

## Chapter 1 : Introduction

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### 1.1 PCI Local Bus Introduction

The PCI (Peripheral Component Interconnect) Local Bus is a high performance, 32-bit or 64-bit bus with multiplex address and data lines. It is intended for use as an interconnected mechanism between highly integrated peripheral controller components, peripheral add-in boards, and processor/memory systems.

### 1.2 About BEK-P407 Mainboard

The SiS 486-VIP (VESA/ISA/PCI) chips are two-chip solution ideally for Intel's 80486, SL Enhanced 486, P24D/P24T/DX4 CPU, AMD's 486, Enhanced Am486 and Cyrix's Cx486 (M7) CPU based on green AT system. By supporting the most popular industrial standard system interfaces; it provides flexibility for system design and applications.

The SiS85C496 PCI & CPU Memory Controller (PCM) integrates the Host Bridge (Host Interface), the cache and main memory DRAM Controller, the PCI Bridge, the built-IDE Controller, and the FS-Link Bus (Fast Slow Link Bus). It provides the address paths and bus control for transfers among the Host (CPU/L1 cache), main memory (L2 cache and DRAM), the Peripheral Component Interconnect (PCI) Bus, and the FS-Link Bus. The L2 cache controller supports both write-through and write-back cache policies and cache sizes up to 1 MBytes. The cache memory can be built using standard asynchronous SRAMs. The main memory DRAM controller interfaces DRAM to the Host Bus, PCI Bus, and FS-Link Bus. Up to eight single sided SIMMs or four double sided SIMMs provide a maximum of 255 MBytes of main memory. The installation of DRAM SIMMs is "Table-Free", which allows the SIMMs be installed into any slot location and any combinations. The built in IDE hard disk controller allows CPU accessing hard disk and also provides higher system integration with lower system cost. The 85C496 is intended to be used with the SiS85C497 AT Bus Controller and built in 206 (85C497).

The SiS85C497 AT Bus Controller and Megacells (ATM) component provides the interface between PCI/CPU/Memory Bus (fast machine) and the ISA Bus (slow machine). The 85C497 also integrates many of the common I/O functions in today's ISA based PC systems. The 85C497 incorporates the logic for FS-Link interface (Fast-Slow Link Interface), ISA interface, DMA controller and data buffers to isolate the FS-Link Bus from the ISA Bus and to enhance performance. It also integrates 14 edge/level interrupt controller, refresh controller, a 8-bit BIOS timer, three programmable timer/counters, non-maskable-interrupt (NMI) control logic, Power Management Unit, and RTC. Figure 1.1 shows the system block diagram.

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### 1.3 Block Diagram

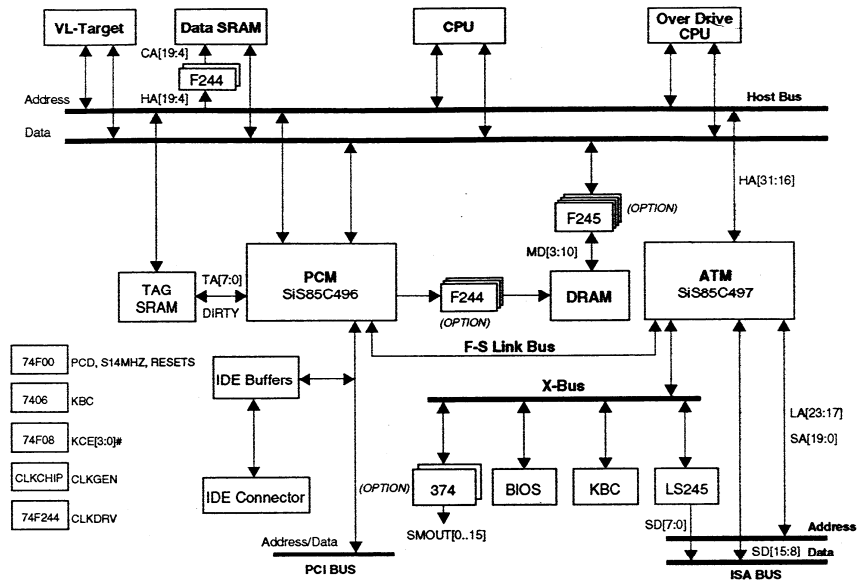


Figure 1.1

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### 1.5 System Performance List

The following performance data list is the testing results with some popular testing programs. (The different H/W & S/W configuration will result in different testing result.) These data are just reference for users.

