IBM

Installation and Service Guide for 4810/4910
Model 31x, 32x, W2H

SurePOS 300

IBM

Installation and Service Guide for 4810/4910 Model 31x, 32x, W2H

> **Note**
>
> Before using this information and the products it supports, be sure to read the safety information booklet (GA27-4004) and the general information under Appendix B, "Notices," on page B-1.

Second Edition (March 2005)

This edition applies to IBM Point-of-Sale terminals, 4810 and 4910 (includes the 4810 terminal bundled with a printer, display, cash drawer, and possibly other I/O). This publication is available on the IBM Retail Stores Solutions Electronic Support Web site.

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About this guide

This guide provides product planning information, replacement and removal procedures, problem determination and parts listings of field-replaceable-units (FRUs) for the IBM 4810/4910 SurePOS™ 300. The 4910-32x model is an Express solution, which includes a 4810-32H machine, a printer, display, cash drawer, and possibly other I/O. The components of the 4910 Express Solution are determined by each country or geographical region.

Throughout this guide, the term *4810* refers to all models of the IBM 4810/4910 SurePOS 300. The chapters are organized as follows:

*   Chapter 1, "Introduction," on page 1-1 provides a summary of all the models of the IBM 4810/4910 SurePOS 300.
*   Chapter 2, "Disassembling the 4810/4910 SurePOS 300," on page 2-1 describes the procedure for removing parts from the 4810/4910.
*   Chapter 3, "Problem determination," on page 3-1 describes the procedures for resolving problems.
*   Chapter 4, "Parts catalog," on page 4-1 provides the most recent parts information for the product.

Who should read this manual

This manual is intended for use by experienced personnel responsible for installing and maintaining all models of the IBM 4810 SurePOS 300.

Related publications

The following IBM publications, drivers, and service diskette information are available from the IBM Retail Store Solutions Web site at: http://www.ibm.com/solutions/retail/store. From the store page, select **Support**.

*   *IBM 4820 SurePoint Solution: System Reference*, SA27-4249
*   *IBM 4820 SurePoint Solution Installation and Service Guide*, GA27-4231
*   *IBM 4810 SurePOS 300 Technical Reference*
*   *IBM SurePOS 500/600 Series Planning, Installation, and Operation Guide*, GA27-4254
*   *IBM SurePOS 500/600 Series Hardware Service Guide*, GY27-0396
*   *SureMark Printers User's Guide*, GA27-4151
*   *SureMark Printers Hardware Service Manual*, GY27-0355

Driver and Service Diskette Information

*   Terminal hardware folder
    *   4820 downloads
        *   4694/4695/ISA Service Diskette, Version 5.33 or later
*   Peripheral Drivers folder
    *   IBM POSS Suite, which includes:
        *   POS Device Diagnostics
        *   POSS for Windows
        *   OLE for POS (OPOS)
        *   JavaPOS

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– 4820 Touch Drivers for SurePOS 700 Series, which includes the MicroTouch™ TouchWare™
– POSS for DOS download

Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use the 4810/4910 SurePOS 300 successfully. The following is a high-level list of the accessibility features:

• All controls are located on the front of the machine, in easy reach.
• Industry-standard serial and USB ports allow alternative I/O devices.
• Manuals are available in .PDF format and can be downloaded from the Web. See "Related publications" on page vii for the URL.
• Displays can be driven at 60 Hz to eliminate problems caused by screen flicker.

Uninterruptible power supply option

This product contains a sealed lead acid battery. The battery must be recycled or disposed of properly.

In the United States, IBM has established a collection process for reuse, recycling, or proper disposal of used IBM sealed acid batteries. For information about proper disposal of these batteries, please contact IBM at 1–800–426–4333. Please have the IBM part number listed on the battery available prior to your call.

For information disposal of sealed acid batteries outside the United States, go to the following URL or contact your local waste disposal facility.

http://www.ibm.com/ibm/environment/products/batteryrecycle.shtml

End of life disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at http://www.ibm.com/ibm/environment/products/prp.shtml.

Notice: This mark applies only to countries within the European Union (EU) and Norway.

Appliances are labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

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Between major revisions of this document, we might make minor technical updates. The latest version of this document is available on the Retail Store Solutions Web site at www.ibm.com/solutions/retail/store/support/publications.

11-9-2005

Summary of changes

November 2005

- Inserted the new End-of-Life disposal statement
- Inserted the new Tell us what you think statements
- Added supported models to front cover

February 2005

Updated information on IBM SurePOS 300 to include the 4910-32x model, which is an Express solution that includes the 4810-32H, a printer, display, cash drawer, and possibly other I/O devices. The 4910 Express solutions are country and geographically specific. A revision bar (|) in the left margin indicates updated sections.

December 2004

Added I/O commands information in a new appendix.

June 2004

Added information about new Model W2H. Changed or new information is indicated by a revision bar (|) in the left margin.

April 2004

Deleted reference to the *IBM Compact ANPOS Keyboard*, GA27-4187-00 and added references to *IBM SurePOS 500/600 Series Planning, Installation, and Operation Guide* and *IBM SurePOS 500/600 Series Hardware Service Guide*, GY27-0396. Added information about the 1.2 GHz CPU to the parts catalog.

November 2003

Corrected minor technical errors.

May 2003

Added information about new Model 32x. Updated the parts catalog.

Chapter 1. Introduction

This chapter describes the characteristics of the IBM 4810 SurePOS 300, which includes the machine type 4910.

Product summary

The 4810 consists of a personal computer (PC) core with expansion slots, Electronic Industries Association (EIA) 232 connectors, an Ethernet LAN adapter, and built-in video (VGA) support. In addition to these features, the 4910 SurePOS Express Model includes bundled I/O that may vary according to country and geographic region. Designed specifically for distributed environments, the 4810 can be mounted vertically or horizontally under a check stand or counter.

Features

Table 1-1 describes the features of the 4810/4910 SurePOS 300.

