Synway CTI Series

SHT-2B/USB
SHT-4B/USB

USB Voice Box

Hardware Manual

Version 1.0

Synway Information Engineering Co., Ltd

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Contents

Copyright Declaration

Revision History

Version	Date	Comments
Version 1.0	2006-3	Initial publication

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Chapter 1 Overview

The CTI series SHT-2B/USB and SHT-4B/USB are the voice boxes using analog telephone lines and USB1.1 interface. With various functional modules configured in a different way, they can work as virtual, station or trunk phones to accept incoming calls.

1.1 Functions

- Equipped with an audio amplifier, a speaker (able to simulate ringing) and an audio output port to directly drive the speaker in headset or phone handset.
- Detects the ringing current on the trunk channel, the pickup/hangup behavior on the station channel, the phone line voltage and the polarity reversal. Transmits the ringing current.
- The trunk and station channels are connected directly during power outage, which improves the system security to a great extent.
- Automatically checks the USB voice box to determine the model and number of modules installed on it.
- Uses SPECDial - a professional driver algorithm - to perform a complete automatic dial process through analog lines, accurately identify called-party statuses and precisely determine whether the answering is from the subscriber, the answering machine or the fax machine.
- Calling party info (Caller ID) detection/transmission, DTMF and FSK support; adopts the echo cancellation algorithm conforming to the telecom standard; supports the Barge-in feature for IP phone application and speech recognition.
- Supports signal modulation and demodulation, enabling communication of FSK signals with such information terminals as PDA and information phones.
- Supports simultaneous full-duplex recording and playback on 4 channels, each with a different format (CCITT A/μ-Law 64kbps or IMA ADPCM 32kbps)
- Programmable tone analyzer detects all kinds of tones on analog channels
- Automatic Gain Control (AGC) support in recording operation
- Adaptive echo cancellation

1.2 Features

- **USB1.1 Bus Support**

  Includes USB1.1 bus; supports hot-swap and PNP (plug and play) features; provides portable application and easy installation without the need for any external power supply when it serves as a virtual phone or uses trunk channels.

- **Module Configurable**

  4 on-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 USB voice box.

- **Available Analog Phone Line Jack**

  Adopts the RJ11 jack to connect the phone line directly, eliminating the need for extra junction boxes, making connection easy and malfunctions rare.

- **Available Audio Output Jack**

  Equipped with an audio amplifier to directly drive the speaker of the headset or phone handset.

- **Programmable Tone Detector**

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

- **Realtime Analog Line Voltage Detection**

  Determines whether the phone line is broken and judges the pickup/hangup behavior of the phone on a same line.

- **Polarity Reversal Detection**

  Includes the API interface to detect the polarity of the analog phone line.

- **Various CODECs Support**

  Offers a large selection of voice CODECs, including G711 A-Law, μ-Law, Linear PCM, IMA-ADPCM, MP3 and VOX.

- **Supports WAV File**

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

- **Hardware Serial Number & Authorization Code Identification Circuit**

  Each voice box has a unique hardware serial number and an authorization code identification circuit, designed for software safety. Users can apply to our company for an exclusive authorization 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. All features are available via simple function calls on the driver platform, without having to understand complex call procedures.

