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VS-2530 All-In-One 3.5" Disk Size Low Power Geode CPU Board User's Manual

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- A list of your name, address, telephone, facsimile number, or email address where you may be reached during the day
- Description of you peripheral attachments
- Description of your software (operating system, version, application software, etc.) and BIOS configuration
- Description of the symptoms (Extract wording any message)

For updated BIOS, drivers, manuals, or product information, please visit us at www.visionsystems.de

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Chapter 1 Introducing the VS-2530 System Board

Overview

The VS-2530 is an all-in-one 3.5" disk size NS Geode low power CPU board. This user's manual provides information on the physical features, installation, and BIOS setup of the VS-2530.

Built to unleash the total potential of the Pentium Processor, the VS-2530 is all-in-one CPU board computer capable of handling today's demanding requirements. Able to support 200-300 MHz CPUs, this system board supports dual 10/100M interface network port, audio, 1 So-DIMM socket for up to 128MB PC-100 SDRAM, and a 4MB PCI-VGA controller that can support both LCD's and CRT's simultaneously or independently.

Each VS-2530 has two ports for I/O communications. One RS-232C/485/IrDA and one RS-232C port are available.

The VS-2530 is perfect for POS and POI applications, network systems, panel / MMI's, order entry kiosks, test equipment, OEM projects or as a motherboard for a panel PC. The unit is only 145X102mm, offering unparalleled performance in a very small footprint.

Series Comparison Table

Model	VS-2530
Processor	GX1-300Mhz
Chipset	CS5530A
1So-DIMM(Max. SDRAM)	128MB
VGA CRT/LCD	CS5530A
Watchdog Timer	Yes
Multi I/O Chip	2S1P
Enhanced IDE	Yes
USB	Yes
IrDA	Yes
Audio	Yes
Ethernet (10/100Mbps)	Dual
Board Size	145mm x 102mm

Layout

J1
CN3
CN6
J6
JP1
J3
CN4
J5
CN8
JP2
BUS1
J4
JP3
JP6
JP4
JP5
CN5
CN7
J2
CN1
CN2
DB1
DB2
J7
LM1
CN9
CN10
CN11

Specifications

- Supports 200~300 MHz NS Geode GX1 CPU.
- NS CS5530 (A) chipset with UMA architecture.
- One So-DIMM socket for up to 128MB PC-100 SDRAM.
- One or two 100M/10M Ethernet with RJ-45 connector.
- Provides CRT, LCD interface with 1.5MB to 4MB shared memory.
- One parallel port, one floppy port and one PCI IDE Interface.
- One RS-232C and one RS-232C/RS-485/IrDA.
- PS/2 compatible keyboard and mouse interface.
- On-board power, watch and HDD LED indicator.
- Software programmable watchdog timer.
- Audio function supports Line-In, Line -Out and MIC-In.
- Two USB ports.
- Two TTL input lines and two TTL output lines
- +5V, 1.3A maximum and +12V, 0.1A maximum. (Base on 300MHz CPU and without LCD panel and LCD inverter)
- EMI Considered on every output signals.
- 3.5" disk size, 145 mm x 102 mm (5.7” x 4.0”)

Packing List

Upon receiving the package, verify the following things. Should any of the mentioned happens, contact us for immediate service.

- Unpack and inspect the VS-2530 package for possible damage that may occur during the delivery process.
- Verify the accessories in the package according to the packing list and see if there is anything missing or incorrect package is included.
- If the cable(s) you use to install the VS-2530 is not supplied from us, please make sure the specification of the cable(s) is compatible with the VS-2530 system board.

Note: after you install the VS-2530 series, it is recommended that you keep the diskette or CD that contains drivers and document files, and keep the document copies, or unused cables in the carton for future use.

The following lists the accessories that may be included in your VS-2530 package. Some accessories are optional items that are only shipped upon order.

- One VS-2530 all-in-one 3.5" disk size CPU board.
- One 44-pin hard disk driver interface cable.
- One 20-pin to 34-pin floppy disk interface cable.
- One serial port adapter cable and 1 parallel port interface cable. (10-pin IDC to DB-9)
- One PS/2 keyboard and mouse port adapter cable.
- One audio adapter with VS-4612A transfers board.
- One 6-pin power adapter cable.
- One compact disk includes software utility.

Chapter 2 Hardware Installation

To set up a VS-2530 system card, complete the description in Chapter 2 and Chapter 3.

This chapter introduces the system board connectors & jumper settings, and guides you to apply them for field application.

Before Installation

Before you install the system board, make sure you follow the following descriptions.

1. Before removing the board from its anti-static bag, wear an anti-static strap to prevent the generation of Electricity Static Discharge (ESD). The ESD may be created from human body that touches the board. It may do damage to the board circuit.

2. Install or unplug any connector, module, or add-on card, be sure that the power is disconnected from the system board. If not, this may damage the system board components, module, or the add-on-card.

3. Installing a heat sink is necessary for heat dissipation from your CPU. If heat sink is not mounted, this may cause the CPU fail due to over-heating problem.

Hardware Features

Index to Connectors/Jumpers/Others

The following lists the connectors and jumpers to install the VS-2530.

Item	Description
CN1	6-pin 2.0mm keyboard and mouse connector
CN2	RS232C/RS485 Connector for serial port 2
CN3	Parallel port connector
CN4	10-pin audio connector
CN5	Floppy connector
CN6	18-bit LCD interface connector
CN7	IDE hard disk connectors
CN8	Control signals and power source for LCD inverter
CN9 & CN10	RJ-45 LAN port connector
CN11	USB connector
BUS1	PC/104 Connector
DB1	DB9 RS232C Connector for serial port 1
DB2	CRT connector
JP3	RS-485 mode terminator on and off
JP4 & JP5	Power Source Select Jumper for both port
JP6	RS-232/RS-485 mode jumper select for serial port 2
J1 & JP1	External Battery Header and Battery Select Jumper
J2	Touch screen header
J3	TTL I/O Connector
J4	Infrared connector header
J5	External Speaker Header
J6	6-pin 2.0mm JST Power Connector
J7	Reset header
LM1	Real Panel Power/HDD/Watchdog LED Indicator
DIMM1	SoDIMM Socket

J1& JP1: External Battery Header and Battery Select Jumper

J1 is used to connect an external battery pack if on-board Lithium battery is empty or not and please setting JP1 properly of on-board battery or external battery.

.

J3: TTL I/O Connector

J3	Signal	Bit Location	J3	Signal	Bit Location
1	Input 0	Bit o of 78~7BH	2	Output 0	Bit o of 78~7BH
3	Input 1	Bit 1 of 78~7BH	4	Output 1	Bit 1 of 78~7BH
5	+5V	-	6	Ground	-

J5: External Speaker Header

PIN	Signal
1	Speaker+
2	Speaker-

J6: Power Connector (6-pin 2.5mm JST)

Pin 1: Ground
Pin 2: VCC (+5V)
Pin 3: VCC (+5V)
Pin 4: Ground
Pin 5: Ground
Pin 6: + 12V

J7: Reset Header

J7 is a push bottom switcher for system reset, Push and release the bottom will cause hardware reset of VS-2530 and restart system booting.

CN1: Keyboard/Mouse Connector

CN1 is a 6-pin 2.0mm JST connector, use the included adapter cable you can attach standard PS/2 type keyboard and mouse.

CN1

Pin 1: Mouse Data
Pin 2: Keyboard Data
Pin 3: Ground
Pin 4: VCC
Pin 5: Mouse Clock
Pin 6: Keyboard Clock

CN3: 26-pin Parallel Port Connector

The included printer interface cable is used to transfer 26-pin connector into standard DB25 connector.

CN3	DB-25	Description	CN3	DB-25	Description
1	1	-STROBE	2	14	-AUTO FORM FEED
3	2	DATA 0	4	15	-ERROR
5	3	DATA 1	6	16	-INITIALIZE
7	4	DATA 2	8	17	-PRINTER SELECT IN
9	5	DATA 3	10	18	Ground
11	6	DATA 4	12	19	Ground
13	7	DATA 5	14	20	Ground
15	8	DATA 6	16	21	Ground
17	9	DATA 7	18	22	Ground
19	10	-ACKNOWLEDGE	20	23	Ground
21	11	BUSY	22	24	Ground
23	12	PAPER	24	25	Ground
25	13	PRINTER SELECT	26	--	No Used

CN4: 10-Pin Audio Connector

CN4	Description	CN4	Description
1	CDINL	2	LININL
3	CDINR	4	LININR
5	VCC	6	ANALOG GND
7	LINOUTL	8	MICIN
9	LINOUTR	10	GND

CN5: 20-pin Floppy Connector

The included floppy drive interface cable is used to transfer 20-pin connector into standard 34-pin connector. The following table shows signal connections between 20-pin & 34-pin connectors.

The following table shows signal connections.