Table 1-1. Summary of features

Feature	Model 31x	Model 32x / Model W2H
CPU	VIA C3 866 MHz /133 MHz	VIA C3 1.2 GHz / 133 MHz

I/O ports	• One parallel printer port
	• Four RS-232 ports:
	  – Two standard
	  – Two powered
	• Four standard, USB ports
	• Keyboard and mouse ports
		• Six RS-232 ports:
		  – Four standard
		  – Two powered
		• Four standard, USB ports
		• Keyboard and mouse ports
		• One cash drawer port

Memory	• Two DIMM slots for industry-standard PC133 SDRAM • 128 MB standard, expandable to 512 MB	
Video	SVGA interface	
LAN	10/100 Ethernet chip capable of supporting both 10BASE-T or 100BASE-TX full- or half-duplex Ethernet. Wired for Management (WfM 2.0).	
Slots	One PCI feature card slot (half size)	
Clock	Nonvolatile real time clock	
Keyboard/ mouse	IBM PS/2® or equivalent keyboard	
Flash memory	Optional Type II Compact Flash socket (mutually exclusive with the 40-GB hard disk drive). This socket is internal to the unit and is not for devices that are removed or inserted as part of their function.	
Hard disk drive (HDD)	Optional 3.5-inch IDE (mutually exclusive with the flash memory).	
Audio	AC97-compatible audio with microphone in, line in and line out.	

The following table lists the standard features shipped with each model:

Table 1-2. Models and features

Model	Base-unit standard feature
4810-310/320	Base model, no media
4810-31H/32H	40-GB HDD
4810-31C/32C	128-MB flash memory

1-1

Table 1-2. Models and features (continued)

Model	Base-unit standard feature
4810-W2H	40-GB HDD, Microsoft® Windows® XP Professional preloaded
4910-32H/32E/32A	40-GB HDD

Note: References in this guide to the 4810 Model 32x also apply to the 4810 Model W2H and 4910 Models 32H, 32E and 32A.

Physical dimensions

Figure 1-1 shows the dimensions of the product:
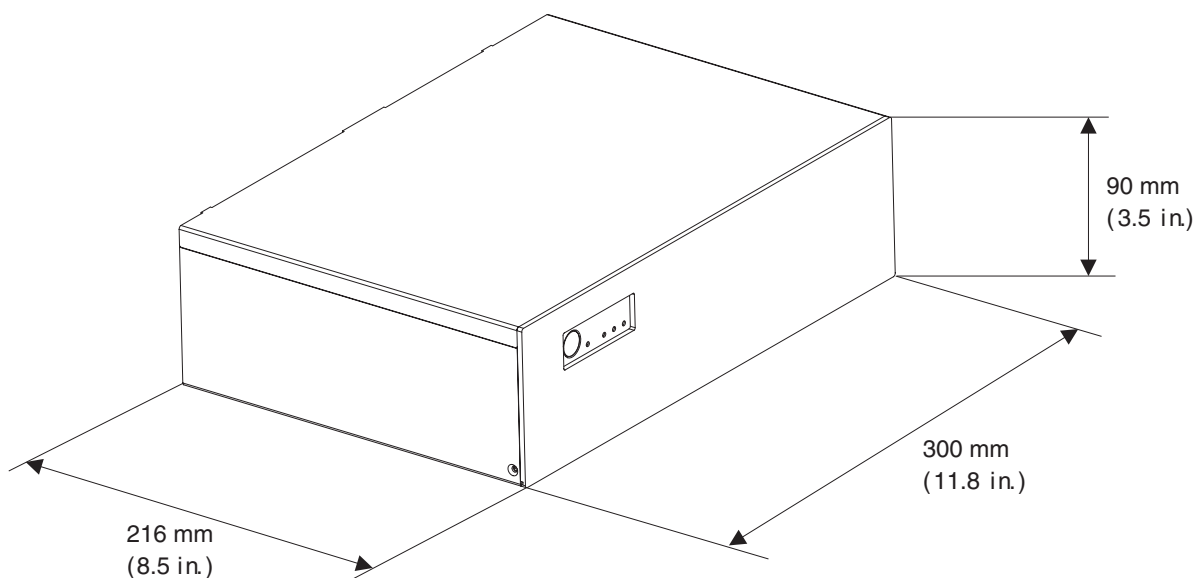
Figure 1-1. Dimensions of the 4810/4910 SurePOS 300 (does not include the I/O devices for the Express models)

- Width: 300 mm (11.8 in.)
- Depth: 216 mm (8.5 in.)
- Height: 90 mm (3.5 in.)
- Weight: 3.2 kg (7 lb.)

Power and cooling

> **Attention**
>
> When installing a new power supply, be sure to set the correct input voltage for your area or you will damage the power supply. See Figure 1-3 on page 1-4 to locate the voltage selection switch.

- Input voltage: 100 - 127 V or 200 - 240 V ac (select using switch)
- Frequency: 50 - 60 Hz (± 3 Hz)
- Power consumption: 100 W maximum; 35 W typical

A fan contained in the power supply provides forced air cooling.

Environmental considerations

Temperature and humidity requirements are as follows:

*   Operating: +10°C to 40°C (50° to 104°F) with 8% to 80% relative humidity
*   Shipping: –40°C to +60°C (–40° to 140° F), which includes condensation but not rain.
*   Storage: 0°C to +60°C (32° to 140° F)

The 4810/4910 SurePOS 300 meets all worldwide Electromagnetic Compatibility (EMC) standards. Refer to Appendix B, "Notices," on page B-1 for a complete description.

