HIPPO DCA 1
486

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REVISION: 1.01

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RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference with radio and television reception.

If this equipment does cause interference to radio or TV reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

* Reorient the receiving antenna.
* Relocate the computer away from the receiver.
* Move the computer away from the receiver.
* Plug the computer into a different outlet so that computer and receiver are on different branch circuits.
* Ensure that card slot covers are in place when no card is installed.
* Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.
* If peripherals are used with this system, it is suggested to use shielded, grounded cables, with in-line filters if necessary.

If necessary, the user should consult the dealer service representative for additional suggestions.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

NOTE

1. Electronic components are sensitive to dust and dirt. Do inspect and clean the computer system regularly.

2. Turn off the power whenever you install or remove any connector, memory module and add-on card. Before turning on the power, make sure that all the connectors, memory modules and add-on cards are secured.

3. After power is on, wait for a minute. The system BIOS are going through a self-test during this period and nothing is shown on the screen. After the self-test, the system BIOS will initialize the display adaptor and show messages.

4. The SIMM sockets are fragile device. Do not force the SIMM modules into the sockets. It may break the locking latches.

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Chapter One
General Features

SPECIFICATION

Processor : 80486DX4, 80486DX2, 80486DX or 80486SX,CX486DX, CX486DX2

Speed : Turbo/normal speed

I/O Slot : Compatible to standard AT bus
Six 16-bit slots Three VESA VL-BUS slots

Cache : 8KB four way set associative internal cache

Memory : 4 level deep write buffer with byte gathering
Shadow RAM for system and video BIOS
Page mode and hidden refresh
4pcs of 72 pin SIMM modules

System Support Functions :

- 8-Channel DMA (Direct Memory Access)
- 16-level interrupt
- 3 programmable timers
- CMOS RAM for system configuration
- Real time clock with battery back-up
- Fast A20 gate and fast reset

Other Features :

- On board POWERGOOD generation
- External battery connector

DYNAMIC CACHE ARCHITECTURE (DCA)

DCA (dynamic Cache Architecture) is a new Cache Memory DCA literally boosts the cache memory efficiency by as much as 300 percent over conventional external cache! It is integrated as part of the high speed logic of the motherboard.

DCA, it's Byte Gathering Write Buffers collect 8 and 16 bit "packets" of information until a single 32 bit "packet" is formed. Using Burst Mode, it then "Writes" this single informational "string" back to RAM in one operation, rather than in several time consuming ones. This is a tremendous improvement on the efficiency of data transfer, as the information is handled solely through the CPU, the High Speed Chipset and the lightning fast Internal Cache of the 80486.

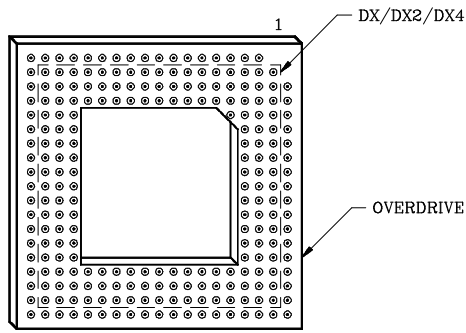
Chapter Two
Configuring The System

Important Note : Turn off the power before installing or replacing any component.

Warning : Make sure the following jumpers setting in a right position. Wrong setting will burn out the CPU.

INSTALLING PROCESSOR (DX, SX, DX2, DX4)

Processor 486DX/DX2/DX4/P24T overdrive is a PGA devices. There is a 238-pin PGA socket or ZIP socket. To install processor, be sure to line up pin 1 of the CPU with pin 1 of the socket as shown below. Make sure that the processor is firmly inserted into the socket.



CPU 486DX / OVERDRIVE SOCKET

For DX, SX, DX2 are 5V supply voltage. Due to the DX4 is 3.45V supply voltage, a sohisticated on board auto detect voltage regulator is implemented on OCTEK HIPPO DCA 1. Therefore, it's no need to add any jumpers for different CPU.

