Synway DST Series

SHR-16DA-CT/PCI

Digital Station Tap Board

Hardware Manual

Version 3.0

Synway Information Engineering Co., Ltd

www.synway.net

Contents

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Revision History

Version	Date	Comments
Version 1.0	2005-3	Initial publication
Version 2.0	2006-8	Changes: Added illustrations of boards and modules for better understanding, and modified some improper descriptions.
Version 3.0	2009-1	Changes: Added module number and channel number, updated and corrected some parts of the document.

Note: Please visit our website http://www.synway.net to obtain the latest version of this document

Chapter 1 Overview

The DST Series SHR-16DA-CT/PCI is a 16-channel digital station tap board with PCI bus, used especially for recording of digital subscriber lines (extension lines) through parallel connection.

1.1 Functions

- High-impedance recording of digital phone lines through parallel connection
- A variety of ways to start/stop recording
- Supports simultaneous recording on 16 channels, each with a different format
- Supports independent-recording of incoming, outgoing and mixed-recording modes
- ANI and DNIS support
- Synchronous acquisition of the information displayed on digital phones during recording
- Detects all modes of keying supported by user phones
- Activity/silence detection
- Automatic Gain Control (AGC) support in recording operation
- Call progress monitoring
- Automatically checks board to see if modules are correctly inserted and to determine the number of modules on the board
- Supports line-fault detection for digital station tap boards and digital phones

1.2 Features

- **PCI 2.1 Bus Support**

  Includes PCI 2.1 bus with burst data transmission rate up to 133 MB/s; PNP (plug and play) feature eliminates the need for jumper leads

- **Modularized Design**

  This board designed in modularized structure can be configured in flexible ways. Each board can be fitted with up to 4 recording modules, and each module supports recording of up to 4 digital phone lines. Now it is widely used in various systems.

- **Available RJ45 Jack**

  A single board has four 8-pin RJ45 jacks, each of which can be converted into four 2-pin

RJ11 jacks, eliminating the need for extra junction boxes, making connection easy and malfunctions rare.

- **Fits Modules via Inter-plane Connectors**

The use of high-precision, streamlined, inter-plane connectors highlights the characteristic compact and highly-reliable advantage of Synway's all-in-one boards.

- **1 to 16 Port Hi-Z Monitoring of Digital Lines**

This board connects to monitored phone lines via high-impedance and parallel connection of 2 or 4-lead lines, with the access points flexibly positioned on the communication line between a digital PBX and some digital phones. In such way, it is widely used for recording of different digital PBXes as well as various digital phones.

- **Programmable Tone Detector**

Detects busy, ringback and fax answering tones, offering facility for use with a variety of switches and enterprise phone systems

- **High-impedance Recording**

The recording impedance is up to 600ΩAC, ruling out interruption on transmission of monitored signals.

- **Instantly-upgradeable Hardware Circuit**

Using instantly-upgradeable hardware circuits, the board can support different model of PBXes and digital phones simply through software reconfiguration, i.e. there is no need to replace any hardware components. So far a dozen of mainstream PBXes, such as Alcatel, Avaya, NEC, Siemens, Nortel, are supported.

- **Voice Processing & Signaling Analysis**

A single board is capable of processing voices and handling call-signaling analysis, and can constitute a recording system by itself without the need for supplementary boards or external devices.

- **Various CODECs Support**

Offers a large selection of voice CODECs, including hardware-based A-law (G.711), μ-law and IMA-ADPCM, software-based 16-bit linear PCM and MP3.

- **Supports WAV File**

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

- **Audio Output Interface**

The first channel on the board equipped with a tone amplifier circuit and an output interface, can directly connect to the headset or sound box, play back speech files and monitor a specified channel in real time via a simple function call.

