About This Manual

This manual is divided into three chapters and several appendices.

Chapter 1 provides an introduction and overview of the system and orients you to the various components discussed in the remainder of the manual. In addition you will find specifications in Chapter 1.

Chapter 2 explains how to install the mainboard into the system unit. In many cases, this will have already be done for you by your dealer, however, it's a good idea to familiarize yourself for future reference. The more you know about the workings of your computer, the more likely you will be satisfied with its performance and features.

Chapter 3 explains the procedures for first time startup, including turning on the power and setting system defaults.

Appendices provide technical details, such as the system and I/O memory and address maps, DMA, interrupts, system timers, and block diagrams.

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Chapter 3
First Time Startup

Introduction

The HEDAKA SINGLE CHIP 286 Turbo Mainboard is high performance AT-compatible mainboard that provides high-speed processing while maintaining full compatibility with the IBM PC/AT. The mainboard is designed to be mounted in a standard PC/XT, "baby AT", or AT-type chassis and uses industry standard power supply inputs, connectors, expansion board socket, etc.

A minimum computer system includes:

• HEDAKA SINGLE CHIP 286 Turbo Mainboard.

• IBM AT power supply or equivalent.

• IBM AT Keyboard or compatible.

• Hard disk/floppy disk controller card.

• At least one floppy disk drive (360KB/720KB/1.2MB/1.44MB).

• An IBM AT CGA, MDA, EGA, VGA display card or compatible.

• A monitor that is compatible with the display card.

Your system also may have additional diskette drives, hard drives, interface boards, modems, printer adapter, tape backup units, etc. In fact any device designed for IBM PC/AT and compatible systems can be installed or connected to the mainboard.

1.1   HEDAKA SINGLE CHIP 286 Turbo Mainboard

As in most IBM PC/AT compatible systems, the HEDAKA mainboard mounts in the bottom of the system units. Using standard connectors and mounting holes, it connects to the system unit's power supply connector and mounting posts.

1.2 Compatibility

The HEDAKA SINGLE CHIP 286 mainboard will run all PC programs on the market. The primary component that determines compatibility is the basic input/output system (BIOS). This is a program that resides in read-only memory (ROM) chip on the mainboard. The mainboard has the latest American Megatrends Inc. (AMI), BIOS. and keyboard. Theseproducts, from respected leader in the field of compatible ROM BIOS, are know industry-wide for their excellent compatibility and high performance.

1.3 Performance

The next most important consideration of most PC users (after compatibility) is speed. The HEDAKA SINGLE CHIP 286 mainboard employs a 12MHz/16MHz/20MHz 80286 microprocessor, with a selectable speed of 12MHz/16MHz/20MHz and 8MHz. Speed is selectable via software command, keyboard, and hardware switch.

1.4 Memory

Memory expansion is another primary consideration when configuring a computer system. the HEDAKA SINGLE CHIP 286 mainboard provides socket for up to 2MB of dynamic random access memory (DRAM).

1.5 Expandability

Other consideration for many users include the number of expansion slots and the type of disk drive support. The HEDAKA SINGLE CHIP 286 mainboard provides six 16-bit and two 8-bit I/O connectors. Extensive support is built into the setup ROMs, including all the popular hard disks, as well as 3.5" diskette drives (both 720KB and 1.44MB). Of course, the standard 360KB and 1.2MB diskette drives are fully supported.

1.6 Specification

Processor and System

Processor type   80286 rated at 12MHz/16MHz/20MHz

System Speed   8MHz/12MHz /16MHz 20MHz software and hard ware selectable

Coprocessor: 8MHz/10MHz/16MHz/20MHz 80287 (optional)

Memory Capacity: Up to 2MB

Memory
configuration: Versatile memory combination: 512K/1024K/2048K memory using 41256 (parity check) & 44256 memory chips.

BIOS Subsystem

Type: **AMI ROM BIOS.**

ROM Capacity: 512K

Additional BIOS
features: Setup program resides in ROM. Power-on-self-test (POST) resides in ROM. User selectable bootup system speed stored in ROM.
Keyboard typematic rate. Power on passward, Hard disk boot sector virus protection.

I/O Subsystem

No. of slots: Six 16-bit slots.
                        Two 8-bit slots.

Form factor: Standard slot spacing and mounting holes for full size XT chassis, "baby AT" chassis and full-size AT chassis.