INSTALLING RAM MODULES

OCTEK HIPPO DCA 1 has four sockets on board for 72pin SIMM modules. The modules should be locked by the sockets. Please check carefully before turning on the power. Otherwise, the system will not work properly.

To install a module, the module edge is angled into the socket's contact and then the module is pivoted into position, where the locking latches will secure it. If the module edge is not completely inserted into the socket, it cannot be pivoted to be in vertical position and should be dragged out and re-inserted again. Do not force the module into the SIMM socket. It will damage the locking latches.

CONFIGURATION OF MEMORY

There are several combinations of DRAM types you may consider. 1Mx32 or 4Mx32 SIMM are acceptable. The memory size is detected automatically by system BIOS and indicated during memory test after reset. No jumper is needed to be set for the memory size and DRAM type.

DRAM CONFIGURATION

SM1	SM2	SM3	SM4	TOTAL
1Mx32				4M
1Mx32	1Mx32			8M
1Mx32	1Mx32	1Mx32		12M
1Mx32	1Mx32	1Mx32	1Mx32	16M
4Mx32				16M
1Mx32	4Mx32			20M
1Mx32	1Mx32	4Mx32		24M
1Mx32	1Mx32	1Mx32	4Mx32	28M
4Mx32	4Mx32			32M
1Mx32	4Mx32	4Mx32		36M
1Mx32	1Mx32	4Mx32	4Mx32	40M
4Mx32	4Mx32	4Mx32		48M
1Mx32	4Mx32	4Mx32	4Mx32	52M
4Mx32	4Mx32	4Mx32	4Mx32	64M

CONTROL OF SYSTEM SPEED

System speed can be controlled by keyboard and turbo switch. To change the speed by keyboard, use `-' and `+' of the numeric keypad. Press `Ctrl' `Alt' and `-' for slow speed and press `Ctrl' `Alt' and `+' for fast speed.

Connect P1 to the turbo switch of the case and P5 to the turbo LED of the case. When the turbo mode is selected, the turbo LED of the case will be turned on.

Whenever the system speed is set to be slow by turbo switch, it cannot be changed by the keyboard, and vice versa.

RESET CMOS SETUP INFORMATION

Sometimes, the improper setting of system setup may make the system malfunction. In this case, turn off the power and set JP10 to 2-3 for a while. The internal CMOS status register is reset. Then set the jumper to 1-2 of JP10 and turn on the power. The BIOS finds the CMOS status register is reset and regards the setup information is invalid. So it will prompt you to correct the information.

SYSTEM BOARD JUMPER SETTING

There are several options which allows user to select by hardware switches.

Display Selection

JP7	
1-2	CGA, EGA, VGA
2-3	Monochrome display *

CPU Type

	486DX\DX2 \DX4	486SX	487SX
JP6	1 - 2	2 - 3	1 - 2
JP8	2 - 3	NO	1 - 2
JP9	2 - 3	1 - 2	2 - 3

System Speed (Only for clock chip version)

	33MHz	25MHz
JP4	1 - 2	2 - 3
JP5	1 - 2	2 - 3

CPU Clock Multiple (Only for DX4 CPU)

JP17	
1-2	Internal Clock 3X
3-4	Internal Clock 2X
5-6	Internal CLock 2.5X

SYSTEM BOARD CONNECTORS

Under typical conditions, these connectors should be connected to the indicators and switches of the system unit. The functions of connectors on the motherboard are listed below.

