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IBM 4684 Point of Sale Terminal:

Introduction and Planning Guide

Document Number SA27-3835-02

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EDITION Edition Notice
Third Edition (March 1992)

This is the third edition of the *IBM 4684 Point of Sale Terminal:
Introduction and Planning Guide*. It replaces SA27-3835-01 and applies
to the IBM (*) 4684 Point of Sale Terminal and an IBM 4683 Point of
Sale Terminal when attached to the IBM 4684 Point of Sale Terminal. A
vertical bar appears in the left margin to indicate new or revised
information. See the Summary of Changes for a list of changes in this
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FRONT_1.2 Electronic Emissions Notices

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FRONT_1.2.2 Canadian Department of Communications Compliance Statement

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Communications du Canada. L'exploitation faite en milieu résidentiel peut
entraîner le brouillage des réceptions radio et télé, ce qui obligerait le
propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en
éliminer les causes.

PREFACE Preface

This manual is a guide for planning for the IBM 4684 Point of Sale
Terminals. It is intended for the person responsible for planning the
installation and operation of the terminals.

   Topic 1 is an introduction to the IBM 4684 Point of Sale Terminals and
   their capabilities, the devices that can be connected to your
   terminals, and input and output configuration possibilities.

   Topic 2 describes the devices that may attach to the terminals in
   further detail and describes security and safety considerations.

   Topic 3 describes the required wiring hardware for the terminals, the
   planning necessary to install the required wiring, including that
   which is required to connect 4684s, 4683s, and a baseband network, and
   wiring test procedures.

   Topic 4 describes the hardware considerations for communicating with a
   host location.

| Appendix A describes considerations unique to World Trade countries.

| Appendix B contains information on expendable supplies and replaceable
| parts.

| Appendix C contains technical information on the dimensions of the
| units and devices you may attach to the terminals.

| Appendix D illustrates the power plugs and receptacles the terminals
| use.

| Appendix E contains configuration worksheets to attach the devices to
| the 4684 and 4683 terminals.

 Subtopics
 PREFACE.1 Store System Library
 PREFACE.2 Related Publications -- Software
 PREFACE.3 Related Publications -- Hardware

PREFACE.1 Store System Library

The following chart relates each publication in the library to the task or
tasks for which it provides data. Choose the task that you want to
complete, and find the appropriate publication in the corresponding
column.

Table 1. Store System Library - Publication Grouping by Task

Planning	Installing	Operating	Programming	Maintaining
IBM 4680 Store System: Selecting Hardware and Software Components GA27-3691	IBM 4683 Point of Sale Terminal: Installation Guide SA27-3783	IBM 4683/4684 Point of Sale Terminal: Operations Guide SA27-3704	IBM 4680 BASIC: Language Reference SC30-3356	IBM 4680 Store System and IBM 4683/4684 Point of Sale Terminal: Problem Determination Guide SY27-0330
IBM 4680 Store System: Planning and Configuration Guide GC30-3532	IBM 4680 Store System: User's Guide SC30-3518	IBM 4680 Store System: Programming Guide SC30-3517	IBM 4680 Store System: Terminal Test Procedures Reference Summary GX27-3779
IBM 4680 Store System: Preparing Your Site GA27-3692	IBM 4684 Point of Sale Terminal: Installation Guide SA27-3837	IBM 4680 Store System: Display Manager User's Guide SC30-3404		IBM 4684 Point of Sale Terminal: Maintenance Summary Card SX27-3885
IBM 4684 Point of Sale Terminal: Introduction and Planning Guide SA27-3835	IBM Personal System/2 Store Loop Adapter/A Installation and Setup Instructions SK2T-0318			IBM 4683/4684 Point of Sale Terminal: Maintenance Manual SY27-0295
	IBM 4684 Store Loop Adapter/A: Installation, Testing, Problem Determination, and Technical Reference SD21-0045			IBM 4683/4684 Point of Sale Terminal: Parts Catalog S131-0097
		IBM 4680 Store System: Messages Guide SC30-3521		
		See the related publications sections for the application manuals that support these tasks.		

| PREFACE.2 Related Publications -- Software

|**IBM Retail Industry Programming Support Services**

| *IBM Retail Industry Programming Support Services: Planning and*
| *Installation Guide - SC33-0575*

| *IBM Retail Industry Programming Support Services: Base Package*
| *Programmer's Guide - SC33-0576*

| *IBM Retail Industry Programming Support Services: Device Drivers*
| *Programmer's Guide - SC33-0680*

| *IBM Retail Industry Programming Support Services: Host Communication*
| *Package Programmer's Guide - SC33-0650*

|**IBM 4680 General Sales Application**

| *IBM 4680 General Sales Application: Planning and Installation Guide -*
| *GC30-3368*

| *IBM 4680 General Sales Application: Guide to Operations - SC30-3369*

| *IBM 4680 General Sales Application: Programming Guide - SC30-3370*

| *IBM 4680 General Sales Application - Price Management Feature: User's*
| *Guide - SC30-3461*

| *IBM 4680 General Sales Application - Terminal Offline Feature: User's*
| *Guide - SC30-3499*

|**IBM 4680 Supermarket Application**

| *IBM 4680 Supermarket Application: Planning and Installation Guide -*
| *GC30-3371*

| *IBM 4680 Supermarket Application: Guide to Operations - SC30-3372*

| *IBM 4680 Supermarket Application: Programming Guide - SC30-3373*

| *IBM 4680 Supermarket Application - Terminal Offline Feature: User's*
| *Guide - SC30-3512*

| *IBM 4680 Supermarket Application - Electronic Funds Transfer Feature:*
| *User's Guide - SC30-3513*

|**IBM 4680 Chain Drug Sales Application**

| *IBM 4680 Chain Drug Sales Application: Planning and Installation*
| *Guide - GC30-3412*

