SurePOS 500 4846-545/565
Technical Reference

Version: 1.1

Change History

Version	Date	Change Description
1.0	2/16/07	Initial Release

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1.0 Introduction

1.1 Highlights

The SurePOS 500 system units with integrated touch screens will help you easily create the right solution for your business.

The SurePOS 500 Series models offer:

- An Intel Celeron D 326 (2.53 GHz) processor
- 512MB of DDR2 memory standard, upgradeable to 1 GB, 1.5GB, or 2GB.
- 8 to 128 MB UMA video memory
- A 80 GB SATA II HDD or greater
- 15" (12.1" and 17" optional) Infrared (IR) touch
- Enhanced wireless integration kit providing coverage and flexibility to meet most country-specific wireless requirements by utilizing USB technology (USB wireless Dongle not included). The Performance multimedia models also offer the capability to add wireless support via PC card slot
- Enhanced systems management
- Port enhancements, including powered 12V and 24V USB 2.0 ports, standard
- A wide range of optional features including receipt printers, displays, and trays to keep the counter neat.

1.2 Models

Model	Base/Admin Model	WEPOS	Bundled Printer	Audio/PC Card function	Warranty
545	Base	No	No	No	Depot
565	Base	No	No	Yes	Depot
E45	Base	Yes	No	No	Depot
E65	Base	Yes	No	Yes	Depot
54Z	Admin of 545	No	No	No	IOR 24x7
56Z	Admin of 565	No	No	Yes	IOR 24x7
E4Z	Admin of E45	Yes	No	No	IOR 24x7
E6Z	Admin of E65	Yes	No	Yes	IOR 24x7
P45	Admin of 545	No	Yes	No	IOR 24x7
P65	Admin of 565	No	Yes	Yes	IOR 24x7

1.3 Specifications

	4846 Model 545	4846 Model 565
Processor	2.53Ghz Intel 326 Celeron D	
FSB Speed	533/800 Mhz Celeron/Pentium4	
Chipset	Intel 915GV / ICH6	
BIOS	Award	
Main Memory	512MB – 1GB DDR2 DIMM, 2 slots, (2 GB max)	
Video	Integrated 2D/3D Intel graphics controller (simultaneous support only for CRT output)	
Secondary Video Adapter	ATI Radeon 7000	
LCD	One of the following: 800x600 12.1-in TFT (2 bulb) 1024x768 15-in TFT (2 bulb)	

	1280x1024 17-in TFT (4 bulb)	
Touch	IBM enhanced ELO Infra-red	
Audio	None	AC97 compliant codec; Amplified stereo speakers
Mass Storage	80GB SATA II 4GB Modular Flash Drive	
LAN	10BaseT/100BaseTx Ethernet	
Expansion	N/A	Type II PC-Card Slot
I/O Ports and Connectors	7 Standard USB (3 display tablet, 4 tower rear) Mouse, Keyboard (rear) 1 12V Powered USB 2.0 (rear) 1 24V Powered USB (rear) 2 Cash Drawer 3 Unpowered RS232 1 Powered RS232 (External Customer Display) Headphone/Microphone – on 565 Model RJ45 Ethernet LAN External CRT	
I/O Devices	External Floppy (USB) MSR (3-Track/JUCC) Integrated 2x20 Distributed 2x20 Distributed APA	
Indicators	Power HDD activity	
Controls	Power LCD Brightness Volume (with speaker kit)	
OS	PC DOS 2000, Windows (2000, XP, WEPOS)	
Ruggedization	Spill resistant (NEMA/IEC) Retail Hardened (ESD)	
Power Supply	155 W Continuous Duty / 225W Maximum Internal Switching Supply	
Mounting	Free Standing Integration Trays	
Security	Power On Password Bolt down/Tray Mounting	

1.4 Related Publications

SurePOS 500 Series Planning, Installation, and Operation Guide for Models 545 and 565, GA27-4365
This guide provides information necessary to install and set up the IBM SurePOS® 500 Series Models 545 and 565. This document is intended for the person who will install, set up, and manage the 4846-xx5 systems

IBM SurePOS 500 Series Hardware Service Guide for Models 545 and 565, SY27-0417
This document provides information on repairing and maintaining the system unit device, including parts listings, troubleshooting, and removal and replacement procedures.

IBM SurePOS 500 Series Operating System Installation Guide for Models 545 and 565, GA30-4132
This guide provides step-by-step information on installing the operating software for the product.

IBM Point of Sale Options and I/O Devices Service Guide, GC30-9737
This guide describes the problem-determination and repair procedures for cash drawers, displays, keyboards, and options that are attached to IBM(R) SurePOS(TM) systems.

To access these publications:

- Go to www.ibm.com/solutions/retail/store/

- Select Support, then select Publications.

1.5 Comparison with predecessor products

Feature	4846-XX5	4840-XX3/XX4	4851-514
Processor	Pentium 4/Celeron (Prescott)	Pentium 4/Celeron (Northwood)	Via C3
Processor, max clock speed	Celeron D 326 (2.53GHZ) upgradable to Prescott 551 (3.4Ghz)	Celeron 2.0GHz upgradable to 2.8Ghz	1.2Ghz
North Bridge/GMCH	Intel 82915GV (Lakeport)	Intel 82845GV (Brookdale) GMCH	CLE266
South Bridge/ICH	ICH6	ICH4	VT8237R
System Memory	2.0GB Max.	2.0GB Max.	2.0GB Max.
System Memory Technology	DDR2 533Mhz maximum	Double Data Rate (DDR) SDRAM, 266Mhz *	DDR 266Mhz *
Integrated Video Controller	Intel Graphics Media Accelerator 900 integrated into chipset	Intel Extreme Graphics, 2D/3D 128b BLT/256b Fill engine	S3 Graphics, 2D/3D 128b engine
Video Memory	Up to 128 MB,shared with system memory	Up to 64MB UMA with Windows Driver, 8MB DOS legacy mode	Up to 32MB UMA
Multi Monitor	True multi monitor with dual video adapter	True multi monitor w/ Cedar adapter	No 2nd display option
Touch Screen Technology	IBM enhanced ELO IR	ELO IR (Carroll Touch)	ELO 5 Wire-Resistive (Accutouch)
Keyboard ports	Rear PS/2 KB	Side and Rear (exclusive) PS/2 KB	Rear PS/2 KB
Parallel Port	None	One	None
10/100Mbit Ethernet	ICH6 integrated MAC, External Intel 82562GT PHY	ICH4 integrated MAC, External Intel 82562ET PHY	VT8237 integrated MAC, Via External PHY
USB Specification	All Ports Low, Full, and High Speed	Tower - Low, Full, High Speed (480Mb/s) Ports Tablet – Low, Full Speed	All Ports Low, Full, and High Speed
Flash Storage	Internal M-Systems USB flash card, mb mount	Compact Flash card and adapter, replaces HDD	RPQ required
Powered USB Ports	One 12v and One 24v Power Ports	One 12v and One 24v Powered Ports	One 24V Power Port
Standard USB Ports	7 Standard (9 total ports)	6 Standard ports (8 total ports)	4 Standard (5 total ports)
Operating System	Supported: Windows 2000, XP, WEPOS, DOS	Supported: Win 2000, Win XP, DOS, IBM IRES (XX3 only)	Supported: Windows 2000, XP, WEPOS, DOS

2.0 Product Structure

For detailed product offering information:

- Go to www-306.ibm.com/common/ssi/OIX.wss
- Select HW and SW desc (sales manual)
- Enter 4846-545 as keyword

2.1 Factory Select Feature

Feature	Description
Memory	512 MB, 1 GB, 2 GB DDR2 533MHz (2 x 1GB)
LCD Size	12-inch, 15-inch, 17-inch
Dual Video	Dual Video adapter card
Modular Flash Drive	4GB Modular Flash Drive

2.2 Key optional features

Feature	Comments
Integrated 2x20 Customer Display	New P/N to 4846
Distributed 2x20 Customer Display	Common with 4840
Distributed APA Customer Display	Common with 4840
3-Track MSR	New P/N to 4846
JUCC MSR	New P/N to 4846
Counter Integration Tray (SST)	New P/N – new fillers added
Standard CD Integration Tray (4610/kybd)	New P/N – new fillers added
Compact CD Integration Tray (keyboard only)	Not offered
Cash Drawer (standard, compact)	Existing P/N
Compact A/N POS Keyboard	Existing P/N
Serial Cable, RJ45 to DB9, 0.7m	Existing P/N
Serial Cable, RJ45 to DB9, 2.0m	Existing P/N
4610-TF6/7 Power Cable, 0.7m	Existing P/N
4610-TF6/7 Power Cable, 2.0m	Existing P/N

2.3 Ship Group

The following items are included with the unit:

- Cat 5 Ethernet Cable (4.3m), P/N 41A3531
- Serial Cable, RJ45 to DB9 (0.7m), P/N 40N5341

The following items are picked packed per order at fulfillment center:

- Warranty Sheet
- Regulatory and Safety Messages Booklet (GA27-4004)
- Hazardous Substance Table (China)

- Power cord selected by country code

2.4 Supported Devices

The following industry standard devices have been tested for use subject to restrictions defined in the Operating System support section. Other industry devices may be supported using standard interfaces; however, no testing has been done to insure functionality in all aspects.

Device	Comments
4610 Printers (RS232 or USB interfaces)	All models. RS232 models can powered via USB Plus power port using 4810 Power cable (feature code 3912 or 3913)
4820 Surepoint Display (RS232 or USB interface)	All Models. Touch models provide dual touch in addition to dual display.
Compact Retail A/N Keyboard	Keyboard MSR not supported if system MSR installed
PC Cards	Refer to IBM RSS Knowledgebase for latest listing of tested devices

2.5 Operating System/POS Driver Support

SurePOS 500 Models 545 and 565 supported operating systems		
Operating system	Support for Point of Sale application drivers (MSRs, customer displays, cash drawers, tone)	Application Driver Notes
PC DOS 2000	Hardware direct interface only	Driver updates are required from previous SurePOS 500 models. MSR and Scanner in Wedge mode is not supported.
Windows 2000, XP Windows Embedded Point of Service (WEPOS) Power management via ACPI Notes: • Only DOS full screen mode supported due to touch screen alignment requirements. • Windows DBCS versions supported.	IBM UPOS Drivers for Windows, Version 1.9.2 or later. (Includes JavaPOS drivers for Windows and OPOS drivers.)	
Linux	Via RPQ only	
IBM Retail Environment for SUSE Linux	Ask IBM sales representative regarding availability	

Note:
[1]The standby and hibernation modes are not supported with WEPOS.

2.6 System management

This section describes the types of system management available with the SurePOS 500.

2.6.1 System management programs

The SurePOS 500 Series supports the following system and power management programs:

Desktop Management Interface

The SurePOS 500 Series supports System Management BIOS (SMBIOS) v2.4, supporting a DMI-compliant agent such as Tivoli(R). This allows access to low-level information. Examples of information that can be accessed are the BIOS level, processor type, speed, manufacturer, system-board information, and detailed memory information.

RDM (Remote Deployment Manager) and IBM Director.
RDM can install an OS and update BIOS remotely and probe machines for low-level information. IBM Director can remotely configure applications and operating systems, transfer files, and inventory workstations on a network.

APM
APM consists of several layers of software that allow the operating system, applications, and BIOS to work together to reduce power consumption. APM is supported on DOS and Linux platforms.

Advanced Configuration and Power Interface
Advanced Configuration and Power Interface (ACPI) V1.0 defines a hardware and software interface and tables by which the operating system can alter the characteristics of the hardware-specific devices. ACPI is supported on Windows 2000 and Windows XP.

Power up on LAN
This feature enables the system to power on when it receives a specific frame over the local area network (LAN) through the 10/100-Mbps Ethernet feature. You can enable power up (wake) on LAN by enabling Wake on LAN in the CMOS Setup Utility program.

Power up (wake) on daily alarm
This feature enables the system to turn on at the same time every day. You can enable power up (wake) on daily alarm by enabling Wake on Alarm in the CMOS Setup Utility program.

RMA
IBM Remote Management Agent is a component of IBM Store Integration Framework that simplifies the delivery of new consumer-facing devices in stores to support the delivery of superior service. For more information, see the Retail Store Solutions web site.

2.6.2 Remote management

The SurePOS 500 Models 545 and 565 supports remote system management over the network. The following functions are supported:

- Selectable startup sequence
- Update POST/BIOS from the network
- Ethernet
- Power up (wake) on LAN

2.7 System Diagnostics

Diagnostics for the SurePOS 500 Models 545 and 565 are available on the IBM Diagnostics for POS Systems and Peripherals package. This package installs to a memory key.

2.7.1 Supported memory keys

The following memory keys are supported by the SurePOS 500 Models 545 and 565:

- IBM USB 2.0 (1 GB), FRU: 41D9746

Go to www.ibm.com for details on this USB key

- PNY USB 2.0 (1 GB), PNY P-FD01GU20-RF

Go to http://www2.pny.com for details on this USB key.

2.8 Physical Characteristics

2.8.1 Dimensions and weights

2.8.1.1 System

4846	Weight	Height:	Height	Depth:	Depth:	Width

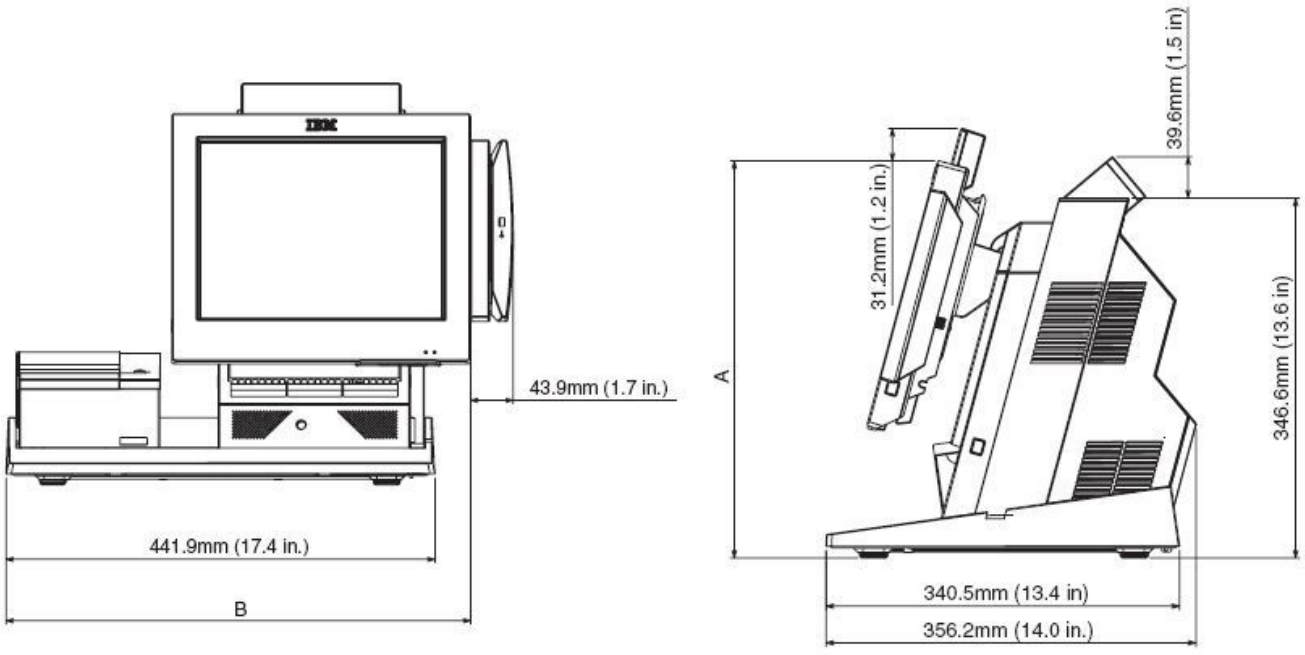
		Tablet at 15 degrees	maximum	Tablet at 15 degrees	Tablet at 60 degrees	
Tower and 12-in. tablet	11.3 kg (25 lbs)	357.9 mm (14.0 in.)	374.1 mm (14.7 in.)	316.8 mm (12.5 in.)	385.8 mm (15.2 in.)	307.9 mm (12.12 in.)
Tower and 15-in. tablet	12.2 kg (27 lbs)	381.8 mm (15.0 in.)	393.6 mm (15.5 in.)	324.4 mm (12.8 in.)	405.8 mm (15.9 in.)	369 mm (14.5 in.)
Tower and 17-in. tablet	14.51 kg (32 lbs)	404.5 mm (15.93 in.)	414.6 mm (16.32 in.)	335.2 mm (13.2 in.)	423.9 mm (16.7 in.)	402.3 mm (15.83 in.)

