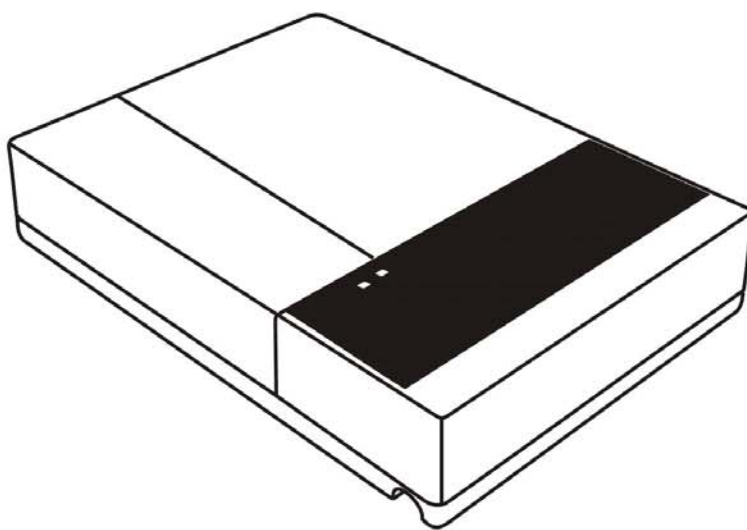


4-Line Computer Telephony interface AD410 Tech Handbook



Contents

SUMMARIZATION	1
BREIF INTRODUCTION	1
GENERAL DESCRIPTION	1
KEY FEATURES.....	1
INSTALLATION	2
OPERATING CONDITION.....	2
HARDWARE STRUCTURE	2
HARDWARE INSTALLATION & DEMO PROGRAM INTRODUCTION	6
RELEVANT KNOWLEDGE	12
USB INTERFACE	12
FAQ	14
APPENDIX	14
TECHNICAL PARAMETERS	14

Summarization

Breif Introduction

The most trouble for software programmer is they know very little about hardware structuring, once the customer's requirements can not be meet by just implementing program based on one PC, then works with some external device is a must for the combination, such as record caller ID numbers, start and end call time & date, record dialed numbers, control line operating status, detect phone connection, judge inbound ringer and ringer times, detect phone using status, check line polarity reversal for phone billing, etc. Under such circumstance, it's really difficult for them to design application software independently, so if they don't know how the hardware works, it's really hard for them to get started the application designing. For this purpose, ARTECH is dedicating provide a complete CTI computer telephony interface solution, and fully open SDK & source code for the second development, we're looking for to cooperating with the software integrators.

General Description

Although the communicative system is progressing constantly, telephone is still the simplest and convenient way. In particular it comes to business field which integrated with computer, many transactions are verified by telephone, in order to avoid forgetting, misunderstanding or dishonest, the recording equipment for call detailed records is a must for some trades. Combining computer & telephony integration, ARTECH is launching CTI series product now. We provide hardware, SDK/API, VC/VB/DELPHI source code, DEMO program for application second development.

Key Features

- Record incoming/outgoing call no., time & date
- Live line operating status display
- Flexible system parameter programming
- Standalone 4-line under one unit
- Expand up to 16 units for 64 lines under one PC
- Specified inbound call ringer control
- Unallowed inbound & outbound call number setting
- Telephone real-time status control
- Support external billing info device display
- Compatible with ETSI/Bellcore FSK & DTMF Caller ID
- Simulate FSK & DTMF CID signal for testing
- Additional I/O port control available for option
- Line polarity reversal detection
- HID USB data transmission without USB driver
- Busy tone detection, right & left channel voice control
- Fully open SDK for application development

Target User

- Telephone Shopping Transactions
- Real Estate Liaison
- Customer Service Center
- Banking & Financial Transactions
- Private Enterprise
- Credit Reference Agency
- SOHO Family Studio
- Security Employee Direct Line
- Call Center Solution
- Call Shop Billing
- Family User for Harassment Collection
- Commercial Transactions

Installation

Operating Condition

1. System Requirement:

Pentium 400 MHz CPU or above
Windows98se/XP/2000/NT OS
10MB HD space or above
128 MB RAM
CD-ROM
Standard USB port
Standard RJ11 port