1.3 Operation Principle

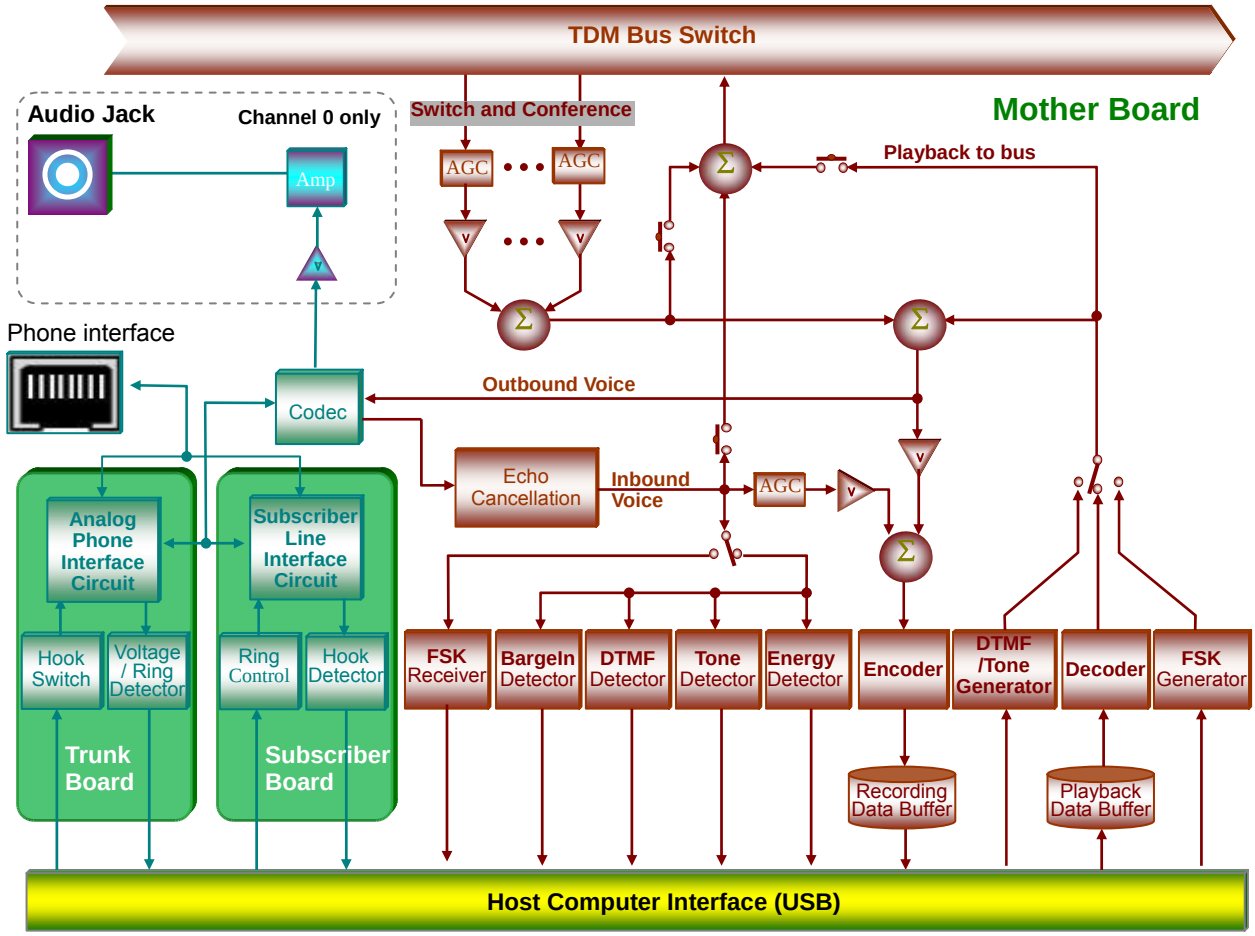

Figure 1-1 Operation Principle

Chapter 2 Installation

2.1 External Structure

- **SHT-2B/USB or SHT-4B/USB**

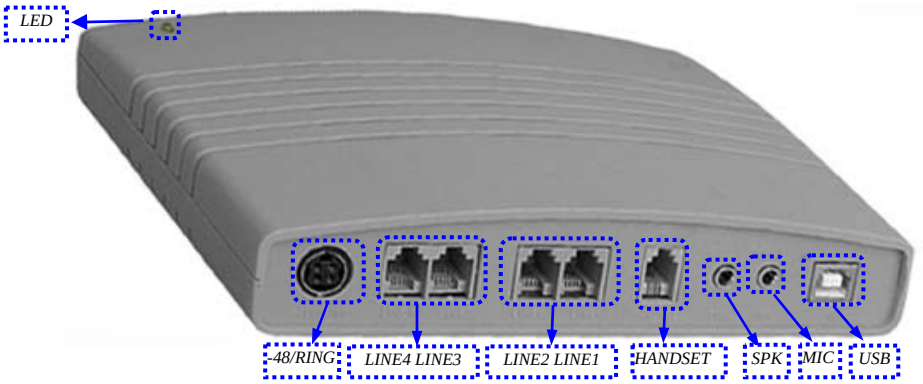

Figure 2-1 Outside View

LED: On - Power on; Off - Power off; Flashing - Operating normally

-48V/RING: Jack to the ringing current and battery feed power supply

LINE1: Jack to the 1st channel

LINE2: Jack to the 2nd channel

LINE3: Jack to the 3rd channel

LINE4: Jack to the 4th channel

HANDSET: Phone handset jack

SPK: Audio output jack, which is a Φ3.5 stereo jack

MIC: Microphone input jack, which is a Φ3.5 stereo jack

USB: USB jack

Notes:

① *SHT-2B/USB doesn't include LINE3 and LINE4;*

② *Because MIC, LINE1 and the handset microphone are connected in parallel, only one of them could be used at a time;*

③ *HANDSET and SPK are connected in parallel. That means audio signals are output from these two jacks synchronously;*

④ *Outgoing voices from the 1st channel, including those being played and those down from*

the bus, will be output through SPK;

⑤ *When MIC or the microphone of HANDSET is used for recording, the 1st channel must be set to a 'Microphone Recording Channel';*

⑥ *The minimum interval between insertion and extraction of the USB data line should not be shorter than 9S.*

2.2 Label Description

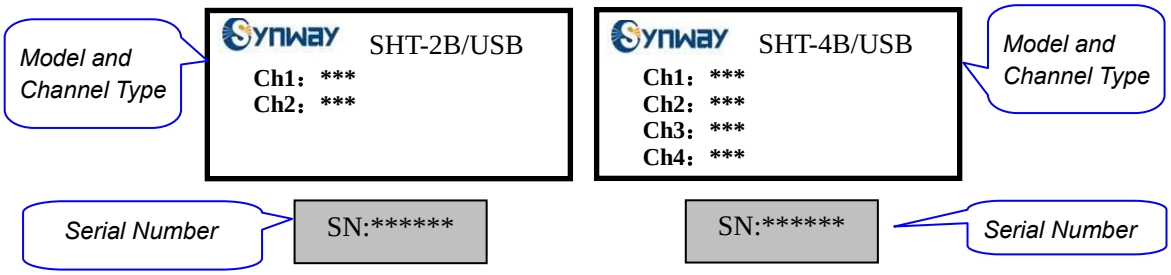

Figure 2-2 Labels for SHT-2B/USB and SHT-4B/USB

There are three channel types 'handset (headset)', 'trunk' and 'station' which respectively indicate the microphone recording channel, the trunk channel and the station channel. The serial number is denoted by Arabic figures and each product has a unique serial number.

2.3 System Requirements

To ensure the proper operation of the USB voice box, the computer hardware and software configurations must meet the following requirements:

- Host System Requirements

  CPU: 300 MHz Intel® Pentium® II or above
  RAM: Each USB voice box needs at least 1 MByte RAM
  HD: At least 1Gbyte remaining disk space
  Interface: Each USB voice box needs a USB interface

- Supported Operating Systems

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

2.4 Installation Procedure

Step 1: Connect to analog phone line

Refer to Figure 2-3 below for interface signal definitions to avoid improper connection.

Step 2: Connect to the headset or the phone handset

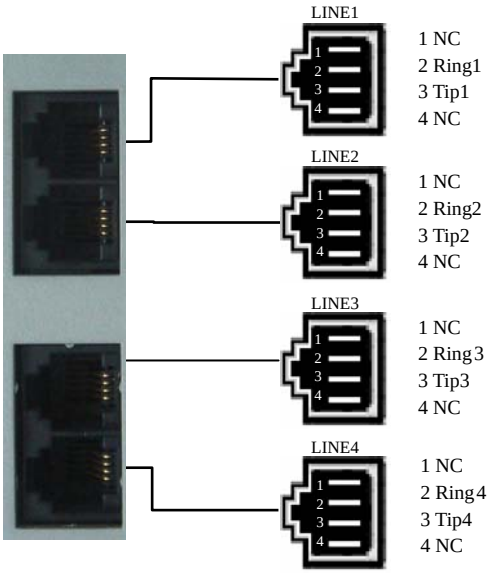

Figure 2-3 Interface Signal Definitions

When the 1st channel is configured to be the 'handset (headset)' channel, the headset or handset can be used to implement the feature of 'virtual phone'. The installation is shown in Figure 2-4.