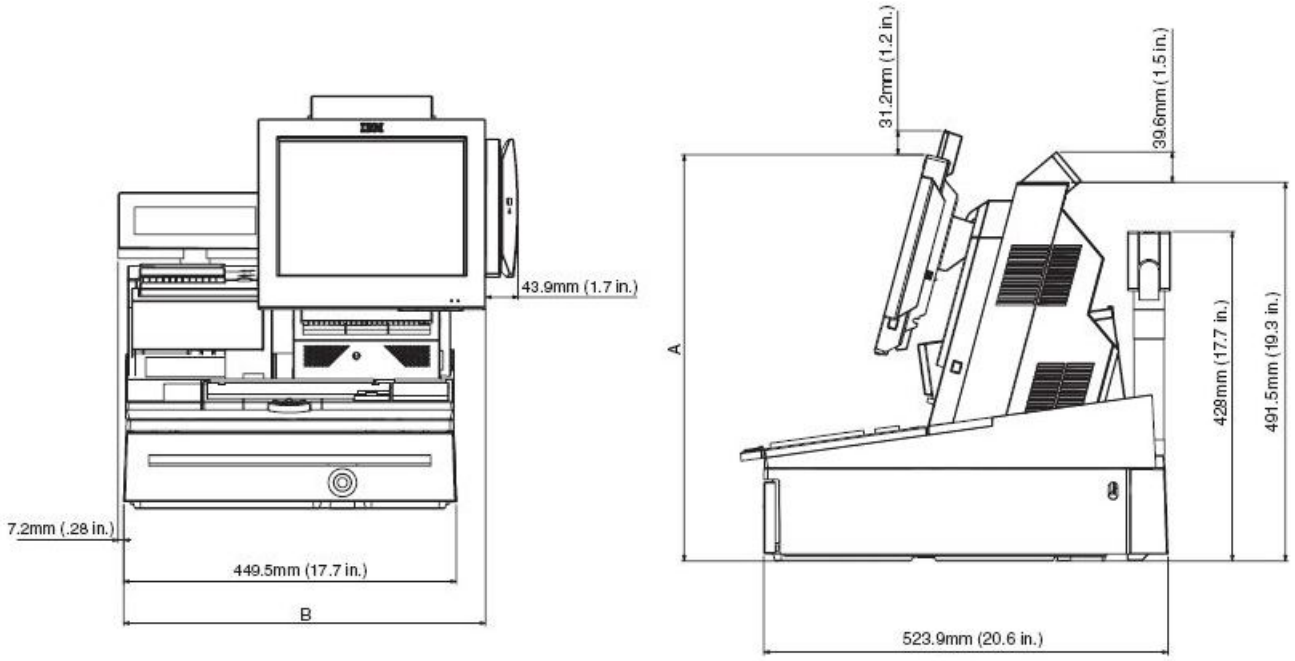
2.8.1.2 Weights of features

Component	Weight
Integrated 2x20 display	0.2 kg (0.38 lbs)
Distributed 2x20 display	0.5 kg (1.2 lbs)
Distributed APA display	0.7 kg (1.6 lbs)
MSR (three-track or JUCC)	0.16 kg (0.41 lbs)

2.8.1.3 Dimensions with Trays

	Measurement A (see figure below)	Measurement B (see figure below)
Product with 12 in. tablet and the following:		
Counter top tray	382.4 mm (15.1 in.)	478.6 mm (18.8 in.)
Cash drawer tray	493.5 mm (19.4 in.)	480.9 mm (18.9 in.)
Retail tray	527.4 mm (20.8 in.)	489.2 mm (19.2 in.)
Product with 15 in. tablet and the following:		
Counter top tray	406.2 mm (15.9 in.)	509.2 mm (20.0 in.)
Cash drawer tray	517.3 mm (20.4 in.)	511.4 mm (20.1 in)
Retail tray	551.1 mm (21.7 in.)	519.7 mm (20.5 in.)
Product with 17 in. tablet and the following:		
Counter top try	428.9 mm (16.9 in.)	525.9 mm (20.7 in.)
Cash drawer	540 mm (21.3 in.)	528.1 mm (20.8 in.)
Retail tray	573.8 mm (22.6 in.)	536.4 mm (21.1 in.)





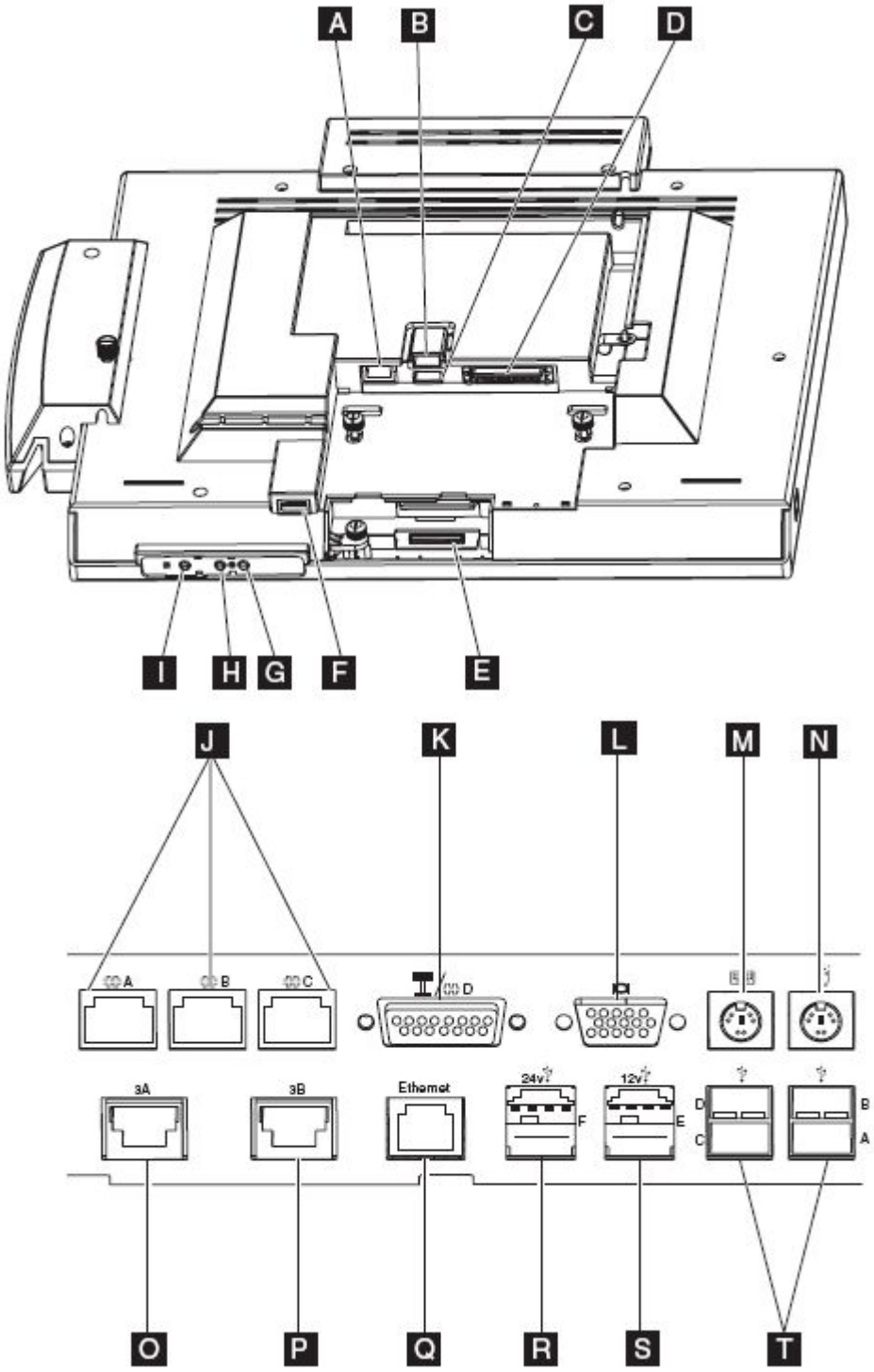
2.8.2 Controls

Function	Actuation	Location	Operation
Power	Momentary contact button	Under LCD chin	Toggles state between OFF and ON
Brightness up			Increases brightness by 1 step
Brightness down			Decreases brightness by 1 step

2.8.3 Visual Indicators

Function	Color	Location	State
Power	Green	Front bezel	Off - System Off Blinking - Standby/during POST On – Operational
HDD	Yellow	Front bezel	Off - No activity Blinking - HDD activity
Wired LAN	Green	Tailgate (RJ45 connector)	Left LED States – Off - 10 Mb mode – On - 100 Mb mode Right LED States – Off - No link – On - Good Link – Blinking - Network activity

2.8.4 Connector/Controls Identifier

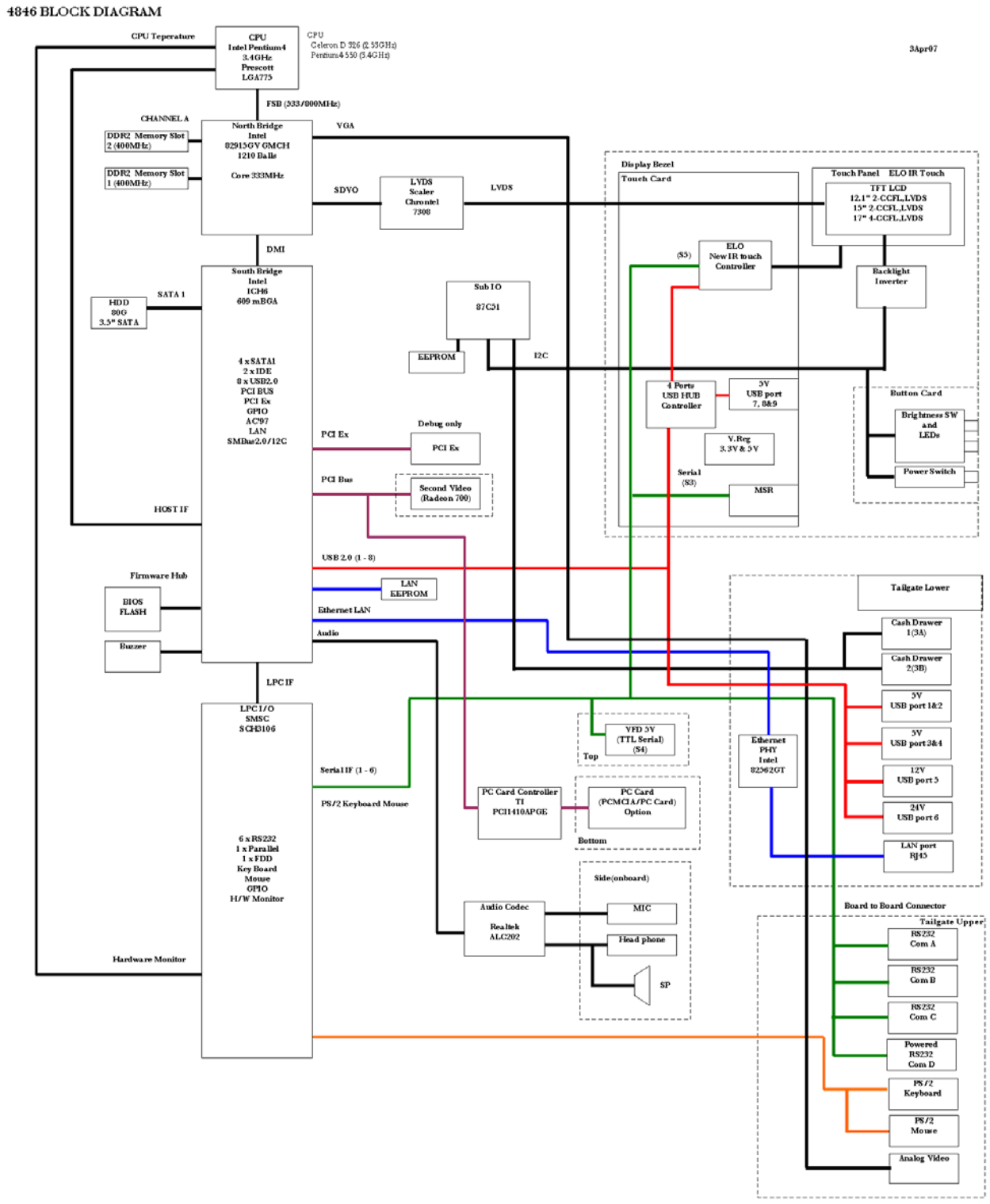


Identifier	Function
A	MSR
B, C	USB 2.0
D	Tablet attachment
E	Touch Ring
F	USB 2.0
G/H	Brightness up/down buttons

I	Power control
J	RS232
K	External Display / RS232
L	Analog Video
M	Keyboard
N	Mouse
O/P	Cash Drawer
Q	Ethernet
R	24V USB 2.0 Plus Power
S	12V USB 2.0 Plus Power
T	USB 2.0 (4x)

2.9 Product Description

2.9.1 Block Diagram



2.10 Logic

Processor: Intel Celeron D 326 2.53Ghz

- LGA775 Socket
- 16K Level 1 cache / 256KB Level 2 cache
- 533Mhz Front Side Bus
- Streaming SIMD Extensions 3
- Execute Disable Bit
- Hyperthreading is not supported by Celeron
- Support Extended Memory 64 Technology (EM64T)

To inquire about P4 support, contact an IBM sales representative

North Bridge: Intel 82915GV

- Processor Interface
  - 533Mhz front side bus (800Mhz capable)
- System Memory
  - Supports up to 2GB DDR2 533Mhz DRAM (PC2-4200 DDR2): 512GB, 512GB, 1GB DIMM's supported
  - One or two 64-bit wide DDR2 SDRAM data channels
  - Bandwidth up to 8.5 GB/s in dual-channel interleaved mode
  - Non-ECC memory only
- Intel GMA 900 2D/3D
  - 133 Mhz Core
  - Direct 9x Support
  - Dynamic Memory Video Technology V3.0 using up to 128MB video memory
- 2.0 GB/s Link to South Bridge
- Digital Display Support
  - SDVO output
  - 200Mhz dot clock
  - Scaling using Chrontel 7308 LVDS scaler
- Analog Display Support
  - 400Mhz Integrated 24-bit RAMDAC
  - Up to 2047x1536@85Hz refresh

Note:
Dual channel mode requires two matching size DIMM's installed. When a single DIMM is installed or two dissimilar size DIMM's are installed, the memory operates in single channel mode.

