Synway CTI Series

SHN-480C-CT/PCIe

VoIP Media Processing & Signaling

Hardware Manual

Version 1.0

Synway Information Engineering Co., Ltd

www.synway.net

Contents

Copyright Declaration

Revision History

Version	Date	Comments
Version 1.0	2014-06	Initial publication

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Chapter 1 Overview

The Synway CTI Series SHN-480C-CT/PCIe is a large-capacity board for VoIP media processing and signaling, integrated with LAN interfaces. It uses a high-density integrated media gateway processor which can efficiently handle VoIP CODECs for up to 480 channels. This series board provides such services as encoding, transmitting, parsing and receiving SIP messages, managing on-board channels and IP conversations, sending and receiving voice data over IP links, putting encoded or decoded voice data onto CT-BUS, etc. It supports the following applications: IP gateway, media server/conference server, Softswitch, IP PBX, IP call center, IP application server, IVR, large-capacity IAD (Integrated Access Device), VoIP solutions, and NGN networking equipment.

1.1 Functions

- A single board provides up to 480 channels for IP processing.
- Supports the following functions during the call: voice recording and playing, volume adjustment, dynamic CODEC change, etc.
- All channels are allowed to play and record voices simultaneously. Automatic Gain Control (AGC) support in recording operation.
- Supports call transfer and call hold during IP calls.
- Allows DTMF signal transmission and detection by any of the three methods: in-band, out-of-band (RFC2833), signaling (SIP-INFO).
- Integrated with two independent 10/100/1000M compatible Ethernet interfaces, the board can work without costing or relying on the network card resource of the computer.
- Includes H.100 bus, compatible with MVIP, SC and ST bus, facilitating smooth connectivity to third-party boards with H.100 bus for the transfer of voice data from/to other devices.
- The flexible distributed conferencing system sets no limit on the number of simultaneous conferences and participants in each conference, allows monitoring and recording of the whole conference and each individual speaker.
- Each board has a unique hardware serial number written in the firmware to distinguish itself from other boards and prevent piracy.
- The on-board authorization code identification circuit is designed for software safety. Users can apply to our company for the authorization code.

1.2 Features

- **PCIe Bus Support**

  Developed with the design of PCIe X1, this board supports PCIe X1, X2, X4, X8 and X16 slots.

- **DMA Read and Write**

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

- **Integrated LAN**

  The board is integrated with two independent 10/100/1000M BASE-TX compatible Ethernet interfaces.

- **Network Protocol Processing in Hardware**

  Thanks to the powerful media gateway processor on the board, such network protocols as TCP/UDP, HTTP, ARP/RARP, DNS, NTP, TFTP, TELNET, STUN, etc. can be processed high efficiently without costing any host CPU.

- **Easy Firmware Upgrade**

  Users may upgrade the on-board firmware simply using a software tool to the latest version published by Synway.

- **Multiple Programming Modes Support**

  Our driver supports three programming modes: polling mode, event callback mode and Windows message mode.

- **Various VoIP CODECs Support**

  The supported VoIP CODECs include G.711 A-Law, G.711 μ-Law, G.729A/B, G.722, G.723.1, AMR, iLBC.

- **Barge in**

  Supports the Barge-in feature.

- **Highly Efficient and Real-time Call Control and Voice Processing**

  This board enables highly efficient call control, call management and voice processing; the multiple on-board DSPs used for voice processing give a nearly real-time voice effect.

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

  Synway owns the intellectual property rights for the unified high-intelligence SynCTI driver development platform. By simple API function calls on this platform, users can customize such features as call connection and call control, and perform various

applications based on IP+IP or IP+TDM. Our API interfaces are highly encapsulated and exported in ANSI C style, which eliminates the need for users to consider the bottom layer IP communication details.