20-pin	Signal	34-pin	20-pin	Signal	34-pin
1	Drive Enable A	2	12	Ground	23
2	-Index	8	13	-Write Enable	24
3	-Select A	12	14	-Track 0	26
4	Ground	11	15	-Write Protect	28
5	-Motor A	16	16	Ground	29
6	- Select B	14	17	-Read Data	30
7	-Motor B	10	18	-Head	32
8	Ground	9	19	-Disk Change	34
9	-Direction	18	20	Ground	31
10	-Step	20			
11	-Write Data	22	-	No Connection	Others

CN7: IDE hard Disk Connectors

CN7 is 44-pin 2.0mm IDC connectors. Use the included hard disk cables to attach up to two 2.5” hard disk drives.

CN7 – Hard disk connector

The following table lists the pin description of CN7.

Pin	Description	Pin	Description
1	-RESET	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	NOT USED
21	IDEDREQ	22	GROUND
23	-IOW A	24	GROUND
25	-IOR A	26	GROUND
27	IDEIORDYA	28	GROUND
29	-DACKA	30	GROUND
31	AINT	32	GROUND
33	SA 1	34	Not Used
35	SA 0	36	SA 2
37	CS 0	38	CS 1
39	HD LED A	40	GROUND
41	VCC	42	VCC
43	GROUND	44	Not Used

CN9/CN10: RJ45 LAN Connector with LED indicators

CN9 and CN10 both is a RJ45 connector with 2 LEDs for LAN. The left side LED (orange) indicates data is being accessed and the right side LED (green) indicates on-line status. (On indicates on-line and off indicates off-line) CN9 supports LAN port #1 and CN10 for LAN port #2.

RJ45 connector

1 8

(Front View)

The following lists the pin assignment of CN9/CN10.

CN9/CN10	Signal	CN9/CN10	Signal
1	TPTX+	5	FBG1
2	TPTX -	6	TPRX -
3	TPRX+	7	FBG2
4	FBG1	8	FBG2

CN11: USB Connector

CN11 is a dual port USB connector. Any USB device can be attached to CN11 with plug-and-play supported. The up side port is USB #1 and the down side port is USB #2.

DB1, CN2, J2, J4, JP3, JP4, JP5 & JP6: Serial Port Connectors and Jumper Settings

The following figure shows the serial port connector positions and settings.

☐ RS-232C Pin Definitions (DB1, and CN2)

DB1 (COM1) is a standard serial port connectors; CN2 (COM2) are 10-pin 2.0mm IDC connectors. The included serial port adapter cables are used to transfer 10-pin 2.0mm IDC into standard DB-9 connector. The following tables show the signal connections of these connectors and the included adapter cable for CN2:

CN2	RS-232 Signal	RS-485	DB-9
1	-DCD2	-	1
2	-DSR2	-	6
3	RXD2	485-	2
4	-RTS2	-	7
5	-TXD2	485+	3
6	-CTS2	-	8
7	-DTR2	-	4
8	-RI2	-	9
9	Ground	-	5
10	Case Ground	Case Ground -	Case

- **JP6: RS-232/RS-485 Jumper Select and Pin Definitions & JP3: RS485 Terminator on/off**

Serial port 2 provides RS-485 function by selecting JP6 jumper. When RS-485 mode is selected, the RS-485 signals use the same connector as RS-232C. JP3 is the terminator on/off jumper only when using RS-485 mode. The following figure and table guide you how to setup RS-485 serial port.

- **JP4 & JP5: Select Power Source Jumper Select**

Serial port 2 provides power source will driver the "RI" signal pin if JP4 or JP5 WERE located on the power output position.

☐ J4 & J2: Infrared Connector and Touch Screen

J4 provides infrared signals and J2 for touch screen signals of serial port 2. The RS-232C signal of serial port 2 is used to interface with touch screen controller internally and infrared signal is used to interface with Infrared modules. If an I.R. device is installed, also enter the BIOS> Peripheral Setup, select an I.R protocol from the Serial Port B Mode field.

LM1: Power/Watchdog and HDD LED

☐ JP1: Clear CMOS Data

You can use JP1to clear CMOS data. The CMOS store information like system date, time, boot up device, password, IRQ... that are set up with the BIOS. To clear the CMOS, set JP1 to open then return to 1-2 before system is power -off. The default setting is 1-2

BUS1: PC/104 Bus Connectors

The CN12 connector supports a little signals of ISA for easy debugging or testing. It is reserved for board manufacture only.

BUS1 – BUS A & B

BUS1 – BUS C & D

PC/104 A&B Pin

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	-	A17	SA14	B1	Ground	B17	-DACK1
A2	SD7	A18	SA13	B2	RSTDRV	B18	DRQ1
A3	SD6	A19	SA12	B3	+5V	B19	-
A4	SD5	A20	SA11	B4	IRQ9	B20	BUSCLK
A5	SD4	A21	SA10	B5	-5V	B21	IRQ7
A6	SD3	A22	SA9	B6	DRQ2	B22	IRQ6
A7	SD2	A23	SA8	B7	-12V)	B23	IRQ5
A8	SD1	A24	SA7	B8	-ZWS	B24	IRQ4
A9	SD0	A25	SA6	B9	+12V	B25	IRQ3
A10	IORDY	A26	SA5	B10	Key1	B26	-DACK2
A11	AEN	A27	SA4	B11	-MEMW	B27	TC
A12	SA19	A28	SA3	B12	-MEMR	B28	ALE
A13	SA18	A29	SA2	B13	-IOW	B29	+5V
A14	SA17	A30	SA1	B14	-IOR	B30	OSC
A15	SA16	A31	SA0	B15	-DACK3	B31	Ground
A16	SA15	A32	Ground	B16	DRQ3	B32	Ground

PC/104 C& D Pin

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
C1	GND	C11	MEMW#	D1	Ground	D11	-DACK#5
C2	SBHE	C12	SD8	D2	MEMCS16#	D12	DREQ5
C3	LA23	C13	SD9	D3	IOCS16#	D13	DACK#6
C4	LA22	C24	SD10	D4	IRQ10	D14	DREQ6
C5	LA21	C25	SD11	D5	IRQ11	D15	DACK#7
C6	LA20	C26	SD12	D6	IRQ12	D16	DREQ7
C7	LA19	C27	SD13	D7	IRQ15	D17	VCC
C8	LA18	C28	SD14	D8	IRQ14	D18	-
C9	LA17	C29	SD15	D9	DACK#0	D19	GND
C10	MEMR#	C20	KEY	D10	DREQ0	D20	GND

DIMM1: So-DIMM Socket

The DIMM1 socket on the solder side accepts 32MB to 128MB PC-100 SDRAM modules.

Chapter 3 Installing CRT and LCD Monitors

This chapter describes the configuration and installation procedure of LCD and CRT displays. Both CRT and LCD displays may be used at the same time. Only TFT type LCDs may be used. CRT monitors should work with no problem under Windows 95/98. However, each type of LCD requires different BIOS.

The VS-2530 supports a CRT colored monitor and a TFT LCD (DSTN LCDs are not supported with this board). It can be connected to create a compact video solution for the industrial environment. 4MB of RAM on-boarded allows a maximum CRT resolution of 1024X768 with 256 colors and a LCD resolution of 800X600 with 64k colors. Different VGA display modes are possible, but your monitor must possess certain characteristics (different modes require different drivers to display the mode desired.

- LCD Flat Panel Display
- CRT & LCD Display

CRT Display (DB2)

A VGA connector is provided for CRT display.

Pin 1: Red
Pin 2: Green
Pin 3: Blue
Pin 13: Hsync
Pin 14: Vsync
Pin 12: DDC Data
Pin 15: DDC Clock
Pin 5 & 10: Digital Ground
Pin 6,7,8: Analog Ground
Others: Not Used

LCD FLAT PANEL DISPLAY

Each LCD model requires specific BIOS in order to work properly. If you want to use a panel that your board was not originally designed for then, please send an email to service@visionsystems.de and state the LCD type and full specification you use.

The following shows the block diagram of using VS-2530 for LCD display.

LCD Panel Block Diagram

The block diagram shows that VS-2530 still needs components to be used with a LCD panel. It needs control for the brightness and the contrast of the LCD panel while inverter board is the one that supplies the high voltage to drive the LCD panel.

NOTE: Be careful with the pin orientation when installing connectors and the cables. A wrong connection can easily destroy your LCD panel. The pin 1 of the cable connectors is indicated with a sticker and the pin1 of the ribbon cable usually has a different color.

CN6: LCD Connector

CN6 is an 18-bit LCD interface connector. The pin assignments are listed in the following table.

