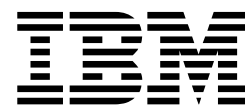IBM SurePOS 500/600 Series

System Reference

IBM SurePOS 500/600 Series

System Reference

> **Note**
>
> Before using this information and the product it supports, be sure to read the general information under "Appendix D.
> Notices" on page 85 and "Electronic emission notices" on page 86.

Contents

About this manual

This manual contains software and hardware information about the IBM SurePOS 500/600 Series (SurePOS 500/600). This manual is organized as follows:

- **Chapter 1. Introducing the SurePOS 500/600 Series** provides architecture and migration statements, introduces the various models, features, and mounting options, and identifies the attachable I/O devices.
- **Chapter 2. System specifications** shows how I/O devices attach to the SurePOS 500/600 Series and provides information about the functional features of the system board.
- **Chapter 3. Physical specifications** provides environmental and other physical information about the product.
- **Chapter 4. Power supply** describes the features of the power supply.
- **Chapter 5. System management** contains information about the Desktop Management Interface (DMI), the LAN Client Control Manager and power management systems.
- **Chapter 6. System diagnostics and troubleshooting** contains information about the Service Diskette, the CMOS reset jumper and POST error and beep codes.
- **Chapter 7. Input/output devices and commands** describes the supported input and output devices, their programming considerations and explains the I/O commands.
- **Appendix A. Connector-pin assignments** lists connector-pin assignments for external and internal connectors.
- **Appendix B. System address maps** provides maps of system areas.
- **Appendix C. IRQ and DMA channel assignments** lists channel assignments for interrupt requests and DMA.
- **Appendix D. Notices** provides legal notices, electronic emission notices, and trademark information.

Who should read this manual

This manual is intended for the programmer, system administrator, and other technical personnel who are responsible for the programming and operation of the SurePOS 500/600 Series systems.

Related publications

The following IBM publications are available from the IBM Retail Store Solutions Web site. To access these publications:

1. Go to www.ibm.com/solutions/retail/store.
2. Select **Support**, then select **Publications**.

- *Safety Information – Read This First*, GA27–4004
- *SurePOS 500/600 Series Installation and Operation Guide*, GA27–4254
- *SurePOS 500/600 Series Hardware Service Guide*, GY27–0396
- *4610 SureMark Point-of-Sale Printers Hardware Service Manual*, GY27–0355
- *4610 SureMark Point-of-Sale Printers User's Guide*, GA27–4151
- *4820 SurePoint Solutions Installation and Service Guide*, GA27–4231
- *4820 SurePoint Solutions System Reference*, SY27–4249

Driver and service diskette information

The following driver and diagnostic programs are available on the IBM Retail Store Solutions Web:

- SurePOS 500/600 Series Device Drivers
- SurePOS 500/600 Series Service Diskette
- 4820 SurePoint Solutions Device Drivers

To access these programs:

1. Go to www.ibm.com/solutions/retail/store.
2. Select **Support**.
3. Select the device, such as the **IBM SurePOS 500/600 Series**.
4. Under Download, select the appropriate item.

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To access a PDF version of this book:

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2. Select **Support**.
3. Under Related Links, select **Publications.**

After you have filled out the form, return it by mail, by fax, or by giving it to an IBM representative. If applicable, include a reference to the specific location of the text on which you are commenting. For instance, include the page or table number.

Between major revisions of this manual we may make minor technical updates. The latest softcopy version of this manual is available on the IBM Retail Store Solutions Web site.

Figures

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Tables

December 7, 2001

Summary of Changes

The following changes were made to this document in July 2001.
- Added information for models 531, 611, 621, and X51.
- Added information on optional features.

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Chapter 1. Introducing the SurePOS 500/600 Series

The IBM SurePOS 500/600 Series (*SurePOS 500/600*) enables you to provide fast, accurate customer service and to manage your restaurant or store efficiently. The machine type for the SurePOS 500/600 is 4840. The 4840 models are listed in Table 2 on page 3. The SurePOS 500 Series is designed for the food service specialties, while the SurePOS 600 Series is designed for retail specialties. You can configure the SurePOS 500/600 systems to support a wide variety of both IBM and non IBM I/O devices — everything from standard serial-attached devices such as the IBM Kitchen Subsystem or IBM 4610 SureMark printer, to USB-attached devices. The SurePOS 500/600 can only be mounted to a wall if ordered as a SurePOS 500/600 with Wall Mount feature.

System resources and operating system may limit the use of ports. The Figure 1 on page 2 shows a sample SurePOS 500/600 configuration.
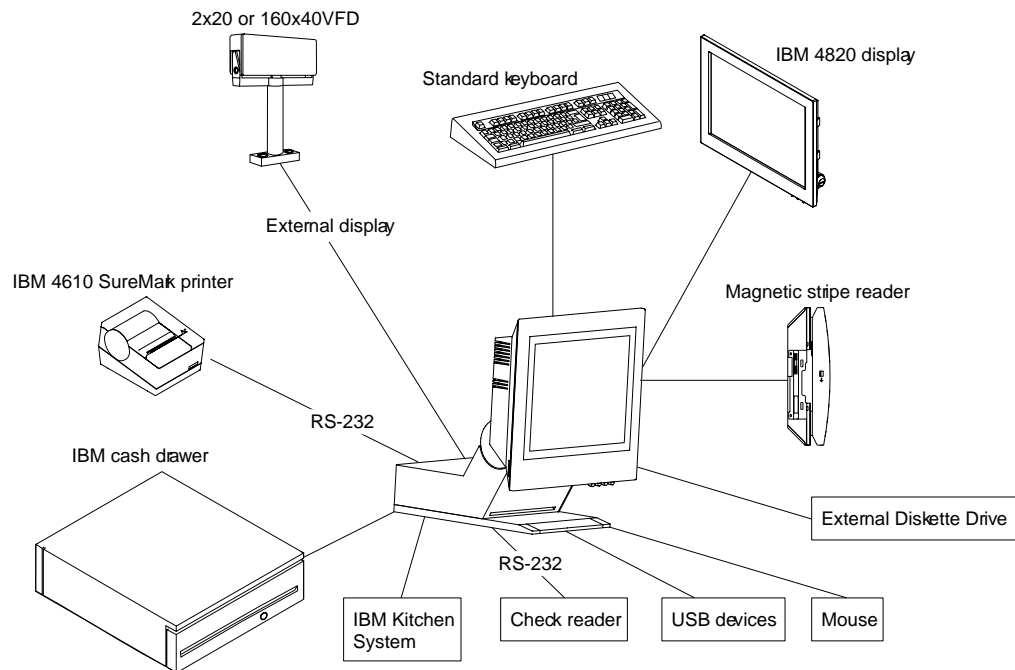
Figure 1. SurePOS 500/600 configuration with optional features

SurePOS 500/600 models

The SurePOS 500/600 Series is available in sixteen models.

Table 1.

SurePOS 500 Models	SurePOS 600 Models
521/52I	611/61I
531/53I	621/62I
541/54I	651/65I
551/55I	
561/56I	

Note: The following 4840 models are functionally identical. The only difference is the type of warranty service. See "Warranty Information" on page 16 for more information about warranty service.

- 4840–521 is identical to the 4840–52I
- 4840–531 is identical to the 4840–53I
- 4840–541 is identical to the 4840–54I
- 4840–551 is identical to the 4840–55I
- 4840–561 is identical to the 4840–56I
- 4840–611 is identical to the 4840–61I
- 4840–621 is identical to the 4840–62I
- 4840–651 is identical to the 4840–65I

All models use an AMD K6-2 400-MHz processor with PC100 synchronous DRAM system memory (32 MB to 256 MB available). Models 521, 541, 531, 551, 561 and 651 provide a resistive touch screen, 10/100-Mbps networking, and all standard PC

ports. Models 611 and 621 also provide 10/100-Mbps networking and all standard PC ports. However, models 611 and 621 do not have a resistive touch screen; a keyboard is used instead. Table 2 and Table 3 list the distinctive differences in the features among the models. Additional standard features and optional features are listed following the table.

SurePOS 500 Series Models

The SurePOS 500 Series models are designed for food service or hospitality retailers.

Table 2. Features

Model	Operator Terminal	Audio	PC Card	Presence Detector
4840–521	12.1 in, Dual Bulb, Passive (DSTN) Color LCD	No		No
4840–531	12.1 in. Single Bulb, Active (TFT) Color LCD	No		No
4840-541		No		No
4840–551	12.1 in. Ultra-bright Active Color Display	Yes		No
4840-561		Yes		Yes

SurePOS 600 Series Models

The SurePOS 600 Series models are designed for the retail environment.

Table 3. Features

Model	Operator Terminal	Audio	PC Card	Presence Detector
4840-611	12.1 in. Single Bulb, Active (TFT) Color LCD, Non-touch	No		No
4840–621		Yes		No
4840-651	12.1 in. Single Bulb, Active (TFT) Color LCD	Yes		No

Standard Features

The following features are standard on all models.

- Integrated power supply
- 3.5-in., IDE, hard disk drive (HDD)
- Three RS-232 serial ports
- Two cash-drawer ports
- External video port
- Parallel port
- Two universal serial bus (USB) ports
- External diskette-drive port
- Magnetic stripe reader (MSR) connector
- Integrated and distributed character display connectors
- Advanced cooling-pipe technology

System resources and operating systems may limit the use of ports.

Optional features

The following options are available on all models unless otherwise specified:

- SurePOS 500/600 with Wall Mount feature (Models 521, 531, 541, 551, 561, and 651 only)
- Full-size cash drawer,, locking till, till insert (fixed and adjustable), and lock
- Compact cash drawer, locking till, till insert (fixed and adjustable), and lock
- Full-size non-keyboard integration tray for cash drawer and countertop
- Full-size keyboard integration tray for cash drawer and countertop
- Compact keyboard integration tray for cash drawer
- 32-MB, 64-MB and 128-MB additional memory upgrades
- Integrated character display
- Distributed character display (pole mount)
- All points addressable character graphic display
- IBM External 1.44-MB external diskette drive
- 3-Track MSR
- Dual sided single track MSR (Japan and Korea only)
- Mouse and Keyboard ”Y“ cable
- IBM Space Saver II keyboard
- SureMark Printer (Machine Type: 4610, Models TF6, TF7, IF6m TG3, TG4, TG5, TI3, TI4, TI5, DG3, and DG4)

   Note: The **D** in the models DG3 and DG4 stands for Depot warranty. The **I** in model IF6, TI3, TI4, and TI5 stands for IBM on-site repair (IOR) warranty.

- SurePoint Solution (Machine Type: 4820, Models 4FT and 4FD)

The following features are only available on SurePOS 500/600 Models 551, 561, 621 and 651:

- Audio (speaker kit, microphone port, headphone port)
- PC card support, including wireless

Dual-display feature

The SurePOS 500/600 provides dual-display capability. Information on the SurePOS 500/600 display can be completely different than information displayed on an attached display. The SurePoint Solution (Machine Type: 4820, Models 4FT and 4FD) can be integrated onto the base of the SurePOS 500/600 or attached as a distributed model. Other external VGA device can be connected to the SurePOS 500/600 Series 15-pin port.

System software features

The SurePOS 500/600 supports the following operating systems:

- DOS 2000 (USB, audio and PC card are not supported)
- Windows® 98 Second Edition
- Windows 2000
- Windows NT 4.0 (Service Pack 6, Limitations on PC card, USB not supported)

System software includes:

- Basic input/output software (BIOS)
- Plug-and-Play BIOS

- Power-on self-test (POST)
- Configuration/Setup Utility program
- Advanced Power Management (APM)[1]
- Advanced Configuration and Power Interface (ACPI)[2]
- Touch-screen calibration utility during POST
- Flash-update utility program
- SurePOS 500/600 Diagnostic Service Diskette

Understanding the architecture

The SurePOS 500/600 meets standard PC architecture requirements. The external video display connector is Super Video Graphics Array (SVGA) compatible. The customer displays connect to the system through a serial port. The three-track MSR communicates with the system through a MSR connector using a serial interface or the PS/2 keyboard interface, selectable by means of a switch on the MSR. The dual-sided, single-track MSR communicates only serially.

The SurePOS 500/600 does not require POS drivers to access the I/O devices; the following application programming interface (APIs) allow access:

- Direct hardware (allows you to access function not supported by OPOS and JavaPOS)
- POSS Win
- OLE for Retail POS (OPOS)
- JavaPOS

OPOS drivers are available for the MSR (serial mode only), character display, and cash drawer. POSS Win drivers are available for fiscal printer and customer LCD features only. For more information, access the Retail Store Solutions Internet site at: www.ibm.com/solutions/retail/store/, select **Support**, then under Point of Sale Support, select **IBM SurePOS 500/600 Series**.

Mounting options

You can mount the SurePOS 500/600 in the following ways:

- Free standing on a counter top
- Secured to a counter top (with or without an integration tray)
- Secured to a full-sized drawer (with an integration tray)
- Secured to a wall. The Wall Mount feature must be specified when ordering your SurePOS 500/600. (This mounting option is not available for Models 611 and 621.)

---

1. APM is fully supported on Windows 98, and supported on Windows 2000 with the exceptions of suspend and resume.
2. ACPI is supported only on Windows 98 and Windows 2000.

Free-standing mounting option
Figure 2 illustrates the free-standing mounting option.
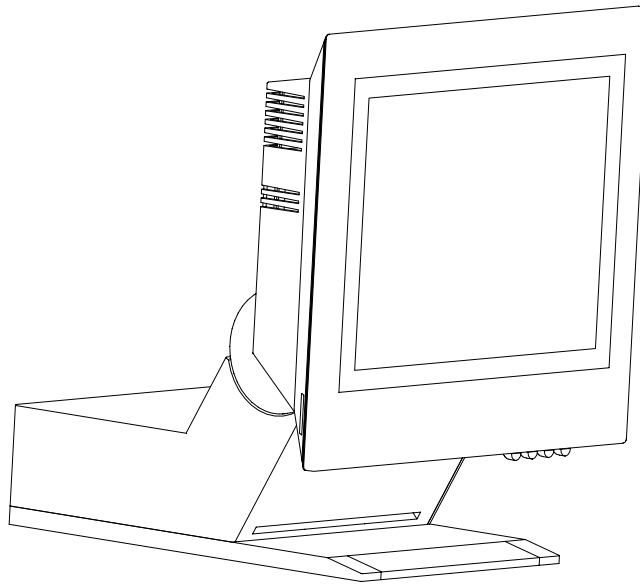
Figure 2. Free-standing mounting option

Countertop mounting options

There are two variations of the countertop mounting option. You can mount the free-standing base foot to the counter or you can use the countertop integration tray. If you are using a countertop integration tray, the base foot on the SurePOS 500/600 is replaced with an mounting bracket. The SurePOS 500/600 is then securely attached to the integration tray with two screws. Figure 3 shows a SurePOS 500/600 and an IBM 4610 SureMark printer mounted to a countertop integration tray.

