Lex Mainboard

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USER'S MANUAL

BN693X
USER'S MANUAL

M/B For Socket 370 Pentium® III Processor

NO. G03-BN693XR1A

Release date: DEC 2000

**** Year 2000 compliant ****

TABLE OF CONTENT

USER'S NOTICE

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Manual Revision Information

Reversion	Revision History	Date
1.0	First Release	Dec 2000

Item Checklist

- ☑ BN693X
- ☑ Cable for IDE/Floppy
- ☑ CD for motherboard utilities
- ☐ Cable for USB Port 3/4 (Option)
- ☑ BN693X User's Manual

Intel® Processor Family

Thermal Solutions

As processor technology pushes to faster speeds and higher performance, thermal management becomes increasingly crucial when building computer systems. Maintaining the proper thermal environment is key to reliable, long-term system operation. The overall goal in providing the proper thermal environment is keeping the processor below its specified maximum case temperature. Heatsinks induce improved processor heat dissipation through increased surface area and concentrated airflow from attached fans. In addition, interface materials allow effective transfers of heat from the processor to the heatsink. For optimum heat transfer, Intel recommends the use of thermal grease and mounting clips to attach the heatsink to the processor.
When selecting a thermal solution for your system, please refer to the website below for collection of heatsinks evaluated and recommended by Intel for use with Intel processors.

Vendor list for heatsink and fan of **Pentium® !!! processor**, please visit :
http://developer.intel.com/design/Pentiumiii/components/index.htm
Vendor list for heatsink and fan of **Intel®Celeron™ processor**, please visit :
http://developer.intel.com/design/celeron/components/index.htm

Chapter 1

Introduction of BN693X Motherboard

1-1 Feature of motherboard

The BN693X motherboard is design for use Intel PentiumIII /Celeron PPGA/FC-PGA CPU, which utilize the Socket 370 design and the memory size expandable to 1.5GB.

This motherboard use the newest VIA Apollo Pro VT82C693A chipset, whose 133MHz front side bus & 133MHz memory interface delivers a clear upgrade path to the future generation of 133MHz processors and PC-133 SDRAM. The BN693X motherboard offers ULTRA ATA 66. This provides speedier HDD throughout that boosts overall system performance.

The BN693X also has an integrated AC'97 2.1 CODEC on board which is fully compatible with Sound Blaster Pro® that gives you the best sound quality and compatibility.

With 2 USB control as well as capability of expanding to 4 USB connectors, the BN693X meet future USB demand also this motherboard has built-in hardware monitor function. This will monitor and protect your computer.

The BN693X motherboard supports ACPI function such like Ring_In Wake Up, Ring_In Power On, Wake On LAN, RTC Power On for OS Directed Power Management.

The Special fuction in BIOS SETUP can choose system clock step by step increasing between 66~99Mhz, 100~132Mhz, 133~166Mhz to approach Over-Clock possiblilty. System auto detection and reboot system use default frequency when system boot fail by overclocking.

This motherboard supports standard Synchronous DRAM (SDRAM) and Virtual Channel Memory (VCM), in a flexible mix/match manner.

This motherboard provides high performance & meets future specification demand. It is really wise choice for your computer.

1-2 Specification

Spec	Description
Design	* ATX form factor 4 layers PCB size: 30.5x19.0cm
Chipset	* VIA Apollo Pro VT82C693A/82C686A Chipset
Socket 370	* Support Intel Pentium III /Celeron PPGA/FC-PGA CPU * Support Cyrix MIII processor * Support Front Side Bus 66Mhz/100Mhz/133Mhz CPU
Memory Socket	* 168-pin DIMM socket x 3 * PC-100/PC-133 SDRAM/Virtual Channel Memory (VCM) * Expandable to 1.5GB * Support 3.3V SDRAM DIMM
Expansion Slot & Headers	* AGP slot x1 * 32-bit PCI slot x 5 * AMR slot x 1 * ISA slot x 1
Integrate IDE	* 2 channel of Bus Master IDE port supporting ULTRA DMA 33/66 mode devices
Audio	* AC'97 Digital Audio controller integrated * AC'97 Audio CODEC on board * Audio driver and utility included
PC Health	* Monitoring CPU/System Temperature, FAN Speed, System Voltage
BIOS	* Award 2MB Flash ROM
Multi I/O	* PS/2 keyboard and PS/2 mouse connectors * Floppy disk drive connector x1 * Parallel port x1 * Serial port x2 * USB connector x2 * USB headers x2 (connecting cable option) * Audio connector (Line-in, Line-out , MIC & Game Port)