CN6	Description	CN6	Description	CN6	Description	CN6	Description
1	+5V	21	FPD8	2	+5V	22	FPD9
3	Ground	23	FPD10	4	Ground	24	FPD11
5	+ 3.3V	25	N.C	6	+ 3.3V	26	N.C
7	R/L	27	FPD12	8	Ground	28	FPD13
9	N.C	29	FPD14	10	N.C	30	FPD15
11	FPD0	31	FPD16	12	FPD1	32	FPD17
13	FPD2	33	Ground	14	FPD3	34	Ground
15	FPD4	35	FPCLK	16	FPD5	36	FPVSYNC
17	N.C	37	FPDISP	18	N.C	38	FPHSYNC
19	FPD6	39	U/D	20	FPD7	40	FPVDDEN

Note: N.C. means not connected, it is reserved for upgraded signals.

CN8: provides control signals and power source for LCD inverter.

CN8

5 4 3 2 1

Pin1: +12V
Pin2: Ground
Pin3: FPBLKEN
Pin4 VR.
Pin5: +5V
Note: +12V is come from BUS1

Chapter 4 BIOS Setup

This chapter describes the BIOS setup.

Overview

BIOS are a program located on a Flash memory chip on a circuit board. It is used to initialize and set up the I/O peripherals and interface cards of the system, which includes time, date, hard disk drive, the ISA bus and connected devices such as the video display, diskette drive, and the keyboard. This program will not be lost when you turn off the system.

The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

The BIOS default values ensure that the system will function at its normal capability. In the worst situation the user may have corrupted the original settings set by the manufacturer.

All the changes you make will be saved in the system RAM and will not be lost after power-off.

When you start the system, the BIOS will perform a self-diagnostics test called Power On Self Test (POST) for all the attached devices, accessories, and the system. Press the [Del] key to enter the BIOS Setup program, and then the main menu will show on the screen.

Note: Change the parameters when you fully understand their functions and subsequence.

```
ROM PCI/ISA BIOS (2A434FJD)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP                INTEGRATED PERIPHERALS
BIOS FEATURES SETUP                SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP             USER PASSWORD
POWER MANAGEMENT SETUP             IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION              SAVE & EXIT SETUP
LOAD BIOS DEFAULTS                 EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS

Esc : Quit                         ↑ ↓ → ←   : Select Item
F10 : Save & Exit Setup            (Shift)F2 : Change Color
```

BIOS Functions

On the menu, you can perform the following functions

1. Standard CMOS Setup-
2. BIOS Features Setup
3. Chipset Features Setup
4. Advanced Chipset Setup
5. Power Management Setup
6. PNP/PCI Configuration
7. Load BIOS Defaults
8. Load Setup Default
9. Integrated Peripherals Setup
10. User Password
11. IDE Auto Detect
12. Save & Exit Setup
13. Exit Without Saving

Keyboard Convention

On the BIOS, the following keys can be used to operate and manage the menu:

Item	Function
ESC	To exit the current menu or message
Page Up/Page Down	To select a parameter
F10	Save and exit
F2	To change the color of the menu display. F2 is to go forward and F3 is to go backward.
UP/Down Arrow Keys	To go upward or downward to the desired item

Standard CMOS Setup

This section describes basic system hardware configuration, system clock setup and error handling. If the CPU board is already installed in a working system, you will not need to select this option anymore.

```
                    ROM PCI/ISA BIOS (2A434FJA)
                      STANDARD CMOS SETUP
                      AWARD SOFTWARE, INC.

Date (mm:dd:yy) : Fri, Jan  4 2002
Time (hh:mm:ss) : 16 :  4 : 52

HARD DISKS          TYPE    SIZE   CYLS HEAD PRECOMP LANDZ SECTOR  MODE

Primary Master   :    0       0      0    0       0     0      0  AUTO
Primary Slave    :    0       0      0    0       0     0      0  AUTO


Drive A : 1.44M, 3.5 in.
Drive B : None

Video   : EGA/VGA
Halt On : No Errors

ESC : Quit              ↑ ↓ → ←   : Select Item      PU/PD/+/- : Modify
F1  : Help              (Shift)F2 : Change Color
```

- **Date & Time Setup**

Highlight the <Date> field and then press the [Page Up] /[Page Down] or [+]/[-] keys to set the current date. Follow the month, day and year format.

Highlight the <Time> field and then press the [Page Up] /[Page Down] or [+]/[-] keys to set the current date. Follow the hour, minute and second format.

The user can bypass the date and time prompts by creating an AUTOEXEC.BAT file. For information on how to create this file, please refer to the MS-DOS manual.

- **Floppy Setup**

The <Standard CMOS Setup> option records the types of floppy disk drives installed in the system.

To enter the configuration value for a particular drive, highlight its corresponding field and then select the drive type using the left-or right-arrow key.

- **Hard Disk Setup**

The BIOS supports various types for user settings, The BIOS supports <Pri Master>, <Pri Slave>, so the user can install up to two hard disks. For the master and slave

jumpers, please refer to the hard disk's installation descriptions and the hard disk jumper settings.

You can select <AUTO> under the <TYPE> and <MODE> fields. This will enable auto detection of your IDE drives during boot up. This will allow you to change your hard drives (with the power off) and then power on without having to reconfigure your hard drive type. If you use older hard disk drives, which do not support this feature, then you must configure the hard disk drive in the standard method as described above by the <USER> option.

- **Video**

This option selects the type of adapter used for the primary system monitor that must match your video display card and monitor. Although secondary monitors are supported, you do not have to select the type in Setup.

You have two ways to boot up the system:

When VGA set as primary and monochrome set as secondary, the selection of the video type is " VGA Mode".

When monochrome set as primary and VGA set as secondary, the selection of the video type is "Monochrome Mode".

- **Error Halt**

This option determines whether the computer will stop if an error is detected during power up.

No errors	The system boot will not be stopped for any error that may be detected.
All errors	Whenever the BIOS detect a non-fatal error the system will be stopped and you will be prompted.
All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors.
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors.

- **Memory**

This option is display-only which is determined by POST (Power On Self Test) of the BIOS.

- **Base Memory**

The POST of the BIOS will determine the amount of base (or conventional) memory

installed in the system. The value of the base memory is typically 512K for systems with 512K memories installed on the motherboard, or 640K for systems with 640K or more memory installed on the motherboard.

- **Extended Memory**

The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1MB in the CPU's memory address map.

- **Other Memory**

This refers to the memory located in the 640K to 1024K-address space. This is memory that can be used for different applications. DOS uses this area to load device drivers to keep as much base memory free for application programs. Most use for this area is Shadow RAM.

- **Total Memory**

System total memory is the sum of basic memory, extended memory, and other memory.

BIOS Features Setup

This section describes the configuration entries that allow you to improve your system performance, or let you set up some system features according to your preference. Some entries here are required by the CPU board's design to remain in their default settings.

```
                    ROM PCI/ISA BIOS (2A434FJA)
                      BIOS FEATURES SETUP
                      AWARD SOFTWARE, INC.

Virus Warning              : Disabled   Video  BIOS Shadow  : Enabled
CPU Internal Cache         : Enabled    C8000-CBFFF Shadow  : Disabled
Quick Power On Self Test   : Enabled    CC000-CFFFF Shadow  : Disabled
Boot Sequence              : C,A,SCSI   D0000-D3FFF Shadow  : Disabled
Swap Floppy Drive          : Disabled   D4000-D7FFF Shadow  : Disabled
Boot Up Floppy Seek        : Enabled    D8000-DBFFF Shadow  : Disabled
Boot Up NumLock Status     : On         DC000-DFFFF Shadow  : Disabled
Gate A20 Option            : Fast
Typematic Rate Setting     : Disabled
Typematic Rate (Chars/Sec) : 6
Typematic Delay (Msec)     : 250
Security Option            : Setup
PCI/VGA Palette Snoop      : Disabled
OS Select For DRAM > 64MB  : Non-OS2
Report No FDD For WIN 95   : No

                                        ESC : Quit        ↑↓→← : Select Item
                                        F1  : Help        PU/PD/+/- : Modify
                                        F5  : Old Values  (Shift)F2 : Color
                                        F6  : Load BIOS  Defaults
                                        F7  : Load Setup Defaults
```

- **Virus Warning**

This option may flash on the screen. During and after the system boots up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system and the following error message will appear, in the mean time, you can run an anti-virus program to locate the problem.

Available Options: Disabled, Enabled

Default setting: Disable

- **CPU Internal Cache**

This functions speeds up memory access. The VS-2530 GXM Cyrix CPU has an internal cache.

Available options: Disabled, Enabled

Default setting: Enabled

- **Quick Power On Self Test**

This option speeds up Power On Self Test (POST) after you power on the computer. If it is set to Enable, BIOS will shorten or skip some items' checks during POST.

Available options: Disabled, Enabled

Default setting: Enable

- **Boot Sequence**

This field specifies which device the system looks first upon power on.

Default setting: C, CDROM, A

- **Swap Floppy Drive**

The field reverses the drive letter assignments of your floppy disk drives in the Swap A, B setting, otherwise leave on the default setting of ***Disabled*** (No Swap). This works separately from the BIOS Features floppy disk swap feature. It is functionally the same as physically interchanging the connectors of the floppy disk drives. When the function's setting is <***Enabled***>, the BIOS swapped floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A under DOS.

