Synway CTI Series

SHF-4D/PCIe

Analog Fax Board

Hardware Manual

Version 1.0

Synway Information Engineering Co., Ltd

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Contents

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Revision History

Version	Date	Comments
Version 1.0	2014-6	Initial publication

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Chapter 1 Overview

The Synway CTI Series SHF-4D/PCIe is the 4-channel analog fax board with PCI Express bus. It is designed with a smart appearance and a flexible structure, providing excellent faxing and voice processing capabilities. With the selectable modules, you can customize systems to what you want. The 2U height and the half-length design it has minimize the space to install in a chassis so that most common main frames you find in daily life are big enough to hold them. In a word, this product is really cost effective.

1.1   Functions

- A single SHF-4D/PCIe board can be installed with at most 2 dual-channel modules and support 4 voice or fax channels

- Support of the modem standards V.34, V.17, V.29, V.27ter and V.21, the rate up to 33.6kbps which can be reduced on the self-adaptive basis, and the V.8 modem negotiation protocol

- Support ring-alert for external calls

- Station phones on-hook/off-hook detection

- Direct connection between trunk and station keeps call uninterrupted during power outage

- Calling party info (Caller ID) detection/transmission, DTMF and FSK support

- Activity/silence detection

- Automatic Gain Control (AGC) support in recording operation

- DTMF transmission and detection

- Board TDM support

- Automatic line voltage detection

- Automatically checks the board to determine the number and type of modules on the board

- Each board has a unique hardware serial number written in the firmware to distinguish itself from other boards and prevent piracy. The number is available via an easy function call with applications

- The on-board authorization code identification circuit is designed for software safety. Users can apply to our company for the authorization code

- The on-board lightning-proof circuit reaches the telecom standard and eliminates the damage caused by the lightning

- Support 16ms echo cancellation

1.2　Features

● **PCI Express 2.0 Bus Support**

Includes PCI Express 2.0 bus with 32/64-bit PCI Express slot and 3.3V/5V slot voltage; operable on device platforms which support PCI Express.

● **Module Configurable**

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

● **Interface**

The on-board RJ11 jack can connect directly to telephone lines, making connection easy and malfunctions rare.

● **Power**

The power is supplied by PCI Express slot, eliminating the need for external power source.

● **Indicator**

Rear projection indicators. We make use of the gaps between RJ11 jacks and the light-admitting quality of the jack to hide the indicators behind the RJ11 jacks. Such design not only ensures the neatness of the board, but also allows you to get the module type and errors in running without opening the main frame.

● **Programmable Tone Detector**

Detects single or dual tones at any frequency, offering facility for use with a variety of PBXes and key telephone systems.

● **Professional Driver Algorithm**

Uses SPECDial - a professional driver algorithm - to perform a complete automatic dial process through analog lines, accurately identifies called-party statuses and precisely distinguishes an answering machine from a fax machine that is responding at the remote end.

● **Echo Cancellation**

The self-adaptive echo cancellation feature effectively eliminates echoes under various conditions, which cancels out the effect of voice playback on DTMF and busy tones detection, avoids self-excited oscillation and howling, and minimizes the possibility of registering wrong DTMF and busy tones in a conference call.

● **Various CODECs Support**

Offers a large selection of voice CODECs, including hardware-based A-law, μ-law, IMA-ADPCM, software-based 16-bit linear PCM, MP3 and VOX.

● **Supports WAV File**

The recorded voice files can be edited and played by audio tools such as Cooledit.

● **Synway's Unified SynCTI Driver Development Platform**

Synway owns the intellectual property rights for the unified high-intelligence SynCTI driver development platform. Each system supports up to 2048 channels. Functions such as the detection and analysis of rings, tones and Caller IDs, are available via simple function calls on the driver platform, without having to understand complex call procedures.