Note: With the countertop integration tray option, the IBM 4610 SureMark printer must be mounted along with the SurePOS 500/600. The countertop integration tray option should not be used if you are not using the printer.
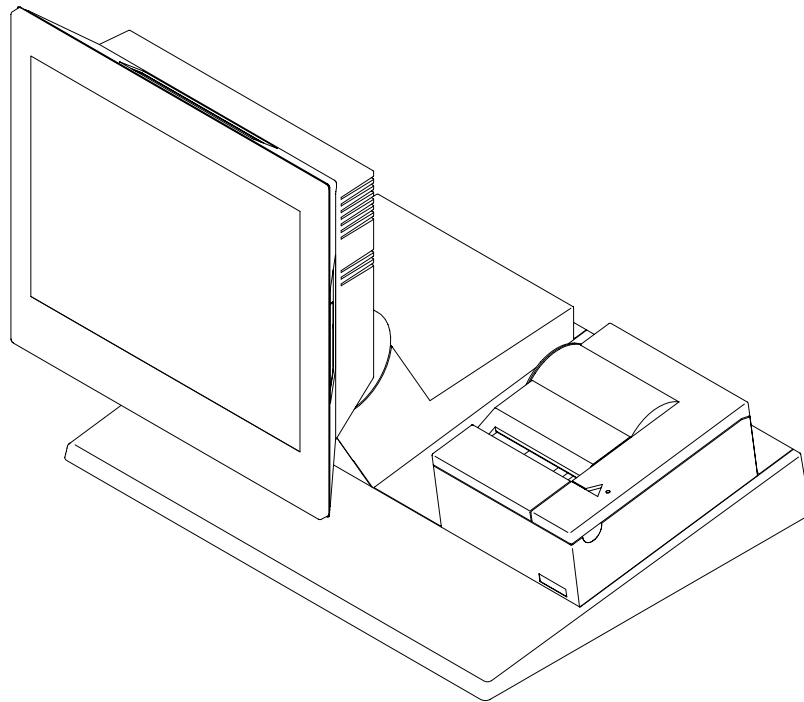
Figure 3. Countertop mounting option with integration tray

Figure 4 shows a SurePOS 500/600, a keyboard and a IBM 4610 SureMark printer mounted to a countertop keyboard-integration tray.
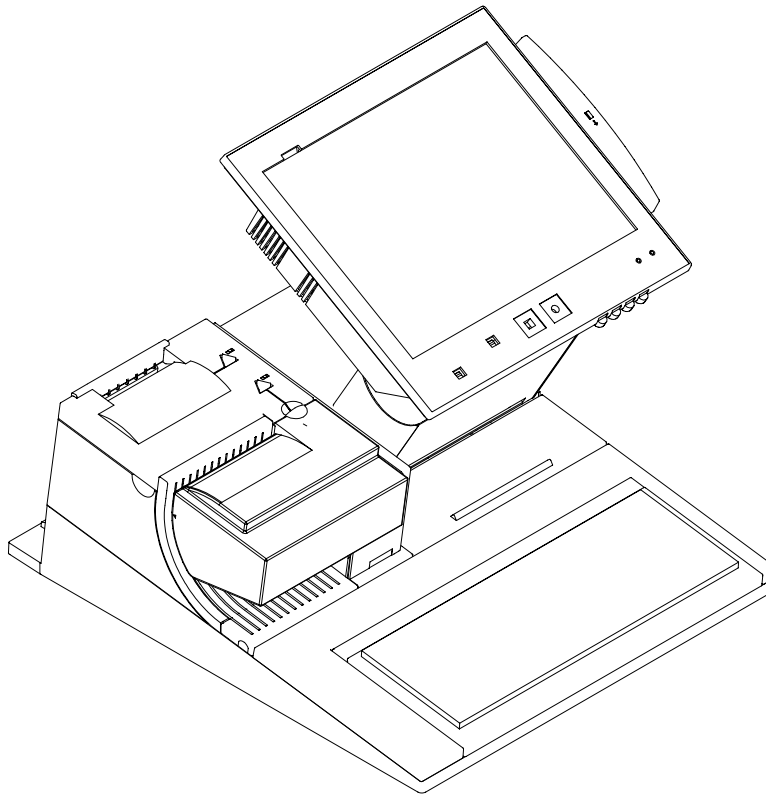
Figure 4. Countertop mounting option with keyboard integration tray

Cash-drawer mounting option
The SurePOS 500/600 cash drawer mounting option is similar to the countertop option, except that the system attaches to the cash drawer by means of an integration tray and the cash drawer can be secured to a counter top. Figure 5 shows the full-size cash-drawer mounting option.
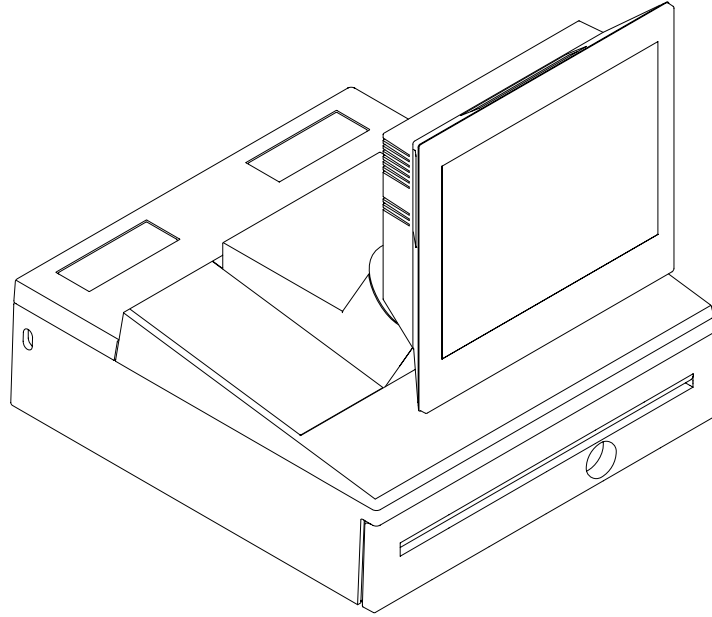
Figure 5. Cash-drawer mounting option

Figure 6 shows the full-size cash-drawer mounting option with keyboard-integration tray.
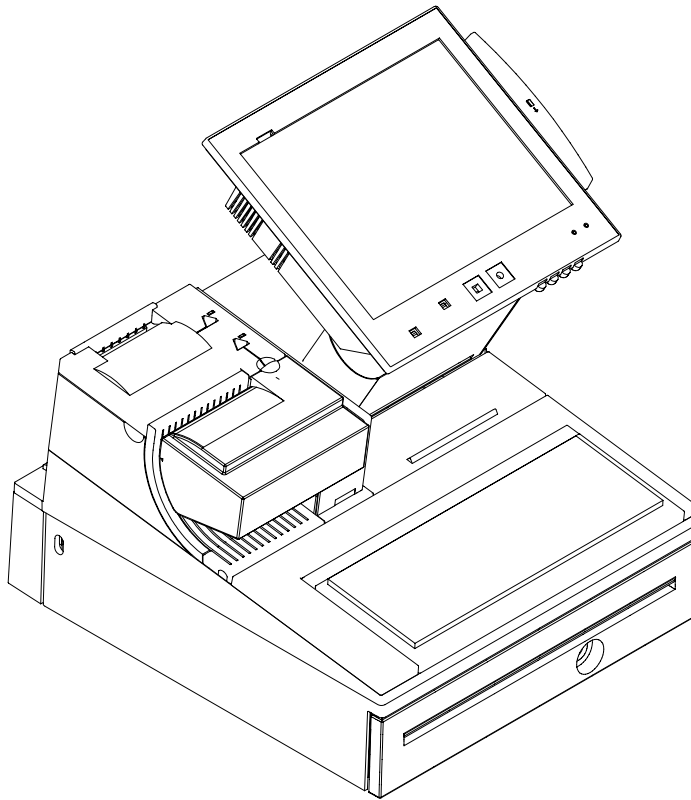
Figure 6. Full-size cash-drawer mounting option with keyboard-integration tray

Figure 7 shows the full-size cash-drawer mounting option with keyboard integration tray, integrated character display and 4820 SurePoint Solution display option.
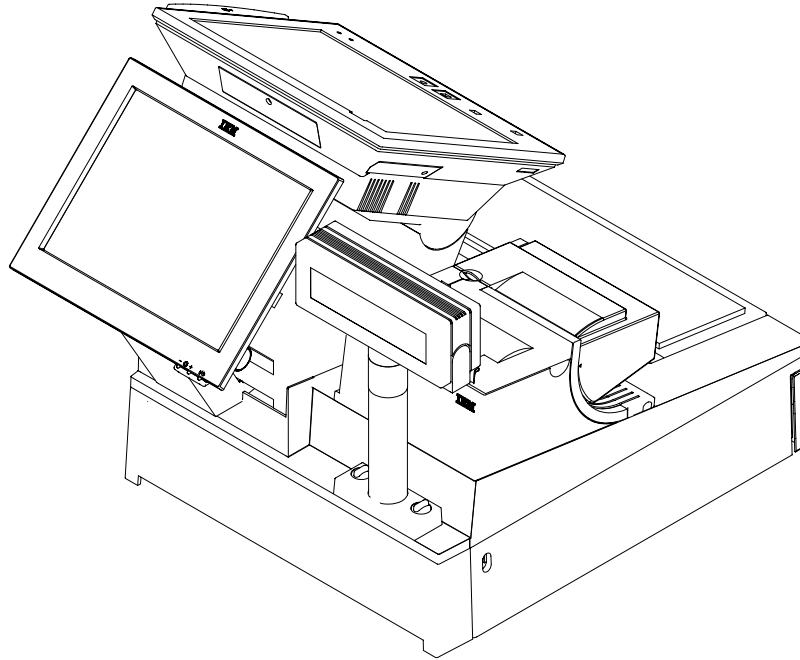
Figure 7. Cash-drawer mounting option with keyboard integration tray, integrated character display and 4820 SurePoint Solution display options

Figure 8 shows the compact-size cash-drawer with keyboard-integration tray mounting option.
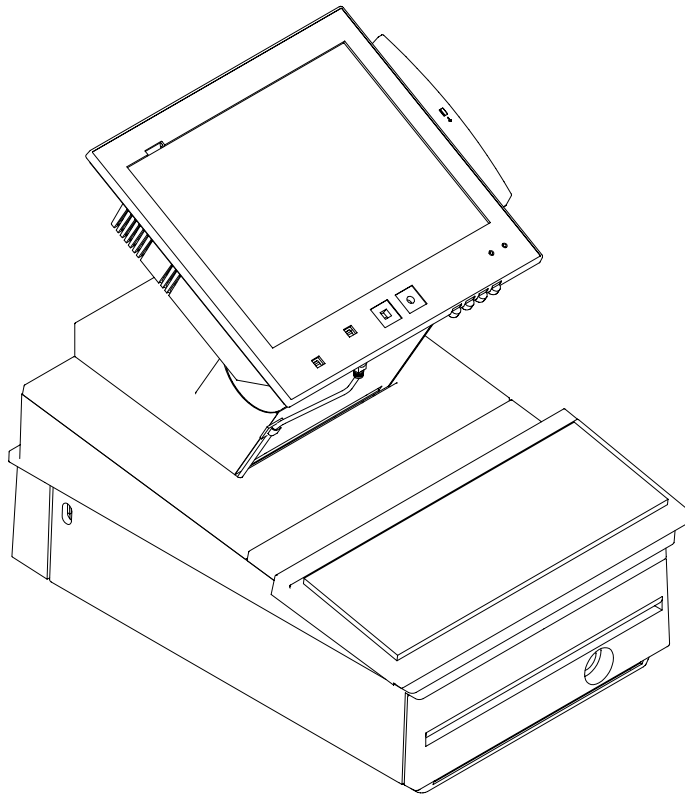
Figure 8. Compact-size cash-drawer with keyboard-integration tray mounting option

Wall-mounting feature

The following figure illustrates the SurePOS 500/600 with the Wall Mount feature.
The wall-mounting feature must be specified when ordering your SurePOS 500/600.
The wall-mounting feature is not available for models 611/61I and 621/62I, but is
available for all other SurePOS 500/600 .
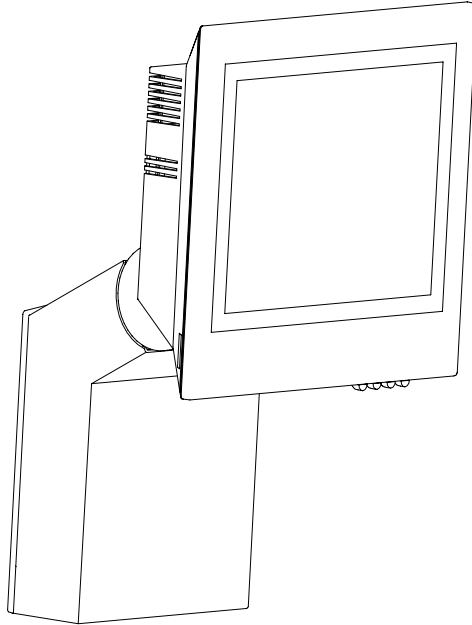
Figure 9. Wall-mounting option

System management

This section describes the types of system management available with the SurePOS 500/600.

System management programs

The SurePOS 500/600 supports the following system and power management programs:

Desktop Management Interface
The SurePOS 500 supports System Management BIOS (SMBIOS) 2.3, providing a DMI-compliant agent such as Tivoli®. 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.

LAN Client Control Manager
LAN Client Control Manager (LCCM) is a key component in IBM's Universal Management offering for POS systems running in a Windows-based environment.

Advanced Power Management
Advanced Power Management (APM) consists of several layers of software that allow the operating system, applications, and BIOS to work together to reduce power consumption.

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.

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

Power up (wake) on ring
This feature enables the system to turn on when it receives a ring from an external modem connected to a serial port. You can enable power up (wake) on ring by enabling **Power up on Ring** in the 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 **Power up on Daily Alarm** in the Setup Utility program.

Remote management

The SurePOS 500/600 supports remote system management over the network. The following functions are supported:

- Selectable start-up sequence
- Update POST/BIOS from the network
- Ethernet setup
- Power up (Wake on LAN)

Compatible products

The IBM SurePOS 500/600 Series models are most similar to the SureOne POS
workstations and are not compatible with any IBM food service POS workstation.
IBM designed the SurePOS 500/600 to operate with the many POS PC
applications. These applications are available in the marketplace through retail, mail
order, or independent dealers.

You can use the following products with the SurePOS 500/600:
- 4610 SureMark Single Station Thermal Printer (RS-232 models)
- 4610 SureMark Printer Model GB3
- 4820 SurePoint Solution Terminal
- IBM Kitchen System
- OEM USB devices
- OEM RS-232 printers
- OEM parallel printers
- CRT displays

Warranty Information

The following table shows the warranty information for the sixteen SurePOS 500/600 models.

Table 4. Warranty Information

Machine type	Warranty Service	Warranty service upgrade
4840–521	EasyServe Depot Repair	IOR 9 x 5, Next Business Day IOR 24 x 7, Same Day
4840–531	EasyServe Depot Repair	IOR 9 x 5, Next Business Day IOR 24 x 7, Same Day
4840–541	EasyServe Depot Repair	IOR 9 x 5, Next Business Day IOR 24 x 7, Same Day
4840–551	EasyServe Depot Repair	IOR 9 x 5, Next Business Day IOR 24 x 7, Same Day
4840–561	EasyServe Depot Repair	IOR 9 x 5, Next Business Day IOR 24 x 7, Same Day
4840–611	EasyServe Depot Repair	IOR 9 x 5, Next Business Day IOR 24 x 7, Same Day
4840–621	EasyServe Depot Repair	IOR 9 x 5, Next Business Day IOR 24 x 7, Same Day
4840–651	EasyServe Depot Repair	IOR 9 x 5, Next Business Day IOR 24 x 7, Same Day
4840–52I	IOR 24 x 7, Same Day	None
4840–53I	IOR 24 x 7, Same Day	None
4840–54I	IOR 24 x 7, Same Day	None
4840–55I	IOR 24 x 7, Same Day	None
4840–56I	IOR 24 x 7, Same Day	None
4840–61I	IOR 24 x 7, Same Day	None
4840–62I	IOR 24 x 7, Same Day	None
4840–65I	IOR 24 x 7, Same Day	None

Note: IOR 24x7 is IBM on-site repair 24 hours a day and seven days per week. 9x5 is nine hours per day for five days per week.

Chapter 2. System specifications

This chapter illustrates how I/O devices attach to the SurePOS 500/600 Series and contains information about the functional features of the system board.

System configuration diagram

Figure 10 shows a typical SurePOS 500/600 Series configuration and indicates how various I/O devices connect to the system.
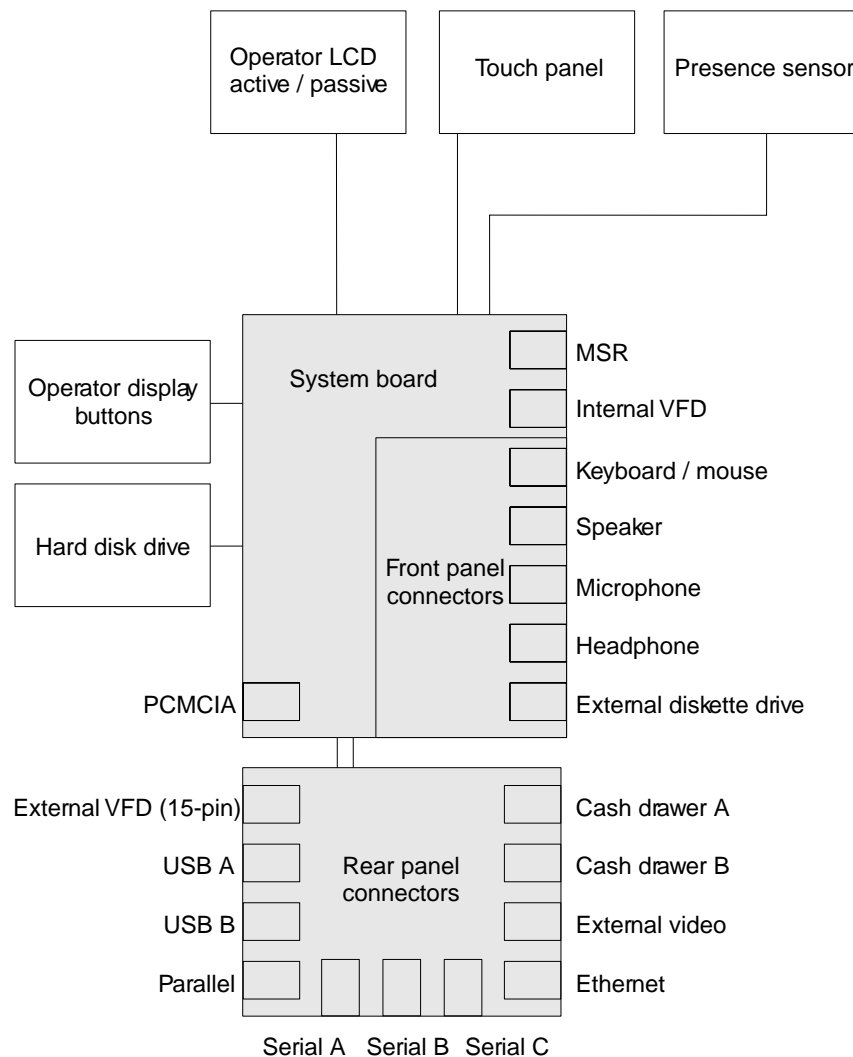
Figure 10. Model 561 system configuration diagram

Understanding the system board

This section contains information about the functional features of the system board. For details about the components on the system board, see "System-board features" on page 30.

