16 BIT FULL DUPLEX / 3D STEREO SOUND CARD

USER MANUAL

CE

Before installing this ES1868 or ES1868 + ES938 Sound Card, please read this manual carefully and retain it for future reference.

> *Note : ES1868 is the chipset for regular 16-bit Full Duplex Stereo Sound Card whereas ES1868 + ES938 is for 16-bit 3D Full Duplex Stereo Sound Card*

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1. Introduction

The *ESS ES1868 and ES1868 + ES938 (for 3D)* is a 16-bit Full Duplex sound card based on the *ESS* integrated digital sound controller chip which is compatible with Sound Blaster PRO. This sound card provides an integrated audio solution for business audio, education/entertainment, and multimedia applications.

The *ESS ES1868 and ES1868 + ES938 (for 3D)* Sound Card will let you run thousands of Sound Blaster and Sound Blaster PRO compatible games and applications, including a rapidly growing number of Windows business applications that are compatible with the Windows Sound System.

Included with full support for these PC popular sound standards, the *ESS ES1868 and ES1868 + ES938 (for 3D)* includes multiple audio cable interface for SONY, Mitsumi and Panasonic CD-ROM drives. Also, it has multiple input and output ports for recording and playback of stereo sound.

1.1 The ESS ES1868 and ES1868 + ES938 (3D) Sound Card Features

The *ESS ES1868 and ES1868 + ES938 (for 3D)* is a fully featured sound card which includes the following :

- 16 bit full duplex stereo sound
- Record, compress and playback voice, sound and music simultaneously
- Integrated 16-bit A/D and D/A converters
- Supports on board 3D Sound Effect (*ESS ES1868 + ES938 only*)
- ADPCM as well as patented ESPCM compreassion for lower bit rates
- Maximum sampling rate up to 44.1KHz for recording and playback
- 6 channel mixer
- Software volume control for both record and playback (64 steps)
- Built in 2 watts per channel stereo power amplifier
- Connector for mic in, line in, line out, speaker out and wave table connector
- Game port for joystick or MIDI device
- Plug and Play Features
- Supports ATAPI IDE Interface

1.2 What is in your package ?

You should have the following items in your package :

- *ESS ES1868 or ES1868 + ES938 (for 3D)* Sound Card
- *ESS ES1868 / ES938* Driver Disks :
    - Driver Disk #1
    - Driver Disk #2   *or Driver CD x 1 (optional)*
    - Utility Disk #1   *(detailed CD installation, pl ease refer to the CD-Rom sleeve)*
- *ESS ES1868 and ES1868 + ES938 (for 3D)* User Manual
- Willowpond Utility Manual

1.3 System Requirements

The *ESS ES1868 and ES1868 + ES938 (for 3D) Sound Card* is manufactured for IBM PC compatible components, software and related computer components

- IBM-compatible computer models and compatibles with PnP BIOS
- At least 2MB RAM (4MB RAM for Windows 3.1 Applications)
- VGA or SVGA graphics adapter and monitor
- 2MB free on hard disk for intalling all *ESS ES1868 and ES1868 + ES938 (for 3D)* software
- MS DOS version 3.3 or later
- Windows 3.1 for games and applications in Windows
- External speakers, microphone and headphones (optional)

2. Installation
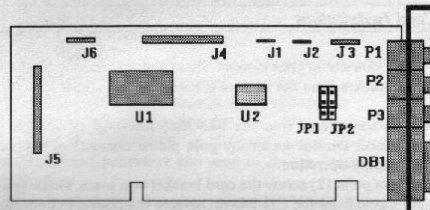
Layout of ES1868 + ES938 3D Full Duplex Stereo Sound Card

Jumpers and Connectors Description

J1	Panasonic Cd-ROM Drive Audio Cable Connector
J2	Mitsumi CD-ROM Drive Audio Cable Connector
J3	Sony CD-ROM Drive Audio Cable Connector
J4	Wave Table Connector
J5	IDE CD-ROM Drive Connector
J6	Hardware Volume Control Connector
P1	MIC IN Connector
P2	LINE IN Connector
P3	SPEAKER OUT / LINE OUT Connector
DB1	Game Port Connector

JP1 & JP2 :