1.7   Special Features

HEDAKA SINGLE CHIP 286 Mother Board provides 4 Special features to increase capability. the features can be utilizied when the system memory on board is at least 1MByte. They are described in the following sections.

1.7.1 Keyboard Typematic Rate

When user presses down a key, it takes a little while to get repeated character. The feature of Keyboard Typematic Rate can shorten the time taken and increase the character's repeating rate by choosing the FAST mode in SETUP menu.

1.7.2 Power On Password

Power On Password is provided to secure the system form illegal access by other people. The feature can be enabled through the SETUP menu. Once it is enabled, it is necessary to type in password whenever the system power is turned on.

Note: if user forgets the password, you should turn off the power,short the power, the JP16 by putting matel across pin 1&2 and then move away. When you turn on the power again, no password is requested but a message of " CMOS battery state low" is shown on the screen. User can ignore the message. JP16 will be implemente in new P.C.B. At the moment, you can short pin 22 of 146818 to pin 12.

1.7.3 Hard Disk Boot Sector Virus Protection

HEDAKA SINGLE CHIP 286 Mother Board provides this feature to protect system from being infected with computer virus. If the feature is enable through the SETUP menu, the system will be immune from the viruses that affect the hard disk partition table and boot sector.

1.7.4 Shadow RAM

The function of the Shadow RAM is to load the content of system BIOS,Video BIOS etc. to the system memory so as to speed up the processing.

The segments of BIOS to be downloaded to Shadow RAM are selected through the SETUP menu during booting up system. In the SETUP menu, segments of FO to FC are the location of system BIOS. To speed up the proccessing, it is recommended to select ON.

Mainboard Installation

This chapter explains how to install your HEDAKA SINGLE CHIP 286 mainboard. These procedures may already have been performed by your dealer. If so, you may skip to Chapter 3.

In this manual when referring to Jumpers the work "closed" means to mount a shorting plug on the corresponding pins of the jumper.

This chapter is divided into the following sections:

• Adding memory

• Adding a Coprocessor

• Mounting

• Connecting internal cables

2.1 Memory Combination

The HEDAKA SINGLE CHIP 286 Mother board uses 424256 DRAM chips and can configure 512K, 1M, 1.5M or 2M (maximum)bytes on board. Corresponding 41256 DRAM chips are used if parity check is enabled .

The followings show you how to install RAM chips correctly with the desired RAM size. The shadow parts are the location that RAM chips should be installed.

MEMORY SIZE   RAM Socket

512K

1M

1.5M

2M
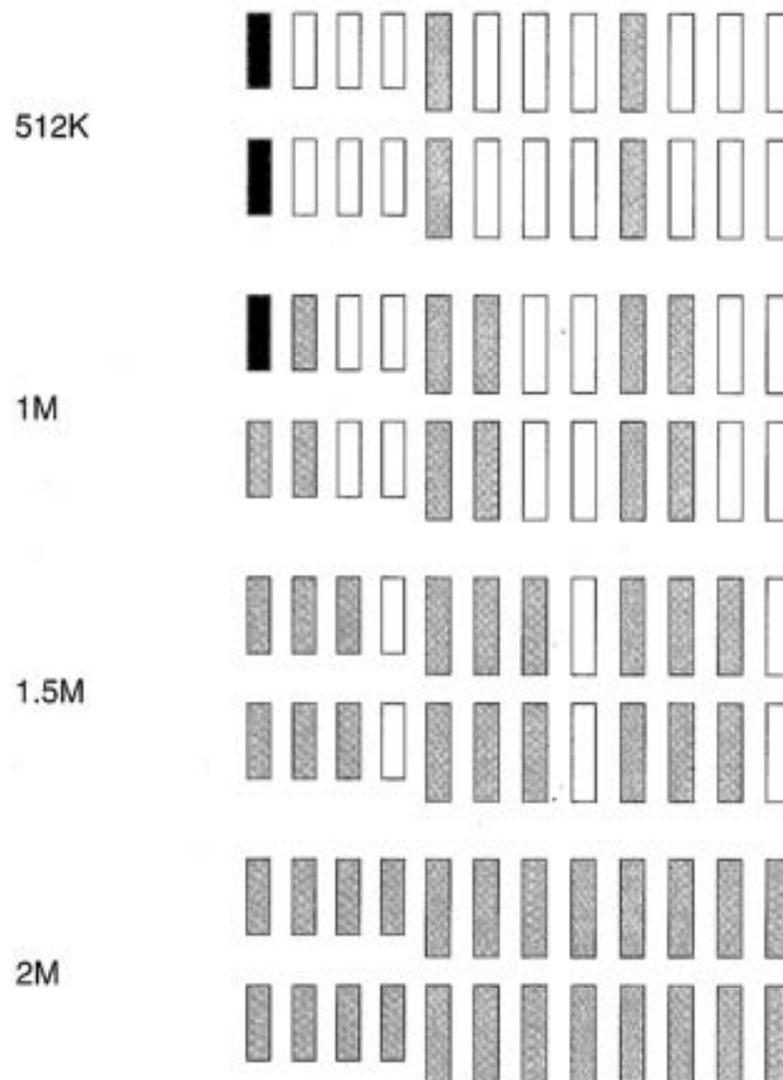
*Party RAM chip (optional)