1.3 Operation Principle

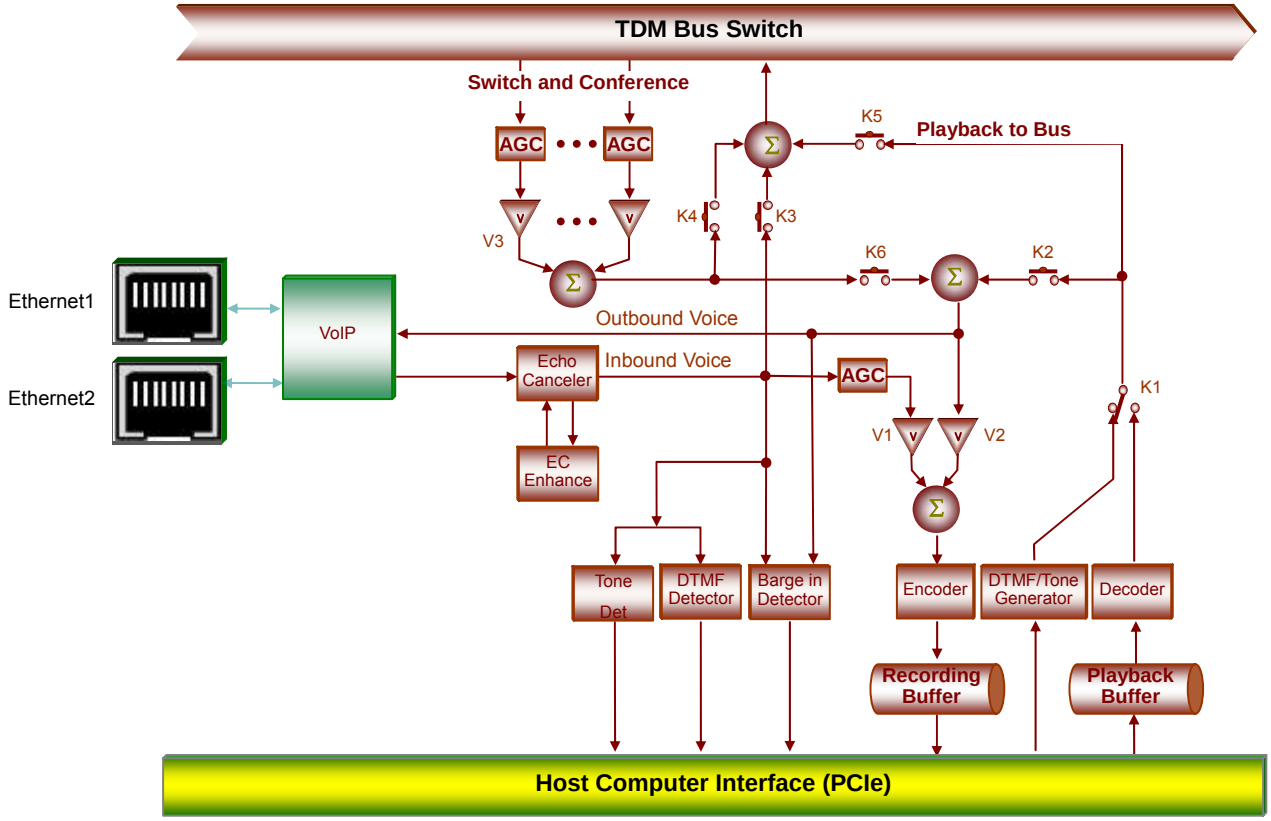


Figure 1-1 Operation Principle of SHN-480C-CT/PCIe

Note: As the firmware chips are loaded through Ethernet1 at the board startup, you shall make sure Ethernet1 is connected properly to the network cable; otherwise the board will fail to start.