	Description
P1	Turbo switch
P2	Speaker connector
P3	Hardware reset connector
P4	Power LED & Ext-lock connector
P5	Turbo LED
P6,P7	Power supply connector
P8	External battery connector
P9	Cooling fan connector
KB1	Keyboard connector

Pin assignment of the connector are illustrated as follows:

P1 - Turbo Switch Connector

Pin	Assignment
1	Selection Pin
2	Ground

P2 - Speaker Connector

Pin	Assignment
1	Data out
2	+5 Vdc
3	Ground
4	+5 Vdc

P3 - Hardware Reset Connector

Pin	Assignment
1	Selection Pin
2	Ground

P4 - Power LED & Ext-Lock Connector

Pin	Assignment
1	+5 Vdc
2	Key
3	Ground
4	Keyboard inhibit
5	Ground

P5 - Turbo LED Connector

Pin	Assignment
1	+5Vdc
2	LED signal

P6,P7 - Power Supply Connector

Pin	Assignment
1	POWERGOOD
2	+5 Vdc
3	+12 Vdc
4	-12 Vdc
5	Ground
6	Ground

Pin	Assignment
1	Ground
2	Ground
3	-5 Vdc
4	+5 Vdc
5	+5 Vdc
6	+5 Vdc

P8 - External Battery Connector

Pin	Assignment
1	+ Vdc
2	not used
3	Ground
4	Ground

P9 - Cooling Fan Connector

Pin	Assignment
1	+ 5Vdc
2	Ground

KB1 - Keyboard Connector

Pin	Assignment
1	Keyboard clock
2	Keyboard data
3	Spare
4	Ground
5	+5 Vdc

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Chapter Three
Technical Information

This section provides technical information about OCTEK HIPPO DCA 1 and is intended for advanced users interested in the basic design and operation of OCTEK HIPPO DCA 1.

MEMORY MAPPING

Address	Range	Function
000000-7FFFFF	000K-512K	System Board Memory (512K)
080000-09FFFF	512K-640K	System Board Memory (128K)
0A0000-0BFFFF	640K-768K	Display Buffer (128K)
0C0000-0DFFFF	768K-896K	Adaptor ROM / Shadow RAM (128K)
0E0000-0EFFFF	896K-960K	System ROM / Shadow RAM (64K)
0F0000-0FFFFF	960K-1024K	System BIOS ROM / Shadow RAM (64K)
100000-7FFFFF	1024K-8192K	System Memory
800000-FFFFFF	8192K-16318K	System Memory

I/O ADDRESS MAP

I/O Address Map on System Board

I/O address hex 000 to 0FF are reserved for the system board I/O.

ADDRESS (HEX)	DEVICE
000-01F	DMA Controller 1, 8237
020-03F	Interrupt Controller 1, 8259, Master
040-05F	Timer, 8254
060-06F	Keyboard Controller
070-07F	Real Time Clock, NMI (non-maskable interrupt) mask
080-09F	DMA Page Register, 74LS612
0A0-0BF	Interrupt Controller 2, 8259
0C0-0DF	DMA Controller 2, 8237
0F0	Clear Math Coprocessor Busy
0F1	Reset Math Coprocessor
0F8-0FF	Math Coprocessor Port

I/O address hex 100 to 3FF are available on the I/O channel.

ADDRESS (HEX)	DEVICE
1F0-1F8	Fixed Disk
200-207	Game I/O
278-27F	Parallel Printer Port 2
2F8-2FF	Serial Port 2
300-31F	Prototype Card
360-36F	Reserved
378-37F	Parallel Printer Port 1
380-38F	SDLC, bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome Display and Printer Adapter
3C0-3CF	Reserved
3D0-3DF	Color Graphics Monitor Adapter
3F0-3F7	Diskette Controller
3F8-3FF	Serial Port 1

SYSTEM INTERRUPTS

Sixteen levels of system interrupts are provided on OCTEK HIPPO DCA 1. The following shows the interrupt-level assignments in decreasing priority.

Level	Function
Microprocessor NMI	Parity or I/O Channel Check
Interrupt Controllers	
CTLR 1	CTLR 2
IRQ0	Timer Output 0
IRQ1	Keyboard
IRQ2	
IRQ8	Real-time Clock Interrupt
IRQ9	Software Redirected to INT 0AH (IRQ2)
IRQ10	Reserved
IRQ11	Reserved
IRQ12	Reserved
IRQ13	Coprocessor
IRQ14	Fixed Disk Controller
IRQ15	Reserved
IRQ3	Serial Port 2
IRQ4	Serial Port 1
IRQ5	Parallel Port 2
IRQ6	Diskette Controller
IRQ7	Parallel Port 1

DIRECT MEMORY ACCESS (DMA)

OCTEK HIPPO DCA 1 supports seven DMA channels.

