6. Appendix

Appendix A. 3D HRTFs (Head Related Transfer Functions) Positional Audio

HRTF is a set of audio filters which vary the locations of sound effects (spatial hearing cues) in three-dimension as measured from listener's eardrum. Special digital signal processing techniques are applied to re-create spatial hearing cues to make our ears hear realistic and three-dimensional sounds. This technology allows us to pin-point the location of sound sources in the real world (up/down, left/right, and front/back) by using only two speakers. The on-board ***CMI8330A/3D sound processor*** also allows the positioning of 3D sound sources and listeners via an API (Application Programming Interface) such as Microsoft's DirectSound3D API for the Windows® platform for on-the-fly sound effect production.

The 3D Positioning and on-the-fly sound effect production make possible the Interactive 3D Audio. A virtual environment can be created that can be navigated by a user while a story line unfolds (you are walking through the Jurassic Park) in unpredictable ways based on the user's actions and inputs (you hear a big roaring from behind and turn around to see it is a dinosaur!). The most fun and engaging environments are the very realistic ones that put the participant in the middle of a three-dimensional world with action happening all around: racing games, 3D Internet sites or flight simulators, to name a few.

Hints to listen three-dimensional sounds correctly and properly:

1. Use ***Headphones*** (less interference such as outside voices or room reflections comparing to using speakers).
2. Choose correct ***Output Devices*** as mentioned in the demo program or software titles.
3. Position yourself in the ***topmost of a right-angled*** triangle formed by yourself and the two speakers. In addition, the height of your ears should be equal to that of the speakers.
4. ***Turn off the Surround Sound*** if you desire the 3D positional sound effect.

Appendix B. Cyrix MMX Enhanced Media GX Processor

The more processing that occurs on the CPU itself, the more efficiently the PC system performs. The reason is simple: while the CPU processes data at 200 Mhz, for example, the bus that moves data to and from other components operates at only one third of that speed, or even less. Any off-chip data lookups take more time – and the potential for data "stalls" increases. Cyrix eliminated this bottleneck with a new processor architecture that breaks through traditional PC technology barriers to put needed multimedia and system functions on the Media GXm processor.

The ***Cyrix Virtual System Architecture (VSA)***, a fully compatible software technology that replaces hardware functionality with VSA software instructions, eliminates the need for expensive add-in cards. There are two new processor features:

1. ***XpressRAM*** - the memory controller is placed onto the CPU to allow for move of data lookups directly to DRAM and back to the CPU, eliminating the need for expensive external cache.
2. ***XpressGRAPHICS*** - the graphics controller and accelerator is built onto the Media GXm processor to allow processing of graphics at the full speed of the CPU, then going to the monitor directly without delay. In most PCs, graphics are processed away from the main CPU through the slower PCI bus at 33 Mhz. The innovative graphics compression scheme of Media GXm with high speed buffering allows flexibility in memory configuration without adding costly video memory. Just select the monitor resolution through Windows and the Media GXm processor will automatically configure the rest.

Network System Board Series
MMX Enhanced

NPC6836

User's Manual

Rev. 1.70

1. Introduction

1.1 System Overview

NPC6836 Network System Board incorporates the latest MMX Enhanced Media GXm super-integration CPU from Cyrix Corporation of USA. This 64-bit x86 compatible CPU integrates Memory Management, PCI Bus Control, Graphics/Video Acceleration and Register Sets for the 57 industrial standard MMX instructions, making it a powerful computing and multimedia processing engine. The on-board 3D Positioning sound processor gives unparalleled user gaming experience. For office users, the factory optional 100/10 Mbps LAN enables them to meet the current 10 Mbps bandwidth requirement and upgrade to 100 Mbps when higher bandwidth is required.