2. Environment Requirement:

Operating Temp: 0°C - 50°C (32°F - 122°F)
Storage Temp: -30°C - 65°C (-22°F - 149°F)
Operating Humidity: 10% - 90% without congealment

3. USB Audio Function:

Supports USB2.0 full speed
Supports USB audio device class specification 1.0
Supports Microsoft Windows98se/ ME / 2000/ XP

4. Product Spec:

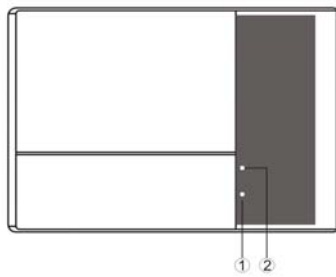
Name: 4-Line Computer Telephony Interface
Model: AD410
Dimension: 151(L) × 208(W) × 70(H) (mm)
Weight: 720g

Packing Contents: AD410 Hardware 、 Driver CD 、 RJ11 Cord 、 User's Manual 、 USB Cable 、 DC24V Power Adapter 、 Audio Cable 、 Expanded Cable 、 Suspension Screws 、 Round Power Plug Converter

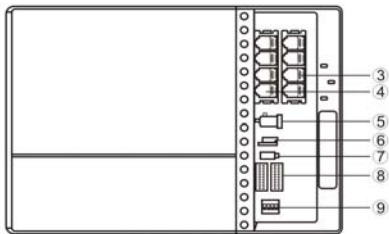
Hardware Structure

1. Product Overview

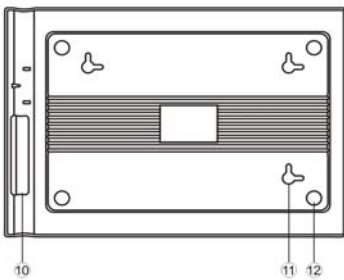
Please have a good look for each part of AD410 device before operating.



- 1. Data Transmission Indicator
- 2. Power Indicator



- 3. RJ11 Phone Jack
- 4. RJ11 Line Jack
- 5. DC Power Jack
- 6. USB Jack
- 7. Audio Output Jack
- 8. Expandable PIN
- 9. DIP Switch



- 10. Cable Hole
- 11. Suspension Hole
- 12. Non-skid Cushion

2. Packing Contents

1. AD410 Hardware
2. Driver CD
3. USB Cable
4. RJ11 Cord x 4pcs
5. DC24V Power Adapter
6. Audio Cable
7. Expanded Cable
8. Suspension Screws
9. Round Power Plug Converter

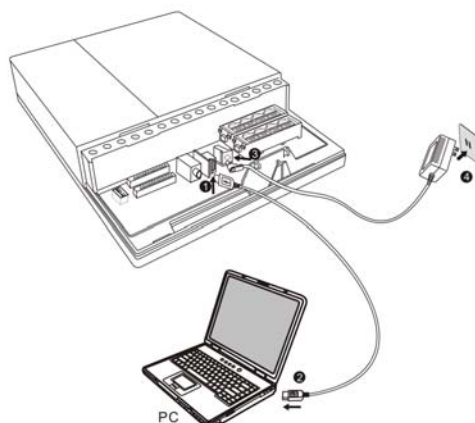
3. Installation

One USB interface connects to PC

One DC Jack interface connect to device and AC power Jack

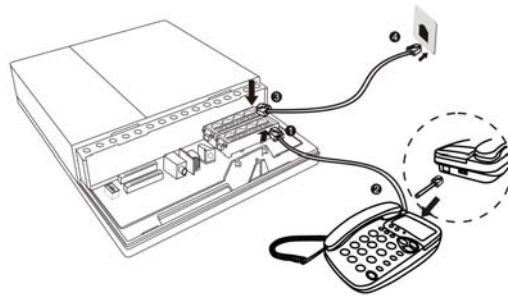
Four RJ11 Line ports connect to PSTN/C.O. line from telecom station

