

Crystal Semiconductor Software Installation Guide

For Windows 95, Windows 3.1x, Windows NT, and OS/2 Drivers



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Chapter 1: Introduction

Document Overview

This manual provides installation instructions for the drivers supplied with Crystal Semiconductor audio products. Installation instructions are provided for four operating systems:

- Windows 95
- Windows 3.1x
- Windows NT
- OS/2

This document provides generic installation information concerning the drivers for the operating systems listed above. For specific information refer to the release notes for the driver that you are installing. For your reference, appendices with additional information are also included in this document:

- Appendix A - Resource Data
- Appendix B - Files Copied to the Host Machine
- Appendix C - Files Modified on the Host Machine

Additional Information Sources

For additional information on these Crystal Semiconductor products, try any of the following sources:

- Product data sheets
To order by email: lit@crystal.cirrus.com
Or call 512-445-7222
Or link to the Crystal web site:<http://www.crystal.com/pub/pub.htm>
- Release notes for current driver release
- Technical support
Call 512-445-7222 or 1-800-888-5016
- World Wide Web site: <http://www.crystal.com/>
Current drivers: <http://www.crystal.com/support/crysoft.htm>
Technical documentation: <http://www.crystal.com/pub/pub.htm>
Technical support: <http://www.crystal.com/support/contact.htm>

Chapter 2: Overview Information

Diskette Contents

The diskettes from Crystal Semiconductor for all operating systems include of the following components:

- setup/installation files
- OS-specific drivers
- DOS support programs

For specific listings of the files that will be copied to your hard drive, please refer to Appendix B.

Driver Updates

Current Crystal drivers are also available from the Crystal web site at <http://www.crystal.com/support/crysoft.htm>. These drivers are compressed using PKZIP, which may be obtained from PKWARE's web site at <http://www.PKWARE.com/>.

To install, download the appropriate driver to your hard drive from the Crystal website, unzip the drivers files, and then follow the installation instructions listed for each operating system. The sets of files available from the web site are identical to the set of files provided on diskette from Crystal.

Chapter 3: Installation

Windows 95 Operating System with Plug & Play BIOS

This section provides instructions on installing the Crystal audio drivers for Windows 95 from diskette or driver files downloaded from the Crystal Semiconductor web site. For additional information on the installation, please refer to the appendices of this document and to the release notes for the driver you are installing.

Before Installing...

Before installing the current CrystalWare audio drivers, ensure that all previously installed drivers have been removed from your system. To do this, simply run the Setup.exe that is included on the CrystalWare diskette via this process:

1. Insert the CrystalWare Windows 95 driver disk in your floppy disk drive.
2. Execute Setup.exe via any of the following methods:
 - a. From the Program Manager, Run A:\Setup.exe where A designates your disk drive.
 - b. From Windows Explorer, double click on Setup.exe
 - c. From "My Computer" (Program Manager), Select Drive A and double click on Setup.exe
4. A dialog box will appear with three options: Install Driver, About, and Cancel. Click on the 'Install Driver' button. This will remove any previously installed drivers from your system.
5. You will be prompted to reboot your system. Click on OK to reboot and then proceed to Step 1 below to complete installation of the new drivers.

If drivers from other audio device manufacturers were installed, please consult appropriate documentation or help procedures to remove these drivers.

Installing the Drivers

To install new drivers for either an add-in card or for a motherboard ISA audio subsystem, please remove all previously installed drivers per the procedure listed above under **Before Installing...** After all old drivers have been removed, follow the steps below to install the new drivers.

1. When you power on your Windows 95 system, Plug and Play will recognize your new hardware and prompt you to install the appropriate drivers from the CrystalWare diskette with this dialog box:



3. Select “Driver from disk provided by hardware manufacturer” and click on OK.
4. Windows 95 will ask for a disk to be inserted into Drive A.
5. Insert the Crystal supplied **Windows 95 Driver Disk** into Drive A and click OK.



6. After completion of the driver installation, and depending on whether the installed board has Plug & Play disabled (see information below on Plug and Play), Windows 95 will ask if you want to restart Windows 95. If it does ask you for a restart (PnP is disabled), remove the floppy disk from Drive A and respond ‘yes’.
7. If Plug & Play is enabled, installation will proceed and Windows 95 will complete the installation of additional drivers for additional logical devices in the Crystal codec. If PnP is disabled, then Windows 95 will restart and then complete the installation of additional drivers.

Plug and Play BIOS and Operating Systems

As required by Windows 95, the Crystal Semiconductor Windows 95 Software Kit has facilities to bypass Plug & Play BIOS but still allow Windows 95 to configure the Crystal codec’s resources. Since not all PnP BIOS’s install devices in an equal manner, bypassing the PnP BIOS has proven to be the most reliable method for ensuring correct installation under Windows 95.

This is achieved by loading the correct resource data into the Crystal codec (normally from an EEPROM). It is important to understand that resource data is critical to the operation of the Crystal codec and users should familiarize themselves with the RESOURCE.EXE program supplied by Crystal Semiconductor and the contents of RESOURCE.TXT on the Utility Disk.

Windows 3.1x Operating System with Plug & Play BIOS

This section provides instructions on installing the Crystal audio drivers for Windows 3.1 from diskette or files downloaded from the Crystal Semiconductor web site. For additional information on the installation, please refer to the appendices of this document and to the release notes for the driver you are installing. These installation instructions in this section also apply to installation under Win-OS/2. For more information on OS/2, please refer to pag@2 of this document.

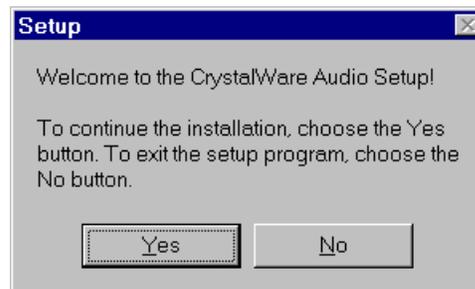
Before Installing...

Before installing the current CrystalWare audio drivers, ensure that all previously installed drivers have been removed from your system. Previously installed Crystal drivers will be overwritten when you install the new drivers from the CrystalWare Windows 3.1 diskette. If drivers from other audio device manufacturers were installed, please consult appropriate documentation or help procedures to remove these drivers.

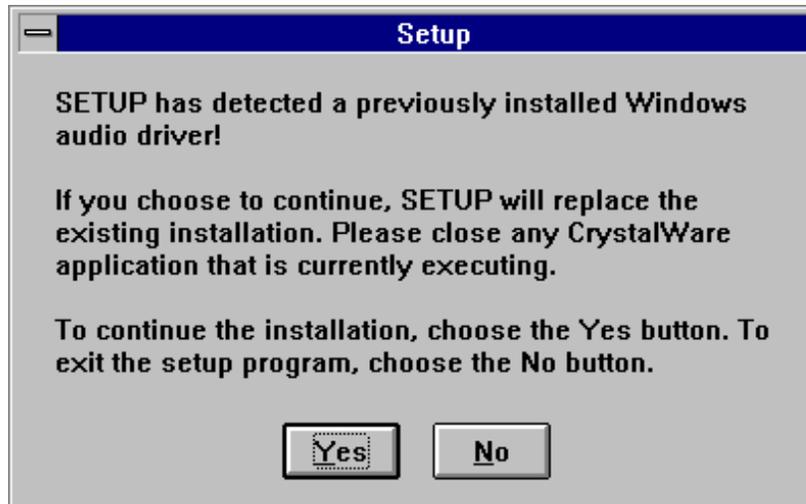
Installing the Drivers

To install the Crystal drivers for Windows 3.1, please follow the steps listed below.