Chapter 2 Installation

2.1 Hardware Structure

- **SHN-480C-CT/PCIe Board**

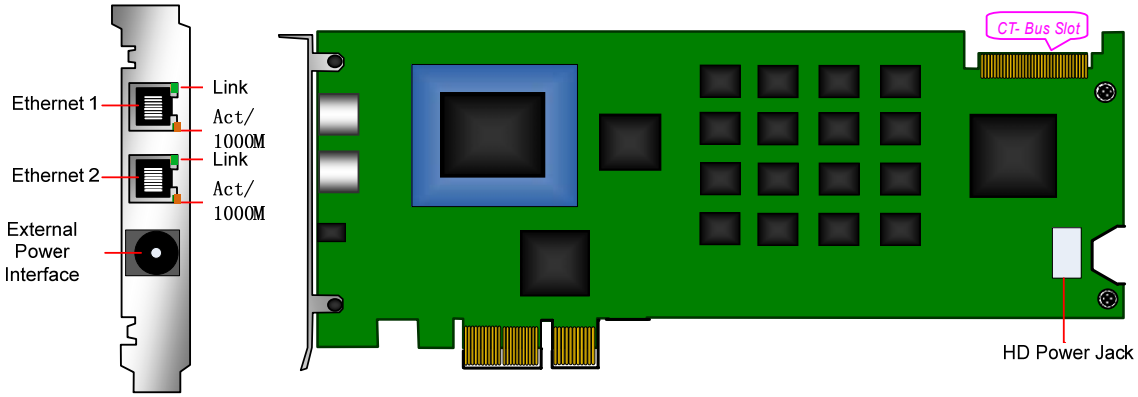


Figure 2-1 Left & Front Views

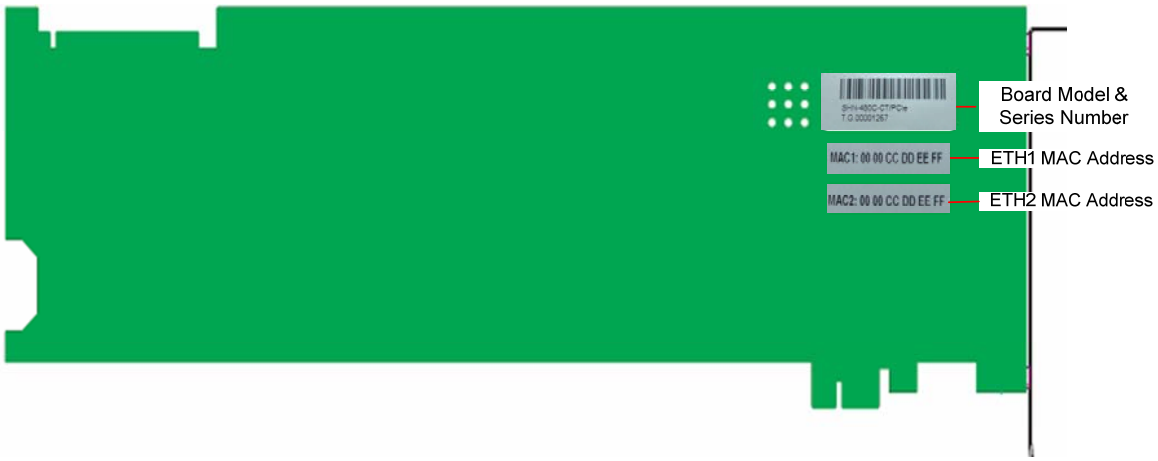


Figure 2-2 Rear View

2.2 System Requirements

Host System Requirements

CPU: 1600MHz Intel® Pentium® DualCore or above

Memory: 2G or more

HD: Depends on individual requirements

Supported Operating Systems

Refer to Section 1.4 SynCTI Supported OS in *SynCTI Programmer's Manual.pdf*.

2.3 Installation Procedure

Note: Always turn off the power before installation!

Step 1: Properly fit the required VoIP board into the PCIe slot on the PC chassis.

Notes:

① For the installation of other voice boards from Synway which are used with these VoIP boards, refer to corresponding hardware manuals.

② Other necessary hardware devices (such as network card, IP phones and PBX) used to set up a whole VoIP application environment should be installed by users themselves.

Step 2: Connect H.100 bus interfaces on all boards by bus cable.

Through CT-BUS, the VoIP board can easily exchange voice data with other voice boards used with it.

Notes:

① See Figure 2-3 for correct insertion. Do not twist or insert in the opposite direction.