Four RJ11 Phone ports connect to normal analog telephone set



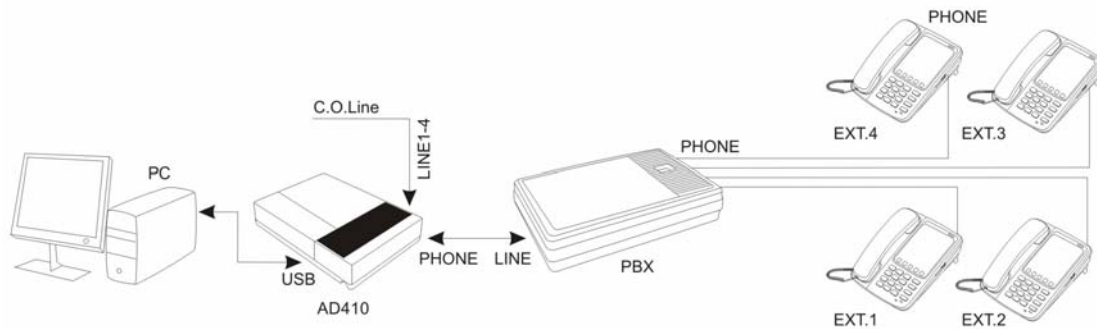
4. Installing Procedures

1. Connect one side of USB to USB Jack of AD410
2. Connect another side of USB to USB Jack of PC
3. Plug one side of power adapter to DC Jack of AD410
4. Plug another side of power adapter to AC Jack of AC power
5. Connect one side of Line cable to Line1 Jack of AD410
6. Connect another side of Line cable to PSTN/C.O. Line from Telecom station
7. Connect one side of Phone cable to Phone1 Jack of AD410
8. Connect another side of Phone cable to normal analog telephone set
9. The installation for Line2~Line4, Phone2~Phone4 are same as Line1, Phone1



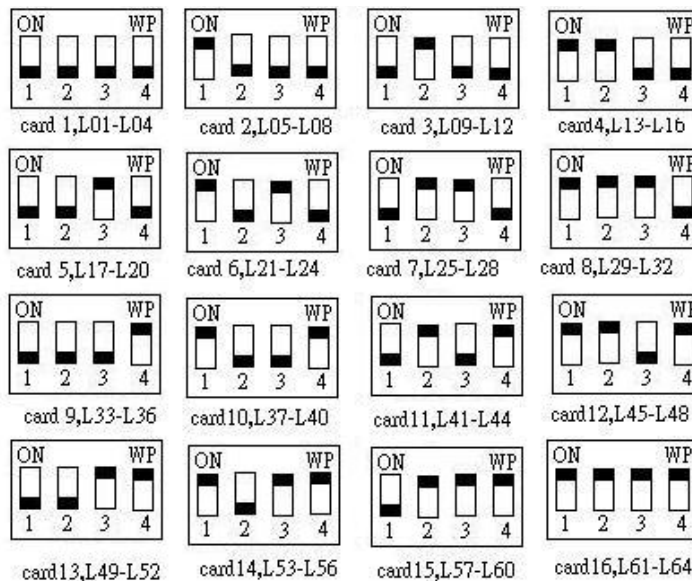
5. Connection Diagram

AD410 transmits data via standard USB protocol, all detailed call information can be logged to PC, such as inbound and outbound call number, time & date, line control status, live phone operating status, inbound ringer & ringer times detection, line polarity reversal detection, external SP100 billing device control, etc. On the expandable feature, it can expand up to 16 units for 64 lines simultaneously.



Expanded Device ID Setting

One AD410 features 4 lines, it can expand up to 16 units for 64 lines at the same time, you only need set different device ID to distinguish them by DIP switch, please make sure the switch position is correct for each card, below switch setting is for 16 device(Card1~Card16):