#### A. Using INTEL CPU

Software/CPU Type	486DX4-100	486DX4-75	486DX2-66	486DX-33
Landmark V2.00	355.82Mhz	268.13Mhz	220Mhz	111Mhz
Power Meter V1.81	28.4Mips	21.2Mips	20.6Mips	10.8Mips
Norton V8.0	192.4Index	144.6Index	140.8Index	70.8Index

#### B. Using AMD CPU

Software/CPU Type	486DX4-120	486DX4-100	486DX2-80	486DX2-66
Landmark V2.00	401.3Mhz	328Mhz	262.63Mhz	220Mhz
Power Meter V1.81	38Mips	27.6Mips	22.6Mips	20.6Mips
Norton V8.0	260Index	192.4Index	154Index	140.8Index

#### C. Using CYRIX CPU

Software/CPU Type	5x86-100	486DX4-100	486DX2-80	486DX2-66
Landmark V2.00	420.94Mhz	328.35Mhz	263.88Mhz	219Mhz
Power Meter V1.81	35.1Mips	28.4Mips	22.8Mips	19.1Mips
Norton V8.0	262.7Index	169.2Index	135.8Index	112.6Index

# **CHAPTER 2**

## *Features of the Mainboard*

## Chapter 2 : Features of the Mainboard

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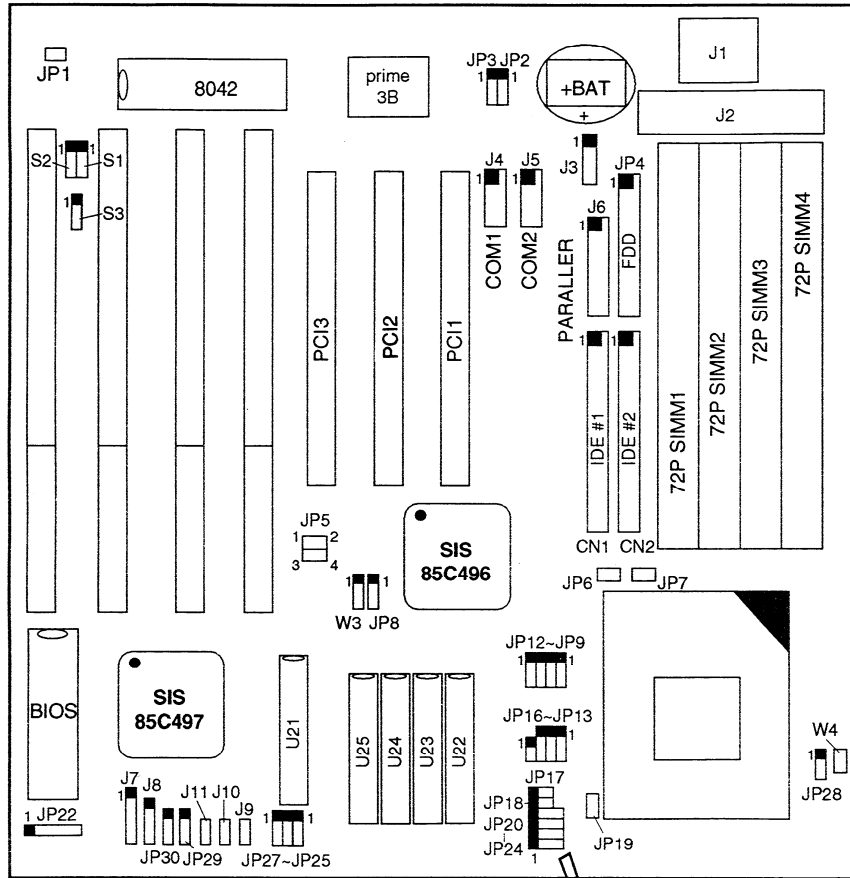
### 2.1 Features