2.2 Inatalling an 80287 Coprocessor

Inside HEDAKA SINGLE CHIP 286 Mother Board there is a 40 pin socket for the 80287 co-processor. Please refer to the layout of HEDAKA SINGLE CHIP 286 Mother Board to locate the position to plug in the co-processor.

The clock rate of the co-processor can be sat to the same of the CPU or to an added oscillator.

Please note that there are two jumper settings for the 80287:-

Jumper	Shorted	Description
JP15	1-2	External Oscillator is used as input clock
	2-3	Internal CPU clock is used as input clock
JP14	1-2	Input clock is used directly
	2-3	Input clock is divided by 3

* Default Setting

2.2.1.

If an osciallator is used as imput clock, pin 1 and 2 of JP14 are shorted and pin 1 and 2 of JP15 are shorted.

Co-processor	Frequency of Oscillator
80287-20	20MHz
80287-16	16MHz
80287-12	12MHz
80287-10	10MHz
80287- 8	8MHz

Note: For the adding of the oscillator to the mother board, you are recommended to consult your dealer for a qualified service personnel to solder the oscillator to the mother board.

2.2.2

If CPU clock is used as input clock, pin 2 and 3 of JP11 are shorted and pin 2 and 3 of JP15 are shorted.

CPU clock	Clock frequency for 80287	Co-processor
20 MHz • 2	20 MHz • 2/3 = 13.33 MHz	80287 16
16 MHz • 2	16 MHz • 2/3 = 10.67 MHz	80287 12
12 MHz • 2	12 MHz • 2/3 = 8 MHz	80287 8

Thus 80287-16 is recommended for 20MHz CPU mother board. Whereas 80287-12 is recommended for 16MHz and 80287-8 is for 12MHz.

2.3 Setting the Monitor Type

Set the monitor type to match your monitor. If you have a color monitor (CGA, EGA, etc.), set the monitor type to color. If you have a monochrome monitor (IBM monochrome adapter, Hercules, etc.), set the monitor type to monochrome. To set the monitor type, set jumper JP8 as follows:

JP8: Monitor Select

2-3: closed to select color monitor.
1-2: opened to select monochrome monitor.

Color monitor   Monochrome monitor

2.4 Mounting the Mainboard

To mount the mainboard in the system unit, follow these steps:

1. Carefully place the mainboard into the system unit chassis, RAM sockets toward the front left corner.

2. Position the mainboard over the chassis mounting standoffs. Align the appropriate mounting holes. Note that the board has holes for more than one type of chassis, so some holes will not be used.

3. Mount the mainboard using the screws removed from the mainboard, or using the screws provided with the system unit chassis.

First Time Startup

The first time you start your system, you will need to follow some special procedures to specify your system configuration, initialize and format your hard disk, and install system software. This chapter explains these special prcedures. Do not proceed until you are certain your system has been properly installed and connected to an appropriate power source.

In this chapter, you will:

• Turn on system power.

• Run the setup program to specify varios system configuration parameters.

3.1 Turning on the Power

Turn on system power by first turning on the video display power switch, then turning on the power switch. The system will go through its automatic power on self test (POST) and then attempt to boot (that is, to load the operating system from a disk drive).

Since your disks are not formatted, and since the system does not yet know what type of disks your system has, you will get an error message when POST completes. This error message is normal during this phase.

You are now ready to run the SETUP program.

3.2 AMI 286 SETUP

The SETUP program lets you specify your system's configuration of diskette drives, hard disk drives, video display, memory, date and time. The SETUP program is built-in, you do not need to have a diskette to use it.

Note
The following procedures assume your system has the AMI 286 BIOS installed. If your system has a different BIOS installed, these procedures will not work.