1.3   Operation Principle
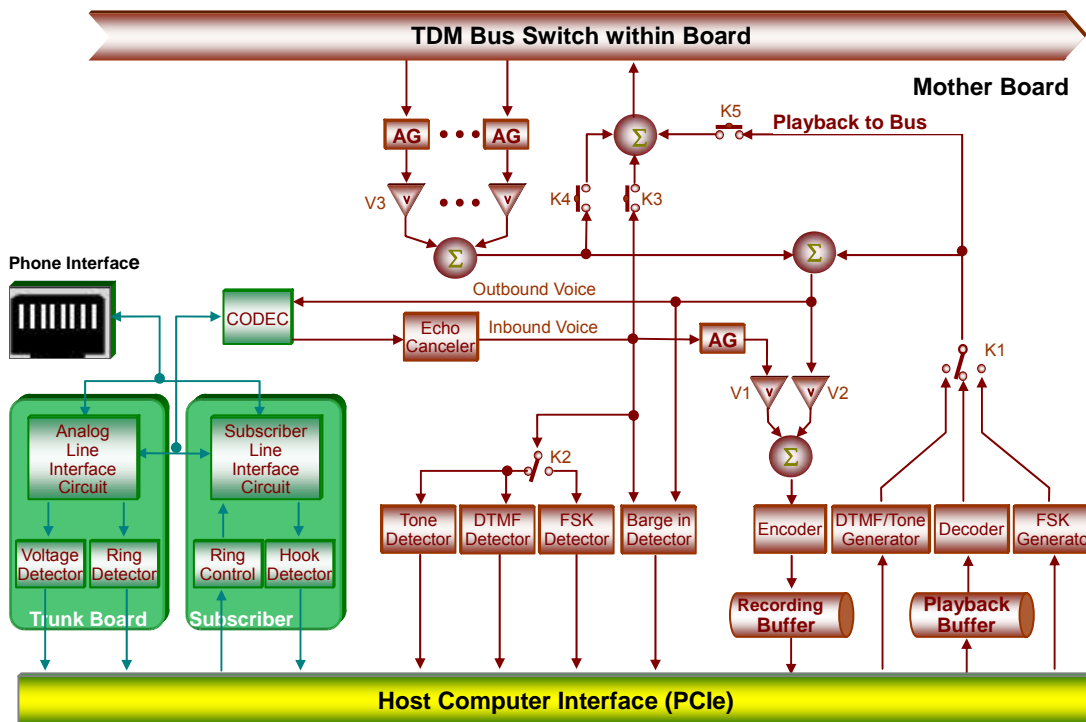
Figure 1-1 Operation Principle

Chapter 2 Installation

2.1 Hardware Structure

See Table 2-1 below for available models of motherboards and modules.

Component	Maximum Quantity	Model	Comments
Motherboard	1	SHF-4D/PCIe	4-channel half-length fax motherboard with PCI Express bus
Module	2	FXO200	Trunk module
		FXS200	Station module
		FXC200	Composite module

Table 2-1 Model list for SHF-4D/PCIe
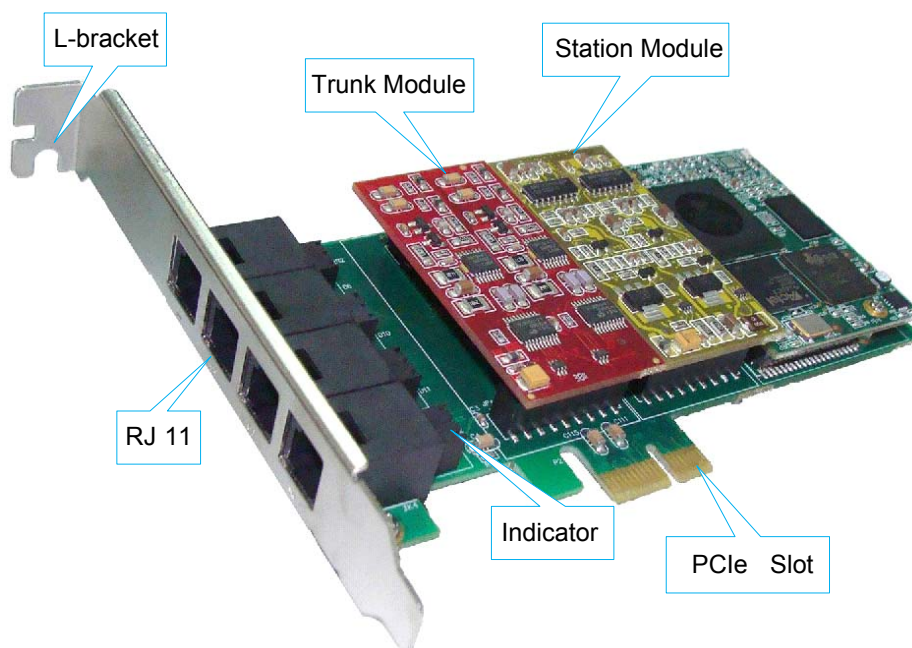
2.1.1 Motherboard