1-2 = Enable on board amplifier   (P3 = SPEAKER OUT Connector)
2-3 = Disable on board amplifier   (P3 = LINE OUT Connector)

Note :   i) The factory default setting is 1-2
            ii) Uses 1-2 setting - when connect the sound card to normal computer speakers
            iii) Uses 2-3 setting - when connect the sound card to self-power devices
                 (e.g. Hi-Fi system, amplifier)

2.1 Hardware Installation

2.11 Sound Card Installation

1. Locate a free 16-bit ISA slot in your system. These slots are usually black in color.
2. Remove the metal bracket from the back of the system case adjacent to this slot and keep the screw.
3. Carefully insert the sound card into the free slot, inserting at a slight angle and then pushing firmly in place. Do not touch the gold plated contacts of the card as this may cause bad contact during operation.
4. Using the screw from point (2) screw the card bracket into place, keeping it secure.
5. Attach the Audio Cable from the CD-ROM Drive to the relevant connector on the sound card (check the sound card manual).
6. Connect the IDE ATAPI cable from the CD-ROM Drive to the relevant connector on the sound card (similar to the CD-ROM, the sound card will have Pin "1" indicated. Make sure the IDE cable with the colored strip connects at Pin "1").
7. Close the system case and attach the power cable again. Hardware installation of the CD-ROM and sound card is now completed.

2.12 CD-ROM Drive Installation

1. Turn off your computer system.
2. Un-plug the main connector from the back of your computer case/system.
3. Open the lid or remove the cover from your system case.
4. Locate a free 5.25" drive bay and carefully insert the CD-ROM drive in the bay, using the 4 screws included with this package to hold the CD-ROM drive firm in place.
5. Locate a free DC Power Connector from your system power supply and insert it to the CD-ROM connector (it can only be inserted one way).
6. Attach the Audio Cable to the CD-ROM drive (it can only be inserted one way).
7. Attach the ATAPI IDE cable to the CD-ROM Drive. The IDE cable in gray in color but has a stripe (usually red or white) colored on one side of the cable. this side is a guide for you to insert the cable in a way which corresponds to Pin"1" printed on the layout diagram of the CD-ROM ATAPI connector.

Note :
i) The ATAPI CD-ROM must connect to the secondary IDE Port on the motherboard.
ii) If no IDE port available on the motherboard, then connect ATAPI CD-ROM to the sound card (J5).

2.2   Software Driver Installation

2.21   DOS Driver Installation

1. Insert the *Sound Card* driver disk "Driver Disk #1" in your floppy drive, log onto that drive and type "**DOS\SETUP**" at DOS prompt.
2. The *Sound Card* DOS driver installation program will appear.
3. Use the arrow keys to move the pointer "[   ]" to the parameter which you want to select and then press the "**RETURN**" or "**SPACE**" key to confirm the new setting.
4. If there is more than one parameter you want to change, please repeat the procedure #3 to make all the changing
5. After you have finished the changing, press the "**ESC**" key to leave the installation program. The system will prompt you a "**Make changes to CONFIG.SYS and AUTOEXEC.BAT (Y/N)?**" at this time, you must press the "Y" key to confirm the system update, otherwise the installation program will not install the *Sound Card* DOS driver for you.
6. Reboot your computer system.

Note : If you use both of the DOS and MS Windows 3.1, you should skip the installation of the DOS driver of the Sound Card. Instead, you only need to install the Sound Card Window 3.1 driver which will work for both the DOS and Windows environment simultaneously.

DMA - direct Memory Access (DMA) is the electronic channel for moving data directly between main storage and peripheral equipment without requiring processing of the data by the CPU.

IRQ - Interrupt request (IRQ) is the request for processing on a particular priority level. It is generated by the I/O device (the add-on cards).

Port address - is the address used to specify port connectivity parameters and to assign link addresses for the certain I/O device.

2.22 ES938 DOS Driver Installation
(only for the 3D model of ES1868+ES938)

1. Create a directory "**938 DOS**" in your hard disk.
2. Insert the Sound Card "**Driver Disk #1**" in your floppy drive, copy the file "**ES1868 + ES938 CTL.EXE**" of the directory "938 DOS" on this diskette to the hard disk directory "**938 DOS**".

