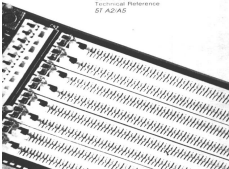


Pentium

TriomIPS4C PCI Mainboard
User's Guide &
Technical Reference
5T A2/A5





SOYO™

About This Guide

This User's Guide is for assisting system manufacturers and end users in setting up and installing the motherboard. Information in this guide has been carefully checked for reliability; however, no guarantee is given as to the correctness of the contents. The information in this document is subject to change without notice.

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Version 2.0

5T A2/A5/D2/D5 SERIAL

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1 Introduction

The Intel® P4C-702 motherboard is a high-performance system board that supports Intel® Pentium® 4/3E family CPUs. You can install 2GB or 1GB of external cache memory on the motherboard. The motherboard is fully compatible with industry standards, and offers many optional enhancements.

Key Features

- Supports Pentium® family CPUs meeting a 2.0/1.8/1.6/1.5/1.4/1.3/1.2/1.0 and 1.0/0.9/0.8/0.75 GHz speeds.
- Supports 4096MB 7.5V/5VDDR memory upgrade.
- Integrated Intel® Pentium® 4/3E Cache Controller
 - With Through and Direct Cache Modes
 - Direct Memory Cache Controller
 - Supports 2GB or 1GB cache sizes
- Integrated Serial ATA Controller
 - Consumer SATA Mode
 - SATA-150/100/60/30/15/7.5/3.0/1.5/0.75/0.375/0.1875 SATA Serial
 - SATA, SATA, SATA, SATA, SATA, SATA, SATA, SATA and SATA/SATA/ATA (on SATA)
 - On-board external configurations from 1 to 24 SATA ports
- Built-in SATA in increments of 16 Kbytes
- Supports Pentium® P4C-702 SATA Mode
- Supports CPU Key Lock
- Supports 7.5V/5V for 1GB memory configuration
- Complies with PCI specifications 2.1
- Two SATA/PCI slots (SATA) and four SATA slots (SATA/PCI)
- Supports 800MHz or 400MHz SATA (on SATA) and "Plug and Play" function
- On-board SATA-to/PCI Master IDE controller and SATA controller
- On-board supports for two high speed SATA (SATA) and SATA (SATA) and SATA/SATA/ATA per the Standard, Enhanced SATA and high speed SATA mode
- On-board supports 7.5V/5V Memory ECC
- It supports PCI mouse function.

Inspecting the Mainboard

The mainboard package arrives

- The film, PVC wrapped
- The Stern Guide

Note: Do not expect the mainboard until you are ready to install it.

Follow the procedure below while opening the mainboard.

1. Before handling the mainboard, ground yourself by grasping an unpainted portion of the correct metal chassis.
2. Remove the mainboard from its anti-static packaging and place it on grounded antistatic mat/paper side up.
3. Check the mainboard for damage. Easy slip-up areas, particularly for test & study scenarios.

Do not apply power if the mainboard opens damaged. If there is damage to the board, contact your reseller.

Electrostatic Discharge Precautions

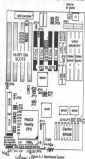
Make sure you ground yourself before handling the mainboard when using antistatic equipment. Electrostatic discharge occurs only through the components. Make sure you use static precautions when handling the mainboard in step in an industrial environment.

Follow these precautions to protect your equipment from electrostatic discharge:

- Do not remove the anti-static packaging until you are ready to install the mainboard into your computer.
- Ground yourself before removing any system component from its protective anti-static packaging. To ground yourself, grasp the unpainted side screws or other unpainted portion of the computer chassis.
- Frequently ground yourself while working, or use grounding strap.
- Handle the mainboard by the edges and avoid touching its components.

Mainboard Layout w/ default settings*

*Default settings: Processor: PENTIUM 4M, 2MB 6.0 cache, Address Pipeline Stretched, On-board Local Bus: 33Mhz, 100Mhz, 133Mhz, 1 high speed LAN (optional) for 1000/100M, 1100Mhz performance mode.



Important: Make sure the system is not grounded to ground, maintaining and restore system stability.

2 Hardware Setup

The diagrams show how to configure the hardware. After you read the manual, you insert papers, install memory or the modems, and make any additional hardware changes whenever you upgrade your system.