All SurePOS 500/600 Series models contain an AMD K6-2 400-MHz processor. The system-board chip set consists of the Trident "CyberBlade" CBi7 and the Via VT82C686A logic chips, which support a 100 MHz bus to the processor.

The board has two DIMM sockets, which use 168-pin Synchronous DRAM PC100 memory. The board supports memory DIMMs ranging in size from 32 MB to 128 MB. You can install DIMMs in any combination. The default amount of memory installed varies by model; however, the maximum system memory is 256 MB.

To increase system performance, the system board has 512 KB of L2 cache. The chip set provides a PCI bus interface to both the Ethernet and PCMCIA controllers, and complies with the PCI 2.2 specification. The board provides an UltraDMA, 66, IDE interface for the hard-disk drive. USB support is built into the chip set and two standard USB ports are provided. The two USB ports enable you to directly attach either low speed or full speed USB devices. Full speeds is 12 Mbps. With the use of external USB hubs, up to 127 devices can be attached to a SurePOS 500/600.

Video subsystem

The SurePOS 500/600 Series system-board chip set provides a 2D/3D-capable video subsystem. The video subsystem uses a portion of the main system memory as video memory. The Setup Utility provided in the system BIOS enables you to select either 2 MB, 4 MB or 8 MB of video memory. The video subsystem supports dual frame buffer apertures for independent memory access for graphics and video. The video subsystem also provides dual monitor support, permitting entirely different data to display on the internal LCD and the external video port.

Touch sensing

The SurePOS 500/600 (Models 521, 531, 541, 561, and X51) ships with touch sensing capability. This capability uses a resistive technology touch system. The sensor is activated by touching, with a stylus or finger, the selected area on the display that indicates the desired function.

Presence sensor

The SurePOS 500/600 Series Model 561 comes with a presence sensor built into the cover of the operator LCD. It uses infrared technology to detect an object within a 6-degree cone in front of the display. It is used to wake up (resume) the system from Standby mode.

You can calibrate the sensor by changing the maximum detection range from approximately 2 feet to 5 feet (depending upon reflectivity of the sensed object). The sensor can detect objects as close as 12 inches.

Audio subsystem

The SurePOS 500/600 Series Models 561, 621, and X51 come with an audio subsystem. The subsystem provides high-quality stereo sound for multimedia and voice-capable applications. It provides jacks on the front connector panel to allow you to attach a headphone and a microphone. An optional, stereo speaker kit attaches to the bottom of the display for normal room listening.

| **Note:** You set the volume by using normal Windows™ multimedia controls together
| with a volume control on the speaker kit.

Serial ports

Six universal asynchronous receiver/transmitter (UART) serial ports are integrated
into the system board. Three serial ports are available for general use, and three
have dedicated functions (serial for MSR, serial for character display and serial for
the touch system).

The IBM character display (both integrated and distributed) and IBM cash drawers
share serial port D. If you do not use either type of I/O device, then serial port D is
available as a fourth standard serial port. Note that port D is a 15-pin connector,
whereas the other serial-port connectors have less pins. The 15-pin serial port
connector provides power as well as the nine serial port signals.

For the serial port 9-pin and 15-pin connector pin assignments, see "Serial
connectors" on page 71. Refer to the Serial Connector for specifications of the
power available on the 15-pin serial port.

If at least one IBM cash drawer is attached to the system, you **must** specify the
Cash Drawer setting in the Setup Utility as Enabled to allow the cash drawer to
function. The Disabled setting allows you to connect an OEM device to the display
port when a cash drawer is not present. If you use an IBM cash drawer, you can
only attach an IBM character display (internal or external) to serial port D.

Table 5 shows the default serial-port assignments in the configuration. See
"Appendix C. IRQ and DMA channel assignments" on page 83 for details about the
assignments.

Table 5. Default serial-port assignments

Port assignment	Address range (hex)	IRQ	Assignment
Serial A	03F8–03FF	4	User available
Serial B	02F8–02FF	3	User available
Serial C	Disabled	None	None
Serial D	02E8–02EF	11	character display (If not using character display and cash drawer, serial D is user available)
Serial E	03E8–03EF	10	MSR
Serial F	02E0–02E7	15	Touch

Parallel port

The system board contains integrated support for extended capabilities port (ECP), enhanced parallel port (EPP), and standard parallel port (SPP) modes. The modes of operation are selected with the Setup Utility program. The default setting is ECP. The ECP and EPP modes are compliant with IEEE 1284.

Table 6 shows the default parallel-port assignment used in the configuration.

Table 6. Default parallel-port assignment

Port Assignment	Address Range (hex)	IRQ
Parallel	0378–037F	7

The system board has one connector for the parallel port. For information about the connector pin assignments, see "Parallel connector" on page 73.

PS/2 keyboard and mouse ports

The system unit provides a keyboard port. A PS/2 mouse can be used with the use of a Y-cable.

For information on the connector-pin assignments, see "Keyboard and mouse connector" on page 70. Table 7 shows the default port assignment used in the configurations for keyboard and mouse.

Table 7. PS/2 keyboard/mouse port assignment

Port Assignment	Addresses	IRQ Level
PS/2 Keyboard	60 and 64	1
Mouse	60 and 64	12

Ethernet port

The SurePOS 500/600 Series has an integrated Ethernet subsystem, which consists of:

- AMD 79C973 Ethernet subsystem
- Remote Program Load (RPL) ROM (integrated into system flash)
- Serial EEPROM for storing data

The Ethernet subsystem:

- Operates in shared 10BASE-T or 100BASE-TX environment
- Transmits and receives data at 10 Mbps or 100 Mbps
- Has an RJ-45 connector for LAN attachment
- Supports power up (wake) on LAN using Magic Packet
- Supports RPL and Dynamic Host Configuration Protocol (DHCP)
- Stores register values, MAC address, and vital product data in serial EEPROM

The Ethernet connector on the rear connector panel has two LEDs, which indicate the following link status:

Left indicator   **On**: 100-Mbps line speed
                            Off: 10-Mbps line speed

Right indicator	**On**: Link established
	Off: Link broken

For information on the connector pin assignments, see "Ethernet connector" on page 74.

Real-time clock and CMOS

The real-time clock is a low-power clock that provides a time-of-day clock and a calendar. The clock settings are maintained by the battery when the power cord is removed. See Figure 17 on page 30 for the location of the battery.

Restoring the default CMOS settings

You can restore CMOS default settings while in Setup by pressing the F9 function key.

Clearing the CMOS settings

The SurePOS 500/600 uses 242 bytes of battery-backed complementary metal-oxide semiconductor (CMOS) memory to store system settings. If the CMOS memory becomes corrupted and the system does not boot, you can restore the factory default values by following these steps:

1. Loosen the captive screw **A** from memory cover **B** located on the back of the display, as shown in Figure 11 and slip the cover off the two alignment pins as described in *IBM SurePOS 500 Series Hardware Service Guide* in the topic "Memory module removal and installation."

2. Remove the memory module(s) **C** .

3. Locate the CMOS reset jumper (JP4) **D** on the system board near the memory modules.
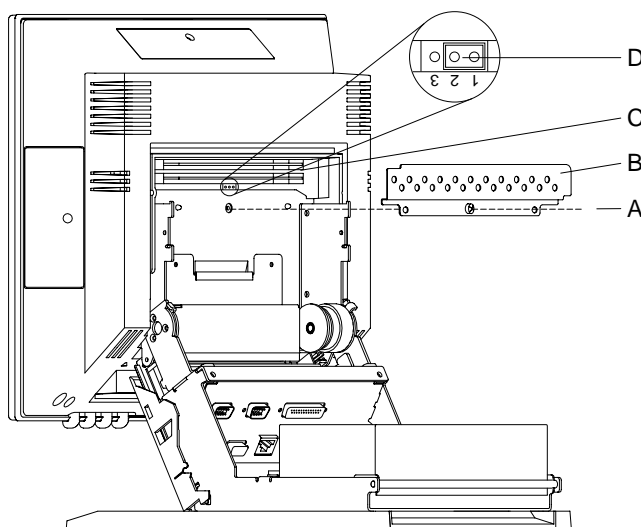
Figure 11. CMOS reset jumper JP4

4. Remove the jumper, which is normally located on pins 1 and 2.

5. Place the jumper on pins 2 and 3 and wait for 5 seconds. This resets the CMOS.

6. Return the jumper to pins 1 and 2.

7. Reinstall the memory module, memory cover and rear cover as described in the *IBM SurePOS 500 Series Hardware Service Guide.*

8. Switch power ON.

When you restart the system after resetting the CMOS, the following error
messages display:

```
0271: Check date and time setting
0251: System CMOS checksum bad
```

To correct these errors, run the Setup Utility. Reset the date, the time, and any
other settings that had been modified before the CMOS was reset. For additional
information about using the Setup Utility, refer to the *SurePOS 500/600 Series
Installation and Operation Guide.*

Basic I/O subsystem (BIOS)

The SurePOS 500/600 Series BIOS supports:

*   Hard-disk drive autotyping
*   Plug and Play V4.2
*   ATAPI Removable Media Support
*   RPL
*   DRAM autosizing
*   Flash BIOS backup
*   Extended System Configuration Data (ESCD)
*   POST/BIOS setup, pre-boot, and boot
*   SMBIOS 2.3
*   APM 1.2
*   Advanced Configuration and Power Interface (ACPI) 1.1

Flash

The system board contains a 1-MB flash electrically-erasable ROM (EEPROM) for
storing the POST/BIOS, video BIOS, IBM logo, Setup Utility, RPL code, and
Plug-and-Play data.

If BIOS becomes corrupted, it automatically runs from a backup copy of BIOS that
resides in the second half of the flash. Under the Setup Utility's DMI Event Logging
menu, you can view whether the system is using normal BIOS or backup BIOS.

To obtain the latest level of flash BIOS for the SurePOS 500/600 Series:

1. Insert a formatted diskette into the diskette drive of a PC *with Internet access.*
2. Access the IBM Retail Store Solutions Web site at:
    www.ibm.com/solutions/retail/store/.
3. Select **Support**.
4. Under Download, download the update program to a temporary location on the
    PC's hard-disk drive. Run the self-extracting program and respond to the
    messages that displays. This program writes the updates to the diskette.
5. After the program completes, switch OFF the power on the SurePOS 500/600
    Series. Insert the diskette into a drive attached to the system, then switch the
    system ON again. The system boots from the diskette, the flash BIOS update
    occurs, and the system powers OFF automatically.
6. Switch on the power. The system boots using the new BIOS update.

Note: The flash utility saves and restores your CMOS setting.

PC Card subsystem

Models Model 551, 561, 621, and Model 651 provide a PC Card subsystem that accepts a single Type 1 or Type 2, or PCMCIA. The subsystem allows you to use a wireless card on these models. An optional PCMCIA filler panel is available for use with wireless PCMCIA cards. For the location of the PCMCIA slot on the system board, see Figure 17 on page 30.

Note: RPL and power up (wake) on LAN or Ring are not supported for PCMCIA cards.

Cable connectors

Connectors for attaching external peripheral devices (except for the internal character display and the MSR) are located both under the front edge of the display and on the tailgate between the display and the base of the SurePOS 500/600 Series. The MSR connector is on the right side of the display under a filler panel. The internal character display connector is on the top of the display under a filler panel.

Front connectors
The front connectors are as follows:

- Keyboard (or mouse with Y-cable)
- Diskette drive
- Headphone (Models 561, 621, and X51 only)
- Microphone (Models 561, 621, and X51 only)
- Speaker kit (Models 561, 621, and X51 only)

Figure 12 shows the front connector panel.
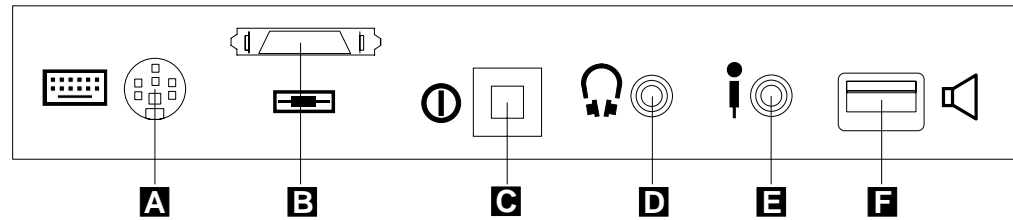
Figure 12. Front connector panel

A	Keyboard/mouse connector	**D**	Headphone connector (4840-561 only)
B	Diskette-drive connector	**E**	Microphone connector (4840-561 only)
C	Power switch	**F**	Speaker-kit connector (4840-561 only)

SurePOS 500/600 non-wall mount tailgate connector panel

The tailgate connectors are as follows:

- Serial (3)
- Parallel
- Cash drawer (2)
- 15-pin serial connector for a distributed character display or a 160x40 APA character display
- External video
- Ethernet
- USB (2)

Connectors on the tailgate for features integrated into the system board can be identified by a symbol directly above each connector. For connector pin assignments, see "Appendix A. Connector-pin assignments" on page 69.Figure 13 shows the rear connector panel.
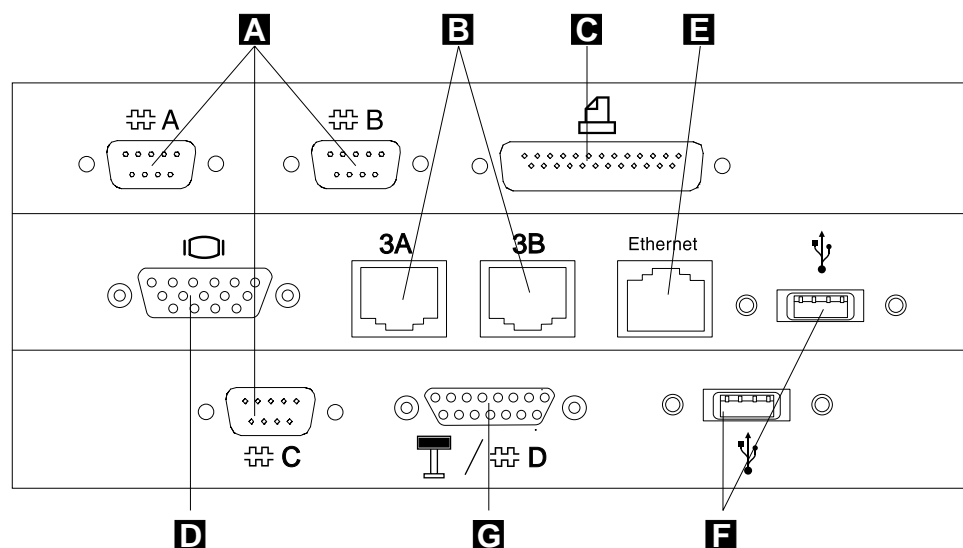
Figure 13. Tailgate connector panel on non-wall mount SurePOS 500/600

A	Serial connectors (3)	**E**	Ethernet connector

B	Cash drawer connectors (2)	**F**	USB connectors (2)
C	Parallel connector	**G**	15-pin serial connector for a distributed character display
D	External video connector		

SurePOS 500/600 with Wall Mount feature tailgate connector panel

Figure 14 shows the tailgate connector locations for the SurePOS 500/600 with Wall Mount feature.
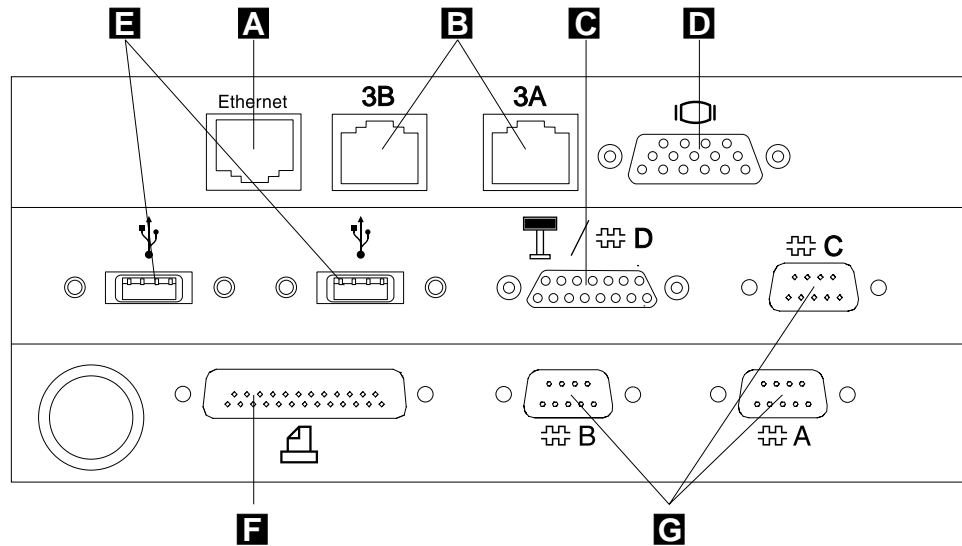
Figure 14. SurePOS 500/600 with Wall Mount feature tailgate connector panel

A	Ethernet connector	**E**	USB connectors (2)
B	Cash drawer connectors (2)	**F**	Parallel connector
C	15-pin serial connector for a distributed character display	**G**	Serial connectors (3)
D	External video connector		

Chapter 3. Physical specifications

This chapter provides the physical specifications for the SurePOS 500/600 Series models.