Available options: Disabled, Enabled

Default setting: Disabled

- **Boot Up Floppy Seek**

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360K types are 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks.

Enabled	BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks. Note that BIOS cannot tell from 720K, 1.2M or 1.44M drive type, as they are all 80 tracks.
Disabled	BIOS will not search for the type of floppy disk drive by track number. Note that there will not be any warning message if the drive installed is 360K.

- **Boot Up Numlock status**

This field is used to activate the Num Lock function upon system boot. If the setting is on, after a boot, the Num Lock light is lit, and user can use the number key.

Available options: On, Off

Default setting: On

- **Gate A20 Option**

  This item is chosen as <Normal>, the A20 signal is controlled by keyboard controller or chipset hardware. The selection is "Fast" Port 92 or a chipset specific method controls means the A20 signal

  Available options: Normal, Fast

  Default setting: Normal

- **Typematic rate Setting**

  This function specifies the keystroke repeat rate when a key is pressed and held down.

  Available options: Disable, Enable

  Default setting: Disable

- **Typematic Rate (Chars/Sec)**

  Typematic Rate sets the rate at which characters on the screen repeat when a key is pressed and held down.

  Available options: 6, 8, 10, 12, 15, 20, 24, or 30 characters per second

  Default setting: 6

- **Typematic Delay (Msec)**

  The number selected indicates the time period between two identical characters appearing on screen.

  Available options: 250,500 750 and 1000

  Default setting: 250

- **Security Option**

  This field enables password checking every time the computer is powered on or every time the BIOS Setup is executed. If ***Always*** is chosen, a user password prompt appears every time and the BIOS Setup Program executes and the computer is turned on. If ***Setup*** is chosen, the password prompt appears if the BIOS executed.

  Available options: Setup, Always

  Default setting: Setup

- **PCI/VGA Palette Snoop**

This option must be set to Enabled if any ISA adapter card installed in the computer requires VGA palette snooping.

Available options: Enable, Disable

Default setting: Disable

- **OS Select for DRAM > 64MB**

This segment is specifically created for OS/2 when DRAM is large than 64MB,if you operating system is OS/2 and DRAM used is large 64MB, You have to select "OS/2" OTHERWISE (under non –OS/2), default is NON OS/2.

Available options: Non-OS/2, OS/2

Default setting: Non-OS/2

- **Report No FDD for Win95**

This option allows Windows 95 to share IRQ6 (assigned to a floppy disk drive) with other peripherals in case the driver does not exist.

Available options: Enable, Disable

Default setting: Disable

- **Video, 16k Shadow C000 - DC00, 16k shadow**

These fields control the location of the contents of the 16KB of ROM beginning at the specified memory location. If no adapter ROM is using the named ROM area, this area is made available to the local bus. The settings are:

1. **Disabled:** The video ROM is not copied to RAM. The contents of the video ROM cannot be read from or written to cache memory.

2. **Enabled:** The contents of C000h - CFFFF are written to the same address in system memory (RAM) for faster execution.

Available options: Disabled, Enabled,

Default setting: Disable (Video shadow is Enable)

Chipset Features Setup

This section describes the configuration of the board's chipset features.

```
                    ROM PCI/ISA BIOS (2A434FJ9)
                     CHIPSET FEATURES SETUP
                      AWARD SOFTWARE, INC.

SDRAM CAS latency Time    : 3 T
SDRAM Clock Ratio Div By  : 3

16-bit I/O Recovery (CLK): 5
8-bit  I/O Recovery (CLK): 5

USB Controller            : Enabled
USB Legacy Support        : Disabled


Video Memory Size         : 1.5 M
Display status            : CRT
Flat Panel Resolution     : 640x480

                          ESC : Quit          ↑↓→← : Select Item
                          F1  : Help         PU/PD/+/- : Modify
                          F5  : Old Values   (Shift)F2 : Color
                          F6  : Load BIOS  Defaults
                          F7  : Load Setup Defaults
```

- **SDRAM CAS AUTO Latency Time**

This field specifies the latency for the Synchronous DRAM system memory signals.

Available Options: 3T, 2T

Default setting: 3 T

- **SDRAM Clock Ration Div by**

When 100 MHz external frequency runs the system, the system will run at 3 cycle clocks. When 66 MHz runs the system, the system will run at 4 cycle clocks. Selecting Auto, the system will be auto adaptive depending on the SDRAM clock that is installed.

Available Options: 4T, 3T

Default setting: 3 T

- **8bit I/O Recovery Time**

The recovery time is the length of time, measured in CPU clocks, which the system will delay after achieving an input/output request. This delay takes place to wait for the I/O to complete the request. This field specifies the recovery time for 8bit I/O.

Available Options: Disabled, 1 –8 Sysclk

Default setting: 5 Sysclk

- **16Bit I/O Recovery Time**

This field specifies the recovery time for 16Bit I/O.

Available Options: Disabled, 1 –8 Sysclk

Default setting: 5 Sysclk

- **USB Controller**

Select Enabled if a USB device is installed to the system. If Disabled are selected, the system will not be able to use a USB device.

Available Options: Disabled, Enabled

Default setting: Enabled

- **USB Legacy Support**

Select Enabled if you system contains a USB controller and you have USB keyboard and mouse. If Disabled are selected, the system will not be able to use a USB device under DOS.

Available Options: Disabled, Enabled

Default setting: Disable

- **Video Memory**

This field specifies which VGA display memory. You can select either Video memory on the VGA. The setting share onboard memory.

Available Options: 1.5MB, 2.5MB, and 4MB

Default setting: 1.5MB

- **Display state**

This field specifies which VGA display will be used when the system is boot. You can select either the LCD or the CRT booting on the VGA.

Available Options: Both, LCD, and CRT

Default setting: CRT

- **Flat Panel Resolution**

When use the LCD the field specifies which select display resolution for different TFT LCD display type.

Available Options: 640x480, 800x600 and 1024x768

Default setting: 640X480

Power Management

```
                    ROM PCI/ISA BIOS (2A434FJ9)
                     POWER MANAGEMENT SETUP
                      AWARD SOFTWARE, INC.

Power Management          : Disabled      IRQ1  (KeyBoard)    : ON
                                          IRQ3  (COM 2)       : OFF
        ** PM Timers **                   IRQ4  (COM 1)       : OFF
Doze Mode                 : Disabled      IRQ5  (LPT 2)       : OFF
Standby Mode              : Disabled      IRQ6  (Floppy Disk): OFF
HDD Power Down            : Disabled      IRQ7  (LPT 1)       : OFF
MODEM Use IRQ             : NA            IRQ9  (IRQ2 Redir)  : OFF
                                          IRQ10 (Reserved)    : OFF
Throttle Duty Cycle       : 33.3 %        IRQ11 (Reserved)    : OFF
                                          IRQ12 (PS/2 Mouse)  : OFF
                                          IRQ13 (Coprocessor): OFF
                                          IRQ14 (Hard Disk)   : OFF
                                          IRQ15 (Reserved)    : OFF

                                          ESC : Quit         ↑↓→← : Select Item
                                          F1  : Help        PU/PD/+/- : Modify
                                          F5  : Old Values  (Shift)F2 : Color
                                          F6  : Load BIOS  Defaults
                                          F7  : Load Setup Defaults
```

- **Power Management**

  The field determines how much power consumption is needed for the system after selecting the below items.

- **Doze Mode**

  This field defines the continuous idle time before the system enters Doze Mode.

- **Standby Mode**

  This field defines the continuous idle time before the system enters Standby Mode. If any item defined is enabled & active Standby timer will be reloaded.

- **HDD Power Down**

  This field specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired.

  Available Options: Disabled, Standby, Suspend

  Default setting: Disabled

- **Modem Use IRQ**

  This field specifies the IRQ of the modem.

- **IRQ**

  These options enable event monitoring. When the computer is in a power saving mode, activity on the named interrupt request line is monitored by BIOS. When any activity occurs, the computer enters Full On mode.

PCI/Plug and Play

```
                    ROM PCI/ISA BIOS (2A434FJ9)
                     PNP/PCI CONFIGURATION
                      AWARD SOFTWARE, INC.

PNP OS Installed          : No          PCI IRQ Actived By   : Level
Resources Controlled By   : Manual
Reset Configuration Data  : Disabled    Used MEM base addr   : N/A

IRQ-3  assigned to : Legacy ISA
IRQ-4  assigned to : Legacy ISA
IRQ-5  assigned to : PCI/ISA PnP
IRQ-7  assigned to : PCI/ISA PnP
IRQ-9  assigned to : PCI/ISA PnP
IRQ-10 assigned to : Legacy ISA
IRQ-11 assigned to : Legacy ISA
IRQ-12 assigned to : PCI/ISA PnP
IRQ-14 assigned to : PCI/ISA PnP
IRQ-15 assigned to : PCI/ISA PnP
DMA-0  assigned to : PCI/ISA PnP
DMA-1  assigned to : PCI/ISA PnP        ESC : Quit        ↑↓→← : Select Item
DMA-3  assigned to : PCI/ISA PnP        F1  : Help        PU/PD/+/- : Modify
DMA-5  assigned to : PCI/ISA PnP        F5  : Old Values  (Shift)F2 : Color
DMA-6  assigned to : PCI/ISA PnP        F6  : Load BIOS  Defaults
DMA-7  assigned to : PCI/ISA PnP        F7  : Load Setup Defaults
```

- **PNP O/S Installed**

Set to Yes to inform BIOS that the operating system can handle Plug and Play (PnP) devices.