1-3 Performance List

The following performance data list is the testing result of some popular benchmark testing programs. These data are just referred by users, and there is no responsibility for different testing data values gotten by users (the different Hardware & Software configuration will result in different benchmark testing results.)

CPU: Intel PIII® 866MHz FC-PGA package
Intel Celeron 667MHz FC-PGA package

DRAM: 128M SDRAM x2 (Hyundai GM 72V66841ET75)

VGA Expansion Card: Geforce 256 (1024x768 Hi-color) Driver V3.68

Hard Disk Driver: Quantum Fireball KX20A11

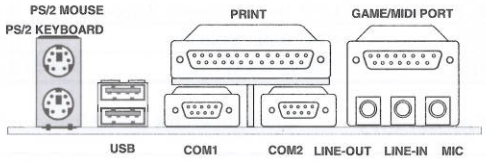
BIOS: Award Optimal default

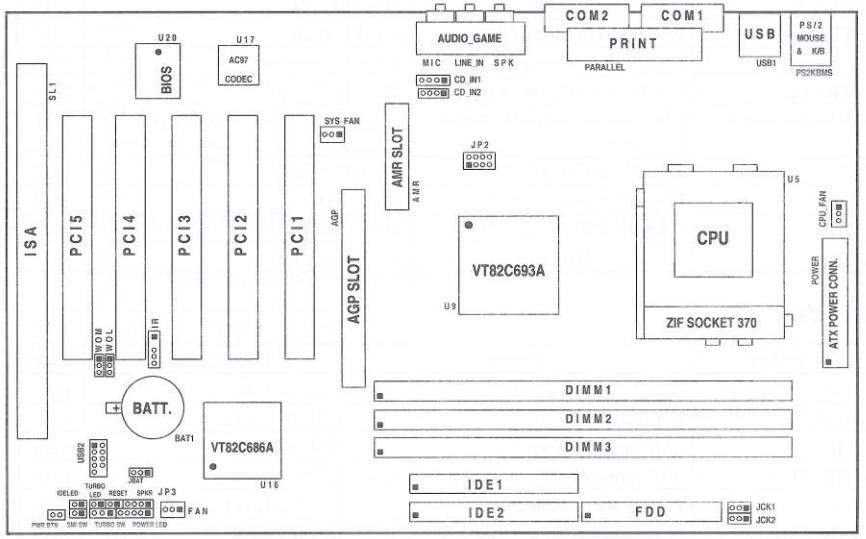
OS: Win 98SE

Performance Test Report

	Coppermine 866MHz	Celeron 667MHz
3D Mark 99	5899	4327
3D Mark 2000	4115	2918
3D Winbench 99 V1.2	896	816
3D Winbench 2000	80	73.4
Final Reality	5.78	4.20
Winstone 99 V1.3	31.2	23.9
Winstone 2000	32.5	23.2
Winbench 99 :		
CPU Mark 99	73.6	40.1
FPU Winmark 99	4590	2530
Business Disk Winmark99	3940	3500
Hi-end Disk Winmark99	11000	9390
Business Graphic Winmark	374	232
Hi-end Graphic Winmark	1040	686
SYS Mark 2000 : SISMark 2000 Rating (Internet Content Creation / Office Productivity)		
Suites	170 (168/171)	105 (106/105)
Offical	171 (173/169)	106 (109/104)
SISOFT Sandra 2000 :		
CPU MIPS	2342	1796
FPU MFLOPS	1160	889
CPU / Memory MB/S	282	164
FPU / Memory MB/S	303	178
QUAKE3 :		
DEMO1 FPS	97.2	51.6
DEMO2 FPS	91.9	48.2