Figure 2-1 SHF-4D/PCIe Motherboard

2.1.2 Module

SHF-4D/PCIe can have FXO, FXS or FXC (composite module) only, or be equipped with two or three of them at the same time.

● **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 the abilities to detect line voltage, diagnose line failure, and judge the on-hook/off-hook state of the
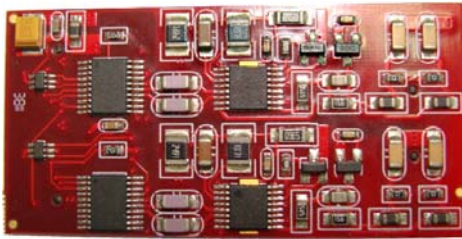
station phone which is linked with it.

Figure 2-2 Trunk Module

● **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 -48V standard battery feed voltage and the integrated overcurrent/overvoltage circuit protection system, can accommodate a subscriber line in length of up to 5.5km.
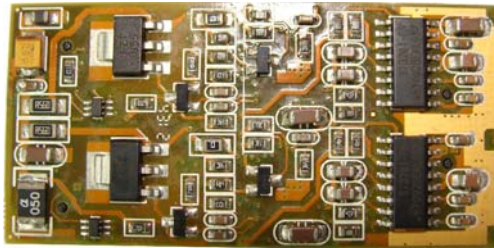

Figure 2-3 Station Module

● **FXC (Composite Module)**

A composite module accommodates a trunk channel and a station channel. It has a special capability of ensuring safe communication via an automatic direct connection of the trunk and station channels when the driver is not running or the PC is powered off.
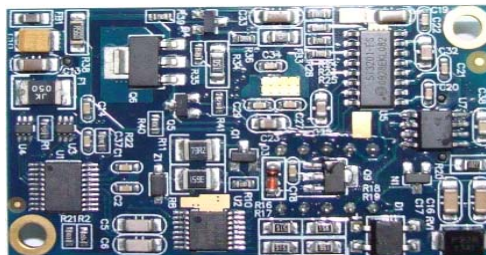

Figure 2-4 Composite Module

2.2   Interface Identification

SHF-4D/PCIe has 4 RJ11 jacks. Each RJ11 jack connects with a dual-channel module.

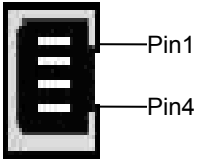The pin layout of the 4-pin RJ11 jack is shown as follows.