Channel	Function
0	Spare (8 bit transfer)
1	SDLC (8 bit transfer)
2	Floppy Disk (8 bit transfer)
3	Spare (8 bit transfer)
4	Cascade for DMA Controller 1
5	Spare (16 bit transfer)
6	Spare (16 bit transfer)
7	Spare (16 bit transfer)

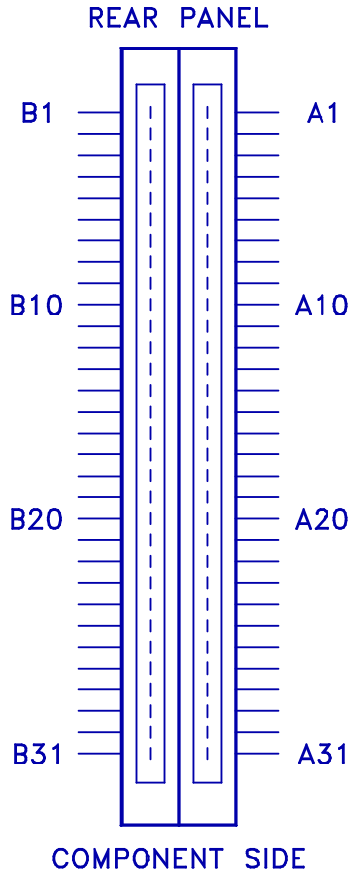
SYSTEM EXPANSION BUS

OCTEK HIPPO DCA1 provides six 16-bit slots and three VL-bus slots.

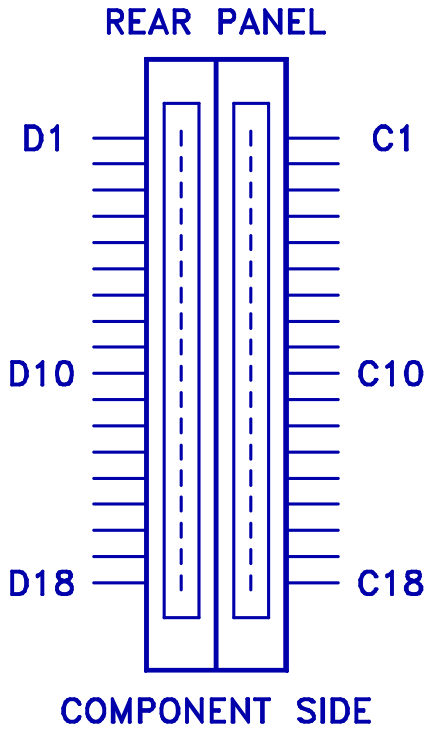
The I/O channel supports:

* *I/O address space from hex 100 to hex 3FF*
* *Selection of data access (either 8 or 16 bit)*
* *24 bit memory addresses (16MB)*
* *Interrupts*
* *DMA channels*
* *Memory refresh signal*

The following figure shows the pin numbering for I/O channel connectors (A-side and B-side).



The following figure shows the pin numbering for I/O channel connectors (C-side and D-side).



The following tables summarize pin assignments for the I/O channel connectors.