1-4 Layout & Jumper Setting





Jumpers

Jumper	Name	Description	Page
JCK1, JCK2	CPU Bus Frequency Selection	3-pin Block	p. 8
JP2	CPU Ratio Selector	2x4-pin Block	p. 8
JBAT	CMOS RAM Clear	3-pin Block	p. 9

Connectors

Connector	Name	Description	Page
POWER	ATX Power Connector	20-Pin Block	p.15
PS2KBMS	PS/2 Keyboard/PS/2 Mouse	6-Pin Female	p.15
USB1	USB Port Connector	4-Pin Connector	p.16
PARALLEL	Parallel Port Connector	25-Pin Female	p.16
AUDIO–GAME	Line IN/Line Out/MIC/Game Connector	15-pin Connector+3 phone jack	p.16
COM1, COM2	Serial Port COMA, COMB	9-Pin Connector	p.16
FDD	Floppy Driver Connector	34-Pin Block	p.17
IDE1	Primary IDE Connector	40-Pin Block	p.17
IDE2	Secondary IDE Connector	40-Pin Block	p.17

Headers

Header	Name	Description	Page
USB2	USB Port Connector	10-Pin Block	p.18
IDELED	IDE activity LED	2-Pin Block	p.18
SMI	SMI Suspend Switch	2-Pin Block	p.18
PWR BTN	ATX power button/soft power button	2-Pin Block	p.18
JP3	Front Panel Connector	16-Pin Block	p.18
WOL	Wake On LAN	3-pin Block	p.19
WOM	Wake On Modem	3-pin Block	p.19
CPU–FAN, FAN SYS–FAN,	FAN Connector	3-pin Block	p.19
IR	Infrared Module Connector	5-Pin Block	p.20
CD_IN1, CD_IN2	CD-Audio Connector	4-pin Block	p.20

Expansion Sockets

Socket/Slot	Name	Description	Page
ZIF Socket 370	CPU Socket	Celeron PPGA CPU Socket	p.11
DIMM1, DIMM2 DIMM3	DIMM Module Socket	168-pin DIMM SDRAM Module Expansion Socket	p.12
PCI1, PCI2, PCI3, PCI4, PCI5	PCI Slot	32-bit PCI Local Bus Expansion slots	p.14
AGP SLOT	AGP SLOT	AGP Expansion Slot	p.15
SL1	ISA Slot	16-bit ISA Bus Expansion slot	

Chapter 2

Hardware installation

2-1 Hardware installation Steps

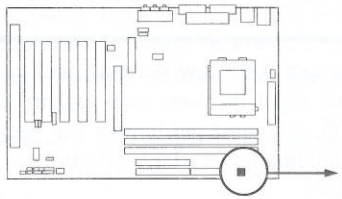
Before using your computer, you had better complete the following steps:

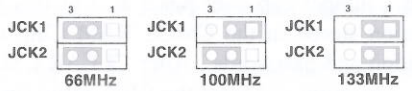
1. Check motherboard setting
2. Install CPU
3. Install Memory
4. Install Expansion cards
5. Connect Ribbon cables, Panel wires, and power supply
6. Setup BIOS
7. Install software driver & utility

2-2 Checking Motherboard's Jumper Setting

1. CPU Bus Frequency Selection : JCK1, JCK2

CPU BUS	JCK1	JCK2
66MHz	2-3	2-3
100MHz	1-2	2-3
133MHz	1-2	1-2





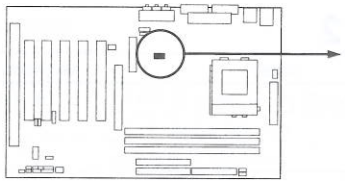
CPU Bus Frequency Selection

- **Users also can setting the CPU Bus frequency in the "Host Clock" in Miscellaneous Control. (Please refer to page 40)**

2. CPU Ratio Selector : JP2

Ratio	1	2	3	4
2.0x	ON	ON	ON	ON
2.5x	ON	ON	OFF	ON
3.0x	ON	OFF	ON	ON
3.5x	ON	OFF	OFF	ON
4.0x	OFF	ON	ON	ON
4.5x	OFF	ON	OFF	ON
5.0x	OFF	OFF	ON	ON