Available Options: Yes, No

Default setting: No

- **Resources Controlled By:** Auto, Manual

If you select Auto, all the interrupt request (IRQ), DMA assignment, and Used DMA fields disappear, as the BIOS automatically assigns then. The default value is "Manual ".

Available Options: Auto. , Manual

Default setting: Manual

- **Reset Configuration Data:** Enable, Disable

If you select Enable to reset Extended System Configuration Data (ESCD) when you exit setup is you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operation operating system cannot boot.

Available Options: Enable, Disable

Default setting: Disable

- **IRQ-n/DMA-n Assigned:** PCI/ISA PnP, Legacy ISA

  The resources are controlled manually.

  1. Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt/DMA (such as IRQ4, IRQ3 for serial port 1 and 2).

  2. PCI/ISA PnP Devices compliant with Plug and play standard, whether designed for PCI or ISA bus.

- **Use MEM base addr. : Resources Controlled By:** Auto, Manual

  Select a base address for the memory area used by any peripheral that requires high memory.

  Available Options: N/A, C800, CC00, D000, D400, D800 and DC00

  Default setting: N/A

Peripheral Setup

This section describes the function of peripheral features.

```
                    ROM PCI/ISA BIOS (2A434FJA)
                     INTEGRATED PERIPHERALS
                      AWARD SOFTWARE, INC.

IDE HDD Block Mode        : Enabled
Primary IDE Channel       : Enabled        Build in CPU Audio        : Enabled
  Master Drive PIO Mode   : Auto           Audio I/O Base Address    : 220H
  Slave Drive PIO Mode    : Auto           MPU-401 I/O Base Address  : 330H
                                           Audio IRQ Select          : IRQ 5
IDE Primary Master UDMA   : Auto           Audio Low  DMA Select     : DMA 1
IDE Primary Slave  UDMA   : Auto           Audio High DMA Select     : DMA 5

Onboard FDC Controller    : Enabled
Onboard Serial Port 1     : 3F8/IRQ4
Onboard Serial Port 2     :
UART Mode Select          :

Onboard Parallel Port     :
Parallel Port Mode        :
ECP Mode Use DMA          : 3
```

- **IDE HDD Block Mode**

This option allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive (HDD).

- **IDE PIO**

IDE hard drive controllers can support up to two separate hard drives. These drives have a master/slave relationship, which is determined by the cabling configuration used to attach them to the controller. Your system supports one IDE controller – a primary and a secondary – so you have the ability to install up to four separate hard disks.

PIO means Programmed Input/Output. Rather than have the BIOS issue a series of commands to affect a transfer to or from the disk drive, PIO allows the BIOS to tell the controller what it wants and then let the controller and the CPU perform the complete task by them. This is simpler and more efficient (and faster). Your system supports five modes, numbered from 0 to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.

- **OnBoard FDC**

This field enables the floppy drive controller on the VS-2530.

Available Options: Auto, Disabled, Enabled

Default setting: Auto

- **OnBoard Serial Port 1**

  These fields select the I/O port address for each Serial port.

  Available Options: Disabled, 3F8H/IRQ4, 2F8H/IRQ3, 3E8H/IRQ4, 2E8H/IRQ3

  Default setting: 3F8H/IRQ4

- **OnBoard Serial Port 2**

  These fields select the I/O port address for each Serial port.

  Available Options: Disabled, 3F8H/IRQ4, 2F8H/IRQ3, 3E8H/IRQ4, 2E8H/IRQ3

  Default setting: 2F8H/IRQ3

- **UART Mode Select**

  The second serial port offers these infrared interface modes.

  Available Options: Normal, IrDA, and ASKIR

  Default setting: Normal

- **OnBoard Parallel Port 1**

  This field selects the I/O port address for parallel port.

  Available Options: Disabled, 378H/IRQ7, 278H/IRQ5, 3BCH/IRQ7

  Default setting: 378H/IRQ7

- **Parallel Port Mode**

  This field specifies the parallel port mode. ECP and EPP are both bi-directional data transfer schemes that adhere to the IEEE P1284 specifications.

  Available Options: Printer, EPP1.7+SPP, EPP1.7+ ECP, EPP1.9, EPP, and ECP

  Default setting: Printer

- **ECP Mode Use DMA**

  This field is read-only and cannot be configured.

  Available Options: 0, 1, and 3

  Default setting: ECP for DMA3

- **Build In CPU Audio**

  This field specifies the internal Audio Control.

  Available Options: Disable, Enable

  Default setting: Enable

- **Audio Base I/O Address**

  These fields select the I/O port address for Audio.

  Available Options: 220H, 240H, 260H and 280H

  Default setting: 220H

- **Audio IRQ Select**

  This field specifies the IRQ for the Audio.

  Available Options: Disable, 5,7 and 10

  Default setting: 5

- **Audio Low DMA Select**

  This field specifies the DMA for internal Audio Control.

  Available Options: Disable, 0, 1 and 3

  Default setting: 1

- **Audio High DMA Select**

  This field specifies the DMA for internal Audio Control.

  Available Options: Disable, 5, 6 and 7

  Default setting: 5

Password Setup

There are two security passwords: Supervisor and User. Supervisor is a privileged person that can change the User password from the BIOS.

According to the default setting, both access passwords are not set up and are only valid after you set the password from the BIOS.

To set the password, please complete the following steps.

1. Select **Change Supervisor Password.**

2. Type the desired password (up to 8 character length) when you see the message, "Enter New Supervisor Password."

3. Then you can go on to set a user password (up to 8 character length) if required. Note that you cannot configure the User password until the Supervisor password is set up.

4. Enter Advanced CMOS Setup screen and point to the Password Checkup field.

5. Select Always or Setup.

✧ **Always:** a visitor who attempts to enter BIOS or operating system will be prompted for password.

✧ **Setup:** a visitor who attempts to the operating system will be prompted for user password. You can enter either User password or Supervisor password.

6. Point to **Save Settings and Exit** and press Enter.

7. Press Y when you see the message, "Save Current Settings and Exit (Y/N)?"

Note: it is suggested that you write down the password in a safe place to avoid that password may be forgotten or missing.

To set the password, please complete the following steps.

1. Select **Change Supervisor Password**.

2. Press Enter instead of entering any character when you see the message, "Enter New Supervisor Password."

3. Thus you can disable the password.

Chapter 5 Driver and Utility

The enclosed diskette includes VS-2530 VGA, AUDIO driver a LAN driver.

VGA Drivers

WIN98/WIN95 Driver

1 To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>VGA>NS5530>WIN98. If your system is not equipped with a CD ROM device, copy the VGA driver from the CD ROM to a 1.44" diskette.

2 Execute CYRIXM~1.exe file.

3 The screen shows the SETUP type. Press any key to enter the main menu.

4 As the setup is completed, the system will generate the message as follows.

Yes, I want to restart my computer now. Installation is done!

No, I will restart my computer later.

System must be restart then complete the installation.

5 In the WINDOWS98/ME, you can find the <DISPLAYL> icon located in the {CONTROL PANEL} group.

6 Adjust the <Resolution> and <Color>,

LAN Utility & Driver

1 To install the LAN utility OR driver, insert the CD ROM into the CD ROM device, and enter DRIVER>LAN>RTL8139C. If your system is not equipped with a CD ROM device, copy the LAN VGA driver from the CD ROM to a 1.44" diskette.

2 Execute install.exe file.

Note: In the LAN directory, a HELPME.EXE file is included to provide installation information

Audio Drivers

/IN 95/98 Driver

1. To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>AUDIO>NS5530>WIN98. If your system is not equipped with a CD ROM device, copy the VGA driver from the CD ROM to a 1.44" diskette.
2. Execute CYRIXM~1.EXE file.
3. The screen shows the SETUP type. Press any key to enter the main menu.
4. As the setup is completed, the system will generate the message as follows.

   Yes, I want to restart my computer now. Installation is done!

   No, I will restart my computer later.

   System must be restart then complete the installation.

Watchdog Timer

This section describes how to use the Watchdog Timer, including disabled, enabled, and trigger functions.