2.23   Windows 3.1 Driver Installation

1. After entering Windows 3.1 or higher, choose "**Run**" from the File Menu of the Program Manager.
2. Place the Sound Card driver disk "**Driver disk #1**" in a floppy drive. In the Run dialog box, type the letter of the drive and "**WIN31\SETUP**" (for example A:\WIN31\SETUP), then click the "**OK**" button.
3. When the Sound Card Windows 3.1 driver installation program appears, click "**Continue**" and then "**Driver Installation**" button to start the installation.
4. After that, you can modify the setting to what you want under the "**Hardware Setting**" dialog box. Click the "**OK**" button when you finish the modification.
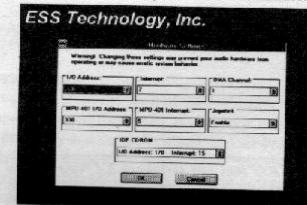

5. The system will then prompt you the following dialog box, click the "**Reboot System**" button.
6. Make sure that all floppy disk has been removed from the floppy disk drive then click the "**OK**" button, the Windows system will be updated automatically.

2.24 ES938 Windows 3.1 Driver Installation
(only for the 3D model of ES1868+ES938)

1. Create a directory "**938 WIN31**" directory in your hard disk.
2. Insert the Sound Card "**Driver Disk #1**" in your floppy drive and copy all the files under its directory "**938 WIN31**" to the hard disk directory "**938 WIN31**".
3. After entering Windows 3.1, choose "**New...**" from the File Menu of the Program Manager to open the "**New Program Object**" dialog box.
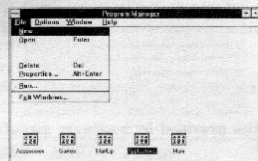
4. Select "**Program Group**" and click the "**OK**" button to open the "**Program Group Properties**" dialog box.
5. Type "**ES1868 + ES938 Control**" in the "**Description**" input box and then click the "**OK**" button.
6. Select the "**New...**" from the File Menu of the Program Manager to open the "**New Program Object**" dialog box again.
7. Select the "**Program Item**" and then click the "**OK**" button to open the "**Program Item Properties**" dialog box.
8. Type "**ES1868 + ES938 Control**" in the "**Description**" input box, "**TONECTRL.EXE**" in the "**Command Line**" input box; "**C:\938WIN31**" in the "**Working Directory**" input box. And then click the "**OK**" button.
9. Double click the upper left button of the "**ES1868 + ES938 Control**" windows to complete the Sound Card Driver installation.

2.25 WINNT 3.51 Driver Installation

1. After entering **WINNT** (Version 3.51 or higher). Double click on the "**Main**" → "**Control Panel**" → "**Drivers**" icons.
2. Click the "**Add...**" button
3. Select the "**Unlisted or Updated Driver**" item, and click the "**OK**" button.
4. Insert the Sound Card "**Driver Disk #2**", type the letter of drive and "**\WINNT**" (for example A:\WINNT\), then click the "**OK**" button.
5. Click the "**OK**" button again.
6. Under the "**ESS Base I/O Address**" dialog box, click the "**continue**" button.
7. After that, you can modify the setting to what you want under the "**ESS1868 Configuration**" dialog box. Click the "**OK**" button when you finish the modification.
8. For the new driver to take effect, you should click the "**Restart Now**" button.

2.26 Windows 95 Driver Installation

Note : Install the Sound Card into the motherboard only after the Windows '95 has already installed into the new HDD of the new system, then restart the system and follow the procedure below..

1. Install the Sound Card on the motherboard, and power on the system
2. During the Windows 95 boot procedure, new hardware will be detected as shown below.
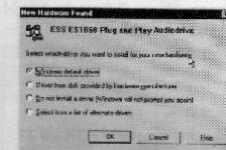
3. Select the "**Driver from disk provided by hardware manufacture**" item, and click the "**OK**" button.
4. Windows 95 will then prompt a "**Install From Disk**" dialog box.
5. Insert the Sound Card "**Driver Disk #2**" into Drive A and click the "**Browse...**" button to choose "**A:\WIN95**", then click "**OK**" button to install the Windows 95 driver.
6. After that, the "**New Hardware Found**" dialog box window will appear for gameport joystick.
7. Select the "**Windows default driver**" item, and click the "**OK**" button to complete the installation of the game port driver.
8. In the same way, you can achieve the installation of the Standard IDE/ESDI Hard Disk Controller.
9. Finally, Windows 95 will ask if you want to restart system for the new driver to take effect, you should click the "**YES**" button.