Front view and LEDs

Figure 1-2 shows the LEDs of the 4810/4910.
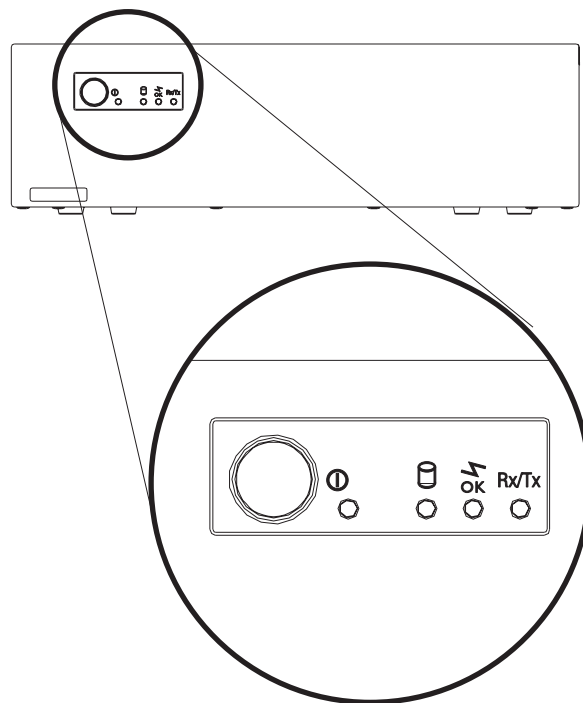
Figure 1-2. Front view of 4810/4910

The LEDs function as follows:

This LED indicates that the 4810/4910 is powered on.

This LED, which blinks during HDD access, indicates HDD activity.

OK

| This network connection LED is on when the 4810/4910 is connected to a
| hub or switch.

Rx/Tx

This LED blinks during receive/send transmission.

Rear connectors

| See the rear connector for your 4810/4910 model:
| • Go to "Rear connectors 4810 (31x models)."
| • Go to "Rear connectors 32x models" on page 1-6.

| Rear connectors 4810 (31x models)

| Figure 1-3 shows the connections available on the 4810 (models 31x) and
| 4910-32H:

Note: Not sure whether placing 4910 in the heading is correct. Please advise whether the 4910 models would follow the current grouping of the rear connectors for the 4810 models 31x and 32x. If not, how should the 4910 be incorporated?
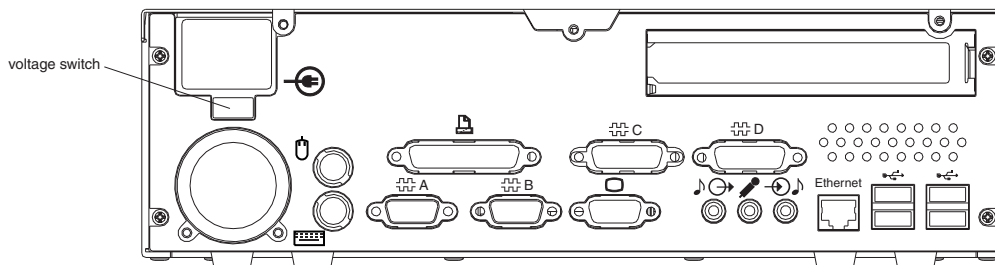
Figure 1-3. 31x models rear view connections. Note the location of the voltage selection switch.

USB ports.

Parallel port. Optionally, you can plug a parallel-interface device into this port.

SVGA display port.

A   Port for external serial devices, such as a scale or a scanner. This port is COM1.

B   Port for a second external serial device. This port is COM2.

C

Port for a third serial device, which is 12 V powered.

D

Port for a fourth serial device, which is 12 V powered.

Port for an Ethernet LAN cable.

Mouse port.

Port for a PS/2 or compatible keyboard.

Microphone port.

Audio input port.

Port for audio output, such as self-amplified speakers

power   Power. The voltage switch allows you to select 100-127 V or
200-240 V ac.

> **Attention**
>
> When installing a new power supply, be sure to set the correct
> input voltage for your area or you will damage the power
> supply. See Figure 1-3 on page 1-4 to locate the voltage
> selection switch.

Rear connectors 32x models

Figure 1-4 shows the connections available on the 4810/4910 models 32x:
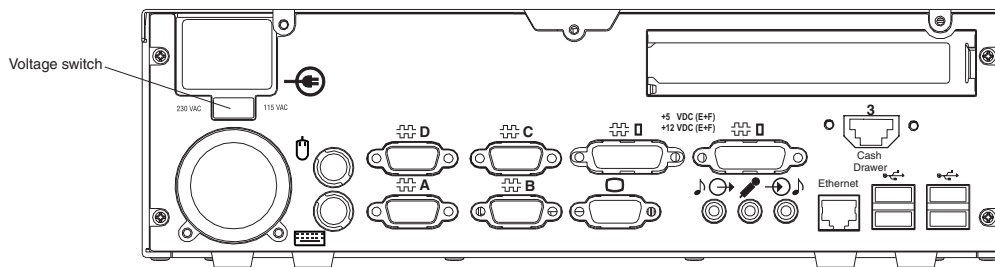
Figure 1-4. 32x models rear view connections. Note the location of the voltage selection switch.

USB ports.	
SVGA display port.	
A	Port for external serial devices, such as a scale or a scanner. This port is COM1.
B,C,D	Ports for second, third, and fourth external serial devices.
E	Port for a fifth serial device, which is 12 V powered.
F	Port for a sixth serial device, which is 12 V powered.
	Port for an Ethernet LAN cable.
	Mouse port.
	Port for a PS/2 or compatible keyboard.
	Microphone port.
	Audio input port.

Port for audio output, such as self-amplified speakers

power

Power. The voltage switch allows you to select 100-127 V or 200-240 V ac.