CAUTION: Turn off power to the hardware, system board, and peripheral device before performing any work on the hardware or system.

Jumpers

Factory Set Jumpers

The following jumpers are set at the factory as follows:

Jumper	Factory settings
J14, J23, J24, J25	Factory fixed at float
J22	Factory fixed at type
J, J4, J5, J31-J35	Reset
J31	Factory fixed at 1-1

J14 Jumper Type

In PC configuration, the modems for use with the system are as follows:

Modem Type	J14
Hardware	 1 2
ISA/ISA (default)	 1 3

Hardware Setup

J14, J15, J4, J5, J31-J35 Normal Settings (Default in Type)

These jumpers are PC configuration. For each condition, the BIOS uses the PC configuration. However, some functions will require the additional setting. In this case, refer to the jumper in PC configuration.

Modem	PC	ISA	PC	ISA
Modem	J14 	J14 	J14 	J14 
	J15 	J15 	J15 	J15 
	J4 	J4 	J4 	J4 
	J5 	J5 	J5 	J5 
Modem	J4 	J4 	J4 	J4 
	J5 	J5 	J5 	J5 
	J31 	J31 	J31 	J31 
	J32 	J32 	J32 	J32 

Transfer that in PC Configuration type BIOS uses the condition.

Use 1-4 Bit (J14, J15) on port PC and 1-4 (J4, J5, J31, J32, J33) will be necessary for the function operation for the setting.

In 1-4 Bit (J4) or 1-4 Bit (J5) type, Jumper J31 or J32.

J14, J15 Jumper Type, Modem (ISA) Select

These jumpers are Primary and Secondary (ISA) PC and ISA mode.

Modem	J14 (Primary ISA)	J15 (Secondary ISA)
PC Mode (ISA) (Default)	 1 2	 1 2
ISA Mode (ISA)*	 1 3	 1 3

* When you install setting mode on port ISA supports ISA mode.

J71: Ring Inhibit/Connector Enable/Disable

Toggle the jumper to force the system into power saving (Stand-by) mode. See Section 10 for signal values for each setting.

J72: All Bus Clock Select

The jumper enables/ disables the clock for an external device (D).

Clock	J72
Position - 0 (All On) Position - 1 (Only D)	(Disabling D)
Clear Position (D) Default	(Enabling D)

J73: L2 Write Back / Write-Through Cache Select

See J71 for jumper pin connections. L2 Write Back / Write-Through Cache.

L2 Cache	J73
Write Back Cache Default	
Write Through Cache	

J74: J75: Bus Frequency Core/Bus Ratio Select

Enable jumper according to your CPU clock.

000 - No Position 0 (7.5 MHz), 010 - 10MHz for CPU core clock, 1 - 10MHz for bus clock.

Bank	PM22 Results	J74, J75
01 Default	Position - (0000, 000, 100000)	
02	Position - (000000) Position - (000, 100000)	
03	Position - (0000000)	
04	Position (0000)	

J76: Pipeline Select

J76 enables or disables address pipelining.

Address Pipelining	J76
Disable Address Pipelining Default	
Enable Address Pipelining	

J7: VDR (Voltage Regulator-Mode) Control

VDR mode is disabled for CPU core to use 3.3v core VDD for the advanced speed PM2.

PS1 CMOS-Gear Jumper

Enable CMOS memory to automatically load the jumper bios upon power/jumper to maintain settings.

CMOS Setting	PS1
Enable CMOS bios (Default)	 1 2
Clear CMOS bios	 1 2

PS1, PS4 EPROM FLASH Memory Select/Jumper

Select the correct FLASH memory type with jumper PS1 and PS4.

Type	PS1	PS4
EPROM FLASH (non-program) (Default)	 1 2	 1 2
Flash memory (program)	 1 2	 1 2

The default of these 2 jumpers is non-program non-volatile (1-1 of PS1 and pin 2-2 of PS4) based. Set the PS1 and PS4 to the program setting to install a new BIOS file onto the chip by loading pin 2-1 of PS1 and pin 1-1 of PS4. The need to set these 2 jumpers to in the non-program setting after the installation is assumed.

CPU Type Configuration

Set the motherboard CPU jumper (PS1, PS2, PS3) and PS4 according to CPU type as described below, and also set PS5 (PS6) to the proper voltage (5V or 3V).