To run the SETUP, do the following:

1. Simultaneously press the < Ctrl > < Alt > < Del > keys to reboot the system (or turn the power on if the system is off). After the memory has been checked, the following message will appear on your screen:

```
Press < DEL > if you want to run SETUP or DIAGS
```

2. Press the < Del > key (the one that shares the decimal point at the bottom of the numeric keypad).

ADVANCED CMOS AND EEPORM SETUP VI COPY RIGHT (C) 1990 EVER - SUCCESS SYSTEMS LTD.

		CYL	HEADS	PRECOMP	LZONE	SECTORS	SIZE
DATE (M / D / Y)	: 01 / 01 /80						
TIME (H : M : S)	: 12 : 00 : 00						
FLOPPY DRIVE A	: 1.2M						
FLOPPY DRIVE B	: NONE						
HARD DISK 1	: NONE						
HARD DISK 2	: NONE						
VIDEO DISPLAY	: EGA / VGA						
SYSTEM SPEED	: NO CHANGE						
PARITY	: ENABLED						
SPECIAL FEATURE	: DISABLED						
BASE MEMORY	: 640KB						
EXTENDED MEMORY	: 1024KB						
EMS MEMORY	: DISABLED	PAGE FRAME : E000H				I/O PORT	
SHADOW RAM	: SEGMENT	C0 C4 C8 CC D0 D4 D8 DC E0 E4 E8 EC F0 F4 F8 FC					
		X X X X X X X X X X X X X ON ON ON					

ENTER = SELECT, Pg Up / Pg On = MODIFY, F10 = SAVE & EXIT

Use the ↓ ← ↑ → keys to highlight the parameters you want to change. Use the <PgUp> and <PgDn> keys to modify the values.

Date and Time

Use the ↓ ← ↑ → keys to select the parameters you want to change. Use the <PgUp> and <PgDn> keys to cycle through the available settings.

Floppy Disk Drives

Select the Floppy drive field. Press the <PgUp> and <PgDn> keys to cycle through the available settings. Available floppy disk drives are 5 1/4" (360KB, 1.2MB) and 3 1/2" (720KB, 1.44MB). If your system does not have a floppy drive B, be certain to specify "Not installed".

Primary Display

Select the Primary display field to establish the primary video display adapter type. Press the <PgUp> and <PgDn> keys to cycle through the available settings:

● Monochrome (Monochrome adapter, including MDA and Hercules)

● Color 40x25 (Color Graphics Adapter initialized in 40-column mode).

● EGA (Enhanced Graphics Adapter) or VGA (Video Graphic Array).

● Color 80x25 (Color Graphics Adapter initialized in 80-column mode).

Hard Disk Drives

For hard disk drives, use the <PgUp> and <PgDn> keys to cycle through the 46 types of disk drives supported. Type 47 is given to help the user defined its own drive type which will be stored in the CMOS. See Table 3.2 for a printed list of these drive types.

Bypassing Keyboard Error

To configure the system for non dedicated file servers, you can set the keyboard "Not installed" in the SETUP menu so that BIOS will not report any "Keyboard error" and will not wait for "F1" key to be pressed during system boot.

Bypassing Video Error

To configure the system for non dedicated file servers, you can set the video "Not installed" in the SETUP menu if you do not have a display connected. The BIOS will not report any "Video error" and will not wait for any "F1" key to be pressed during system boot.

Bypassing Floppy Error

To configure the system without floppy controller, you can set both the BIOS supported floppy drives (A and B) as "Not installed". In that case BIOS will not check for the floppy controller and will not report any error.

After you have finished with the SETUP program, press the <Esc> key. A prompt will then appear:

```
Write data into CMOS and exit (Y/N)
```

Type "Y" and press the <Enter> key. The computer performs a cold boot (equivalent to turning the power off and back again), followed by memory test, and then tries to boot from the disk drive. If your hard disk has not yet been initialized, be sure that you have a bootable DOS diskette.