┌─ **Attention** ─────────────────────┐
When installing a new power supply, be sure to set the correct input voltage for your area or you will damage the power supply. See Figure 1-4 on page 1-6 to locate the voltage selection switch.
└──────────────────────────────────────┘

Chapter 2. Disassembling the 4810/4910 SurePOS 300

This section describes how to disassemble the 4810/4910 SurePOS 300.
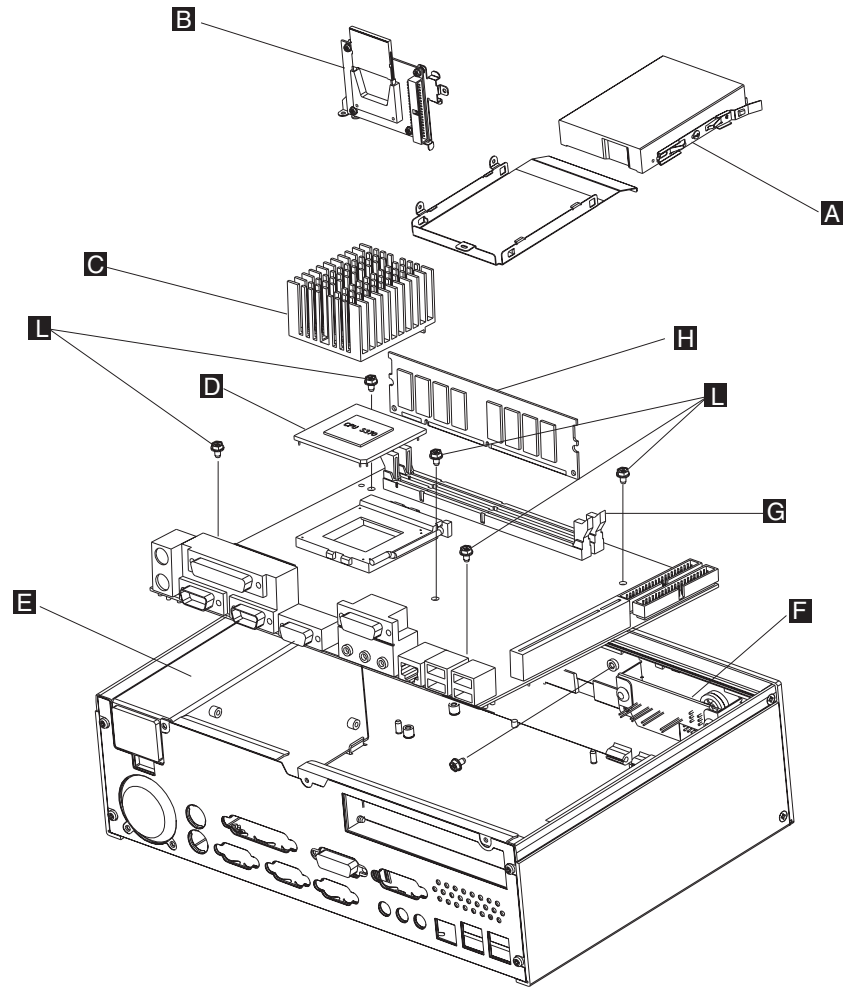
Figure 2-1. View of components

1. Unplug the power cord.
2. Remove the cover from the unit.
3. Remove the hard drive (**A** in Figure 2-2 on page 2-2) or compact flash (**B**):

   Note: The unit can accommodate either the hard disk drive or the compact flash.

   a. To remove the hard drive, disconnect the power and interface cables from the hard drive.
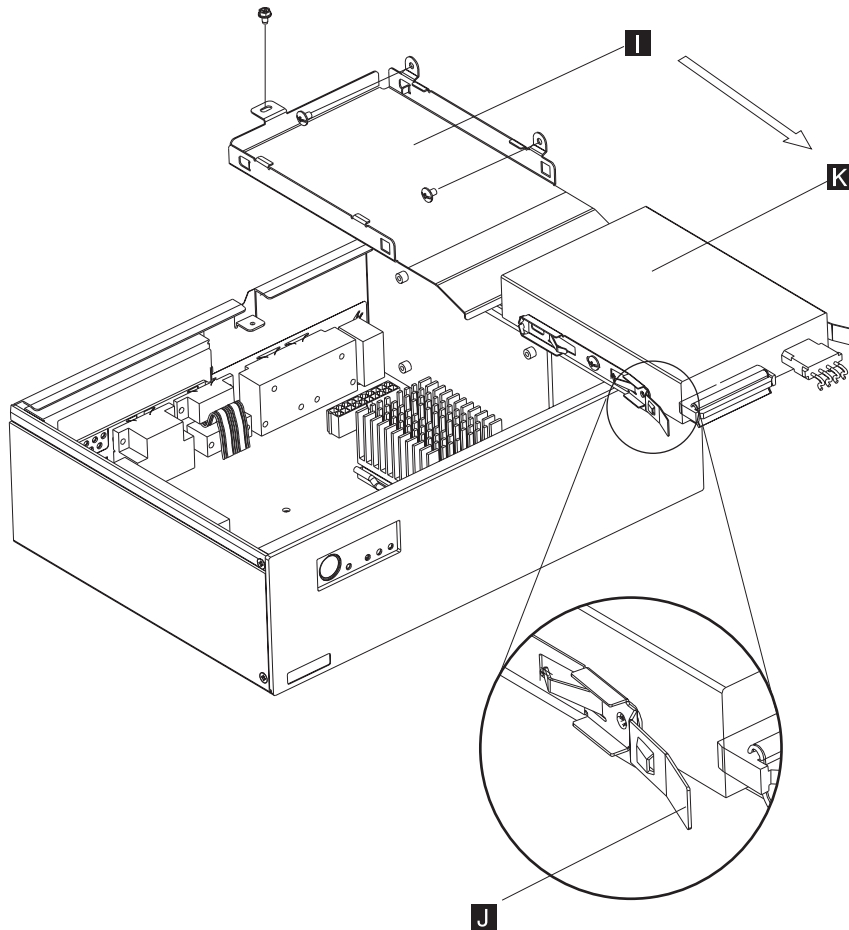
Figure 2-2. Bracket assembly and hard drive

  b. Using Figure 2-2, follow the directions for either an HDD or flash memory.

   • Press to release the tabs (**J**) on each side of the hard drive (**K**) and slide it out of the bracket (**I**).

   • To remove the compact flash:

    1) Disconnect the cables from the compact flash

    2) Remove the screws holding the assembly. Slide the compact flash card assembly (**B** in Figure 2-1 on page 2-1) to one side and lift out.