Device Expanding

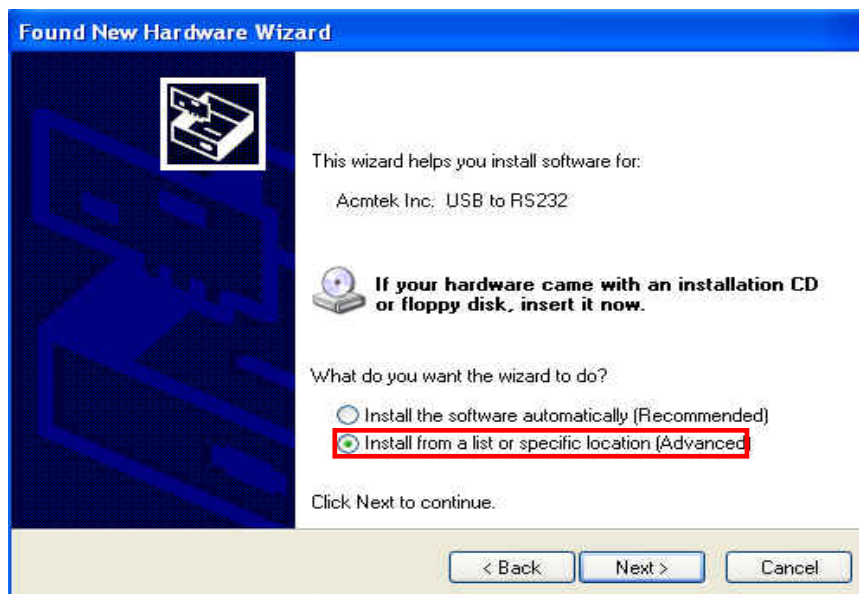
When you intend to expand device for more lines, the firstly thing is to set device ID for distinguishing different device, then you need to connect each unit via the expanded cable, after done you only need connect the first device to PC via USB connection, other units do not need connect with PC. Moreover, the expanded PIN for connecting each unit is intelligently designed, worry-free, no need care the PIN position, if the position is incorrect you can not connect them at all. Please use the expanded cable to connect each unit one by one on the PIN Jack.

Hardware Installation & DEMO Program Introduction

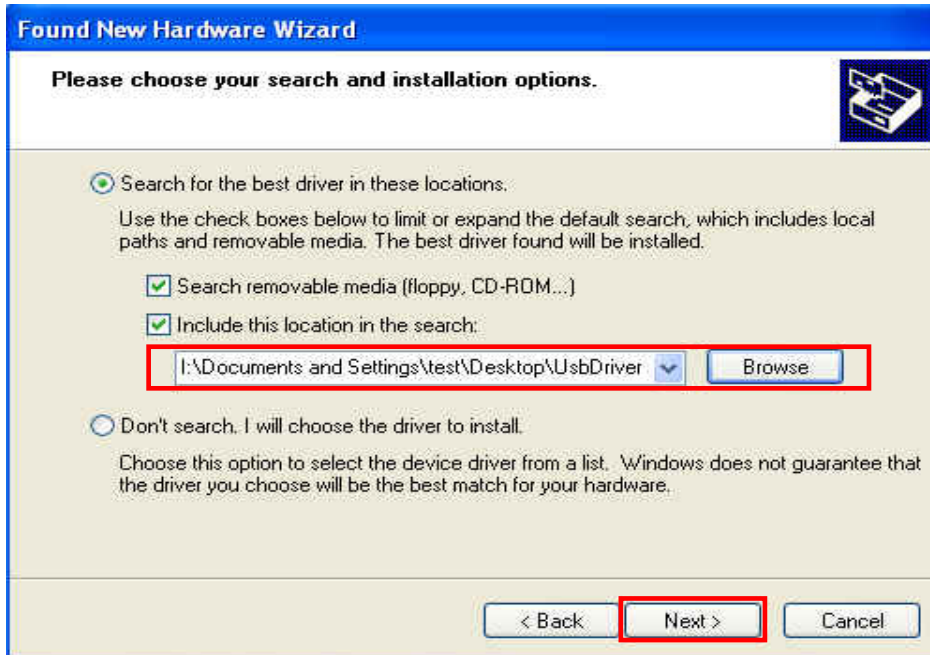
When you use AD410 on the first time, the windows will find new device while connecting, you need install the USB driver by manual, please select the second item to continue.