CHIPSET	:	SiS85C496/497.
CPU	:	INTEL 80486DX4/DX2/DX/SX/SL-Enhanced, P24T, P24D. AMD 80486DX4/DX2/DX, X5 CYRIX 80486DX4/DX2/DX, 5X86 Ti 80486DX2/DX4
CACHE MEMORY	:	128K/256K/512K cache memory on board.
DRAM MEMORY	:	4 PCS 72 PIN SIMM SOCKETS on board. Supports up to 128MB.
SLOT	:	4 ISA 16 bit slots. 3 PCI 32 bit slots.
BIOS	:	AWARD BIOS.
FDD	:	Built in FDC Controller. Support 360K, 1.2M (5.25"), 720K, 1.44M, 2.88M (3.5")
PCI IDE	:	Built in IDE Controller. Supports 2 PCI IDE Channels (4 HDD).
I/O	:	Built in SUPER I/O Controller. Supports 2 Serial Ports & 1 Parallel Port with NORMAL MODE, ECP MODE, EPP MODE & ECP + EPP MODE.
DIMENSION	:	22cm x 22cm.

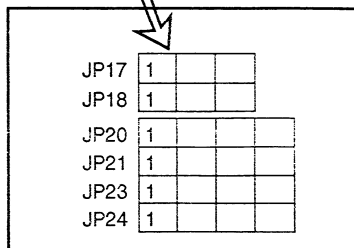
# **CHAPTER 3**

*Hardware Description*

3.1 Location of Components and Jumpers on the Mainboard



- J7 : Keylock
- J8 : Speaker
- J10 : Reset
- J11 : Turbo LED
- JP30 : Turbo Switch



## Chapter 3 : Hardware Description

### 3.2 Jumpers and Connectors Summary

Before installing your 486 system board, make sure the jumpers and connectors are set to the correct position.