 4. Using Figure 2-1 on page 2-1, press and lift the clamps (**G**) on each side of the dual inline memory module (DIMM) (**H**) to lift it from the socket.

Note: Removing the central processing unit (CPU) and heat sink is necessary only if you are replacing the CPU.

 5. Remove the heat sink (**C** in Figure 2-1 on page 2-1) and the CPU (**D**):

  a. To remove the heat sink, press down and then forward on the clamp.

  b. Break the silicon grease bond by twisting and then lifting the heat sink.

  c. Lift the zero insertion force (ZIF) connector from the CPU.

  d. Remove the CPU from the unit.

 6. Remove the LED assembly (**F** in Figure 2-1 on page 2-1) by removing the screws and sliding it to one side.

 7. Remove the power supply (**E**):

2-2 SurePOS Installation and Service

    a. Unplug the connector and remove the screws that hold the power supply.

    b. Lift the power supply from the unit.

Attention

When installing a new power supply, be sure to set the correct input voltage for your area or the power supply will be damaged. See Figure 1-3 on page 1-4 to locate the voltage selection switch.

---

8. Remove the screws holding the riser card and then remove riser card.
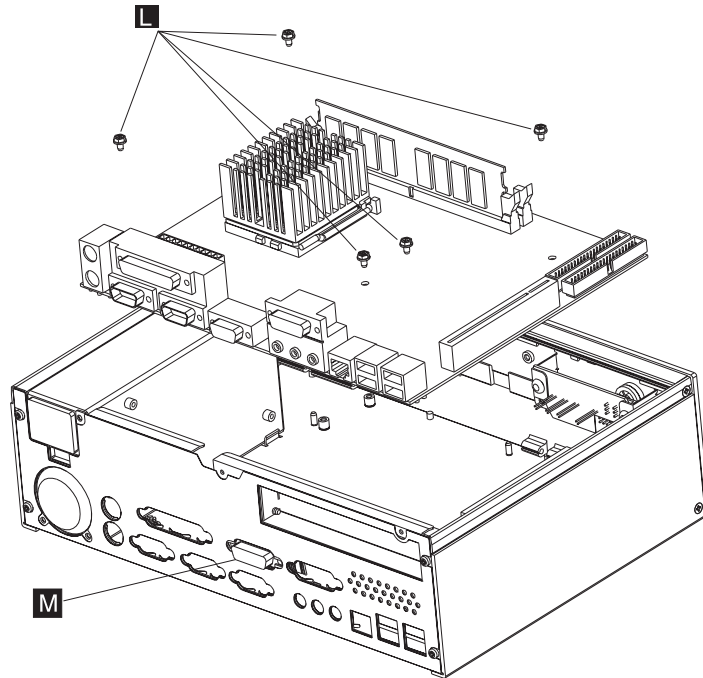
Figure 2-3. Planar board assembly

9. Using Figure 2-3 or Figure 2-1 on page 2-1, remove the screws (**L**) holding the planar board to the frame.

10. Remove the RS-232 panel-mounted connector (**M**).

11. You can now lift the planar board from the unit.

12. To reassemble the 4810/4910 SurePOS 300, reverse this procedure.

Note: For disassembling instructions for the SureMark printer and other I/O bundled with the 4910, please refer to each device's respective service guides.

Chapter 3. Problem determination

Note: Refer to *IBM Safety Information - Read This First*, GA27-4004, before
beginning the procedures in this chapter.

Both software errors or hardware failures can cause problems with the 4810/4910
SurePOS 300. This chapter contains troubleshooting information to help you
determine the cause of a problem and how to solve it.

Preliminary checklist

Begin each service call by checking all of the items in this preliminary checklist. If,
after performing all the steps, a problem still exists, refer to Table 3-1 to continue
problem determination.

1. Observe the power light. If it is not on, refer to Table 3-1.
2. Verify that the cables are securely and correctly connected.
3. Verify that the I/O devices, which have their own power switches, are connected
   to an ac power outlet that is operating correctly and that the devices are
   powered on.
4. Verify that the contrast and brightness controls on the video display (if attached)
   are set correctly.
5. Verify that all installed hardware devices (such as a memory module, feature
   card, printer, or mouse) are connected correctly and securely.

Table 3-1. 4810/4910 symptoms

Symptom	Actions
The power LED is off.	1. Verify that the power cord is plugged into both the wall outlet and the back of the terminal. 2. Verify that the voltage switch setting is correct for your area. 3. Verify that the terminal is powered on. 4. Verify that there is power from the outlet. 5. Disconnect all attached devices and feature cards to determine if one is overloading the power supply. If the power light returns, reconnect them one at a time to determine the failing field-replaceable unit (FRU). 6. Ensure that all internal cabling and memory modules are correctly inserted. 7. Exchange the power supply. 8. Exchange the system board.
Terminal is not operating.	1. Unplug the power outlet, wait 5 seconds, and then power ON. Verify that the power light on the front panel is on. Look for any error messages and listen for a beep at the completion of the POST. 2. Check for a blown fuse, a tripped circuit breaker, or a power failure. 3. Verify that all cables are securely connected to and inside of the terminal.
Power on, LED does not light.	Replace the LED assembly.

3-1

> **Note:** To troubleshoot problems with the 4610 SureMark Printer, please refer to the *SureMark Printers Hardware Service Guide*, GY27-0355. For other I/O devices bundled with the 4910, please refer to each device's respective service guide.

Chapter 4. Parts catalog

This chapter provides parts information available for the Model 31x and 32x system units. See the *IBM Store Systems: Parts Catalog*, for parts information about peripheral devices.