Device specifications

This topic lists the dimensions of the SurePOS 500/600 Series in the available mounting configurations and gives weights of the components. The specifications for countertop and cash drawer mounting are identical to those for the free-standing, except that neither option includes the foot. If you plan to integrate I/O devices with the system, integration trays are available for both the countertop or wall-mounting configurations. The dimensions of the trays are slightly different as shown in Table 8.

Table 8. Integration tray dimensions

	Width	**Depth**
Countertop tray	441.5 mm (17.54 in.)	340 mm (13.4 in.)
Cash-drawer tray	441.5 mm (17.54 in.)	474.6 mm (18.7 in.)
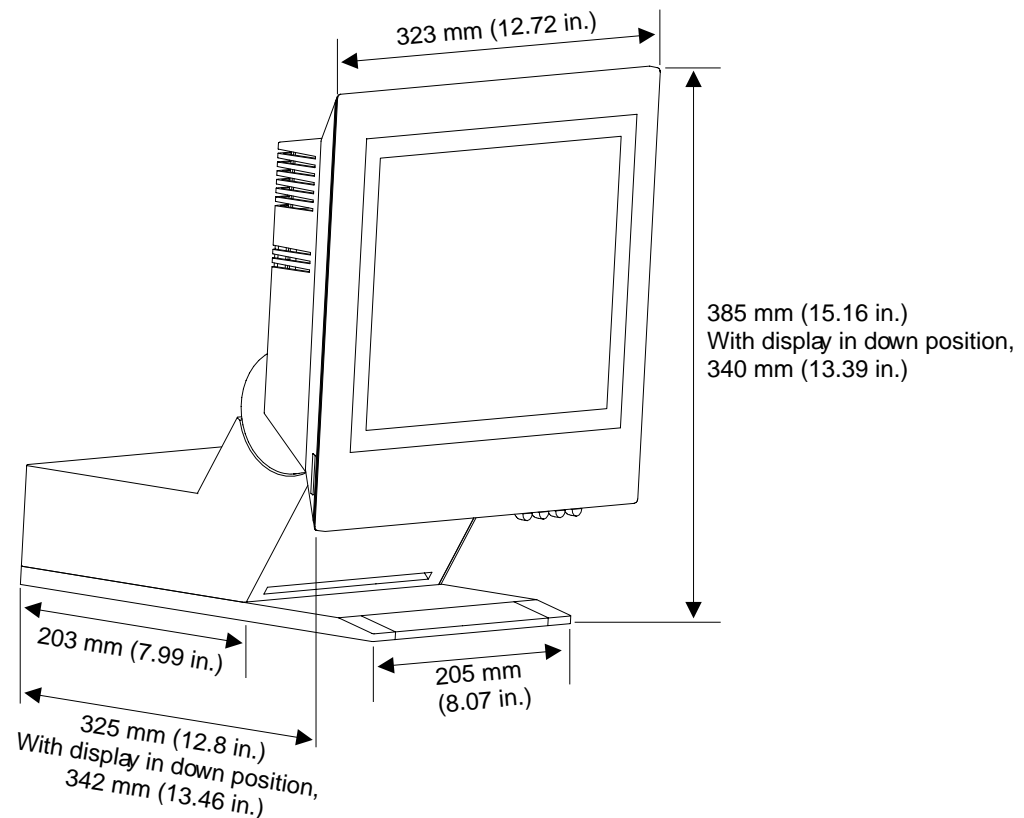
Figure 15. Free-standing configuration dimensions

With display in back position, 253 mm (9.96 in.)

233 mm (9.17 in.)

323 mm (12.72 in.)

516 mm (20.31 in.) with display in back position, 533 mm (20.98 in.)

253 mm (9.96 in.)

205 mm (8.07 in.)
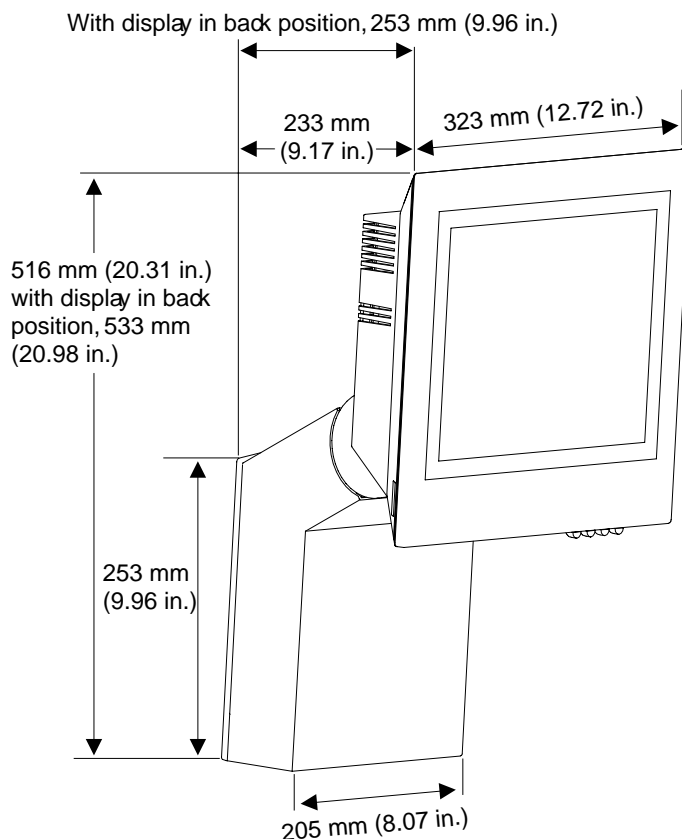
Figure 16. Wall mount configuration dimensions

Table 9. Weight

Description	Weight
System unit (without I/O)	9.50 kg (21 lb)
Integrated character display	0.21 kg (0.45 lb)
Distributed character display	0.55 kg (1.2 lb)
Distributed APA, character graphic display	0.73 kg (1.6 lb)
MSR (three-track or dual-sided single track)	0.16 kg (0.35 lb)
Stereo speaker kit	0.5 kg (1.1 lb)
IBM SpaceSaver II Keyboard	1.14 kg (2.5 lb)

Environmental requirements

The following sections identify the required operating conditions for the SurePOS 500/600 Series.

Elevation

The SurePOS 500/600 is designed to operate at elevations up to 3050 m (10 000 ft).

Air temperature and humidity

The temperature and humidity requirements are as follows:

Table 10. Air temperature and humidity

Condition	Temperature limits (dry bulb)	Relative humidity	Maximum wet bulb temperature
Operating (with HDD)	5°C to 40°C (41°F to 104°F)	8% to 80%	27°C (80.6°F)
Operating (no HDD)	0°C to 40°C (32°F to 104°)	8% to 80%	27°C (80.6°F)
Power off	0°C to 52°C (32°F to 125.6°F)	5% to 95%	27°C (80.6°F)
Storage	0°C to 60°C (32°F to 140°F)	5% to 80%	29°C (84.2°F)
Shipment	−40°C to 60°C (−40°F to 140°F)	5% to 100%	29°C (84.2°F)

Note: These requirements apply at sea level. The upper limit for dry-bulb temperature must be reduced 1°C for every 137 meters of elevation above 915 meters. The upper limit for wet bulb temperature must be reduced 1°C for every 274 meters of elevation above 305 meters.

Spill resistance

The SurePOS 500/600 is designed to be spill-resistant when mounted in normal configurations. It meets the following standards:

- NEMA Type 5 rating per NEMA Standards Publication/No. 250-1991 *Enclosures for Electrical Equipment* (National Electrical Manufacturers Association)
- IP 52 rating per IEC 529 (Degrees of Protection by enclosures (IP Code))

Acoustics and noise emission

The SurePOS 500/600 Series complies with the Category/Class 2C acoustics standard. Table 11 provides the declaration of noise-emission values for the product at the room temperatures noted. All measurements are made in accordance with International Standards Organization (ISO) DIS 7779 and reported in conformance with ISO DIS 7574/4.

Table 11. Noise-emission levels

Measurement	25°C (77°F)		27°C (80.6°F)		32°C (89.6°F)		40°C (104°F)	
	Oper	Idle	Oper	Idle	Oper	Idle	Oper	Idle
<LwA>ú	5.09 bels		5.16 bels		5.24 bels		5.54 bels	

Heat dissipation

The SurePOS 500/600 Series dissipates a maximum of 120 W (392 BTU/hr).

System-board features

This section shows the location and provides details of the system board components.

System-board layout

Figure 17 shows the layout of the components on the system board.
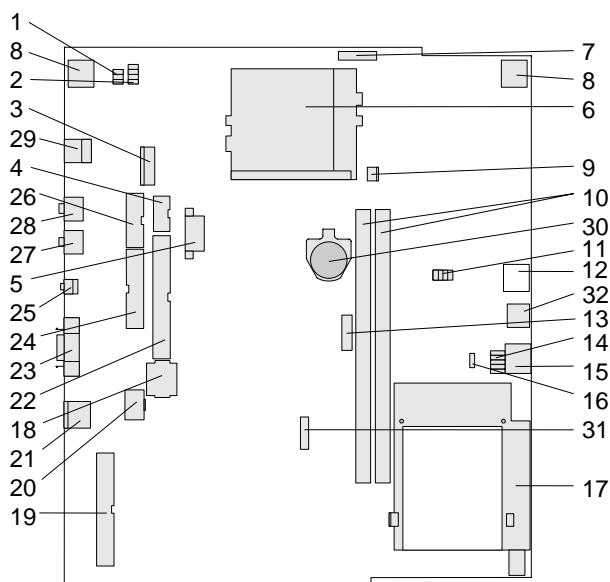
Figure 17. System board layout (front)

1	Processor ratio jumper (JP2)	**17**	PCMCIA socket (J9)
2	Core voltage jumper (JP3)	**18**	Internal (to daughter card) Ethernet port (J1)
3	HDD power connector (J6)	**19**	IDE connector (J14)
4	Serial port 3 connector (J13)	**20**	Universal Serial Bus connector (J15)
5	Main power connector (P1)	**21**	PS/2 keyboard/mouse connector (J2)
6	Socket 7 processor (S1)	**22**	1 Parallel - 2 Serial connector (J4)
7	MSR connector (J12)	**23**	Diskette-drive connector (J11)
8	LCD backlight connectors (P2, P3)	**24**	Tailgate card connector (J3)
9	Fan connector (J16)	**25**	Power switch (SW1)
10	DIMM sockets (J7, J8)	**26**	Distributed VFD or APA connector (J10)
11	Frequency set jumper (JP1)	**27**	Headphone jack (J21)
12	Integrated VFD connector (J18)	**28**	Microphone jack (J20)
13	Clear CMOS jumper (JP4)	**29**	Speaker kit connector (J22)
14	Touch panel jumpers (JP6-10)	**30**	Battery
15	Touch panel connector (J25)	**31**	LCD daughter-card connector (J5)
16	Microtouch EPROM memory select jumper (JP5)		

AMD K6-2 microprocessor

All SurePOS 500/600 Series models contain an AMD K6-2 400 MHz microprocessor. The microprocessor has an attached heat sink with a thermostatically-controlled fan and heat pipe to dissipate heat. The microprocessor provides the following features:

- Optimization for 32-bit software
- 64-bit microprocessor data bus
- 100 MHz front-side bus (FSB)
- Integrated AGP controller
- 512 Kb level 2 cache
- Concurrent PCI bus controller
- 256-Kb, full-speed advanced-transfer cache memory integrated into the microprocessor
  - Four-way set associative
  - Non-blocking
- 36-bit microprocessor address bus
- Math coprocessor
- MMX technology to improve the processing of graphic, video, and audio data

Chipset control

The North Bridge is a Trident CBi7 chip and the South Bridge is a Via VT82C686A. The chips are the interface between the microprocessor and the following components:

- Memory subsystem
- PCI buses
- IDE bus master connection
- USB ports (2)
- SMBus
- Enhanced DMA controller
- Real-time clock (RTC)
- Serial ports (6)
- Parallel port
- Ethernet
- Audio (microphone & headphone -Models 561, 621, and X51 only)
- Internal speaker
- Speaker kit
- Cash drawers (2)
- Video
- MSR port
- VFD customer-display port
- External diskette-drive port
- Keyboard/mouse

Memory subsystem

The system memory is controlled by the Trident chip. System memory is synchronous dynamic random access memory (SDRAM). The maximum amount of system memory is 256 MB (some system memory is used as video memory). For memory expansion, the system board provides two, dual, inline, memory module (DIMM) sockets. The system board supports DIMMs in sizes from 32 MB to 128 MB, and they can be installed in any combination. The amount of memory installed initially varies by model. The following information applies to system memory:

- The maximum height of memory modules is 35 mm (1.375 in.).
- Use only industry-standard, 168-pin, PC-100 DIMMs.

- The DIMM pin assignments comply with industry-standard, 168-pin, PC-100 SDRAM DIMMs.

IDE bus master interface
The system board incorporates a PCI-to-IDE interface that complies with the standard for *AT Attachment Interface with Extensions* standard.

The bus master for the IDE interface is integrated into the Via chip, which is compliant with PCI 2.2. It connects directly to the PCI bus and is designed to allow concurrent operations on the PCI bus and the IDE bus. The chip is capable of supporting PIO mode 0-4 devices, IDE DMA mode 0-4 devices, and ATA 66 transfers of up to 66 Mbps. The IDE devices receive their power through a four-position power cable containing +5 V Main, +12 V, and ground.

USB interface

Universal Serial Bus (USB) technology is a standard feature of the SurePOS 500/600 Series. The system board provides two USB ports. You can attach a USB device and if that device is a hub, you can attach multiple peripheral devices to the hub. The maximum speed of the USB on the SurePOS 500/600 Series is 12 Mbps, with a maximum of 127 peripheral devices. The USB complies with *Universal Host Controller Interface Guide 1.0*.

Features provided by USB technology include:
- Support for concurrent operation of multiple devices
- Suitability for different device speeds
- Support for cable length of up to 5 m (16 ft. 5 in) from host to hub or from hub to hub
- A wide range of packet sizes

For information on the connector-pin assignments for the USB interface, see "USB port connector (2)" on page 70.

Chapter 4. Power supply

This chapter provides information about the power supply and system management in the SurePOS 500/600 Series, the attached I/O devices, and device ports, where applicable. The system is powered by a 3-output voltage, universal-input switching power supply. Internal signals from the processor control on and off operation.

Power requirements and consumption

Table 12 identifies the power input requirements and consumption specifications for the SurePOS 500/600.

Table 12. Power requirements and consumption

Description	Specification/requirement
Power consumption (100 V)	Off: 3.5 W Suspend: N/A Standby: 23 watts On (idle): 45 watts On (maximum): 115 watts
Input voltage	100 ~ 240 V ac (nominal) 90 ~ 265 V ac (maximum) sinusoidal, trapezoidal, or square wave inputs
Input frequency	50 Hz ± 3 Hz or 60 Hz ± 3 Hz
Maximum kVA	0.15
ac input connector	IEC 320 Type C14
Leakage current	3.5 ma maximum (<0.25 ma at 100 V)
Inrush	< 50 A (peak, first cycle)
Power line harmonics (Power correction factor)	EN 61000-3-2

Power output

The SurePOS 500/600 contains an 84 W universal input, three-output, switching power supply. It provides the dc power outputs listed in Table 13, regulated by on-card components, with over-current protection on all outputs.

Table 13. Power outputs

Output	Nominal voltage (V)	Tolerance (%)	Maximum average current (A)	Minimum average current (A)	Ripple (peak-to-peak, mV)
+5 V Standby	5.00	+5 / -3.0	0.50	0.050	50
+5 V Main	5.00	+5 / -2.5	9.00	0.200	50
+12 V	12.00	+5 / -3.75	3.00	0.00	100

The +5 V Standby is available at all times and is used for power control. Signals from the processor control power on and off operation.

Chapter 5. System management

This section describes the system and power management options of the SurePOS 500/600 Series.