Ratio	1	2	3	4
5.5x	OFF	OFF	OFF	ON
6.0x	ON	ON	ON	OFF
6.5x	ON	ON	OFF	OFF
7.0x	ON	OFF	ON	OFF
7.5x	ON	OFF	OFF	OFF
8.0x	OFF	ON	ON	OFF



CPU Ratio Selector

Table for the Pentium III and Celeron Socket 370 CPU

Celeron		
Speed	Bus	Ratio
300/66	66MHz	4.5x
333/66	66MHz	5.0x
366/66	66MHz	5.5x
400/66	66MHz	6.0x
466/66	66MHz	7.0x
500/66	66MHz	7.5x
533/66	66MHz	8.0x
533A/66	66MHz	8.0x
566/66	66MHz	8.5x
600/66	66MHz	9.0x
633/66	66MHz	9.5x
667/66	66MHz	10.0x
700/66	66MHz	10.5x

Pentium III		
Speed	Bus	Ratio
500E/100	100MHz	5.0x
533EB/133	133MHz	4.0x
550E/100	100MHz	5.5x
600E/100	100MHz	6.0x
600EB/133	133MHz	4.5x
650E/100	100MHz	6.5x
667/133	133MHz	5.0x

Pentium III		
Speed	Bus	Ratio
700E/100	100MHz	7.0x
733/133	133MHz	5.5x
750E/100	100MHz	7.5x
800E/100	100MHz	8.0x
866/133	133MHz	6.5x
933/133	133MHz	7.0x
1.0B GHz/133	133MHz	7.5x

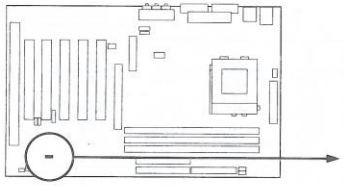
* Because the Ratio are fixed by CPU Manufacture, users don't need to setting ratio any more, this table just for reference use.

3. CMOS RAM Clear: JBAT

WARNING: Make sure your computer is POWER OFF when you CLEAR CMOS.

Connect a jumper cap over pin 2 & 3 of this jumper for a few seconds, will clears information stored in the CMOS RAM Chip that input by user, such as hard disk information and passwords. After CLEAR CMOS, you must put jumper cap back to pin 1 & 2 location and enter the BIOS setup (by holding down <DEL> during power-up) to re-enter BIOS information (see BIOS SETUP).

Selections	JBAT
Normal	1-2 (Default)
Clear CMOS	2-3 (momentarily)



CMOS RAM Clear Setting

2-3 Install CPU

2-3-1 Glossary

Chipset (or core logic) – two or more integrated circuits which control the interfaces between the system processor, RAM, I/O devises, and adapter cards.

Processor slot/socket – the slot or socket used to mount the system processor on the motherboard.

Slot (AGP, PCI, ISA, RAM) – the slots used to mount adapter cards and system RAM.

AGP – Accelerated Graphics Port – a high speed interface for video cards; runs at 1X (66MHz), 2X (133MHz), or 4X (266MHz).

PCI – Peripheral Component Interconnect – a high speed interface for video cards, sound cards, network interface cards, and modems; runs at 33MHz.

ISA – Industry Standard Architecture – a relatively low speed interface primarily used for sound cards and modems; runs at approx. 8MHz.

Serial Port – a low speed interface typically used for mouse and external modems.

Parallel Port – a low speed interface typically used for printers.

PS/2 – a low speed interface used for mouse and keyboards.

USB – Universal Serial Bus – a medium speed interface typically used for mouse, keyboards, scanners, scanners, and some digital cameras.

Sound (interface) – the interface between the sound card or integrated sound connectors and speakers, mic, game controllers, and MIDI sound devices.

LAN (interface) – Local Area Network – the interface to your local area network.

BIOS (Basic Input/Output System) – the program logic used to boot up a computer and establish the relationship between the various components.

Driver – software, which defines the characteristics of a device for use by another device or other software.