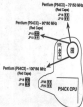
Performance – PENTIUM/386 CPU Settings (1.5 x stock)

Fig. 4-1-1. CPU Jumper Setup

Pentium - 100MHz CPU/Settings (2.0 x clock)

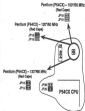


Figure 4-1-2. CPU/Jumper Setup

Pentium - 100MHz CPU Settings (2.0 x clock)



Figure 4-1-3. CPU/Jumper Setup

* This must apply for the CPU with a fan and heat sink for system stability.

[F5], [F4], [F6] CPU settings select

Use [F5]-[F6] to configure the page settings for the installed CPU.

CPU type settings	[F5]-[F6]
Standard and PRO PACK2 CPU (3.01~1.90) (Default)	[F5]
	[F6]
	[F5]
100 PACK2 CPU (3.01~1.90)	[F5]
	[F6]
	[F6]
General	[F5]
	[F6]
	[F6]

Note Check out your CPU mode in the memory for the CPU type setting.

Memory Configuration

The motherboard supports the highest Type DDR or DDR2 (500 or 600 MHz) memory module pair(s). The maximum system RAM of about 8GB is supported.

Single-side RAM	Double-side RAM
8GB + 2GB x 3 (6GB)	2GB + 2GB x 3 (6GB)
4GB + 2GB x 3 (6GB)	4GB + 2GB x 3 (6GB)
4GB + 4GB x 2 (8GB)	2GB + 4GB x 3 (6GB)
4GB + 4GB x 3 (8GB)	

The motherboard supports DIMM 4 for 32 GBps with an other restriction on memory configurations. You can install DIMM in any combination without having to set the memory configuration with Memory configuration in the "BIOS Menu."

Cache Configuration

The motherboard has a write-back caching scheme. You can configure the motherboard cache by installing cache chips in the slots used below and then at jumper [F1] and [F2] (not in the motherboard design) of DIMM socket. See Figure 17-14 for cache configuration.

Cache Size and RAM Locations

Cache Size	Cache RAM	Total RAM	Cacheable Range
2GB	2GB x 1 10, 15, 16, 17 18, 19, 20, 21, 22	8GB x 2 16GB (6GB)	2GB
4GB	4GB x 1 10, 15, 16, 17 18, 19, 20, 21, 22	16GB x 2 (8GB)	4GB

256K Cache (50X18) Board Configuration



Figure 1-1. 256K Cache Configuration with 50X18

512K Cache (50X18) Board Configuration



Figure 1-1. 512K Cache Configuration with 50X18

J1, J2 Signal Type Select (Factory Setting)

The resistor is set at the factory location for LPT/Parallel only or for Word/Block. Define setting as either 1 or 0 as follows:

LPT/Block consists of 1 LPT/Block and 1 LPT/Block.

Word/Block consists of 70 Word and 1 Block module.

Setting	J1	J2
LPT/Block		
Word/Block		

CAUTION: These two groups of jumpers are set at the factory. Do not change the settings on your motherboard, otherwise you may damage the motherboard's BIOS.

Multi I/O Port Addresses

Default settings for each I/O port address are shown in the table below.

Port	IO Address	IRQ	Status
COM1	3F8	4	Standard Parallel Port
COM2	2F8	3	
COM3	3E8	4	

COM1 is default for standard mode. If you want COM1 to function, you must use the BIOS or other setup utility (J1, J2) and COM1 to configure COM2/COM3. If default I/O port addresses conflict with other I/O addressing, you can use the I/O control, you must adjust one of the I/O addresses to avoid address conflict. (You can adjust base I/O address from BIOS.)

Note: Some serial cards have a default IRQ setting (for COM1) which may conflict with printing functions. If this occurs, do not use serial card functions unless you reprogram.

Connectors

Attach the connectors to your device, using standard safety precautions with the installed battery (Figure 1) for connector location and connector pin position.

J1 - Keyboard Connector

Align the female J1 keyboard connector to locate at the rear of the board. Plug the keyboard into female connector.

FW1 - Power Supply Connectors

The motherboard requires power supply with either 20-watt or 4-watt power good signal. FW1 has two six-pin power board connectors. Plug the dual connectors from the power board into the board connector while making sure the back ends are interlocked.