Desktop Management Interface

To help retailers better manage their POS equipment centrally, the SurePOS 500/600 Series supports the Desktop Management Interface (DMI) 2.0. DMI is an industry standard that allows you to manage the hardware more easily. DMI allows any DMI-compliant manager to exchange information with a managed system. The SurePOS 500/600 supports SMBIOS 2.3, providing a DMI-compliant agent, for example, Tivoli™, with access to low-level information, such as the BIOS level, processor type/speed/manufacturer, system board information, and detailed memory information. With DMI support in the SurePOS 500/600 Series, IBM provides POS equipment that can be managed more easily from a centralized location without requiring the participation of personnel in the store. Without DMI, the retailer would have to travel to each store and specifically check each system. With DMI, the retailer can check each system from a central site. For further information on DMI-support in the SurePOS 500 Series, along with the specific networking and system-management capabilities included in the SurePOS 500/600 Series, refer to the Retail Store Solutions Web site.

Note: Of the operating systems supported on the SurePOS 500 Series, DMI is supported only by Windows-based operating systems.

LAN Client Control Manager

LAN Client Control Manager (LCCM) is a key component in IBM's Universal Management offering for POS systems operating in a Windows-based environment. LCCM makes it easier to manage clients in a LAN by allowing remote and unattended client configuration, deployment, redeployment, and lower level tasks.

LCCM is made possible, in part, by the IBM/Intel Advanced Manageability Alliance (AMA) established in 1996. The AMA builds on industry-standard technology to create new, more effective solutions for customers, such as Wake on LAN and Alert on LAN. LCCM V2.5 incorporates support for DHCP and the Preboot eXecution Environment (PXE) defined in Intel's Wired for Management and the 1997 NetPC Guideline, as well as support for RPL boot protocol used by the industry since 1986. Support of the SurePOS 500 Series is included as maintenance for LCCM 2.5.1.

LCCM V2.5 offers a RapidRestore feature to virtually rebuild hard-disk drives in the case of software corruption without generating a network traffic burden. RapidRestore periodically backs up the operating environment to a hidden partition on the local drive. If data corruption occurs, the hidden partition is activated to become a fully restored operating environment. LCCM enables a network administrator to gain control of a computer over a network to perform tasks that would normally require someone to be physically present at the system. It significantly reduces the costs of deploying and maintaining IBM computers by reducing the number of visits to each machine.

This program can remotely identify a computer and gather vital product data, such as serial number, machine type model, system memory, hard-disk drive capacity,

and BIOS level. It can also remotely perform automated, unattended installation of Windows 98, Windows NT, and applications. LCCM can also remove or make data non-recoverable on a hard-disk drive using the Secure Data Disposal tool, protecting sensitive information if a drive is redeployed or retired.

LCCM allows you to:

*   Modify a selected system's CMOS settings (for example, change boot sequences, enable or disable onboard components, and restore passwords).
*   Update a selected system's BIOS (for example, use a newer or older level of BIOS for enterprise-wide consistency).
*   Power on computer systems by sending a Magic Packet to systems enabled for Wake on LAN®.

When combined with other robust management features of the SurePOS 500 Series such as Wake on LAN, LCCM greatly simplifies system deployment and configuration. Once the systems are plugged into a power source and a network and are remotely powered on, you can perform the remaining client system-setup tasks from a remote network console. Using LCCM, you can schedule a convenient time to power on the systems, flash their BIOS to ensure consistency across your organization, download the appropriate software image for each user, and then power down the systems.

Power-management options

SurePOS 500/600 supports both APM 1.2 and ACPI 1.1 power-management schemes. Table 14 lists the power management options:

Table 14. Power-management options

Option	Supported Power States
APM	Off, APM standby, APM enabled, Full on
ACPI	Global states: G0, G1, G2 Sleep states: S0, S1, S5

The SurePOS 500/600 supports the following power-on state changes based on events:

Table 15. Power-on state changes based on events

Event	Power up (wake)	Resume
Power button	Yes	Yes
LAN	Yes	Yes
Ring	Yes	Yes
Daily alarm	Yes	Yes
Touch	No	Yes
Presence	No	Yes
Keyboard/mouse (PS/2, USB)	No	Yes

While power is on, you can use the Setup Utility to configure the power button for the following modes:

*   Disabled: Button operation is ignored

- Enabled: Button operates like a hard power button, that is, toggles between G0 and G2
- Resume: Button operates like a resume button, that is, toggles between G0 and G1

Note: The power button always powers on the machine, regardless of these option settings.

Advanced Power Management

Advanced Power Management (APM) consists of several layers of software that allow the operating system, applications, and BIOS to work together to reduce power consumption. APM controls the power usage of the system based on system activity. If the system is inactive for an extended period of time, APM puts the system into a standby, or suspended, state. This feature can provide significant power savings during times of inactivity. The system can resume normal operation in a relatively short time. Normal operation can be restored by a Resume event, see Table 15 on page 36 for event information. The system also can be activated by pressing the power button, if enabled through the Setup Utility.

The SurePOS 500/600 features a presence sensor, which signals the system to resume operation upon detection of an object in front of the display. The SurePOS 500/600 includes APM BIOS V1.2 to allow an APM-aware operating system to put the system into one of the following states:

- Full on
- APM standby
- Off

Windows 98 Second Edition provides a power application on the desktop system tray that indicates whether the system is running from ac power. If the system has been inactive for a specified time, you also can select such actions as turning off the display or turning off the hard-disk drive.

Advanced Configuration and Power Interface

Advanced Configuration and Power Interface (ACPI) V1.0 defines a hardware and software interface and tables by means of which the operating system can alter the characteristics of the hardware-specific devices. The ACPI hardware interface provides the following functions to the operating system:

SCI   Control and detection of system control events, using a normal system control interrupt (SCI) instead of a system management interrupt (SMI).

Control of the system's power state
> The details of the platform's support for the hardware interface are provided in a table within the system BIOS. ACPI is replacing APM as the preferred power-management interface because it defines an environment that allows the operating system to manage power consumption completely. The operating system must be ACPI-aware for ACPI to function. The latest versions of Windows 98 Second Edition and Windows 2000 are ACPI-aware.

Power up (Wake) on LAN
> Power up on LAN instructs a SurePOS 500/600 that is in a powered-off state to power up (wake up) when a specified LAN event occurs. With this feature, software updates and other systems management functions can be performed on a powered-off or unattended SurePOS 500/600, or one that is in standby mode. Power up on LAN is enabled through the Setup Utility.

Power up (wake) on Ring

>   This feature enables the system to power up or resume from standby if a
>   modem ring is detected on one of the serial ports. Power up on Ring is
>   enabled through the Setup Utility.

Power up (wake) on Daily Alarm

>   This event lets you configure the system to power up at a specified time of
>   day. Power up on Daily Alarm is enabled through the Setup Utility.

By using any of these events, you can save on utility bills and maintenance costs
by putting the SurePOS 500/600 into a powered-off state or into suspend mode at
night, while still retaining the ability to manage the system from a central site.

Chapter 6. System diagnostics and troubleshooting

This section describes the Service Diskette and the use of the CMOS reset jumper.

Using the Service Diskette

The SurePOS 500/600 Series Service Diskette is a DOS-bootable diskette. It provides menu-driven tests and utilities that enable trained service technicians to configure and test the SurePOS 500/600 Series and I/O devices. The diskette is available for downloading from the IBM Retail Store Solutions Web site as follows:

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

2. Select **Support**.

3. Under SurePOS Systems and Peripherals, select IBM SurePOS 500/600 Series.

4. Under Downloads, select SurePOS 500 Service Diskette.

To rebuild diskettes from image files, download the EXE file, insert a diskette in drive A and run the EXE file. When you boot the Service Diskette, a main menu appears. All selections are available from this menu.

When you boot the SurePOS 500/600 Series with the Service Diskette, a main menu is displayed that includes sub-menus. The sub-menus display selection menus for Utilities, POS Device Test and System Components Tests.

Note: Using the Service Diskette requires a diskette drive on the system. If the system does not have a diskette drive, the service technician must use a field replaceable unit (FRU) diskette drive to run the diskette-based diagnostics.

For IBM 4840 models that do not have the optional external diskette drive (FDD) installed (Feature 7900) and it is necessary to flash the BIOS or use the Service Diskette, service personnel must use an external diskette drive plus attachment cable.

The external diskette drive kit released as a tool for the IBM 4695 (P/N 25H2722) can be used to service the IBM 4840. The external diskette drive kit consists of the diskette drive P/N 10H4056 and attachment cable P/N 74H0219; however, the attachment cable provided with the kit is not compatible with the IBM 4840 external drive interface connector.

A separate FDD attachment cable, P/N 05K2844, must be used with the external diskette drive, P/N 10H4056, when attaching the drive to the IBM 4840.

Another option is to order the Field Replaceable Unit for the IBM 4840 external diskette drive, Feature 7900 (Floppy Kit) P/N 15K2023, which includes a diskette drive and attachment cable.

Following replacement of the IBM 4840 System Board, the Setup Utility must be run to configure the CMOS RAM. To run the Setup Utility, an externally attached keyboard is required. A keyboard may not be part of the customer configuration and

must be provided by service personnel. Any PS/2 type keyboard may be used, for example, P/N 02K0806, and IBM spacesaver keyboard P/N 37L0888.

For baud rate settings, go to "Peripheral default baud rates" on page 67.

CMOS reset jumper

Before replacing the system board in an effort to correct an unresolved problem, have a service representative reset the CMOS settings. See the "CMOS Reset Jumper" topic in the *IBM SurePOS 500 Series Hardware Service Guide*.

POST error codes

POST error messages display during startup if POST detects problems with the hardware or a change in the hardware configuration. POST error messages are 3-, 4-, 5-, 8-, or 12-character alphanumeric messages. Table 16 lists the error codes, the cause, and the recommended action.

Table 16. POST error codes

Code	Condition	Action
01*xx*	System errors.	Replace the system board.
02*xx*	Extended errors.	
0200	Hard disk drive failure.	1. Replace the hard disk drive. 2. Replace the system board.
0210	Key is stuck.	1. Remove any objects lying on the keyboard. 2. Replace the keyboard.
0211	Keyboard error.	1. Replace the keyboard. 2. Replace the system board.
0212	Keyboard controller failed.	Replace the system board.
0220	Monitor type does not match CMOS - run Setup Utility.	Run Setup Utility.
0230	System RAM failed at offset *xxxx*.	1. Replace memory. 2. Replace the system board.
0231	Shadow RAM failed at offset *xxxx*.	1. Replace memory. 2. Replace the system board.
0232	Extended RAM failed at address line: *xxxxxxxx*.	1. Replace memory. 2. Replace the system board.
0250	System battery is dead.	1. Replace the battery and run Setup Utility. 2. Replace the system board.

Table 16. POST error codes (continued)

Code	Condition	Action
0251	System CMOS checksum failed - default configuration used.	Run Setup Utility.
0260	System timer error.	Replace the system board.
0270	Real-time clock error.	1. Run Setup Utility. 2. Replace the battery. 3. Replace the system board.
0271	Check date and time settings.	1. Run Setup Utility. 2. Replace the battery. 3. Replace the system board.
0280	Previous boot incomplete - default configuration used.	Run Setup Utility.
02A0	Coprocessor error.	1. Replace the processor. 2. Replace the system board.
02B0	Diskette drive error.	1. Replug cable. 2. Check for bad diskette. 3. Replace the diskette drive. 4. Replace the system board.
02B2	Incorrect diskette drive type - run Setup Utility.	1. Use correct IBM Diskette drive. 2. Run Setup Utility.
02D0	System cache error - cache disabled.	1. Replace the processor. 2. Replace the system board.
02E0	I/O error.	Replace the system board.
02F5	DMA test failed.	Replace the system board.
02F6	Software NMI failed.	1. Power OFF and then ON. 2. Replace the system board.
02F7	Fail-safe timer NMI failed.	Replace the system board.
04xx	PnP ISA errors.	1. Run Setup utility. 2. Replace the system board.
05xx	PCI errors.	1. Run Setup Utility. 2. Replace the system board.

Table 16. POST error codes (continued)

Code	Condition	Action
06xx	Motherboard Configurable Devices (MCD) errors.	
0611	IDE configuration changed.	Run Setup Utility.
0612	IDE configuration error - device disabled.	1. Run Setup Utility. 2. Replace the hard disk drive. 3. Replace the system board.
0613	Serial port A configuration changed.	Run Setup Utility.
0614	Serial port A configuration error - device disabled.	1. Run Setup Utility. 2. Replace the system board.
0615	Serial port B configuration changed.	Run Setup Utility.
0616	Serial port B configuration error - device disabled.	1. Run Setup Utility. 2. Replace the system board.
0617	Diskette drive configuration changed.	Run Setup Utility.
0618	Diskette drive configuration error - device disabled.	1. Run Setup Utility. 2. Replace the system board.
0619	Parallel port configuration changed.	Run Setup Utility.
061A	Parallel port configuration error - device disabled.	1. Run Setup Utility. 2. Replace the system board.
07xx	USB errors.	Run Setup Utility.
8100	Memory decreased in size.	Run Setup Utility.

POST beep codes

A beep code is a series of tones in sets of two or three that sound if a POST error occurs. The beep pattern represents numeric values and provides further information about the location of a potential problem. Table 17 lists the error codes, the cause, and the recommended action.

Table 17. POST beep codes

Code	Description	Action
1-3-1-1	DRAM refresh failed.	1. Remove and reinstall the DIMM. 2. Switch the DIMM to another socket. 3. Replace the DIMM. 4. Replace the system board.
1-3-1-3	Keyboard controller failed	1. Try another PS/2 keyboard that is known to be good. 2. Replace the system board.
1-3-3-1	Autosize DRAM failed	1. Remove and reinstall the DIMM. 2. Switch the DIMM to another socket. 3. Replace the DIMM. 4. Replace the system board.
1-3-4-1	RAM failed on address line *xxxx*	1. Remove and reinstall the DIMM. 2. Switch the DIMM to another socket. 3. Replace the DIMM. 4. Replace the system board.
1-3-4-3	RAM failed on data bits *xxxx* of low byte of memory bus	1. Remove and reinstall the DIMM. 2. Switch the DIMM to another socket. 3. Replace the DIMM. 4. Replace the system board.
2-2-3-1	Unexpected interrupts	1. Remove any installed PC card. 2. Replace the system board.
1 long, 2 short beeps	Adapter ROM, or BIOS primary and secondary checksum failed	1. Remove any installed PC card. 2. Replace the system board.
2 short beeps before boot	POST did not complete successfully	See "POST error codes" on page 40 for the error that is displayed and the action that should be taken.
1 long, then 1 short beep and system powers off	System processor is over temperature	1. Check the power supply fan and the processor fan to ensure that they are operating. 2. Check the processor heat sink to make sure that it is installed correctly with wired clamp and contains a thermal pad between thee processor and the heat sink. 3. Replace processor. 4. Replace the system board.
1 short beep before boot	POST was successful	No action required.

Chapter 7. Input/output devices and commands

This section describes the input/output (I/O) devices that can attach to the SurePOS 500/600 Series models. Most models allow RS-232 connectivity. Some devices have unique connectors, such as some keyboards and cash drawers. For example, the USB I/O devices provide unique connectors that can be hot-plugged.

This section also lists the I/O commands and describes how the SurePOS 500/600 Series devices use these commands.

Types of I/O devices

You can attach the following IBM point-of-sale I/O devices to the SurePOS 500/600 Series:

- Integrated character display
- Distributed character display
- APA-character graphic display
- Three-track magnetic stripe reader (MSR)
- Dual sided single track MSR
- Cash drawer
- Speaker kit, microphone, headphone (4840-561 only)
- Diskette drive
- PCMCIA card (type 1 or 2 - 4840-561 only)
- External CRT or flat-panel video display (analog interface)
- IBM Space Saver II keyboard

You can also attach the following non-IBM devices to the SurePOS 500/600 Series:

- Standard PC keyboard
- Standard USB device (such as a mouse)
- Standard RS-232 device
- Parallel printer
- Scanner
- Backpack CD-ROM (parallel port-attached)
- External CRT or flat-panel video display (analog interface)

Table 18 shows the number of external ports for all SurePOS 500/600 Series models.

Table 18. External port summary

Function/feature	Number of ports
Serial (RS-232) Interface (9-pin D-shell)	3
Keyboard/mouse	1
Speaker kit	1 (Models 561, 621, and X51 only)
Microphone	1 (Models 561, 621, and X51 only)

Table 18. External port summary (continued)

Function/feature	Number of ports
Headphone	1 (Models 561, 621, and X51 only)
Parallel (25-pin D-shell)	1
Video display	1
PCMCIA card slot	1 (Models 561, 621, and X51 only)
Distributed character display (15-pin)	1
MSR	1
24-volt cash drawer	2
Type A USB	2
External diskette drive	1
10/100-Mbps Base T Ethernet	1

Character display

The SurePOS 500/600 Series supports the following distributed character displays:

- Integrated character display (2x20 VFD)
- Distributed character display (2x20 VFD)
- APA-character graphic display (160x40 APA VFD)

These displays have resident character sets that support various code pages and all have the ability to store additional user-defined characters. Table 19 shows the default character-display port assignment.