I/O Channel (A-Side)

I/O Pin	Signal Name	I/O
A1	-I/O CH CK	I
A2	SD7	I/O
A3	SD6	I/O
A4	SD5	I/O
A5	SD4	I/O
A6	SD3	I/O
A7	SD2	I/O
A8	SD1	I/O
A9	SD0	I/O
A10	-I/O CH RDY	I
A11	AEN	O
A12	SA19	I/O
A13	SA18	I/O
A14	SA17	I/O
A15	SA16	I/O
A16	SA15	I/O
A17	SA14	I/O
A18	SA13	I/O
A19	SA12	I/O
A20	SA11	I/O
A21	SA10	I/O
A22	SA9	I/O
A23	SA8	I/O
A24	SA7	I/O
A25	SA6	I/O
A26	SA5	I/O
A27	SA4	I/O
A28	SA3	I/O
A29	SA2	I/O
A30	SA1	I/O
A31	SA0	I/O

I/O Channel (B-Side)

I/O Pin	Signal Name	I/O
B1	GND	Ground
B2	RESET DRV	I
B3	+5 Vdc	Power
B4	IRQ9	I
B5	-5 Vdc	Power
B6	DRQ2	I
B7	-12 Vdc	Power
B8	0WS	I
B9	+12 Vdc	Power
B10	GND	Ground
B11	-SMEMW	O
B12	-SMEMR	O
B13	-IOW	I/O
B14	-IOR	I/O
B15	-DACK3	I
B16	DRQ3	O
B17	-DACK1	I
B18	DRQ1	O
B19	-Refresh	I/O
B20	CLK	O
B21	IRQ7	I
B22	IRQ6	I
B23	IRQ5	I
B24	IRQ4	I
B25	IRQ3	I
B26	-DACK2	O
B27	T/C	O
B28	BALE	O
B29	+5 Vdc	Power
B30	OSC	O
B31	GND	Ground

I/O Channel (C-Side)

I/O Pin	Signal Name	I/O
C1	SBHE	I/O
C2	LA23	I/O
C3	LA22	I/O
C4	LA21	I/O
C5	LA20	I/O
C6	LA19	I/O
C7	LA18	I/O
C8	LA17	I/O
C9	-MEMR	I/O
C10	-MEMW	I/O
C11	SD8	I/O
C12	SD9	I/O
C13	SD10	I/O
C14	SD11	I/O
C15	SD12	I/O
C16	SD13	I/O
C17	SD14	I/O
C18	SD15	I/O

I/O Channel (D-Side)

I/O Pin	Signal Name	I/O
D1	-MEM CS16	I
D2	-I/O CS16	I
D3	IRQ10	I
D4	IRQ11	I
D5	IRQ12	I
D6	IRQ15	I
D7	IRQ14	I
D8	-DACK0	O
D9	DRQ0	I
D10	-DACK5	O
D11	DRQ5	I
D12	-DACK6	O
D13	DRQ6	I
D14	-DACK7	O
D15	DRQ7	I
D16	+5 Vdc	Power
D17	-MASTER	I
D18	GND	Ground

The following table summery pin assignments for VESA VL-bus connector.

VL-bus (side A)

I/O Pin	Signal Name
A1	CD1
A2	CD3
A3	GROUND
A4	CD5
A5	CD7
A6	CD9
A7	CD11
A8	CD13
A9	CD15
A10	GROUND
A11	CD17
A12	POWER
A13	CD19
A14	CD21
A15	CD23
A16	CD25
A17	GROUND
A18	CD27
A19	CD29
A20	CD31
A21	CA30
A22	CA28
A23	CD26
A24	GROUND
A25	CA24
A26	CA22
A27	POWER
A28	CA20

VL-bus (side A)

I/O Pin	Signal Name
A29	CA18
A30	CA16
A31	CA14
A32	CA12
A33	CA10
A34	CA8
A35	GROUND
A36	CA6
A37	CA4
A38	WBACK-
A39	BEO-
A40	POWER
A41	BE1-
A42	BE2-
A43	GROUND
A44	BE3-
A45	ADS-
A46	LRDY-
A47	LDEV-
A48	LREQ-
A49	GROUND
A50	LGNT-
A51	POWER
A52	ID2
A53	ID3
A54	ID4
A55	LKEN-
A56	LEADS-

VL-bus (side B)