South Bridge: Intel ICH6

- PCI Bus support, Rev 2.3, 33 Mhz
- Serial ATA II support, 150 Mbps
- Support for up to 8 USB 2.0/USB 1.1 ports
  - Support for wake up from sleeping states
  - Supports legacy keyboard/mouse software
- Power Management Support
  - ACPI 2.0 compliant
  - APM-based legacy power management
- Integrated LAN controller
  - Wake on LAN with Magic Packet
  - 10/100 Mb/s Ethernet
- Support for AC-'97 2.3 audio codec
- SMBus 2.0/I²C support

I/O Subsystem: SMSC SC3106 Super I/O Controller

- RS232 support
- Keyboard/Mouse support
- Power Control
- Temperature monitoring and fan control

Audio Subsystem: Realtek ALC202 codec (X6X models only)

- AC '97 compliant audio
- Supports 44.1K/48K/96K/192KHz DAC Independent Sample Rate
- All ADCs Support 48K/192KHz Independent Sample Rate
- 1W + 1W amplifier

PC Card Support (TI PCI140A) (X6X models only)
- Support for 1 Type II 5V/3.3V PC Card or 3.3V CardBus Cards
- Hot insertion/removal support
- Register-compatible with the Intel 82365SL-DF and 82365SL ExCA controllers

Secondary Video Adapter - ATI Radeon 7000 graphics processor
- 2D/3D capability, supports 3D resolutions (32-bit color) up to 2048x1536
- 32MB DDR onboard memory
- Better 3D performance (than base video)
- PCI 2.2 compliant : PCI-33

Touch
- ELO-based Infra-redesign
- RS232 interface to touch, mouse emulation
- Flashable firmware via USB

Touch Specifications

Attribute	Specification
Technology	Modified ELO Infra-red
Calibration	Not required
Input Method	Finger, stylus (8mm diameter min.)
Controller Resolution	1024x1024
Accuracy (std dev)	0.080-in.
Accuracy (max err)	0.047-in. (96%) 0.222-in (4%)
Drift	None
Glass Finish	Anti-glare
Transmissiveness	92%
Travel	N/A
Touch Activation Force	None

2.11 Component specifications

2.11.1 4GB Modular Flash Drive

Characteristic	Specification
Interface	USB 2.0
Data Reliability	< 1 non-recoverable error in 10^{14} bits read
Performance	20Mbps read / 10Mps write

2.11.2 Hard Disk Drive

Characteristics	Specification
Form Factor	3.5-in
Formatted Capacity (GB)	80GB or greater
Interface	SATA II, up to 3.0Gb/s
Rotational Speed	7200 rpm

Access Time – Read (inc. overhead)	13 ms typ
Access Time – Write (inc. overhead)	15 ms typ

2.11.3 LCD

	12-inch TFT	**15-inch TFT**	**17-inch TFT**
Interface	Single Channel LVDS	Single Channel LVDS	Dual Channel LVDS
Minimum Brightness (cd/m^2) (without front glass)	450	230	300
Number of CCFL bulbs	2	2	4
Active Area (mm)	246.0H x 184.5 V	304.128H x 228.096 V	337.92H × 270.34 V
Resolution (pixels)	800 x 600	1024 x 768	1280 x 1024
Color	24 bit	24 bit	24 bit
Contrast Ratio (typ)	300:1	500:1	500:1
Minimum Backlight Life (half brightness)	30,000 hrs	30,000 hrs	40,000 hrs

2.11.4 Magnetic Stripe Reader

Characteristic	**Specification**
Features	• ISO 7811 Tracks 1,2,3 capability • Enable/Disable Carriage Return • Enable/Disable Sentinels • Programmable Sentinels • Individually selectable Tracks • Flashable firmware For details on configuring the MSR, go to the www.ibm.com/solutions/retail/store/support and search for knowledge base entry number R1001036
Card Support	• Standard • Mini-cards • Foil laminated cards
Coercivity of Magnetic Stripe	300 to 4000 Oe
Read Direction	Bi-directional
Swipe Speed	5 to 60 inches per second
Maximum Jitter	12%
Error Rate	Less than 0.5%
Electrical Interface	Serial
Rated Life	500,000 swipes

2.11.5 Integrated and Distributed 2x20

	Integrated 2x20	**Distributed 2x20**
Technology	Vacuum Fluorescent	
Format	2 rows, 20 characters	
Brightness (w/o lens)	300 cd/m2	300 cd/m2
Display Color (w/o lens)	Green	
Adjustment	n/a	Multi-position detent
Character Box	5 x 7	5 x 7
Character Height (mm)	7.74 x 4.15	9.5 x 4.45

Emulations	Logic Controls Emulation or IBM Multi-Mode	
Character Sets (IBM Multi-mode)	Code Page 437 (US/Euro) Code Page 897 (Katakana) Code Page 858 (Int'l) Code Page 852 (Central Europe) Code Page 855 (Cyrillic) Code Page 857 (Turkey) Code Page 862 (Israel) Code Page 863 (Can Fr) Code Page 864 (Arabic) Code Page 865 (Nordic) Code Page 808 (Cyrillic Russian) Code Page 869 (Greece)	
User Defined Characters	Logic Controls Mode: 1 IBM Mode: 8	
Electrical Interface	TTL Serial	RS232
Power	5V	12V
Power Consumption (all pixels energized)	6W	7.2 W
Attachment Cable	Pigtail	3.8 m (12 ft)

2.11.6 All Points Addressable (APA) Display

An external all points addressable customer display is supported. This is intended to meet DBCS language requirements. It attaches to the 15-Pin Powered serial port which provides power and signaling.

Attribute	**Specification**
Technology	Vacuum Fluorescent
Brightness	300 cd/m2
Format (dot)	160 x 40
Active Area (mm)	132.55 x 32.95
Dot Size (mm)	0.58 (W) x 0.58 (H)
Dot Pitch (mm)	0.83 (W) x 0.83 (H)
Display Color	Green (peak wavelength 505 nm)
Modes	All Points Addressable (160x40) Character Mode
Built in Font Code Pages for Character Mode 5x7 A/N (4 and 5 line mode) 8x16 A/N English (2 line mode) 8x16 A/N Katakana (2 line mode) 16x16 Kanji (2 line mode) 16x16 Hanguel (2 line mode) 16x16 Simplified Chinese (2 line mode) 16x16 Traditional Chinese (2 line mode)	 Futaba Standard IBM Code Page 437 modified Futaba Standard JIS X 208-1990 KS C 5601-1992 GB-2321-80 BIG5
Character Box Height (mm) 5x7 8x16 16x16	 3.90 (H) x 5.56 (W) 6.39 (H) x 13.03 (W) 13.03 (H) x 13.03 (W)
Electrical Interface	RS232 with 12 V power
Power Consumption	6W (typ) 8.4 (max)
Adjustment	Multi-position
Attachment Cable	3.8m

2.11.7 Built-in speakers (X6X models only)

Attribute	Specification
Drivers	2 element, 1 way, sealed design
Type	7 x 4 (28 mm x 40 mm x 15 mm deep)
Impedance	12 ohm impedance
Magnetic Shielding	Yes
Frequency Response	160Hz - 11 kHz (+/- 3 dB)
Output (rms EIAJ 10% THD 1kHz)	1W + 1 W
Loudness	82 dB +/- 3 dB (1 Watt/ch @ 1 m)
S/N Ratio	65 dB (IEC A weighted, ref 1 W)
Volume Adjustment Knob	Easily accessible on front of speaker unit
Channel Separation	40 dB
Total Harmonic Distortion	10%
Input Voltage	10.8V V DC +/- 10%
Input Sensitivity	1 V (1 W, 1kHz)
Input Impedance	12 ohm (1 kHz)
Power Consumption	4 W at maximum volume setting
Input Terminal	Molex 70555-0038 (power + signal)

3.0 BIOS and software description

This section provides an overview of BIOS, SETUP, and system software.

3.1 Setup

The POST CMOS Setup Utility program provides menus for querying and configuration the system. The menus can be navigated using touch OR a keyboard attached to a USB or PS/2 port.

The CMOS Setup Configuration Utility has optional password protection. The password can be entered through on screen keypad or keyboard, and can only be numerical. If the password is forgotten, it can be cleared using the CMOS Clear Jumper located on the main card.

3.2 Functional Standards

- BIOS Boot Specification, v1.01, January 11, 1996
- Plug and Play BIOS Specification, v1.0A, May 5, 1994
- Plug and Play BIOS MODIFICATION Paper for Plug and Play BIOS Specification, v1.0A, October 4, 1994
- ATAPI Removable Media Device BIOS Specification, v1.0, January 30, 1997
- PCI Local Bus Specification, Revision 2.1, June 1, 1995
- PCI BIOS Specification, Revision 2.3, March 29, 2002
- El Torito Bootable CD-ROM Format Specification, v1.0, January 25, 1995
- Preboot Execution Environment (PXE) Specification, Version 2.1.
- Advanced Power Management Specification, v1.2
- Advanced Configuration and Power Interface Specification, Revision 1.0b, February 2, 1999
- DMI Specifications, v2.0
- SMBIOS Specification, v2.4
- Simple Boot Flag Specification, Version 2.1
- PC 2001 System Design Guide
- Wired for Management Baseline 2.0 Review Request 77 Remote Lockout API

3.3 Standard BIOS Features

BIOS supports the following features:

- Display checkpoints during POST on top-right corner
- WfM Remote Lockout
- Power-On Self Test (POST)
- Warm Boot support
- Memory Auto-detection
- Hard Disk Auto-detection
- Fast A20 Interface
- Advanced Storage Features
  - SATA support
  - 48-bit LBA (Logical Block Addressing) support with Int 13h extensions for drives>528MB
  - UDMA (Ultra DMA)
  - Storage Auto-detection
  - Self Monitoring Analysis and Reporting Technology (S.M.A.R.T.) Support
- USB Legacy Support
  - USB 2.0 support
  - USB Keyboard/mouse for non-USB enabled OS's
  - USB Keyboard support in Setup
- Simple Boot Flag support
- APM 1.2 Support
- ACPI 1.0b Support

- Thermal management

3.4 BIOS Interrupts

This section lists the supported interrupt in DOS. Refer to the IBM Personal System/2 and Personal Computer BIOS Interface Technical Reference for additional information.

- Int 02h – NMI
- Int 05h - Print Screen
- Memory Location 50:00h.
  This is a byte memory location. A value of 00h indicates that the print screen successfully completed or was not invoked. A value of 01h indicates that a print screen is in progress and subsequent print screens are ignored. A value of FFh indicates that the print screen terminated due to an error.
- Int 08h - System Timer
  This interrupt modifies memory locations 40:6Ch, 40:70h, 40:40h, and 40:3Fh. It also invokes interrupt 1Ch.
- Memory Location 40:6Ch
  This dword is incremented every Int 08h tick or 18.2 times per second. The memory location is reset to 00000000h when a 24-hour duration has elapsed.
- Memory Location 40:70h
  This byte has a value of 00h until a 24 hour duration has elapsed. It is then set to 01h. The byte must be manually reset back to 00h.
- Memory Location 40:40h
  This byte is decremented every interrupt 08h tick or 18.2 times per second. If the timer goes to 00h, the floppy motor is turned off and resets the floppy flags in memory location 40:3Fh.
- Int 09h – Keyboard
  Called on every make or break keystroke. The 32-byte buffer starting at 40:1Eh is updated at the address pointed by the keyboard buffer tail pointer. The keyboard buffer tail pointer at memory location 40:1Ch is incremented by 2 unless it extends past the keyboard buffer, in which case it wraps. When a key is read, the keyboard buffer head pointer at memory location 40:1Ah is incremented by 2 unless it extends pass the keyboard buffer, in which case it wraps. Special keys such as CTRL, ALT, or Shift update the status at memory location 40:17h, 40:18h and 40:96h. A CTRL-ALT-DELETE key sequence sets the reset flag at memory location 40:72h to 1234h and jumps to the reset vector.

  Pressing the Pause key causes the interrupt handler to loop until a valid ASCII keystroke occurs.

  Pressing the Print Screen key causes an Interrupt 05h to be issued.

  A CTRL-BREAK sequence causes Interrupt 1Bh to be issued.

  Pressing the SysReq key causes Interrupt 15h Function 85h (System Request Key Pressed) to be issued.

  Any make keystroke causes Interrupt 15h Function 91h, Subfunction 02h (Interrupt complete from Keyboard) to be issued.

  After any scan code is read from I/O port 60h and Int 15h, Function 4Fh (Keyboard Intercept) is issued. An EOI is issued upon returning from the Keyboard Intercept.
- Memory Location 40:1Eh
  This location is the start of a 32-byte keyboard buffer.
- Memory Location 40:1Ah
  This word points to the next character in the keyboard buffer.
- Memory Location 40:1Ch
  This word points to the last character in the keyboard buffer. If the value equals the value in memory location 40:1Ah, the keyboard buffer is empty. If the value is two bytes from the contents of memory location 40:1Ah, the keyboard buffer is full.
- Memory Location 40:17h
  This byte contains the keyboard status byte.
- Memory Location 40:18h
  This byte contains the extended keyboard status byte.

- Memory Location 40:96h
  This word contains the extended keyboard status.
- Memory Location 40:72h
  This word contains the soft reset flag.
- Int 10h – Video
  This interrupt is supported by the video ROM.
  Int 11h - Equipment Determination
  Returns the data at memory location 40:10h.
- Memory Location 40:10h
  This word contains the equipment list.
- Int 12h - Base Memory Size
  Returns the value at memory location 40:13h.
- Memory Location 40:13h
  This word contains the amount of memory up to 640 KB. This count will often be less than 640 KB due to NIC ROM bootloaders.
- Int 13h - HDD and Floppy Diskette Services
- Int 14h - Serial Communication Services
- Int 15h - System Services
  Sub functions are those defined by the IBM Personal System/2 and Personal Computer BIOS Interface Technical Reference manual. Additional sub function support is OEM dependent.
- Int 16h - Keyboard Services
- Int 1Ah - System-Timer Services, PCI BIOS
- Int 1Bh – CTRL+Break Handler
- Int 1Ch - Periodic Timer Interrupt
- Int 1Dh - Video Parameter Table
  Set by the video BIOS
- Int 1Eh - Floppy Diskette Drive Parameters
  Points to an 11-byte data structure
- Int 1Fh - Video Graphics Characters
  Set by the video BIOS
- Int 23h - CTRL+C, CTRL+Break Handler
- Int 41h - HDD C: Drive Parameters
  Points to a 16-byte data structure for drive C:
- Int 46h - HDD D: Drive Parameters
  Points to a 16-byte data structure for drive D:

3.5 Fixed BIOS Entry Points

The fixed entry points in F000:xxxx must be supported for traditional reasons. The table below lists the fixed BIOS entry points.

Location	Description
F000:E05Bh	POST Entry Point
F000:E2C3h	NMI Entry Point
F000:E6F2h	Int 19h Entry Point
F000:E6F5h	Configuration Data Table
F000:E729h	Baud Rate Generator Table
F000:E739h	Int 14h Entry Point
F000:E82Eh	Int 16h Entry Point
F000:E987h	Int 09h Entry Point
F000:EC59h	Int 13h Floppy Entry Point
F000:EF57h	Int 0Eh Entry Point
F000:EFC7h	Floppy Disk Controller Parameter Table
F000:EFD2h	Compatibility for printer Int 17h

F000:F065h	Compatibility for Video interrupt
F000:F0A4h	MDA and CGA Video Parameter Table Int 1Dh
F000:F841h	Int 12h Entry Point
F000:F84Dh	Int 11h Entry Point
F000:F859h	Int 15h Entry Point
F000:FA6Eh	Low 128 character of graphic video font
F000:FE6Eh	Int 1Ah Entry Point
F000:FEA5h	Int 08h Entry Point
F000:FF53h	Dummy Interrupt Handler
F000:FF54h	Int 05h Print Screen Entry Point
F000:FFF0h	Power-On Entry Point
F000:FFF5h	8 character ROM Date in ASCII “MM/DD/YY”
F000:FFFEh	System Model (FCh) (outdated – use SMBIOS)

3.6 BDA Memory Addresses

The BIOS Data Area (BDA) starts at 40:0 and should be populated as follows.

Start Location	Length in bytes	Description	Interrupt Using It	Comments
00h	2	COM1 base address	14h	motherboard UART1 I/O address
02h	2	COM2 base address	14h	motherboard UART2 I/O address
04h	2	COM3 base address	14h	motherboard UART5 I/O address
06h	2	COM4 base address	14h	motherboard UART4 I/O address
08h	2	LPT1 base address	17h	Should be 0000h
0Ah	2	LPT2 base address	17h	Should be 0000h
0Ch	2	LPT3 base address	17h	Should be 0000h
0Eh	2	EBDA segment		
10h	2	Installed hardware	11h	
12h	1	Reserved		
13h	2	Base memory size	12h	
15h	2	Reserved		
17h	1	Keyboard control 1	16h	
18h	1	Keyboard control 2	16h	
19h	1	Work area for ALT key	16h	
1Ah	2	Keyboard-buffer Head	16h	
1Ch	2	Keyboard-buffer Tail	16h	
1Eh	32	Keyboard Buffer	16h	
3Eh	1	Floppy recalibrate status	13h	
3Fh	1	Floppy motor status	13h	
40h	1	Floppy motor timeout	13h	
41h	1	Floppy operation status	13h	
42h	7	Floppy controller status	13h	
49h	30	Video info	10h	
67h	4	POST callback address		
6Bh	1	Last Unexpected interrupt		

6Ch	4	Timer Counter	1Ah	
70h	1	Timer Overflow	1Ah	
71h	1	Break key state	16h	
72h	2	Reset Flag		
74h	1	HDD operation status	13h	
75h	1	Number of HDDs attached	13h	
76h	2	Reserved	13h	
78h	1	LPT1 time-out	14h	
79h	1	LPT2 time-out	14h	
7Ah	1	LPT3 time-out	14h	
7Bh	1	Reserved		
7Ch	1	COM1 time-out		
7Dh	1	COM2 time-out		
7Eh	1	COM3 time-out		
7Fh	1	COM4 time-out		
80h	2	Keyboard buffer start ptr	16h	
82h	2	Keyboard buffer end ptr	16h	
84h	7	Video info	10h	
89h	2	Reserved		
8Bh	1	Floppy media control	13h	
8Ch	1	HDD Controller status	13h	
8Dh	1	HDD Controller error status	13h	
8Eh	1	HDD Interrupt control	13h	
8Fh	1	Reserved		
90h	1	Floppy 0 media status	13h	
91h	1	Floppy 1 media status	13h	
92h	1	Floppy 2 media status	13h	
93h	1	Floppy 3 media status	13h	
94h	1	Drive 0 current cylinder	13h	
95h	1	Drive 1 current cylinder	13h	
96h	1	Keyboard mode state & flags	16h	
97h	1	Keyboard LED flags	16h	
98h	2	User Wait flag offset	15h	
9Ah	2	User wait flag segment	15h	
9Ch	2	Low word of user wait count	15h	
9Eh	2	High word of user wait count	15h	
A0h	1	Wait active flag	15h	
A1h	7	Reserved		
A8h	4	Video info	10h	
ACh	54h	Reserved		
100h	1	Print Screen status	05h	

3.7 EBDA Memory Addresses

The Extended BIOS Data Area (EBDA) starts at the segment pointed to by the contents of 40:0Eh.

