PCM-3200

PC/104 Sound Module

Copyright Notice

This document is copyrighted, 1997. All rights are reserved. The original manufacturer reserves the right to make improvements to the products described in this manual at any time without notice.

No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of the original manufacturer. Information provided in this manual is intended to be accurate and reliable. However, the original manufacturer assumes no responsibility for its use, nor for any infringements upon the rights of third parties which may result from its use.

Acknowledgements

YAMAHA and OPL are trademarks of YAMAHA Corporation.
Sound Blaster Pro, Sound Blaster 16 and Wave Blaster are registered trademarks of Creative Technology Ltd..
PC/104 and the PC/104 logo are registered trademarks of the PC/104 Consortium.
Microsoft, MS-DOS, and MS are registered trademarks of Microsoft Corporation.
Windows, Windows 95, and Windows NT are registered trademarks of Microsoft Corporation.

IBM, AT, OS/2 and Micro Channel are registered trademarks of International Business Machines Corporation.

All other product names or trademarks are properties of their respective owners.

Packing Set

Before you begin installing PCM-3200 card, please make sure that the following materials have been shipped:

- 1 PCM-3200 PC/104 Sound Module

- 1 PCM-3200 User's Manual (this document)

- 3 Driver disks for DOS, Windows 3.1, Windows 95, Windows NT 4.0, and YAMAHA Audio Rack Software application utilities

- 2 Audio Adapter Cables

If any of these items is missing or damaged, contact your distributor or sales representative immediately.

Contents

CHAPTER 1

General Information

This chapter gives background information on the PCM-3200.
(YAMAHA OPL3-SAx & OPL4-ML Sound System).

You can find out :

- Product Highlights

- Product Features

- Compatibility

- Product Specifications

- Card Layout

Product Highlights

- PC/104 Embedded-PC Module.

- Sound Blaster Pro & 16 compatible.

- Built-in YAMAHA OPL3 FM synthesizer.

- Built-in YAMAHA OPL4 Wavetable synthesizer.

- Built-in General MIDI interface.

- ISA Plug and Play (PnP).

- Full duplex for concurrent recording and playback.

- Proven YAMAHA compatibility, quality and reliability.

Introduction

The PCM-3200 sound card offers a wide range of flexible, economical and expandable solutions that can satisfy diverse needs in audio applications.

The kernel of PCM-3200 is the YAMAHA OPL chips that are the industry standard music synthesizers found in most personal computer audio boards. The OPL3 uses FM synthesis techniques which are proprietary to YAMAHA. The OPL3-SA single chip audio solution integrates audio CODEC, DOS games compatibility and D/A converter with FM synthesis in one package. The OPL3-SA replaces up to four devices used in current Soundblaster compatible audio subsystems.

For the high end of sound quality, the OPL4 family in the PCM-3200 combines synthesis techniques to produce rich musical sound using YAMAHA's unique FM-enhanced wavetable synthesis. The OPL4-ML chip combines the FM/wavetable synthesizer with a wavetable sample ROM and General MIDI interface into one package. The PCM-3200 uses the first truly cost-effective implementation of wavetable synthesis in your applications.

Whatever the particular configuration, each of the PCM-3200 audio system can be relied on the high levels of quality, compatibility and reliability.

Features

- YAMAHA's Sproven YMF718 (OPL3-SA2C) and YMF704B (OPL4-ML) chip.

- Contains 8-Mbit Wave table ROM.

- Supports industry standard PC Game compatibility.

- Supports Windows Sound System compatibility.

- Supports Plug and Play ISA 1.0a compatibility.

- Built-in 16-bit Sigma-Delta stereo CODEC.

- Programmable Sample Rate from 5.5kHz to 48kHz for Recording/ Playback.

- Hardware and software master volume control.

- Dual DMA (supports DMA Demand Mode) with FIFO for full duplex.

- Supports IMA ADPCM, A-Law, µ-Law, Compression / Decompression.

- MPU-401 compatible MIDI interface.

- Built-in 6-channel stereo mixer (Line, Aux1, Synth(Aux2), SB, CODEC, MIC).

- Supports 5-channel analog input (Line, Aux1(CD), Aux2(External Synthesizer), MIC, MIN).

- Wave table synthesis is able to generate up to 24 voices simultaneously.

- Complies with GM system Level 1.

- 24mA TTL bus driver capability.

- 5V, 12V, -12V power supply for digital and analog.

- Supports power management.

Specifications

Technical Specifications

Computer BUS : PC/104 (ISA) Standard

Bus Width : 16-bit

Input/Output Connectors :

- Wave Blaster   Input/Output
- Game/MIDI Port   Input/Output
- Line Out   Output
- Line In   Input
- Microphone In   Input
- Mitsumi CD-ROM Audio   Input
- Panasonic CD-ROM Audio   Input
- Monaural In   Input

Compatibility

- Adlib
- Sound Blaster Pro applications
- Sound Blaster 16 applications
- YAMAHA OPL3 FM Synthesizer
- YAMAHA OPL4 Wavetable Synthesizer
- MPU-401 UART MIDI

Physical and Environmental Specifications

Length : 3.6 inches

Width : 3.8 inches

Operating Temperature : 32 to 140 °F (0 to 60 °C)

Humidity (operating) : 5% to 95% Non-Condensing

Power Requirements : 5V, 12V, -12V

Board layout
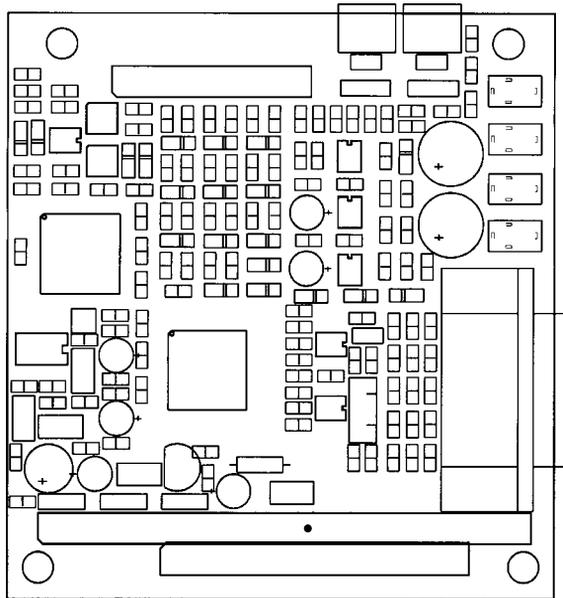
Hardware Installation

This chapter tells you how to set up the PCM-3200 (YAMAHA OPL3-SAx & OPL4-ML Sound System) hardware, including instructions on setting jumpers and connecting external devices. Be sure to read all the safety precautions before you begin the installation procedures.

Jumpers , Connectors and Switches

Connectors on the board link it to external audio devices and other PC/104 modules. In addition, the board has a number of jumpers that allow you to configure the audio application to suit your systems.