Table 3.2 Supported Hard Disk Drives

Type	Cylinders	Heads	Write Precomp	Landing Zone	Capacity
1	306	4	128	305	10MB
2	615	4	300	615	20MB
3	615	6	300	615	31MB
4	940	8	512	940	62MB
5	940	6	512	940	47MB
6	615	4	None	615	20MB
7	462	8	256	511	31MB
8	733	5	None	733	30MB
9	900	15	None	901	112MB
10	820	3	None	820	20MB
11	855	5	None	855	35MB
12	855	7	None	855	50MB
13	306	8	128	319	20MB
14	733	7	None	733	43MB
15	Reserved				
16	612	4	All	663	20MB
17	997	5	300	977	41MB
18	977	7	None	997	57MB
19	1024	7	512	1023	60MB
20	733	5	300	732	30MB
21	733	7	300	732	43MB
22	733	5	300	733	30MB
23	306	4	All	336	10MB
24	925	7	All	925	54MB
25	925	9	None	925	69MB
26	754	7	754	754	44MB
27	754	11	None	754	69MB
28	699	7	256	699	41MB
29	823	10	None	823	68MB
30	918	7	918	918	53MB
31	1024	11	None	1024	94MB
32	1024	15	None	1024	128MB

Continue on next page ...

Table 3.2 Supported Hard Disk Drives

Type	Cylinders	Heads	Write Precomp	Landing Zone	Capacity
33	1024	5	1024	1024	43MB
34	612	2	128	612	10MB
35	1024	9	None	1024	77MB
36	1024	8	512	1024	68MB
37	615	8	128	615	41MB
38	987	3	987	987	25MB
39	987	7	987	987	57MB
40	820	6	820	820	41MB
41	977	5	977	977	41MB
42	981	5	981	981	41MB
43	830	7	512	830	48MB
44	830	10	None	830	69MB
45	917	15	None	918	114MB
46	1224	15	None	1223	152MB

3.3 Keyboard Speed Select

In addition to setting the processor clock speed by the front panel switch and via SETUP program, you can also change processor speed by keyboard command. The HEDAKA SINGLE CHIP 286 mainboard has speed switching circuitry allowing it to change speed during operation, even while you are running a program. To change the processor speed, use these key combinations:
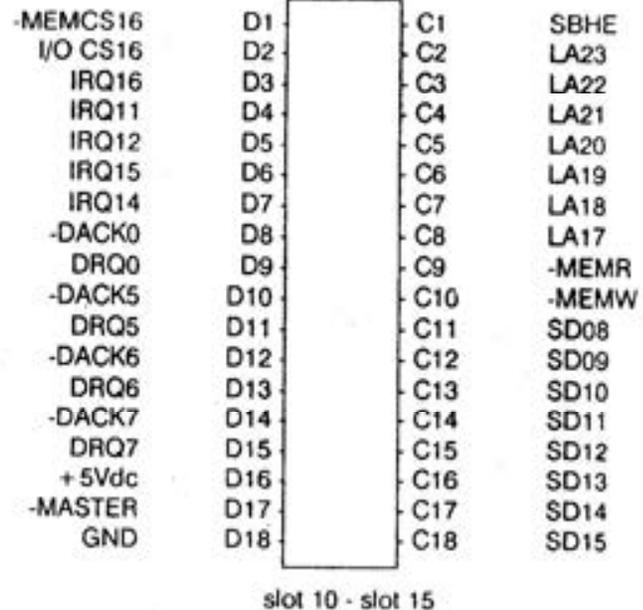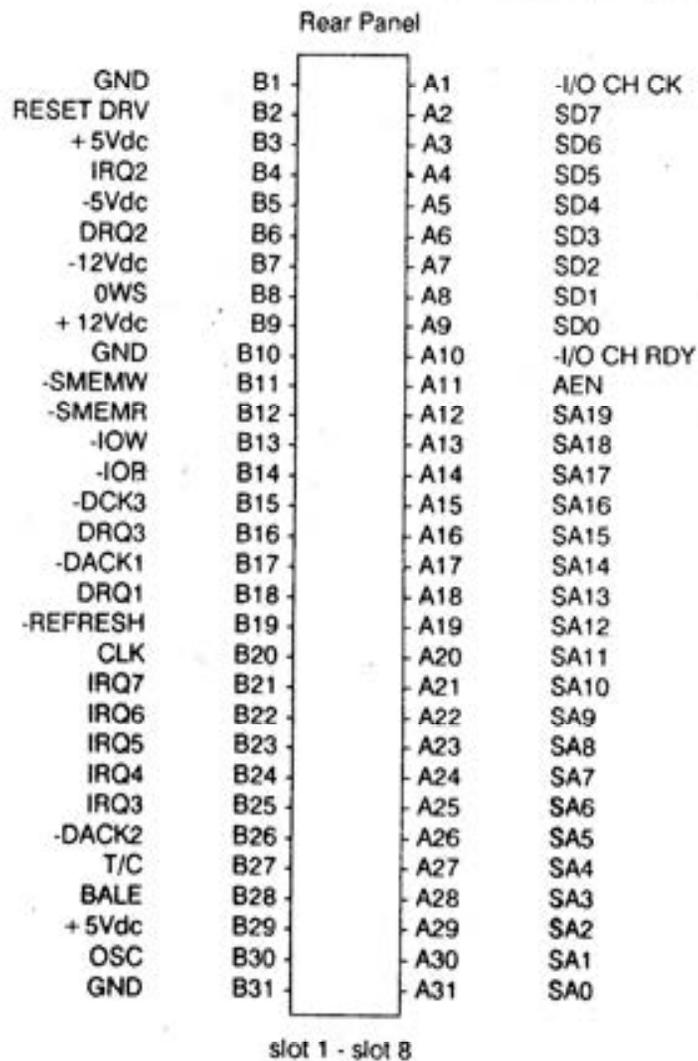
High speed: <Ctrl> <Alt> <+>
Low speed: <Ctrl> <Alt> <->