Start Location	Length in bytes	Description	Comments
00h	1	Length of EBDA in KB	
01h	32	Reserved	
17h	1	Number of POST errors	not required
18h	5	POST error log	not required
22h	4	Mouse Driver Ptr	Int 74h
26h	1	Mouse flag byte 1	Int 74h
27h	1	Mouse flag byte 2	Int 74h
28h	8	Mouse data	Int 74h
30h	3d0h	Reserved	Reserved

3.8 Memory Map

This section documents the default memory map. Note that add-in cards or changing CMOS Setup items may alter the memory map, particularly below 1 MB.

Memory Map with USB Legacy Support enabled (default)

Physical Address Range (Dec)	Physical Address Range (Hex)	Size	Description
0-639 KB	00000-9FC00	512 KB	Conventional DOS memory (size may decrease if booted via LAN)
639 KB	9FC00-9FFFF	1 KB	EBDA (Extended BIOS Data) moveable by Himem, memory managers
640-767 KB	A0000-BFFFF	128 KB	Legacy Video Buffer
768-831 KB	C0000-CFFFF	64 KB	Video BIOS ROM (shadowed)
832-863 KB	D0000-D7FFF	32 KB	USB Legacy Support
864-867 KB	D8000-D8FFF	4 KB	Network ROM boot loader
868-895 KB	D9000-DFFFF	28 KB	Free for EMM386
896 KB-959KB	E0000-EFFFF	64 KB	Free for EMM386
960KB – 1MB	F00000-FFFFFF	64KB	System ROM BIOS
1- 16 MB	100000-FFFFFF	15 MB	PCI/ISA Space
16 MB – 4095.5 MB	1000000-FFF7FFFF	4079.5 MB	OS, PCI adapter memory decode, etc.
4095.5 MB - 4096 MB	FFF80000-FFFFFFF	512 KB	System ROM BIOS (ISA Bus)

Memory Map with USB Legacy support disabled:

Physical Address Range (Dec)	Physical Address Range (Hex)	Size	Description
0-639 KB	00000-9FC00	512 KB	Conventional DOS memory (size may decrease if booted via LAN)
639 KB	9FC00-9FFFF	1 KB	EBDA (Extended BIOS Data) moveable by Himem, memory managers
640-767 KB	A0000-BFFFF	128 KB	Legacy Video Buffer

768-831 KB	C0000-CFFFF	64 KB	Video BIOS ROM (shadowed)
832-835 KB	D0000-D0FFF	4 K	Network ROM boot loader
836-895 KB	D0FFF-EFFFF	124 KB	Free for EMM386
896 – 959KB	E0000-EFFFF	64KB	Free for EMM386
960 KB - 1MB	F0000-FFFFF	64 KB	System ROM BIOS
1- 16 MB	100000-FFFFFF	15 MB	PCI/ISA Space
16 MB – 4095.5 GB	1000000-FFF7FFFF	4079.5 MB	OS, PCI adapter memory decode, etc.
4095.5 MB - 4096 MB	FFF80000-FFFFFFF	512 KB	System ROM BIOS (ISA Bus)

3.9 COM Port Setup

Physical UART	Tailgate Port Name	Function	Connector Type	Location	Notes	Default I/O and IRQ
UART1	COM1	Available to user	RJ45	Rear Tailgate	BDA COM1	3F8/4
UART2	COM2	Available to user	RJ45	Rear Tailgate	BDA COM2	2F8/3
UART3	COM3	Available to user	RJ45	Rear Tailgate	COM6	2E0/11
UART4	Dist-VFD	Distributed VFD connection	DB15 F	Rear Tailgate	BDA COM4 Only one of integrated or distributed VFD may be enabled at the same time. CMOS Setup allows selection.	2E8/6
		Integrated VFD connection	Custom	Tower Top		
		8051 1	Internal	Internal	Communications with 8051 for EEPROM, cash drawer, and LCD control.	
UART5	n/a	MSR connection	RJ45	Tablet Side	BDA COM3	3E8/5
UART6	n/a	Touch	Internal	Internal	COM5 Resources hardcoded to 2F0h/IRQ 7	2D8/7

3.10 Video Modes

Supported VGA Video Display Modes

Video Mode	Pixel Resolution	Color Depth (bpp)	Mode Type	Display Adapter	Font Size	Character Resolution	Dot Clock (MHz)	Horiz. Freq. (KHz)	Vert Freq(Hz)	Video Memory (KBytes)

[1] Information for communicating with the 8051 can be found in the Bryce I/O Subsystem Microcontroller Firmware Specification.

00h	320 x 200	16 (gray) (4 bpp)	Text	CGA	8 x 8	40 x 25	25	31.5	70	256
	320 x 350	16 (gray) (4 bpp)		EGA	8 x 14	40 x 25	25	31.5	70	256
	360 x 400	16 (4 bpp)		VGA	9 x 16	40 x 25	28	31.5	70	256
01h	320 x 200	16 (4 bpp)	Text	CGA	8 x 8	40 x 25	25	31.5	70	256
	320 x 350	16 (4 bpp)		EGA	8 x 14	40 x 25	25	31.5	70	256
	360 x 400	16 (4 bpp)		VGA	9 x 16	40 x 25	28	31.5	70	256
02h	640 x 200	16 (gray) (4 bpp)	Text	CGA	8 x 8	80 x 25	25	31.5	70	256
	640 x 350	16 (gray) (4 bpp)		EGA	8 x 14	80 x 25	25	31.5	70	256
	720 x 400	16 (4 bpp)		VGA	9 x 16	80 x 25	28	31.5	70	256
03h	640 x 200	16 (4 bpp)	Text	CGA	8 x 8	80 x 25	25	31.5	70	256
	640 x 350	16 (4 bpp)		EGA	8 x 14	80 x 25	25	31.5	70	256
	720 x 400	16 (4 bpp)		VGA	9 x 16	80 x 25	28	31.5	70	256
04h	320 x 200	4	Graph	All	8 x 8	40 x 25	25	31.5	70	256
05h	320 x 200	4 (gray)	Graph	CGA	8 x 8	40 x 25	25	31.5	70	256
	320 x 200	4 (gray)		EGA	8 x 8	40 x 25	25	31.5	70	256
	320 x 200	4		VGA	8 x 8	40 x 25	25	31.5	70	256
06h	640 x 200	2	Graph	All	8 x 8	80 x 25	25	31.5	70	256
07h	720 x 350	Mono	Text	MDA	9 x 14	80 x 25	28	31.5	70	256
	720 x 350	Mono		EGA	9 x 14	80 x 25	28	31.5	70	256
	720 x 400	Mono		VGA	9 x 16	80 x 25	28	31.5	70	256
08h-0Ch	Reserved			-		-				
0Dh	320 x 200	16 (4 bpp)	Graph	E/VGA	8 x 8	40 x 25	25	31.5	70	256
0Eh	640 x 200	16 (4 bpp)	Graph	E/VGA	8 x 8	80 x 25	25	31.5	70	256
0Fh	640 x 350	Mono	Graph	E/VGA	8 x 14	80 x 25	25	31.5	70	256
10h	640 x 350	16 (4 bpp)	Graph	E/VGA	8 x 14	80 x 25	25	31.5	70	256
11h	640 x 480	2 (4 bpp)	Graph	VGA	8 x 16	80 x 30	25	31.5	60	256
12h	640 x 480	16 (4 bpp)	Graph	VGA	8 x 16	80 x 30	25	31.5	60	256
13h	320 x 200	256 (8 bpp)	Graph	VGA	8 x 8	40 x 25	25	31.5	70	256

VESA Modes Supported by Video BIOS

Video Mode	Pixel Resolution	Colors (bpp)	Mode Type	Display Adapter	Vertical Frequency (Hz)	Video Memory (MB)
101h	640 x 480	256 (8 bpp)	Graph	VGA	60	0.5
	640 x 480	256 (8 bpp)	Graph	VGA	75	0.5
	640 x 480	256 (8 bpp)	Graph	VGA	85	0.5
103h	800 x 600	256 (8 bpp)	Graph	SVGA	60	1
	800 x 600	256 (8 bpp)	Graph	SVGA	75	1
	800 x 600	256 (8 bpp)	Graph	SVGA	85	1
105h	1024 x 768	256 (8 bpp)	Graph	XVGA	60	1
	1024 x 768	256 (8 bpp)	Graph	XVGA	75	1
	1024 x 768	256 (8 bpp)	Graph	XVGA	85	1
107h	1280 x 1024	256 (8 bpp)	Graph	SXGA	60	2
	1280 x 1024	256 (8 bpp)	Graph	SXGA	75	2
	1280 x 1024	256 (8 bpp)	Graph	SXGA	85	2
111h	640 x 480	64K (16 bpp)	Graph	VGA	60	1
	640 x 480	64K (16 bpp)	Graph	VGA	75	1
	640 x 480	64K (16 bpp)	Graph	VGA	85	1
114h	800 x 600	64K (16 bpp)	Graph	SVGA	60	2
	800 x 600	64K (16 bpp)	Graph	SVGA	75	2
	800 x 600	64K (16 bpp)	Graph	SVGA	85	2
117h	1024 x 768	64K (16 bpp)	Graph	XVGA	60	2
	1024 x 768	64K (16 bpp)	Graph	XVGA	75	2
	1024 x 768	64K (16 bpp)	Graph	XVGA	85	2
11Ah	1280 x 1024	64K (16 bpp)	Graph	SXGA	60	4

	1280 x 1024	64K (16 bpp)	Graph	SXGA	75	4
	1280 x 1024	64K (16 bpp)	Graph	SXGA	85	4
112	640 x 480	16M (32 bpp)	Graph	VGA	60	2
	640 x 480	16M (32 bpp)	Graph	VGA	75	2
	640 x 480	16M (32 bpp)	Graph	VGA	85	2
115	800 x 600	16M (32 bpp)	Graph	SVGA	60	4
	800 x 600	16M (32 bpp)	Graph	SVGA	75	4
	800 x 600	16M (32 bpp)	Graph	SVGA	85	4
118	1024 x 768	16M (32 bpp)	Graph	XVGA	60	4
	1024 x 768	16M (32 bpp)	Graph	XVGA	75	4
	1024 x 768	16M (32 bpp)	Graph	XVGA	85	4

3.10.1 Display mode and operating system restrictions

The operating system, the display size, and any attached CRTs can affect the display resolution. The following definitions describe the terms and various display configurations:

Display Configuration	Definition
Single	A type of display configuration that supports only one display device.
Twin	A type of display configuration that supports two display devices, each of which has the same content, resolution, and timings. Also referred to as Simultaneous mode.
Clone	A type of display configuration that drives two display devices, each displaying the same content, but can have different resolutions and (independent) timings.
Dual Independent Head (DIH)	A type of display configuration that supports two displays with different content on each display device. Also referred to as an Extended Desktop.

The onboard LCD supports the following modes when using the indicated operating system:

- DOS: Single
- Windows 2000 and Windows XP: Clone (default), twin
- WEPOS: Clone (default), twin

The onboard LCD and one extra attached LCD:

- DOS: Single; the onboard LCD is primary
- Windows 2000 and Windows XP: Clone (default), twin, DIH
- WEPOS: Clone (default), twin, DIH

Operating system with display combinations and restrictions			
Display		DOS	Windows
Onboard LCD only	Image	Single1	Single
	Restrictions	None	

Onboard LCD + external display	Image	Single	Dual-same
	Restrictions	External display not supported	Media clips show on onboard LCD only; External display must be the same resolution as onboard LCD
Onboard LCD + Add-in video card	Image	Single, on board LCD	Dual-independent2
	Restrictions	None	Onboard LCD becomes secondary display when installing Windows
General	Restrictions	Touch on primary display only	None

1. Dual-same: same data on both displays; simultaneous mode
2. Dual-independent; different/independent data on both displays; extended desktop

Supported video resolutions in Windows operating system	
LCD size	Available video resolutions for onboard LCD
12 in.	640 x 480, 720 x 480, 800 x 600
15 in.	640 x 480, 720 x 480, 800 x 600, 960 x 540, 1024 x 768
17 in.	640 x 480, 720 x 480, 800 x 600, 960 x 540, 1024 x 768, 1152 x 864, 1280 x 720, 1280 x 768, 1280 x 960, 1280 x 1024

3.11 Power Management

3.11.1 APM

Function	**Supported**	**From State**	**Comments**
Global Standby	Yes	power button, inactivity timer	
Wake on LAN	Yes	Standby,Off	Default=disable, configurable in Setup
Wake on Alarm	Yes	Standby,Off	Default=disable, configurable in Setup
Wake on Ring	Yes	Standby/Off	Serial D only Default=disable, configurable in Setup
Power off	Yes	power button, APM call	Power button default = Instant Off
Wake on Touch	Yes	Standby	Default=enable, configurable in Setup
CPU Idle calls from OS	Yes	On	OS must have APM engaged/connected (i.e. DOS

			power.exe loaded)
Wake from PS/2 keyboard/mouse	Yes	Standby	Always enabled
Wake from USB keyboard/mouse	Yes	Standby	Always enabled
Standby Timer	Yes	On	Default=disabled, configurable in Setup
Hard Disk Standby	Yes	On	
Video Standby	Yes	On	
Clock Throttling	Yes	On	
Wake on Presence Sensor	No		no presence sensor
PCMCIA ring	No		
Global Suspend (Save to disk or RAM) State	No		
Power on by keyboard	No		
Battery support	No		

3.11.2 ACPI

Function	Supported	From State	Comments
Global Standby	Yes	power button, inactivity timer	
Wake on LAN	Yes	S1/S5	
Wake on Alarm	Yes	S1/S5	
Power off	Yes	All	
Wake on Touch	Yes	S1	
Wake on Ring	Yes	S1/S5	Serial D only
Wake from PS/2 keyboard/mouse	Yes	S1	
Wake from USB keyboard/mouse	Yes	S1	Provide support, enabled/disabled through Device Manager
Clock Throttling	Yes	S0	
Wake on Presence Sensor	No		no presence sensor
PCMCIA ring	No		
Global Suspend (Save to disk or RAM) State	No		

Power on by keyboard	No		
Battery support	No		

3.12 System Information Data

3.12.1 SMBIOS

System Management BIOS (SMBIOS) is a standard interface to provide information configured by the manufacturer about the PC hardware. BIOS complies with the minimum specifications in the SMBIOS v2.4 specification Appendix Section 4.

Note: According to the SMBIOS spec (section 2.1: Table Convention), SMBIOS provides static information only, gathered each POST or before booting. SMBIOS cannot provide run-time, dynamic information to software.

3.12.2 Cumulative Structure List

- BIOS Information (Type 0)
  - Vendor
  - BIOS Version
  - BIOS Characteristics Extension Byte 1
- BIOS Characteristics Extension Byte 2
- System Information (Type 1)
  - Manufacturer = “IBM CORPORATION”
  - Product Name
  - Version
  - Serial number
  - Wake up Type
- Base Board (or Module) Information (Type 2)
- System Enclosure (Type 3)
- Processor information (Type 4)
- Cache Information (Type 7)
- On Board Devices Information (Type 10)
- Physical Memory Array (Type 16)
- Memory Device (Type 17)
- Built-in Pointing Device (Type 21)
  - For built-in Touch Screen
- Hardware security (Type 24)
  - Power-on Password Status
  - Administrator Password Status
- Voltage Probe (Type 26)
  - One structure for each voltage probe
- Cooling Device (Type 27)
  - One structure for each of CPU, chassis, and power supply fan
- Temperature Probe (Type 28)
  - One structure for each of CPU and motherboard (ambient)
- System boot information (Type 32)
  - Boot status
- Management Device (Type 34)
- Management Device Component (Type 35)
  - One for each type26-28 management device, except power supply fan
  - Each type35 "Threshold Handle" points to respective type 36
- Management Device Threshold Data (Type 36)
  - One for each type 35 device
  - Each type35 "Threshold Handle" points to respective type 36
- System Power Supply (Type 39)

3.13 Vital Product Data

Vital Product Data (VPD) is the IBM-specific information about a system. The data includes values such as machine type, model, serial number, BIOS/Flash revision, system board unique ID, etc. VPD is accessed through SMBIOS, as defined in the SMBIOS specification.