The VS-2530 is equipped with a programmable time-out period watchdog timer. You can use your own program to enable the watchdog timer. Once you have enabled the watchdog timer, the program should trigger the I/O every time before the timer times out. If your program fails to trigger or disable this timer before it times out, e.g. because of a system hang-up, it will generate a reset signal to reset the system. The time-out period can be programmed to be set from 1 to 255 seconds or minutes.

The CD –ROM includes a Watch Dog demo file. In the file, there are 3 execution programs written in different forms. The sub-directories of the file are:

1. WATCHDOG/ASSEMBLE: Library and Test Program written in Assembly Language

2. WATCHDOG/TURBOC: Library and Test Program written in Turbo C++

The WATCHDOG includes a demonstration program established for users who would like to configure the Watchdog timer by themselves.

Note: In the WATCHDOG directory, README.TXT file is included to provide demo program information.

Watchdog Timer Setting

The watchdog timer is a circuit that may be used from your program software to detect system crashes or hang-ups. LED1 on this CPU board is the watchdog timer indicator, which is located at the upper-left corner above the USB connector. Whenever the watchdog timer is enabled, the LED will blink to indicate that the timer is counting. The watchdog timer is automatically disabled after reset.

Once you have enabled the watchdog timer, your program must trigger the watchdog timer every time before it times out. After you trigger the watchdog timer, it will be set to non-zero value to watchdog counter and start to count down again. If your program fails to trigger the watchdog timer before time-out, it will generate a reset pulse to reset the system.

The factor of the watchdog timer time-out constant is approximately 1 seconds. The period for the watchdog timer time-out is between 1 to FF timer factors.

If you want to reset your system when watchdog times out, the following table listed the relation of timer factors between time-out periods.

Time Factor	Time-Out Period (Seconds)	Time-Out Period (Minutes)
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
“	“	“
“	“	“
“	“	“
FF	FF	FF

Watchdog Timer Enabled

To enable the watchdog timer, you have to output a byte of timer factor to the watchdog. The following is a Turbo C++ program, which demonstrates how to enable the watchdog timer and set the time-out period at 6 seconds.

```
#include “stdio.H”
#include “WDLIB.H”

main( )
{
char WD_TIME=ox6;

InitWD(equWdUnitS);
printf (“Enable watchdog”);
//Trigger watchdog Timer Output is 6 seconds
EnWD(WD_TIME);
}
```

Watchdog Timer Trigger

After you enable the watchdog timer, your program must write the same factor as enabling to the watchdog register at least once every time-out period to its previous setting. You can change the time-out period by writing another timer factor to the watchdog register at any time, and you must trigger the watchdog before the new time-out period in the next trigger. Below is a Turbo C++ program, which demonstrates how to trigger the watchdog timer:

```
#include “stdio.H”
#include “WDLIB.H”

main( )
{
char WD_TIME=ox6;

InitWD(equWdUnitS);
printf (“Enable watchdog”);
//Trigger watchdog Timer Output is 6 seconds
EnWD(WD_TIME);
}
```

Watchdog Timer Disabled

To disable the watchdog timer, simply write a 00H to the watchdog register.

```
#include “stdio.H”
#include “WDLIB.H”

main( )
{
InitWD(equWdUnitS);
printf (“Disable Watch Dog”);
//Disable watch dog
DisWD(WD_TIME);
}
```

Programming RS-485

The majority communicative operation of the RS-485 is in the same of the RS-232. When the RS-485 precedes the transmission, which needs control the TXC signal, and the installing, steps are as follows:

Step 1: Enable TXC

Step 2: Send out data

Step 3: Waiting for data empty

Step 4: Disable TXC

Note: Please refer to the section of the "Serial Ports" in the Chapter "System Controllers" for the detail description of the COM port's register.

- **Initialize COM port**

Step 1: Initialize COM port in the receiver interrupt mode, and /or transmitter interrupt mode. (All of the communication protocol buses of the RS-485 are in the same.)

Step 2: Disable TXC (transmitter control), the bit 0 of the address of offset+4 just sets "0".

NOTE: Control the VS-2530 CPU card's DTR signal to the RS-485 ' s TXC communication.

- **Send out one character (Transmit)**

Step 1: Enable TXC signal, and the bit 0 of the address of offset+4 just sets "1".

Step 2: Send out the data. (Write this character to the offset+0 of the current COM port address)

Step 3: Wait for the buffer's data empty. Check transmitter holding register (THRE, bit 5 of the address of offset+5), and transmitter shift register (TSRE, bit 6 of the address of offset+5) are all sets must be "0".

Step 4: Disabled TXC signal, and the bit 0 of the address of offset+4 sets "0"

- **Send out one block data (Transmit – the data more than two characters)**

Step 1: Enable TXC signal, and the bit 0 of the address of offset+4 just sets "1".

Step 2: Send out the data. (Write all data to the offset+0 of the current COM port address)

Step 3: Wait for the buffer's data empty. Check transmitter holding register (THRE, bit 5 of the address of offset+5), and transmitter shift register (TSRE, bit 6 of the address of offset+5) are all sets must be "0".

Step 4: Disabled TXC signal, and the bit 0 of the address of offset+4 sets "0"

- **Receive data**

The RS-485's operation of receiving data is in the same of the RS-232's.

- **Basic Language Example**

a. Initial 86C450 UART

```
10      OPEN "COM1:9600,m,8,1"AS #1 LEN=1
20      REM Reset DTR
30      OUT &H3FC, (INP(%H3FC) AND &HFA)
40      RETURN
```

b. Send out one character to COM1

```
10 REM Enable transmitters by setting DTR ON
20      OUT &H3FC, (INP(&H3FC) OR &H01)
30      REM Send out one character
40      PRINT #1, OUTCHR$
50      REM Check transmitter holding register and shift register
60      IF ((INP(&H3FD) AND &H60) >0) THEN 60
70 REM Disable transmitters by resetting DTR
80      OUT &H3FC, (INP(&H3FC) AND &HEF)
90      RETURN
```

- **c. Receive one character from COM1**

```
10      REM Check COM1: receiver buffer
20      IF LOF(1)<256 THEN 70
30      REM Receiver buffer is empty
40      INPSTR$"
50      RETURN
```

```
60      REM Read one character from COM1: buffer

70      INPSTR$=INPUT$(1,#1)

80      RETURN
```

NOTE: The example of the above program is based on COM2 (I/O Address 2F8h). The RS-485 of the VS-2530 uses COM2. If you want to program it, please refer to the BIOS Setup for COM2 address setup.

Chapter 6 Error Coding

This section outlines the errors that may occur when you operate the system, and also gives you the suggestions on solving the problems.

Topic include:

- Trouble Shooting for Error Messages
- Trouble Shooting for POST Code

Trouble Shooting for Error Messages

The following information informs the error messages and troubleshooting. Please adjust your systems according to the messages below. Make sure all the components and connectors are in proper position and firmly attached. If the errors still exist, please contact with your distributor for maintenance.

□ **POST BEEP**

Currently there are two kinds of beep codes in BIOS setup.

- One indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by three short beeps.
- The other indicates that an error has occurred in your DRAM. This beep code consists of a constant single long beep.

□ **CMOS BATTERY FAILURE**

When the CMOS battery is out of work or has run out, the user has to replace it with a new battery.

- **CMOS CHECKSUM ERROR**

  This error informs that the CMOS has corrupted. When the battery runs weak, this situation might happen. Please check the battery and change a new one when necessary.

- **DISPLAY SWITCH IS SET INCORRECTLY**

  Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in BIOS Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter BIOS Setup and change the video selection.

- **DISK BOOT FAILURE**

  When you can't find the boot device, insert a system disk into Drive A and press < Enter >. Make sure both the controller and cables are all in proper positions, and also make sure the disk is formatted. Then reboot the system.

- **DISKETTE DRIVES OR TYPES MISMATCH ERROR**

  When the diskette drive type is different from CMOS, please run setup or configure the drive again.

- **ERROR ENCOUNTERED INITIALIZING HARD DRIVE**

  When you can't initialize the hard drive, ensure the following things:

  1. The adapter is installed correctly
  2. All cables are correctly and firmly attached
  3. The correct hard drive type is selected in BIOS Setup

- **ERROR INITIALIZING HARD DISK CONTROLLER**

  When this error occurs, ensure the following things:

  1. The cord is exactly installed in the bus.
  2. The correct hard drive type is selected in BIOS Setup
  3. Whether all of the jumpers are set correctly in the hard drive

- **FLOPPY DISK CONTROLLER ERROR OR NO CONTROLLER PRESENT**

  When you cannot find or initialize the floppy drive controller, please ensure the controller is in proper BIOS Setup. If there is no floppy drive installed, ensure the Diskette Drive selection in Setup is set to NONE.

- **KEYBOARD ERROR OR NO KEYBOARD PRESENT**

  When this situation happens, please check keyboard attachment and no keys being pressed during the boot. If you are purposely configuring the system without a keyboard, set the error halt condition in BIOS Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot procedure.