4-1

Assembly 1: Field-replaceable units
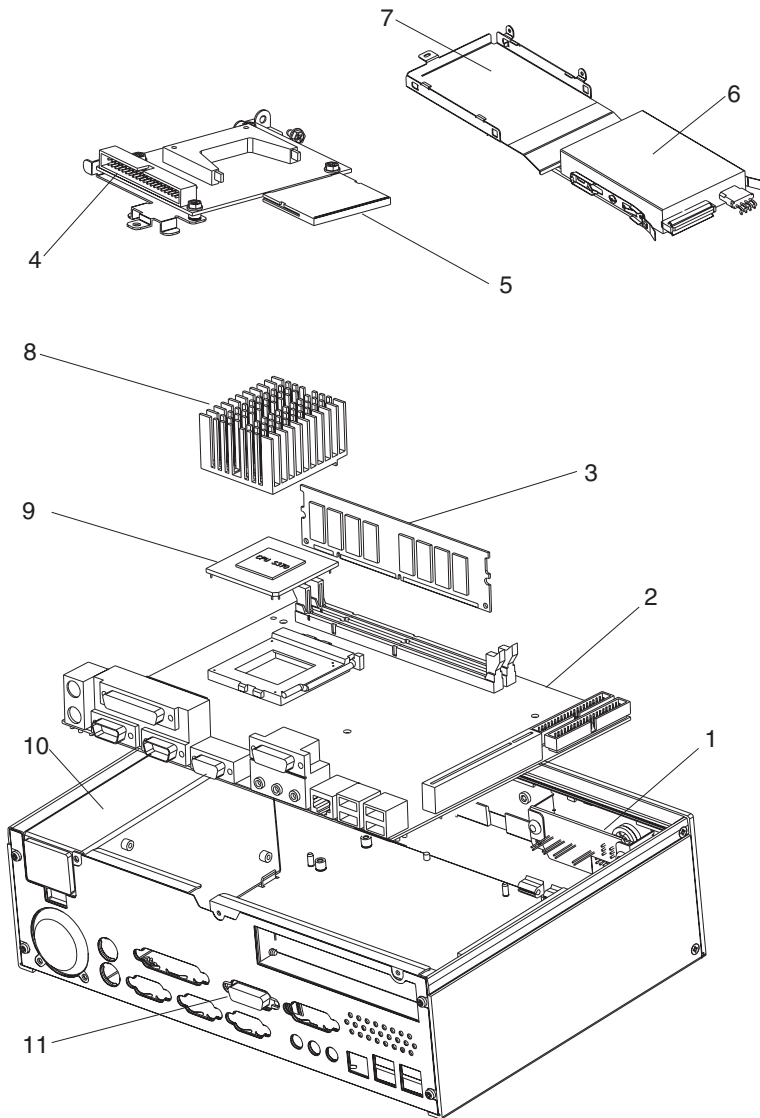
Asm– Index	Part Number	Units	Description
1–1	45P6211	1	LED panel
–2	03R5908	1	System board (31x)
–2	03R5973	1	System board (32x)
–3	16K9262	1	128-MB DIMM
–	45P6236	1	256-MB DIMM
–	03R5924	1	512-MB DIMM
–4	45P6205	1	Compact Flash mount
–5	45P6203	1	64-MB Compact Flash
–	45P6235	1	128-MB Compact Flash
–	45P6209	1	Riser card (31x, not shown)
–	03R5968	1	Riser card (32x, not shown)
–	45P6222	1	Battery (not shown)
–6	03R5912	1	HDD
–7	03R5911	1	HDD bracket
–	45P6206	1	HDD cable (not shown)
–8	45P6090	1	CPU heat sink (31x)
–8	03R5953	1	CPU heat sink and fan (32x)
–9	47P9036	1	866 MHz CPU (31x)
–9	03R5970	1	1.2 GHz CPU (32x)
–	45P6213	1	Parts kit (not shown)
–10	45P6204	1	100 W power supply
–11	03R5929	1	Panel-mounted 15-pin connector
–	42L0098	1	Ethernet cable (not shown)
–	03R5972	1	CD port card (32x, not shown)
–	03R5969	1	Panel-mounted 9-pin serial connector (32x, not shown)
–	03R5974	1	Riser power connector (32x, not shown)

Note: For a list of field replaceable units for the printer that is bundled with 4910, refer to the *SureMark Printers Hardware Service Guide*, GY27-0355. For other I/O devices bundled with the 4910, please refer to each device's respective service guide.

Appendix A. Input/output device commands

This section lists the commands and their usage.

Character display (VFD) commands

The integrated customer display and distributed customer 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 (U.S./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 U.S./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 A-1 on page A-3 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 data stream indicates that the related pixel position is ON; a 0 indicates that it is OFF.

*Table A-1. 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 A-2 for defined characters:

Table A-2. 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
betweenX'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 A-3 on page A-4 shows the format of these eight bytes.
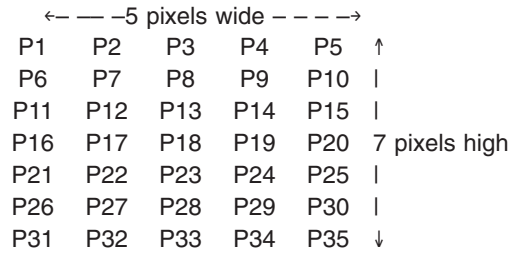
Note: A hyphen character in the table indicates a do-not-care bit.
The other values relate to the character pixel positions
shown in the diagram following the table. A value of 1 in the
appropriate place in the data stream indicates that the
related pixel position is ON; a 0 indicates that it is OFF.

Table A-3. 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  ↓
```
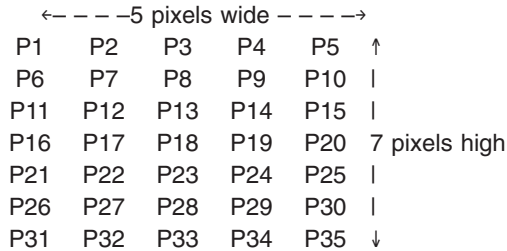
Brightness control (04) <EOT>

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 A-7.

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

(06), (1B, 06), (07), (1B), 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

```
(1B), (5B, 32), (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 address)
    2 hex digits Pf=1, 2
    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' (Positions X'8200'--X'823F' are not available.)
   X'8840'--X'88FF', X'8940'--X'9FFF' (Positions X'8900'--X'893F' are not available.)
   X'E040'--X'E0FF', X'E140'--X'EAFF' (Positions 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' (Positions X'8200'--X'829F' are not

Appendix A. Input/output device commands   **A-13**

available.)

