nd interface
	3	5th and 6th pins	3rd interface
	4	7th and 8th pins	4th interface

Table 2-7 Correspondence between Channels, Pins in RJ45 and Interfaces of 4-way Hub

Step 3: Connect to the ringing current & battery feed power supply

Note: Skip this step if FXS (station module) is not used in the system.

If you are using the external ringing current & battery feed power supply from Synway, note that the plug has a peculiar design for the prevention of improper insertion and extraction. The correct way is to hold the plug body (not the locking ring, or it cannot be fully inserted) when inserting the plug home into the socket, and to grasp the locking ring (not the plug body or the conductor) when pulling the plug out from the socket. See Figure 2-8 below.

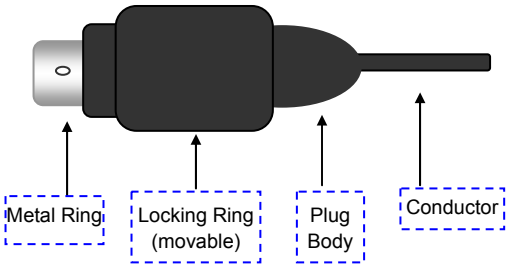


Figure 2-8 Plug Structure

Step 4: Set up an application environment

Connect phone lines with the port to an FXO module and the telephone with the port to an FXS module, to establish an application environment.

Step 5: Boot your computer and install the driver

Regarding driver installation, refer to Section 2.7 for details.

2.7 Software Installation

2.7.1 System Requirements

Host System Requirements

CPU: 300MHz Intel® Pentium®III or above

Memory: 256M or more

HD: Depends on individual requirements

Supported Operating Systems

- ✓ Linux RH7.2/RH9.0/AS4/FC4/SUSE10

2.7.2 Installation Package

The driver installation package includes all necessary files for installation and use of the Synway FXM driver. See below for details.

No.	Filename	Description
1	fxmXXX-1.0.0.tar.gz	FXM driver package
2	AST FXM_UserManual.doc	User manual for this driver (English version)
3	AsteriskTFOT.zip	Introduction to installation and configuration of Asterisk (official provision)

Notes:

1. **'fxmXXX' marked in fxmXXX-1.0.0.tar.gz varies on actual board models. For example, the driver package of FXM-8A/PCI is called 'fxm8apci-1.0.0.tar.gz', while that of FXM-16A/PCIe is named 'fxm16apcie-1.0.0.tar.gz'**
2. **fxmXXX-1.0.0.tar.gz can only be installed with the help of the Zaptel driver and started by running Asterisk.**
3. **The Zaptel driver must be installed for compilation and operation of this driver.**
4. **This driver supports the version of zaptel-1.4. So we recommend zaptel1-1.4.8 and Asterisk-1.4.17. for your use, which can be downloaded from the website www.synway.net or http://downloads.digium.com/pub.**

2.7.3 Driver Installation

Notes:

1. **Here we take the driver installation for 'FXM-8A/PCI ' as an example.**
2. **The driver installation for other board models in the FXM series is just the same way as that for 'FXM-8A/PCI'. Only thing you should do otherwise is use the name of corresponding driver package to replace the name 'fxm8apci-1.0.0.tar.gz'.**
3. **As Zaptel driver and Asterisk platform, we use zaptel-1.4.8 和 Asterisk-1.4.17.**

See below for driver installation procedures.

Step 1: Login to the system (users with root access only)

Step 2: Compile and install Zaptel

Copy the file zaptel-1.4.8.tar.gz to the target directory /opt and execute the following commands to perform compilation of the Zaptel driver.

```
#cd /opt
#tar –xvf zaptel-1.4.8.tar.gz
#cd zaptel-1.4.8
#make
#make install
```

Copy fxm8apci-1.0.0.tar.gz to the directory of zaptel-1.4.8 and execute the following commands.

```
#cd /opt/zaptel-1.4.8
#tar –xvf fxm8apci-1.0.0.tar.gz
#cd fxm8apci-1.0.0
```

#make
Complete the driver compilation for the FXM-8A-PCI board.