The table below lists the function of each jumpers and connectors:

Jumpers	
Label	**Function**
JP1	Select OPL4-ML analog output or wave blaster connector enable

Connectors	
Label	**Function**
J1	PC/104 ISA-bus expansion
J2	PC/104 ISA-bus expansion
CN1	Wave Blaster/MIDI Extension connector
CN2	Modem Interface connector
CN3	Game/Joystick/MIDI connector
CN4	Mono Input connector
CN5	Panasonic CD Audio Input connector
CN6	Mitsumi CD Audio Input connector
CN7	Stereo Line In connector
CN8	Stereo Line Out connector
CN9	Speaker Out connector
CN10	MIC connector
CN11	Volume control-Up header
CN12	Volume control-Down header

Switches	
Label	**Function**
SW1	Volume Control - UP (1.5dB increase/push)
SW2	Volume Control - Down (1.5dB decrease/push)

Notes : Pushing the two switches at the same time performs the mute

    function.

Locating Jumpers, connectors and switchhes
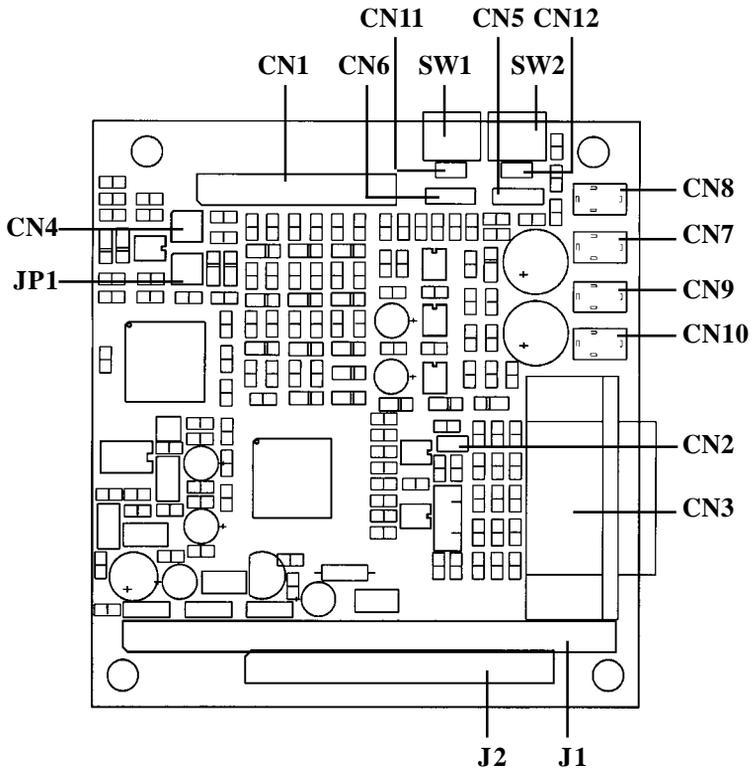
Setting Jumpers

To match the needs of your application, you need to configure your PCM-3200 by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper you connect the pins with the clip. To "open" a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case you would connect either pins 1 and 2 or 2 and 3.

Open　　　　**Closed**　　　　**Closed 2-3**
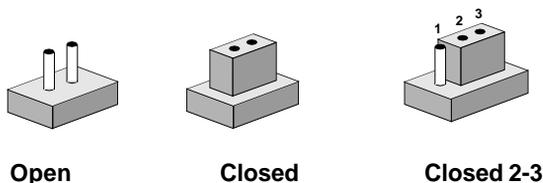
The jumper settings are schematically depicted as follows:

Open　　　　**Closed**　　　　**Closed 2-3**
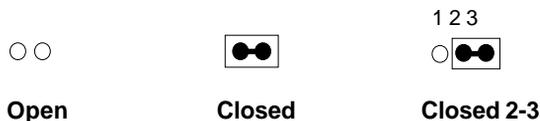
A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your system application, contact your local distributor or sales representative before you make any changes.

Safety Precautions

Warning ! Always completely disconnect the power cord from your chassis whenever you are working on it. Do not make connections while the power is on because sensitive electronic components can be damaged by the sudden rush of power. Only experienced electricians personnel should open the PC chassis.

Caution ! Always ground yourself to remove any static charge before touching the card. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.

Installing PCM-3200 Module

Factory Default Settings

PCM-3200 Sound Module default configuration that supports the Plug and Play 1.0a specification will depend on the available system resources.

Jumper Configuration Reference

Only one jumper block on the PCM-3200 Sound Module is used to configure user-selectable wave table options.

Jumper Block JP1:
This pin pair is used to set AUX2 line.

JP1 1-4 & 2-3 Both Close = OPL4-ML analog output L,R line enable (*)

JP1 1-4 & 2-3 Both Open = Wave Blaster connector enable (* means default setting)

External Devices Connecting

Wave Blaster/MIDI Extension Connector (CN1)

The wave table connector is used to attach an external wave table card for playback, mixing, or recording.

Modem Interface Connector (CN2)

This connector provides chip select signal (/MCS) and IRQ input (MIRQ) pins to control external devices such as a modem. These pins should be No-connects if not used.

Game/Joystick/MIDI Connector (CN3)

The Game/MIDI Port connector (15-pin D-sub) is used to attach a joystick for game interface or to attach an external FM synthesizer for playback, mixing, or recording.

Mono Input Connector (CN4)

Mono input connector is provided that allows routing of the PC speaker to the PCM-3200 sound card. This allows the PC-speaker to be the output of the PCM-3200.

Panasonic CD Audio Input Connector (CN5)

The Panasonic CD audio input connector is used to connect the audio cable from Panasonic CD-ROM drive for playback, mixing, and recording.

Mitsumi CD Audio Input Connector (CN6)

The Mitsumi CD audio input connector is used to connect the audio cable from Mitsumi CD-ROM drive for playback, mixing, and

recording.

Stereo Line In Connector (CN7)

The Stereo Line In phone-jack is used to attach stereo devices such as cassette, digital audio tape, or minidisk players for playback, mixing, or recording.

Stereo Line Out Connector (CN8)

The Stereo Line Out phone-jack provides the non-amplified output for the stereo channels (left and right). The output is for attaching powered speakers or an external audio amplifier. When used in conjunction with the Speaker Out output, the surround sound function will be activated.

Speaker Out Connector (CN9)

The Speaker Out phone-jack provides the built-in power amplifier outputs for the left and right stereo channels. When used in conjunction with Line Out output, the surround sound function will be activated.

MIC Connector (CN10)

The Microphone In phone-jack is used to attach a microphone for live audio input for playback, mixing, or recording. A 20dB gain can be obtained internally. The microphone input impedance will be around 1.8k ohm.

Volume Control-Up header (CN11)

This pin header can be connected to an external Volume Control-Up switch.

Volume Control-Down header (CN12)

This pin header can be connected to an external Volume Control-Down switch.

Installation for Windows 95

Use this chapter to install PCM-3200 drivers for Windows 95:

- Installation procedures
- Use OPL SoftSynth to setup GM configuration

Introduction

The PCM-3200 (YAMAHA OPL3-SAx Sound System) driver is stored in three floppy disks.