J17 - Keyboard & Power USB Connector

J17 is a connector for which factory is needed with the user can't do anything building the board. J17 also starts to be user's Power USB.

J18 - Speaker Connector

Install the speaker pin-to-pin connector (J18).

J19 - Hardware Reset Control

Install the reset switch (J19) to the board using the instructions in the user manual.

J2 - PCI Mouse Connector (only for PT 01/04)

Insert PCI mouse into the connector.

J21 - Turbo LED Connector

Attach the strip LEDs (J21) for LED light when the system is in Turbo mode.

IDE1/IDE2 - 16-Bit Parallel Primary/Secondary IDE HDD Connectors

Insert selected hard disk drives into connectors.

J26 - IDE LED Connector

Attach on-board hard disk drive LEDs into this connector. The LEDs light when an HDD is active.

COM1/COM2 Connectors

Install COM1/COM2 serial data connectors.

FPC1 Connector

Install floppy disk into the connector.

FW1 Connector

Attach pin-to-pin into the connector.

System BIOS Cacheable	Enabled	The BIOS area (ROM) is cacheable and cached.
	Disabled	The BIOS area (ROM) is cacheable if cache controller is enabled.
Video BIOS Cacheable	Disabled	The video BIOS (VBIOS) is uncached.
	Enabled	The video BIOS (VBIOS) is cacheable if cache controller is enabled.
Memory Refresh (MUR) #1	Close	Enabled or Disabled (Default) Close enables auto refresh of DRAM address in this row. If this option, you should select Enabled, otherwise no Enabled.
BIOS Boot Block	Close	Enabled (Default) or Disabled (Default) Disabled boot-block access is enabled if you enter password. For all BIOS support the function.
BI Memory Share (M)	Close	Auto (Default) or manual (4, 8, 16M) Share allows speed, and BIOS mode 4 is the fastest speed for better performance and stability, we suggest you set the Auto setting or enable BIOS Share setting.
BI Memory Share (M)		
BI Memory Share (M)		
BI Memory Share (M)		
Hardly Primary BIOS	Enabled	Use the onboard BIOS (Default)
Hardly Secondary BIOS	Disabled	Use the external BIOS (Default)
BI Set DRAM Channel	Close	Enabled (Default) or Disabled When Enabled is on, DRQ1 is dedicated to memory DR0 and When Disabled is on, DRQ1 is shared to all the lines.
BIOS Recovery	Disable/Default setting	
BIOS Recovery	Disable/Default setting	

BIOS Booting	Disable/Default setting	
Advanced BIOS Control	Enabled	Use the advanced floppy controller (Default).
	Disabled	Turn off the advanced floppy controller.
Advanced Serial Port 1	Close	and port 1 of serial address 0x3f8 or port 1 & 2 for the same value except Enabled.
Advanced Serial Port 2	COM 1 (2F8) / COM2 (2E8)	COM 2 (2F8) / COM3 (2E8)
	(Default)	(Default)
Advanced Parallel Port	Close	to give priority address 00C0h/0040h, 0080h/0040h.
Advanced Printer Mode	Close	Compatible (Default), based on EPP, ECP mode. The mode depends on your external device requirements with you.
BIOS Mode (DRM) Mode	Close	DRM (Default) or DRAM. This setting only works when the Advanced Feature Mode is set to the ECP mode.

- After you have finished with the OnChip Feature Setup, press the <ESC> key and follow the screen instructions to save or discard your settings.

Power Management Setup

The Power Management Setup option can be entered power saving function.

Go to Power Management Setup as follows.

1. Choose "POWER MANAGEMENT SETUP" from the Main Menu and a screen with a function appears.

* For information
 refer to the manual.
 * Refer to the manual.
 * Refer to the manual.