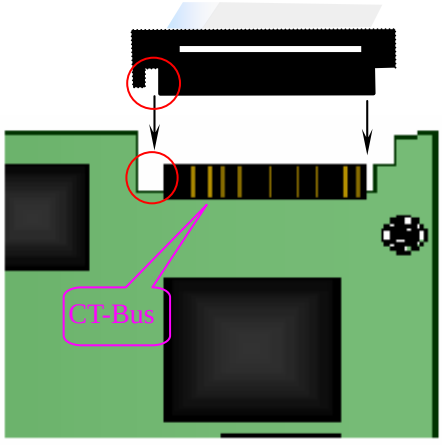


Figure 2-3 Connection of H.100 Bus

②. The bus cable houses stiff conducting material. Therefore, when it has been shaped, do not bend it repeatedly or violently lest it is broken.

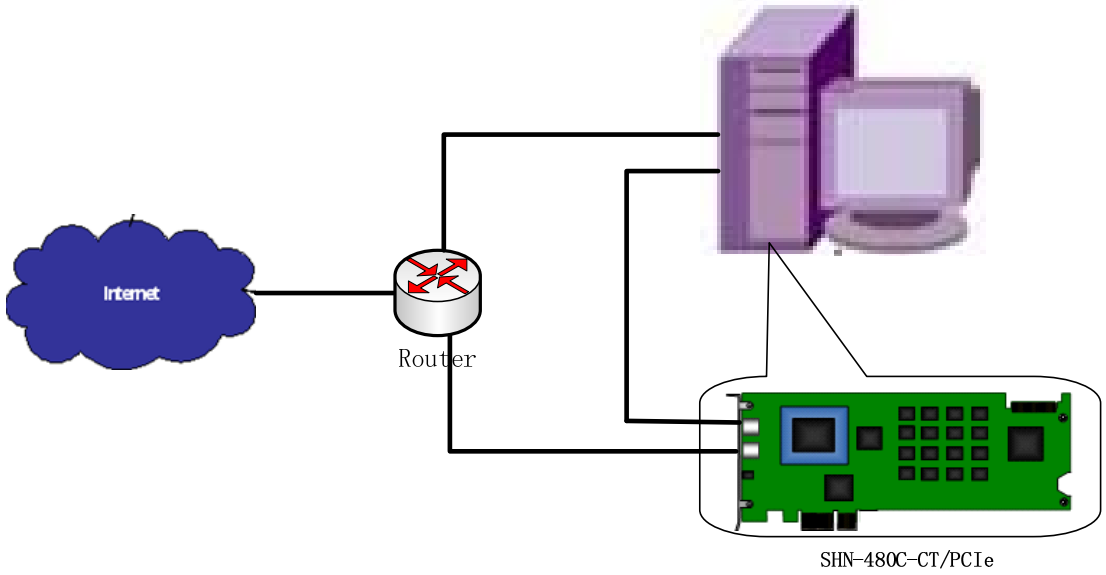
Step 3: Boot your computer and install the driver.

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

Step 4: Connect the network cable

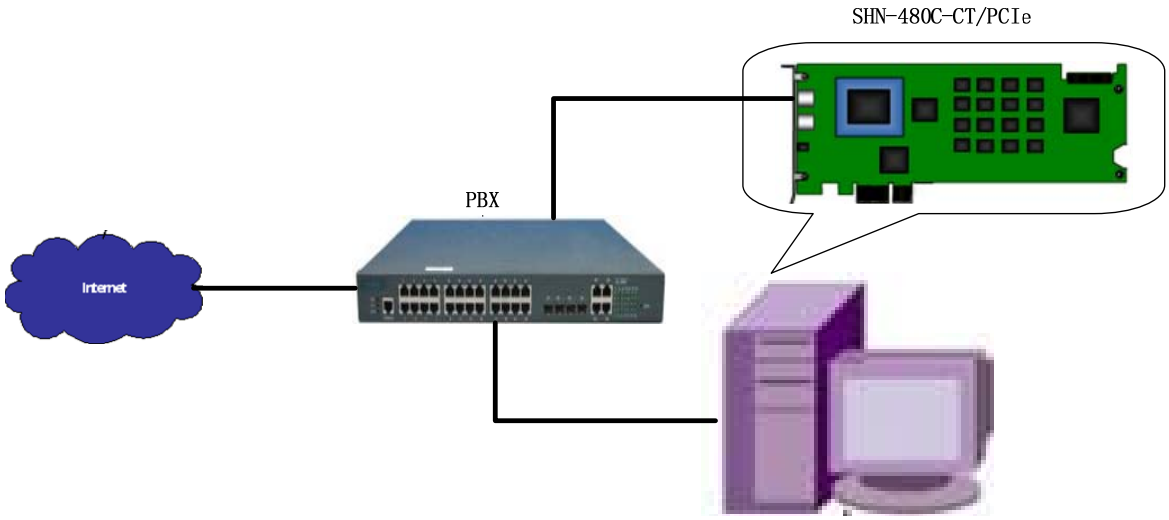
SHN-480C-CT/PCIe has two Kilomega Ethernet ports and provides many connection mehtods.