2.27 ES1868 + ES938 Windows 95 Driver Installation
(only for the 3D model of ES1868+ES938)

1. Create a "**938WIN95**" directory in the hard disk.
2. Insert the Sound Card "**Driver Disk #2**" into the floppy disk drive and copy all the files under its directory "**938WIN95**" to the hard disk directory "**938WIN95**".
3. Boot up Windows '95, click the "**Start**" button on the task bar of the desktop. Then click "**Settings**" → "**Taskbar...**" to open the "**Taskbar Properties**" dialog box.
4. Click the "**Start Menu Programs**" folder.
5. Click the "**Add...**" button to open the "**Create Shortcut**" dialog box.
6. Type "**C:\938WIN95**" in the "**Command Line:**" input box.
7. Click the "**Next >**" button to open the "**Select Program Folder**" dialog box.
8. Click the "**Next >**" button once more to open the "**Select a Title for the Program**" dialog box.
9. Type "**ES1868 + ES938 Control**" in the "**Select a name for the shortcut:**" input box and then click the "**Finish**" button to go back to the "**Taskbar Properties**" dialog box.
10. Click the "**OK**" button to complete the installation of the Sound Card Driver Installation.
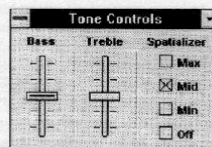
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3. How to use the ES938 (3D-sound effect) control

3.1 DOS ES1868 + ES938 Control
(only for the 3D model of ES1868+ES938)

1. Boot up the hard disk and log into the "**938DOS**" directory
2. Type "**ES1868 + ES938CTL / parameter**" at the DOS prompt. The parameter is the optional functions of the ES1868 + ES938 3D-Sound Effect control. The syntax of the complete command is described as below :
   ES1868 + ES938CTL </S:[0-3]></B:[0-7]></T:[0-7]>
   /S - Set Spatializer Level 0-Off, 1-Low, 2-Medium, 3-High
   /B - Set Bass Level (0 thru 7)
   /T - Set Treble Level (0 thru 7)
   e.g. "**ES1868 + ES938CTL /S:3**" means enable the highest 3D-Sound Effect.

3.2 Windows 3.1 ES1868 + ES938 Control
(only for the 3D model of ES1868+ES938)

1. Start up Windows 3.1 and double click the program group icon "**ES1868 + ES938 Control**".
2. Double click the program item icon "**ES1868 + ES938 Control**" to launch the ES1868 + ES938 3D-sound control program.
3. The outlook of the ES1868 + ES938 3D-Sound Effect control program is shown below :
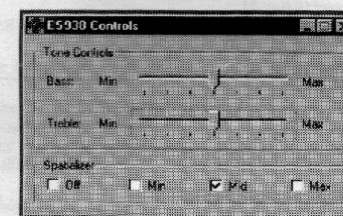
- **Bass Bar** is used to control the bass strength of the sound output. To adjust the bass level, first you must point the cursor to its middle slide button, then press the mouse left button and hold on the finger. Moving the mouse up or down at this time will adjust the Bass level, you then release the finger once you think the bass level is satisfied.
- **Treble Bar** is used to control the treble strength of sound output. To adjust the treble level, first you must point the cursor to its middle slide button, then press the mouse left button and hold on the finger. Moving the mouse up or down at this time will adjust the treble level, you then release the finger once you think the bass level is satisfied.
- **Spatializer check box** is used to control the 3D-Sound Effect strength level. There are four levels : Off (means no 3D-Sound Effect); Min (means the least 3D-Sound Effect); Mid (means more 3D-Sound Effect); Max (means the most 3D-Sound Effect). It is very easy to change the setting, clicking on the check box (you will see a X in the check box) will make the changing.

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3.3 Windows 95 ES938 Control
(only for the 3D model of ES1868+ES938)

1. Start up Windows 95 and click the "Start" button of the task bar on the windows desktop. Then select the "Programs" -> "ES1868 + ES938 Control" to launch the ES1868 + ES938 3D-Sound Effect control program.
2. The outlook of the ES1868 + ES938 3D-Sound Effect control program is shown below: Check the jumper setting of the Sound Card before installing it into the open slot and secure it.