Please install Windows 95 driver when use on Windows 95.

Installing the Driver

The PCM-3200 supports Windows 95 Plug-and-Play. When you start Windows 95, the automatic search option for the Add New Hardware Wizard works as described below.

1. The following dialog box appears. Select "Driver from disk provided by hardware manufacture" as shown below, then click OK.

New Hardware Found ? ×

OPL3-SA2 Reference Board proto-1

Select which driver you want to install for your new hardware:

○ Windows default driver

⦿ Driver from disk provided by hardware manufacturer

○ Do not install a driver (Windows will not prompt you again)

○ Select from a list of alternate drivers

| OK | Cancel | Help |
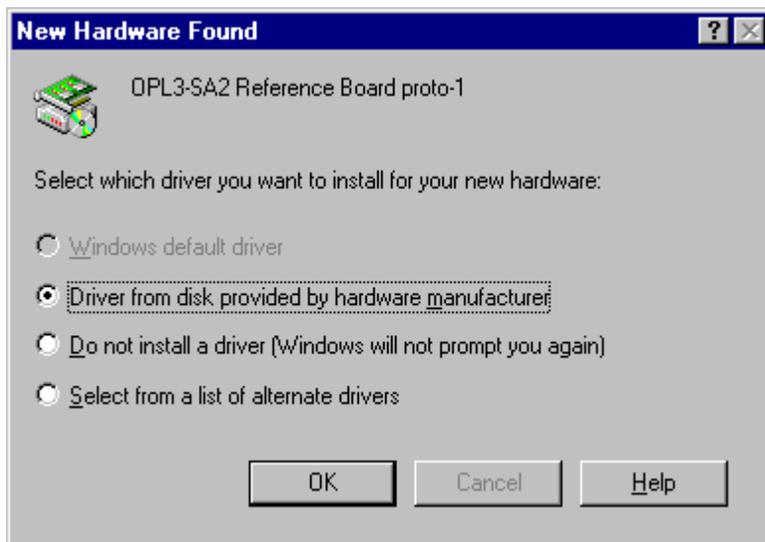
NOTE:
As the resouce data is that of OPL3-SA3, the dialog box represents as OPL3-SA3. When OPL3-SA2 is mounted. It shows "OPL3-SA2" Sound Board.

The following dialog box appears.

Insert the Driver floppy disk into the disk drive and click OK, or identify appropriate directory (WIN95) on the CD-ROM drive.

The drivers are going to be installed into your hard disk drive.

This is for the PCM-3200 (YAMAHA OPL3-SAx Sound System) installation.

The game port joystick driver is detected and installed automatically.

2. The following dialog box appears. Select "Do not install a driver" as shown below, then click OK.
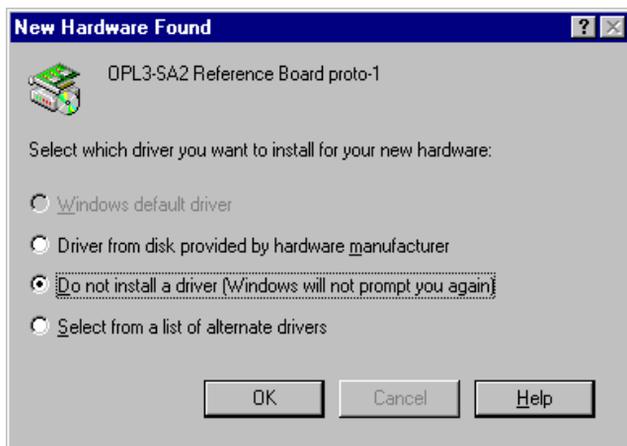
Note:

You can use PCM-3200 (YAMAHA OPL3-SAx Sound System) COM port for modem interface. In this case, install Windows standard driver or identify YAMAHA Windows 95 driver same as above 1.
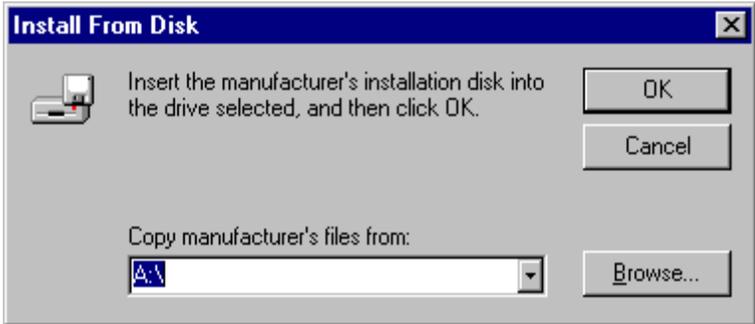
The following dialog box appears.

Select "Driver from disk provided by hardware manufacture" as shown below, then click OK. (Keep the Driver floppy disk2 in the disk drive)
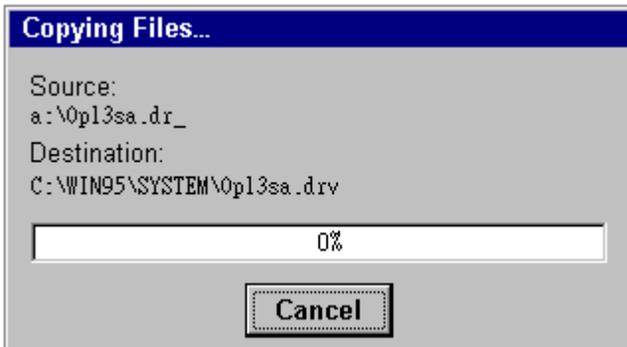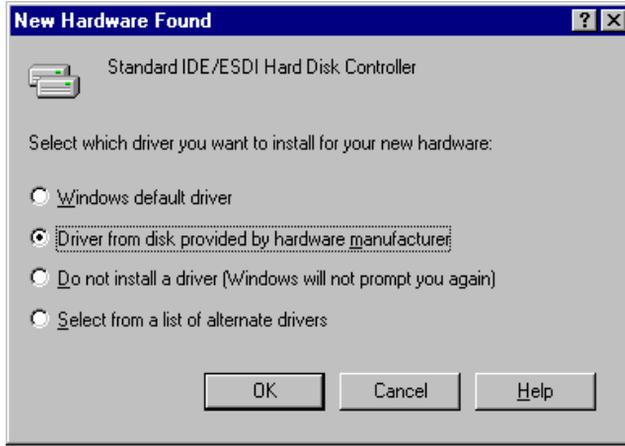

Note.

This is for standard IDE/ESDI Hard Disk Controller installation. If the board does not support the controller, select "Do not install a driver".