- **TDM Capability**

  Includes H.100 bus, facilitating smooth connectivity to third-party boards with H.100 bus for the transfer of acquired voice signals to other devices

- **Unique Hardware Serial Number**

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

- **Authorized Code Identification Circuit**

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

- **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

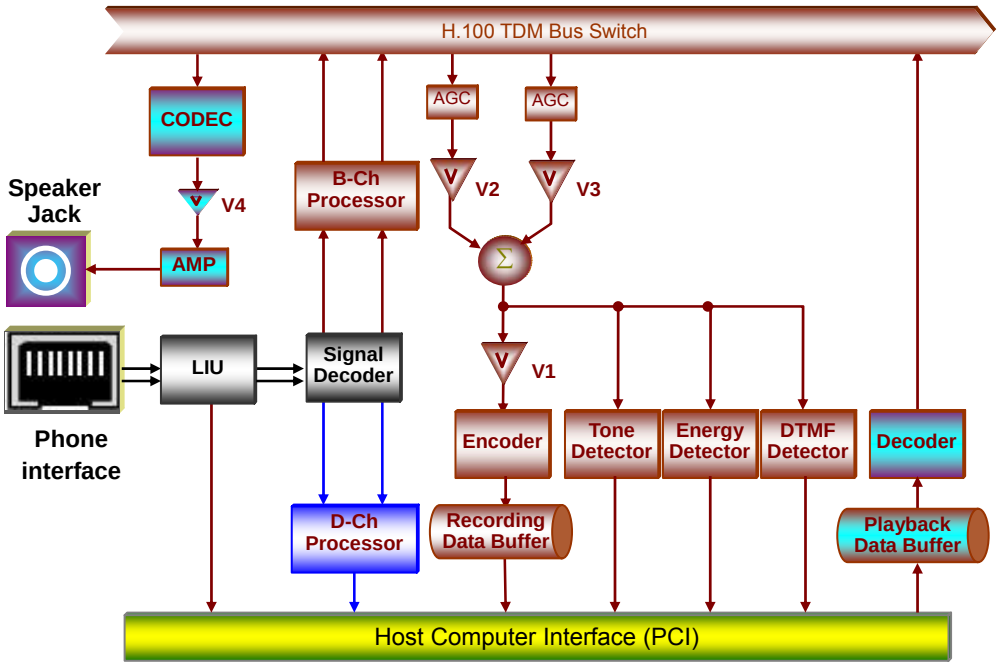

Figure 1-1 Operation Principle

1.4 Functional Modules

This board requires only one type of modules, i.e. the 4-port digital call recording module (see Figure 2-4) to record most digital PBXes and telephones in parallel together with the help from its firmware-loading feature. It fits up to 4 such modules and can automatically determine how many of them are inserted.