1.2 Features

Processor	Cyrix	• MMX Enhanced Media GXm • 200/233/266/300 MHz
Core Logic	Cyrix	• Cx 5520
Processor Voltage		• Single voltage or split rail (switching design)
VGA	Cyrix	• VSA (Virtual System Architecture) VGA • 64-bit Graphics Accelerator • Shared Memory design (1.25MB-2.125MB display memory) • Up to 1280 x 1024 /256 colors; 1024 x 768 /64K colors • Hardware assisted MPEG-1 playback
Sound	C-Media	• CM 8330A/C3D Processor • HRTF (Head Related Transfer Function) 3D Positioning • S/PDIF (Song/Philips Digital Interface) interface • Software Wavetable Synthesizer • 3D Surround Sound • SB16 compatible • Supports Aureal 3D & MS DirectX 5.0
Ethernet	Realtek MAC Speed	• RT8139 single chip • IEEE 802.3 • 100 Base TX/ 10 Base T • Full Duplex design to upgrade to 200/20 Mbps
Main Memory	Min./Max. Socket Type	• 16/256 MB • 2 168-pin DIMM sockets • High performance SDRAM
On-board I/O	EIDE	• Dual channel Enhanced IDE support PIO Mode 4 IDE devices. Twin Header IDE HDD, CD-ROM, Tape Drive for MO Drive
	Serial Port Parallel Port Floppy control	• 2 16550 compatible UARTs (one supports IrDA or ASKIr infrared interface) • ECP/EPP enhanced parallel port • Interface for 2 360/720/1.44/2.88 floppy drives
Expansion Slot	PCI ISA	• 2 Master/Slave slots (PCI Spec. 2.1 compliant) • 2 16-bit ISA slots
BIOS	Award	• Energy Star compliant green feature
Battery		• Lithium battery for CMOS backup
Form Factor		• Half-size baby AT (standard AT mounting holes)
Dimensions		• 223x223mm

5. Troubleshooting

5.1 Sound and Game Controllers

For ***Verification of Sound and Game Controllers Installation*** in ***Windows 95***, go to ***"System"*** of ***"Control Panel"*** and click ***"Device Manager"***. There is a ***"Sound, video and game controllers"*** section and the following elements should be installed.

- External Midi (Mpu401) Device
- Joystick Device
- SB16 Audio Device
- Windows Sound System (WSS) Device

If there is no other ***"Sound, video and game adapters"*** except the On-board CMI8330, there should be only the above four items in that section. Otherwise, the remaining element should be deleted.

5.2 Joystick Device

If there is a problem about ***Joystick Device*** in ***Windows 95***, check the ***Input/Output Range*** of it.

Go to ***"System"*** of ***"Control Panel"***, double-click ***"Sound, video and game controllers"*** section. Show the ***Properties*** of ***Joystick Device*** and click the ***Resources*** tab. The Input/Output range should be ***"0200-0207"***. Otherwise, disable ***"Use Automatic Setting"*** and change the Input/Output range to the above correct value.

5.3 Plug-and-Play Device

If there are problems associated with PnP Devices, you could try to reset the ***PNP/PCI configuration data*** of mainboard BIOS per the following procedures.

1. Enter ***CMOS Setup Utility*** page during System Boot-up (press ***Del*** during Memory Test).
2. Choose ***PNP/PCI Configuration***, set ***"Reset Configuration Data: Enable".***
3. Press ***ESC*** to go back to ***CMOS Setup Utility*** main page.
4. Press ***F10*** and save the settings, then exit.

4. Software Driver Installation

4.1 Cyrix VSA VGA Software Driver

1. To install ***Windows 95 Driver***, after Windows 95 installation, go to ***System*** of ***Control Panel***. In ***Device Manager***, double-click ***"Display Adapter"*** then ***Standard Display Adapter (VGA)*** will be shown. Go to the ***Properties*** of Standard Display Adapter and then ***Change Driver*** for this display adapter. Click ***"Have Disk"*** and insert the driver diskette in the floppy drive. Then enter the path ***"A:\Win95"*** for driver installation.

2. To install ***Windows NT 4.0 Driver***, go to ***Display Properties*** of ***Control Panel*** and enter ***Display Setting***. Click ***"Display Type"*** and then change ***"Adapter Type"***. Click ***"Have Disk"*** and insert the driver diskette in the floppy drive. Then enter the path ***"A:\Winnt4.0"*** for driver installation.