3. To make sure that the PCM-3200 (YAMAHA OPL3-SAX Sound System) Driver has been installed correctly, open the System Properties dialog box in the control panel.

ex1. Sound System & Game port Joystick
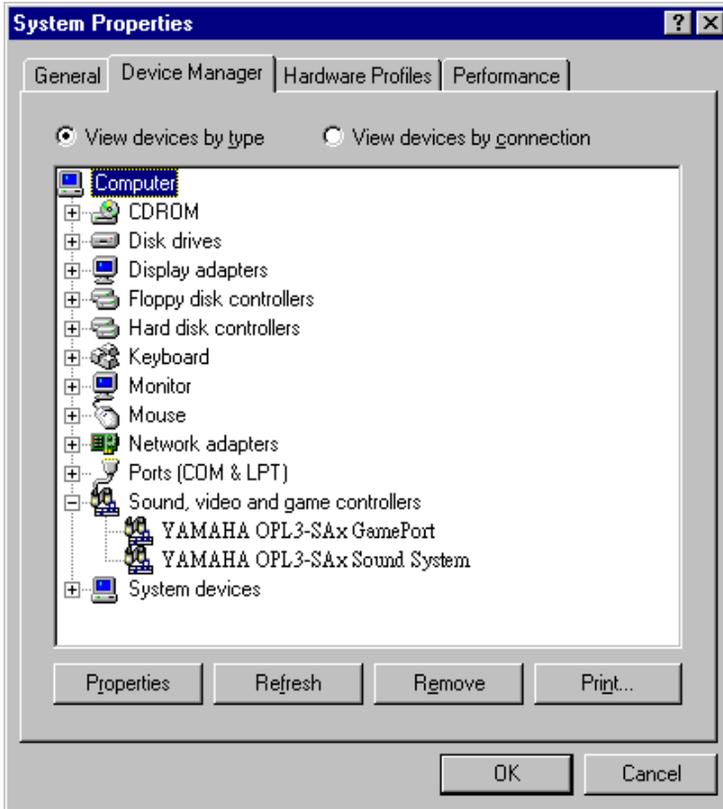
If "YAMAHA OPL3-SAx Game Port" and "YAMAHA OPL3-SAx Sound System" appear, the PCM-3200 installation is successfully completed.

OPL SoftSynth Control Panel

The Soft Synthesizer supports GM System Level 1 MIDI data. Its volume is adjusted by the Wave volume control. The OPL SoftSynth Control Panel shown below is used to setup the Soft Synthesizer.

Quality

These four options determine the sound quality (i.e., sampling rate) and the number of voices that the SoftSynth can produce simultaneously. Select a mode appropriate for the CPU performance of your computer. If you choose a high quality mode and your computer does not have adequate processing performance, the SoftSynth may not produce sound fluently. In this case, select a lower quality mode.

Mode	Sampling Rate (kHz)	Max Voices
Normal	11.025	16
Good	22.025	16
Very Good	22.025	24
Excellent	22.025	32

Reverb

If you choose ON, you can add reverb to the sound of the SoftSynth.

Filter

The SoftSynth sound is more fluent with the filter ON. This, however with the filter ON, requires CPU resources.

MPU401 OUT

These settings allow you to select an External MIDI instrument or the SoftSynth for use with DOS-based games that are played on Window box. The MS-DOS Prompt item in the Main Program Group opens a MS-DOS window. Select General MIDI in the game settings to use this function.

Full Duplex

It is possible to record a new Wave file while playing an existing Wave file.

Note:

SoftSynth/WaveOut of PCM-3200 (YAMAHA OPL3-SA2 Sound System) is cooperative mode, you can play Wave data and SoftSynth MIDI simultaneously.

<**MIC Volume Control**>

When the "MIC +20dB" is checked, microphone volume increases 20dB during play back and recording.

<**Tone Configuration**>

This function can be controlled at using YMF715 (OPL3-SAX).

Tone Control

The quantity of bass and treble can be each adjusted by 2 pieces of slider.

3D Enhanced

"Ymersion" is a Yamaha's original technology for wide stereo.

Default

When this button is clicked, the each value can be returned to default.

Installing the Application (YSTATION) and the Configuration Utility (SETUPSA)

If you in install

both the Audio Rack application "YSTATION" and the configuration utility (SETUPSA) for DOS MODE of Win95, please refer to <case1>.

If you install

only the Audio Rack application "YSTATION", please refer to <case2>.

If you install

only the configuration utility (SETUPSA) for DOS MODE of Win95, please refer to <case3>

Note:

"DOS MODE" means the status in which you select "shutdown" Windows95 in the start menu and "Restart the computer in MS-DOS mode".

<case1> Installing the Application (YSTATION) and the Configuration Utility (SETUPSA)

To install the Audio Rack "YSTATION" application and configuration utility (SETUPSA) for DOS MODE of Win95:

1. Insert Disk [SA31INST] into your floppy disk drive or select appropriate (APPLI) directory of CD-ROM.

2. Launch the MS-DOS prompt.

3. AT THE C:\DOS prompt, type

      A:

then press Enter.

If your floppy disk or CD-ROM drive is the B or E drive, type B: install of A:, then press Enter. (For installation by CD-ROM, go to the directory "APPLI:)

4. Type "WINSTALL -a", and press Enter.

(Type "WINSTCD -a", and press Enter. In the case of installation by CD-ROM)

To use IDE CD-ROM interface of soundcard, add the option "-c" also as follows. "WINSTALL -a -c"

(Type "WINSTCD -a -c", and press Enter. In the case of installation by CD-ROM)

5. Follow the on-screen instructions to complete the installation.

Note:

If you go to DOS-MODE from Win95, press "Start" button, select "Shut Down...".

Then you can run the configuration utility (SETUPSA).

<case2> Installing the Application

To install the Audio Rack APPLICATION:

1. Insert Disk [SA31INST] into your floppy disk drive or select appropriate (APPLI) directory of CD-ROM.

2. Launch the MS-DOS prompt.

3. At the C:\DOS prompt, type

A:

then press Enter.

If your floppy disk or CD-ROM drive is the B or E drive, type B: or E:

instead of A:, then press Enter. (For installation by CD-ROM, go to the directory "APPLI")

4. Type "WINSTALL", and press Enter.

(Type "WINSTCD -d", and press Enter. In the case of installation by CD-ROM)

5. Follow the on-screen instructions to complete the installation.

<case3> Installing the Configuration Utility (SETUPSA)

To install the configuration utility (SETUPSA) for only DOS MODE of Win95:

1. Insert Disk [SA31INST] into your floppy disk drive or select appropriate (APPLI) directory of CD-ROM.

2. Launch the MS-DOS prompt.

3. At the C:\DOS prompt, type

>   A:

>   then press Enter.

If your floppy disk or CD-ROM drive is the B or E drive, type B: or E: instead of A:, then press Enter. (For installation by CD-ROM, go to the directory "APPLI")

4. Type "WINSTALL -d", and press Enter.

(Type "WINSTCD -d", and press Enter. In the case of installation by CD-ROM)

To use IDE CD-ROM interface of soundcard, add the option "-c" also as follows. WINSTALL d c"

(Type "WINSTCD -d -c", and press Enter. In the case of installation by CD-ROM)

5. Follow the on -screen instructions to complete the installation.

Note:

If you go to DOS-MODE from Win95, press "Start" button, select "Shut Down...", and select "Restart the computer in MS-DOS mode?".