3.13.1 VPD Layout in SMBIOS

This section describes the traditional VPD. Refer to the SMBIOS specification for methods of accessing these fields.

Data field	SMBIOS record Type and Field	Data type	Field length
BIOS level	Type 0 “BIOS Version”	ASCII string	7
	Example: X6KT100		
Machine type/model	Type 1 “Product name” and “Version”	ASCII string	7
	Example: 4846545 The machine type/model does not have dashes or spaces in SMBIOS		
System serial number	Type 1 “Serial Number”	ASCII string	7
Product Family	Type 1 “Family”, Type 11	ASCII string	11
LAN MAC Address	Type 1 “UUID”, offset 0Ah	hex	6
	Usage: The LAN MAC address can be parsed from the Type 01 “UUID” field, offset 10 (0Ah). For example, if the UUID is 40 3E 4C 58 76 7B DA 11 A4 29 00 14 5E 14 00 15, the MAC address is 00 14 5E 14 00 15.		

3.13.2 SMBIOS Type 11 Structure Layout

The format of the SMBIOS Type 11 Structure for OEM strings is as follows:

Offset	Name	Length	Value	Description
00h	Type	1 byte	0Bh	OEM strings structure indicator
01h	Length	1 byte	05h	Length of structure
02h	Handle	2 bytes	varies	
04h	Count	1 byte	varies	Number of strings in this structure
05h	Product Family String	11 bytes	ASCII string	“SurePOS 500”

3.13.3 VPD using Int 15h

```
;Get pointer to VPD block
        mov     ax, 0d207h
        int     15h

;ES:DI now points to the following structure:
vpdDataStruc  STRUC
        header                  DW      55aah
        vpdSignature            DB      'VPD'
        vpdLength               DB      48
        reserved                DB      7  dup(20h)
        buildID                 DB      9  dup(20h)
        boxSerial               DB      7  dup(20h)
        uniqueID                DB      11 dup(20H)
        machineType             DB      7  dup(20h)
        vpdChecksum             DB      ?
vpdDataStruc  ENDS
```

4.0 Environmental Specifications

4.1 Temperature/Humidity Limits

Condition	Temp Limits (Dry Bulb)	Relative Humidity	Max. Wet Bulb Temp
Operating / Standby	5 to 40°	8 to 80 %	27°C
Storage (packaged)	0 to 60°C	5 to 80 %	29°C
Shipment (packaged)	-40 to 60°C	5 to 100 %	29°C

4.2 Altitude Limits

The product is designed to operate up to 3050 meters (10,000 feet).

4.3 Power

Power Consumption (system)	**Off (attached to mains)**	**4W**
	Suspend	Not supported
	Standby	80W
	On (idle)	120W
	On (max)	170W
Input Voltage	100 - 127, 200 - 240 VAC (nominal), 50 or 60 Hz (+/- 3 Hz) Sinusoidal, trapezoidal, or square wave inputs	
kVA	0.3	
AC Input Connector/Cable	IEC 320 C14, unshielded right angle type	
Leakage current	3.5 mA maximum	
Inrush	< 30 A (peak, first cycle)	

4.4 Acoustics

Measurement	Operator -Idle
LwAu (bels)	5.0
All measurements made in accordance with ISO 7779 and reported in conformance with ISO 9296.	

4.5 Standards Compliance

4.5.1 Product Certifications

Category	Standard
External Safety	• IEC 60950-1 1st Edition with all national deviations • UL 60950-1 1st Edition • CAN/CSA C22.2 No. 60950-1 3rd Edition • CCC (China) • IRAM (Argentina) • PSE (Japan) • GOST (Russia) • BSMI (Taiwan)
Electrostatic Discharge (ESD)	EN 55024:1998 (EN 61000-4-2:1995)

Susceptibility	Air: Level 3 (8KV) Contact: Level 2 (4KV) Performance Criterion: B
Electromagnetic Interference (EMI)	FCC Part 15 Class A Canada EMI Class A (ICES-003) CISPR 22 Radiated Class A, Conducted Class B (EN55022): 1998 VCCI Class A Taiwan EMI CNS-13438 Class A Korea EMI MIC Notice No. 1996-78 Class A New Zealand EMI Class A Australia EMI Class A
Radiated Electromagnetic Susceptibility (RES)	EN 50024: 1998 (EN61000-4-3) Criteria A
Electrical Fast Transient/Power Line Transient (EFT/PLT)	EN 50024: 1998 (EN61000-4-4) Criteria B
Near Field Phenomena	MPRII
Power Line Disturbance/Ring	EN50024: 1998 (EN 61000-4-11)
Lightning Surge Susceptibility	EN50024: 1998 (EN61000-4-5, Criteria B)
Immunity to conducted disturbances	EN55024:1998 EN61000-4-6 Criteria A
Power Frequency Magnetic Field Immunity	EN55024:1998 EN61000-4-8 Criteria A
Power Line Harmonics (Power Correction Factor)	EN 61000-3-2

4.5.2 Ergonomics and accessibility

Category	**Standard**
Flat Panel	ISO/FDIS 13406-2, Flat Panel Standards
Accessibility	Section 508 of U.S. Rehabilitation Act

5.0 External Ports

5.1 Port Listing

Port	Electrical Interface	Connector Type	Location
Keyboard, Mouse	IBM PS/2	PS/2 mini-DIN	Tower Rear
Headphone	Audio Output	3.5 mm stereo mini plug	Tower Side
Microphone	Audio Input	3.5 mm mini plug	Tower Side
External Speaker	Audio Output + power	Custom	Not accessible
MSR	RS232/Keyboard Wedge	RJ45	Tablet side
Integrated Customer Display	RS232, +5V	Custom	Tower Top
Distributed Customer Display (Serial D)	RS232, +5V, +12v power	DB15F	Rear Tailgate
Serial A	RS232	RJ45	Rear Tailgate
Serial B	RS232	RJ45	Rear Tailgate
Serial F	RS232	RJ45	Rear Tailgate
Cash Drawer A	IBM 24v CD Interface	4-pin AMP SDL	Rear Tailgate
Cash Drawer B	IBM 24v CD Interface	4-pin AMP SDL	Rear Tailgate
USB 1	USB 2.0	USB Type A	Rear Tailgate
USB 2	USB 2.0	USB Type A	Rear Tailgate
USB 3	USB 2.0	USB Type A	Rear Tailgate
USB 4	USB 2.0	USB Type A	Rear Tailgate
USB 5	USB 2.0	USB Type A	Tablet
USB 6	USB 2.0	USB Type A	Tablet
USB 7	USB 2.0	USB Type A	Tablet Chin – near brightness buttons
USB 12V	USB 2.0 + 12V	USB Plus Power	Rear Tailgate
USB 24V	USB 2.0 + 24V	USB Plus Power	Rear Tailgate
External Video	Analog CRT	VGA (DB15F)	Rear Tailgate

5.2 Port Power Ratings

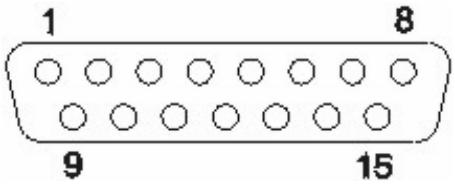
- Each port has a maximum continuous rating. There is also a total maximum rating from a combination of all ports.
- Total 12V current available for all external loads is 5A max. Total 5V current available for all external loads is 5A max.
- Only one cash drawer may be activated at any instance in time.
- Hot plugging of powered USB devices, especially printers, is not supported. Some powered USB devices create surge currents that may cause the system power supply to initiate over-current shut down.

Port # / name	Voltage Spec.	Tolerance	Maximum current
Distributed VFD/Serial D	5V	+5, -7%	0.95A
	12V	+5, -7%	0.65A
USB (7x)	5V	+5,-7%	0.5 A
USB Plus Power	5V	+5%,-7%	0.5 A
	12V	+5%, -10%	1.5 A

	24V	+10%, -1%	3.0 A continuous, 5.0 A peak
Kybd and Mouse (combined)	5V	+5, -7%	2.26A
Cash Drawer (3A/3B)	24V		1A

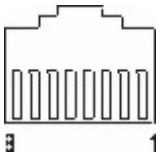
5.3 Connector Pinouts

5.3.1 Customer Display Connector



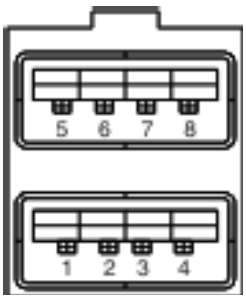
Pin	Connector	Pin	Connector
1	CD (carrier detect)	9	+12 V dc
2	RXD (receive data)	10	+5 V dc Main
3	TXD (transmit data)	11	Dist_VFD present
4	DTR (data terminal ready)	12	DSR (data set ready)
5	Ground	13	RTS (request to send)
6	Ground	14	CTS (clear to send)
7	+5 V dc Main	15	RI (ring indicate)
8	+12 V dc		

5.3.2 MSR connector



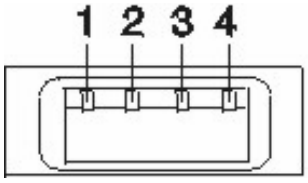
Pin	Connector
1	+5 V dc Main
2	Serial Data In (TTL Level)
3	Serial Data Out (TTL Level)
4	Ground
5	MSR Present (low indicated MSR is present)
6	MSR Mode (low indicated keyboard wedge, high indicated RS-232)
7	Keyboare Enable (low enables keyboard data to the system
8	Keyboard Data (to system shipset)
9	Keyboard Clock (to system chipset)
10	Ground

5.3.3 USB Plus Power (2x)



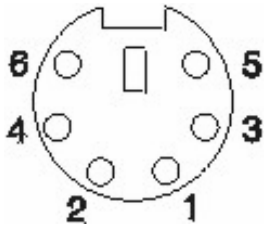
Pin	Signal
Shell	Shield
1	VBus 5V
2	D-
3	D+
4	Ground
5	Ground
6	Vplus (12V or 24V)
7	Vplus (12 or 24V)
8	Ground

5.3.4 USB port connector (7x)



Pin	Connector
1	5V VBus
2	-Data
3	+Data
4	Ground

5.3.5 Keyboard, Mouse connector (2x)



Pin	Signal	I/O

1	Keyboard Data	I/O
2	Mouse Data	I/O
3	Ground	
4	+5 V Main	
5	Keyboard Clock	I/O
6	Mouse Clock	

5.3.6 Microphone connector

This connector is only present on X6X models

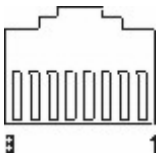
Pin	Signal
Tip	Signal
Ring	+5 V
Base	Ground

5.3.7 Headphone Connector

This connector is only present on X6X models

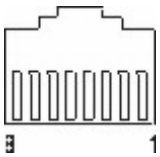
Pin	Signal
Tip	Left channel audio
Ring	Right channel audio
Base	Ground

5.4 Serial Connector (x3)



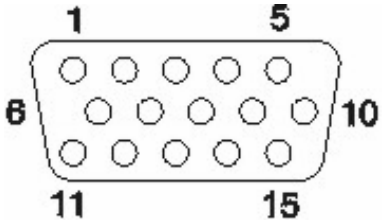
Pin	Signal	I/O
1	Carrier detect	I
2	Receive data	I
3	Transmit data	O
4	Data terminal ready	O
5	Signal ground	
6	Data set ready	I
7	Request to send	O
8	Clear to send	I

5.4.1 Ethernet connector



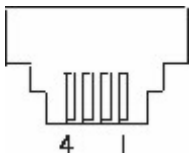
Pin	Signal	I/O
1	TxD+	O
2	TxD-	O
3	RxD+	I
4	Ground	
5	Ground	
6	RxD-	I
7	Ground	
8	Ground	

5.4.2 External video connector



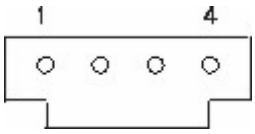
Pin	Connector
1	Red
2	Green
3	Blue
4	Monitor ID2 - not used
5	Ground
6	Red ground
7	Green ground
8	Blue ground
9	no connector
10	Gound
11	No connector
12	MON ID1
13	Horizontal sync
14	Vertical Sync
15	MON ID3

5.4.3 Cash Drawer (x2)



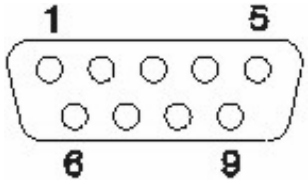
Pin	Connector
1	Ground
2	Sense
3	Open
4	24V

5.4.4 Internal Customer Display



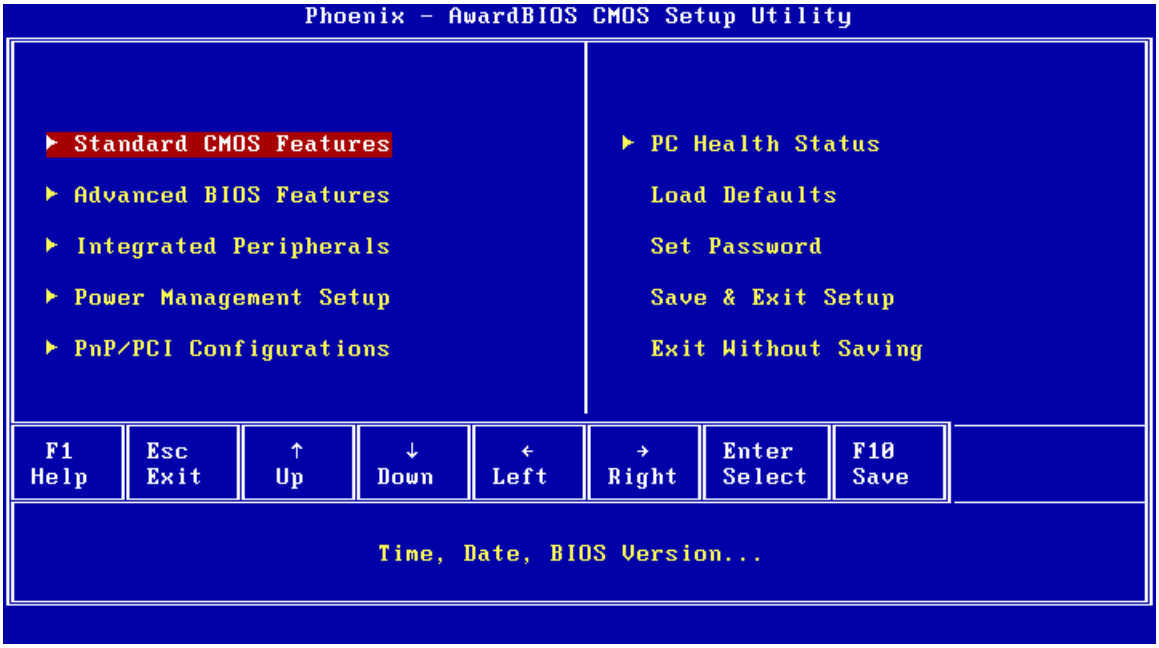
Pin	Connector
1	+5V Main
2	Transmit Data
3	Int VFD Present
4	Ground

5.4.5 RJ45 to RS232 Cable



Signal	Pin number, RJ45 End	Pin number, RS232 end
DSR/RI	1	6
CD	2	1
DTR	3	4
GND	4	5
RXD	5	2
TXD	6	3
CTS	7	8
RTS	8	7

6.0 CMOS Setup Utility



Standard CMOS Features
See section x

Advanced BIOS Features
See section x

Integrated Peripherals
See section x

Power Management Setup
See section x

PnP/PCI Configurations
See section x

PC Health Status
See section x

Load Defaults
Loads default values for all configurable items in CMOS Setup.