| *IBM 4680 Chain Drug Sales Application: Guide to Operations -*
| *SC30-3413*

| *IBM 4680 Chain Drug Sales Application: Programming Guide - SC30-3414*

|**IBM 4680 Store Management Application**

| *IBM 4680 Store Management Application: Planning and Installation*
| *Guide - GC30-3483*

| *IBM 4680 Store Management Application: Guide to Operations -*
| *SC30-3484*

| *IBM 4680 Store Management Application: Programming Guide - SC30-3487*

| *IBM 4680 Store Management Application - Inventory Control Feature:*
| *User's Guide - SC30-3485*

| *IBM 4680 Store Management Application - Price Management Feature:*
| *User's Guide - SC30-3486*

|**IBM 4684 Store Sales Application**

| *IBM 4684 Store Sales Application: Planning and Installation Guide -*
| *SB11-8470*

| *IBM 4684 Store Sales Application: Programmer's Reference Manual -*
| *SB11-8472*

| *IBM 4684 Store Sales Application: Operator's Guide - SB11-8471*

| *IBM 4684 Store Run-time Support System: Installation and User's Guide*
| *- SB11-8552*

| *IBM 4684 Store Application Tool Kit: Programmer's Guide - SB11-8478*

|**In-Store Processing**

| *In-Store Processing: Application Development Guide - SC30-3534*

| *In-Store Processing: IBM AIX - Application Development Guide -*
| *SC30-3537*

| *In-Store Processing: IBM OS/2 Extended Edition - Application*
| *Development Guide - SC30-3538*

| *In-Store Processing: IBM OS/400 - Application Development Guide -*
| *SC30-3535*

| *In-Store Processing: IBM 4680 OS - Application Development Guide -*
| *SC30-3536*

|**Networks**

| *IBM Local Area Network Support Program - IBM P/N 83X7873*
| *IBM PC Network Baseband Planning Guide - S68X-2269*
| *IBM PC Network Broadband Guide - S68X-2269*
| *IBM Token-Ring Network Introduction and Planning Guide - GA27-3677-2*

| PREFACE.3 Related Publications -- Hardware

| **Scanners**

| IBM 1520 Hand-Held Scanner User's Guide - GA27-3685

| IBM 4686 Retail Point of Sale Scanner: Physical Planning,
| Installation, and Operation Guide - SA27-3854

| IBM 4686 Retail Point of Sale Scanner: Maintenance Manual - SY27-0319

| IBM 4687 Point of Sale Scanner Model 1: Physical Planning,
| Installation, and Operation Guide - SA27-3855

| IBM 4687 Point of Sale Scanner Model 1: Maintenance Manual -
| SY27-0317

| IBM 4687 Point of Sale Scanner Model 2: Physical Planning Guide -
| SA27-3882

| IBM 4687 Point of Sale Scanner Model 2: Operator's Guide - SA27-3884

| IBM 4687 Point of Sale Scanner Model 2: Maintenance Manual -
| SY27-0324

| **IBM Personal Computer and IBM Personal System/2 (***)

| IBM Guide to Operations - Personal Computer/AT - IBM P/N 6280066

| IBM Guide to Operations - Personal Computer/AT - Store Loop Adapter -
| SA27-3694

| IBM Hardware Maintenance and Service - Personal Computer/AT - Store
| Loop Adapter - SX27-0296

| IBM Personal System/2 - Model 50 Quick Reference and Reference
| Diskette - S68X-2247

| IBM Personal System/2 - Model 60 Quick Reference and Reference
| Diskette - S68X-2213

| IBM Personal System/2 - Model 70 Quick Reference and Reference
| Diskette - S68X-2308

| IBM Personal System/2 - Model 80 Quick Reference and Reference
| Diskette - S68X-2284

| IBM Personal System/2 - Store Loop Adapter/A: Supplements for the
| Hardware Maintenance Library - SK2T-0319

| **Cabling**

| A Building Planning Guide for Communication Wiring - G320-8059
| IBM Cabling System Planning and Installation Guide - GA27-3361
| IBM Cabling System Catalog - G570-2040 Using the IBM Cabling System
| with Communication Products - GA27-3620
| IBM PC Network Broadband Guide - S68X-2269
| IBM Token-Ring Network Introduction and Planning Guide - GA27-3677

| **Setup and Verification**

| IBM 4680 Store System: Setup and Verification - SA27-3703

 Subtopics
 PREFACE.3.1 General Publications

| PREFACE.3.1 General Publications

| *Advanced Data Communications for Stores - General Information -*
| *GH20-2188*

| *Distributed Systems Executive - General Information - GH19-6394*

| *IBM Disk Operating System 4.0 - IBM P/N 6280256*

| *IBM Proprinters - SC31-3793*

| *IBM 3270 Emulation Feature for the IBM 4680 Store System - (Online*
| *with the product)*

| *IBM 4680 Support for COBOL Version 2 - (Online with the product)*

| *IBM 4680 Store System Regression Tester - (Online with the product)*

| *NetView Distribution Manager: General Information - GH19-6587*

| *Systems Network Architecture: General Overview - GC30-3073*

CHANGES Summary of Changes

Subtopics

CHANGES.1 SA27-3835-2 (March 1992)

This edition includes information about new devices and enhancements
associated with the IBM 4684 Point of Sale Terminal and an IBM 4683 Point
of Sale Terminal when attached to the IBM 4684 Point of Sale Terminal.
This edition includes information on:

    IBM ANPOS Keyboard
    IBM 4683 Point of Sale Printer Model 3
    IBM 4684 Model 200
    IBM 4684 Model 300.

CHANGES.2 SA27-3835-1 (December 1989)

This edition includes information about new devices and enhancements
associated with the IBM 4684 Point of Sale Terminal and an IBM 4683 Point
of Sale Terminal when attached to the IBM 4684 Point of Sale Terminal.
This edition includes information on:

    IBM Models 160 and 161 with 60 Mb fixed disks
    Token-Ring Adapter for the 4684
    X.25 Adapter for the 4684
    Integrated services digital network (ISDN) adapter for the 4684
    Additional memory expansion
    Wiring for PS/2 (*) attachment to 4684 Baseband Local Area Network
    Full-screen video support on the Reference Diskette
    Availability of an upgrade kit for either installing a fixed disk in a
    4684 Model 110 or 111, or exchanging the 30 Mb fixed disk in a Model
    130 or 131 for a 60 Mb fixed disk.