#### CPU TYPE SELECTION

CPU TYPE	JP9	JP10	JP11	JP12	JP13	JP14	JP15	JP16	JP17	JP18	JP19	JP20	JP21	JP23	JP24	JP5	JP28	W4
<b>INTEL SL</b>																		
SX-25	OFF	OFF	OFF	2-3	4-5	1-2	2-3	OFF	OFF	1-2	OFF	OFF	OFF	3-4	2-3	OFF	OFF	ON
SX-33	OFF	OFF	OFF	2-3	4-5	1-2	2-3	OFF	OFF	1-2	OFF	OFF	OFF	3-4	2-3	1-2,3-4	OFF	ON
SX2-50	OFF	OFF	OFF	2-3	4-5	1-2	2-3	OFF	OFF	1-2	OFF	OFF	OFF	3-4	2-3	OFF	OFF	ON
DX-33	OFF	OFF	OFF	2-3	4-5	1-2	2-3	OFF	OFF	1-2	OFF	OFF	OFF	3-4	2-3	1-2,3-4	OFF	ON
DX2-50	OFF	OFF	OFF	2-3	4-5	1-2	2-3	OFF	OFF	1-2	OFF	OFF	OFF	3-4	2-3	1-2,3-4	OFF	ON
DX2-66	OFF	OFF	OFF	2-3	4-5	1-2	2-3	OFF	OFF	1-2	OFF	OFF	OFF	3-4	2-3	1-2,3-4	OFF	ON
DX2-66	OFF	OFF	OFF	2-3	4-5	1-2	2-3	OFF	OFF	1-2	OFF	OFF	OFF	3-4	2-3	1-2,3-4	OFF	ON
DX4-75	OFF	OFF	OFF	2-3	4-5	1-2	2-3	OFF	OFF	1-2	OFF	OFF	OFF	3-4	2-3	1-2,3-4	OFF	ON
DX4-100	OFF	OFF	OFF	2-3	4-5	1-2	2-3	OFF	OFF	1-2	OFF	OFF	OFF	3-4	2-3	1-2,3-4	OFF	ON
DX4-100(EW)	OFF	1-2	1-2	2-3	4-5	2-3	2-3	OFF	1-2	1-2	OFF	OFF	OFF	3-4	2-3	1-2,3-4	1-2	OFF
<b>INTEL NOL</b>																		
SX-25	OFF	OFF	OFF	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2-3	OFF	OFF	ON
SX-33	OFF	OFF	OFF	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2-3	1-2,3-4	OFF	ON
DX-33	OFF	OFF	OFF	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1-2,3-4	1-2,3-4	OFF	ON
DX2-66	OFF	OFF	OFF	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1-2,3-4	1-2,3-4	OFF	ON
<b>INTEL P24T</b>	OFF	OFF	1-2	1-2	1-2	OFF	2-3	1-2	OFF	1-2	OFF	2-3	1-2	3-4	1-2,3-4	1-2,3-4	OFF	ON
<b>INTEL P24D</b>	OFF	1-2	1-2	1-2	4-5	2-3	2-3	OFF	OFF	1-2	OFF	3-4	OFF	1-2,3-4	1-2,3-4	1-2,3-4	OFF	ON
<b>CYRIX</b>																		
DX-33	OFF	OFF	2-3	2-3	2-3	OFF	1-2	OFF	OFF	1-2	ON	3-4	2-3	2-3	1-2,3-4	1-2,3-4	OFF	ON
DX-40	OFF	OFF	2-3	2-3	2-3	OFF	1-2	OFF	OFF	1-2	ON	3-4	2-3	2-3	1-2,3-4	1-2	OFF	ON
DX2-50	OFF	OFF	2-3	2-3	2-3	OFF	1-2	OFF	OFF	1-2	ON	3-4	2-3	2-3	1-2,3-4	OFF	OFF	ON
DX2-66(5V)	OFF	OFF	2-3	2-3	2-3	OFF	1-2	OFF	OFF	1-2	ON	3-4	2-3	2-3	1-2,3-4	1-2,3-4	OFF	ON
DX2-66(3.3V)	OFF	OFF	2-3	2-3	2-3	OFF	1-2	OFF	OFF	1-2	ON	3-4	2-3	2-3	1-2,3-4	1-2,3-4	1-2	OFF
DX2-80	OFF	OFF	2-3	2-3	2-3	OFF	1-2	OFF	OFF	1-2	ON	3-4	2-3	2-3	1-2,3-4	1-2	1-2	OFF
DX4-100	OFF	OFF	2-3	2-3	2-3	OFF	1-2	OFF	OFF	1-2	ON	3-4	2-3	2-3	1-2,3-4	1-2,3-4	1-2	OFF
5X86-100	OFF	1-2	1-2	2-3	4-5	2-3	2-3	OFF	1-2	1-2	OFF	3-4	OFF	2-3,4	1-2,3-4	1-2,3-4	1-2	OFF
5X86-120	OFF	1-2	1-2	2-3	4-5	2-3	2-3	OFF	1-2	1-2	OFF	3-4	OFF	2-3,4	1-2,3-4	1-2	1-2	OFF
<b>AMD SL</b>																		
DX4-100SV8B	OFF	1-2	1-2	2-3	4-5	2-3	2-3	OFF	1-2	1-2	OFF	3-4	OFF	1-2,3-4	1-2,3-4	1-2,3-4	1-2	OFF
DX4-120SV8B	OFF	1-2	1-2	2-3	4-5	2-3	2-3	OFF	1-2	1-2	OFF	3-4	OFF	1-2,3-4	1-2,3-4	1-2	1-2	OFF
5X86-133(X3)	2-3	1-2	1-2	2-3	4-5	2-3	2-3	OFF	1-2	1-2	OFF	3-4	OFF	1-2,3-4	1-2,3-4	1-2,3-4	1-2	OFF
<b>AMD NOL</b>																		
DX-33	OFF	OFF	OFF	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3-4	OFF	OFF	3-4	1-2,3-4	OFF	ON
DX-40	OFF	OFF	OFF	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3-4	OFF	OFF	3-4	1-2	OFF	ON
DX2-66NV8T	OFF	OFF	OFF	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3-4	OFF	OFF	3-4	1-2,3-4	1-2	OFF
DX2-80NV8T	OFF	OFF	OFF	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3-4	OFF	OFF	3-4	1-2	1-2	OFF
DX4-100NV8T	OFF	OFF	OFF	2-3	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3-4	OFF	OFF	3-4	1-2,3-4	1-2	OFF