Method 1 (recommended):



Note: This method uses the two Ethernet ports on the board, Ethernet 1 connecting to the PC while Ethernet 2 connecting to the Router. Meanwhile, it requires more than one network interface on the PC.

Method 2:



Note: This method only uses Ethernet1 on the board. As the firmware chips are loaded through Ethernet1 at the board startup, the board will fail to start without connecting Ethernet1 with the network cable. That is, you shall ensure a proper connection of both Ethernet1 and a network interface on the PC to the PBX. Here we suggest you to use a PBX instead of a router. as the router may allocate incorrect IP addresses and cause the start failure of the board.

Step 5: Configure the operating parameters for the VoIP board

Refer to *SynCTI Programmer's Manual* for details.

Key Tips:

- In a normal situation, the board can start to work just after you insert it to the PCIe slot of the PC and boot up the PC. Only when the PCIe slot is in power shortage should you connect the board to an external power or the HD power cable. If you come across the board failure at startup, please contact our technicians for help. Do not connect the board with an external power supply or the HD power cable until you find the exact cause.
- Since a single board will gradually heat up while being used, if two or more boards need to be inserted to a PC whose ventilation is not good, we suggest you space them by at least a PCI Express slot.
- As the system is expected to run for long hours unmannedly, 'energy-saving' mode should be turned off for both the CPU and the HD in CMOS or WINDOWS operating system. This is to ensure full-speed operation of the computer, or it may lead to a drop in performance or unexpected errors after running for some time.
- A chassis installed with voice boards must be grounded for safety reasons, according to standard industry requirements. A simple way is earthing with the third pin on the plug. No or improper grounding may cause instability in operation as well as decrease in lightning resistance.

Appendix A Technical Specifications

Dimensions

312×111mm^2 (excluding L-bracket)

Weight

≈ 215g

Environment

Operating temperature: 0℃—55℃

Storage temperature: -20℃—85℃

Humidity: 8%— 90% non-condensing

Storage temperature: 8%— 90% non-condensing

On-board LAN

Interfaces: 2 (10/100/1000M BASE-TX (RJ-45))

Self-adaptive bandwidth: Support

Automatic reversal: Support

Recording/Playing Format

A-Law, μ-Law, ADPCM

Maximum System Capacity

Theoretically up to 2 VoIP boards concurrently per system

Audio CODEC

G.711A, G.711U, G.729A/B, G.722, G.723.1, AMR, iLBC

Sampling Rate

8kHz

Power Requirements

Maximum power consumption: ≤30W

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.

Headquarters

Synway Information Engineering Co., Ltd

http://www.synway.net/

9F, Synway D&R Center, No.3756, Nanhuan Road, Binjiang District, Hangzhou, P.R.China, 310053

Tel: +86-571-88860561

Fax: +86-571-88850923

Technical Support

Tel: +86-571-88864579

Mobile: +86-18905817070

Email: techsupport@sanhuid.com

Email: techsupport@synway.net

MSN: synway.support@hotmail.com

Sales Department

Tel: +86-571-88860561

Tel: +86-571-88864579

Fax: +86-571-88850923

Email: sales@synway.net