Then you can run the configuration utility (SETUPSA).

Using IDE CD-ROM interface in the DOS-MODE

In the DOS-MODE, when using IDE CD-ROM interface of soundcard, Change the parameters of IDE in SETUPSA, because these are OFF as default values. CD-ROM device driver should be bundled in config.sys, and the CD-ROM driver is unique to each manufacture of CD-ROM drive.

ex. : CD-ROM drive made by Mitsumi

In the "CONFIG.SYS" file, confirm or add the following two descriptions or rewrite:

DEVICE=C:\OPL3SA\SACDROM.SYS /P1E8 /I11 /A3EE

:

:

DEVICE=C:\MTM\MTMCDAI.SYS /D:MTMIDE01 /P:1F0,14 /P:1E8,11

In the "AUTOEXEC.BAT" file, confirm or add the following description or rewrite:

C:\DOS\MSCDEX.EXE /D:MTMIDE01 /S

:

If the CD-ROM drive cannot be recognized in your system, please contact with the manufacture of CD-ROM drive.

Ymersion control supported by OPL3-SAx

Ymersion, on-chip Yamaha 3D sound enhancement, can be controlled by the Windows 95 standard volume control.
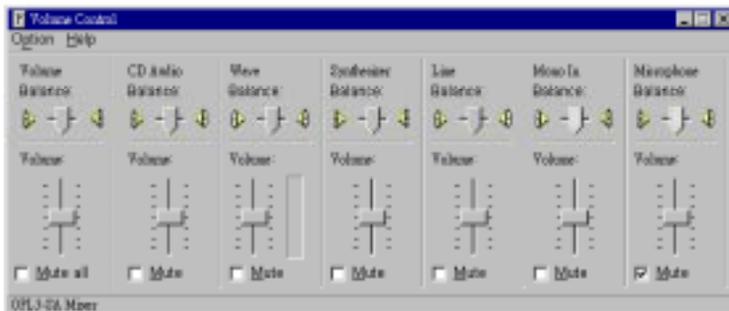
(1) Click "Options", and select "Advanced Controls".
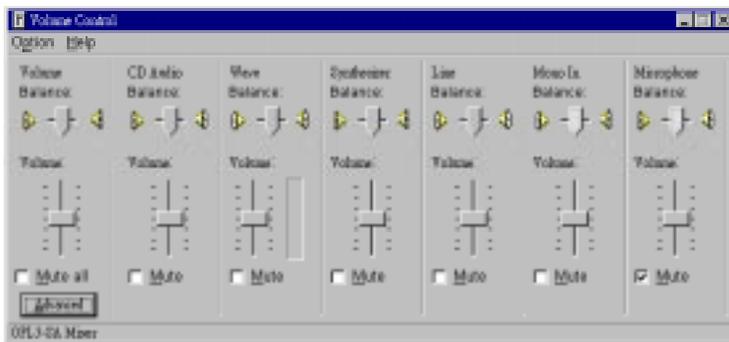
(2) Click left-bottom "Advanced" control button.
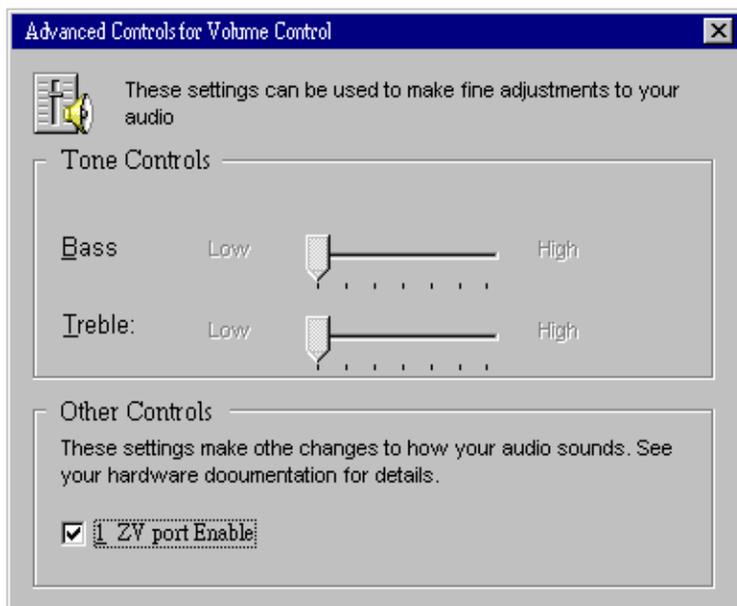
Note:

Do not check "2 ZV port Enable" while ZV port is not supported.

Installation for Windows 3.1 & DOS

Use this chapter to install PCM-3200 driver for Windows 3.1 and DOS:

- Installation procedures
- Use SoftSynth to setup GM configuration

Introduction

The PCM-3200 (YAMAHA OPL3-SAx Sound System) driver and the associated softwares are in two 2 HD floppy disks. The PCM-3200 requires MS-DOS 6.2 or Windows 3.1. The installation under other operating systems is not garanteed to work properly. Installation from MS-DOS leads to installation of windows 3.1 & DOS driver.

Along with the PCM-3200 driver, the following applications are installed.

Typing optional command leads to set up DOS enviroment only. See next page for details.

Installation

At first, make sure that CONFIGURATION MANAGER is installed in your system before starting the installation of the Windows 3.1 & DOS driver and even that of DOS only.

If Configuration Manager has not been installed, follow the guide below to install Configuration Manager.

Install Plug and play **Configuration manager**

1. In DOS : (US mode: chev us[return])
2. Insert diskette [INSTALL (DISK1)] into drive A or B.
3. At the DOS prompt,
         type A: instal [return] for diskette
4. Install as followed:
         Insert the installation diskette [INSTALL (DISK2)] for
         diskette installation
5. finish
6. reboot
7. auto configuration (by configuration manager)

Based on the resource information assigned by configuration manager, Windows 3.1 & DOS driver of the PCM-3200 (YAMAHA OPL3-SAx Sound System) can be installed.

Install PCM-3200 (YAMAHA OPL3-SAx Sound System) Windows 3.1 & DOS driver.

An PCM-3200 must be in your system for successful driver installation.

This software is installed from the DOS prompt, not the Run command in Windows.

The Installation program overwrites the existing AUTOEXEC.BAT and Windows SYSTEM.INI files.

To cancel the Installation program, press the Esc key at anytime.

1. Insert Disk [SAINST] into your floppy disk drive.

2. At the C: DOS prompt, type

   A:

   then press Enter.

If your floppy disk drive is the B drive, type B: instead of A:

3. Type "Install" (for Windows) or "Install -d" (for only DOS), and press Enter.

If Configuration manager, dwcfgmg.sys is not installed at Config.sys, the following error message will be displayed. Install Windows 3.1 & DOS driver after installing the Configuration manager.

Error : Configuration Manager was not installed.

```
YAMAHA OPL3-SAx Driver Installation
Copyright(c) 1996 YAMAHA Corporation All Rights Reserved

Do you want to install the OPL3-SAx Board ?

              [Yes]              [No]
```

4. Select and click YES.

If you're not using a mouse, press the Return key for YES, or the Esc key to Cancel.