1. Two diskettes are provided with driver files for Windows 3.1. Insert the disk labeled "Disk 1 of 2." From the 'File Manager' program or the 'File/Run' menu option of 'Program Manager' select the drive or directory containing the installation files. If you have downloaded the drivers from the website, unzip the files and then proceed to step 2.
2. Double click on the file 'SETUP.EXE'.
3. InstallShield Wizard will load and give you the option of installing the drivers or canceling. Click on YES to install the drivers.

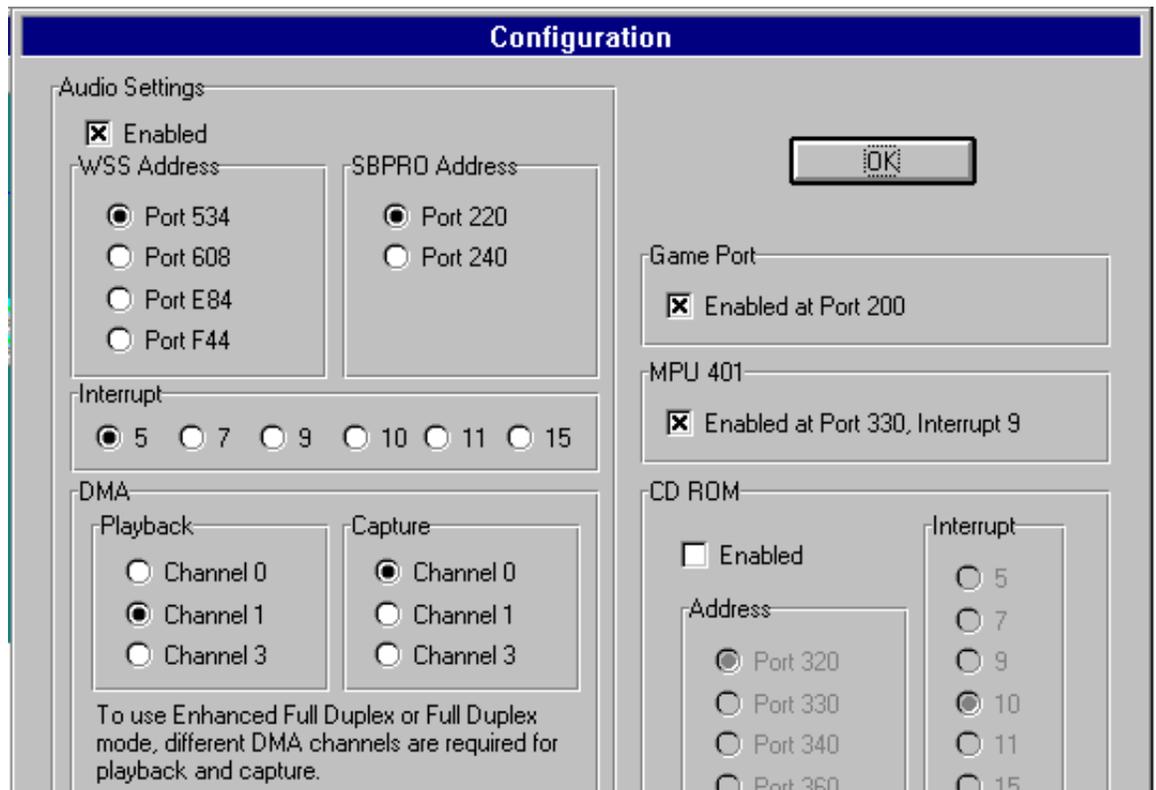


4. The Installation program will scan your configuration for previously installed drivers. If old drivers are detected, the following screen will appear. Click on YES and the old installation will be overwritten.



5. The next screen will ask for a directory name to install some of the files. Enter the directory name or leave the default, "C:\CRYSTAL." Click on 'NEXT' to continue. InstallShield will prompt you to insert Disk 2 of 2 at the appropriate time.

6. A Configuration screen will appear that displays the setting for the I/O, IRQ, and DMA resources. To accept the defaults, click on OK.



7. Installation will now take place and a Crystal program group will be created.

8. After completion of the driver installation Windows 3.1x will ask if you want to restart Windows. If it does ask you for a restart, remove the floppy disk from Drive A and respond 'yes'.

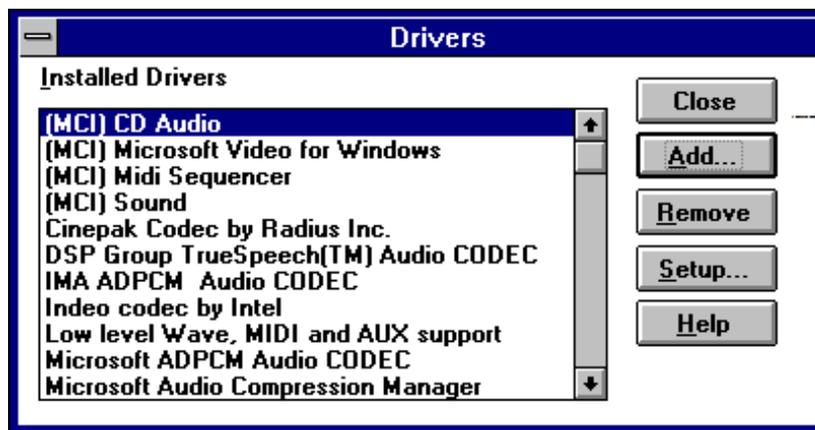
Windows NT

This section provides instructions on installing the Crystal audio drivers for Windows NT from diskette or driver files downloaded from the Crystal Semiconductor web site for both NT 3.51 and NT 4.0. For additional information on the installation, please refer to the appendices of this document and to the release notes for the driver you are installing.

Before Installing...

Before installing the current CrystalWare audio drivers, ensure that all previously installed drivers have been removed from your system. To remove existing drivers:

1. Open the Control Panel and double click the DRIVERS icon. The DRIVERS dialog box will appear.

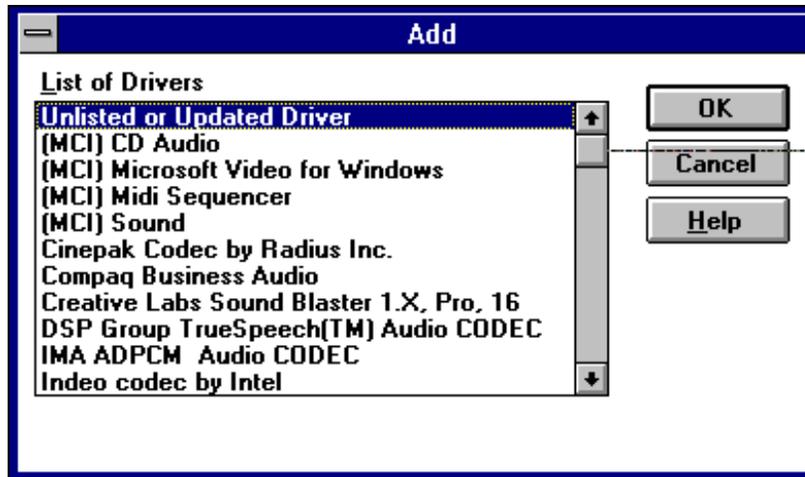


2. Select existing audio drivers to be deleted and press the Remove button.

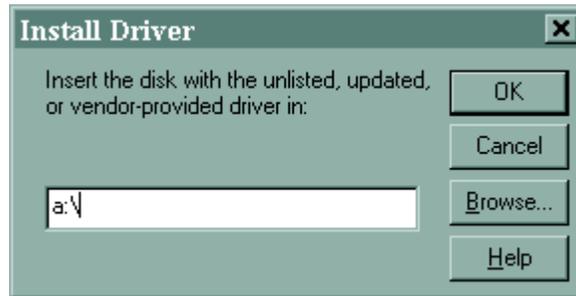
Installing the Drivers (Windows NT 3.51)