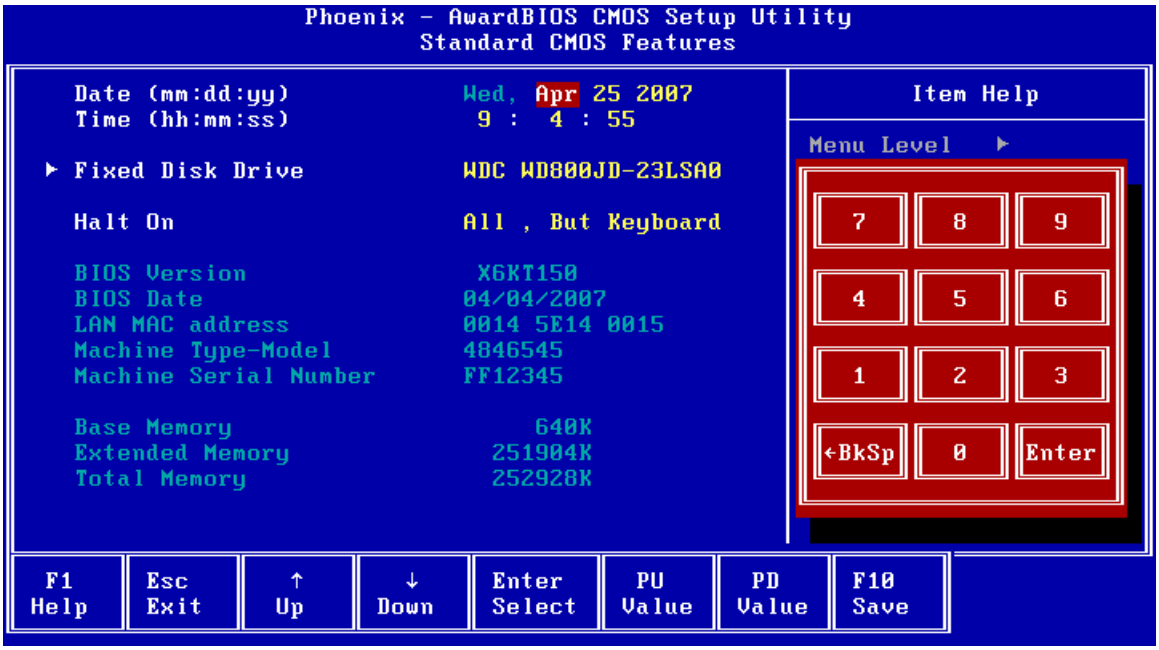
Set Password
Sets the numeric password used for the “Security Option” item using a keyboard or on-screen numpad. See section x.

Select <Enter> at the “Enter Password:” prompt to clear the password.

Save & Exit Setup
Select “Yes” to saves any changes made in the CMOS Setup Utility and restarts the system. Select “No” to return to the CMOS Setup utility.

Exit Without Saving
Select “Yes” to restart the system without saving any changes made in the CMOS Setup utility. Select “No” to return to the CMOS Setup utility.

6.1 Standard CMOS Features



Date
Sets the Date using a keyboard or on-screen numpad.

Time
Sets the Time using a keyboard or on-screen numpad.

Fixed Disk Drive
Select <Enter> to view the sub-menu.

BIOS Version
Shows the current BIOS revision.

BIOS Date
Shows the BIOS revision date.

LAN MAC Address
Shows the onboard NIC MAC Address.

Machine Type-Model
Shows the Machine Type and Model.

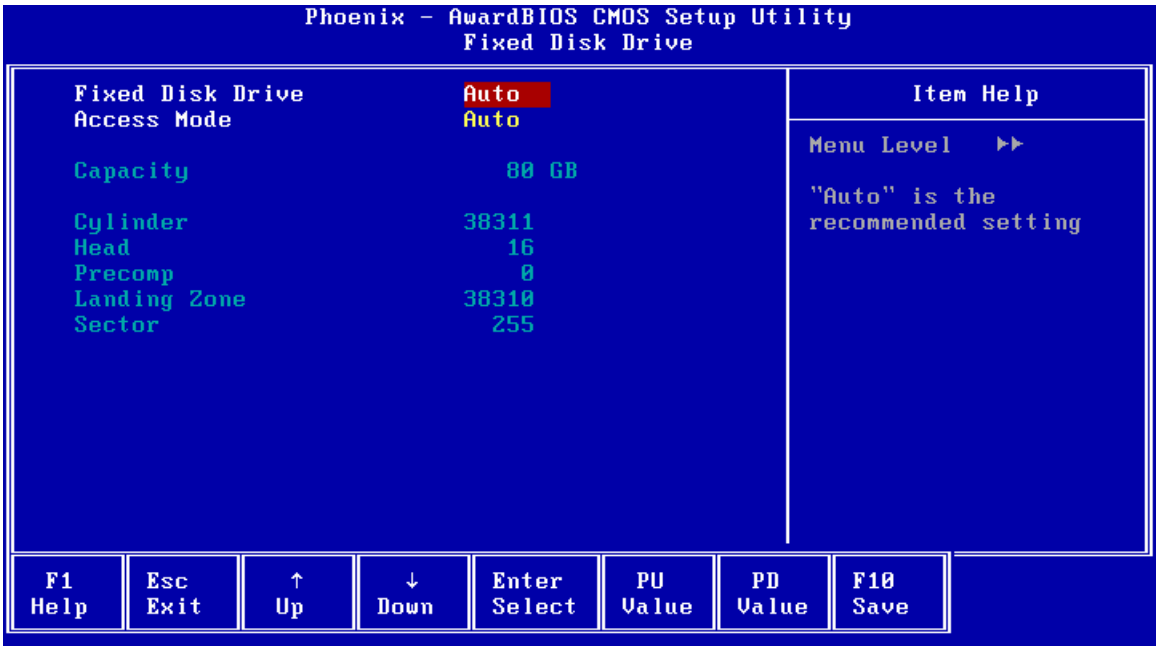
Machine Serial Number
Shows the machine Serial Number.

Base Memory
Shows the base memory amount up to 640 Kilobytes (KB).

Extended Memory
Shows the amount of memory above 1 MB in KB.

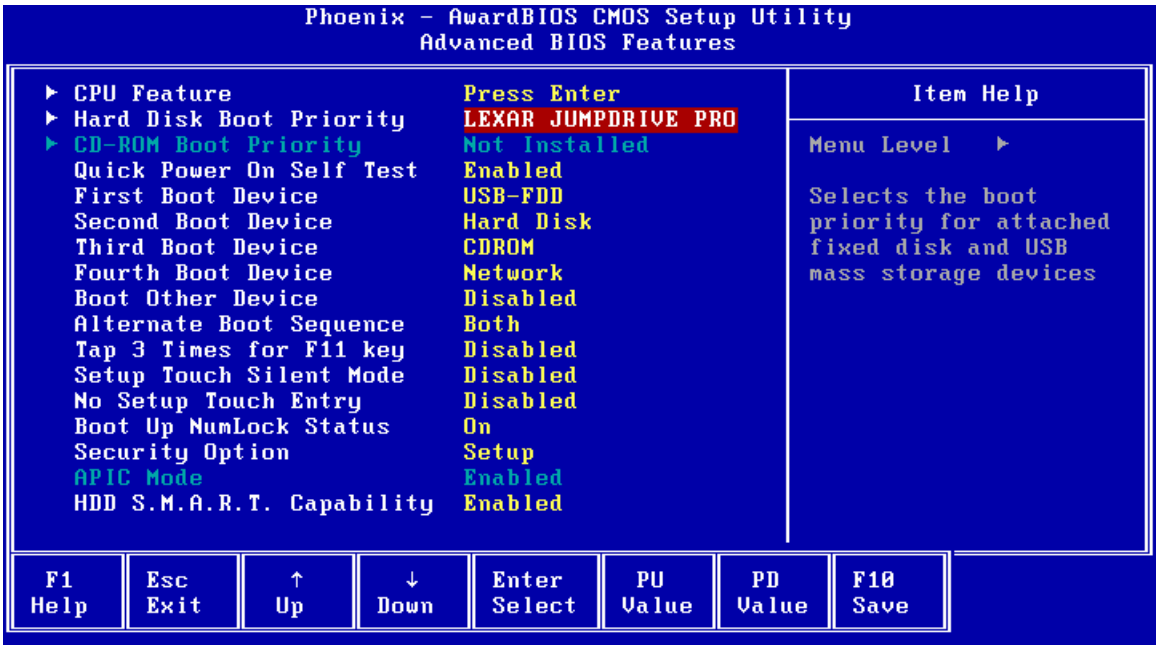
Total Memory
Shows the total memory amount in KB. This amount does not include the shared video memory.

6.2 Fixed Disk Drive



Shows the Hard Disk Drive Size and parameters. Changing settings on this menu is not recommended.

6.3 Advanced BIOS Features



CPU Feature
Select <Enter> to view the sub-menu. See section

Hard Disk Boot Priority
Shows the Hard Disk devices that will be booted if “Hard Disk” is selected as one of the First through Fourth Boot Devices.

Select <Enter> to view the sub-menu and set the priority.

CD-ROM Boot Priority

Shows the CD-ROM devices that will be booted if “CDROM” is selected as one of the First through Fourth Boot Devices.

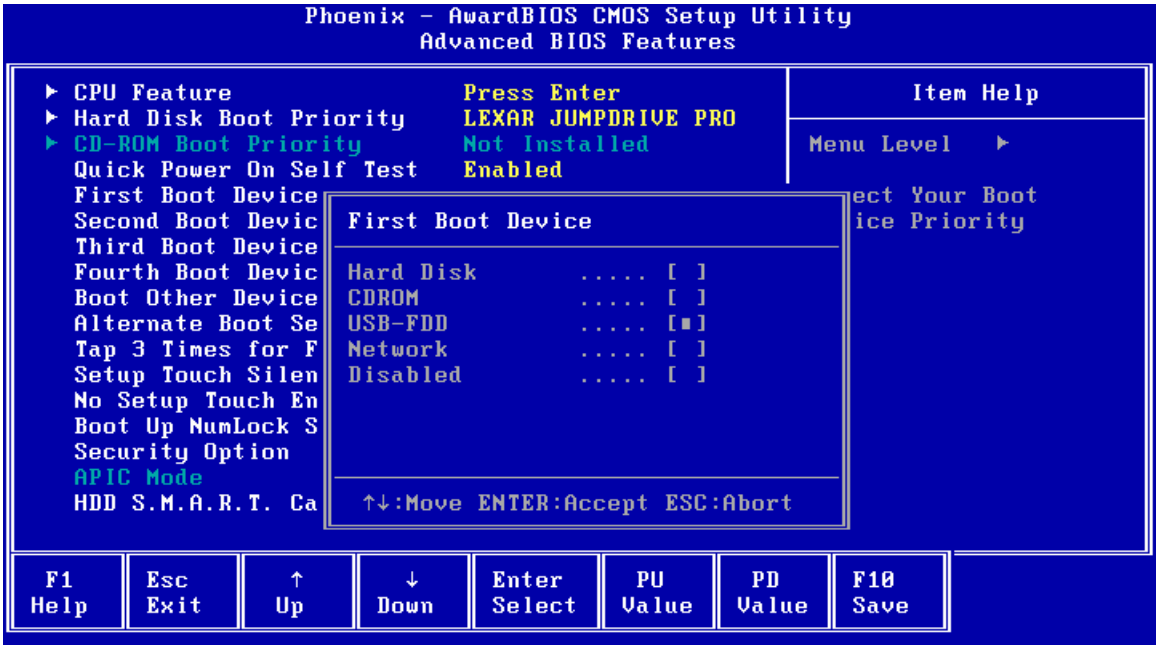
Select <Enter> to view the sub-menu and set the priority.

Quick Power On Self Test
If enabled, allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.

Default: Enabled

Options:
- Disabled
- Enabled

6.3.1 First Boot Device



The system will attempt to boot from the specified device category before trying other boot devices.

Default: USB-FDD (USB Floppy Drive)

Options:
- Hard Disk
- CDROM
- USB-FDD
- Network
- Disabled

Second Boot Device
The system will attempt to boot from the specified device category after trying the first boot device.

Default: Hard Disk (see Hard Disk Boot Priority)

Options:
- Hard Disk
- CDROM
- USB-FDD
- Network

- Disabled

Third Boot Device
The system will attempt to boot from the specified device category after trying the second boot device.

Default: CDROM (See CD-ROM Boot Priority)

Options:
- Hard Disk
- CDROM
- USB-FDD
- Network
- Disabled

Fourth Boot Device
The system will attempt to boot from the specified device category after trying the third boot device.

Default: Network

Options:
- Hard Disk
- CDROM
- USB-FDD
- Network
- Disabled

Boot Other Device
If enabled, the system will try all booting all device categories if the first through fourth boot devices fail.

Default: Disabled

Options:
- Disabled
- Enabled

Alternate Boot Sequence
Specifies whether a Magic Packet(TM) powering on the system, pressing <F12> during the POST, or both, will cause the normal boot sequence to be skipped and a Network-only boot to be attempted. If “Boot Other Device” is enabled, other boot devices are tried if the Network boot fails.

Default: Both

Options:
- Disabled
- Magic Packet
- <F12> Key
- Both

Tap 3 Times for F11 key
Enters an F11 key scan code if the onboard touchscreen is tapped three times at the prompt. Enables support for Rescue and Recovery Software.

Default: Disabled

Options:
- Disabled
- Enabled

Setup Touch Silent Mode

Prevents messages prompting the user to touch the screen to enter CMOS Setup, unless an error occurs.

Default: Disabled

Options:
- Disabled
- Enabled

No Setup Touch Entry
If enabled, prevents entering CMOS Setup using the touch screen. A keyboard can still be used to enter CMOS Setup.

Default: Disabled

Options:
- Disabled
- Enabled

Boot Up NumLock Status
Selects the power-on state for the keyboard NumLock. Select “Off” when using a keyboard in DOS that shares the numpad keys with letter keys.

Default: On

Options:
- Off
- On

Security Option
Select whether the password is required every time the system boots or only when entering CMOS Setup.

Select “Setup” to require a password before entering the CMOS Setup Utility. Select “System” to require a password before entering CMOS setup or before booting from one of the selected boot devices.

Use the “Set Password” option on the main menu to set the password. If the password is blank, this option has no affect.

Default: Setup

Options:
- Setup
- System

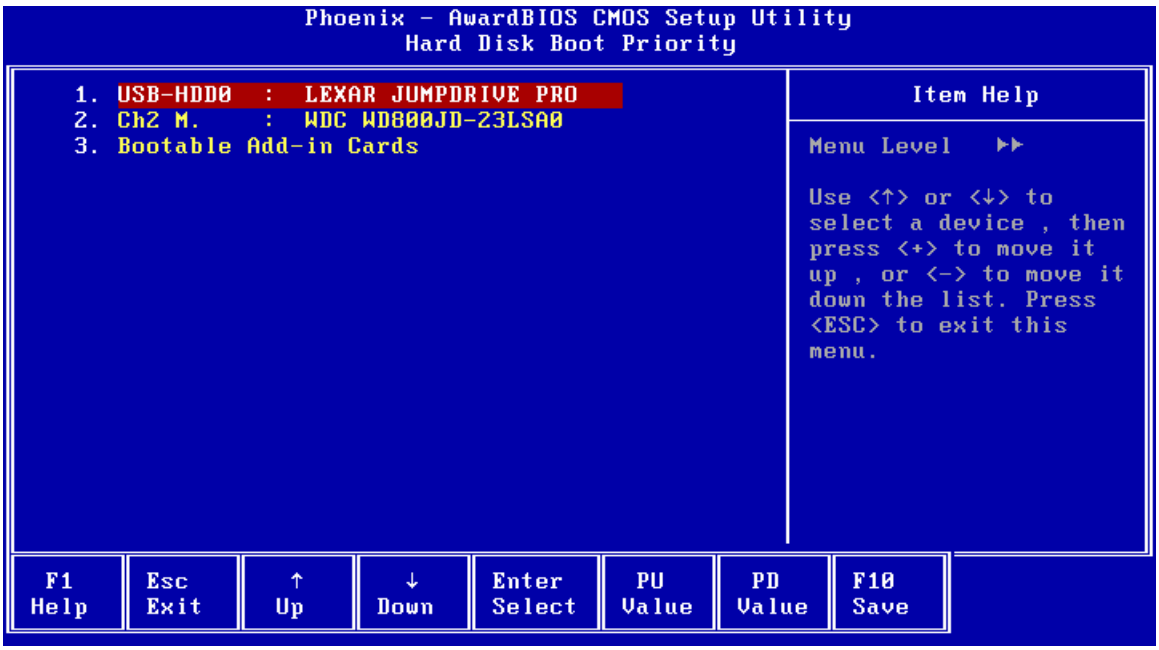
APIC Mode
This item is for information only and cannot be configured. It shows whether the Advanced Programmable Interrupt Controller is enabled. Some operating systems will utilize the APIC.

HDD S.M.A.R.T. Capability
Select "Enabled" to allow detecting and reporting of some hard disk errors during the POST (Power On Self Test). The BIOS does not detect errors; it only shows errors detected and reported by the hard disk.