The following dialog box appears.

```
Configuration file will be installed to:
        C:\OPL3SA
                    [OK]
```

5. Specify the installation directory for the OPL3-SAx Configuration File or accept the default, then click OK.

The files are copied to the hard disk and the following dialog box appears, informing you that parameter settings for the PCM-3200 (YAMAHA OPL3-SAx Sound System) have been added to the AUTOEXEC.BAT file and a copy of the original AUTOEXEC.BAT file has been saved as AUTOEXEC.BAK.

The following contents are written into the new AUTOEXEC.BAT. After restart PC, these are valid.

　- SET BLASTER (Setting the BLASTER function)

　- SETUPSA2.EXE (that is written into the directory assigned at "Configuration file will be installed to:")

```
"AUTOEXEC.BAT" was installed on DRIVE:C
Your original "AUTOEXEC.BAT" file was saved as "AUTOEXEC.BAK"
                        [OK]
```

6. Click OK to continue.

note:

The installation of DOS only, the message that the installation is completed is displayed. Then, click OK to finish the installation.

The following dialog box appears, asking whether or not you have Windows installed on your computer.

```
Is "Microsoft Windows" installed on this computer?
            [Yes]              [No]
```

7. Click Yes if Windows 3.1 is installed on your computer. Click No if it isn't.

The following dialog box appears, asking whether or not you want to install the OPL3-SAx (PCM-3200) Driver.

If you click Yes, the OPL3-SAx Driver for Windows is installed.

```
YAMAHA OPL3-SAx Driver Installation
Copyright(c) 1996 YAMAHA Corporation All Rights Reserved

Do you want to install the OPL3-SAx Driver?

                [Yes]                    [No]
```

8. Click Yes to install. Click No not to install.
The following display appears.

```
Applications will be installed in:
        c:\opl3sa_

                    [OK]
```

9. Specify the installation directory for the Applications or accept the default, then click OK.

The following dialog box appears, asking where Windows is installed.

```
In which directory is Windows installed?
        c:\Windows_

                [OK]
```
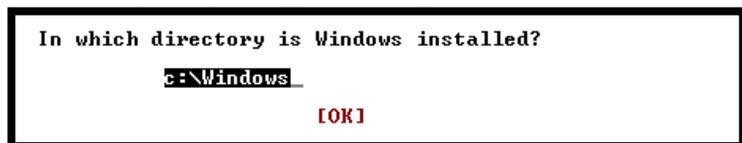
10. Click OK if Windows is installed in the directory C:\Windows, which is the default directory for Windows. Or specify a different directory.

After the Windows settings have been changed, the following dialog box appears, asking whether you want to replace the MIDI Mapper.

```
Do you want to replace the MIDI mapper?
If you select YES,
your original MIDI mapper will be saved as "midimap.opl".

              [Yes]                    [No]
```

 11. Select Yes to replace the current MIDI Mapper. Select No not to replace it.

If a MIDI Mapper already exists and you replace it with the PCM-3200 (YAMAHA OPL3-SAx Sound System) MIDI Mapper, the original one is saved as midimap.opl. See your Windows documentation for more information about MIDI Mapper.

12. Insert the other PCM-3200 (OPL3-SAx) floppy disks [SA31DRV] when prompted.

The following dialog box informs you that the installation is complete and the original SYSTEM.INI file was saved as SYSTEM.opl.

```
Driver installation is complete.
Your original "system.ini" file was saved as "system.opl".
                        [OK]
```

13. Click OK to finish.

14. Restart your computer and launch Windows.

When windows started, the application (YAMAHA STATION) is expanded.
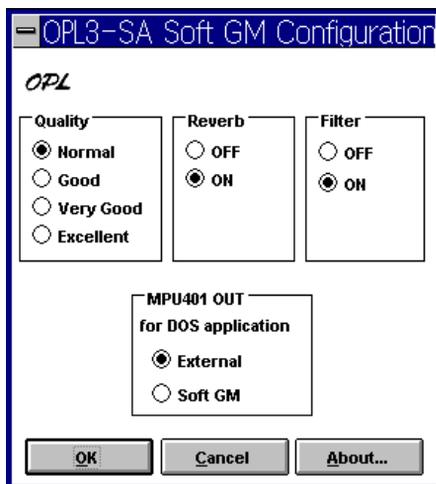
SETUPSA2

The SETUPSA2.EXE executes two processes.

- Display the information of PCM-3200 (YAMAHA OPL3-SAx

Sound System) I/O address, DMA and IRQ assigned by Configuration Manager.

- Set the value of master volume that is written into OPL3-SAx.INI.

OPL SoftSynth Control Panel

The Soft Synthesizer supports GM System Level 1 MIDI data. Its volume is adjusted by the Wave volume control. The OPL SoftSynth Control Panel shown below is used to setup the Soft Synthesizer.

Quality

These four options determine the sound quality (i.e., sampling rate) and the number of voices that the SoftSynth can produce simultaneously. Select a mode appropriate for the CPU performance of your computer. If you choose a high quality mode and your computer does not have adequate processing performance, the SoftSynth may not produce sound fluently. In this case, select a lower quality mode.

Mode	Sampling Rate (kHz)	Max Voices
Normal	11.025	16
Good	22.025	16
Very Good	22.025	24
Excellent	22.025	32

Reverb

If you choose ON, you can add reverb to the sound of the SoftSynth.

Filter

With the filter ON, the SoftSynth sound is more fluent. This, however, requires CPU resources.

MPU401 OUT

These settings allow you to select an External MIDI instrument or the SoftSynth for use with DOS-based games that are played on Window box. The MS-DOS Prompt item in the Main Program Group can open an MS-DOS window. Select General MIDI in the game settings to use this function.

Full Duplex

It is possible to record a new Wave file while playing an existing Wave file.

Note:

SoftSynth/WaveOut of PCM-3200 (YAMAHA OPL3-SAx Sound System) is cooperative mode, you can play Wave data and SoftSynth MIDI simultaneously.

CHAPTER 5

YAMAHA
Audio Rack Software

The PCM-3200 (YAMAHA OPL3-SAx & OPL4-ML Sound System) includes YAMAHA Audio Rack software , used to control CD, MIDI, WAVE, MULTI & Mixer components.

This chapter tells you how to use thiese application utilities.

Introduction

The YAMAHA Audio Rack software consists of CD, MIDI, and WAVE players. The WAVE component can record and playback WAV format files.

There are six components: Power Control, CD, MIDI, WAVE, Multi, and Mixer. They can be arranged in any order, and it is not necessary for all components to be opened all the time.

The green LED blinks while a component plays.

You can play WAVE and MIDI (.WAV and .MID) files simply by dragging and dropping them from the File Manager.

● Power Control Component

This component manages and launches the other components.

● WAVE Component

This component plays and records WAVE format files. The recording source can be CD(AUX), MIC, LINE, or LOOP.