To install the Crystal software on a Windows NT 3.51 system, please follow these steps:

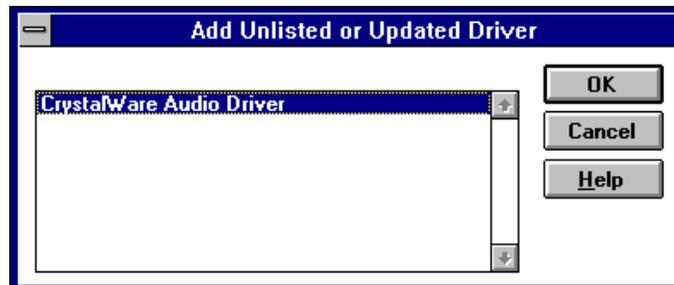
1. Copy the files on the diskette to a directory on the hard drive, or you may install from floppy.
2. Open the Control Panel and double click the DRIVERS icon. The DRIVERS dialog box will appear, as shown in the above screen shot.
3. Press the ADD button. Select *Unlisted or Updated Drivers*. A screen shot of the ADD windows is shown below. Press the OK button.



4. A dialog box will pop up and request the path of the location of the drivers to be installed. Enter A:\ if you are installing the driver from a floppy.



5. The current driver (in this example, *CrystalWare Audio Drive*) is displayed on the dialog box. Select it and press OK.



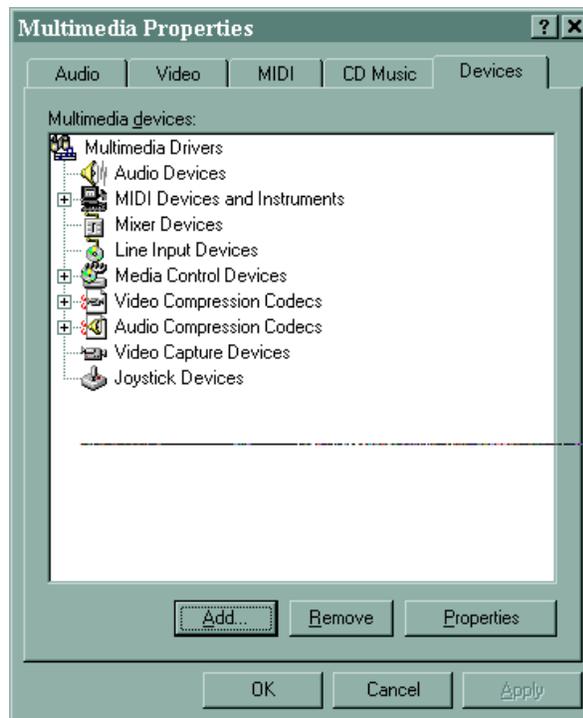
The audio control Program group will appear containing the Input and Mixer Panel applications. A warning message will appear on the screen prompting to restart Windows NT. You may press the Don't Restart Now button.

Installing the Drivers (Windows NT 4.0)

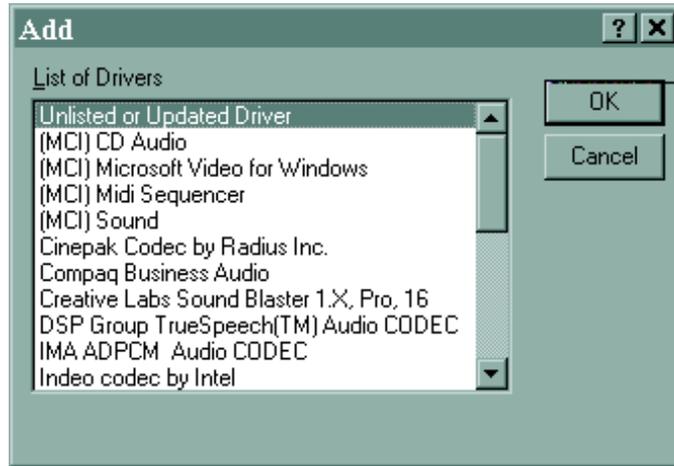
1. Double click the MULTIMEDIA icon in the control panel.



The Multimedia Properties windows will appear. Click on the Devices tab and press the Add button.

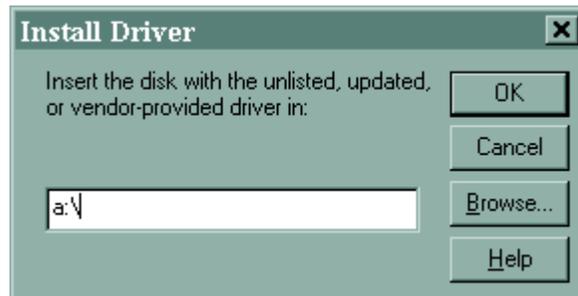


2. Select *Unlisted or Updated Drivers* by placing the mouse pointer over it and clicking the left mouse button. A screen shot of the ADD windows is shown below. Press the OK button.

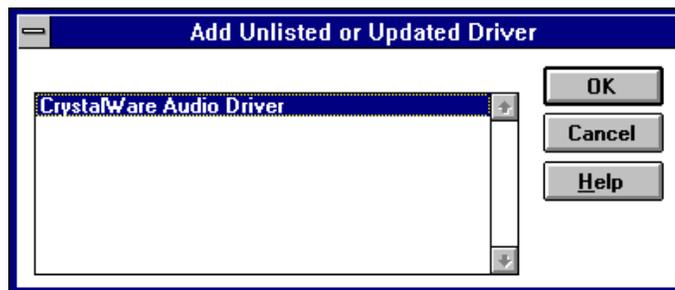


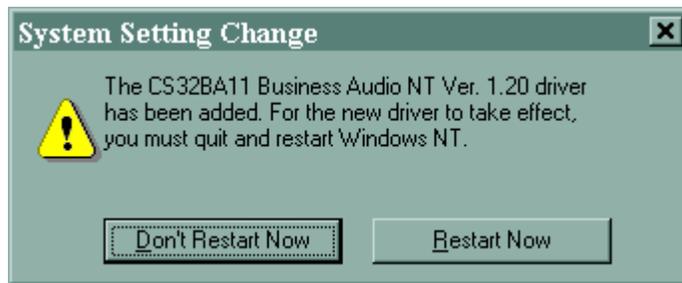
3. A dialog box will appear and request the path of the location of the drivers to be installed.

Enter A:\ if you are installing the driver from a floppy



4. The *CrystalWare Aduio Driver* is displayed on the dialog box. Select it and press OK. The audio control Program Group will appear containing the Input and Mixer Panel applications. A warning message will appear on the screen prompting to restart WindowsNT. Even though it is not necessary to restart your system, we recommend doing it. You may press the Don't Restart Now button.