Processor – the "central processing unit" (CPU); the principal integrated circuit used for doing the "computing" in "personal computer"

Front Side Bus Frequency
The working frequency of the motherboard, which is generated by the clock generator for CPU, DRAM and PCI BUS.

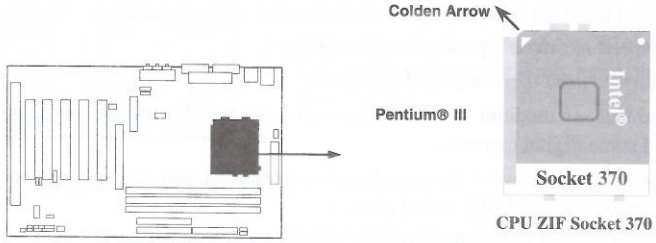
CPU L2 Cache
The flash memory inside the CPU, normally Pentium III CPU has 256K or above, while Celeron CPU will have 128K.

2-3-2 Install CPU

This motherboard Provides a ZIF Socket 370. The CPU that comes with the motherboard should have a cooling FAN attached to prevent overheating. If this is not the case, then purchase a correct cooling FAN before you turn on your system.

WARNING! Be sure that there is sufficient air circulation across the processor's heatsink and CPU cooling FAN is working correctly, otherwise it may cause the processor and motherboard overheat and damage, you may install an auxiliary cooling FAN, if necessary.

To install a CPU, first turn off your system and remove its cover. Locate the ZIF socket and open it by first pulling the level sideways away from the socket then upward to a 90-degree angle. Insert the CPU with the correct orientation as shown below. The notched corner should point toward the end of the level. Because the CPU has a corner pin for two of the four corners, the CPU will only fit in the orientation as shown.



CPU ZIF Socket 370

When you put the CPU into the ZIF socket. No force require to insert of the CPU, then press the level to Locate position sightly without any extra force.

2-3-3 Over clock Running

WARNING! This section is for experienced motherboard installer only. Over clocking can result in system unstability or even shortening life of the processor.

After setting the Jumper JCK1, JCK2 you can choose overclock running by BIOS CMOS SETUP UTILITY. When you entered CMOS SETUP UTILITY, choose "Miscellaneous Control" you will see the screen as below then.


```
CMOS Setup Utility - Copyright(C) 1984-2000 Award Software
Miscellaneous Control

CyrixIII Clock Ratio            Default      | Item Help
Auto Detect DIMM/PCI Clock      Enabled      |
Spread Spectrum                 Disabled     | Menu Level >
** Current Host Clock is      66Mhz **      |
Host Clock at Next Boot is     66Mhz        | CyrixIII CPU Ratio
** Current DRAM Clock is      66Mhz **      | Adjustment
DRAM Clock at Next Boot is 66Mhz (HOST CLK) |

↑↓→← Move Enter:Select Item +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Optimized Defaults F7:Standard Defaults
```

By press PageDown/PageUp key you can change the Host clock frequency
When jumper setting 66MHz you can choose 66~99MHz
When jumper setting 100MHz you can choose 100~132MHz
When jumper setting 133MHz you can choose 133~166MHz

2-4 Install Memory

This motherboard provides three 168-pin DUAL INLINE MEMORY MODULES (DIMM) sites for memory expansion available from minimum memory size of 32MB to maximum memory size of 1.5GB SDRAM.

Valid Memory Configurations

Bank	168-Pin DIMM		Total Memory
Bank 0, 1 (DIMM1)	SDRAM 32, 64, 128, 256, 512MB	X1	32MB~512MB
Bank 2, 3 (DIMM2)	SDRAM 32, 64, 128, 256, 512MB	X1	32MB~512MB
Bank 4, 5 (DIMM3)	SDRAM 32, 64, 128, 256, 512MB	X1	32MB~512MB
Total	System Memory (Max. 1.5GB)		32MB~1.5GB

NOTE! Make sure the total installed memory does not exceeds 1.5GB, otherwise the system may hang during startup.

Generally, installing SDRAM modules to your motherboard is very easy, you can refer to figure 2-4 to see what a 168-Pin PC100 & PC133 SDRAM module looks like.