Hint: *Skip Step 4 if the headset is installed in this step.*

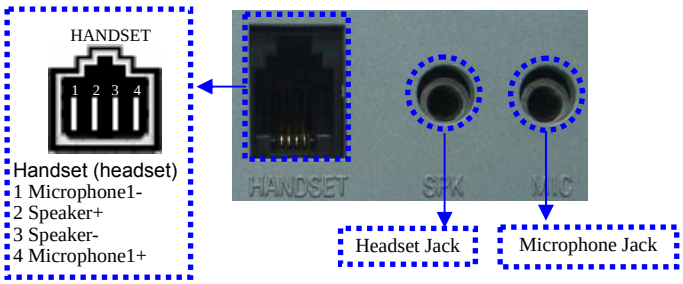

Figure 2-4 Connection of Microphone and Handset

Notes:

① *Do not connect the analog phone line to the 'Handset (Headset)' channel;*

② *When implementing the feature of 'virtual phone', you may use the embedded speaker in the USB voice box or the headset to make rings, but still need application software to support the dialing and the pickup/hangup control. For more details, refer to 'SynCTI Programmer's Manual'.*

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

Skip this step if there is no station channel.

Note:

The ringing current and battery feed power supply is also required to be connected when trunk

channels and station channels are used at a same time. It has no effect on trunk channels.

Step 4: Connect the sound box or other appropriate sound devices

Skip this step if there is no need to 'monitor in real time' or 'play', or the headset/handset has been installed in Step 2.

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

Step 5: Connect the USB voice box and the PC by USB data lines (See Figure 2-5)

Note: *The USB voice box is not allowed to share the same USB port on the PC with other USB devices.*

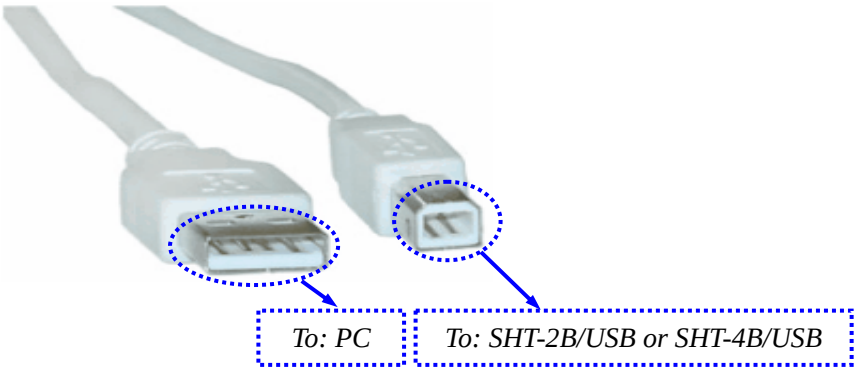

Figure 2-5 USB Data Line

Step 6: Install the driver

If it's the first time to install the USB voice box on the PC, please run the installation program in the driver installation package before Step 5; otherwise, the driver will be installed by the operating system automatically. Regarding driver installation, refer to *SynCti_InstManual.pdf*.

Note: *If the installation error occurs, remove the USB data line from the PC. Plug it and install the driver again.*

Key Tips:

- 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 the USB voice box 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

170 x 130 x 20mm^3

Weight

≈200g (exclusive of ringing current & battery feed power supply)

Environment

Operating temperature: 0℃—55℃

Storage temperature: -20℃—85℃

Humidity: 8%—80%, non-condensing

Input/output Interface

Headset jack: One φ3.5 stereo jack

Telephone line jack: Four 4-pin RJ11 connectors

USB jack: One USB1.1 standard interface

Audio Specifications

CODEC: CCIIT A/μ-Law 64kbps,

IMA ADPCM 32kbp

Audio output power: ≥50mW

Distortion: ≤3%

Frequency response:300-3400Hz (±3dB)

Signal-to-noise ratio: ≥38dB

Echo suppression: ≥40dB

Maximum System Capacity

Up to 8 USB voice boxes concurrently per system; up to 4 channels per box。

Audio Encoding & Decoding

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

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

Power Requirements

+5V DC: ≤400mA

Power: ≤2.1W

Safety:

Lightning resistance: Level 4

Safety certificates: FCC;CE

Maximum Subscriber Line Length for Station Channel

5.5km

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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