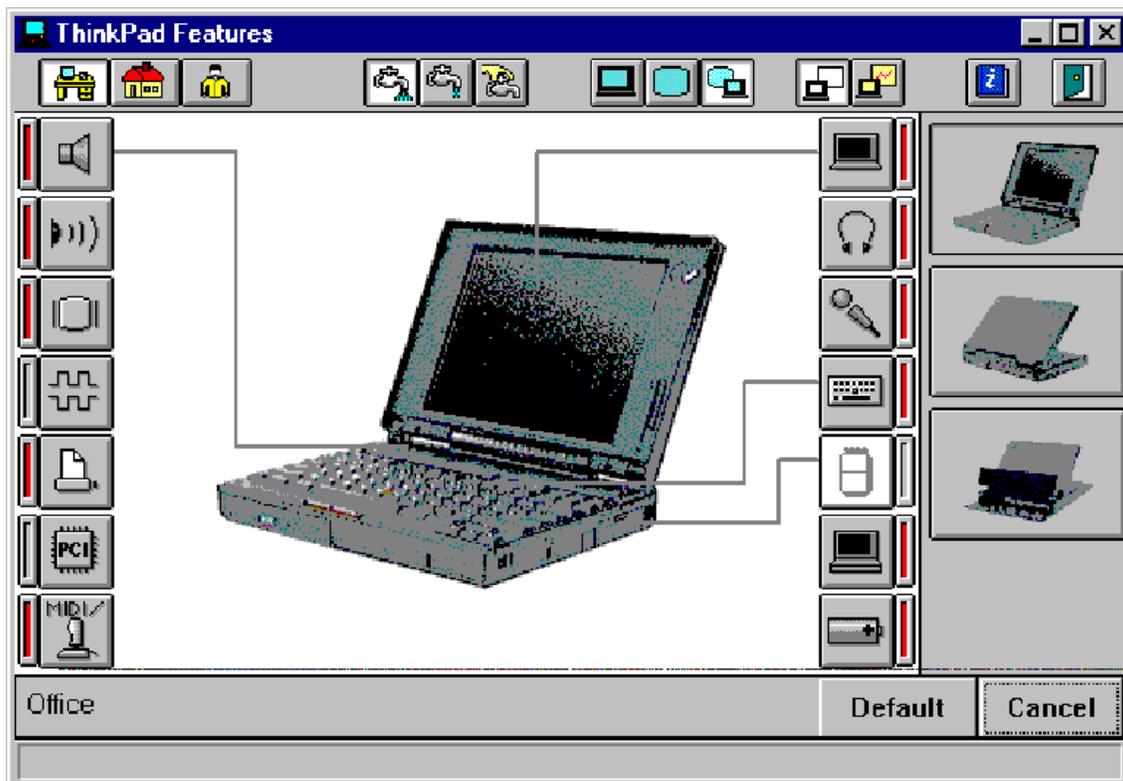




Configuring the CMOS Settings

To change CMOS settings, run the utility provided by IBM. In Windows NT 3.51 it is essential to adjust the settings in the IBM utility prior to installing the CrystalWare audio drivers and adjusting the Crystal settings. In NT 4.0, settings that are changed in the IBM utility will be automatically detected by the Crystal drivers and no action is required by the user.

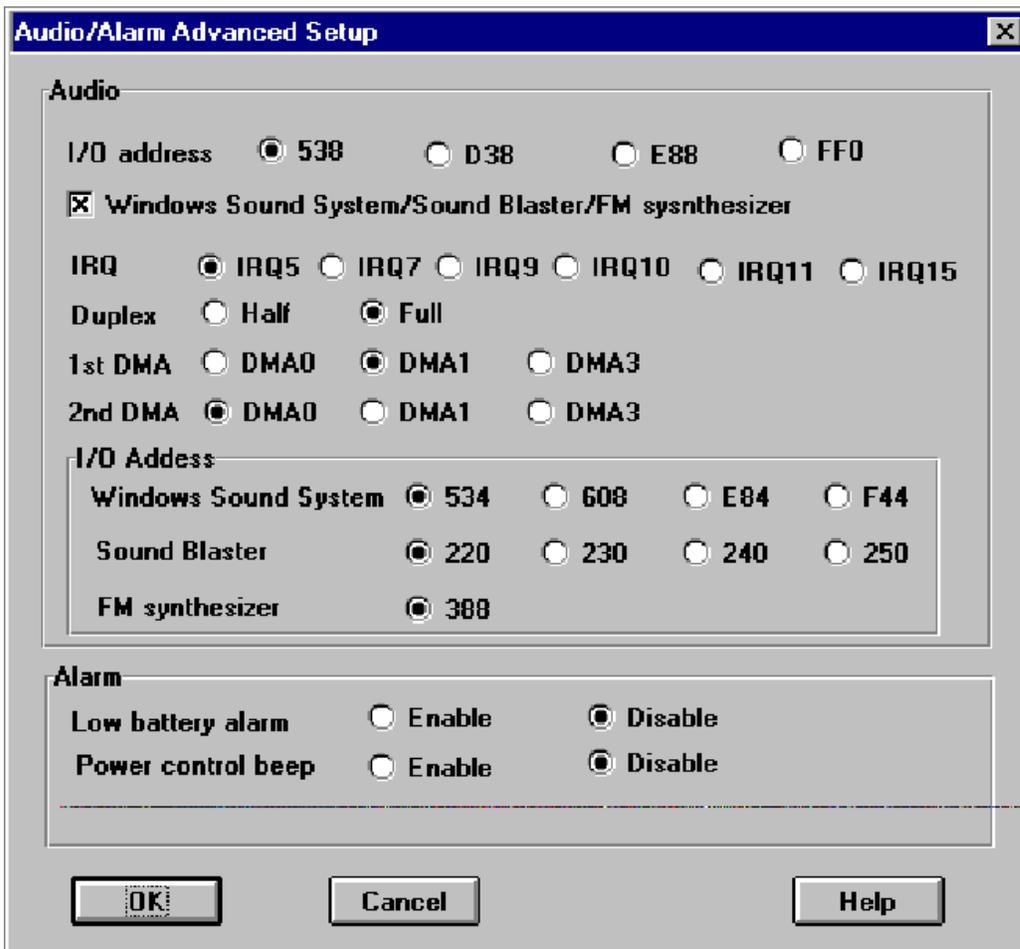
1. If you are running NT 3.51, before changing the settings, uninstall any existing drivers as described in "Before Installing" above. If you are running NT 4.0 the PnP feature will detect any changes you make via the IBM utility automatically.
2. Run the IBM utility: C:\ThinkNT\tpn.exe. This will bring up the following window



3. Click on either the Speaker button (top button on the left column) or the Headphones button (second button from the top on the right column). The following dialog box will appear:



4. Click on the Advanced button, which will bring up the Audio/Alarm Advanced Setup window in which the settings can be changed.



5. The settings in the IBM panel shown above correspond to the settings in the Crystal panel and should be configured as shown in the following table. Again, this is for Windows NT 3.51 users only; Windows NT 4.0 will detect changes in the IBM panel automatically via the Plug and Play feature.