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

X'CAA0'--X'CAFF', X'CBA0'--X'FDFF' (Positions 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' (Positions X'A200'--X'A29F' are not available.)

X'B0A0'--X'B0FF', X'B1A0'--X'F7FF' (Positions 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' (Positions X'A200'--X'A23F' are not available.)

X'C940'--X'C9FF', X'CA40'--X'F9FF' (Positions 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

(06), (1B, 06), (07), (1B, 07)

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

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Germany

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 30. August 1995 (bzw. der EMC EG Richlinie 89/336).

Dieses Gerät ist berechtigt. in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

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

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

Das Gerät erfüllt die Schutzanforderungen nach EN 50082–1 und EN 55022 Klasse A.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden:

″Warnung: dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maβnahmen durchzuführen und dafür aufzukommen.″

EN 50082–1 Hinweis:

″Wird dieses Gerät in einer industriellen Umgebung betrieben (wie in EN 50082–2 festgelegt), dann kann es dabei eventuell gestört werden. In solch einem Fall ist der Abstand bzw. die Abschirmung zu der industriellen Störquelle zu vergröβern.″

Anmerkung:

Um die Einhaltung des EMVG sicherzustellen, sind die Geräte, wie in den IBM Handbüchern angegeben, zu installieren und zu betreiben.

Australia / New Zealand

Attention: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Japanese power line harmonics compliance statement

高調波ガイドライン適合品

高調波ガイドライン適合品

Japanese Voluntary Control Council for Interference (VCCI) statement

This product is a Class A Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Technology Equipment (VCCI). In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

　この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Korean Communications Statement

Please note that this device has been approved for business purposes with regard to electromagnetic interference. If you find this is not suitable for your use, you may exchange it for a non-business purpose one.

A급 기기(업무용)

이 기기는 업무용으로 전자파적합등록을 받은 기기이오니
판매자 또는 이용자는 이점을 주의하시기 바라며, 만약
구입하였을 때에는 구입한 곳에서 가정용으로 교환하시기
바랍니다.

Taiwanese class A warning statement

警告使用者:
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策•

Taiwanese battery recycling statement

Waste batteries, please recycle.

廢電池請回收

Chinese Class A warning statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

中华人民共和国"A 类"警告声明

> 声　明
> 此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

Electrostatic discharge (ESD)

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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Appendix C. Safety information

Danger:

Before you begin to install this product, read the safety information in *IBM Safety Information — Read This First*, GA27-4004. This booklet describes safe procedures for cabling and plugging in electrical equipment.

Gevaar:

Voordat u begint met de installatie van dit produkt, moet u eerst de veiligheidsinstructies lezen in de brochure *Veiligheidsinstructies—Lees dit eerst*, GA27-4004. Hierin wordt beschreven hoe u electrische apparatuur op een veilige manier moet bekabelen en aansluiten.

C-1

⚠

Perigo:

Antes de começar a instalar este produto, leia as informações de segurança
contidas em *Informações Sobre Seguranaça—Leia Isto Primeiro,* GA27-4004.
Esse folheto descreve procedimentos de segurança para a instalação de
cabos e conexões em equipamentos elétricos.

⚠

Fare!

Før du installerer dette produkt, skal du læse sikkerhedsforskrifterne i
Sikkerhedsforskrifter—Læs dette først GA27-4004. Vejledningen beskriver den
fremgangsmåde, du skal bruge ved tilslutning af kabler og udstyr.

⚠

Gevaar

Voordat u begint met het installeren van dit produkt, dient u eerst de
veiligheidsrichtlijnen te lezen die zijn vermeld in de publikatie *IBM Safety
Information — Read This First*, GA27-4004. In dit boekje vindt u veilige
procedures voor het aansluiten van elektrische appratuur.

⚠

VAARA

Ennen kuin aloitat tämän tuotteen asennuksen, lue julkaisussa *Turvaohjeet—Luetämä ensin*, GA27-4004, olevat turvaohjeet. Tässä kirjasessa on ohjeet siitä, miten sähkölaitteet kaapeloidaan ja kytketään turvallisesti.

⚠

Danger

Avant d'installer le présent produit, consultez le livret *Informations pour la sécurité–Lisez-moi d'abord*, GA27-4004, qui décrit les procédures à respecter pour effectuer les opérations de câblage et brancher les équipements électriques en toute sécurité.

⚠

Vorsicht

Bevor mit der Installation des Produktes begonnen wird, die Sicherheitshinweise in *Sicherheitsinformationen—Bitte zuerst lesen,* IBM Form GA27-4004. Diese Veröffentlichung beschreibt die Sicherheitsvorkehrungen für das Verkabeln und Anschlieβen elektrischer Geräte.

⚠

Vigyázat

Mielôtt megkezdi a berendezés üzembe helyezését, olvassa el a *IBM Safety Information — Read This First*, GA27-4004 könyvecskében leírt biztonsági információkat. Ez a könyv leírja, milyen biztonsági intézkedéseket kell megtenni az elektromos berendezés huzalozásakor illetve csatlakoztatásakor.

⚠

Pericolo

prima di iniziare l'installazione di questo prodotto, leggere le informazioni relative alla sicurezza riportate nell'opuscolo *Informazioni di sicurezza—Prime informazioni da leggere* in cui sono descritte le procedure per il cablaggio ed il collegamento di apparecchiature elettriche.

⚠

Fare

Før du begynner å installere dette produktet, må du lese sikkerhetsinformasjonen i *Sikkerhetsinformasjon—Les dette først,* GA27-4004 som beskriver sikkerhetsrutinene for kabling og tilkobling av elektrisk utstyr.