Step 3: Compile and install Asterisk

Copy the file Asterisk-1.4.17.tar.gz from the CD to the target directory of /opt (or some other directory),
#cd /opt
#tar –xvf Asterisk-1.4.17.tar.gz
#cd Asterisk-1.4.17
#./configure
#make
#make install
Complete Asterisk compilation.

Step 4: Load the driver

#cd /opt
#cd zaptel-1.4.8
#modprobe zaptel
#cd fxm8apci-1.0.0
#insmod shfxm-8a.ko

Step 5: Start Asterisk (Make sure all previous configurations are correct. See Chapter 3 for details.)

#ztcfg -vv
#asterisk –vvvvc
*CLI> zap show channels

2.7.4 Driver Uninstallation

Step 1: Uninstall the driver of the FXM-8A board

Execute the Command: rmmod shfxm-8a

Step 2: Check if the driver uninstallation is successful

Execute the Command: lsmod
Check if the driver has been successfully uninstalled. If successful, the item shfxm-8a will not be shown in the result.

Chapter 3 Configuration

This chapter cites a simple configuration instance to explain how to configure Asterisk platform to meet individual application requirements. Once getting familiar with this instance, you are able to compile this configuration file for something you want.

3.1 Common Configuration Items

/etc/zaptel.conf

```
fxsks=1-4          # Trunk Module
fxoks=5-8          # Station Module
loadzone = us
defaultzone=us
```

/etc/asterisk/zapata.conf

```
[channels]
context=exampletest
usecallerid=yes
hidecallerid=no
callwaiting=no
threewaycalling=yes
transfer=yes
echocancel=yes
relaxdtmf=yes
group=2
signalling=fxo_ks        # Station Module
channel => 5
channel => 6
channel => 7
channel => 8
group=1
signalling=fxs_ks        # Trunk Module
channel => 1
channel => 2
channel => 3
channel => 4
```

/etc/asterisk/extensions.conf

```
[exampletest]
exten => _300X,1,Dial(zap/ ${EXTEN},50)
exten => _300X,n,playback(hello-world)
```

exten => _300X,n,Hangup()

This configuration is performed provided Channels 1~4 are trunks and Channels 5~8 serve as stations. Users can modify the configuration by their own situation. extensions.conf only sets the rules of station calls.

3.2 Configuration Testing

Step 1: Enter the following command to configure the board

#ztcfg –vv

Step 2: Enter the following command to connect Asterisk

#asterisk –vvvvc

Step 3: Check the state of channel connection upon a successful start

*CLI> zap show channels

Notes:

① **In Step 1, if zaptel.conf is properly configured, the printed information displayed after you enter the command ztcfg –vv should be something like the following.**

Zaptel Version: 1.4.8
Echo Canceller: MG2
Configuration
======================

Channel map:

Channel 01: FXS Kewlstart (Default) (Slaves: 01)
Channel 02: FXS Kewlstart (Default) (Slaves: 02)
Channel 03: FXS Kewlstart (Default) (Slaves: 03)
Channel 04: FXS Kewlstart (Default) (Slaves: 04)
Channel 05: FXO Kewlstart (Default) (Slaves: 05)
Channel 06: FXO Kewlstart (Default) (Slaves: 06)
Channel 07: FXO Kewlstart (Default) (Slaves: 07)
Channel 08: FXO Kewlstart (Default) (Slaves: 08)

8 channels to configure.

Changing signalling on channel 1 from Unused to FXS Kewlstart
Changing signalling on channel 2 from Unused to FXS Kewlstart
Changing signalling on channel 3 from Unused to FXS Kewlstart
Changing signalling on channel 4 from Unused to FXS Kewlstart
Changing signalling on channel 5 from Unused to FXO Kewlstart
Changing signalling on channel 6 from Unused to FXO Kewlstart

Changing signalling on channel 7 from Unused to FXO Kewlstart
Changing signalling on channel 8 from Unused to FXO Kewlstart

If zaptel.conf is improperly configured, the printed information displayed after you enter the command ztcfg –vv should be something like the following.