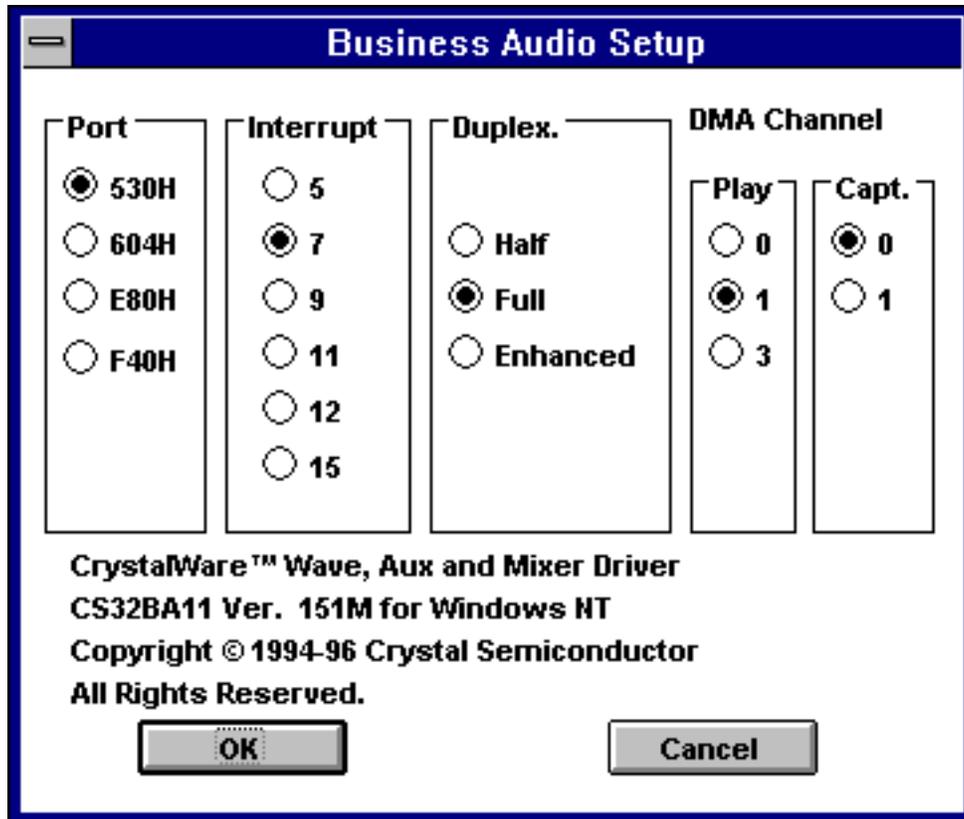
IBM Panel - Audio/Alarm Advanced Setup	Crystal Panel - Business Audio Setup	Notes
I/O Address	Port	
<i>Valid settings:</i> I/O WSS 538 534 E88 E84	<i>Valid settings:</i> 530 E80	
<i>Invalid settings:</i> D38 N/A FF0 N/A	<i>Invalid settings:</i> N/A N/A	Do not select D38 or FF0 in the IBM panel
IRQ IRQ5 IRQ7 IRQ9 IRQ10 IRQ11 IRQ15	Interrupt 5 7 9 11 12 15	
Duplex Half Full N/A	Duplex Half Full Enhanced	Do not select "Enhanced" in the Crystal panel
1st DMA DMA0 DMA1 DMA3	Play 0 1 3	1st DMA/Play and 2nd DMA/Capt. may not have the same settings.
2nd DMA DMA0 DMA1 DMA3	Capt. 0 1 N/A	1st DMA/Play and 2nd DMA/Capt. may not have the same settings. Do not select DMA3 in the IBM panel.

6. Once the IBM panel is adjusted, note the new settings (you will have to enter them in the Crystal panel) and click on the OK button. You will be prompted to reboot the system.

7. When you reboot:

- if you are running NT 3.51, you should now install the CrystalWare audio drivers as directed above (see page 12).
- if you are running NT 4.0 and already have drivers installed, the system will detect any changes in the settings.
- if you are running NT 4.0 and do not have drivers installed, you may now install the drivers as directed above (see page 15)

8. Bring up the Crystal panel shown in the following figure by double-clicking on the Drivers icon in the Control Panel. In the Drivers dialog box, select the CrystalWare Audio driver from the menu and click on the Setup button. This will bring up the following panel:



9. Set the settings in this panel to match those in the IBM utility panel, as described in the table on the previous page.

10. Click on OK and reboot. Your CMOS settings should now be changed.

Example CMOS Setting Changes

This section includes example sequences of events for changing the CMOS settings as described in detail above. Please note that the examples provided here are only possible settings but are not the only options. The full set of valid settings is described in the table on the previous page.

Example IRQ Setting Change

1. Run the IBM Thinkpad utility (*Audio/Alarm Advanced Setup*).
2. Select **IRQ5**.
3. Click on OK and exit the utility.
4. Reboot
5. Bring up the Crystal panel (*Business Audio Setup*).
6. Select **5** under Interrupt.
7. Click on OK.
8. Reboot

Example DMA Setting Change

1. Run the IBM Thinkpad utility (*Audio/Alarm Advanced Setup*).
2. For 1st DMA, select **DMA0**. For 2nd DMA, select **DMA1** (*Note that 1st DMA and 2nd DMA may not both be set to the same setting; i.e., they could not both be set to DMA0.*)

3. Click on OK and exit the utility
4. Reboot
5. Bring up the Crystal panel (*Business Audio Setup*).
6. Under Play, select **0**. Under Capt., select **1**.
7. Click on OK
8. Reboot

Example I/O Setting Change

1. Run the IBM Thinkpad utility *Audio/Alarm Advanced Setup*.
2. Under I/O Address, select **538**. Under WSS, select **534**. (*Note that the WSS value must match the I/O Address value as listed in the table above.*)
3. Click on OK and exit the utility
4. Reboot
5. Bring up the Crystal panel (*Business Audio Setup*).
6. Under Port, select **530**.
7. Click on OK
8. Reboot

Installing MIDI Synthesizer Drivers

Installing the current CrystalWare Audio drivers will automatically install the MIDI synthesizer drivers. No action is required by the user.

OS/2 Operating System

This section provides instructions on installing the Crystal audio drivers for OS/2 from diskette and from the Crystal Semiconductor web site. For additional information on the installation, please refer to the appendices of this document and to the release notes for the driver you are installing.

Plug and Play System Issues

The CS4232 and CS4236 are Plug and Play (PnP) compatible devices. If the system contains a PnP BIOS, the command line options for `wconfig.sys` are ignored unless the `/O` command line option is also added to the `wconfig.sys` device.

Before Installing...

Before installing the current CrystalWare audio drivers, ensure that all previously installed drivers have been removed from your system:

1. Open the System Setup folder on the OS/2 desktop.
2. Double click on the Selective Install icon and press the multimedia device support button.
3. Highlight any installed drivers and click on the remove button.

Once any existing drivers are removed via this process, you may proceed with the new driver installation as listed below.

System Requirements

CrystalWare Audio drivers for OS/2 require OS/2 WARP 3.0 or higher. Before attempting to install the drivers, ensure that you have at least WARP 3.0 installed on your system.

Installing the Drivers

1. Insert the Crystal Audio for OS/2 diskette in drive A.
2. Start the Multimedia Application Install program which is located in the Multimedia folder on the OS/2 desktop. Once you are in the multimedia installation program, select Source Drive A: (or whichever drive Crystal Audio for OS/2 diskette is in).
3. The installation program will show two Crystal Audio devices in the Features column: CS4231 and CS4232/CS4236. Select the driver that applies to the Crystal Audio device installed on your system. Do NOT select more than one Crystal Semiconductor Audio device. A check mark will appear next to the feature(s) selected.