Table 19. Default character-cash drawer display port assignment

Port assignment	Address range (hex)	IRQ
Character display	02E8–02EF	11

Note: You can configure this information using the Setup Utility.

The VFD default baud rate is 9 600 bps, 8 data bits, no parity bit, and 1 stop bit (9600–8–N-1).

External video display

The SurePOS 500/600 Series supports both IBM and original equipment manufacturer (OEM) displays. You connect the external video display at the video port on the rear connector panel.

Cash drawer

The SurePOS 500/600 Series supports two IBM cash drawers: either standard or compact, and either fixed till or adjustable till. It has two, 24-volt, cash-drawer connectors on the rear (tailgate) connector panel; each connector is able to accommodate a cash drawer. Table 19 shows the default cash drawer port assignments.

An interface on the system board detects the attachment of an IBM cash drawer to the system.

Hard-disk drive

The SurePOS 500/600 provides a standard, 3.5-in. IDE, hard-disk drive.

Diskette drive

The SurePOS 500/600 supports the IBM 1.44-MB, 3.5-in. diskette drive. The front connector panel provides a receptacle for connecting the drive. Table 20 shows the diskette-drive port assignment.

Table 20. Default diskette drive port assignment

Port Assignment	Address (hex)	IRQ
Diskette drive	03F0–3F5, 3F7	6

Magnetic stripe reader (MSR)

The SurePOS 500/600 supports the following MSR devices:

- 3-Track MSR (RS-232 or keyboard interface)
- Dual sided single track MSR (RS-232 interface only)

One 10-pin connector is provided on the system board for MSR support. For information about the connector pin assignments, see "MSR connector" on page 69. Table 21 shows the default MSR port assignment.

Table 21. Default MSR port assignment

Port assignment	Address range (hex)	IRQ
MSR	03E8–03EF	10

Notes:

1. You can configure this information using the Setup Utility.
2. Setup not required if using keyboard interface.

Note: You can configure this information using the Setup Utility.

PCMCIA card

Models 561, 621, and X51 provide a system board containing an integrated PC Card subsystem, and contain a socket for a single Type 1 PCMCIA card.

The subsystem enables you to use a wireless interface on the SurePOS 500/600 Series. You can use the Setup Utility to enable or disable the subsystem. For the location of the PCMCIA socket on the system board, see Figure 17 on page 30.

IBM Space Saver II Keyboard

The system unit provides a keyboard port to which the IBM Space Saver II keyboard attaches. A PS/2 mouse can be used with the use of a Y-cable.

For information on the connector-pin assignments, see "Keyboard and mouse connector" on page 70. Table 22 shows the default port assignment used in the configurations for keyboard and mouse.

Table 22. Default Space Saver II keyboard port assignment

Port Assignment	Addresses	IRQ Level
Space Saver II keyboard	60 and 64	1

Table 22. Default Space Saver II keyboard port assignment (continued)

Port Assignment	Addresses	IRQ Level
Mouse	60 and 64	12

Input/output device commands

This section lists the commands and their usage for the SurePOS 500/600 Series I/O devices.

Character display (VFD) commands

The Integrated character display and distributed character display use the same command sets.

This section describes the following character display commands:
- Emulation mode select
- Character set select
- User character definition
- Brightness control
- Alphanumeric message scroll
- Backspace
- Horizontal tab
- Line feed
- Carriage return
- Test
- Display position
- Normal display
- Vertical scroll
- Cursor on
- Cursor off
- Reset
- Null

Note: The command code format shown in the following topics consists of the hex value followed by the ASCII representation of that value within brackets.

Emulation mode select (00) <NULL>

00 *nn*

Purpose:
>   Sets the specified emulation mode.
>
>   **00**   Logic Controls Emulation Mode (default)
>
>   **01**   IBM mode

Example:
>   This example sets Logic Controls emulation mode:
>   00 00

Character set select (02) <STX>

Note: This command is effective only in IBM Mode.

02 *nn*

Purpose:

Selects the specified character set.

00   Modified IBM code page 437 (US/European, power-on default)

01   Modified IBM code page 897 (Katakana)

02   Modified IBM code page 858 (Multilingual International)

03   Modified IBM code page 852 (Central Europe)

04   Modified IBM code page 855 (Cyrillic)

05   Modified IBM code page 857 (Turkey)

06   Modified IBM code page 862 (Israel)

07   Modified IBM code page 863 (Canadian French)

08   Modified IBM code page 864 (Arabic)

09   Modified IBM code page 865 (Nordic)

0A   Modified IBM code page 808 (Cyrillic - Russia)

0B   Modified IBM code page 869 (Greece)

Example:

This example selects the US/European character set:

    02 00

User character definition (03) <EXT>

03	*nn*

Purpose:

Defines a custom character.

Logic Controls Emulation Mode

The byte that follows the command byte contains an ASCII character between X'20' and X'7F' of a keyboard key to be redefined. This byte is followed by five bytes defining the bit patterns of the user-defined character. Logic Controls Emulation Mode allows only one keyboard key to be redefined. This means that there is only one user-definable character in this mode. Once a key is redefined, any occurrence of that character on the display will change to the user-defined character. If a new key is redefined, the previously redefined key is restored to the original character in all places on the display and the newly redefined key is changed to the user-definable character. Table 23 on page 52 shows the format of these five bytes.

Note: A hyphen character in the table indicates a do-not-care bit. The other values relate to the character pixel positions shown in the diagram following the table. A value of 1 in the appropriate place in the data stream indicates that the related pixel position is ON; a 0 indicates that it is OFF.

Table 23. User character definition: Logic Controls Emulation Mode

Byte #	Bit							
	0	1	2	3	4	5	6	7
1	P8	P7	P6	P5	P4	P3	P2	P1
2	P16	P15	P14	P13	P12	P11	P10	P9
3	P24	P23	P22	P21	P20	P19	P18	P17
4	P32	P31	P30	P29	P28	P27	P26	P25
5	-	-	-	-	-	P35	P34	P33

* These character definitions are maintained for application compatibility with displays with 5x8 character boxes.

```
←— —5 pixels wide – – – –→
P1    P2    P3    P4    P5   ↑
P6    P7    P8    P9    P10  |
P11   P12   P13   P14   P15  |
P16   P17   P18   P19   P20  7 pixels high
P21   P22   P23   P24   P25  |
P26   P27   P28   P29   P30  |
P31   P32   P33   P34   P35  ↓
```
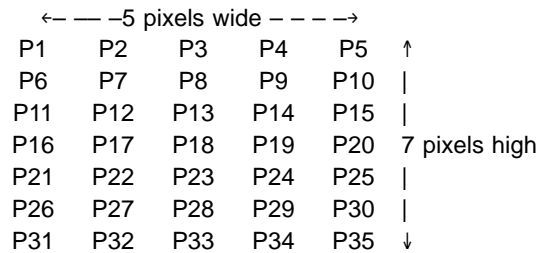
IBM Mode

IBM Mode allows nine user defined characters to be defined. See Table 24 for defined characters:

Table 24. User character definition: IBM Mode

1. X'15'	6. X'1A'
2. X'16'	7. X'1C'
3. X'17'	8. X'1D'
4. X'18'	9. X'1E'
5. X'19'	

The byte that follows the command byte represents an address between X'15' and X'1A', or between X'1C' and X'1E' in the currently selected character set. This byte is followed by eight bytes, which define the actual bit patterns of the user-defined character. Table 25 on page 53 shows the format of these eight bytes.

Note: A hyphen character in the table indicates a do-not-care bit. The other values relate to the character pixel positions shown in the diagram following the table. A value of 1 in the appropriate place in the data stream indicates that the related pixel position is ON; a 0 indicates that it is OFF.

Table 25. User character definition: IBM emulation mode

Byte #	Bit							
	0	1	2	3	4	5	6	7
1	-	-	-	P1	P2	P3	P4	P5
2	-	-	-	P6	P7	P8	P9	P10
3	-	-	-	P11	P12	P13	P14	P15
4	-	-	-	P16	P17	P18	P19	P20
5	-	-	-	P21	P22	P23	P24	P25
6	-	-	-	P26	P27	P28	P29	P30
7	-	-	-	P31	P32	P33	P34	P35
8*	-	-	-	-	-	-	-	-

* These user character definitions are maintained for application compatibility with displays with 5x8 character boxes.

```
←– – – –5 pixels wide – – – –→
P1    P2    P3    P4    P5   ↑
P6    P7    P8    P9    P10  |
P11   P12   P13   P14   P15  |
P16   P17   P18   P19   P20  7 pixels high
P21   P22   P23   P24   P25  |
P26   P27   P28   P29   P30  |
P31   P32   P33   P34   P35  ↓
```

Brightness control (04) <EOT>

04	*nn*

Purpose:

Specifies a brightness setting for the display, in a percentage. The power-on default is 100%.

X'FF'	100%
X'60'	60%
X'40'	40%
X'20'	20%

Alphanumeric message scroll (05) <ENG>

05	*xxx...*

Purpose:

Specifies a message of up to 45 characters to continuously scroll across the top line of the display. (Any text on the bottom line does not change.) Data received after the 45th character are ignored except for a carriage return (X'0D'). The message starts to display when the carriage return command is received. If the cursor position is on the top line when this command is received, it is moved to the first position on the bottom line. If it is on the bottom line, its position does not change. Data continues scrolling on the top line until a valid character (backspace, horizontal tab, line feed,

carriage return, or display position command is written to the top line. The test and reset commands stop the scrolling message regardless of the display position.

Backspace (08) <BS>

08

Purpose:

Decrements the cursor position by one and clears any character displayed in that position. If the write position is at the lower left, the position is moved to the upper right, and if it is at the upper left, it is moved to the lower right. This commands stops the scrolling alphanumeric message if the cursor position is on the top line when this command is sent.

Horizontal tab (09) <HT>

09

Purpose:

Increments the cursor position by one. No characters are erased. This command stops the scrolling message if the cursor position is on the top line when the command is sent. At the end of a line, the display behavior is determined by the state of the display control mode as follows:

Normal Display Control Mode (DC1)

If the cursor is at the upper right position, it is moved to the lower left position. If the cursor is at the lower right position, it is moved to the upper left position.

Vertical Scroll Display Control Mode (DC2)

If the cursor is at the upper right position, it is moved to the lower left position. If the cursor is at the lower right position, the characters displayed on the bottom line are moved to the top line, the bottom line is cleared, and the cursor is moved to the lower left position.

Line feed (0A) <LF>

0A

Purpose:

The display behavior is determined by the state of the display control mode as follows:

Normal Display Control Mode (DC1)

The cursor is moved to the same position in the complementary line. In this mode, a line-feed command stops the scrolling alphanumeric message if the cursor is on the top line when this command is sent.

Vertical Scroll Display Control Mode (DC2)

If the cursor is on the top line, it is moved to the complementary position on the bottom line. If the cursor position is on the bottom line, all characters on that line are moved to the top line, the bottom line is cleared, and the cursor position is unchanged. This command always stops the scrolling alphanumeric message.

Carriage return (0D) <CR>

0D

Purpose:

Causes the cursor to move to the leftmost position of the current line. This command stops the scrolling alphanumeric message if the cursor position is on the top line when this command is sent.

Test (0F) <SI>

0F

Purpose:

Causes the first 40 characters in the currently selected character set to be displayed once. At the end of the test, a test pattern is written that turns all pixels ON. At the end of the test, the display is cleared and is reset to the power-on state as described at "Reset (1F) <US>" on page 56.

Display position (10) <DLE>

10 *nn*

Purpose:

Changes the cursor position. The byte that follows the command byte indicates the character position where the next data-string write operation is to start. Any values greater than X'27' are ignored and the cursor position remains unchanged. This command stops the scrolling alphanumeric message if the cursor position is on the top line when this command is sent.

X'00'   Top left
X'13'   Top right
X'14'   Bottom left
X'27'   Bottom right

Normal-display control mode (11) <DC1>

11

Purpose:

Sets normal display-control mode (DC1) and permits data to be written to either line. After a character is written, the cursor moves one position to the right. When the display position is at the last position of the top line, the cursor moves to the first position of the bottom line. When the display position is at the last position of the bottom line, the cursor moves to the first position of the top line. The display remains in DC1 mode until a DC2 mode command is issued, a reset command is issued, or power is removed from the display.

Vertical-scroll display control mode (12) <DC2>

12

Purpose:

Sets vertical-scroll display control mode (DC2) and permits data to be

written to either line. When the display position is at the last position of the top line, the cursor moves to the first position of the bottom line. When either valid character data or a Horizontal Tab command is sent to the last position of the bottom line, the data on the bottom line is transferred to the top line and the cursor is moved to the lower left position. Note that a Carriage Return command does not cause the data on the bottom line to be transferred to the top line. This mode is the default setting for power on and reset. The display remains in DC2 mode until a DC1 mode command is issued.

Cursor on (13) <DC3>

13

Purpose:
> Turns on the cursor. The command is the power-on default setting.

Cursor off (14) <DC4>

14

Purpose:
> Turns off the cursor.

Reset (1F) <US>

1F

Purpose:
> Causes the display to reset some programmable parameters to the power-on state, which is defined as:
>
> • Cursor on.
> • Scrolling alphanumeric message off.
> • All character positions filled with X'20'.
> • Write position for next write at position X'00' (top left).
> • Default code page (437) selected.
> • DC2 mode enabled.
> • Default (Logic Controls) emulation mode selected.
> • Brightness set to 100%.
> • IBM user-defined characters not erased. The Logic Controls user-defined, character key is reset.

All byte values between X'00' and X'1F' not defined in this section are ignored by the display in Logic Controls mode. User-defined characters in the IBM mode that have not been defined previously are spaces.

Null VFD Commands

(X'06'), (X'1B', X'06'), (X'07'), (X'1B'), X'07')

Purpose:
> These are null commands for both integrated and distributed display modules. They will have no effect on the operation of the display.:

APA commands

This section describes the following APA VFD commands:

- Backspace without deleting
- Line feed
- Carriage return
- Test
- Clear display
- Display position
- Delete to end of line
- Dimming
- Cursor mode
- Screen mode
- Horizontal scroll
- Display mode
- User definable font
- Graphic display mode
- Double-size letter in horizontal
- Character code set of full-size letter
- Character code set of half-size letter
- Horizontal scroll on all lines
- Font selection
- Null

Note: The command code format shown in the following topics is in hexadecimal format.

Backspace without deleting

08

Purpose:

The write-in position is shifted to the left one digit and the displaying screen is not changed. This command is ignored when the write-in position is on the least significant digit.

Line feed

0A

Purpose:

The write-in position is shifted to the next row on the same digit position. If the write-in position is on the bottom row, the displayed character is scrolled up to the upper row. All characters on the bottom row are cleared. The write-in position is not changed. The displayed character under the screen mode of the 24x24-dot 1 row+16x16-dot 2 rows is not scrolled up from the row of 16x16-dot format to 24x24-dot.

Carriage return

0D

Purpose:
> The write-in position is shifted to the most significant digit of the same row.
> If the write-in position is on the most significant digit, the command is
> ignored.

Test

```
0F
```

Purpose:
> Causes the 40 characters in the IBM code page 437 character (X'20'-X'47')
> set to be displayed one time. In addition, at the end of the test, a test
> pattern is written that turn all pixels.
>
> When Test is working, all codes are ignored. The test command X'OF' is
> only available when the IBM code page 437 is selected.
>
> When the other font table except IBM code page 437 is selected, test code
> is ignored.

Clear display

```
(X'1B'), (X'5B', X'32'), (X'4A')
```

Purpose:
> All the displayed characters are erased. The write-in position is not
> changed.

Display position

```
1B 5B Py 3B Px 48
```

Purpose:
> Instead of writing the character from the first digit, use this command to
> specify the write-in start position. The write-in position is shifted with Py and
> Px and is based on the half-size letter of the font, which is specified with
> the Screen Mode command. Py indicates the position of the row and Px the
> digit. Py and Px must be defined under the following conditions:
> - If Py is 0, it is set to 1 (X'31').
> - If Py is greater than the bottom row, it is set to the bottom row.
> - If Px is 0, it is set to 1 (X'31').
> - If Px is greater than the least digit, it is set to the least digit.
>
> A special form of the display position command exists (1B 5B 48 27),
> which sets the write-in position to the home position (Py=1 and Px=1).

Delete to end of line

```
1B 5B 30 4B
```

Purpose:
> The displayed characters from the write-in position to the end position on
> the same row are erased. The write-in position is not shifted.

Dimming

```
1B 5C 3F 4C 44 Ps
```

Purpose:

Luminance can be adjusted into six levels by using this command. The data byte following the command sequence (represented by *Ps* in the preceding command format), changes the dimming level. When the module is turned on, the level is set to 5 (100%).