	Pin	Note
Pin1 — Pin4	1	
	2	Tip
	3	Ring
	4	

Table 2-2 RJ11

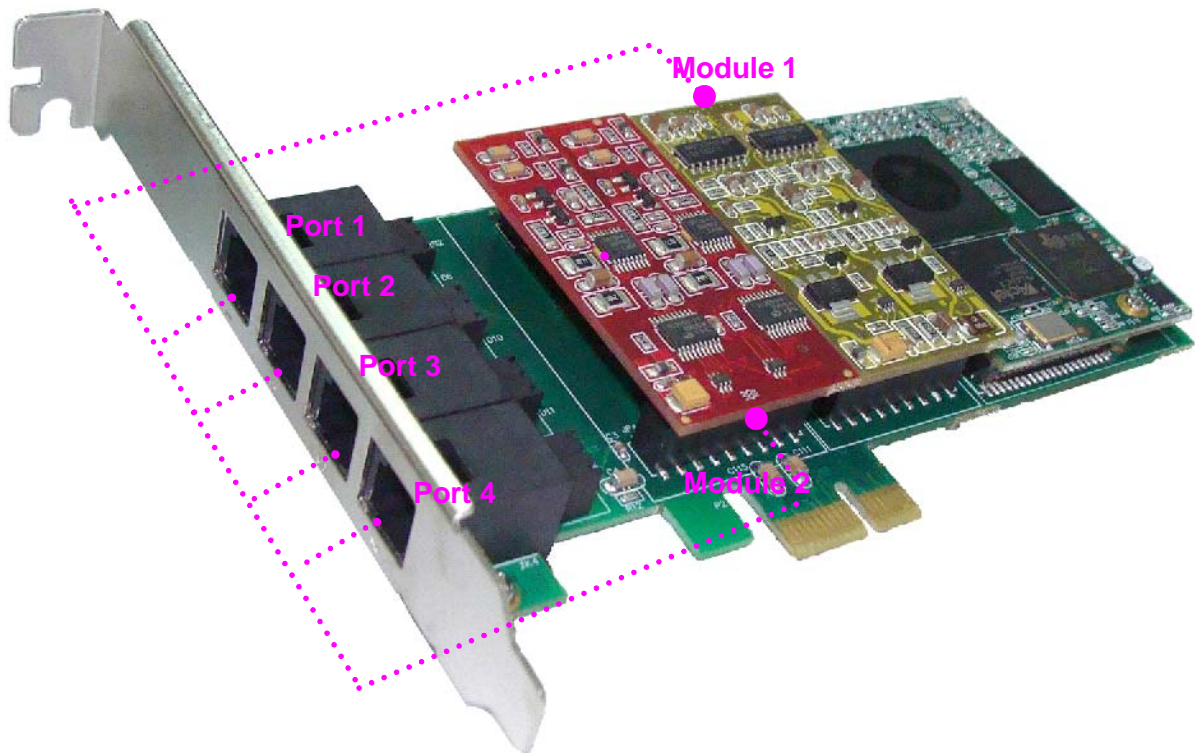Figure 2-5 below shows the corresponding relationship between the modules on the motherboard and the RJ11 jacks.

Figure 2-5 Modules and RJ11 Jacks

Note:

1) What each RJ11 jack corresponds to is the module position but not the module type. For example, as shown in Figure 2-5 above, Port 1 and Port 2 are connected to Module 1, no matter Module 1 is FXO, FXS or FXC. Likewise, Port 3 and Port 4 correspond to Module 2, no matter Module 2 is FXO, FXS or FXC.