NOTE: TI 486DX2-66, -80, TI486DX4-100 Jumper the Same Cyrix-CPU 486DX2-66, -80, Cyrix 486DX4-100

#### JP28, W4: 3V/4V/5V CPU VOLTAGE SELECTOR

	INTEL/AMD/Cyrix (3V)	Cyrix DS2-80 (4V)	ALL 5V CPU & P24T-63/83
JP28	1-2	2-3	X
W4	OFF	OFF	ON



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### JP5, CPU CLOCK SELECTOR

	25MHZ 486SX/DX-25 486DX2-50 486DX4-75,P24T-63	33MHZ 486SX/DX-33 486D2-66 486DX4-100,P24T-83 5X86-133/100	40MHZ 486DX-40 486DX2-80 486DX4-120 5X86-120	50MHZ 486DX-50
JP5	1-2 OFF 3-4 OFF	1-2 ON 3-4 ON	1-2 ON 3-4 OFF	1-2 OFF 3-4 ON

### Power Connector (J2)

The power connector is used to connect power lines and power good signal from the power supply's P8 & P9 connectors to the system board.

The pin assignments are:

PINOUT	ASSIGNMENTS
1	POWER GOOD
2	+5V
3	+12V
4	-12V
5	GROUND
6	GROUND
7	GROUND
8	GROUND
9	-5V
10	+5V
11	+5V
12	+5V

### Keyboard Connector (J1)

The keyboard connector is a 5-pin DIN connector

The pin assignments are:

PINOUT	ASSIGNMENTS
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	NO CONNECTION
4	GROUND
5	+5V

## Chapter 3 : Hardware Description

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### Print IRQ Selection

IRQ SELECTION FUNCTION	S1
IRQ 5	1-2
IRQ 7	2-3

### ECP Mode DMA Selection

DMA SELECTION FUNCTION	S2	S3
DMA 1	1-2	1-2
DMA 3	2-3	2-3

### CPUCLK Selection

CPU SELECTION FUNCTION	W3
ACLK = CPUCLK	1-2
DELAY ACLK TO CPUCLK	2-3

CPU SPEED	JP8
<= 33MHz	1-2
> 33MHz	2-3

### Reset Switch Connector (J10)

PINOUT	ASSIGNMENTS
1	GROUND
2	RESET INPUT

### Speaker Connector (J8)

PINOUT	ASSIGNMENTS
1	+5V
2	GROUND
3	GROUND
4	SPEAK OUT

### Turbo Switch Connector (J30)

PINOUT	ASSIGNMENTS
1	VCC
2	TURBO INPUT
3	GROUND

## Chapter 3 : Hardware Description

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### Turbo LED Connector (J11)