Ps	Luminance %
0 (X'30')	0
1 (X'31')	31.6
2 (X'32')	45
3 (X'33')	58.8
4 (X'34')	79.4
5 (X'35')	100 (default)

Cursor mode

1B 5C 3F 4C 43 *Ps*

Purpose:

This command is only available in 5x7-dot screen mode. The data byte following the command sequence (represented by *Ps* in the preceding command format), changes the cursor mode. The cursor is always displayed at the write-in position. The cursor is formed by five dots that are located at the bottom of 5x7-dot matrix character font.

Ps	Mode
0 (X'30')	No lighting (default)
1 (X'31')	Blinking
2 (X'32')	Lighting

No Lighting	The cursor does not display. This is the default setting when power is turned on.
Blinking	The cursor flashes ON and OFF every 0.3 seconds at the blank digit.
Lighting	The cursor displays. If the write-in position is assigned to the position at which a character is displaying, the cursor displays instead of the character.

Screen mode

1B 5C 3F 4C 53 *Ps*

Purpose:

The data byte following the command sequence (represented by *Ps* in the preceding command format), changes the screen mode.

Ps	Mode
6 (X'36')	5x7 dots, 4 rows (default)
7 (X'37')	5x7 dots, 5 rows
8 (X'38')	16x16 dots, 2 rows

Horizontal scroll

1B 5C 3F 4C 48 *Pm* **3B** *Pl* **3B** *Pt* **3B** *Pn* **3B** *Pd...Pd*

Purpose:

This command initiates horizontal scrolling. The control bytes embedded in the command sequence (represented by *Pm, Pl, Pt,* and *Pn* in the preceding command format), change the scrolling characteristics. *Pd...Pd* represents the data bytes.

Pm	6 (X'36'): 5x7 dots, 4 rows
	7 (X'37'): 5x7 dots, 5 rows
	8 (X'38'): 16x16 dots, 2 rows
Pl	1 ~ 4 (X'31' ~ X'34'): Pm=6
	1 ~ 5 (X'31' ~ X'35'): Pm=7
	1, 2 (X'31', X'32'): Pm=8
Pt	1 (X'31'): 1 line/10 ms
	1 (X'32'): 1 line/20 ms
Pn	The number of data bytes (1 for half-size letter, 2 for full-size letter, maximum is 128 (X'80').
Pd...Pd	The data characters.

The following list explains how the horizontal scroll command operates:

- When a character is displayed on the line selected for scroll mode, all displaying characters and the display mode set command are erased.
- A character scrolls by closed loop until the cancel command is selected. In this case, the same message is scrolled repeatedly with no space.
- A screen scrolls from right to left, dot by dot.
- The scrolled display range is defined by the screen mode setting.
- The command is canceled when Pn = X'00'. After it is canceled, displayed characters are cleared, and the write-in position moves to the most significant digit of the row.
- The command can be started only on a single line.
- A character's display mode set command (reverse, blinking, and so on) can be added with the display data frame. If the command is written two or more times in one scroll data frame, only the first command is valid; others are ignored.
- When message data is changed, you must reissue this command. While scrolling, the user definable font set command is not available.

Display mode set

1B 5B *Ps* **6D**

Purpose:

This command sets the display mode characteristics. The control byte embedded in the command sequence (represented by Ps) sets the mode.

Ps	**Mode**
0 (X'30')	Reset display mode. Characters written after this command are reset to normal display mode.
5 (X'35')'	Blinking mode. Characters written after this command blink ON and OFF every 0.3 seconds.
7 (X'37')	Reverse mode. Characters written after this command are reversed.

User-definable font set

1B 5C 3F 4C 57 Pf 3B Pn 3B Pc 3B Pd...Pd

Purpose:

> This command specifies a user-definable font set. The control bytes embedded in the command sequence (represented by *Pf, Pn,* and *Pc* in the preceding command format), change the font characteristics. *Pd...Pd* represents the font data bytes.

Pf (font size)   1 (X'31'): 5x7 dots (ANK)
                            2 (X'32'): 8x16 dots
                            3 (X'33'): 16x16 dots
Pn (font number) 1 ~ 32 (X'31' ~ X'33', X'32') Pf=1, 2
                            1 ~ 16 (X'31' ~ X'31', X'36') Pf=3
Pc (registration   2 hex digits Pf=1, 2
address)   4 hex digits (Pf=3)
Pd...Pd   2 hex digits x 7 Pf=1
                            2 hex digits x 16 Pf=2
                            2 hex digits x 2 x 16 Pf=3

> **Note:** All data is stored into RAM. You must issue this command every time you switch ON the power.

Available registration address can be established as follows:

1. **Font size 5x7**

   At the all language
   > X'20'--X'FF'

2. **Font size 8x16**

   English
   > X'01'--X'FF' (except X'08', X'0A', X'OD', X'1B')

   Japanese
   > X'20'--X'7F', X'A0'--X'DF'

   Korean, Simplified Chinese and Traditional Chinese
   > X'20' ˜ X'A0'

3. **Font size 16x16**

   Japanese JIS X 0208-1990 (Font selection X'1B', X'53', X'31')
   > X'8140'--X'81FF', X'8240'--X'84FF' (All positions of X'8200'--X'823F' are not available.)

   X'8840'--X'88FF', X'8940'--X'9FFF' (All positions of X'8900'--X'893F' are not available.)

   X'E040'--X'E0FF', X'E140'--X'EAFF' (All positions of X'E100'--X'E13F' are not available.)

   Korean KS C 5601-1992 (Font selection X'1B', X'53', X'32')
   > X'A1A0'--X'A1FF', X'A2A0'--X'ACFF' (All positions of X'8200'--X'829F' are not available.)

   X'B0A0'--X'B0FF', X'B1A0'--X'C8FF' (All positions of X'B100'--X'B19F' are not available.)

   X'CAA0'--X'CAFF', X'CBA0'--X'FDFF' (All positions of X'CB00'--X'CB9F' are not available.)

Simplified Chinese GB2312-80 (Font selection X'1B', X'53', X'33')
X'A1A0'--X'A1FF', X'A2A0'--X'A9FF' (All positions of X'A200'--X'A29F' are not available.)
X'B0A0'--X'B0FF', X'B1A0'--X'F7FF' (All positions of X'B100'--X'B19F' are not available.)

Traditional Chinese Big-5 (Font selection X'1B', X'53', X'34')
X'A140'--X'A1FF', X'A2A0'--X'C6FF' (All positions of X'A200'--X'A23F' are not available.)
X'C940'--X'C9FF', X'CA40'--X'F9FF' (All positions of X'CA00'--X'CA3F' are not available.)

Graphic display mode

```
1B 5C 3F 4C 47 Px 3B Py 3B Ph 3B Pw 3B Pd
```

Purpose:

This command specifies the graphic display mode. The control bytes embedded in the command sequence (represented by *Px, Py, Ph*, and *Pw* in the command format), change the graphic display characteristics. *Pd* represents the data byte.

Px (display position)   0 ~ 159 (X'30' ~ X'31', X'35', X'39')
Py (display position)   0 ~ 39 (X'30' ~ X'33', X'39')
Ph (height)   1 ~ 40 (X'31' ~ X'34', X'30')
Pw (width)   1 ~ 160 (X'31' ~ X'31', X'36', X'30')
Pd   The display data.

Double-size letter in horizontal

```
1B 23 Ps
```

Purpose:

This command sets a character with double-size letter in horizontal. It is available for all full-size letter, all half-size letter, and ANK font.

Ps   5 = Normal-size letter
     6 = Double-size letter in horizontal

Horizontal scroll on all lines
The format of the Horizontal Scroll Select command is as follows:

```
1B 5C 3F 4C 4D 53
```

Purpose:

This command sets horizontal scroll mode.

The format of the Horizontal Scroll Release command is as follows:

```
1B 5C 3F 4C 4D 45
```

Purpose:

This command resets horizontal scroll mode.

The format of the Horizontal Scroll Display Mode Set command is as follows:

```
1B 5C 3F 4C 4D Pm 3B Pl 3B Pt 3B Pn 3B Pd...Pd
```

Purpose:

This command sets horizontal scrolling options. The control bytes embedded in the command sequence (represented by *Pm, Pl, Pt,* and *Pn* in the preceding command format), change the scrolling characteristics. *Pd...Pd* represent the data bytes. This command does not affect previous display settings.

Pm (screen mode)	6 (X'36'): 5x7 dots, 4 rows
	7 (X'37'): 5x7 dots, 5 rows
	8 (X'38'): 16x16 dots, 8x16 dots, 2 rows
Pl (row)	1 ~ 4 (X'31'~X'34'): Pm=6
	1 ~ 5 (X'31'~X'35'): Pm=7
	1 ~ 2 (X'31'~X'32'): Pm=8
Pt (scroll speed)	1 (X'31'): 1 digit/10 ms
	1 (X'32'): 1 digit/20 ms
Pn (number of characters)	The number of data bytes (1 for half size letter, 2 for full size letter, maximum is 128 (X'80').
Pd...Pd	This represents the data characters.

The format of the Horizontal Scroll Start command is as follows:

```
1B 5C 3F 4C 4D 47
```

Purpose:

This command begins horizontal scrolling on all lines. All subsequent commands are ignored until a Scroll Mode Release command is sent.

The rules of operation for the Horizontal Scroll On All Lines are as follows:

- Any codes not described here are ignored.
- The most recent Display Mode Set command becomes effective in one screen scroll setting before the Scroll Start command is performed.
- A screen scrolls from right to left, dot by dot.
- The range of the display that is being scrolled is defined by the screen mode setting.
- The command is canceled when Pn = X'00'. After it is canceled, displayed characters are cleared, and the write-in position moves to the most significant digit of the row.
- The command can be started only on a single line.
- A character's Display Mode Set command (reverse, blinking, and so on) can be added with the display data frame. If the command is written twice or more in one scroll data frame, only the first command is valid; others are ignored.
- When message data is changed, you must reissue this command. While scrolling, the User Definable Font Set command is not available.
- Space data is written in the other rows except those selected with the Pl code.

Font selection

1B 53 Pn

Purpose:

   Selects the language font to use

The command stream is as follows:

Pn   30: English - IBM code page 437 modified (default)
         31: Japanese - JIS X 0208-1990
         32: Korean - KS C 5601-1992
         33: Simplified Chinese - GB-2321
         34: Traditional Chinese - BIG5

Null Commands

(06H), (1BF, 06H), (07H), (1BH), 07H)

Purpose:

   These are null commands for both integrated and distributed display
   modules. They will have no effect on the operation of the display.:

Cash-drawer commands

This section describes the following cash-drawer commands:

- Open cash drawer 1
- Open cash drawer 2
- Read cash-drawer status
- Unsolicited cash drawer status

Open cash drawer 1

07

Purpose:

To open cash drawer 1, use the following command, which sends an ASCII Bell character to the character-display serial port.

Open cash drawer 2

1B   07

Purpose:

To open cash drawer 2, use the following 2-byte sequence, which sends an Escape character followed by an ASCII Bell character to the character display serial port.

Read cash-drawer status

06

Purpose:

To obtain status information for cash drawers, use the following command, which sends an ASCII ACK character to the character display serial port. See "CD status byte format" for a description of the cash-drawer status byte.

Unsolicited cash-drawer status

1B   06

Purpose:

To toggle the unsolicited cash-drawer status function on or off, use the following 2-byte sequence, which sends an Escape character followed by an ASCII Ack character to the character-display serial port. The default setting is OFF. If the unsolicited status function is ON, the system checks cash drawer status approximately every 500 ms. Any status change causes the return of the status byte. Also, if unsolicited status is on, sending an Open command causes the cash drawer to return a status byte. See "CD status byte format" for a description of the status byte.

CD status byte format

CD1	**CD1/CD2 Status Byte**
Bit 7	Always a 0, for compatibility
Bit 6	Cash drawer 1 sensor

- '1' = Cash drawer 1 open (if connected)
- '0' = Cash drawer 1 closed

CD1	**CD1/CD2 Status Byte**
Bit 5	Cash drawer 2 sensor

- '1' = Cash drawer 2 open (if connected)
- '0' = Cash drawer 2 closed

Bit 4	Cash drawer 1 present indicator

- '1' = Cash drawer 1 is present
- '0' = Cash drawer 1 is not present

Bit 3	Cash drawer 2 present indicator

- '1' = Cash drawer 2 is present
- '0' = Cash drawer 2 is not present

Bit 2	Unsolicited status function state

- '1' = Unsolicited status function is currently ON
- '0' = Unsolicited status function is currently OFF

Bit 1	Reserved always 0 for compatibility
Bit 0	Reserved always 0 for compatibility

Purpose:

To obtain status information format for a cash drawer, send read status command. The system also supports unsolicited cash drawer status.

MSR data received

This section describes the data received from the MSR when a card is swiped. The MSR is an input-only device, and therefore does not use commands. The dual-sided single track MSR attaches to the MSR connector and communicates serially. The 3-track MSR has a slide switch, which enables you to connect it either as a standard serial device or through the keyboard interface. (If you choose the latter connection, the incoming data appears to come from a keyboard; therefore, no device driver is needed.)

The MSR default baud rate is 19 200 bits/second (bps), 8 data bits, no parity bit, and 1 stop bit (19200–8–N-1).

3-Track MSR data
The incoming data from the 3-track MSR has the following format:

Successful read (Serial Mode)	SS *card data* ES	Start sentinel character (ASCII **%** for track 1; ASCII **;** for track 2 and ASCII **+** for track 3) End sentinel character (ASCII **?** for all tracks)
Successful read, PS/2 keyboard wedge attached MSR (Keyboard mode)	SS *card data* ES \<CR\>	Start sentinel character (ASCII **%** for track 1, ASCII **;** for track 2 and ASCII **+** for track 3) End sentinel character (ASCII **?** for all tracks) CR charatcer is X'OD'
Unsuccessful read, standard attached MSR (Serial Mode)	Error	> ASCII **E**
Unsuccessful read, PS/2 keyboard wedge attached MSR (Keyboard mode)	Error \<CR\>	ASCII **E**, CR character is X'0D'

Dual-sided, single-track MSR data
The incoming data from the dual-sided, single-track MSR has the following format:

Successful Read (Serial Mode)	SS *card data* ES	Start Sentinel character (ASCII **%** for track 1 and ASCII **;** for track 2) End Sentinel character (ASCII **?** for both tracks)
Unsuccessful Read (Serial Mode)	Error	ASCII **E**

Peripheral default baud rates

The following are the default baud rates for the SurePOS 500/600 Series peripherals:
- The MSR default baud rate is 19 200 bits/second (bps), 8 data bits, no parity bit, and 1 stop bit (19200–8–N-1).
- The VFD default baud rate is 9 600 bps, 8 data bits, no parity bit, and 1 stop bit (9600–8–N-1).

Appendix A. Connector-pin assignments

This appendix lists the connector-pin assignments for the external and internal connectors.

External connectors

The following sections show the connector-pin assignments for external connectors.

Speaker kit connector

This connector is functional only for Models 561, 621, and X51.
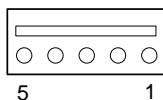
Table 26. Speaker kit connector-pin assignments

Pin	Connector
1	+10.8 V dc at 0.3 A maximum
2	Ground
3	Line L
4	Ground
5	Line R

MSR connector
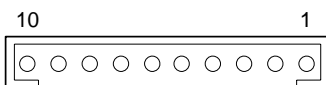
Table 27. MSR connector-pin assignments

Pin	Connector
1	+5 V dc
2	Serial data in
3	Serial data out
4	Ground
5	MSR present
6	MSR mode
7	Keyboard enable
8	Keyboard data
9	Keyboard clock
10	Ground

USB port connector (2)

1 2 3 4
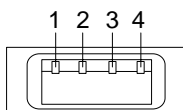
Table 28. USB port connector-pin assignments

Pin	Connector
1	+5 V dc
2	–Data
3	+Data
4	Ground

Keyboard and mouse connector

1 2
3 4
5 6
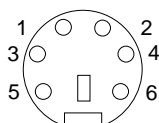
Table 29. Keyboard and mouse connector-pin assignments

Pin	Signal	I/O	Pin	Signal	I/O
1	Keyboard data	I/O	4	+5 V dc	
2	Mouse data	I/O	5	Keyboard clock	I/O
3	Ground		6	Mouse clock	I/O

Microphone connector
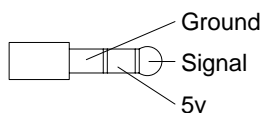
Ground
Signal
5v

Table 30. Microphone connector-pin assignments

Pin	Signal
Tip	Signal
Ring	+5 V dc
Base	Ground

Headphone connector

Ground
Left channel
Right channel
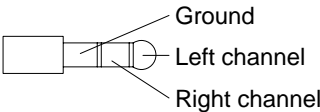
Table 31. Headphone connector-pin assignments

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

Serial connectors

9-pin serial connector (3)
The 9-pin serial connector is a male connector.