1.0 Topic 1. Introduction to the IBM 4684 Point of Sale Terminal

The IBM 4684 Point of Sale Terminal is a self-contained host independent
and controller independent system that makes available both retail
(point-of-sale) and administrative functions.

Subtopics
1.1 Hardware
1.2 Minimum Terminal Input/Output Configurations
1.3 Terminals and Devices
1.4 Configuration Choices

| *1.1 Hardware*

| The major hardware units of the 4684 Point of Sale Terminal are:

| The IBM 4684 Point of Sale Terminal.

| The IBM 4683 Point of Sale Terminal (Models 002 and A02). These
| terminals can be attached to the 4684 terminal and are dependent on
| the 4684 terminal for processing and control.

| A baseband network or Token-Ring network. These networks provide a
| communication link between 4684 terminals. They also provide a
| communication link between a 4684 terminal and an IBM Personal
| System/2 (PS/2).

Subtopics
1.1.1 4684 Models 200 and 300
1.1.2 4684 Models 110, 111, 130, 131, 160, and 161
1.1.3 4684 Option Adapter Cards
1.1.4 Customer Ship Group

| 1.1.1 4684 Models 200 and 300

| The IBM 4684 Point of Sale Terminal Model 200 and Model 300 can operate as
| a store controller using the *IBM 4680 Operating System*. The IBM Retail
| Industry Programming Support Services operating system continues to be
| supported on all of the 4684 terminal models.

| Other major changes that the 4684 Model 200 and 300 provide are:

| Support for the Additional Memory Option

| Support for a 40 Megabyte (Mb), 80 Mb, or 160 Mb fixed disk drive

| Support for the IBM Baseband Network Side Card (Model 300 Only)

| Support for the IBM Token-Ring Network Side Card (Model 300 Only)

| Support for the IBM PC Network* Baseband Adapter/A (1 Only / Model 300
| Only)

| Support for the IBM PS/2 300/1200/2400 Internal Modem/A

| Support for the IBM Realtime Interface Multiport/2 (with either 512 Kb
| or 1 Mb of user memory) with either a four-port RS-232-C interface
| board, or a four-port RS-232-C plus a four-port RS-422-A interface
| board

| Support for the IBM X.25 Realtime Interface Co-Processor/2

| Support for the IBM 4684 Store Loop Adapter/A (up to two adapters)

| Support for the IBM 6157 Tape Attachment Adapter (1 Only).

| **Note:** The 4684 Model 200 terminal is similar to the 4684 Model 1xx
| terminals. The Model 1xx and the Model 200 both have an 80286 processor.
| The 4684 Model 300 terminal has an 80386 SX processor.

| **See** "4684 Model 200" **and** "4684 Model 300" in topic 1.1.1.2 **for additional
| information on the new models**.

 Subtopics
 1.1.1.1 4684 Model 200
 1.1.1.2 4684 Model 300

|*1.1.1.1 4684 Model 200*

|The model 200 is available with either a Baseband Network option as part
|of the system card (connectors 1A and 1B) or without a network option (no
|connectors at 1A or at 1B).

|The memory options available in the 4684 model 200 are: 1 Mb, 2 Mb, or 4
|Mb.

|PICTURE 1

|Figure 1. Model 200 without Baseband Network Option

|PICTURE 2

|Figure 2. Model 200 with Baseband Network Option

1.1.1.2 4684 Model 300

The model 300 provides for one side card adapter to be connected to the
system board (slot 6). This side card has external connectors on the back
panel of the system unit. The side card adapters that will plug into slot
6 are the Baseband Network Side Card and the Token-Ring Network Side Card.
Use of the side card provides greater flexibility for the two option
adapter slots (1 and 2) in the system unit. You may also choose to have
no side card option adapter installed.

The memory options available in the 4684 model 300 are: 1 Mb, 2 Mb, 4 Mb,
6 Mb, or 8 Mb.

PICTURE 3

Figure 3. Model 300 without Side Card Option (Slot 6)

PICTURE 4

Figure 4. Model 300 with Baseband Network Side Card Option (Slot 6)

PICTURE 5

Figure 5. Model 300 with Token-Ring Network Side Card Option (Slot 6)

|1.1.2 *4684 Models 110, 111, 130, 131, 160, and 161*
|The IBM 4684 Point of Sale Terminals are designed so that one terminal can
|stand alone in point-of-sale functions; control other terminals; or act in
|a satellite capacity, driven by a controlling terminal. Also, the 4684
|terminals can be driven by a PS/2. One 4683 Model 002 or A02 terminal can
|be directly attached to each 4684 terminal through socket 11.

|Table 2 shows the IBM 4684 Point of Sale Terminal models. Differences are
|found in their storage capabilities and the option of a Baseband network
|or Token-Ring network. The 4684 models are available, depending on your
|country, with both high and low voltage power supplies.

|An upgrade kit is available for user or service personnel to install a
|fixed disk in an IBM 4684 Point of Sale Terminal. It contains parts and
|instructions for one of the following:

| Installing a 30 Mb or 60 Mb fixed disk drive in an IBM 4684 Point of
| Sale Terminal Model 110 or Model 111.

| Removing the existing 30 Mb fixed disk drive in an IBM 4684 Point of
| Sale Terminal Model 130 or Model 131 and install a 60 Mb fixed disk in
| its place.