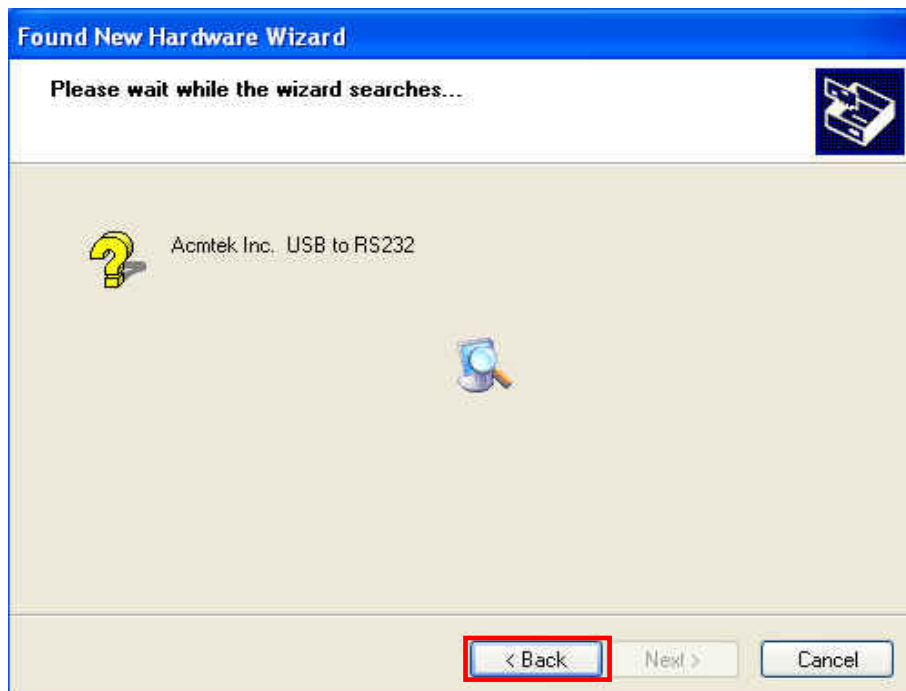
Please select the second item to continue.



Then please find out the USB driver in SDK package (AD410 Demo\Driver)

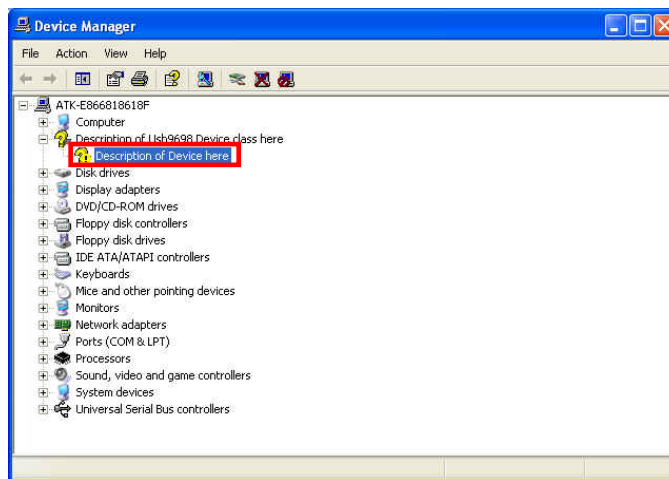


After done to click [Next] to continue will install USB driver immediately.

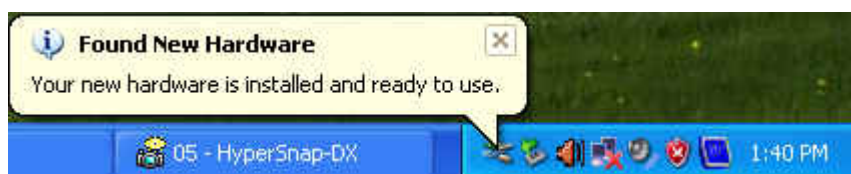




Then please click [Finish] to end installation, you can check the new-added device on Device Manager as shown in below window [Description of usb9698 Device class here]