1   5
6   9
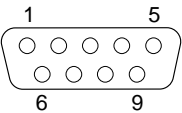
Table 32. Assignment for 9-pin serial connector

Pin	Signal	I/O	Pin	Signal	I/O
1	Carrier detect	I	6	Data set ready	I
2	Receive data	I	7	Request to send	O
3	Transmit data	O	8	Clear to send	I
4	Data terminal ready	O	9	Ring indicator	I
5	Signal ground				

15-pin serial connector
The 15-pin serial connector is a female connector.

```
   8              1
  ┌─────────────────┐
  ( o o o o o o o o )
  \  o o o o o o o  /
   └───────────────┘
   15             9
```
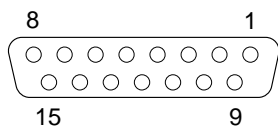
Table 33. Assignments for 15-pin serial connector

Pin	Connector	Pin	Connector
1	Carrier detect	8, 9	+12 V dc at 0.5 A maximum
2	Receive data	11	Distributed display present
3	Transmit data	12	Data set ready
4	Data terminal ready	13	Request to sendy
5	Ground	14	Clear to sen
6	Ground	15	Ring indicate
7, 10	+5 V dc at 0.5 A maximum		

Parallel connector

```
13                                    1
  ┌─────────────────────────────────┐
  │ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ │
  │  ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○  │
  └─────────────────────────────────┘
25                                   14
```
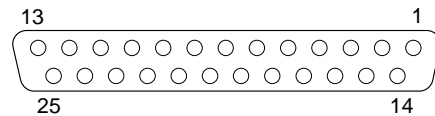
Table 34. Assignment of parallel-connector pins

Pin	Signal	I/O	Pin	Signal	I/O
1	Strobe#	I/O	14	Auto Fd XT#	O
2	Data bit 0	I/O	15	Error#	I
3	Data bit 1	I/O	16	Init#	O
4	Data bit 2	I/O	17	Slct In#	O
5	Data bit 3	I/O	18	Ground	
6	Data bit 4	I/O	19	Ground	
7	Data bit 5	I/O	20	Ground	
8	Data bit 6	I/O	21	Ground	
9	Data bit 7	I/O	22	Ground	
10	Ack#	I	23	Ground	
11	Busy	I	24	Ground	
12	Pe	I	25	Ground	
13	Slct	I			

Diskette-drive connector

```
14                                    26
  ┌─────────────────────────────────┐
  │ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ │
  │ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ │
  └─────────────────────────────────┘
1                                    13
```
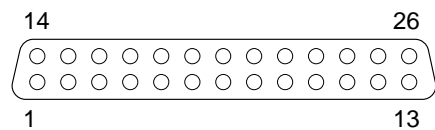
Table 35. Assignment of diskette-drive connector pins

Pin	Signal	I/O	Pin	Signal	I/O
1	Ground		14	No connection	
2	+5 V dc		15	No connection	
3	Ground		16	No connection	
4	Ground		17	Index sensing	I
5	No connection		18	No connection	
6	Drive select 0	O	19	No connection	
7	Motor control 0	O	20	Ground	
8	Direction (0=inward, 1=outward)	O	21	Track step pulse	O
9	Write data	O	22	Write gate	O
10	Ground		23	Track 0 sensing	I
11	Drive density select 0	O	24	Write protect	I
12	Read data	I	25	Head select (0=side 1, 1=side 0)	O

Table 35. Assignment of diskette-drive connector pins (continued)

Pin	Signal	I/O	Pin	Signal	I/O
13	No connection		26	Diskette change	I

Ethernet connector

8 1
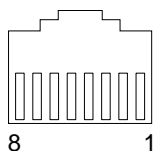
Table 36. Ethernet connector-pin assignments

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

External video connector

5 1
10 6
15 11
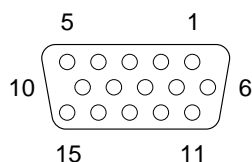
Table 37. Assignment of external-video connector pins

Pin	Connector	Pin	Connector
1	Red	9	No connection
2	Green	10	Ground
3	Blue	11	No connection
4	No connection	12	Monitor ID1
5	Ground	13	Horizontal sync
6	Red ground	14	Vertical sync
7	Green ground	15	Monitor ID3
8	Blue ground		

Cash drawer connector (2)

4   1
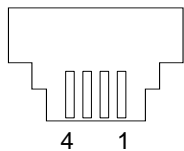
Table 38. Assignment of cash drawer connector pins

Pin	Connector
1	Ground
2	Sensor
3	Open signal
4	+24 V dc

Integrated customer display connector

1   4
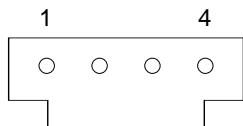
Table 39. Assignment of integrated customer-display connector pins

Pin	Connector
1	+5 V dc at 0.5 A maximum
2	Transmit data
3	Integrated customer display present
4	Ground

Appendix B. System address maps

The following tables show the structure of various types of information in system memory. Address ranges and byte sizes are approximate.

System memory map

The first 640 Kb of system board RAM is mapped starting at address hex 00000000. A 256-byte area and a 1-Kb area of this RAM are reserved for BIOS data. Memory may be mapped differently if POST detects an error.

Sue to resource constraints, one legacy device (Serial A through Serial F, external diskette drive, and LPT1 (parallel port) cannot be used. By default, Serial Port F is disabled.

Table 40. System memory map

Address Range (decimal)	Address Range (hex)	Size	ISA Bus Decode	Description
0 Kb – 511 Kb	00000 – 7FFFF	512 Kb	positive, subtractive	Conventional
512 Kb – 638 Kb	80000 – 9FBFF	127 Kb	positive, subtractive	Extended conventional
639 Kb	9FC00 – 9FFFF	1 Kb	positive, subtractive	Extended BIOS data (movable by HIMEM, QEMM, 386MAX)
640 Kb – 767 Kb	A0000 – BFFFF	128 Kb	positive, subtractive	Trident CBi7 Video RAM
768 Kb – 815 Kb	C0000 – CBFFF	48 Kb	positive, subtractive	Trident CBi7 Video ROM BIOS (shadowed)
816 Kb – 831 Kb	CC000 – CFFFF	16 Kb	positive, subtractive	LAN RPL ROM
832 Kb – 863 Kb	D0000 – D7FFF	32 Kb	positive, subtractive	Available
864 Kb – 879 Kb	D8000 – DBFFF	16 Kb	positive, subtractive	DMI Strings
880 Kb – 896 Kb	DC000 – DFFFF	16 Kb	positive, subtractive	USB Stack
896 Kb – 1 MB	E0000 – FFFFF	128 Kb	positive, subtractive	System ROM BIOS (ISA bus, main memory shadowed)
1 MB – 16 MB	100000 – FFFFFF	15 MB	positive, subtractive	PCI/ISA space
16 MB – 4095.5 MB	10000000 – FFF8000	4079.5 MB	subtractive only	PCI space
4095.5 MB – 4096 MB (4GB)	FF800000 – FFFFFFFF	512 Kb	subtractive only	System ROM BIOS (ISA Bus)

PCI/ISA input/output address map

Table 41 lists resource assignments for the PCI/ISA I/O address map. Any addresses that are not shown are reserved.

Table 41. PCI/ISA I/O address map

Address (hex)	Size (bytes)	Description
0000 – 001F	32	Via 686, DMA #1
0020 – 002D	14	Via 686, interrupt controller #1
0030 – 003F	16	Via 686, interrupt controller #1
0040 – 0043 0050 – 0053	8	Via 686, counter/timer #1
0060	1	8042 keyboard controller, data (on ISA data bus) Via 686
0061	1	Via 686, system port B
0064	1	8042 keyboard controller, command and status byte (on ISA data bus) Via 686
0062, 0063, 0065 – 006F	13	General I/O locations, available to ISA bus
0070, bit 7	1 bit	Via 686, enable/disable NMI
0070, bits 6:0	7 bits	Via 686, real§time clock (RTC) address
0071	1	Via 686, RTC and CMOS data
0072 – 0075	4	Via 686, RTC and CMOS
0080	1	POST Checkpoint register
0081 – 008F	15	Via 686, DMA page register
0092	1	Via 686, system control Register
00A0 – 00B1	18	Via 686, interrupt controller #2
00C0 – 00DF	32	Via 686, DMA #2
01F0 – 01F7	8	IDE channel 0 (decoded by Via 686)
0220 – 022F	16	Via 686, Soundblaster
02E0 – 02E7	8	Quad UART, serial port 5, touch controller
02E8 – 02EF	8	Quad UART, serial port 4, (typical, setup default)
02F8 – 02FF	8	Via 686, Serial Port 2 (typical, setup default)
0377, bit 7	1 bit	Via 686, diskette-drive change
0378 – 037F	8	Via 686, parallel port (typical, setup default)
03B4 – 03B5	2	Trident CBi7 video chip, MDA emulation, index and data
03BA	1	Trident CBi7 video chip, MDA emulation, feature control register
03C0 – 03C1	2	Trident CBi7 video chip, attribute controller index and data
03C2	1	Trident CBi7 video chip, input status register and miscellaneous output register
03C4 – 03C5	2	Trident CBi7 video chip, sequencer, index and data
03C6	1	Trident CBi7 video chip, color palette mask
03C7	1	Trident CBi7 video chip, color palette state
03C8	1	Trident CBi7 video chip, color palette write mode Index

Table 41. PCI/ISA I/O address map (continued)

Address (hex)	Size (bytes)	Description
03C9	1	Trident CBi7 video chip, color palette data port
03CA	1	Trident CBi7 video chip, feature control register
03CC	1	Trident CBi7 video chip, miscellaneous output Register
03CE – 03CF	2	Trident CBi7 video chip, graphics controller, index and data
03D0 – 03D1	2	Trident CBi7 video chip, flat panel extensions, index and data
03D2 – 03D3	2	Trident CBi7 video chip, multimedia extensions, index and data
03D4 – 03D5	2	Trident CBi7 video chip, CRTC (CGA emulation), index and data
03D6 – 03D7	2	Trident CBi7 video chip, configuration extensions, index and data
03D8 – 03D9	2	Trident CBi7 video chip, alternate source/destination segment address
03DA	1	Trident CBi7 video chip, CGA emulation feature control register
03DB	1	Trident CBi7 video chip, alternate clock select
03E0 – 03E1	2	PCMCIA TI1211 controller
03E8 – 03EF	8	Quad UART, serial port 3 (typical, setup default)
03F0 – 03F5	6	Via 686, diskette-drive controller
03F6	1	IDE channel 0 (decoded by Via 686)
03F7, bit 7	1 bit	IDE diskette-drive change (Via 686)
03F7, bits 6:0	7 bits	IDE status channel 0 (decoded by Via 686)
03F8 – 03FF	8	Via 686, serial port #1 (motherboard)
04D0	1	Via 686, interrupt edge/level control #1
04D1	1	Via 686, interrupt edge/level control #2
0CF8 – 0CFB	4	Trident CBi7/Via 686 PCI configuration address register
0CFC – 0CFF	4	Trident CBi7/Via 686 PCI configuration address register
02204 – 02207	4	Trident CBi7 PCI bus master register
02280 – 022FF	128	Trident CBi7 DVD registers
02300 – 02323	36	Trident CBi7 PCI bus master registers
02340 – 023FF	192	Trident CBi7 AGP registers
046E8	1	Trident CBi7 display enable register
06800 – 068FF	256	Via 686, hardware monitor
08000 – 080FF	256	Via 686, power management

SMBIOS structures

Table 42 identifies the SMBIOS structures used by the SurePOS 500/600 Series. SMBIOS provides information configured by the manufacturer about a product. This information resides in the BIOS memory area (hex F0000 – FFFFF address block). Accessing the information present in SMBIOS is one of the tasks in supplying system instrumentation and management data for Web-Based Enterprise Management (WBEM).

The following DMI structure types are supported in the SurePOS 500/600 Series:

Table 42. SMBIOS structures

Structure Type	Description
0	BIOS information
1	System information
2	Base Board information
3	System enclosure or Chassis
4	Processor Information
5	Memory Controller Information
6	Memory-Module Information
7	Cache Information
8	Port-Connector Information
9	System Slots
10	On Board devices
11	OEM Strings
12	System Configuration Options
13	BIOS Language Information
14	Group Associations
15	System Event Log
16	Physical Memory Array
17	Memory Device
18	Memory Error Information
19	Memory-Array Mapped Address
20	Memory-Device Mapped Address
21	Built-in Pointing Device
22	Portable Battery
23	System Reset
24	Hardware Security
25	System Power Controls
26	Voltage Probe
27	Cooling Device
28	Temperature Probe
29	Electrical Current Probe
30	Out-of-Band Remote Access

Table 42. SMBIOS structures (continued)

Structure Type	Description
126	Inactive
127	End-of-Table

Vital product data (VPD) area

Table 43 identifies the format of the VPD area, which resides in EEPROM. Vital Product Data (VPD) is the information about an IBM system that can be read with a program. The information can include machine type, machine serial number, BIOS/flash ID, system board unique ID, and so on. This information has been implemented in different ways on different systems. The SurePOS 500/600 Series BIOS implements the 48-byte VPD data area that all of the latest IBM PCs support. The SurePOS 500/600 BIOS also implements the IBM standard INT 15h interface for finding the VPD data area within the System POST/BIOS ROM. All of this information can be extracted from the SMBIOS data structures as well, which is the preferred method for retrieving system information.

The actual data is stored in the EEPROM that is also used for the Ethernet subsystem. During the manufacturing process, the machine-unique data will be written into the EEPROM by the test process. POST will extract the data from the EEPROM so that the outside interfaces can retrieve it. Machine-unique data can include model, box serial number, and system-board serial number.

Table 43. Vital product data area

Structure Type	Description
VPD_Header	X'Hex AA'
VPD_Header_1	X'Hex 55'
VPD_Signature	'VPD'
VPD_Length	48 (decimal)
VPD_Reserved	7 characters; not implemented in SurePOS 500/600
VPD_BuildID	9 characters; BIOS build ID (version)
VPD_Box_Serial	7 characters; system serial number
VPD_UniqueID	11 characters; system board serial number
VPD_Mach_Type_Model	7 characters; machine type and model number
VPD_Chksum	Sum of all preceding bytes

Appendix C. IRQ and DMA channel assignments

This appendix lists the interrupt request (IRQ) and direct memory access (DMA) channel assignments. The IRQs listed in Table 44 are not shareable, but you can make them available for use by another device as noted.

Table 44. IRQ assignments - fixed

IRQ	System resource	Comments
NMI	Critical system error	
SMI	System management interrupt for power management	
0	System Timer	
1	PS/2 Keyboard	
2	Cascade	
6	Diskette Drive	Available if diskette drive not attached
8	Real-time clock	
9	ACPI	Available if APM mode used
12	Mouse	
13	Floating Point	
14	HDD controller	
15	Touch	

Other system resources typically reside at certain IRQs, but you can relocate some IRQs if necessary. Some resources are optional and not installed, and you can disable an installed resource to make its IRQ available. Table 45 identifies these resources and IRQs.

Table 45. Relocatable IRQs

System Resource	Typical/default IRQ
Serial port A	4
Serial port B	3
LPT1	7
Serial port C	Disabled by default. Use requires disabling other legacy resource to provide IRQ
Serial port D VFD	11
Audio, Ethernet, USB, PCMCIA	5
Serial port E MSR	10

To enable the use of serial port C by Windows, you must disable a system function that has an IRQ assigned. Candidate functions for releasing IRQs, and their default assignments, are:

- IRQ6, assigned to the diskette drive
- IRQ7, assigned to the parallel port (LPT1)
- IRQ10, assigned to serial port E, MSR

• IRQ11, assigned to serial port D (VFD)

Table 46. DMA channel assignments

DMA channel	Data width	System resource
0	8 bits	User available for ISA bus
1	8 bits	User available for ISA bus (normally used for LAN)
2	8 bits	Reserved, diskette drive
3	8 bits	Parallel port if ECP; otherwise, user available for ISA bus
4		Reserved, cascade channel
5	16 bits	User available for ISA bus
6	16 bits	User available for ISA bus
7	16 bits	User available for ISA bus

Appendix D. Notices

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Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die IBM Deutschland Informationssysteme GmbH, 70548 Stuttgart.

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Attention: ESD damage can occur when there is a difference in charge between the part, the product, and the service person. No damage will occur if the service person and the part being installed are at the same charge level.

ESD Damage Prevention

Anytime a service action involves physical contact with logic cards, modules, back-panel pins, or other ESD sensitive (ESDS) parts, the service person must be connected to an ESD common ground point on the product through the ESD wrist strap and cord.

The ESD ground clip can be attached to any frame ground, ground braid, green wire ground, or the round ground prong on the AC power plug. Coax or connector outside shells can also be used.

Handling Removed Cards

Logic cards removed from a product should be placed in ESD protective containers. No other object should be allowed inside the ESD container with the logic card. Attach tags or reports that must accompany the card to the outside of the container.

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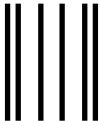
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