Appendix A

A.1 I/O Address Map

Hex Range	Devices	Usage
000-01F	DMA Controller 1	System
020-03F	Interrupt controller 1	System
040-05F	Timer	System
060-06F	8042 (keyboard)	System
070-07F	Real time clock, NMI mask	System
080-09F	DMA page register	System
0A0-0BF	Interrupt controller 2	System
0C0-0DF	DMA controller 2	System
0F0	Clear math Coprocessor busy	System
0F1	Reset math coprocessor	System
0F8-0FF	Math coprocessor	System
1F0-1F8	Fixed disk	I/O
200-207	Game I/O	I/O
278-27F	Parallel printer port 2	I/O
2F8-2FF	Serial port 2	I/O
300-31F	Prototype card	I/O
360-36F	Reserved	I/O
378-37F	Parallel printer port 1	I/O
380-38F	SDLC, bisynchronous 2	I/O
3A0-3AF	Bisynchronous 1	I/O
3B0-3BF	Monochrome display and printer adapter	I/O
3C0-3CF	Reserved	I/O
3D0-3DF	Color/graphics monitor adapter	I/O
3F0-3F7	Diskette controller	I/O
3F8-3FF	Serial port 1	I/O

A.2. I/O Channel

Rear Panel

GND	B1	A1	-I/O CH CK
RESET DRV	B2	A2	SD7
+5Vdc	B3	A3	SD6
IRQ2	B4	A4	SD5
-5Vdc	B5	A5	SD4
DRQ2	B6	A6	SD3
-12Vdc	B7	A7	SD2
0WS	B8	A8	SD1
+12Vdc	B9	A9	SD0
GND	B10	A10	-I/O CH RDY
-SMEMW	B11	A11	AEN
-SMEMR	B12	A12	SA19
-IOW	B13	A13	SA18
-IOR	B14	A14	SA17
-DCK3	B15	A15	SA16
DRQ3	B16	A16	SA15
-DACK1	B17	A17	SA14
DRQ1	B18	A18	SA13
-REFRESH	B19	A19	SA12
CLK	B20	A20	SA11
IRQ7	B21	A21	SA10
IRQ6	B22	A22	SA9
IRQ5	B23	A23	SA8
IRQ4	B24	A24	SA7
IRQ3	B25	A25	SA6
-DACK2	B26	A26	SA5
T/C	B27	A27	SA4
BALE	B28	A28	SA3
+5Vdc	B29	A29	SA2
OSC	B30	A30	SA1
GND	B31	A31	SA0

slot 1 - slot 8

-MEMCS16	D1	C1	SBHE
I/O CS16	D2	C2	LA23
IRQ16	D3	C3	LA22
IRQ11	D4	C4	LA21
IRQ12	D5	C5	LA20
IRQ15	D6	C6	LA19
IRQ14	D7	C7	LA18
-DACK0	D8	C8	LA17
DRQ0	D9	C9	-MEMR
-DACK5	D10	C10	-MEMW
DRQ5	D11	C11	SD08
-DACK6	D12	C12	SD09
DRQ6	D13	C13	SD10
-DACK7	D14	C14	SD11
DRQ7	D15	C15	SD12
+5Vdc	D16	C16	SD13
-MASTER	D17	C17	SD14
GND	D18	C18	SD15

slot 10 - slot 15

A.3 CMOS RAM Address Map

Addresses	Description
00-0D	Real-time clock information
0E	Diagnostic status byte
0F	Shutdown status byte
10	Diskette drive type byte, drives A and B
11	Reserved
12	Fixed disk type byte, drives C and D
13	Reserved
14	Equipment byte
15	Low base memory byte
16	High base memory byte
17	Low expansion memory byte
18	High expansion memory byte
19-2D	Reserved
2E-2F	2-byte CMOS checksum
30	Low expansion memory byte
31	High expansion memory byte
32	Date century byte
33	Information flags (set during power on)
34-3F	Reserved