- **Bass Bar** is used to control the bass strength of the sound output. To adjust the bass level, first you must point the cursor to its middle slide button, then press the mouse left button and hold on the finger. Moving the mouse left or right at this time will adjust the Bass level, you then release the finger once you think the bass level is satisfied.
- **Treble Bar** is used to control the treble strength of sound output. To adjust the treble level, first you must point the cursor to its middle slide button, then press the mouse left button and hold on the finger. Moving the mouse left or right at this time will adjust the treble level, you then release the finger once you think the bass level is satisfied.
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3.4 3D Spatializer technology explained

Everyone knows what stereo sound is. But how the brain perceives it, is important in order to better understand 3D sound. For example, if a piano sound is played through just the left speaker then we will perceive the sound as coming from the left side. If the same sound (and same level, or volume, of sound) is also passed through the right speaker then it will create the effect of the piano sound coming from the center of the two speakers - in essence from a "phantom" speaker. By manipulating the levels of the audio signals to the left & right speakers, and then adding 'effects' to them, it is possible to create up to two extra "phantom" speakers - thus giving us 3D Sound. Further to this we must then understand two more '3D terminologies' - **Sum** and **Difference**...

Sum describes the information of each monophonic audio signal sent to the left & right speakers (in other words - *the sound, and to which speaker*). **Difference** is the information we have when we look at the left & right signals in terms of *level, timing delay and frequency*. By subtracting the *Difference* of the right signal from the *Difference* of the left signal we come out with the all-important 'spatial' information which characterizes stereo program material - and it is this which can be manipulated to produce 3D sound. It is important to note that for the best **3D** results you should not add any effect to the *Sum* signal because this would affect the tone of the sound and result in lost tonal quality, and poor audio quality. This is where other **3D** technologies fail. Instead **3D** Spatializer concentrates purely on the *Difference* signal. These *Difference* signals are passed through a psychoacoustically correct filter which performs three critical functions. First it boosts the portion of the audio spectrum which we rely on most for spatial localization cues. Secondly it adds just enough phase delay, and further delays different parts of the *Difference* signal so that the sense of "space" and size of the "sweet-spot" is dramatically increased. Finally it has a filter/delay block which will prevent acoustic cancellation at low frequencies, so avoiding a sense of weak bass response. Another area of improvement over its competitors is that **3D** Spatializer monitors the incoming signals, and if it senses existing spatial information it will only process this to it's optimum performance level. This is because **3D** technology is now often used in the recording and game industry, and as such there is a danger of "over-processing" which can result in poor spatial image and loss of tone. No other **3D** technology can offer the user a "set-and-forget" feature like this.

Developed by Desper Products Inc, USA and widely used by the recording and entertainment industry (with credits such as Walt Disney's *"The Lion King"* movie/soundtrack) the 3D Spatializer technology has leaped from the consumer electronic markets of TV's and Hi-Fi's to the desktop computer, and is fast becoming the '**3D**' by which others follow..

4. Troubleshooting

Problem : No Sound During Normal Usage.
Solution A: Audio accessories improperly connected. Check that all audio accessories are plugged into the proper connectors.
Solution B : Volume control adjustment. Make sure that the volume control is not set too low.

Problem : No Visual Activity on Volume Meter.
Solution A: DMA channel conflict. Check that no audio accessories are attempting to use the same DMA channels and change DMA channels.
Solution B : The Sound Card driver is removed. Run setup to reinstall the driver.

Problem : No Sound or Receive Error Messages During Windows Starts.
Solution A: Another sound card driver is installed. If you install more than one sound driver in Windows, a conflict may arise. To solve this problem, you should remove all unnecessary drivers, and reinstall the Sound Card driver.
Solution B : The Sound Card driver is removed. Run setup to reinstall the driver.

Problem : No Sound in Windows 95.
Solution A : Configuration problem, you should check the configuration, use the manual configuration to set the Sound Card's resource.
Solution B : Either the motherboard does not support PnP function or the PnP option of the motherboard's BIOS is not enabled. To clarify these, please contact your motherboard dealer.