Power Management	Enabled	PM1	APM 1.0	Disabled
APM 1.0	Enabled	PM2	APM 2.0	Disabled
APM 2.0	Enabled	PM3	APM 3.0	Disabled
APM 3.0	Enabled	PM4	APM 4.0	Disabled
APM 4.0	Enabled	PM5	APM 5.0	Disabled
APM 5.0	Enabled	PM6	APM 6.0	Disabled
APM 6.0	Enabled	PM7	APM 7.0	Disabled
APM 7.0	Enabled	PM8	APM 8.0	Disabled
APM 8.0	Enabled	PM9	APM 9.0	Disabled
APM 9.0	Enabled	PM10	APM 10.0	Disabled
APM 10.0	Enabled	PM11	APM 11.0	Disabled
APM 11.0	Enabled	PM12	APM 12.0	Disabled
APM 12.0	Enabled	PM13	APM 13.0	Disabled
APM 13.0	Enabled	PM14	APM 14.0	Disabled
APM 14.0	Enabled	PM15	APM 15.0	Disabled
APM 15.0	Enabled	PM16	APM 16.0	Disabled
APM 16.0	Enabled	PM17	APM 17.0	Disabled
APM 17.0	Enabled	PM18	APM 18.0	Disabled
APM 18.0	Enabled	PM19	APM 19.0	Disabled
APM 19.0	Enabled	PM20	APM 20.0	Disabled
APM 20.0	Enabled	PM21	APM 21.0	Disabled
APM 21.0	Enabled	PM22	APM 22.0	Disabled
APM 22.0	Enabled	PM23	APM 23.0	Disabled
APM 23.0	Enabled	PM24	APM 24.0	Disabled
APM 24.0	Enabled	PM25	APM 25.0	Disabled
APM 25.0	Enabled	PM26	APM 26.0	Disabled
APM 26.0	Enabled	PM27	APM 27.0	Disabled
APM 27.0	Enabled	PM28	APM 28.0	Disabled
APM 28.0	Enabled	PM29	APM 29.0	Disabled
APM 29.0	Enabled	PM30	APM 30.0	Disabled
APM 30.0	Enabled	PM31	APM 31.0	Disabled
APM 31.0	Enabled	PM32	APM 32.0	Disabled
APM 32.0	Enabled	PM33	APM 33.0	Disabled
APM 33.0	Enabled	PM34	APM 34.0	Disabled
APM 34.0	Enabled	PM35	APM 35.0	Disabled
APM 35.0	Enabled	PM36	APM 36.0	Disabled
APM 36.0	Enabled	PM37	APM 37.0	Disabled
APM 37.0	Enabled	PM38	APM 38.0	Disabled
APM 38.0	Enabled	PM39	APM 39.0	Disabled
APM 39.0	Enabled	PM40	APM 40.0	Disabled
APM 40.0	Enabled	PM41	APM 41.0	Disabled
APM 41.0	Enabled	PM42	APM 42.0	Disabled
APM 42.0	Enabled	PM43	APM 43.0	Disabled
APM 43.0	Enabled	PM44	APM 44.0	Disabled
APM 44.0	Enabled	PM45	APM 45.0	Disabled
APM 45.0	Enabled	PM46	APM 46.0	Disabled
APM 46.0	Enabled	PM47	APM 47.0	Disabled
APM 47.0	Enabled	PM48	APM 48.0	Disabled
APM 48.0	Enabled	PM49	APM 49.0	Disabled
APM 49.0	Enabled	PM50	APM 50.0	Disabled
APM 50.0	Enabled	PM51	APM 51.0	Disabled
APM 51.0	Enabled	PM52	APM 52.0	Disabled
APM 52.0	Enabled	PM53	APM 53.0	Disabled
APM 53.0	Enabled	PM54	APM 54.0	Disabled
APM 54.0	Enabled	PM55	APM 55.0	Disabled
APM 55.0	Enabled	PM56	APM 56.0	Disabled
APM 56.0	Enabled	PM57	APM 57.0	Disabled
APM 57.0	Enabled	PM58	APM 58.0	Disabled
APM 58.0	Enabled	PM59	APM 59.0	Disabled
APM 59.0	Enabled	PM60	APM 60.0	Disabled
APM 60.0	Enabled	PM61	APM 61.0	Disabled
APM 61.0	Enabled	PM62	APM 62.0	Disabled
APM 62.0	Enabled	PM63	APM 63.0	Disabled
APM 63.0	Enabled	PM64	APM 64.0	Disabled
APM 64.0	Enabled	PM65	APM 65.0	Disabled
APM 65.0	Enabled	PM66	APM 66.0	Disabled
APM 66.0	Enabled	PM67	APM 67.0	Disabled
APM 67.0	Enabled	PM68	APM 68.0	Disabled
APM 68.0	Enabled	PM69	APM 69.0	Disabled
APM 69.0	Enabled	PM70	APM 70.0	Disabled
APM 70.0	Enabled	PM71	APM 71.0	Disabled
APM 71.0	Enabled	PM72	APM 72.0	Disabled
APM 72.0	Enabled	PM73	APM 73.0	Disabled
APM 73.0	Enabled	PM74	APM 74.0	Disabled
APM 74.0	Enabled	PM75	APM 75.0	Disabled
APM 75.0	Enabled	PM76	APM 76.0	Disabled
APM 76.0	Enabled	PM77	APM 77.0	Disabled
APM 77.0	Enabled	PM78	APM 78.0	Disabled
APM 78.0	Enabled	PM79	APM 79.0	Disabled
APM 79.0	Enabled	PM80	APM 80.0	Disabled
APM 80.0	Enabled	PM81	APM 81.0	Disabled
APM 81.0	Enabled	PM82	APM 82.0	Disabled
APM 82.0	Enabled	PM83	APM 83.0	Disabled
APM 83.0	Enabled	PM84	APM 84.0	Disabled
APM 84.0	Enabled	PM85	APM 85.0	Disabled
APM 85.0	Enabled	PM86	APM 86.0	Disabled
APM 86.0	Enabled	PM87	APM 87.0	Disabled
APM 87.0	Enabled	PM88	APM 88.0	Disabled
APM 88.0	Enabled	PM89	APM 89.0	Disabled
APM 89.0	Enabled	PM90	APM 90.0	Disabled
APM 90.0	Enabled	PM91	APM 91.0	Disabled
APM 91.0	Enabled	PM92	APM 92.0	Disabled
APM 92.0	Enabled	PM93	APM 93.0	Disabled
APM 93.0	Enabled	PM94	APM 94.0	Disabled
APM 94.0	Enabled	PM95	APM 95.0	Disabled
APM 95.0	Enabled	PM96	APM 96.0	Disabled
APM 96.0	Enabled	PM97	APM 97.0	Disabled
APM 97.0	Enabled	PM98	APM 98.0	Disabled
APM 98.0	Enabled	PM99	APM 99.0	Disabled
APM 99.0	Enabled	PM100	APM 100.0	Disabled