A.4 Real-Time CLock Information

(Addresses 00-0D)

Byte	Function	Address
0	Seconds	00
1	Second alarm	01
2	Minutes	02
3	Minute alarm	03
4	Hours	04
5	Hour alarm	05
6	Day of week	06
7	Date of month	07
8	Month	08
9	Year	09
10	Status register A	0A
11	Status register B	0B
12	Status register C	0C
13	Status register D	0D

Appendix B

B.1 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)

B.2 DMA Controller Registers

Hex Address	Command Codes
0C0	CH0 base and current address
0C2	CH0 base and current word count
0C4	CH1 base and current address
0C6	CH1 base and current word count
0C8	CH2 base and current address
0CA	CH2 base and current word count
0CC	CH3 base and current address
0CE	CH3 base and current word count
0D0	Read status register/Write command register
0D2	Write mode register
0D4	Read temporary registers/write command register
0D6	Write mode register
0D8	Clear byte pointer flip-flop
0DA	Read temporary register/Write mask clear
0DC	Clear mask register
0DE	Write all mask register bits

B.3 Page Register Addresses

Page Register	I/O Hex Address
DMA Channel 0	0087
DMA Channel 1	0083
DMA Channel 2	0081
DMA Channel 3	0082
DMA Channel 5	008B
DMA Channel 6	0089
DMA Channel 7	008A
Refresh	008F

B.4 Interrupts

Level	Function
0	System timer output 0
1	Keyboard output buffer full
2	Interrupt from controller 2 (level 8-15)
3	Serial port 2
4	Serial port 1
5	Parallel port 2
6	Diskette controller
7	Parallel port
8	Real-time clock
9	Software redirected to INT 0AH
10	Reserved
11	Reserved
12	Reserved
13	80287
14	Hard disk drive
15	Reserved

B.5 Timers

Channel	Function
0	System timer
1	Refresh request generator
2	Tone generation for speaker

Appendix C

C.1 Advanced Diagnostic Error Codes

When the ADVANCED DIAGNOSTIC™ is run on the board, the following error codes will appear if the relevant area of operation have problems.

ERROR CODES

CODE	OPERATION AREA	FAIL CODE
100	System Board	101
200	Memory	201
300	Keyboard	301
400	Monochrome and Printer Adapter	401
500	Color/Graphic Monitor Adapter	501
600	Diskette Drive and Adapter	601
700	Math Coprocessor	701
900	Printer Adpater	901
1100	Async Communication	1101
1200	Alt Async Communication	1201
1300	Game Control	1301
1400	Matrix Printer	1401
1500	SDLC Communication	1501
1700	Fixed Disk Drive	1701
2000	BSC Adpater	2001
2100	Alt BSC Adapter	2101

C.2 Advanced Diagnostic Error Messages

ERROR MESSAGES

CODE	DESCRIPTION
01xx	Undetermined problem errors
02xx	Power supply errors
1xx	System board errors
2xx	Memory (RAM) errors
3xx	Keyboard errors
4xx	Monochrome monitor errors
5xx	Color monitor errors
6xx	Diskette drive errors
7xx	8087 or 80287 math coprocessor errors
9xx	Parallel printer adapter errors
10xx	Reserved for parallel printer adapter
11xx	Reserved for parallel printer adapter
12xx	Alternate asynchronous communications adapter errors
13xx	Game control adapter errors
14xx	Printer errors
15xx	Synchronous data link control (SDLC) Communications
16xx	Display emulation errors
17xx	Fixed disk errors
18xx	I/O expansion unit errors
19xx	3270 PC attachment card errors
20xx	Binary synchronous communications (BSC) adpater error
33xx	Compact printer errors