4.2 CMI 8330 3D Sound Driver

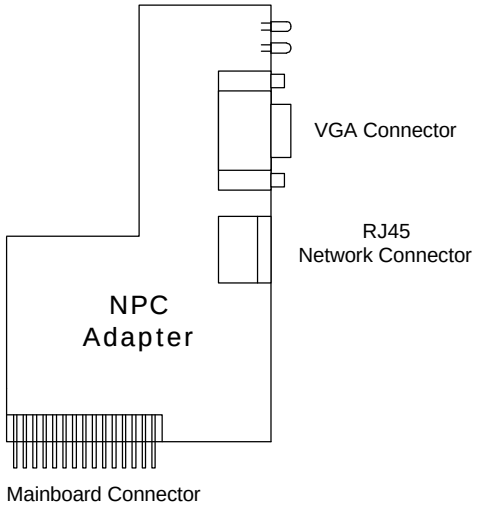
1. To install ***DOS Utility***, insert the driver diskette in the floppy drive and type as follows:
   A:\DOS\install A: [destination drive]
   For example, ***"A:\DOS\install A: C:"***.

2. To install ***Windows 95 Driver***, don't select ***"Sound, MIDI, or Video Capture Card"*** for installation during the phase of ***Analyzing Your Computer***. After Windows 95 installation, ***delete all useless Audio Adapter*** in ***Device Manager*** and then ***Restart*** the computer. Windows 95 will prompt for ***Audio Adapter***. Choose ***"Driver from disk provided by hardware manufacturer"***. Insert the driver diskette of Sound Driver in the floppy drive. Then enter path ***"A:\"*** for driver installation.

4.3 RT8139 100/10 Mbps LAN Driver

1. To install ***Windows 95 Driver***, don't select ***"Network Adapter"*** for installation during the phase of ***Analyzing Your Computer***. After Windows 95 installation, ***delete all useless PCI Ethernet Controller*** in ***Device Manager*** and then ***Restart*** the computer. Windows 95 will prompt for ***PCI Ethernet Controller***. Choose ***"Driver from disk provided by hardware manufacturer"***. Insert the driver diskette in the floppy drive. Then enter path ***"A:\"*** for initial installation (may prompt for ***"netrts.inf"***) and path ***"A:\Win95"*** for file ***"rtl8139.sys"***.

2. To install ***Windows NT 4.0 Driver***, go to ***Network*** of ***Control Panel*** and ***Install NT Networking***. Click ***"Wired to the network"*** and then ***select from list***. Click ***"Have Disk"*** and insert the driver diskette in the floppy drive. Then enter the path ***"A:\"*** for installation of ***RTL8139 Fast Ethernet Adapter***.



2. Getting Started

2.1 Unpacking NPC6836

The package should contain the following items:

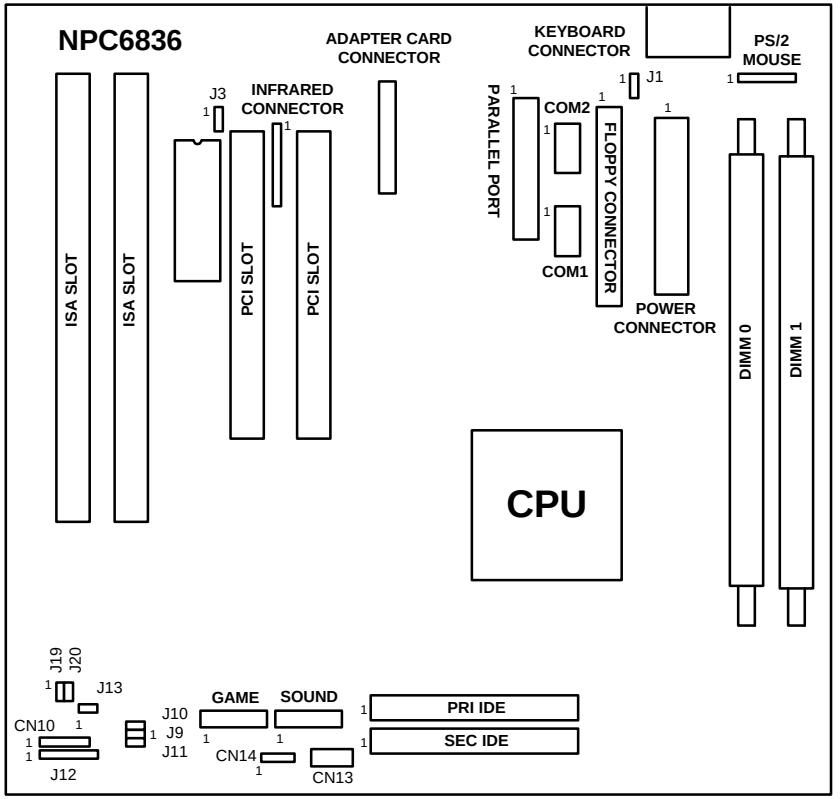
- ✓ NPC6836 system board
- ✓ this manual
- ✓ NPC adapter card
- ✓ IDE cable
- ✓ floppy cable
- ✓ sound and game cables
- ✓ floppy diskette containing software driver for sound, VGA (and network, depending on purchase option)