LOOP is the internal circuit of the OPL3-SA2 (i.e. MIDI play source).

The window display shows the file name, format, and time.

● MIDI Component

This component plays Standard MIDI Files (SMF).
The window display shows the file name, tempo, and time.

● CD Component

This component plays audio CDs.
The window display shows the track, title, song name, and time.

● MULTI Component

This component controls simultaneous playback of the CD, MIDI, and WAVE components.
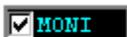
● MIXER Component

This component controls playback and recording of your sound card.

From left to right the buttons are:

Management buttons

☑ MONI	When this box is checked, you can monitor the sound at the external LINE, CD, or MIC input while recording.
POWER	Power ON/OFF
LOCK	The left and right channel faders are locked together.
SOURCE	Select the recording source (the MONI function is not available when Loop is selected).

Recording faders

REC	CD, Mic, Line, or Loop recording level. Loop is the internal circuit of the OPL3-SA2 (i.e. MIDI play source).
MIC	Available fader.

Playback faders

LINE	
CD	CD or AUX
SYNTH	FM or Wavetable Synthesizer
WAVE	WAVE Playback
MONO	MONO IN
SW.SYN	Soft Synthesizer
MASTER	

When this box is checked, the component is muted.

The following graphic shows all six components together.

System requirements

- IBM-PC compatible computer with a minimum 80286
- At least 1MB of available hard disk space
- Windows 3.1, Windows 95 or higher
- Sound board & its Windows driver
- MCI Extensions must be installed in the windows driver section

How to Play

Common operations of CD, MIDI, WAVE, and MULTI player.

Each component has the following basic functions:

Play, Stop, Pause, Fast Forward, Rewind.
The CD player also has Next and Previous functions.
Component buttons are marked with symbols commonly found on audio players. So if you've ever used an audio player you'll find Audio Rack operation straightforward.

Square	Stop
Double Bars	Pause
Single Right Arrow	Play
Double Left Arrows	Scan backward
Double Right Arrows	Scan forward
Left Arrow & Square	Go to the beginning of previous song
Right Arrow & Square	Go to the beginning of next song
Power	Show or remove component
Open	Open File Open dialog box. Drag & Drop is supported via File Manager

CD player only functions

Eject drive	Open and close the CD-ROM
Repeat	Repeat playback indefinitely

If your CD-ROM drive does not support the Eject function, nothing will happen when you click the Eject button.

Titling CDs

Clicking the Name button on the CD Component accesses the Name CD dialog box shown below. This allows you to enter the CD title and track names. The CD title can be up to 26 characters long. Track names can be up to 28 characters long, although, only the first 19 characters are displayed on the CD Component's display
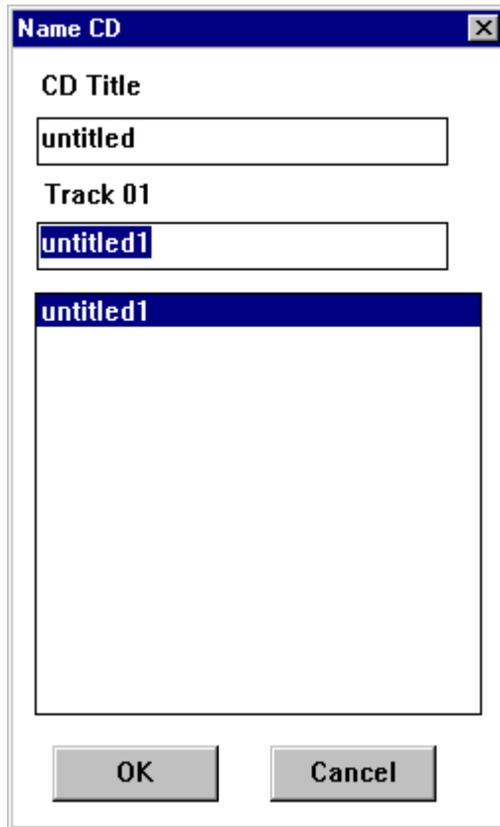
Please click the buttons, and experiment with the Audio Rack!

Playlist

The Playlist allows you to arrange CD tracks, MIDI songs, and WAVE sound files into a program of your choice. Playback starts with the first item in the playlist and continues until all items have been played. The Play Mode can be set to Repeat so that the playlist items are played repeatedly.

Click the LIST button on the Power Control component.

In the Playlist dialog box, shown below, arrange your CD, MIDI, and WAVE data as desired.

You can enter the title of your CD.

Play Mode

When set to Single, the data in the play list is played once.

When set to Repeat, the data in the play list is played repeatedly.

Clicking the OK button saves the play list in the \Windows\System\Audioruk.ini file. If the currently loaded CD is different from the one specified in the play list, an error message appears. This means that the song name on the CD does not match the one in the play list. In this case you should edit the play list. Otherwise the error message will appear repeatedly.

Config

Click the CONFIG button on the Power Control component.

In the Config dialog box you can configure the Audio Rack.

Auto Play

When Auto Play in this Config is OFF, the WAVE, MIDI, CD, and MIX components are OFF.

When Auto Play is ON, data registered in the play list plays sequentially when the Audio Rack is started.

If Play Mode on the PlayList dialog box is set to Repeat and Auto Play is ON, data registered in the play list plays repeatedly when the Audio Rack is started.

Display mode

When Auto Play is ON, you can decide which components are displayed.

When set to Select, components whose box in the Component Select section are checked are displayed.

When set to Now Playing, only the component currently playing is displayed.

Component Select

The Component Select check boxes allow you to select which components are used for Auto Play. Components whose box is checked are used for Auto Play. These settings are active only when the Display mode is set to Select.

Recording Mode

New   Create a new file

Overwrite   Overwrite the existing file

Add   Append to the current file

Sampling Rate

These buttons allow you to set the sampling rate for recording Wave files.

Type

These buttons allow you to choose either mono or stereo Wave file recording.

Data Format

These buttons allow you to set the data format to either 8 or 16 bit.

WAVE files are recorded in Mono, with a Sampling Rate of 22050Hz, and an 8-bit resolution.

Error Messages

The following is a list of Audio Rack error messages.

"Can't open window"

This message appears if a window cannot be opened when Audio Rack is started.

"Disc not loaded"

This message appears if you click the NAME button on the CD Component and no CD is loaded.

"The Wave data has changed. Save current changes?"

This message appears if you attempt to quit with unsaved changes.

"A Wave file with this name already exists. Overwrite?"

This message appears if you attempt to save a Wave file using a name that is already used.

"Can't get timer"

This message appears during playback if the Timer resources are insufficient.

"The CD loaded is different to that in the Playlist"

This message appears when you click the LIST button on the Power Component and the currently loaded CD is different from the one specified in the Playlist.

Others: error messages supported by MCI are supported.

A

Installing PC/104 Modules

This appendix gives instructions for
installing PC/104 Modules.