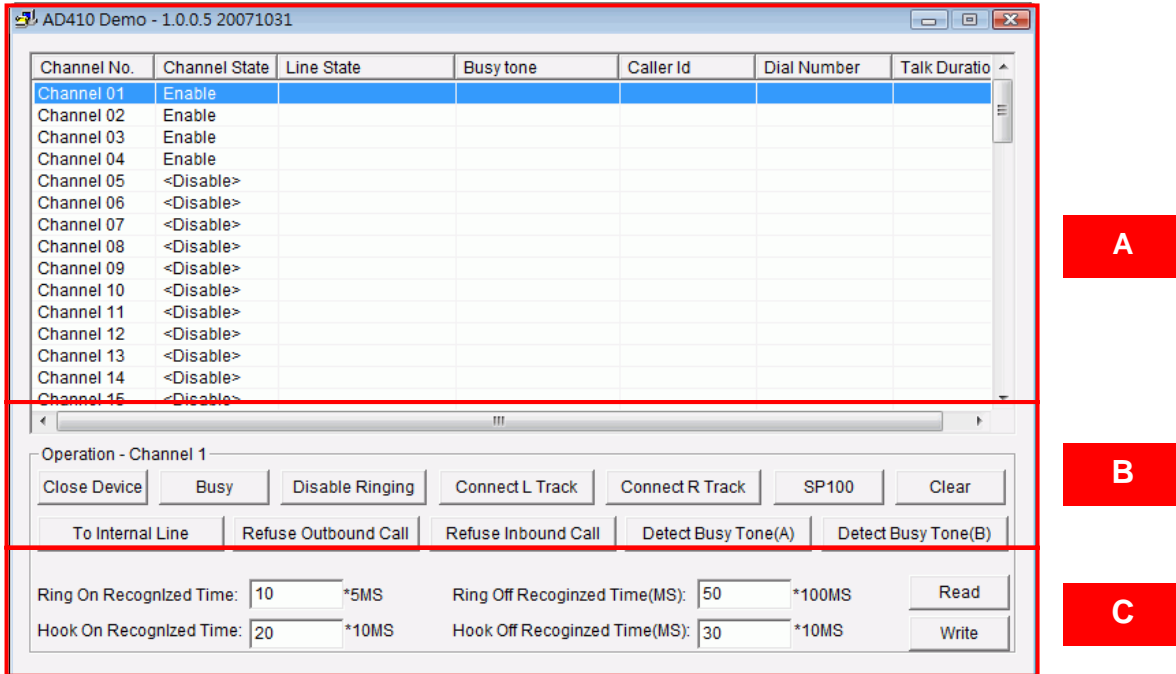


When the USB driver is successfully installed, the windows will also remind you the new hardware is installed and ready to use. Then you can get started to operate on DEMO program.



Demo Program Introduction

1. Complete the hardware installation as per the indication
2. Run DEMO program: AD410 Demo\AD410Demo.exe
3. Then will show below DEMO program friendly user interface:



A area is for live Line status display
 B area is for device function control
 C area is for system parameter programming

1. A area for current Line status display

Channel No: Stands expand up to 16 units of AD410 device, totally include 64 channels

Channel State: Stands device connecting status, [Enable] stands connecting success, [Disable] stands connecting failed

Line State: Stands system live Line operating status, all status as shown in below table:

Line Status	Introduction
Hook On (Outbound)	Hang up phone(outbound call)
Hook Off (Outbound)	Pick up phone(outbound call)
Hook On (Inbound)	Hang up phone(inbound call)
Hook Off (Inbound)	Pick up phone(inbound call)
Polarity Reversal	Receive line polarity reversal signal
Ring On	Inbound ringer On
Ring Off	Inbound ringer Off
Caller ID	Receive caller ID number
Dial Number	Dialing number
Talking	Talking on the phone
Missed Call	Missed incoming call

Busy Tone: When AD410 itself is online (press this button for DEMO) and active [Detect Busy Tone (A)]or [Detect Busy Tone (B)], when busy tone is detected will show [Have Busy Tone], else will show [No Busy Tone]

Caller ID: Show incoming caller ID number

Dialer Number: Show outgoing dialed number

Talk Duration: When pick up phone to get through inbound call will automatically count duration after dialing over and waiting 3 seconds

2. B area for device function control

Close Device(Open Device): Press it is to enable/disable device

Busy(Idle): Press it will control line to be busy status, when you call in will hear busy tone, press again will release line to be standby mode

Disable Ringing(Enable Ringing): Press it to disable incoming ringer, press again will become normal

Connect L Track(Disconnect L Track): Press it while incoming call can connect left channel of Audio out from PC to Audio in of AD410

Connect R Tack(Disconnect R Track): Press it while incoming call can connect right channel of Audio out from PC to Audio in of AD410