Table 2. Models of the 4684 Terminals			
Model	**Storage**	**Function**	**Availability**
110	1.44 Mb Diskette Drive	Stand Alone without Baseband Network	Europe, Middle East, and Africa only
111	1.44 Mb Diskette Drive	Controlling, Stand Alone, or Satellite with a Baseband Network	U.S., Europe, Middle East, and Africa
130	30 Mb Fixed Disk 1.44 Mb Diskette Drive	Stand Alone without Baseband Network	Europe, Middle East, and Africa only
131	30 Mb Fixed Disk 1.44 Mb Diskette Drive	Controlling or Stand Alone with a Baseband Network	U.S., Europe, Middle East, and Africa
160	60 Mb Fixed Disk 1.44 Mb Diskette Drive	Stand Alone without Baseband Network	Europe, Middle East, and Africa only
161	60 Mb Fixed Disk 1.44 Mb Diskette Drive	Controlling or Stand Alone with a Baseband Network	U.S., Europe, Middle East, and Africa

| 1.1.3 4684 Option Adapter Cards

|The 4684 terminal can support up to two option adapters (feature cards).

|The following option adapters may be used:

| IBM Dual Asynchronous Communication Adapter/A

| IBM ISDN Interface Co-Processor/2 Adapter (available in Europe, Middle
| East, and Africa only)

| IBM Multiprotocol Communication Adapter

| IBM PC Network Baseband Adapter/A (1 Only / Model 300 Only)

| IBM PS/2 300/1200/2400 Internal Modem/A

| IBM Realtime Interface Multiport/2 (with either 512 Kb or 1 Mb of user
| memory) with either a four-port RS-232-C interface board, or a
| four-port RS-232-C plus a four-port RS-422-A interface board

| IBM Token-Ring Network Adapter/A

| IBM Token-Ring Network 16/4 Adapter/A

| IBM X.25 Realtime Interface Co-Processor/2

| IBM 4684 Store Loop Adapter/A

| IBM 6157 Tape Attachment Adapter (1 Only)

| .5 Mb to 2 Mb Memory Expansion Adapters

| 2 Mb to 8 Mb 80286 Memory Expansion Adapter.

|One of the following side card adapters may be used with the 4684 Model
|300:

| IBM Baseband Network Side Card (Model 300 Only)
| IBM Token-Ring Network Side Card (Model 300 Only).

Note: The US version of the .5 to 2 Mb Memory Expansion Adapter is
different from that available in other countries. In the US the card
comes with 512K memory standard and can be expanded to 2 Mb in 512K
increments by ordering the Memory Expansion Kit. In all other countries,
the .5 to 2 Mb Expansion Adapter comes with 1 Mb standard memory and can
be expanded to 2 Mb in one 1 Mb increment.

If an ISDN adapter is to be installed in conjunction with an X.25 adapter
or any other Realtime Interface Co-Processor, it must be installed in slot
1.

Expanded memory is memory that is addressed through a combination of an
Expanded Memory Specification (EMS) device driver and an IBM hardware
adapter capable of expanded memory. The IBM PS/2 memory option adapters
used in the 4684 can take advantage of expanded memory. If the memory
option adapter is used in EMS mode, the video support may be limited. For
more information, refer to the *Retail Industry Programming Support
Services Device Drivers Programmer's Guide* or the *IBM 4683/4684 Point of
Sale Terminal: Maintenance Manual*. You also can contact IBM Industrial
Relations through your IBM Marketing Support Representative for more
technical information.

1.1.4 Customer Ship Group

Each store will receive one *store ship group* containing publications, a
Reference Diskette, a wrap plug and a terminator plug (for baseband
network functions), diagnostics, other hardware accessories, and customer
hardware maintenance aids. The publications included in the store ship
group are:

    IBM 4684 Point of Sale Terminal: Installation Guide
    IBM 4684 Point of Sale Terminal: Problem Determination Guide
    IBM 4683/4684 Point of Sale Terminal: Operations Guide
    IBM 4683/4684 Point of Sale Terminal: Maintenance Manual
    IBM 4684 Point of Sale Terminal: Maintenance Summary Card
    IBM 4683/4684 Point of Sale Terminal: Parts Catalog.

1.2 Minimum Terminal Input/Output Configurations

Subtopics
1.2.1 4684 Terminal
1.2.2 4683 Terminal

1.2.1 4684 Terminal

Each IBM 4684 Point of Sale Terminal must have a keyboard and a display.
The keyboard must be one of the following:

| 50-Key Modifiable Keyboard
| Alphanumeric Keyboard
| ANPOS Keyboard
| Combined Keyboard/Display
| Enhanced Alphanumeric Keyboard
| Matrix Keyboard.

The display can be one of the following displays:

    40-Character Alphanumeric Display
    Operator Display
    Combined Keyboard/Display
    9-Inch Monochrome Display
| IBM 8503 12-Inch Monochrome Display (Distributed Configuration Only)
| IBM 8504 14-Inch Monochrome Display (Distributed Configuration Only)
| IBM 8512 14-Inch Color Display (Distributed Configuration Only)
| IBM 8513 12-Inch Color Display (Distributed Configuration Only).

40-Character Alphanumeric Display

1.2.2 4683 Terminal
Each 4683 terminal also must have a keyboard and a display.
The keyboard can be one of the following:

| 50-Key Modifiable Keyboard
| Alphanumeric Keyboard
| ANPOS Keyboard
| Combined Keyboard/Display
| Matrix Keyboard.

The display can be one of the following displays:

    40-Character Alphanumeric Display

    Operator Display

    Combined Keyboard/Display

    9-Inch Monochrome Display with a Feature Expansion A

| IBM 8503 12-Inch Monochrome Display (Distributed Configuration Only
| with Feature Expansion A)

| IBM 8513 12-Inch Color Display (Distributed Configuration Only with
| Feature Expansion A).

All additional input/output devices are optional.