2) When an SHF-4D/PCIe board is running, the indicators at the RJ11 jacks corresponding to trunk channels stay red, and those at the RJ11 jacks corresponding to station channels stay green. The indicators being unused will not light up. The color of indicators at each interface is as shown in Figure 2-6 below.
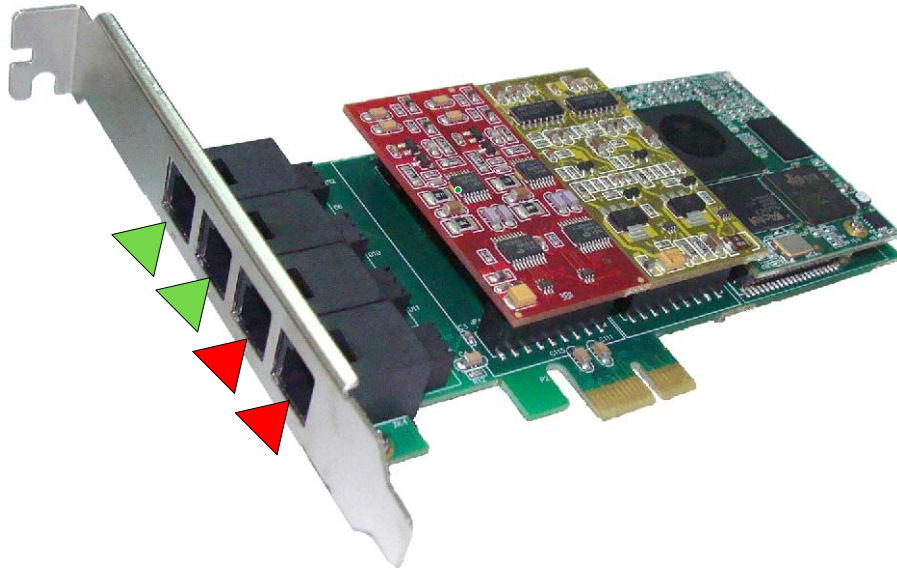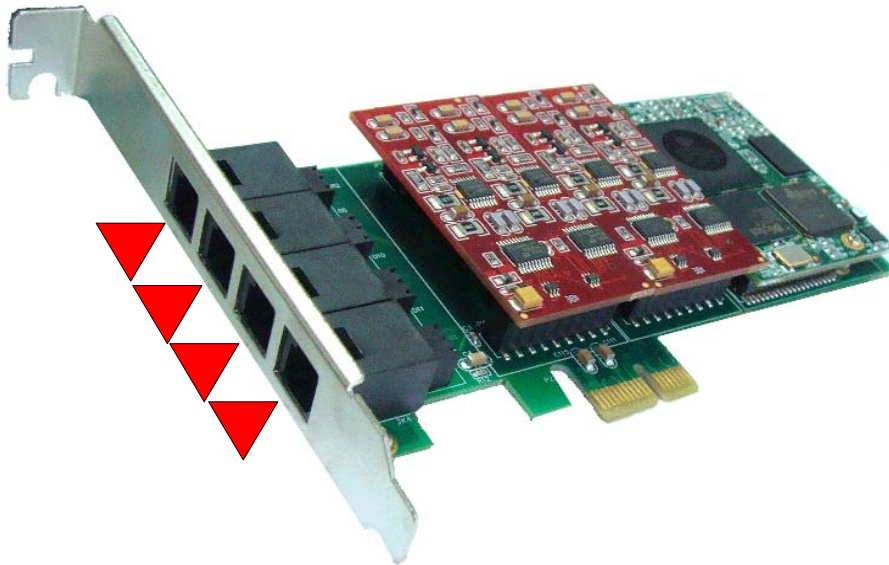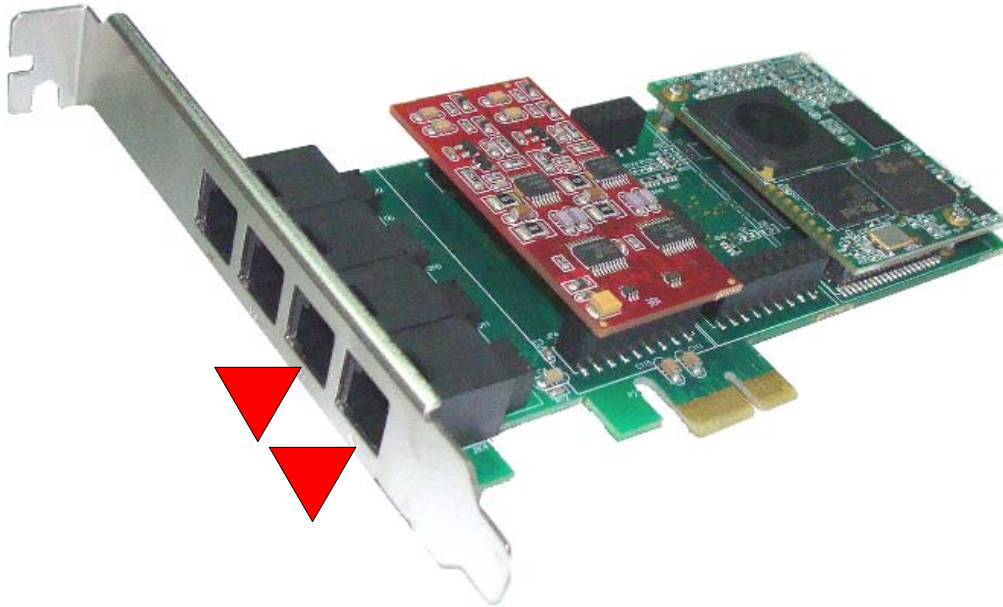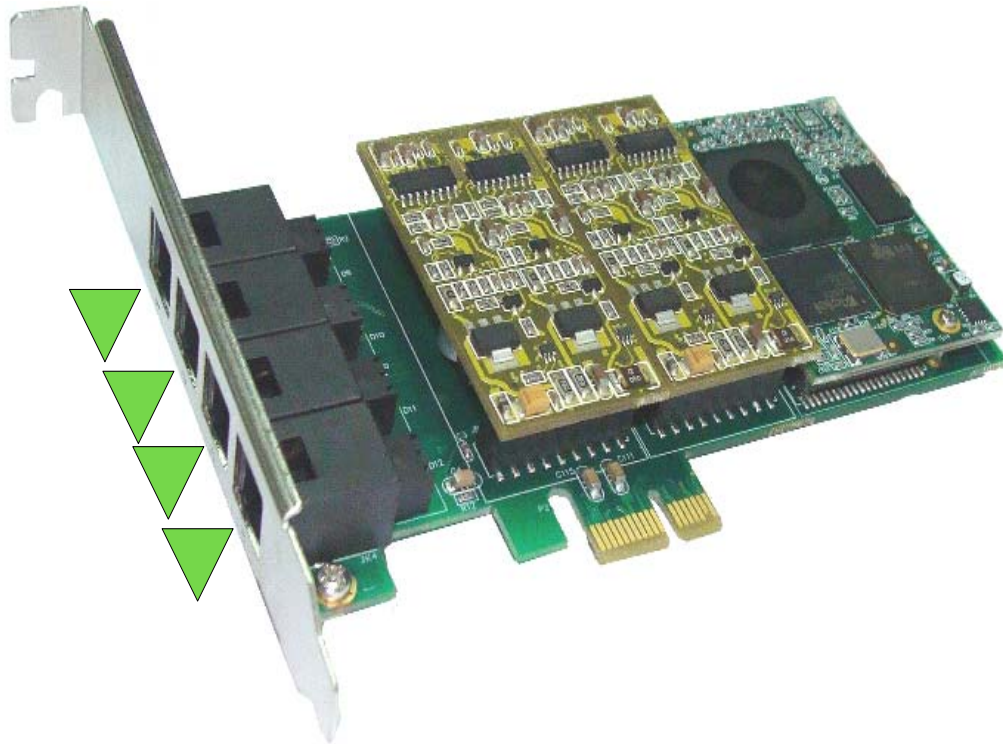
Figure 2-6 Color of Indicators