NOTE: At this point in the installation you may also install OPL3 and MPU401 drivers via the same process as was used for the Crystal drivers described above. These drivers are supplied on the diskette along with the Crystal audio drivers. Select the OPL3 or MPU401 driver from the same menu described in Step 3 and proceed to Step 4. This installation can be done at the same time as the audio drivers are installed.

4. Click the install button to proceed with the installation. Read and follow the instructions provided by the installation program.

For additional information on how to configure your Crystal audio card, please read the file called read.me that is included on the driver diskette.

Installing the Drivers for Win-OS/2

To install the CrystalWare audio drivers on a system running Win-OS/2, please use the Windows 3.1 drivers and follow the installation instructions listed on page 0 of this document.

Mixer Issues

As of this release, there is no generic OS/2 mixer application for Business Audio. Therefore, the volume control for devices attached to mixer LINE, AUX1, and AUX2 is established on the command line of the CWAUDIO.SYS driver. Refer to section 5, CWAUDIO.SYS, for the format of the `mute` and gain setting options.

These values for gain are set on each boot and cannot be altered during system operation. The command line values represent a gain setting where 8 is equal to 0 dB gain. Each increment is 1.5 dB. Values greater than 8 will reduce the volume and values less than 8 increase the volume.

The devices attached to LINE, AUX1, and AUX2 are system dependent and cannot be detailed here. Refer to your system documentation for device configuration.

Note: These settings do not effect standard wave audio volume which is controlled by the OS/2 volume control ICON.

MIDI Issues

This installation diskette allows for the optional installation of the IBM OPL3 and MPU401 MIDI drivers. These drivers are provided to the user as a convenience. Your system may or may not support MIDI audio. Please refer to your system documentation for information related to your system's ability to support MIDI audio.

The CS4236 Crystal Semiconductor Audio device supports an integrated FM synthesizer. Therefore, it is recommended that you install the IBM OPL3 driver to make use of this feature. To do so, check both the Crystal Audio and the IBM OPL3 FM Synthesis features during Multimedia Installation.

Appendix A

Resource Data

To operate correctly in a Plug & Play environment, the Crystal Audio System must be loaded with appropriate resource data. This can be achieved in several ways, the most secure of which is from an external EEPROM. Resource data and utilities are included on a separate disk.

Please refer to the Crystal product data sheet and the RESOURCE.TXT file on the *Utilities Disk*.

Many of the examples and screen shots in this document will vary according to specific resource data entries.

Resource data can be used to configure the Crystal codec for Plug and Play operation or to disable BIOS Plug and Play operation. On the *Utilities Disk*, two batch files, PNP36.BAT and NOPNP36.BAT can be found. Running these batch files will program the EEPROM with data which enables or disables BIOS Plug & Play operation respectively.

Note: If the EEPROM of a Crystal Audio System is programmed, the system MUST be rebooted so that it goes through a power cycle.

Appendix B

Files Copied to the Host Machine

Windows 95

The following files will be copied to the host machine's Windows directory during the installation.

CS32MIX.EXE	CS4232.INI
CS4232C.EXE	CWAUDIO.BIN

The following files will be copied to the host machine's System directory during the installation.

CSFM.DRV	CS4232LD.VXD
CSMIDI.DRV	CSMIDI.VXD
CS32BA11.DRV	CSPCPL.DLL
CWAUDIO.VXD	

The following files will also be copied to the host machine's System directory during the installation of version 1.60 and later.

VWSTREAM.VXD	WSTREAM.DLL
MSGLOOP.EXE	

Windows 3.1

The following files will be copied to the host machine's Windows directory during the installation.

CS32BA11.INI	CSACBAT1.INI
--------------	--------------

The following files will be copied to the host machine's System directory during the installation.

CS32BA11.DRV	VSNDSYS.386
OEMSETUP.INF	BWCC.DLL
CSFM.DRV	MIDIMAP.CFG
MPU401.DRV	MSMIXMGR.DLL
CSPOWER.CPL	

The following files will be copied to the host machine's Crystal directory during the installation

CS32BAIP.EXE	CS32BAOP.EXE
CS32BASP.EXE	CSWAVE.DLL
CSACBAT1.EXE	CS4232C.EXE
CS32HMX.EXE	CS32MIX.EXE
CSACGUCD.EXE	CS4232.INI
CS32DIAG.EXE	SOUNDTST.WAV
TEST.DAT	CS32INTR.EXE
CS32WSS.EXE	CS32CFG.EXE
CWAUDIO.BIN	RESOURCE.BIN

Windows NT

The following files will be copied to the host machine during the installation (assuming that the windows directory is the default name WINNT35)

FILE	DIRECTORY
CS32BAIP.EXE	C:\WINNT35\SYSTEM32
CS32BAOP.EXE	C:\WINNT35\SYSTEM32
CSBAIP.HLP	C:\WINNT35\SYSTEM32
CSBAOP.HLP	C:\WINNT35\SYSTEM32
CSINST.EXE	C:\WINNT35\SYSTEM32
CS32BA11.SYS	C:\WINNT35\SYSTEM32\DRIVERS
CS32BA11.DLL	C:\WINNT35\SYSTEM32
CWAUDIO.BIN	C:\WINNT35\SYSTEM32

OS/2

The following files will be moved onto your system, based on the devices selected :

If Crystal Audio is installed :

- \MMOS2\DLL\CARDINFO.DLL
- \MMOS2\DLL\BSAUDRES.DLL
- \MMOS2\HELP\CWAUDIO.HLP
- \MMOS2\CWAUDIO.SYS
- \MMOS2\CWAUDIO.INI
- \MMOS2\CWAUDIO.BIN
- \MMOS2\CWVAUDIO.SYS
- \OS2\CWCONFIG.SYS
- \MMOS2\DLL\AUDIOIF.DLL
- \MMOS2\DLL\AMPMXMCD.DLL

If IBM OPL3 is installed :

- \MMOS2\OPL3.SYS
- \MMOS2\HELP\OPL3.HLP
- \MMOS2\DLL\OPL3RES.DLL

If IBM MPU401 is installed :

- \MMOS2\MPU401.SYS
- \MMOS2\DLL\MPURES.DLL

If either OPL3 or MPU401 are installed :

- \MMOS2\INSTALL\MIDIPLAY.ICO
- \OS2\BOOT\CLOCK01.SYS
- \OS2\BOOT\CLOCK02SYS
- \OS2\BOOT\TIMER0.SYS

Appendix C

Files Modified on the Host Machine

Windows 95

CONFIG.SYS

The following line will be added to the CONFIG.SYS file of the target host system

```
device=c:\windows\cs4232c.exe /W
```

AUTOEXEC.BAT

No changes will be made to AUTOEXEC.BAT.

SYSTEM.INI & WIN.INI

No changes will be made to SYSTEM.INI or WIN.INI.