Operator Display

1.3 Terminals and Devices

Subtopics
1.3.1 4684 Terminal
1.3.2 4684 Input/Output Devices
1.3.3 4683 Model 002 or A02 Terminal
1.3.4 4683 Input/Output Devices

1.3.1 4684 Terminal

PICTURE 6

Figure 6. IBM 4684 Point of Sale Terminal

1.3.2 4684 Input/Output Devices

You can have the same or different input/output (I/O) devices attached at
each terminal, according to your needs:

| 50-Key Modifiable Keyboard
| Alphanumeric Keyboard
| ANPOS Keyboard
| Combined Keyboard/Display
| Enhanced Alphanumeric Keyboard
| Matrix Keyboard
| Dual-Track Magnetic Stripe Reader on the ANPOS Keyboard
    Dual-Track Magnetic Stripe Reader on the Combined Keyboard/Display
    Dual-Track Magnetic Stripe Reader
    Single-Track Magnetic Stripe Reader
    Hand-Held Bar Code Reader
    Proprinter (*)
    4680 Printer
    Point of Sale Scanner
    Non-video displays:
    -   40-Character Alphanumeric Display
    -   Combined Keyboard/Display
    -   Operator Display
    -   Shopper Display
    Video displays:
    -   9-Inch Monochrome Display
    -   IBM 8503 12-Inch Monochrome Display
    -   IBM 8504 14-Inch Monochrome Display
    -   IBM 8512 14-Inch Color Display
    -   IBM 8513 12-Inch Color Display.
    Cash Drawers
    IBM 3151 or 3161 ASCII Display Terminal or other Asynchronous Device.

1.3.3 4683 Model 002 or A02 Terminal

A 4683 Model 002 or A02 can be attached to a 4684 terminal. The 4683
terminal depends on the 4684 terminal for its processing.

PICTURE 7

Figure 7. IBM 4683 Point of Sale Terminal

1.3.4 4683 Input/Output Devices
You can attach the same or different I/O devices at each terminal,
according to your needs:

| 50-Key Modifiable Keyboard
| Alphanumeric Keyboard
| ANPOS Keyboard
| Combined Keyboard/Display
| Matrix Keyboard
| Dual-Track Magnetic Stripe Reader on the ANPOS Keyboard
     Dual-Track Magnetic Stripe Reader on the Combined Keyboard/Display
     Dual-Track Magnetic Stripe Reader
     Single-Track Magnetic Stripe Reader
     Hand-Held Bar Code Reader
     4680 Printer
     Point of Sale Scanner
     Non-video displays:
     -   40-Character Alphanumeric Display
     -   Operator Display
     -   Shopper Display
     -   Combined Keyboard/Display
     Video displays:
     -   9-Inch Monochrome Display
     -   IBM 8503 12-Inch Monochrome Display
     -   IBM 8513 12-Inch Color Display.
     Cash Drawers
     Asynchronous Device.

Topic 2 describes and illustrates the IBM I/O devices and non-IBM I/O
devices (for instance, a non-IBM alarm), and describes how the devices
attach to the terminals.

1.4 Configuration Choices

You can arrange the point-of-sale terminals in either of two
configurations:

>   *Integrated*, with the I/O devices placed together and connected to the
>   system unit by cables that are 0.5 m (20 in.) long. The terminal has
>   the appearance of being a one-piece terminal.

>   *Distributed*, with *some or all* of the I/O devices physically separated
>   from the system unit. Any devices that are placed with the system
>   unit can be connected using the short 0.5 m (20 in.) cables.
>   Distributed devices are connected to the system unit using distributed
>   cables 1.8 m (6 ft), 2.8 m (9 ft), or 3.8 m (12 ft) long.

Subtopics
1.4.1 Integrated I/O Configuration
1.4.2 Distributed I/O Configuration

1.4.1 Integrated I/O Configuration

In an integrated configuration, IBM recommends that you place the I/O
devices as shown in Figure 8. This arrangement provides the optimum
clearances for operating the terminal.

PICTURE 8

Figure 8. 4684 Terminal With I/O Devices in Integrated Configuration

1.4.1 Integrated I/O Configuration

In an integrated configuration, IBM recommends that you place the I/O
devices as shown in Figure 8. This arrangement provides the optimum
clearances for operating the terminal.

PICTURE 8

Figure 8. 4684 Terminal With I/O Devices in Integrated Configuration

1.4.2 Distributed I/O Configuration

The terminals can have I/O devices arranged in a distributed
configuration. Within the limitations of the distributed cable lengths,
the I/O devices can be placed in flexible physical arrangements that best
suit your needs.

Many different configurations are possible. For example, you can keep
some devices with the system unit as in an integrated configuration and
distribute other devices.

Figure 9 is one example of a distributed configuration. The devices here
are arranged suitably for a wrap stand. However there are numerous other
possible distributed configurations that you can design to optimize the
function of your terminals.

PICTURE 9

Figure 9. Distributed Configuration in a Wrap Stand

2.0 Topic 2. Planning the Installation

You are responsible for ensuring that the store is prepared to support the
IBM 4684 Point of Sale Terminal. This includes the planning to provide
physical space for the equipment and the proper electrical support.
Because many of the tasks require significant lead-time, planning must
begin early. For example, designing and building wrap stands and planning
and installing store wiring can require long periods of time.

This chapter provides information to assist in planning for the
point-of-sale terminals and in meeting the electrical requirements for the
equipment. It includes information about the physical and electrical
requirements for the terminals and devices.