Illustrations (a), (b), (c) and (d) in Figure 2-7 below respectively show how the indicators at RJ11 jacks work with different kind (FXO, FXS or FXC) and number of modules on the SHF-4D/PCIe board.
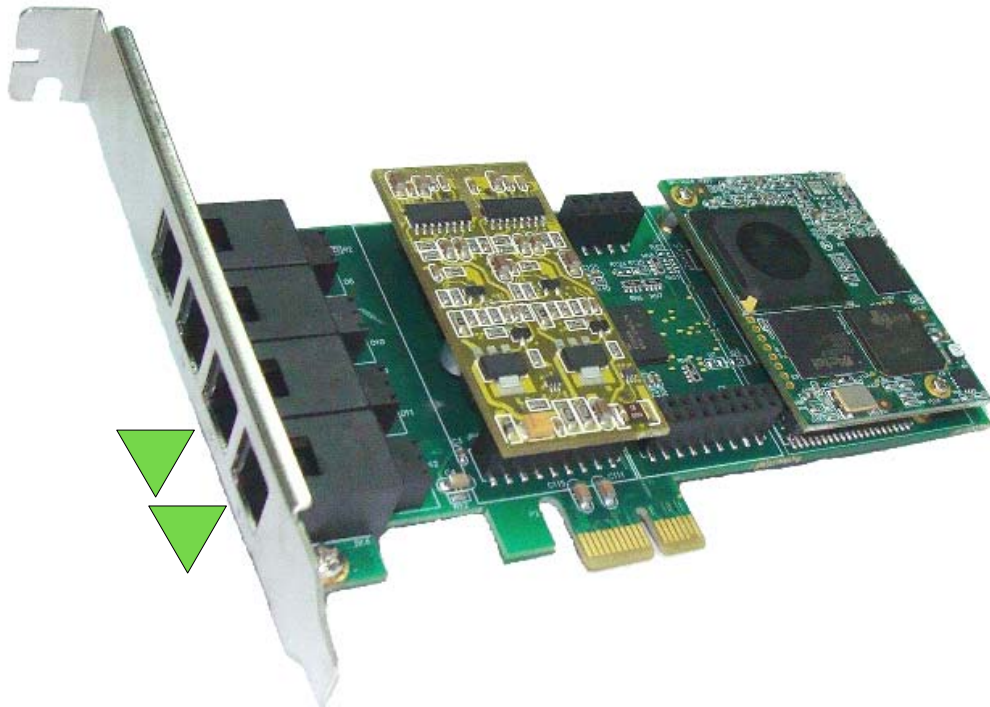