I/O Pin	Signal Name
B1	CD0
B2	CD2
B3	CD4
B4	CD6
B5	CD8
B6	GROUND
B7	CD10
B8	CD12
B9	POWER
B10	CD14
B11	CD16
B12	CD18
B13	CD20
B14	GROUND
B15	CD22
B16	CD24
B17	CD26
B18	CD28
B19	CD30
B20	POWER
B21	CA31
B22	GROUND
B23	CA29
B24	CA27
B25	CA25
B26	CA23
B27	CA21
B28	CA19

VL-bus (side B)

I/O Pin	Signal Name
B29	GROUND
B30	CA17
B31	CA15
B32	POWER
B33	CA13
B34	CA11
B35	CA9
B36	CA7
B37	CA5
B38	GROUND
B39	CA3
B40	CA2
B41	n/c
B42	RESET-
B43	D/C-
B44	M/IO-
B45	W/R-
B46	RDY-
B47	GROUND
B48	IRQ9
B49	BRDY-
B50	BLAST-
B51	ID0
B52	ID1
B53	GROUND
B54	VLCLK
B55	POWER
B56	LBS16-

Appendix A
Operation and Maintenance

STATIC ELECTRICITY

When installing or removing any add-on card, DRAM module or coprocessor, you should discharge the static electricity on your body. Static electricity is dangerous to electronic device and can build-up on your body. When you touch the add-on card or motherboard, it is likely to damage the device. To discharge the static electricity, touch the metal of your computer. When handling the add-on card, don't contact the components on the cards or their "golden finger". Hold the cards by their edges.

KEEPING THE SYSTEM COOL

The motherboard contains many high-speed components and they will generate heat during operation. Other add-on cards and hard disk drive can also produce a lot of heat. The temperature inside the computer system may be very high. In order to keep the system running stably, the temperature must be kept at a low level. A easy way to do this is to keep the cool air circulating inside the case. The power supply contains a fan to blow air out of the case. If you find that the temperature is still very high, it would be better to install another fan inside the case. Using a larger case is recommended if there are a number of add-on cards and disk drives in the system.

CLEANING THE "GOLDEN FINGER"

Whenever inserting an add-on card to the motherboard, make sure that there is no dirt on the "golden finger" of the add-on card. If not, the contact between the "golden finger" and the slot may be poor and thus the add-on card may not work properly. Use a pencil eraser to clean the "golden finger" if dirt is found.

CLEANING THE MOTHERBOARD

The computer system should be kept clean. Dust and dirt is harmful to electronic devices. To prevent dust from accumulating on the mother-board, installing all mounting plates on the rear of the case. Regularly examine your system, and if necessary, vacuum the interior of the system with a miniature vacuum.

Appendix B
Troubleshooting

MAIN MEMORY ERROR

After power up, the monitor remains blank, and there are beep sounds indicating a main memory failure. In this case, turn off the power and remove all SIMM modules. Carefully place the modules back to the sockets and make sure that all the modules are locked by the locking latches firmly.

In some other cases, the total memory found by the BIOS is different from the actual amount of memory on board. (Note that 128K bytes memory is reserved for the shadow RAM function and will not be counted by the BIOS). It is also a memory failure and you can follow the instruction above.

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Appendix C
Summary Of Jumper Setting

	486DX/DX2 /DX4	486SX	487SX
JP6	1-2	2-3	1-2
JP8	2-3	NO	1-2
JP9	2-3	1-2	2-3

JP7	
1-2	CGA,EGA,VGA *
2-3	MONOCHROME DISPLAY

JP10	CMOS CONTAIN
1-2	NORMAL *
2-3	CLEAR / RESET

	33MHz	25MHz
JP4	1-2	2-3
JP5	1-2	2-3

JP17	
1-2	Internal Clock 3X
3-4	Internal Clock 2X
5-6	Internal CLock 2.5X

Reserved Jumper	
JP13, 14, 15	2-3
JP16	1-2
JP1	1-2
JP3	OPEN

Appendix D
System Board Layout