Chapter 2 Installation

2.1 Hardware Structure

- **SHR-16DA-CT/PCI board**

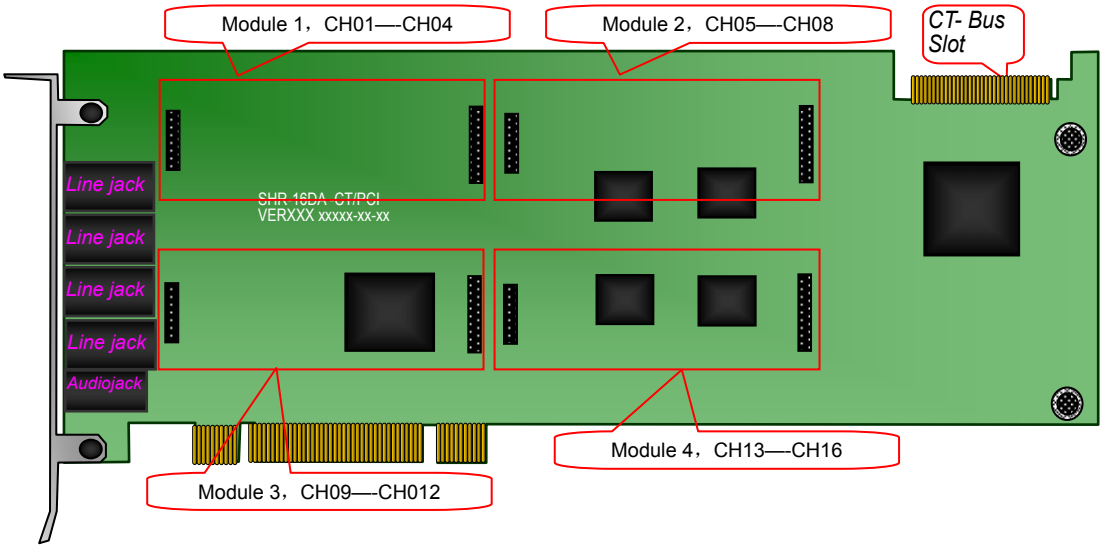

Figure 2-1 Front Side

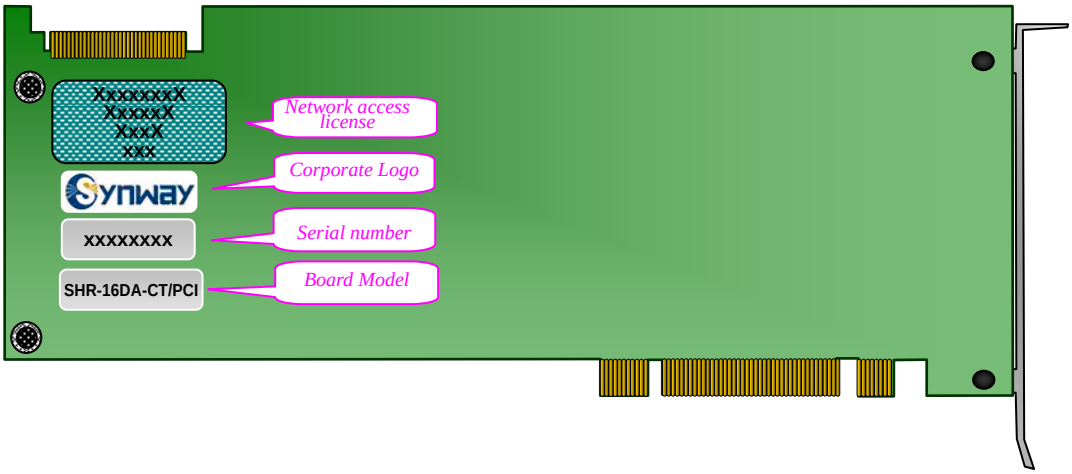

Figure 2-2 Reverse Side

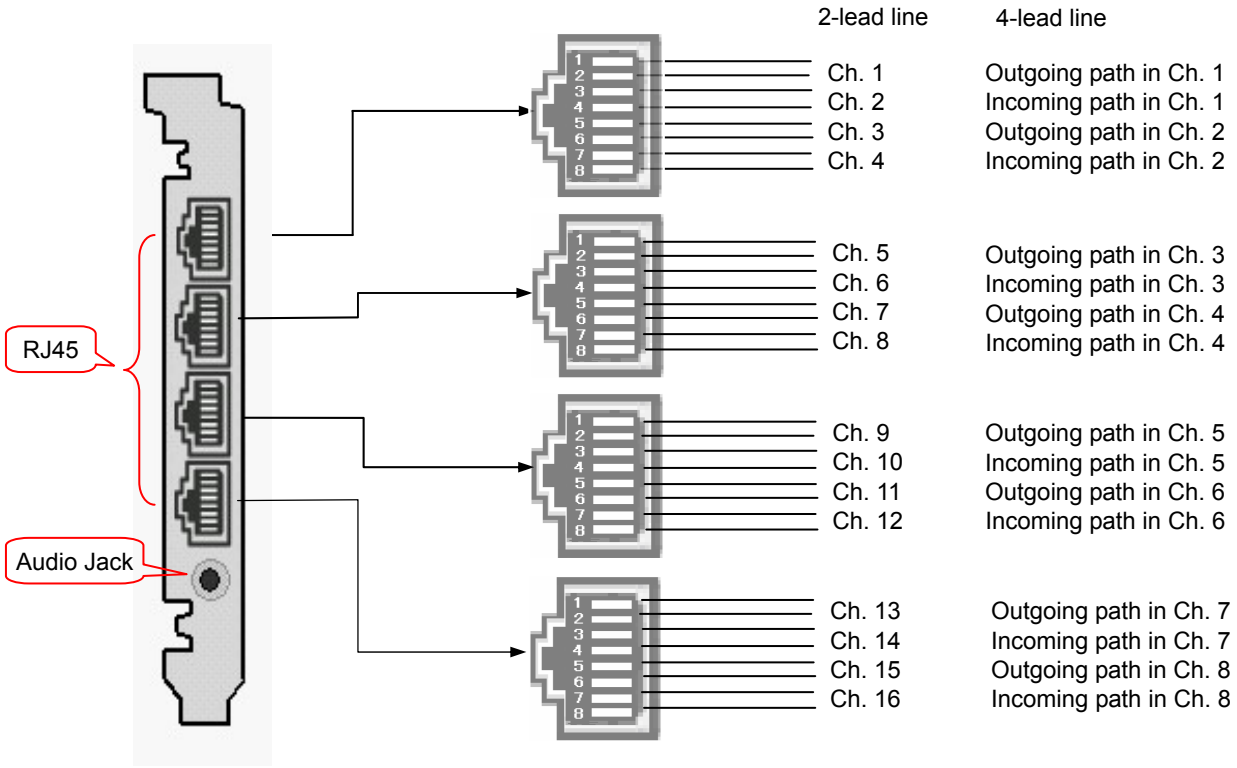

Figure 2-3 Left Side

- **MOD_16DA digital call recording module**

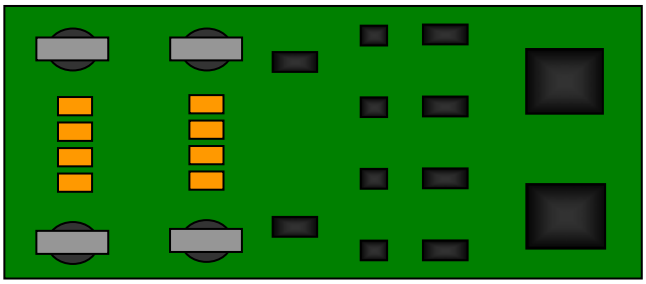

Figure 2-4 Digital Call Recording Module

2.2 System Requirements

Host System Requirements

CPU: 300MHz Intel® Pentium®Ⅱ or above

Memory: 256M or more

HD: Depends on individual requirements

Supported Operating Systems

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

2.3 Installation Procedure

Note: Always turn off the power before installation!

Step 1: Fit the board with modules into the PCI slot on the chassis.

Step 2: Connect the board in parallel to communication lines between the digital PBX and telephones.

In parallel, connect one end of the phone lines to a point on the lines between the digital PBX and telephones, and the other end to the on-board telephone line jacks, i.e. RJ45 jacks.

The SHR-16DA-CT/PCI digital station tap board has four 8-pin RJ45 jacks, each of which leads to four channels and can be converted into four 2-pin RJ11 jacks. See Figure 2-3 for the physical layout of the jack.

Note:

- This board is equipped with RJ45 jacks and you can construct lines by yourself to connect with patch panels or other kind of interfaces. When using RJ11 jacks for conversion, take the 4-way hub from Synway.
- This board accepts two connecting methods respectively with 2-lead lines and 4-lead.

  1. When 2-lead lines are used, as shown in Figure 2-3, each adjacent 2 pins from the top down in successive RJ45 heads correspond to one channel.

     Note: In most situations, the access point for parallel connection is at the middle two pins of a transmission line. However, the Panasonic PBX makes an exception. It requires the access point at the outer two pins of the transmission line.

  2. When 4-lead lines are used,

     For eON and AVAYA-4W digital phones: connect the 3rd and 6th leads between the phone and the PBX (i.e. the outgoing line – from PBX to phone) in parallel to an outgoing path on the board (such as the 1st and 2nd pins of RJ45), and the 1st and 2nd leads (i.e. the incoming line – from phone to PBX) to the incoming path in a same group on the board (such as the 3rd and 4th pins of RJ45).

     For PHILIPS-4W and ISDN digital phones: connect the 2nd and 3rd leads between the phone and the PBX (i.e. the outgoing line) in parallel to an outgoing path on the board (such as the 1st and 2nd pins of RJ45), and the 1st and 4th leads (i.e. the incoming line) to the incoming path in a same group on the board (such as the 3rd and 4th pins of RJ45).