⚠

Perigo

Antes de iniciar a instalação deste produto, leia as informações de segurança *Informações de Segurança—Leia Primeiro,* GA27-4004. Este documento descreve como efectuar, de um modo seguro, as ligações eléctricas dos equipamentos.

⚠

Peligro

Antes de empezar a instalar este producto, lea la información de seguridad en *Información de Seguridad—Lea Esto Primero,* GA27-4004. Este documento describe los procedimientos de seguridad para cablear y enchufar equipos eléctricos.

⚠

Varning—livsfara

Innan du börjar installera den här produkten bör du läsa
säkerhetsinformationen i dikumentet *Säkerhetsföreskrifter—Läs detta först,*
GA27-4004. Där beskrivs hur du på ett säkert sätt ansluter elektrisk utrustning.

危險：安裝本產品之前，請先閱讀
"IBM Safety Information--Read
This First" GA27-4004 手冊中所提
供的安全注意事項。 這本手冊將會說明
使用電器設備的纜線及電源的安全程序。

Opasnost: Prije nego sto pŏcnete sa instalacijom produkta,
pročitajte naputak o pravilima o sigurnom rukovanju u
Upozorenje: Pravila o sigurnom rukovanju - Prvo pročitaj ovo,
GA27-4004. Ovaj privitak opisuje sigurnosne postupke za
priključivanje kabela i priključivanje na električno napajanje.

Upozornění: než zahájíte instalaci tohoto produktu, přečtěte si
nejprve bezpečnostní informace v pokynech „ Bezpečnostní
informace" č. GA27-4004. Tato brožurka popisuje bezpečnostní
opatření pro kabeláž a zapojení elektrického zařízení.

Κίνδυνος: Πριν ξεκινήσετε την εγκατάσταση αυτού του προϊόντος,
διαβάστε τις πληροφορίες ασφάλειας στο φυλλάδιο *IBM Safety
Information-Read this first,* GA27-4004. Στο φυλλάδιο αυτό
περιγράφονται οι ασφαλείς διαδικασίες για την καλωδίωση των
ηλεκτρικών συσκευών και τη σύνδεσή τους στην πρίζα.

危險： 導入作業を開始する前に、安全に関する
小冊子 GA27-4004 の「最初にお読みください」
(Read This First)の項をお読みください。
この小冊子は、電気機器の安全な配線と接続の
手順について説明しています。

위험: 이 제품을 설치하기 전에 반드시
"주의: 안전 정보–시작하기 전에"
(GA27-4004) 에 있는 안전 정보를
읽으십시오.

סכנה : לפני שמתחילים בהתקנת מוצר זה, יש לקרוא את הוראות הבטיחות בחוברת
Caution: Safety Information - Read This First, GA27-4004
חוברת זו מתארת את הוראות הבטיחות לחיבור הכבלים ולחיבור לחשמל של ציוד חשמלי.

خطــر : قبــل عمــلية بــدء تركيــب هذا المنتــج، قم بقراءة معلومـات
الحمــاية الموجودة في التحذيــر: معلومــات الحمــاية – Read This First ,
GA27-4004 . يقــوم هذا الكتيــب بوصــف اجــراءات الآمــان
لتوصــيل الأدوات الكــهربائية بالكــابلات والمقبــس الكــهربائــي.

11-9-2005

ОПАСНОСТ
Пред да почнете да го инсталирате овој продукт, прочитајте
ja информацијата за безбедност:
"Предупредување: Информација за безбедност: Прочитајте го
прво ова", GA27-4004.
Оваа брошура опишува безбедносни процедури за каблирање
и вклучување на електрична опрема.

Uwaga:
Przed rozpoczęciem instalacji produktu należy zapoznać się z instrukcją:
"IBM Safety Information - Read This First", GA27-4004.
Zawiera ona warunki bezpieczeństwa przy podłączaniu do sieci elektrycznej
i eksploatacji.

ОСТОРОЖНО: Прежде чем инсталлировать этот
продукт, прочтите Инструкцию по технике безо-
пасности в документе "Внимание: Инструкция по
технике безопасности -- Прочесть в первую очередь",
GA27-4004. В этой брошюре описаны безопас-
ные способы каблирования и подключения элект-
рического оборудования.

Nebezpečenstvo: Pred inštaláciou výrobku si prečítajte
bezpečnosté predpisy v
Výstraha: Bezpeč osté predpisy - Prečítaj ako prvé,
GA27-4004.   V tejto brožúrke sú opísané bezpečnosté
postupy pre pripojenie elektrických zariadení.

Pozor: Preden zaènete z instalacijo tega produkta
preberite poglavje: 'Opozorilo: Informacije
o varnem rokovanju-preberi pred uporabo,"
GA27-4004. To poglavje opisuje pravilne
postopke za kabliranje,

危險：

　　　　開始安裝此產品之前，請先閱讀安全資訊。

注意：

　　　　請先閱讀 - 安全資訊 GA27-4004

　　　　此冊子說明插接電器設備之電纜線的安全程序。

危险：
在开始安装本产品之前，请阅读
IBM Safety Information - Read This First，
GA27-4004 中的安全信息。
此手册描述了如何安全地连接和插拔电气设备。

Appendix C. Safety information   **C-7**

Index

Numerics

Readers' Comments — We'd Like to Hear from You

SurePOS 300
Installation and Service Guide for 4810/4910
Model 31x, 32x, W2H

Publication No. GA27-4309-01

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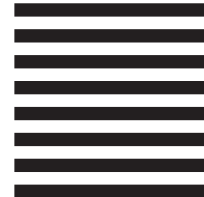
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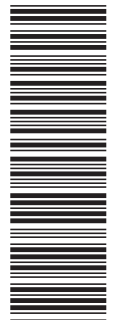Fold and Tape   **Please do not staple**   Fold and Tape

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