(a) 4 RJ11 Jacks All Correspond to Trunk Channels

(b) 2 RJ11 Jacks Correspond to Trunk Channels

(c) 4 RJ11 Jacks All Correspond to Station Channels

(d) 2 RJ11 Jacks Correspond to Station Channels

Figure 2-7 Indicators at RJ11 Jacks

2.3 Channel Number Identification

An SHF-4D/PCIe board provides up to 4 channels, each of which has a fixed number.

The channel number is only decided by '**the port position on the board**'. See Figure 2-8 below. The on-board channels are numbered 1~4 from top to bottom.
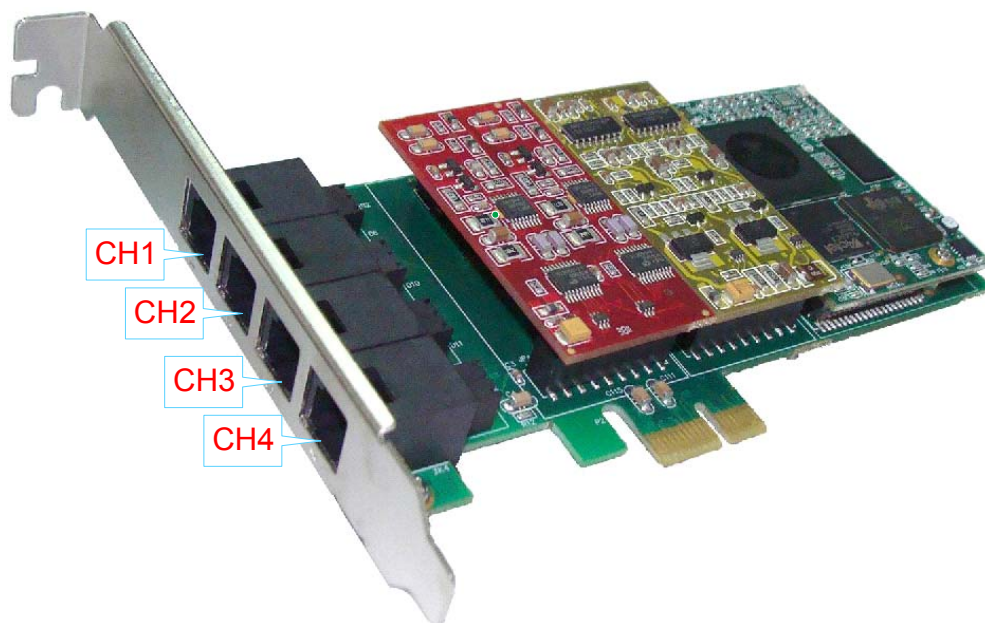

Figure 2-8 Channel Number on Board

2.4 System Requirements

Host System Requirements

CPU: Intel® Pentium®Ⅳ or above

Memory: 1G or more

HD: Depends on individual requirements

Supported Operating Systems

Refer to *SynCTI Programmer's Manual.pdf*.