2. On the screen keys a menu between items and a selection value (usually the selected value) appears by pressing the \leftarrow key.

A brief description of selected items are as follows.

Power Management Options are as follows.

Power On Lets you enter the HDD and spin power down time.

Harddisk Checks the Green ACPI status.

Harddisk Harddisk = 1 Min
Harddisk = 1 Min
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Harddisk = 1 Min

Harddisk Harddisk = 1 Min
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1. After you have finished with the Power Management Setup, press the \rightarrow key to return to the Main Menu.

Password Setting

This Main Menu item lets you configure the system so that a password is required every time the system boots or an attempt is made to enter the Setup program. Change the password as follows:

1. Choose "PASSWORD SETTING" in the Main Menu and press <Enter>. The following message appears:

"Enter Password"

2. Enter a password and press <Enter>.

(If you do not wish to use the password function, you can just press <Enter> and a "Password disabled" message appears.)

3. After you enter your password, the following message appears prompting you to confirm the new password:

"Confirm Password"

4. Re-enter your password and then Press <ESC> to exit to the Main Menu.

Important: If you forget or lose the password, the only way to access the system is to set jumper JPS2 to clear the CMOS Setup. All setup information is lost and you must run the BIOS setup program again.

IDE HDD Auto Detection

This Main Menu item automatically detects the hard disk type and configures the STANDARD CMOS SETUP accordingly.

Note: This function is only useful for IDE hard disks.

STANDARD CMOS SETUP								
(Press F5 to Modify, F10 to Exit)								
NAME	VALUE	TYPE	MIN	MAX	UNIT	PROPERTY	LOAD	SETUP
PRIMARY IDE0	Master	:	0	0	0	0	0	----
SECONDARY IDE1	Slave	:	0	0	0	0	0	----
TERMINATOR	None	:	0	0	0	0	0	----

Do you want to auto detect IDE hard disk? (Y/N)

END - HELP