Subtopics
2.1 Setup Considerations
2.2 Air Circulation Clearance
2.3 Service Clearance for Maintenance
2.4 System Unit
2.5 40-Character Alphanumeric Display
2.6 Operator Display
2.7 Shopper Display
2.8 9-Inch Monochrome Display
2.9 8503 12-Inch Monochrome Display
2.10 8504 14-Inch Monochrome Display
2.11 8512 14-Inch Color Display
2.12 8513 12-Inch Color Display
2.13 50-Key Modifiable Keyboard
2.14 Alphanumeric Keyboard
2.15 Alphanumeric Point of Sale (ANPOS) Keyboard
2.16 Combined Keyboard/Display
2.17 Matrix Keyboard
2.18 Enhanced Alphanumeric Keyboard
2.19 Cash Drawers
2.20 Flip-Top Cash Drawer
2.21 Single-Track Magnetic Stripe Reader
2.22 Dual-Track Magnetic Stripe Reader
2.23 Low-Profile Dual-Track Magnetic Stripe Reader
2.24 Point of Sale Printer Model 1 and Model 2
2.25 Point of Sale Printer Model 3
2.26 Proprinter
2.27 Scanner
2.28 IBM Hand-Held Bar Code Reader
2.29 Non-IBM Devices
2.30 Summary of Cable Lengths to Attach Distributed Devices
2.31 Cable Connections at the System Unit Back Panel
2.32 Security Considerations
2.33 Safety Considerations
2.34 Declaration of Noise Emission Values
2.35 Environmental Considerations
2.36 Checklist of Plans and Schedules

2.1 Setup Considerations

You are responsible for setting up the terminals, including unpacking,
installing, and testing the devices, features, and cables. Cables to
connect the devices are shipped with the terminals and should be installed
at the same time as the terminals.

In distributed arrangements, some cables may have to pass through conduit
or special cable ducts. Be sure the cables can be easily routed at
installation time. A summary of the cable lengths is provided in "Summary
of Cable Lengths to Attach Distributed Devices" in topic 2.30.

Subtopics
2.1.1 Planning the Wrap Stand
2.1.2 Planning the Store Wiring
2.1.3 Planning for Future Changes
2.1.4 Planning the Communication Facilities

2.1.1 Planning the Wrap Stand

A variety of wrap stands are used throughout the industry and the design
of your wrap stands is your option. Guidelines are included in this
chapter regarding the recommended height of the keyboard above the floor,
the location of electrical power receptacles, and other environmental
considerations. Appendix C contains information on the physical
dimensions of the devices.

2.1.1 Planning the Wrap Stand

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chapter regarding the recommended height of the keyboard above the floor,
the location of electrical power receptacles, and other environmental
considerations. Appendix C contains information on the physical
dimensions of the devices.

2.1.1 - 1

2.1.2 Planning the Store Wiring

Cabling hardware, store wiring, and cabling and testing procedures are
required for the 4684 Point of Sale Terminal, the 4683 Point of Sale
Terminal, and the PS/2. They are described in Topic 3 and include:

    Electrical power wiring that provides power to the point-of-sale
    terminals and to the optional PS/2

    Wiring to provide communications between 4684 terminals and any PS/2s

    Store wiring that connects an IBM 4683 terminal Model 002 or A02 to a
    4684 terminal

    4684 cabling specifications and safety requirements

    Store wiring test procedure.

2.1.3 Planning for Future Changes

As you plan the installation of the point-of-sale terminals, consider potential changes in the store that may affect the wiring. It may be more practical to install additional wiring now to provide for expansion or changes in the future. For example, you may want to route the baseband network cable to locations where you may need additional 4684 terminals later. There also may be locations where you can anticipate the need to attach an IBM 4683 Model 002 or A02 to an existing 4684 terminal.

In addition, there may be locations in the store where you will need to relocate point-of-sale terminals for special sales or seasonal promotions. You may also want to consider having additional terminals available during periods that are especially busy.

2.1.4 Planning the Communication Facilities

Stores that transmit data to and from a host processor need communication
facilities for this purpose. This usually consists of a telephone line
with a connection in the store for a RS-232-C device. The RS-232-C device
allows for connection to a modem (a device for transmitting data over
communication lines).

Topic 4 contains information about modems and telephone facilities and
also provides details on how to order the telephone connection.

2.2 Air Circulation Clearance

The terminal's system unit contains a fan for cooling. In planning your
installation, you must provide unrestricted access to room air for
cooling.

The fan on the system unit pulls in air on the left and pushes air out on
the right. Provide at least 25 mm (1 in.) clearance on both sides of the
system unit for enough air clearance. In distributed arrangements, avoid
placing the system unit in locations that restrict the circulation of room
air. If you place a distributed system unit under a counter, leave both
sides open or vented so the fan can circulate room air, instead of heated
air that has already been exhausted from the unit.

Other devices such as displays, scanners, and printers use normal
convection cooling. Avoid blocking the air vents in these devices.

2.3 Service Clearance for Maintenance

Maintenance of terminals at the store will often consist of removing a
device and replacing it with a new or repaired device or part. Although
no specific amount of clearance is stated for the devices, you should
provide enough space at each terminal for easy access to the devices and
their connecting cables.

All cables from the attached I/O devices connect to the rear of the system
unit. To facilitate removing or replacing I/O devices, be sure you locate
the system unit so that easy access to these cables is possible.

2.4 System Unit

The system unit of the 4684 terminal supplies the required voltages to
most devices attached to that terminal. The system units of all models
are similar in appearance and in operating requirements.

All cables going to devices originate at the rear of the system unit. In
planning the physical space for terminals, be sure to provide enough space
for the units and enough of a service loop in the cables so that your
personnel can connect and disconnect the cables at the rear of the system
unit. You can install the system unit vertically on its side but you must
ensure that it is secured in position and that it has adequate
ventilation.

A power cord is available with either a locking or a non-locking plug. In
the U.S., the available power cords are:

    1.8 m (6 ft) locking or non-locking
    2.8 m (9 ft) non-locking
    4.3 m (14 ft) locking or non-locking.

In all other countries a 4.3 m (14 ft) non-locking power cord is the only
power cord available. Appendix D shows the power plug numbers, types of
power plugs, and receptacles available for the 4684 terminal. For the
physical security of the system unit, threaded inserts in the bottom of
the unit secure it to a counter top. Place the system unit in a location
with at least 25 mm (1 in.) of clearance to allow for sufficient air
circulation.

The system unit contains an optional lock located behind the diskette
cover. This feature allows for locking both the diskette drive and the
top cover.