2.5 Hardware Installation

Note: Always turn off the power before installation!

Step 1: Check if all the boards and modules within the package are in good state.

Step 2: Plug all modules you need onto the board.

Step 3: Fit the motherboard into the PCI Express slot on the chassis.
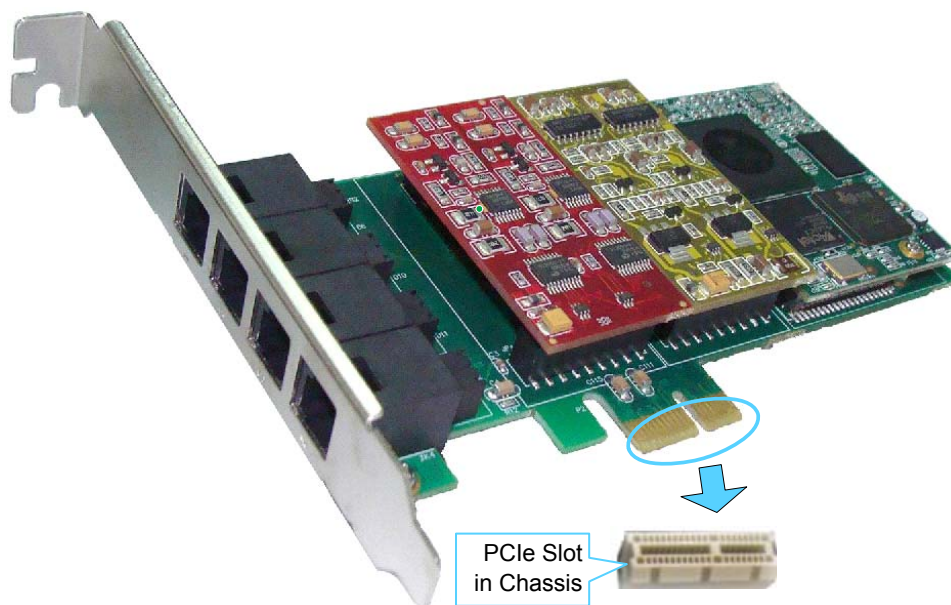

PCIe Slot
in Chassis

Figure 2-9 Insert Motherboard to PCI Slot

Step 4: Set up an application environment.

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

Step 5: Boot your computer and install the driver.

Regarding driver installation, refer to *SynCti_InstManual.pdf*.

Appendix A Technical Specifications

Dimensions

132.5x68.5 mm^2 (excluding L-bracket)

Weight

Motherboard: about 70g

　　　　（excluding modules）

Module: about 10g

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: 4 4-pin RJ11

Audio Specifications

CODEC: CCITT A/µ-Law 64kbps

　　　　IMA ADPCM 32kbps

Distortion: ≤3%

Frequency response: 300-3400Hz (±3dB)

Signal-to-noise ratio: ≥38dB

Echo suppression: ≥40dB

Maximum System Capacity

Up to 100 channels concurrently per system

Power Requirements

Only motherboard

(with modules fully inserted)

+3.3V DC: 1500mA
　　　　(power consumption: 4.95W)

+12V DC: 500mA
　　　　(power consumption: 6W)

Impedance

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

16Bit PCM	128kbps
8Bit PCM	64kbps
A-Law	64kbps
µ-Law	64kbps
VOX	32kbps
ADPCM	32kbps
GSM	13.6kbps
MP3	8kbps

Sampling Rate

8kHz

Safety

Lightning resistance: Level 4

Appendix B 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.

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