Layout of HEDAKA SINGLE CHIP 286 System Board

80287

JP 15
JP 14
JP 8

CN 5   CN4   CN9   CN1   CN3   CN12
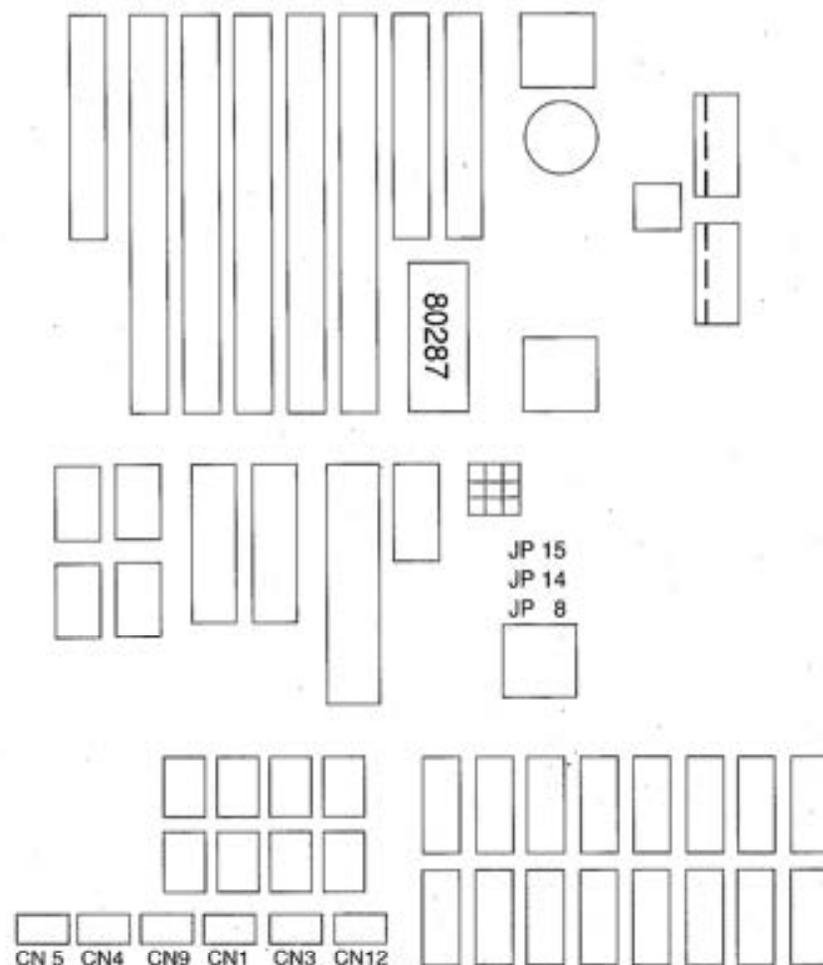
Connector:

Connector		Pinout	Function
Turbo LED	CNI	1 LED Anode 2 LED Cathode	
Power Supply	CN2	1 NC 2 NC 3 +12V 4 -12V 5 Ground 6 Ground 7 Ground 8 Ground 9 -5V 10 +5V 11 +5V 12 +5V	
Turbo Switch	CN3	1 Turbo In 2 Ground	Close: Normal Open: Turbo
Speaker	CN4	1 Speaker — 2 Speaker +	
Reset Switch	CN5	1 Reset In 2 Ground	Close: Reset System Open: Normal Operation
Keyboard Aux. Keyboard	CN6 Cn7	1 Keyboard Clock 2 Keyboard Data 3 Spare 4 Ground 5 +5V	
Key Lock & Power LED	CN9	1 LED Anode 2 Polarization Pin 3 LED Cathode 4 Key Lock 5 Ground	Open: Key Enable Close: Key Lock
7 Segment Display Control	CN12	1 Control Signal 2 +5V 3 Ground	Centrol Signal Low Normal High Turbo

HEDAKA

Single Chip 286 Mother Board

HED-986

USER'S MANUAL

Preface

This User's Manual explains how to install and expand your personal computer based on the DYNAMIT SINGLE CHIP (DM 286) -12/16 /20MHz Turbo Mainboard. By reading this manual, you will be able to set up your system and prepare to operate it.

The DYNAMIT SINGLE CHIP 286 Turbo Mainboard may run different operating systems, and corresponding large number of application programs. In most circumstances, you will probably be using MS-DOS or PC-DOS, the disk operating system supported by a large and growing library of IBM PC compatible application programs. This manual, however, discusses software only in relation to setting up and testing your computer hardware. Refer to the other manuals that accompany your system and applications software for necessary information.