PICTURE 10

Figure 10. System Unit of an IBM 4684 Point of Sale Terminal

2.5 40-Character Alphanumeric Display

A 40-character alphanumeric display can display up to 40 characters of
alphabetic or numeric characters or special symbols, in two rows of 20
characters each. The display mounts on a pedestal and can be tilted and
rotated for best viewing.

A long pedestal is shipped with the display. In an integrated
arrangement, the display attaches to the system unit with two thumbscrews
provided with the display. When mounted on the long pedestal, the display
stands 315 mm
(12-1/2 in.) high.

When a distributed display cable is shipped, a short pedestal is included
with the cable. In a distributed arrangement, you can mount the display
on either the long or short pedestal, depending on your requirements.
When mounted on the short pedestal, the display stands 172 mm (6-3/4 in.)
high.

In a distributed arrangement, you can attach the display pedestal to the
system unit or cash drawer, using the two thumbscrews. If you prefer, you
can locate the display wherever you choose, within the limits of the 3.8 m
(12 ft) distributed cable. In either arrangement, do not block the air
vents on the display.

PICTURE 11

Figure 11. 40-Character Alphanumeric Display

2.6 Operator Display

The operator display is a small 40-character display used to provide
information to the salesperson. It displays alphabetic and numeric
information in two rows of 20 characters each. The character height is
approximately 4.85 mm (0.190 in.). The salesperson can tilt the display
for best viewing. The operator display is intended to be viewed only by
the salesperson. It has a narrow viewing angle and should be placed so
that it is in the salesperson's normal field of vision. The display comes
with a cable, 0.7 m (28 in.) long, for use in an integrated arrangement.

The operator display comes with two mounting options:

    You can mount the display on a 50-Key keyboard or an alphanumeric
    keyboard, using a mounting bracket that is shipped with the display.
    If the keyboard is distributed, you must connect the display using a
    2.8 m (9 ft) extension cable. An operator display and an MSR are
    mutually exclusive when mounted on the keyboard. You can have one or
    the other, but not both.

    You can mount the display on a small tray base, that is shipped with
    the display. The tray base is 159 mm (6-1/4 in.) long x 127 mm (5
    in.) wide. With the display mounted on the tray base, the total
    height is 59 mm (2-3/8 in.).

    Depending on the terminal arrangement, the tray base and display can
    be:

    -   Integrated beside a 50-key keyboard
    -   Integrated beside the printer
    -   Distributed, using the 2.8 m (9 ft) extension cable.

PICTURE 12

Figure 12. Operator Display Mounted on a 50-Key Modifiable Keyboard

PICTURE 13

Figure 13. Operator Display on Tray Base beside a 50-Key Modifiable
           Keyboard

2.7 Shopper Display

|The shopper displays information about the transaction to the shopper. It
|tilts and rotates for the best viewing angle. The display has one row of
|eight numerals with commas and decimal points, and six indicator lights
|that assist in defining the numeric information. It displays numbers
|using a 7-segment format and can also display a limited alphabetic
|character set. The numbers are approximately 14 mm (0.55 in.) high. The
|commas and decimal points are located as shown here.

| Commas: 1 2,3,4 5,6,7 8
| Decimal points: 1 2 3.4 5.6.7 8

|Two mounting options are provided:

| A short post that can be used to mount the shopper display on the back
| of the system unit facing the shopper. If preferred, you can
| distribute the display using a 2.8 m (9 ft) cable.

| An arm mount that can be used much the same as the short post. It can
| mount on either the left or right side of the system unit or cash
| drawer. In either case, the display extends out from the side of the
| terminal a maximum of 102 mm (4 in.).

|For dimensions of the display, mounting post, and arm, see Appendix C.
|The display comes with a 0.7 m (28 in.) cable for an integrated
|arrangement. For a distributed arrangement, a 2.8 m (9 ft) extension
|cable is required.

  PICTURE 14

  Figure 14. Shopper Display on Post

  PICTURE 15

  Figure 15. Shopper Display on Arm

2.8 9-Inch Monochrome Display

You can install a 228 mm (9 in.) monochrome display on a terminal. The
display contains front-mounted brightness and contrast controls. It has a
tilt/swivel mechanism to permit easy positioning. The display can be
installed in one of three arrangements:

    Integrated on the terminal, using a special security base
    Integrated on the terminal, using the tilt/swivel stand
    Distributed in a location of your choice, using the tilt/swivel stand.

When used in an integrated arrangement, along with a printer, the display
must be mounted on a security base. This security base allows the display
to extend past the right side of the terminal and permits the display to
tilt and swivel. If you place the display on the terminal in the position
usually occupied by the printer, it can sit on its stand, where it can
tilt and swivel.

The tilt/swivel stand has a threaded insert in the bottom for securing it
to the surface it is placed on. In an integrated arrangement, you can
attach the display to the standard security base using an M6 metric screw
supplied with the security base. In a distributed arrangement, you can
use an M6 metric screw of appropriate length to secure the display to your
counter.

The display is available for use with 100 to 125 volts or 200 to 240
volts. It has a detachable 2.8 m (9 ft) power cord with a non-locking
plug. Also available in the US for the Chicago area is a 1.8 m (6 ft)
power cord with a non-locking plug. The display has its own ON/OFF switch
and controls and requires a properly grounded electrical outlet.

A short cable, 470 mm (18-1/2 in.) long, with a 15-pin connector is
permanently attached to the display. An additional extension cable is
required to distribute the display. The extension cable is 1.8 m (6 ft).

PICTURE 16

Figure 16. 9-Inch Monochrome Display on Security Base

2.9 8503 12-Inch Monochrome Display

|You can place the 8503 12-inch monochrome display on its four rubber feet
|on a flat surface or on its pedestal. When on the pedestal, the display
|can tilt to the front and rear and can swivel to the left or right.
|Because of its size, the display must be distributed. A 1.8 m (6 ft)
|cable with a 15-pin connector is permanently attached to the display.

|The display is available for use with 100 to 125 volts or 200 to 240
|volts. It has its own power cord, ON/OFF switch and controls, and
|requires a properly grounded electrical outlet. In the U.S, it comes with
|its own 1.8 m (6 ft) power cord and non-locking power plug.