Notice: Configuration file is /etc/zaptel.conf
line 5: Channel 5 already configured as 'FXS Kewlstart' at line 4
line 5: Channel 6 already configured as 'FXS Kewlstart' at line 4
line 5: Channel 7 already configured as 'FXS Kewlstart' at line 4
line 5: Channel 8 already configured as 'FXS Kewlstart' at line 4

4 error(s) detected

② **In Step 3, if zaptel.conf is properly configured, the printed information after it successfully starts Asterisk should be something like the following:**

*CLI> zap show channels

Chan	Extension	Context	Language	MOH Interpret
pseudo		syn1		default
1		syn1		default
2		syn1		default
3		syn1		default
4		syn1		default
5		syn1		default
6		syn1		default
7		syn1		default
8		syn1		default

If zaptel.conf is improperly configured, the system will prompt that this command does not exist after you enter 'zap' into the command line.

③ **Regarding the configurations of trunks, SIP, and etc, go to the following websites to refer to Asterisk's description.**
http://www.asteriskdocs.org/modules/news/
http://www.voip-info.org/wiki/index.php?page=Asterisk+config+files

Chapter 4 FXO & FXS

- **FXO (Trunk Module)**

This module is equipped with the lightning-proof circuit that reaches the telecom standard, and connects its corresponding channel directly to local lines from Central Office Terminal (COT), with abilities to detect line voltage, diagnose line failure, and judge the on-hook/off-hook state of the station phone which is linked with it. See Figure 4-1 and Figure 4-2 for hardware structure.

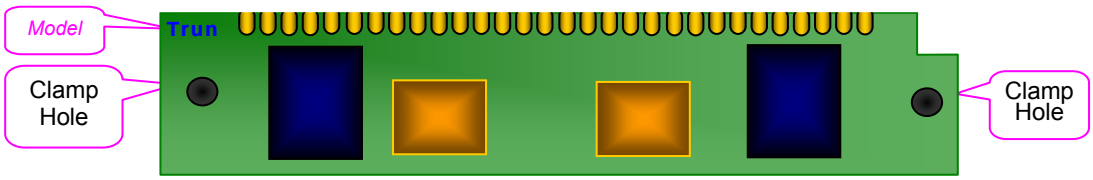


Figure 4-1 Front View

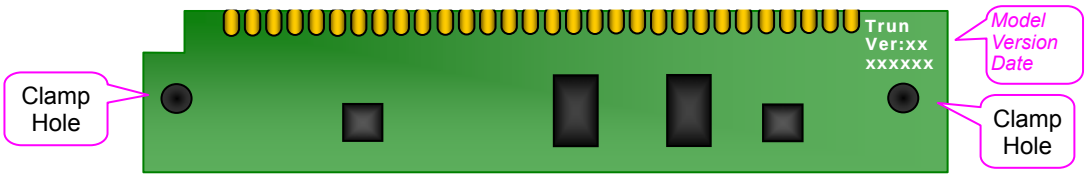


Figure 4-2 Rear View

- **FXS (Station Module)**

This module functions either as a station phone provided it links directly to a telephone or as an extension phone for the PBX, supporting delivery of the calling party information in FSK/DTMF to the phone. It uses -40V battery feed voltage and the integrated overcurrent/overvoltage circuit protection system, can accommodate a subscriber line in length of up to 5.5km. Refer to Figure 4-3 and Figure 4-4 for hardware structure.