SP100 – External Telephone Billing Display

Channel No.: Select required channel number of SP100 device ID

Interval Time Test Next: Turn off SP100 backlight

Test->Turn on Backlight: Turn on SP100 backlight

Test->Show Date Time: Show date and time

Test->Show Caller ID: Show incoming call number

Test->Show Dial Number: Show outbound dialed number

Test->Start Bill: Test start billing

Time Unit: Time unit for billing

Rate Unit: Billing unit rate for each time

Bill Mode: Billing mode

Postpay: Pay after billing

Prepayment: Deposit money first before billing

Prepaid Money: Deposit money amount for prepay mode

Test->Stop Bill: Stop billing counting

Test->Show Greeting: Show greetings on LCD screen

Start Position: Show greeting position on LCD char schedule

Test->Clear Screen: Clear LCD screen

Total Times: Total testing times

Times: Current testing times

Current Testing: Current testing item

Select All: Select test all items

Start Test: Start testing to active

Stop Test: Stop testing to end all

Clear: Clear all info on Line status bar

To Internal Line(To External Line): Press it can switch line to internal mode or external mode

(Internal mode means disconnect phone and line, external mode means connect phone and line)

Refuse Outbound Call(Allow Outbound Call): Press it can forbid outbound call

Refuse Inbound Call(Allow Inbound Call): Press it can forbid inbound call

Detect Busy Tone (A)(Stop Detecting): Press it can detect busy tone from line, AD410 can detect busy tone from 2 lines simultaneously, and you can select required line for busy tone detection

Detect Busy Tone (B) (Stop Detecting): Press it can detect busy tone from line, AD410 can detect busy tone from 2 lines simultaneously, and you can select required line for busy tone detection

3. C are for system parameter programming

Ring On Recognized Time: Recongized ringing on time, factory default is 10(50ms), time unit is 5ms

Ring Off Recognized Time: Recongized ringing off time, factory default is 50(500ms), time unit is 10ms

Hook On Recognized Time: Recongized hang up phone time, factory default is 20(200ms), time unit is 10ms

Hook Off Recognized Time: Recongized pick up phone time, factory default is 30(300ms), time unit is 10ms

Relevant Knowledge

USB Interface

USB is the abbreviation of Universal Serial Bus. USB is created and constituted by Compaq, DEC, Intel, Microsoft, NEC and Northern Telecom corporations, it is the perfect replacement for the serial and parallel bus communication currently, due to its convenient with easy-of-use interface and high-performance speed for data transmission, it has been becoming the main human friendly interface, almost all computer including laptop featured with USB function. The USB interface has below main features.

1. Easy-of-use Operation

USB interface can connect serverl different devices, support plug in and out immediately, on software programming side, the USB driver program and application can auto startup without any user interference. Otherwise, USB device also will not involve in IRQ conflict problem, it has independent reserve interrupt resources, so it does not occupy the PC recources with other devices, it ultimately eliminates your doubles and annoyances while researching. The key for USB is able to freely work as an instant PIPO device.

2. Hi-Speed Data Transmission

USB high speed data transmission is one of the main features, the hightes USB transmission interface can reach up to 12Mb/s, it is much quicker with 100 times against COM port, and much quicker with 10 times against parallel port, nowadays the speed for USB transmission is up to 100Mb/s or above.

3. Flexible Connection

USB supports several different devices connection, theoretically one USB port can connect 127 units of USB devices. The connecting way is very flexiable, your can either use serial connecting, or you can use USB hub to gather with many devices, then connect to USB port of PC. Under USB connection, all device equipped the USB Jack in the outlook of device, no need open casing. The USB supports PIPO feature, so no need turn off power to plug in/out USB device. Likewise, USB provide serial connection way, each USB jack can be connected together with another one. In this way, one USB controller can reach 127 USB

devices simultaneously, each device distance can be up to 5 meters, it can also wisely recognize which USB device is plugged in and out under the serial connection.

4. Direct USB Powered

Normally the serial and parallel connection device need external power, but USB device has no external power adapter required, powered by the build-in power inside USB interface, USB power can provide DC 5V power for device powering, so no AC power support, and the R&D cost is economized accordingly.