- **MEMORY ADDRESS ERROR**

  When the memory address indicates error. You can use this location along with the memory map for your system to find and replace the bad memory chips.

- **MEMORY SIZE HAS CHANGED**

  Memory has been added or removed since last boot. In EISA mode, use Configuration Utility to re-configure the memory configuration. In ISA mode enter BIOS Setup and enter the new memory size in the memory fields.

- **MEMORY VERIFYING ERROR**

  It indicates an error verifying a value is already written to memory. Use the location along with your system's memory map to locate the bad chip.

- **OFFENDING ADDRESS MISSING**

  This message is used in connection with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

- **REBOOT ERROR**

  When this error occurs that requires you to reboot. Press any key and the system will reboot.

- **SYSTEM HALTED**

  Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

Trouble Shooting for Post Codes

When you power on your PC, and the screen display nothing. You have to insert the POST Card for test. The address for ISA POST port is 80h. Make sure the card is in correct slot. The lists below indicate you the error messages. Please follow the instruction to adjust your system. If the error still occurred, please contact with your distributor for maintenance.

- **C0: Turn off OEM specific cache, shadow...**
- **03: Initialize all the standard devices with default values Standard devices includes:**
  1. DMA controller (8237).
  2. Programmable Interrupt Controller (8259).
  3. Programmable Interval Timer (8254).
  4. RTC chip.
- **05:**
  1. Keyboard Controller Self-Test.
  2. Enable Keyboard Interface.
- **07: Verifies CMOS's basic R/W functionality.**
- **BE: Program defaults values into chipset according to the Combinable Chipset Default Table.**
- **C1: Auto-detection of onboard DRAM & Cache.**
- **C5: Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster.**
- **08: Test the first 256K DRAM.**
- **09:**
  1. Program the configuration register of Cyrix CPU according to the Combinable Cyrix Register Table.
  2. OEM specific cache initialization (if needed).

- **0A:**

  1. Initialize the first 32-interrupt vectors with corresponding Interrupt handlers Initialize INT no from 33-120 with Dummy (Spurious) Interrupt Handler.
  2. Issue CPUID instruction to identify CPU type.
  3. Early Power Management initialization (OEM specific).

- **0B:**

  1. Verify the RTC time is valid or not.
  2. Detect bad battery.
  3. Read CMOS data into BIOS stack area.
  4. PnP initializations including (PnP BIOS only).

     -Assign CSN to PnP ISA card.

     -Create resource map from ESCD.
  5. Assign I/O & Memory for PCI devices (PCI BIOS only).

- **0C: Initialization of the BIOS Data Area (40: 0N-40:FF).**

- **0D:**

  1. Program some of the Chipset's value according to Setup. (Early Setup Value Program).
  2. Measure CPU speed for display & decide the system clock speed.
  3. Video initialization including Monochrome, CGA, EGA/VGA. If no display device is found, the speaker will beep.

- **0E:**

  1. Initialize the APIC (Multi-Processor BIOS only).
  2. Test video RAM (If Monochrome display device found).
  3. Show messages including

     -Award Logo, Copyright string, BIOS Date code & Part No.

     -OEM specific sign on messages.

-Energy Star Loge (Green BIOS only).

-CPU brand, type & speed.

-Test system BIOS checksum (Non-compress Version only).

- **0F: DMA channel 0 test.**
- **10: DMA channel 1 test.**
- **11: DMA page registers test.**
- **14: Test 8254 Timer 0 Counter2.**
- **15: Test 8259 interrupts mask bits for channel 1.**
- **16: Test 8259 interrupts mask bits for channel 2.**
- **19: Test 8259 functionality.**
- **30: Detect Base Memory & Extended Memory Size.**
- **31**

  1. Test Base Memory from 256K to 640K.
  2. Test Extended Memory from 1M to the top of memory.

- **32:**

  1. Display the Award Plug & Play BIOS Extension message (PnP BIOS only).
  2. Program all onboard super I/O chips (if any) including COM ports, LPT ports, and FDD port.... according to setup value.

- **3C: Set flag to allow users to enter CMOS Setup Utility.**
- **3D:**

  1. Initialize Keyboard.
  2. Install PS2 mouse.

- **3E: Try to turn on Level 2 cache.**

Note: Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in POST 61h.

- **3F:**

    1. Program the rest of the Chipset's value according to Setup. (Later Setup Value Program).
    2. If auto-configuration is enabled, programmed the chipset with pre-defined value in the Combinable Auto-Table.

- **41: Initialize floppy disk drive controller.**

- **42: Initialize Hard drive controller.**

- **43: If it is PnP BIOS, initialize serial & parallel ports.**

- **45: Initialize math coprocessor.**

- **4E: If there is any error detected (such as video, kb....), show all the error messages the screen & wait for user to press <F1> key.**

- **4F:**

    1. If password is needed, ask for password.
    2. Clear the Energy Star Logo (Green BIOS only).

- **50: Write all CMOS values currently in the BIOS stack area back into the CMOS.**

- **52:**

    1. Initialize all ISA ROMs.
    2. Later PCI initializations (PCI BIOS only).

       -Assign IRQ to PCI devices.

       -Initialize all PCI ROMs.
    3. PnP Initializations (PnP BIOS only).

       -Assign I/O, Memory, IRQ & DMA TO PnP ISA devices.

       -Initialize all PnP ISA ROMs.
    4. Program shadows RAM according to Setup settings.
    5. Program parity according to Setup setting.
    6. Power Management Initialization.

       -Enable/Disable global PM.

-APM interface initialization.

- **53:**

  1. If it is NOT a PnP BIOS, initialize serial & parallel ports.
  2. Initialize time value in BIOS data area by translate the RTC time value into a timer tick value.

- **60: Setup Virus Protection (Boot Sector Protection) functionality according to Setup setting.**

- **61:**

  1. Try to turn on Level 2 cache.

  Note: if L2 cache is already turned on in POST 3D, this part will be skipped.

  2. Set the boot up speed according to Setup setting.
  3. Last chance for Chipset initialization.
  4. Last chance for Power Management initialization (Green BIOS only).
  5. Show the system configuration table.

- **62:**

  1. Setup daylight saving according to Setup value.
  2. Program the NumLock, typematic rate & typematic speed according to Setup setting.

- **63:**

  1. If there are any changes in the hardware configuration, update the ESCD information (PnP BIOS only).
  2. Clear memory that has been used.
  3. Boot system via INT 19H.

- **FF: System Booting. This means that the BIOS already pass the control right to the operating system.**

Appendix

Dimension

Technical Reference

Real-Time Clock and Non-Volatile RAM

The VS-2530 contains a real-time clock compartment that maintains the date and time in addition to storing configuration information about the computer system. It contains 14 bytes of clock and control registers and 114 bytes of general purpose RAM. Because of the use of CMOS technology, it consumes very little power and can be maintained for long periods of time using an internal Lithium battery. The contents of each byte in the CMOS RAM are listed below:

Address	Description
00	Seconds
01	Second alarm
02	Minutes
03	Minute alarm
04	Hours
05	Hour alarm
06	Day of week
07	Date of month
08	Month
09	Year
0A	Status register A
0B	Status register B
0C	Status register C
0D	Status register D
0E	Diagnostic status byte
0F	Shutdown status byte
10	Diskette drive type byte, drive A and B
11	Fixed disk type byte, drive C
12	Fixed disk type byte, drive D
13	Reserved
14	Equipment byte
15	Low base memory byte
16	High base memory byte

Address	Description
17	Low expansion memory byte
18	High expansion memory byte
19-2D	Reserved
2E-2F	2-byte CMOS checksum
30	Low actual expansion memory byte
31	High actual expansion memory byte
32	Date century byte
33	Information flags (set during power on)
34-7F	Reserved for system BIOS

CMOS RAM Map

Register	Description
00h -10h	Standard AT-compatible RTC and Status and Status Register data definitions
11h – 13h	Varies
14h	Equipment Bits 7-6 Number of Floppy Drives 00 1 Drive 01 2 Drives Bits 5-4 Monitor Type 00 Not CGA or MDA 01 40x25 CGA 01 2 Drives 80x25 CGA Bits 3 Display Enabled 0 Disabled 1 Enabled Bit 2 Keyboard Enabled 00 Not CGA or MDA 01 40x25 CGA 01 2 Drives 80x25 CGA Bit 1 Math Coprocessor Installed 0 Absent 1 Present Bit 0 Floppy Drive Installed 0 Disabled 1 Enabled
15h	Base Memory (in 1KB increments), Low Byte
16h	Base Memory (in 1KB increments), High Byte
17h	IBM-compatible memory (in 1KB increments), Low Byte
18h	IBM-compatible memory (in 1KB increments), High Byte (max 15 MB)
19h-2Dh	Vaires
2Eh	Standard CMOS RAM checksum, high byte
2Fh	Standard CMOS RAM checksum, low byte
30h	IBM-compatible Extended Memory, Low Byte (POST) in KB
31h	IBM-compatible Extended Memory, High Byte (POST) in KB
32h	Century Byte
33h	Reserved. Do not use
34h	Reserved. Do not use
35h	Low byte of extended memory (POST) in 64 KB
36h	High byte of extended memory (POST) in 64 KB
37h-3Dh	Varies
3Eh	Extended CMOS Checksum, Low Byte (including 34h-3Dh)
3Fh	Extended CMOS Checksum, High Byte (including 34h-3Dh)

I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses, which also becomes the identity of the device. There is a total of 1K-port address space available. The following table lists the I/O port addresses used on the Industrial CPU Card.