PINOUT	ASSIGNMENTS
1	GROUND
2	LED OUT

### Keylock Connector (J7)

PINOUT	ASSIGNMENTS
1	LED OUTPUT
2	NO CONNECTION
3	GROUND
4	KEYLOCK
5	GROUND

### External Battery

BATTERY FUNCTION	J3
BATTERY IN	1
NC	2
GROUND	3-4

### BIOS ROM TYPE

BIOS ROM SELECT	JP22
FLASH BIOS	1-2, 5-6 CLS
PROM BIOS	2-3, 4-5 CLS

### Other Jumper Setting

JP1	CLOSE : Color Monitor OPEN : Mono Monitor
JP2 JP3	2-3 : RTC Disable 1-2 : RTC Enable
JP9	CLOSE : Break Push Button ON OPEN : Break Push Button OFF
JP6 JP7	HDD LED 2 HDD LED 1

## Chapter 3 : Hardware Description

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### 3.3 Installation of RAM Modules

The memory banks on the mainboard include from SIM1 to SIM4. The mainboard can be installed with 1,2,4,8 or 16MB 72pins SIMM RAM Module. The SIMM RAM Module speed is 60/70 ns.

There are no jumpers for the RAM Module Configuration. The BIOS will test the RAM Module type and size automatically. Please install the same RAM Module size. Total RAM Module size is 1MB-128MB.

### 3.4 Installation of Cache Memory

#### Cache RAM Size

	128K	256K	512K
TAG RAM	8K8*1	16K8*1 or 32K8*4	32K8*1
Bank0	32K8*4	64K8*4	128K8*4

TAG RAM : U21

Bank0 : U22, U23, U24, U25

#### Cache RAM Jumper Setting

JMP	128K	256K	512K
JP25	1-2	2-3	2-3
JP27	2-3	2-3	1-2

JP26 : TAG RAM SIZE SELECTOR

1-2: 32K X 8/8K X 8

2-3: 16K X 8

P407 P13

### 3.5 Super I/O Features

The GM82C803B chip replaces with a single 100 pin chip, a floppy disk controller (FDC) with data separator, two UARTs (GM16C550), one IEEE 1284 parallel port. The GM82C803B also includes one game port chip select, hard disk controller interface and standard AT address decoding for on-chip function. The floppy disk control part provides all the needed functionality between the host processor peripheral bus and the cable connector to the floppy disk driver. It integrates the function of the formatter/controller, data separator, write precompensation, data rate selection, clock generation and high current drivers and supports the 4MB drive as well as the other standard drives. The UARTs perform the parallel to serial/serial to parallel conversion on the data characters received from the CPU or Modem. The IEEE 1284 parallel port is full compatible with the new IEEE 1284 standard. Configuration registers can be used to enable or disable any on-chip function independently of the others.

#### **Enhanced Digital data Separator:**

- Low Cost Implementation-24Mhz Crystal.
- No Filter Components Required.
- 1Mb/s, 500Kb/s, 300Kb/s, 250Kb/s Data Rates.

#### **Multi-Mode Parallel Port with ChiProtect™ Circuitry**

- Standard Mode.
- IBM PC/XT, PC/AT and PS/2 Compatible Bidirectional Parallel Port.

#### **Enhanced Mode**

- Enhanced Parallel Port (EPP), Compatible-EPP 1.7 and EPP 1.9 (IEEE 1284 Compliant).

#### **High Speed Mode**

- Microsoft and Hewlett Packard, Extended Capabilities Port (ECP) IEEE 1284 Compliant.
- Incorporates ChiProtect Circuitry for Protection Against Damage Due to Printer Power-On.
- 24mA Output Drivers.
- Two Parallel Port Interrupt Pins Serial Ports.
- Two High Speed NS16C550 Compatible UARTs with Send/Receive 16 Byte FIFOs.
- MIDI Compatible.
- Programmable Baud Rate Generator.
- Modem Control Circuitry.

#### **IDE Interface**

- On-Chip Decode and Select Logic Compatible with IBM PC/XT and PC/AT Embedded Hard Disk Drives.
- IDE Primary/Secondary Address Selection.

COM1 : Serial Port1

COM2 : Serial Port2

PRN1 : Parallel Port1

FDC1 : FDD Connector

IDE1 : Primary IDE Connector

IDE2 : Secondary IDE Connector

# **CHAPTER 4**

## *BIOS Setup*