Windows 3.1

CONFIG.SYS

The following line will be added to the CONFIG.SYS file of the target host system

```
device=c:\crystal\cs4232c.exe  
SET PATH =c:\crystal
```

AUTOEXEC.BAT

```
SET BLASTER=Awww lx Dy Tz
```

where	www	=	SoundBlaster I/O address, e.g., 220 or 240
	x	=	SoundBlaster interrupt value, e.g., 5,7 or 9
	y	=	SoundBlaster DMA channel, e.g., 0, 1, or 3
	z	=	Type of SoundBlaster card, e.g., 4 for CS4232 (SoundBlaster Pro compatible)

A typical setup for CS4232 would be:

```
SET BLASTER=A220 I5 D1 T4
```

DOS command line mixer:

```
CS32MIX /C=13 /L=13
```

where /C = CD mixer setting
 /L = LINE mixer setting

SYSTEM.INI & WIN.INI

The line 'CrystalBAT = BAT,BAT,C:\crystal\csacbat1.exe,picture' will be added to the [embedding] section of the WIN.INI. See Chapter 4 for information on the SYSTEM.INI entries.

Windows NT: Changes Made To The System Registry

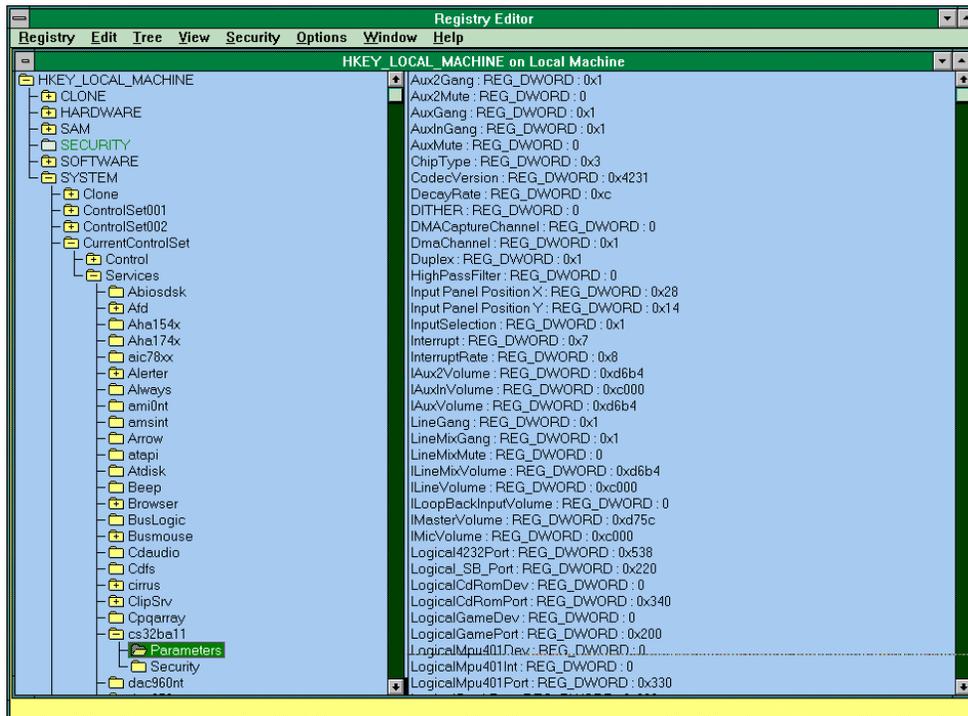
Upon installation of the CS32BA11 Business Audio drivers, the Registry under Windows NT is modified. A snap shot of the typical changes that occur when a CRD4236-1 is installed is shown on figure 2.10. Note that the details of the entries will vary depending on the specific hardware and resource data assigned during the installation process.

To access the System Registry, select RUN from the Program Manager's FILE option (or from the START button menu if using Windows NT 4.0) type "C:\WINNT35\SYSTEM32\REGEDIT32" and press the OK button.

The area changed shown on in the following figure (for Windows NT 3.51) is:

```

HKEY_LOCAL_MACHINE
  SYSTEM
    CURRENTCONTROLSET
      SERVICES
        CS32BA11
          PARAMETERS
  
```



OS/2

Based on your responses to input panels, several lines will be added to the OS/2 CONFIG.SYS file. If you do not know how to respond to the input panels, it is best to NOT change the default settings and click the OK button. The following describes the modifications made to your OS/2 CONFIG.SYS file if no settings are modified, based on the device selected :

```
BASEDEV=CWCONFIG.SYS /P:534 /I:5 /D:1,1 /SB:220 /M:NONE /FM:NONE  
/J:NONE /CD:NONE  
DEVICE=C:\MMOS2\CWAUDIO.SYS /N:BSAUD1$ /L:8  
DEVICE=C:\MMOS2\CWVAUDIO.SYS BSAUD1$
```

If either OPL3 or MPU401 are installed :

```
BASEDEV=TIMER0.SYS  
DEVICE=C:\MMOS2\OPL3.SYS /P:388 /N:OPL31$  
DEVICE=C:\MMOS2\MPU401.SYS /N:MPU4011$
```

Appendix D

Frequently Asked Questions

How come my machine crashes when I try to play a wave file in Windows 95?

- If you have a Diamond Stealth video card, make sure you have the latest drivers for it. Some of their older drivers will cause this to happen.

When I try to play a wave file, the first part of the wave file just repeats. Why?

- This is an interrupt problem.
- If you have used RESOURCE.EXE to program the Plug-and-Play data make sure your IRQ mapping is correct in your INI file. The RESOURCE.EXE program is used to configure the Plug-and-Play data. If you are an end user you will not have access to RESOURCE.EXE.
- If you are using a 4236 and Windows 95 with version 1.20 drivers, this is a bug in the driver. Rebooting will fix this problem and you should never see it again. Windows 95 driver version 1.21 and up fixes this problem.

How come I have sound in Windows 95, but when I got to DOS (or Boot to DOS) my sound doesn't work?

- Your BIOS is setup for a "Plug and Play" operating system (OS) therefore your sound card is not configured until you get into Windows 95. Also, when you exit Windows 95 your sound card is configured because Windows 95 puts everything back the way it found it. Change your CMOS setup to use "Plug-and-Play BIOS" or sometimes it's called "Use Setup Utility".
- Your BIOS may not be configuring your card correctly. From DOS, run the CS4232C.EXE program with a "/V" argument. This will display what your card is actually set to. Make sure those settings match your DOS software. If all the devices are disabled Change your CMOS setup to use "Plug-and-Play BIOS" or sometimes it's called "Use Setup Utility".
- Edit your CONFIG.SYS file and place an "/O" argument at the end of the CS4232C.EXE driver. This will force the card to be configured using the CS4232.INI file located in the Windows 95 Directory.

I changed from Windows 95 back to Windows 3.1x and now I can't get my sound to work. Why?

- Make sure you have obtained the Windows 3.1 drivers and installed them correctly.
- Your BIOS is set to "Use PnP OS" or "Use ICU". Change this to "Use PnP BIOS" or "Use Setup Utility".

How can I manually setup my sound card?

- Edit your CONFIG.SYS file and place an "/O" at the end of the CS4232C.EXE driver. This will override your "Plug-and-Play" BIOS (and Windows 95) and set your card to the settings specified in the CS4232.INI file located in the Windows directory.

What is RESOURCE.EXE?

- This is a program used to setup the Plug and Play resources that will be requested by your sound card. End users will not have access to this utility because they do not need it.

Where can I find drivers for a CS423x based sound card?

Many PC manufacturers customize their audio hardware and software, so the best place for driver updates is always the system or board manufacturer, rather than the audio chip manufacturer.