     For NOTEL M2250 digital phone: connect the 1st and 2nd leads between the phone and the PBX (i.e. the outgoing line) in parallel to an outgoing path on the board (such as the 1st and 2nd pins of RJ45), and the 3rd and 4th leads (i.e. the incoming line) to the incoming path in a same group on the board (such as the 3rd and 4th pins of RJ45).

Note: The 1st, 2nd pins (the outgoing path) and the 3rd, 4th pins (the incoming path) correspond to a same channel, and we say they are in the same group; the 5th, 6th pins (the outgoing path) and the 7th, 8th pins (the incoming path) corrspond to another channel, and we say they are in another group. It is forbidden to change the incoming and outgoing paths in a same group, or to connect a 4-lead phone to different groups. A pair of pin lines at the same direction in a group can be placed in this order or another.

- The phone lines between the access point and the board should be limited to 6 meters to minimize interruption to monitored lines and to improve monitoring accuracy.

Step 3: Connect the sound box or other proper sound devices.

Skip this step if there is no need to 'monitor in real time' or 'play'.

Regarding how to choose proper sound devices, refer to 'Input/output Interface' and 'Audio Specifications' in *Appendix A Technical Specifications*

Step 4: Connect the bus cable with the H.100 bus on each board.

Skip this step if there is no need for bus exchange between multiple boards.

Note:

① See Figure 2-5 for correct insertion. Do not twist or insert in the opposite direction.

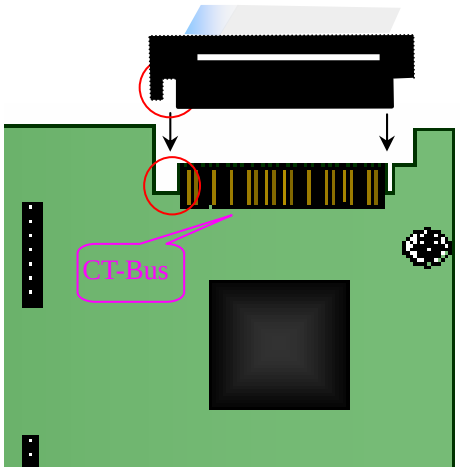

Figure 2-5 Connection of H.100 Bus

② There are two clock settings for our boards: When between-board bus exchange is not required, each board sets its own clock and does not have to be connected to the bus cable; otherwise, each board must be connected to the bus cable to follow the clock of the cable.

③ 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 5: Boot your computer and install the driver.

Regarding driver installation, refer to *Driver Installation Manual*.

Step 6: Reset the PBX type in configuration files under the driver installation directory to conform to that of user's PBX. Alter the module type as well.

Step 7: Set voice coding formats for the communication between the PBX and digital phones.

Different types of PBXes and digital phones support a variety of voice coding formats, which can be set and reset through software configuration for this board.

Key Tips:

- As the system is expected to run for long hours unmanned, '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 digital station tap 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

310×115mm^2 (excluding L-bracket)

Weight

≈ 400g (including 4 recording modules)

Environment

Operating temperature: 0℃—55℃

Storage temperature:-20℃—85℃

Humidity: 8%— 90% non-condensing

Storage humidity: 8%— 90% non-condensing

Input/output Interface

Headset jack: One φ3.5 stereo jack

Telephone line jack: Four 8-pin RJ45 jacks

Audio Specifications

CODEC: CCITT A/μ-Law 64kbps,

IMA ADPCM 32kbps

Output power: ≥50mW

Distortion: ≤2%

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

Maximum Length of Telephone Lines

Less than 600 meters between digital phone and PBX

Less than 6 meters between line access point and digital station tap board

Power Requirements

Maximum power consumption: ≤12W

Impedance

Input impedance: ≥600Ω AC

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

Audio Encoding & Decoding

16Bit PCM	*128kbps*
8Bit PCM	*64kbps*
A-Law	*64kbps*
μ-Law	*64kbps*
VOX	*32kbps*
ADPCM	*32kbps*
GSM	*13.6kbps*
MP3	*8kbps*
GC8	*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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