Default: Enabled

Options:
- Disabled
- Enabled

6.3.2 Hard Disk Boot Priority



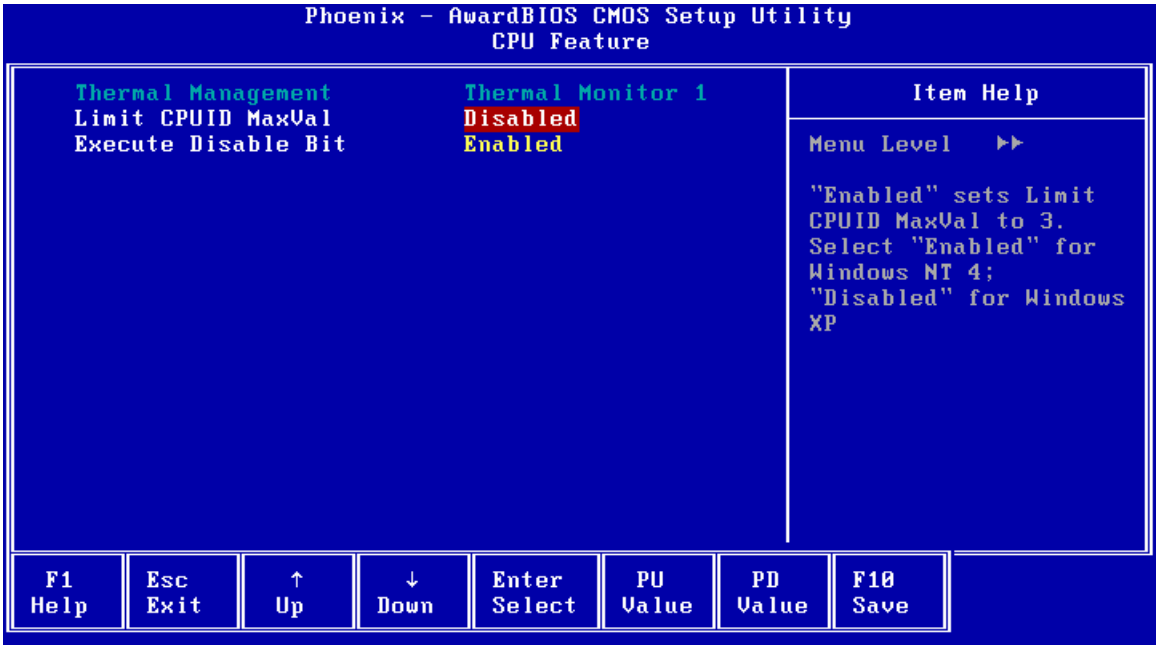
Selects the boot priority for attached fixed disk and USB mass storage devices. Hard Disk devices include USB Memory Keys, Hard Disk drives, and the Modular Flash Drive.

Select an item and use <PageUp> and <PageDown> to adjust the boot priority.

Only the first item in the list is booted as a Hard Disk device.

The device must be installed in the system in order to appear in the list.

6.4 CPU Feature



Thermal Management
Shows the built-in CPU thermal management method being used.

This item is for information only and cannot be configured.

Limit CPUID MaxVal
"Enabled" sets Limit CPUID MaxVal to 3. Select "Enabled" for Windows NT 4; "Disabled" for Windows XP.

Default: Disabled

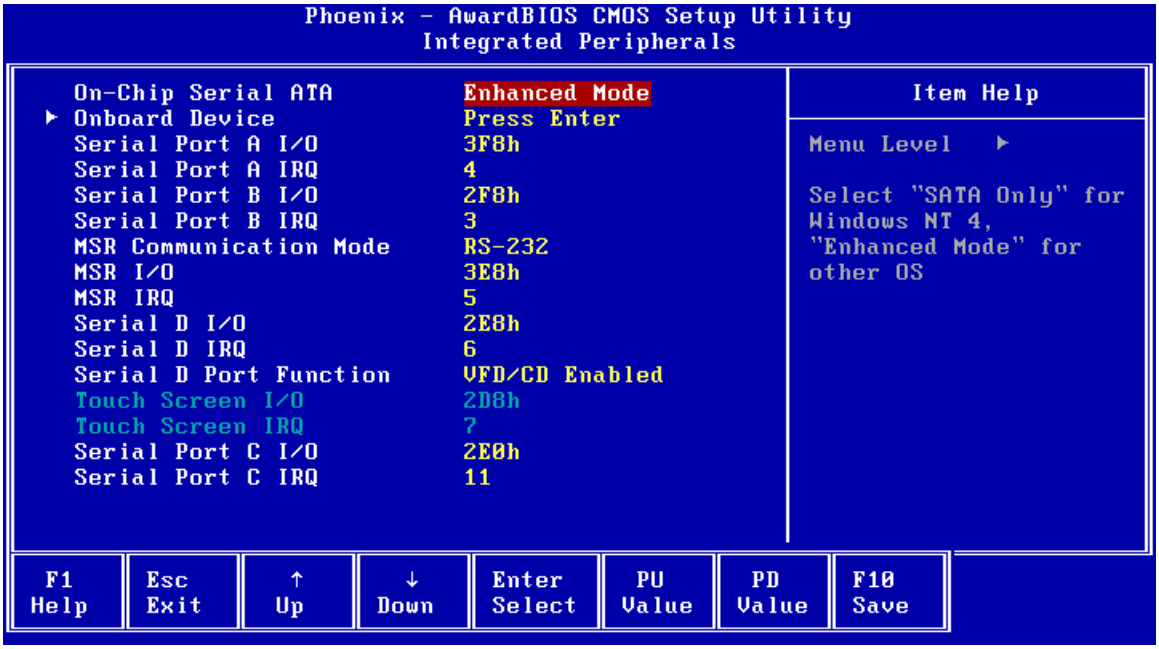
Options:
- Disabled
- Enabled

Execute Disable Bit
When disabled, forces the XD feature flag in the CPU to always return 0. See the following article for more information: http://technet2.microsoft.com/WindowsServer/en/Library/b0de1052-4101-44c3-a294-4da1bd1ef2271033.mspx?mfr=true

Default: Enabled

Options:
- Enabled
- Disabled

6.5 Integrated Peripherals



On-Chip Serial ATA
Select "SATA Only" for Windows NT 4 or "Enhanced Mode" for other Operating Systems.

When “SATA Only” is selected, the IDE controller is configured for Legacy IDE mode. When "Enhanced Mode" is selected, the IDE controller is configured as Native IDE mode capable.

Default: Enhanced Mode

Options:
- Disabled
- Enhanced Mode

- SATA Only

Onboard Device
Select <Enter> to view the sub-menu.

Serial Port A I/O
Selects the I/O address used for Serial Port A. Using the default value is recommended. If modified, ensure the selected I/O address does not conflict with other ports as values cannot be shared.

Default: 3F8h

Options:
- Disabled
- 2E0h
- 2E8h
- 2F8h
- 2D8h
- 3E8h
- 3F8h

Serial Port A IRQ
Selects the IRQ used for Serial Port A. Using the default value is recommended. If modified, ensure the selected IRQ does not conflict with other ports as values cannot be shared.

Default: 4

Options:
- 3
- 4
- 5
- 6
- 7
- 11

Serial Port B I/O
Selects the I/O address used for Serial Port B. Using the default value is recommended. If modified, ensure the selected I/O address does not conflict with other ports as values cannot be shared.

Default: 2F8h

Options:
- Disabled
- 2E0h
- 2E8h
- 2F8h
- 2D8h
- 3E8h
- 3F8h

Serial Port B IRQ
Selects the IRQ used for Serial Port B. Using the default value is recommended. If modified, ensure the selected IRQ does not conflict with other ports as values cannot be shared.

Default: 3

Options:
- 3
- 4
- 5

- 6
- 7
- 11

MSR Communication Mode
This option should be set to the same mode as the switch on the MSR.

Default: RS-232

Options:
- Keyboard Wedge
- RS-232

MSR I/O
Selects the I/O address used for the MSR if "MSR Communication Mode" is set to "RS-232". If the MSR is configured for Keyboard Wedge mode, this item may be set to Disabled.

Using the default value is recommended. If modified, ensure the selected address does not conflict with other ports as values cannot be shared.

Default: 3E8h

Options:
- Disabled
- 2E0h
- 2E8h
- 2F8h
- 2D8h
- 3E8h
- 3F8h

MSR IRQ
Selects the IRQ used for the MSR if "MSR Communication Mode" is set to "RS-232". If the MSR is configured for Keyboard Wedge mode, the selected IRQ is not used by the MSR but is not available for other use.

Using the default value is recommended. If modified, ensure the selected IRQ does not conflict with other ports as values cannot be shared. This item cannot be disabled.

Default: 5

Options:
- 3
- 4
- 5
- 6
- 7
- 11

Serial Port D I/O
Selects the I/O address used for Serial Port D. Using the default value is recommended. If modified, ensure the selected I/O address does not conflict with other ports as values cannot be shared.

Default: 2E8h

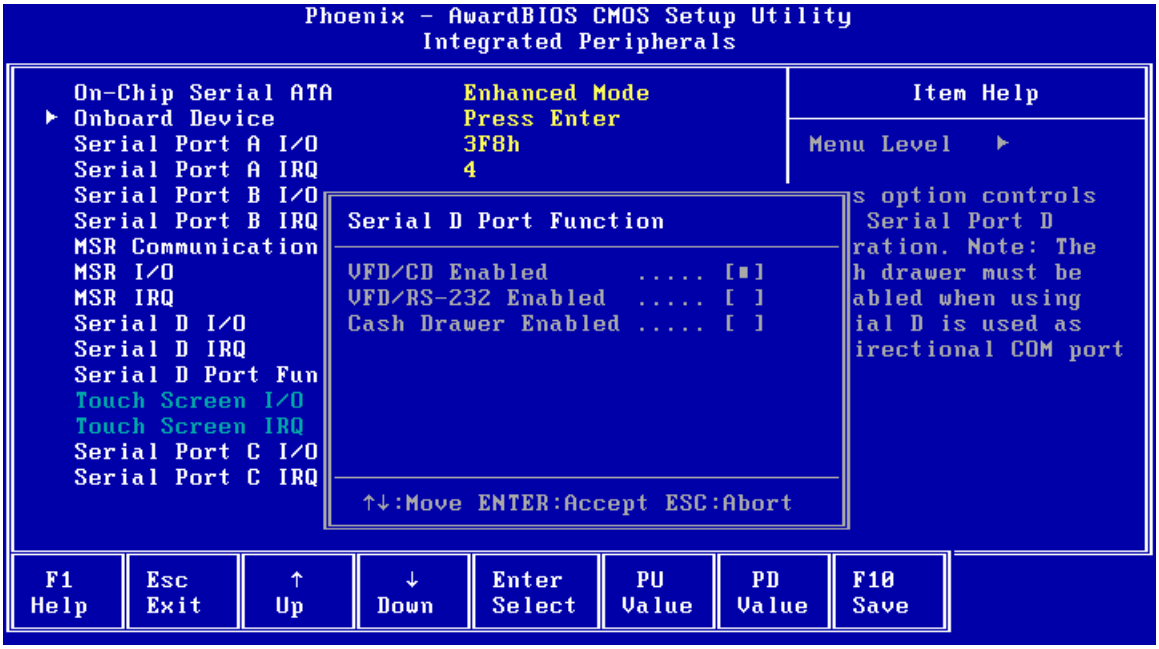
Options:
- Disabled
- 2E0h
- 2E8h
- 2F8h

- 2D8h
- 3E8h
- 3F8h

Serial Port D IRQ
Selects the IRQ used for Serial Port D. Using the default value is recommended. If modified, ensure the selected IRQ does not conflict with other ports as values cannot be shared.

Default: 6

Options:
- 3
- 4
- 5
- 6
- 7
- 11



Serial Port D Function
This option controls the Serial Port D operation.

The IBM Character Display (both integrated and distributed) and the IBM cash drawers share serial Port D. If you do not use either type of these types of I/O devices, then serial port D is available as a fourth standard serial port. Port D is a 15-pin D-shell connector that includes power as well as the serial port signals. The system communicates with the displays in a unidirectional mode. The cash drawer operates in bi-directional mode. The cash drawer must be disabled when Serial D is used as a bi-directional COM port.

If you have at least one IBM cash drawer attached, you must specify the Cash Drawer setting as Enabled. The Disabled setting allows you to connect an OEM device to the Serial D port when a cash drawer is not present. If you use an IBM cash drawer, you can only attach an IBM character display (integrated or distributed) to the system.

Default: VFD/CD Enabled

Options:
- VFD/CD Enabled
- VFD/RS-232 Enabled
- Cash Drawer Enabled

Touch Screen I/O
Shows the I/O address used by the touchscreen controller. This item is for information only and cannot be configured.

Touch Screen IRQ
Shows the IRQ used by the touchscreen controller. This item is for information only and cannot be configured.

Serial Port C I/O
Selects the I/O address used for Serial Port C. Using the default value is recommended. If modified, ensure the selected I/O address does not conflict with other ports as values cannot be shared.

Default: 2E0h

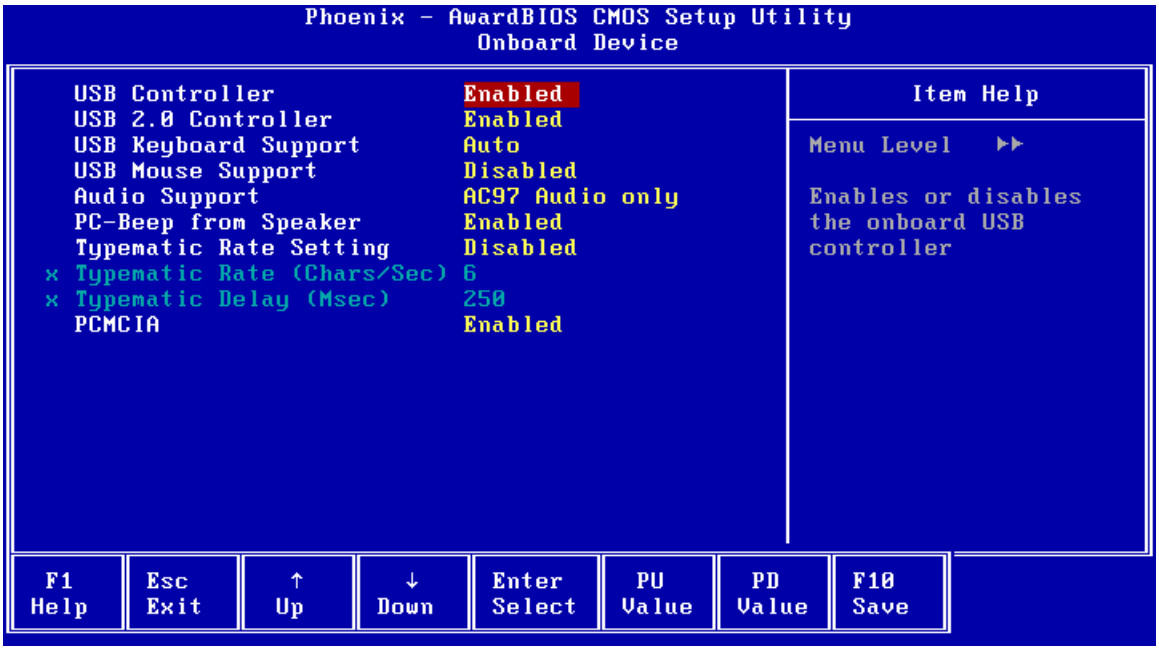
Options:
- Disabled
- 2E0h
- 2E8h
- 2F8h
- 2D8h
- 3E8h
- 3F8h

Serial Port C IRQ
Selects the IRQ used for Serial Port C. Using the default value is recommended. If modified, ensure the selected IRQ does not conflict with other ports as values cannot be shared.

Default: 11

Options:
- 3
- 4
- 5
- 6
- 7
- 11

6.6 On Board Device



USB Controller
Enables or disables the onboard USB controller.

USB devices will not function if the controller is disabled. An additional 32 KB of UMB space can be made available for DOS by disabling the USB Controller.

Default: Enabled

Options:
- Enabled
- Disabled

USB 2.0 Controller
Enables or disables the EHCI USB 2.0 controller. If disabled, the USB ports will operate as 1.X ports only.

Default: Enabled

Options:
- Enabled
- Disabled

USB Keyboard Support
Enables or disables USB keyboard support in non-USB aware environments such as DOS. If 'Auto' is selected, BIOS will enable USB keyboard support if a USB keyboard is detected the POST or disable support if a USB keyboard is not detected.