For a list of support numbers, look at:

<http://foundation.mit.edu/doc/pc-phonelist.txt>

If you have a CS4231 or CS4248 based audio system, the drivers were supplied and are maintained by the manufacturer of the system or the digital interface device connected to the codec.

If you purchased an Intel motherboard that uses the CS4232, and need driver or installation help, call Intel Tech Support at 1-800-628-8686, menu choices 1,3,1.

If you have a CS4232 based audio system, then generic CS4232 drivers are available from Microsoft. Try *<ftp://ftp.microsoft.com/services/whql/audio/drivers>*

CS4232 drivers are posted on the AST help web site at:
<http://www.ast.com/files.htm>

For CS4232 OS/2 Warp drivers, IBM has them posted on the following web site:
<http://www.europe.ibm.com/getdoc/psmemea/progserv/device/sound.html>

How can I add Wavetable audio synthesis to my Intel motherboard?

- If you purchased an Intel motherboard that uses the CS4232, and you wish to upgrade to Wavetable audio synthesis, then CrystaLake Multimedia manufactures the Model 210 and Model 40 wavetable synthesis add-in cards. Check out <http://www.crystalake.com> for details, pricing and how to get one.

How do I get my MIDI player to work in Window NT?

- You need to install the MIDI driver that comes with Windows NT.
- Go to Control Panel, double click Multimedia, click on the MIDI tab and make sure that the MIDI output is MIDI Synth.
- Go to the Control Panel and select Drivers. Add a new driver and select "MIDI Synthesizer" from the bottom of the list.

When I plug my sound card into my computer it wont boot. Why?

- Some older BIOS could not handle the complexity of the CS423x's Plug and Play resource and will crash while reading it. Request a BIOS upgrade from your manufacturer. Or, you could reprogram your resource data with our 'NULL' resource data.
- Some driver might be inadvertently writing to the sound card. One example is the 3COM driver 3C5X9.COM 10/3/94. This driver writes to I/O location 0x110 without checking to see if there is hardware there. If the CS423x's control port is at that location, the machine will hang. Try manually configuring the card and move the control port to different locations.

How can I tell what resources my BIOS is setting my sound card to?

- Boot to a DOS prompt and type "CS4232C /V". The "/V" stands for verbose and will display the settings for the Windows Sound System, Sound Blaster Pro, FM Synthesis, MPU-401 and Joystick.

How can I tell what resources Windows 95 is setting my sound card to?

Run the Device Manager and look at the properties of the Crystal CODEC. Use the resource tab to view the current settings of the Crystal Sound card. The first DMA is for playing and the second (if there is a second one) is for recording. The IRQ is shared by both Windows Sound System and Sound Blaster Pro. The input/output ranges are Windows Sound System, FM Synthesis and Sound Blaster Pro, in that order.

How do I change my input source from Windows 95?

Bring up the mixer and choose Options/Properties from the main menu. Click on the Recording radio button in the 'Adjust Volume for' frame and select OK. The mixer will now show the inputs instead of the outputs.

How do I uninstall the drivers for my sound card in Windows 95?

- Run the program that comes with Windows 95 called 'REGEDIT.EXE'
- Go to the sub-tree `HKEY_LOCAL_MACHINE\Enum\ISAPN` and delete all occurrences that match this wild card 'CSC????_DEV000?'
- Delete the sub-tree `HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\MS-DOS\Options\Crystal`
- Go to the sub-tree `HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\InstalledFiles` and delete the files
 - ◇ cs32ba11.driv
 - ◇ cs32mix.exe
 - ◇ cs4232c.exe
 - ◇ cs4232.ini
 - ◇ cs4232ld.vxd
 - ◇ csfm.driv
 - ◇ cwaudio.bin
 - ◇ cwaudio.vxd
- Go to the sub-tree `HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\MediaResource` and delete the folders
 - ◇ AUX
 - ◇ MIDI
 - ◇ MIXER
 - ◇ WAVE
 - ◇ JOYSTICK
- Shutdown Windows 95 into MS-DOS mode.
- Remove the 'DEVICE=CS4232C.EXE' entry from the CONFIG.SYS
- Delete these files from the Windows directory
 - ◇ cs4232c.exe
 - ◇ cs4232.ini
- Delete these files from the Windows System directory
 - ◇ cwaudio.vxd
 - ◇ cs4232.vxd
 - ◇ cs4232ld.vxd
 - ◇ cs32ba11.driv
 - ◇ csfm.driv

Why does my computer boot slow?

This problem is due to the fact that you have Intel's Configuration Utility install in your CONFIG.SYS on a system with a Plug and Play BIOS. There are several solutions to this.

- If you are running Windows 95
 - ◇ Remove Intel's configuration Utility by commenting out the line 'DEVICE=DWCMCFG.SYS' in your CONFIG.SYS.
 - ◇ If you have 'DOS=UMB' try using a different setting.
- If you are running another non-Plug and Play operating system
 - ◇ Remove Intel's configuration Utility by commenting our the line 'DEVICE-DWCMCFG.SYS' in your CONFIG.SYS. Also, make sure that your BIOS is setup for a non-Plug and Play operating system. This is done by going into you CMOS setup and making sure your Plug and Play options are set to 'Use Setup Utility' or 'PnP OS Disabled'.
 - ◇ If you have 'DOS=UMB' try using a different setting.

How come Windows 95 thinks I have a Windows Sound System Compatible sound card in my system?

- There might be an audio chip on the mother board that supports Windows Sound System. Try disabling it in the Device manager.
- Windows 95 might have detected a Windows Sound System device in the past and does not realize it has been removed. Run the REGEDIT program that comes with Windows 95 and look in the sub-tree HKEY_LOCAL_MACHINE\ENUM\ROOT. Look for a folder named *PNPB007 and delete it. Reboot you PC and the Windows Sound System device should no longer show up in the Device Manager. If it does, then you most likely have two audio CODECS in your PC. One must be disabled from the device manager.

How come Windows 95 thinks I have a Sound Blaster Pro or compatible sound card in my system?

- There might be an audio chip on the mother board that supports Sound Blaster Pro. Try disabling it in the Device manager.
- Windows 95 might have detected a Sound Blaster device in the past and does not realize it has been removed. Run the REGEDIT program that comes with Windows 95 and look in the sub-tree HKEY_LOCAL_MACHINE\ENUM\ROOT. Look for a folders named *PNPB000, *PNPB001, *PNPB002 and delete them. Reboot you PC and the Sound Blaster device should no longer show up in the Device Manager. If it does, then you most likely have two audio CODECS in your PC. One must be disabled from the device manager.

Why do I get a message that says “VSNDSYS.386 not present”?

- If you are using Windows 3.1 and have a plug and play BIOS, you need to change the setting that lets a plug and play operating system configure the hardware to BIOS configuration of hardware.
- If you are using Windows 95 then you need to install Windows 95 drivers instead of Windows 3.1 drivers. You may also need to change the BIOS setting to allow the plug and play operating system to configure the hardware.

Why do I get a message that says “CSFM.DRV must be replaced with a version compatible with VSNDSYS.386”?

Why are the devices in Hardware Manager under “Sound, video and game controllers” marked with a red X and I am getting no sound?

- Look at the properties page of a device that is marked with a red X. In the “General” tab in the “Device usage” box you may have unchecked the box labeled “Original Configuration (Current)” or on some notebooks “Undocked Config (Current)”.