Installing PC/104 modules

The CPU card's PC/104 connectors give you the flexibility to attach PC/104 expansion modules. These modules perform the functions of traditional plug-in expansion cards, but save space and valuable slots. Modules include:

- **PCM-3335**   386 CPU Module w/ Flat Panel/CRT Interface
- **PCM-3600**   FAX/Modem Module
- **PCM-3420**   Fast SCSI-2 Module
- **PCM-3200**   Sound Module
- **PCM-3810**   Solid State Disk Module
- **PCM-3820**   High Density Flash Disk Module
- **PCM-3115**   PCMCIA Module (two slots)
- **PCM-3610**   Isolated RS-232 and RS-422/485 Module
- **PCM-3660**   Ethernet Module
- **PCM-3718**   30 KHz A/D Module
- **PCM-3724**   48-Channel DIO Module
- **PCM-3910**   Breadboard Module

Installing these modules on the CPU card is quick and simple. The following steps show how to mount the PC/104 modules:

1. When remove the CPU card from your system, pay particular attention to the safety instructions already mentioned.
2. Make any jumper or link changes required to the CPU card now. Once the PC/104 module is mounted you may have difficulty in accessing these.
3. Normal PC/104 modules have male connectors and mount directly onto the main card. However, to ensure better bus matching, the connectors on the CPU card and the PC/104 module are both female. For this reason, you may need to use the "male-male" adapter included with the CPU card in order to properly connect your PC/104 module. (Refer to the diagram on the following page.)
4. Mount the PC/104 module onto the CPU card by pressing the module firmly but carefully onto the mounting connectors.
5. Secure the PC/104 module onto the CPU card using the four mounting spacers and srews.
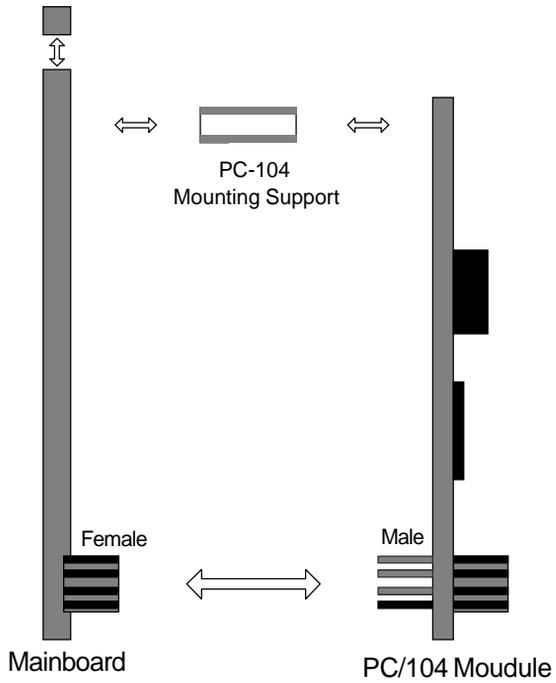
PC/104 Module Mounting Diagram
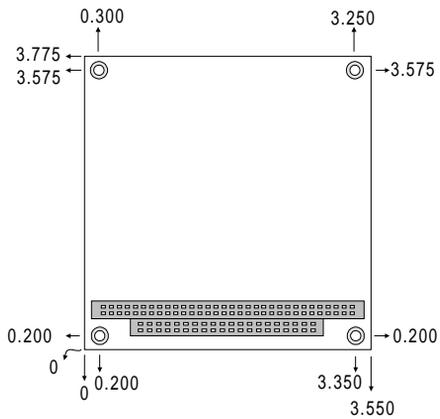
PC/104 module dimensions (inches ±5 %)

Pin Assignments

This appendix contains information of a

detailed or specialized nature. It includes :

- PC/104 Connector
- Wave Blaster/MIDI Extension Connector
- Modem Interface Connector
- Game/Joystick/MIDI Connector
- Panasonic CD Audio Connector
- Mitsumi CD Audio Connector

PC/104 Connectors (J1 , J2)

| Pin | Signal | | Signal | |
Number	Row-A	Row-B	Row-A	Row-B
0	—	—	0V	0V
1	IOCHCHK	0V	SBHE	MEMCS16
2	SD7	RESETDRV	LA23	IOCS16
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	ENDXFR	LA17	DACK0
9	SD0	+12V	MEMR	DRQ0
10	IOCHRDY	(KEY)	MEMW	DACK5
11	AEN	SMEMW	SD8	DRQ5
12	SA19	SMEMR	SD9	DACK6
13	SA18	IOW	SD10	DRQ6
14	SA17	IOR	SD11	DACK7
15	SA16	DACK3	SD12	DRQ7
16	SA15	DRQ3	SD13	+5V
17	SA14	DACK1	SD14	MASTER
18	SA13	DRQ1	SD15	0V
19	SA12	REFRESH	(KEY)	0V
20	SA11	SYSCLK	—	—
21	SA10	IRQ7	—	—
22	SA9	IRQ6	—	—
23	SA8	IRQ5	—	—
24	SA7	IRQ4	—	—
25	SA6	IRQ3	—	—
26	SA5	DACK2	—	—
27	SA4	TC	—	—
28	SA3	BALE	—	—
29	SA2	+5V	—	—
30	SA1	OSC	—	—
31	SA0	0V	—	—
32	0V	0V	—	—

Table title: **PCM-3200 PC/104 Connectors (J1 , J2)**

Wave Blaster/MIDI Extension Connector (CN 1)

PCM-3200	Wave Blaster/ MIDI Extension Connector	(CN1)	
Pin	Signal	Pin	Signal
1	GND	2	NC
3	GND	4	MIDIOUT
5	GND	6	+5V
7	GND	8	NC
9	GND	10	+5V
11	GND	12	NC
13	NC	14	+5V
15	GND	16	NC
17	GND	18	AVDD+12V
19	GND	20	LINE IN LEFT
21	GND	22	AVDD-12V
23	GND	24	LINE IN RIGHT
25	GND	26	RESETB

Modem Interface Connector (CN 2)

PCM-3200	Modem Interface Connector	(CN2)
Pin	Signal	
1	MIRQ	
2	-MCS	1

Game/Joystick/MIDI Connector (CN 3)

PCM-3200	Game/Joystick/MIDI Connector	(CN3)	
Pin	Signal	Pin	Signal
1	VCC	2	GP4
3	GP0	4	GND
5	GND	6	GP1
7	GP5	8	VCC
9	VCC	10	GP6
11	GP2	12	TXD
13	GP3	14	GP7
15	RXD		

Mono Input Connector (CN4)

Pin	Signal
PCM-3200 Mono Input Connector (CN4)	
Pin	Signal
1	GND
2	Monaual input
3	MIC input
4	NC

Panasonic CD Audio Input Connector (CN 5)

PCM-3200 Panasonic CD Audio Input Connector (CN5)

Pin	Signal	Pin	Signal
1	GND	2	Audio In Right
3	GND	4	Audio In Left

Mitsumi CD Audio Input Connector (CN 6)

PCM-3200 Mitsumi CD Audio Input Connector (CN6)

Pin	Signal	Pin	Signal
1	Audio In Right	2	GND
3	Audio In Left	4	GND