CID - Calling Identity Delivery

The worldwide caller ID(Calling Identity Delivery - simplified to CID) format provide 2 ways, DTMF and FSK, those caller ID data are transmitted out before picking up phone. The caller ID in DTMF format is sent out before the first ringing, and FSK caller ID is sent out between the first ringer and second ringer. The DTMF caller ID signal is DTMF tone, shortcoming is by its slow speed and no checksum features, FSK caller ID has the contrary feature with quick speed transmission and have checksum, but if you pick up phone immediately after first ringer, there'll not show caller ID data. In some cities, the caller ID service is charged by telecom station, if your telephone can not show caller ID, please check whether you subscribe caller ID service or not. Please note in general DTMF caller ID data only includes call number, but FSK caller ID includes date, time, caller name and call numbers together.

FAQ**A. Why startup failed or device can not be found by Windows?**

The problem may be caused by:

1. Firstly please make sure the USB connection is correct, if the connection is ok, then please check the BIOS setting to enable USB device.
2. Then reboot your PC for entering BIOS setting to enable USB interface.
3. Please check the USB driver is successfully installed on your OS, please refer to above details for installation.
4. As for NT4.0 OS, due to the USB inability of NT OS, so it can not support USB device.

B. Why caller ID data can not be received?

The problem may be caused by:

1. Pick up phone on the first ringer while coming caller ID in FSK format.
2. Your caller ID service is not subscribed in telecom station yet.
3. No caller ID data transmitted on this call.
4. Connect to some ext. line of PBX, some PBXs can not send caller ID data before talking.
5. On Win98 OS, if caused by user other program, please reconnect device by more times.

C. What should we care if plug in/out device while using?

When you plug device to use, you'd better not plug out it immediately, especially don't repeat plug in/out so frequently, as the OS needs some responding time, the best interval should be at least 5 seconds or above.

D. How many AD410 device can be used based on one PC?

One PC can work with 16 units of AD410 for 64 lines simultaneously.

Appendix**Technical Parameters**

USB Interface: USB1.1 standards

Input Indepence: > 50 K ohm

Signal Noise Ratio: Typical 50 dB

Frequency Response: 300-3400 Hz

Modulation Method: PCM, 64KBPS, 8Kb/sec

Channel Current: < 50mA

Power Consumption: < 250mW

ARTECH CTI Series Product Spec Comparison Table

	AD101	AD120	AD410	AD409
Line Amount	1	1	4	4
Expandable Line Amount	4	4	64	64
Device Power	Powered by USB	Powered by USB	Power Adapter	Power Adapter
Data Transmission	USB	USB	USB	RS232
LED Indicator	●	●	●	●
Polarity Reversal Detection	●	●	●	●
Line Online Control	●	●	●	●
Caller ID Format	DTMF	DTMF	DTMF	DTMF
	Bellcord FSK	Bellcord FSK	Bellcord FSK	Bellcord FSK
	ETSI FSK	ETSI FSK	ETSI FSK	ETSI FSK
Line Recording		USB Transmitting Recording		
Record Dialed No.	●	●	●	●
Record Inbound No.	●	●	●	●
Phone Status Detection	●	●	●	●
Line Status Detection	●	●	●	●
Talking Start & End Time	●	●	●	●
Play on Line		USB Transmitting Voice Playback	Audio Transmitting Voice Playback	Audio Transmitting Voice Playback
Busy Tone Dection		Detected by PC	Detected by Hardware	Detected by Hardware
Ringer Detection	●	●	●	●
Phone Status after Power Off	Can Dial Line	Can Dial Line	Can Dial Line	Can Dial Line
Device Dialing		Send DTMF Tone by PC		
DEMO Program Source Code	●	●	●	●
DEMO Program	●	●	●	●
API Source Code	●	●	●	●
Operating Voltage	USB DC5V	USB DC5V	DC24V Adapter	DC18V Adapter
Operating Current	70~80mA	400~450mA	150~200mA	150~200mA
Max Power	0.4W	2.25W	4.8W	4.3W
Dimension(mm)	95 x 66 x 26	140 x 105 x 26	224 x 160 x45	182 x 147 x42
Net Weight(g)	74	208	540	400
Packing Dimension(mm)	95 x 60 x 115	114 x 55 x 155	255 x 230 x 60	255 x 230 x 60
Weight(g)	186	361	982	868

● Stands featured this function.