Note: *There is an on-board* ***Lithium Battery*** *(Industrial standard coin type CR2032) for backup of the CMOS memory holding the* ***Setup*** *information when the system board power is turned off. Depending on the usage pattern, the battery can last for about a year. It should be replaced with a new battery when error message such as* ***CMOS Options not set***, ***Battery is dead, Battery status low*** *appears. To replace the battery: turn off the system power, remove the original battery and replace it with a new CR2032 battery.*

2.2 NPC Adapter Card

The layout of NPC Adapter Card is shown as follows:

2.3 System Board Diagram



Jumper Settings

CMOS Settings

Normal Operation J1

Clear CMOS J1

Speaker ON/OFF Switch

Speaker Output via Sound Blaster J13

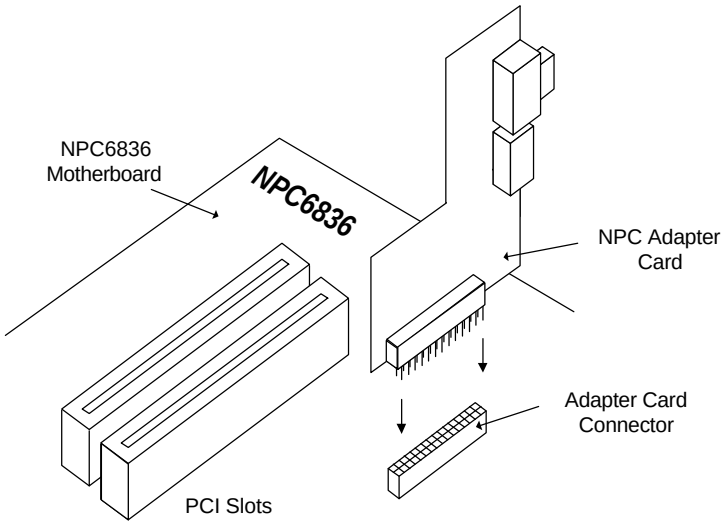
Speaker Off J13

Connectors

J9	Hard disk LED
J10	Standby switch
J11	Reset switch
J12	Keylock
J19	Sony/Philips digital input
J20	Sony/Philips digital output
CN10	Speaker
CN13	CD line in (Panasonic)
CN14	CD line in (Sony)

2.4 How to Insert NPC Adapter Card

Insert NPC Adapter Card in ***Adapter Card Connector*** as following diagram shows:



3. BIOS Setup

For optimization purpose, most of the BIOS parameters have been pre-determined by the manufacturer. The following steps of the BIOS setup are the minimum that is required to get start.

1 Enter ***CMOS Setup Utility*** page during System Boot-up (press ***Del*** during Memory Test).
2 Choose ***LOAD SETUP DEFAULTS***.
3 Choose ***Standard CMOS Setup.***
  3.1 Set the ***Date/Time***.
  3.2 Set to ***AUTO*** for the ***Type*** and ***Mode*** of all Drives.
  3.3 Set the ***Floppy A*** and ***Floppy B*** (if any).
  3.4 Press ***ESC*** to go back to ***CMOS Setup Utility*** page.
4 Choose ***PNP/PCI Configuration***, set ***"IRQ-12 assigned to: Legacy ISA"*** when using ***PS/2 Mouse***. Otherwise, set it to ***"PCI/ISA PnP"***.
5 Press ***F10*** and save the setting, then exit.

Advanced users may want to manipulate the various options to fine-tune their hardware to make the most out of their systems. If there is problem because of modifying the BIOS parameters, it is possible to return to the safe options by loading Setup Default in the main setup page to start all over again.