Address	Device Description
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 071h	Real Time Clock, NMI
078h – 07Bh	TTL I/O
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
2E8h – 2EFh	Serial Port #4(COM4)
2F8h - 2FFh	Serial Port #2(COM2)
2B0 - 2DF	Graphics adapter Controller
378h - 3FFh	Parallel Port #1(LPT1)
360 - 36F	Network Ports
3B0 - 3BF	Monochrome & Printer adapter
3C0 - 3CF	EGA adapter
3D0 - 3DF	CGA adapter
3E8h – 3EFh	Serial Port #3(COM3)
3F0h - 3F7h	Floppy Disk Controller
3F8h - 3FFh	Serial Port #1(COM1)

Interrupt Request Lines (IRQ)

There are a total of 15 IRQ lines available on the Industrial CPU Card. Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on the Industrial CPU Card.

Level	Function
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt Cascade
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	AUDIO
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	LAN #1
IRQ11	LAN #2
IRQ12	PS2 Mouse
IRQ13	FPU
IRQ14	Primary IDE
IRQ15	USB

DMA Channel Map

The equivalent of two 8237A DMA controllers are implemented in the VS-2530 board. Each controller is a four-channel DMA device that will generate the memory addresses and control signals necessary to transfer information directly between a peripheral device and memory. This allows high speeding information transfer with less CPU intervention. The two DMA controllers are internally cascaded to provide four DMA channels for transfers to 8-bit peripherals (DMA1) and three channels for transfers to 16-bit peripherals (DMA2). DMA2 channel 0 provides the cascade interconnection between the two DMA devices, thereby maintaining IBM PC/AT compatibility.

The following is the system information of DMA channels:

DMA Controller 1	DMA Controller 2
Channel 0: Spare	Channel 4: Cascade for controller 1
Channel 1: Reserved for IBM SDLC	Channel 5: Spare
Channel 2: Diskette adapter	Channel 6: Spare
Channel 3: Spare	Channel 7: Spare

Serial Ports

The ACEs (Asynchronous Communication Elements ACE1 to ACE4) are used to convert parallel data to a serial format on the transmit side and convert serial data to parallel on the receiver side. The serial format, in order of transmission and reception, is a start bit, followed by five to eight data bits, a parity bit (if programmed) and one, one and half (five-bit format only) or two stop bits. The ACEs are capable of handling divisors of 1 to 65535, and produce a 16x clock for driving the internal transmitter logic.

Provisions are also included to use this 16x clock to drive the receiver logic. Also included in the ACE a completed MODEM control capability, and a processor interrupt system that may be software tailored to the computing time required to handle the communications link.

The following table is a summary of each ACE accessible register

DLAB	Port Address	Register
0	Base + 0	Receiver buffer (read)
		Transmitter holding register (write)
0	Base + 1	Interrupt enable
X	Base + 2	Interrupt identification (read only)
X	Base + 3	Line control
X	Base + 4	MODEM control
X	Base + 5	Line status
X	Base + 6	MODEM status
X	Base + 7	Scratched register
1	Base + 0	Divisor latch (least significant byte)
1	Base + 1	Divisor latch (most significant byte)

- **Receiver Buffer Register (RBR)**

Bit 0-7: Received data byte (Read Only)

- **Transmitter Holding Register (THR)**

Bit 0-7: Transmitter holding data byte (Write Only)

- **Interrupt Enable Register (IER)**

Bit 0: Enable Received Data Available Interrupt (ERBFI)

Bit 1: Enable Transmitter Holding Empty Interrupt (ETBEI)

Bit 2: Enable Receiver Line Status Interrupt (ELSI)

Bit 3: Enable MODEM Status Interrupt (EDSSI)

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

- **Interrupt Identification Register (IIR)**

Bit 0: “0” if Interrupt Pending

Bit 1: Interrupt ID Bit 0

Bit 2: Interrupt ID Bit 1

Bit 3: Must be 0

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

- **Line Control Register (LCR)**

Bit 0: Word Length Select Bit 0 (WLS0)

Bit 1: Word Length Select Bit 1 (WLS1)

WLS1	WLS0	Word Length
0	0	5 Bits
0	1	6 Bits
1	0	7 Bits
1	1	8 Bits

Bit 2: Number of Stop Bit (STB)

Bit 3: Parity Enable (PEN)

Bit 4: Even Parity Select (EPS)

Bit 5: Stick Parity

Bit 6: Set Break

Bit 7: Divisor Latch Access Bit (DLAB)

- **MODEM Control Register (MCR)**

Bit 0: Data Terminal Ready (DTR)

Bit 1: Request to Send (RTS)

Bit 2: Out 1 (OUT 1)

Bit 3: Out 2 (OUT 2)

Bit 4: Loop

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

- **Line Status Register (LSR)**

Bit 0: Data Ready (DR)

Bit 1: Overrun Error (OR)

Bit 2: Parity Error (PE)

Bit 3: Framing Error (FE)

Bit 4: Break Interrupt (BI)

Bit 5: Transmitter Holding Register Empty (THRE)

Bit 6: Transmitter Shift Register Empty (TSRE)

Bit 7: Must be 0

- **MODEM Status Register (MSR)**

Bit 0: Delta Clear to Send (DCTS)

Bit 1: Delta Data Set Ready (DDSR)

Bit 2: Training Edge Ring Indicator (TERI)

Bit 3: Delta Receive Line Signal Detect (DSLSD)

Bit 4: Clear to Send (CTS)

Bit 5: Data Set Ready (DSR)

Bit 6: Ring Indicator (RI)

Bit 7: Received Line Signal Detect (RSLD)

- **Divisor Latch (LS, MS)**

	LS	MS
Bit 0:	Bit 0	Bit 8
Bit 1:	Bit 1	Bit 9
Bit 2:	Bit 2	Bit 10
Bit 3:	Bit 3	Bit 11
Bit 4:	Bit 4	Bit 12
Bit 5:	Bit 5	Bit 13
Bit 6:	Bit 6	Bit 14
Bit 7:	Bit 7	Bit 15

Desired Baud Rate	Divisor Used to Generate 16x Clock
300	384
600	192
1200	96
1800	64
2400	48
3600	32
4800	24
9600	12
14400	8
19200	6
28800	4
38400	3
57600	2
115200	1

Parallel Ports

- **Register Address**

Port Address	Read/Write	Register
Base + 0	Write	Output data
Base + 0	Read	Input data
Base + 1	Read	Printer status buffer
Base + 2	Write	Printer control latch

- **Printer Interface Logic**

The parallel portion of the SMC37C669 makes the attachment of various devices that accept eight bits of parallel data at standard TTL level.

- **Data Swapper**

The system microprocessor can read the contents of the printer's Data Latch through the Data Swapper by reading the Data Swapper address

- **Printer Status Buffer**

The system microprocessor can read the printer status by reading the address of the Printer Status Buffer. The bit definitions are described below:

NOTE: X represents not used.

Bit 7: This signal may become active during data entry, when the printer is off-line during printing, or when the print head is changing position or in an error state. When Bit 7 is active, the printer is busy and cannot accept data.

Bit 6: This bit represents the current state of the printer's ACK signal. A 0 means the printer has received the character and is ready to accept another. Normally, this signal will be active for approximately 5 microseconds before receiving a BUSY message stops.

Bit 5: A 1 means the printer has detected the end of the paper.

Bit 4: A 1 means the printer is selected.

Bit 3: A 0 means the printer has encountered an error condition.

- **Printer Control Latch & Printer Control Swapper**

The system microprocessor can read the contents of the printer control latch by reading the address of printer control swapper. Bit definitions are as follows:

NOTE: X represents not used.

Bit 5: Direction control bit. When logic 1, the output buffers in the parallel port are disabled allowing data driven from external sources to be read; when logic 0 they work as a printer port. This bit is write-only.

Bit 4: A 1 in this position allows an interrupt to occur when ACK changes from low state to high state.

Bit 3: A 1 in this bit position selects the printer.

Bit 2: A 0 starts the printer (50 microseconds pulse, minimum).

Bit 1: A 1 causes the printer to line-feed after a line is printed.

Bit 0: A 0.5 microsecond minimum highly active pulse clocks data into the printer. Valid data must be present for a minimum of 0.5 microseconds before and after the strobe pulse.