Default: Auto

Options:
- Disabled
- Enabled
- Auto

USB Mouse Support
Enables or disables USB mouse support in non-USB aware environments such as DOS. A mouse driver is still required if support is enabled.

Default: Disabled

Options
- Disabled
- Enabled

Audio Support
Enables or disables the onboard AC'97 audio controller. These should be set to disabled on all 545 models.

Default: AC97 Audio only

Options:
- AC97 Audio only
- All Disabled

PC-Beep from Speaker
Enables or disables PC beeps from the integrated speakers, if present. PC beeps are always enabled from the motherboard beeper.

Default: Enabled

Options:
- Disabled
- Enabled

Typematic Rate Setting
If disabled, keystrokes repeat at a rate determined by the keyboard controller. If enabled, "Typematic Rate" and "Typematic Delay" can be selected.

Default: Disabled

Options:
- Disabled
- Enabled

Typematic Rate (Chars/Sec)
Sets the chars/sec rate at which a character repeats when you hold down a key.

Default: 6

Options:
- 6
- 8
- 10
- 12
- 15
- 20
- 24
- 30

Typematic Delay (Msec)
Sets the delay before key strokes begin to repeat when a key is depressed.

Default: 250

Options:
- 250
- 500
- 750

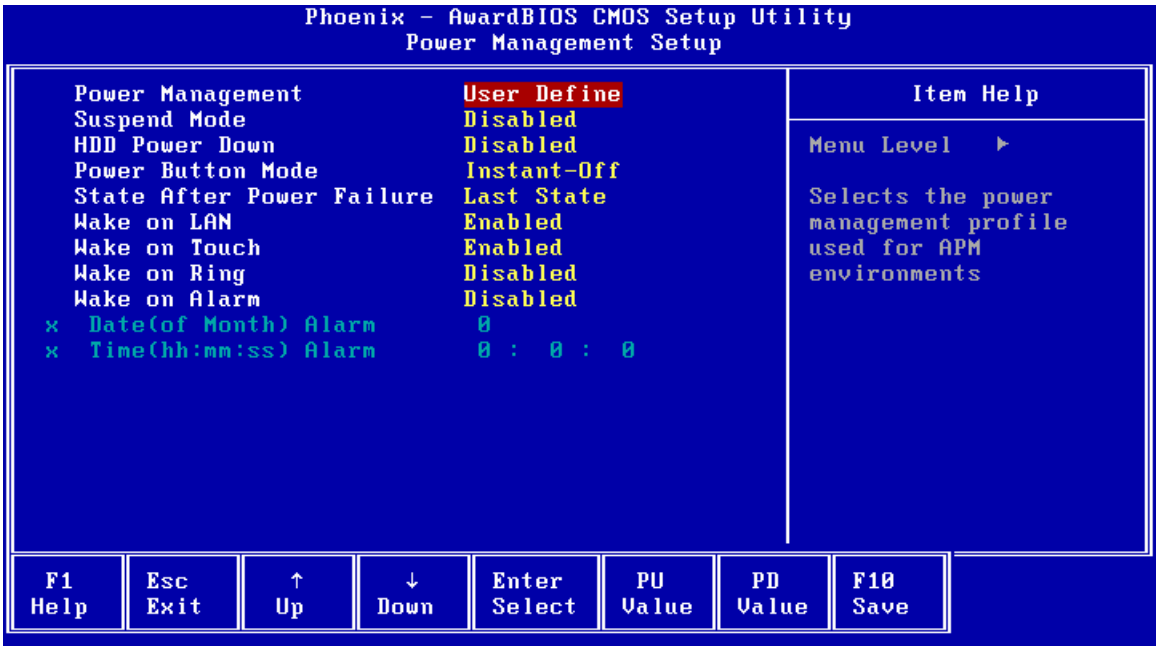
- 1000

PCMCIA
Enables or disables PCMCIA support if your system has the PCMCIA controller option.

Default: Enabled

Options:
- Enabled
- Disabled

6.7 Power Management Setup



Power Management
Selects the power management profile used for Advanced Power Management (APM) environments such as DOS.

“Min Saving” and “Max Saving” are pre-defined profiles for the Suspend Mode and HDD Power Down timeout values. “User Define” allows selection of the Suspend Mode and HDD Power Down timeouts.

This item does not apply to ACPI environments such as Windows.

Default: User Define

Options:
- User Define
- Min Saving
- Max Saving

Suspend Mode
Selects the timeout for entering the suspend state in APM environments. After the selected amount of inactivity time, the system will enter the APM suspend state.

The power LED blinks when the system in suspended. Pressing the power button will resume the system from Suspend.

This option is only available if “Power Management” is set to “User Define”.

This item does not apply to ACPI environments such as Windows.

Default: Disabled

Options:

Disabled

- 1 Min
- 2 Min
- 4 Min
- 8 Min
- 12 Min
- 20 Min
- 30 Min
- 40 Min
- 1 Hour

HDD Power Down
Selects the timeout for powering down the hard disk in APM environments. After the selected amount of inactivity time, the hard disk will spin down. Hard disk activity will cause the hard disk to spin back up.

This option is only available if “Power Management” is set to “User Define”.

This item does not apply to ACPI environments such as Windows.

Default: Disabled

Options:
- Disabled
- 1 Min
- 2 Min
- 3 Min
- 4 Min
- 5 Min
- 6 Min
- 7 Min
- 8 Min
- 9 Min
- 10 Min
- 11 Min
- 12 Min
- 13 Min
- 14 Min
- 15 Min

Power Button Mode
Selects the power button behavior for non-ACPI environments such as DOS.

Default: Instant-Off

Options:
- Instant-Off
- Suspend/Disabled

State After Power Failure
Specifies the power state of the system after power is lost and then restored.

Default: Last State

Options:
- Last State
- Turn On
- Stay Off

Wake on LAN
If enabled, allows a Magic Packet(TM) sent to the onboard LAN adapter to wake the system from a suspend or off state.

Default: Enabled

Options:
- Disabled
- Enabled

Wake on Touch
If enabled, allows a touch on the onboard LCD to wake the system from a suspend state.

Default: Enabled

Options:
- Disabled
- Enabled

Wake on Ring
If enabled, allows a modem attached to Serial Port D to wake the system via Ring Indicate. Ports A-C can be jumpered to tie DSR (pin1) to Ring Indicate if required.

Default: Disabled

Options:
- Disabled
- Enabled

Wake on Alarm
If enabled, the allows the system to wake up at the specified time and date.

Default: Disabled

Options:
- Disabled
- Enabled

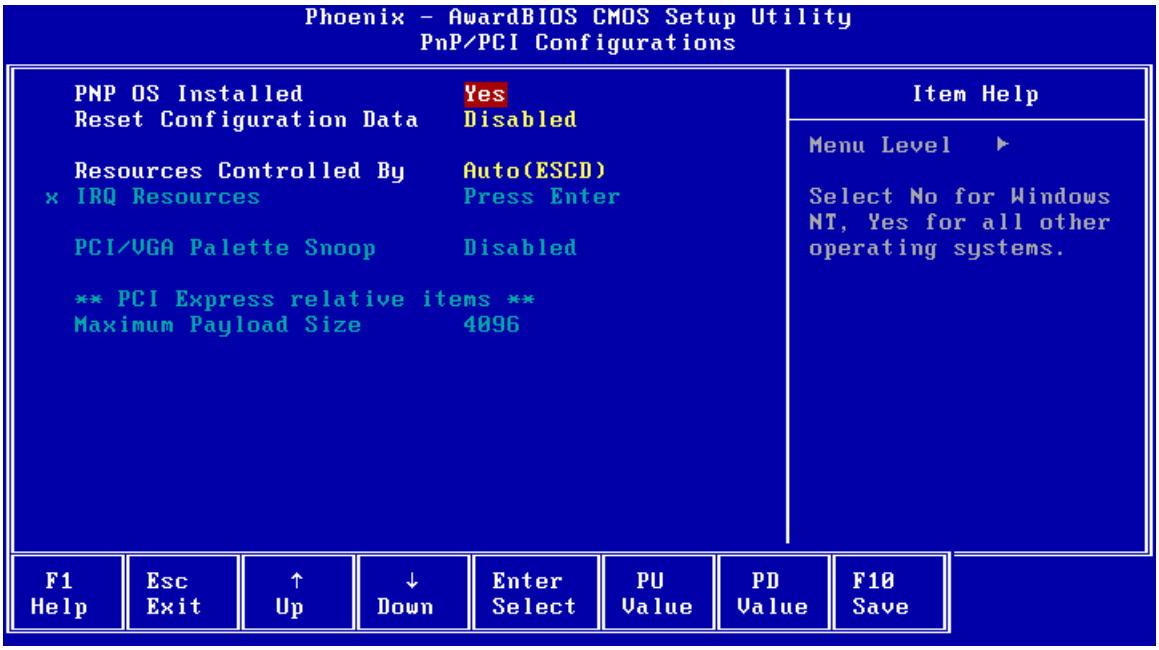
Date (of Month) Alarm
If “Wake on Alarm” is enabled, sets the Alarm date using a keyboard or on-screen numpad. Setting the date to zero specifies that all days are alarm days.

This item is not available if “Wake on Alarm” is disabled.

Time (hh:mm:ss) Alarm
If “Wake on Alarm” is enabled, sets the Alarm time using a keyboard or on-screen numpad.

This item is not available if “Wake on Alarm” is disabled.

6.8 PnP/PCI Configurations



PNP OS Installed
Selects whether the BIOS or the operating system configures certain onboard devices. Select “No” for Windows NT or “Yes” for all other operating systems.

Default: Yes

Options:
- No
- Yes

Reset Configuration Data
This item is for diagnostic purposes only. Select Enabled to reset the Extended System Configuration Data (ESCD) if the operating system cannot boot. The option automatically returns to Disabled on the next boot.

Default: Disabled

Options:
- Disabled
- Enabled

Resources Controlled By
BIOS can automatically configure the boot and Plug and Play compatible devices. Select “Auto (ESCD)” to have BIOS automatically assign the IRQ resources to PCI devices. Select “Manual” to select which IRQs are not available for PCI device use.

Changing this item is not recommended.

Default: Auto(ESCD)

Options:
- Auto(ESCD)
- Manual

IRQ Resources
Select <Enter> to view the sub-menu.

When the selected IRQ is set to “Reserved”, PCI devices will not use that IRQ.

This item is only available when “Resources Controlled By” is set to “Auto (ESCD)”.

Default: PCI Device

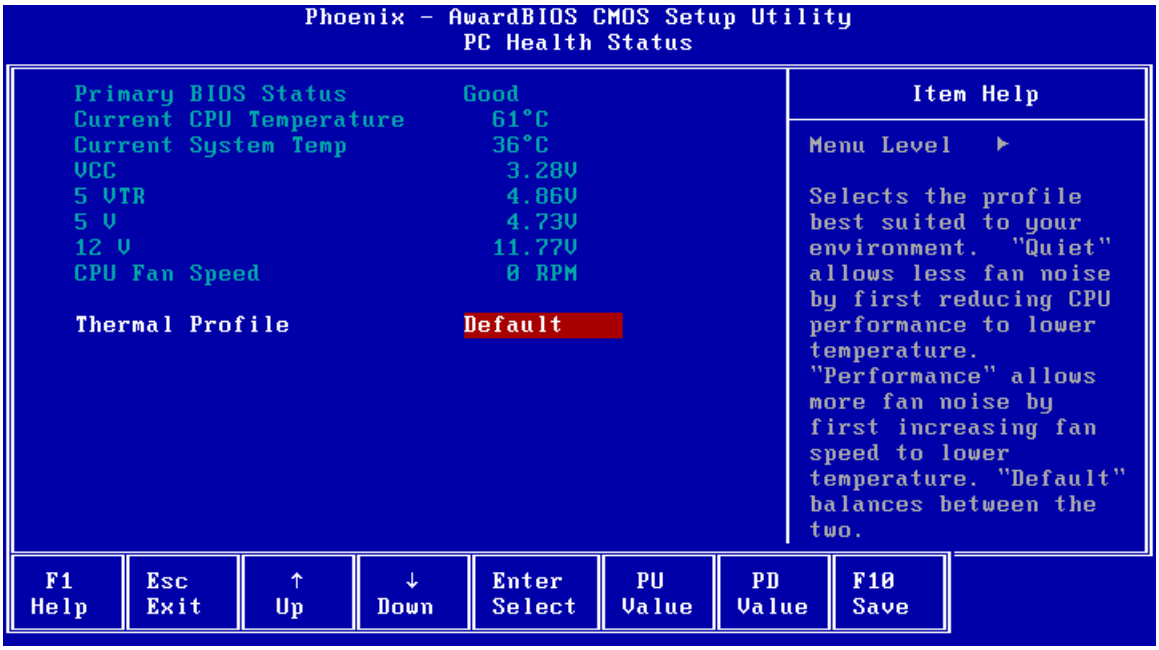
Options:
- PCI Device
- Reserved

PCI/VGA Palette Snoop
This item is for diagnostic purposes only.

Maximum Payload Size
Shows the maximum TLP payload size for PCI Express devices in bytes.

This item is for information only and cannot be configured.

6.9 PC Health Status



Primary BIOS Status
Shows the status of the primary (boot) flash ROM. If the primary BIOS becomes corrupted due to power loss during a BIOS update, the status may show “Bad” indicating that the BIOS update should be re-applied.

This item is for information only and cannot be configured.

Current CPU Temperature
Shows the current CPU temperature.

This item is for information only and cannot be configured.

Current System Temp
Shows the ambient temperature inside the system chassis.

This item is for information only and cannot be configured.

VCC, 5 VTR, 5 V, 12 V

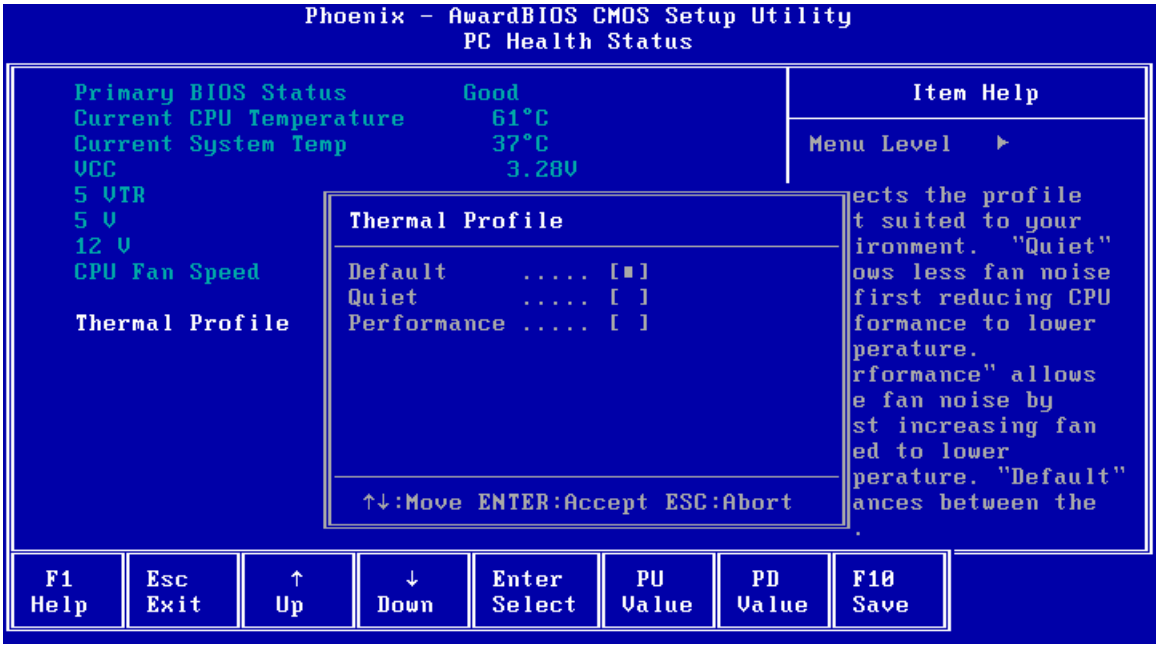
Shows the current voltages for the associated voltage sensors.

This item is for information only and cannot be configured.

CPU Fan Speed
Shows the current CPU fan speed in RPMs.

This item is for information only and cannot be configured.

6.9.1 Thermal Profile



Thermal Profile
Selects the thermal management profile best suited to your environment. "Quiet" allows less fan noise by first reducing CPU performance to lower temperature. "Performance" allows more fan noise by first increasing fan speed to lower temperature. "Default" balances between the two.

Default: Default

Options:
- Default
- Quiet
- Performance

END OF DOCUMENT