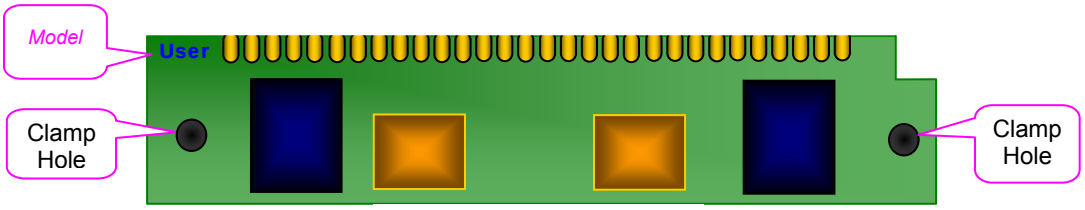


Figure 4-3 Front View

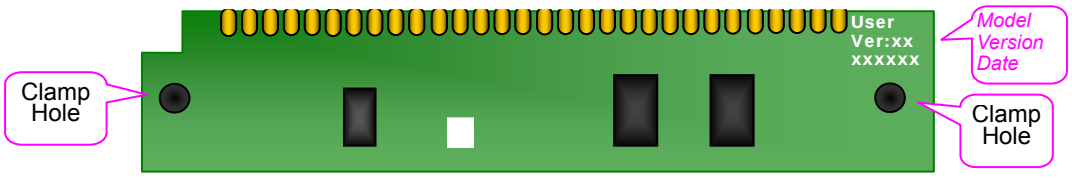


Figure 4-4 Rear View

Appendix A Technical Specifications of FXM-8A/PCI

Dimensions

170×115mm^2 (excluding L-bracket)

Weight

≈120g (Excluding modules and external power supply)

Environment

Operating temperature: 0℃—55℃

Storage temperature: -20℃—85℃

Humidity: 8%—90% non-condensing

Storage humidity: 8%—90% non-condensing

Input/output Interface

Ringing current & battery feed power supply jack: One 4-pin MPC-4

Telephone line jack: Four 4-pin RJ11

Audio Specifications

CODEC: CCITT A/μ-Law 64kbps

Distortion: ≤3%

Frequency response: 300-3400Hz (±3dB)

Signal-to-noise ratio: ≥38dB

Echo suppression: ≥40dB

Maximum System Capacity

Up to 10 boards concurrently per system; up to 8 channels per board

Power Requirements

+5V DC: 600mA

-12V DC: 80mA

+12V DC: 300mA

Maximum power consumption: ≤12W (PC power only)

Impedance

Input impedance: ≥1MΩ/500V DC; ≥10kΩ/1000Hz AC

Insulation resistance for PC isolation from telephone line: ≥2MΩ/500V DC

Telephone line impedance:

Compliant with the national standard impedance for three-component network

Audio Encoding & Decoding

A-Law 64kbps

μ-Law 64kbps

Sampling Rate

8kHz

Safety

Lightning resistance: Level

Appendix B Technical Specifications of FXM-16A/PCIe

Dimensions

280×111mm^2 (excluding L-bracket)

Weight

≈200g (Excluding modules and external power supply)

Environment

Operating temperature: 0℃—55℃

Storage temperature: -20℃—85℃

Humidity: 8%—90% non-condensing

Storage humidity: 8%—90% non-condensing

Input/output Interface

Telephone line jack: Four 8-pin RJ45

Ringing current & battery feed power supply jack: One 4-pin MPC-4

Audio Specifications

CODEC: CCITT A/μ-Law 64kbps

Distortion: ≤3%

Frequency response: 300-3400Hz (±3dB)

Signal-to-noise ratio: ≥38dB

Echo suppression: ≥40dB

Maximum System Capacity

Up to 10 boards concurrently per system; up to 16 channels per board

Power Requirements

+3.3V DC: 3A

+12V DC: 0.5A

Maximum power consumption: ≤12W (PC power only)

Impedance

Input impedance: ≥1MΩ/500V DC; ≥10kΩ/1000Hz AC

Insulation resistance for PC isolation from telephone line: ≥2MΩ/500V DC

Telephone line impedance:

Compliant with the national standard impedance for three-component network

Audio Encoding & Decoding

A-Law	*64kbps*
μ-Law	*64kbps*

Sampling Rate

8kHz

Safety

Lightning resistance: Level 4

Appendix C Technical/Sales Support

Thank you for choosing Synway. Please contact us should you have any inquiry regarding our products. We shall do our best to help you. However, our technicians and salesmen are mainly responsible for maintaining our boards and providing relative technical support. If there are problems about Asterisk, please keep touch with Digium Inc. for help.

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