PICTURE 17

Figure 17. IBM 8503 12-Inch Monochrome Display

| *2.10 8504 14-Inch Monochrome Display*

| You can place the 8504 14-inch monochrome display on its four rubber feet
| on a flat surface or on its pedestal. When on the pedestal, the display
| can tilt to the front and rear and can swivel to the left or right.
| Because of its size, the display must be distributed.

| The display is available for use with 100 to 125 volts or 200 to 240
| volts. It has its own power cord, ON/OFF switch and controls, and
| requires a properly grounded electrical outlet. In the U.S, it comes with
| its own 1.8 m (6 ft) power cord and non-locking power plug.

| PICTURE 18

| Figure 18. IBM 8504 14-Inch Monochrome Display

2.11 8512 14-Inch Color Display

Note: This 14-inch color display is for the IBM 4684 terminal only. It
cannot be attached to an IBM 4683 terminal.

You can place the 8512 14-inch color display on its four rubber feet on a
flat surface or on an optional stand. When on the stand, the display can
tilt to the front and rear, and it can swivel to the left or right.
Because of its size, the display must be distributed. A 1.8 m (6 ft)
cable with a 15-pin connector is permanently attached to the display.

The display is available for use with 100 to 125 volts or 200 to 240
volts. It has its own power cord, ON/OFF switch and controls, and
requires a properly grounded electrical outlet. In the U.S, it comes with
its own 1.8 m (6 ft) power cord and non-locking power plug.

PICTURE 19

Figure 19. IBM 8512 14-Inch Color Display

2.12 8513 12-Inch Color Display

|You can place the IBM 8513 12-inch color display on its four rubber feet
|on a flat surface or on its stand. When on the stand, the display can
|tilt to the front and rear, and it can swivel to the left or right.
|Because of its size, the display must be distributed. A 1.8 m (6 ft)
|cable with a 15-pin connector is permanently attached to the display.

|The display is available for use with 100 to 125 volts or 200 to 240
|volts. It has its own power cord, ON/OFF switch and controls, and
|requires a properly grounded electrical outlet. In the U.S, it comes with
|its own 1.8 m (6 ft) power cord and non-locking power plug.

PICTURE 20

Figure 20. IBM 8513 12-Inch Color Display

2.13 50-Key Modifiable Keyboard

The 50-key keyboard can be installed in an integrated or distributed
arrangement. The integrated arrangement uses a 0.7 m (28 in.) cable and
the distributed arrangement uses a 3.8 m (12 ft) cable. In an integrated
arrangement, an M6 metric screw provided with the terminal can be used to
secure the keyboard to a security base. In a distributed arrangement, you
can use an M6 metric screw of appropriate length to secure the keyboard to
your counter.

A speaker in the keyboard can generate an alarm tone with three
frequencies, two volume levels, and length of duration, all under program
control. An optional lock on the keyboard can limit certain functions or
operations to authorized personnel only. An MSR or Operator Display can
be mounted on the right rear of the keyboard, but not both.

PICTURE 21

Figure 21. 50-Key Keyboard

2.14 Alphanumeric Keyboard

The alphanumeric keyboard can be installed in an integrated or distributed
arrangement. The integrated arrangement uses a 0.7 m (28 in.) cable and
the distributed arrangement uses a 3.8 m (12 ft) cable. In an integrated
arrangement, an M6 metric screw provided with the terminal can be used to
secure the keyboard to a security base. In a distributed arrangement, you
can use an M6 metric screw of appropriate length to secure the keyboard to
your counter.

The keyboard contains 84 keys, including alphabetic, numeric, and special
function keys. A speaker in the keyboard can generate an alarm tone with
three frequencies, two volume levels, and length of duration, all under
program control. An optional lock on the keyboard can limit certain
functions or operations to authorized personnel only. An MSR or Operator
Display can be mounted on the right rear of the keyboard, but not both.

PICTURE 22

Figure 22. Alphanumeric Keyboard

|*2.15 Alphanumeric Point of Sale (ANPOS) Keyboard*

|The alphanumeric point of sale keyboard, referred to in this publication
|as the ANPOS keyboard, consists of:

| A set of alphanumeric keys
| A numeric keypad
| System keys
| A set of point-of-sale keys and 13 function keys that are
| programmable. As in the 50-key keyboard, clear plastic lens caps can
| fit over the keys. The user can place a variety of key legends under
| the clear lens caps to customize the keys to suit the requirements of
| the store. A kit containing alternate style keybuttons and lens caps
| is shipped with the keyboard.

|The keyboard can be attached to an IBM 4684 Point of Sale Terminal in one
|of two ways:

| To the 4684 socket 5A or 5B to perform point-of-sale functions.
| To the 4684 keyboard socket 1 to perform point-of-sale functions and
| to emulate an enhanced alphanumeric keyboard.

|In addition, the keyboard can be attached to an IBM 4683 Point of Sale
|Terminal that is connected to an IBM 4684 Point of Sale Terminal. In this
|case, the keyboard attaches to the 4683 socket 5A or 5B and can perform
|point-of-sale functions.

|The keyboard can be integrated (placed on the terminal to appear as one
|unit) or it can be distributed (placed separate from the terminal, yet
|connected by a cable).

|There are two types of cables available for the ANPOS keyboard:

| One allows the keyboard to connect to socket 1 of the 4684 terminal.
| The other allows the keyboard to connect to socket 5A or 5B of either
| the 4684 or 4683 terminal.

|The cable used for connection to 4684 socket 1 is 0.6 m (2 ft) long for an
|integrated terminal and 3.8 m (12 ft) long for a distributed terminal.

|The cable used for connection to socket 5A or 5B is 0.7 m (28 in.) long
|for an integrated terminal and 3.8 m (12 ft) long for a distributed
|terminal.

|PICTURE 23

|Figure 23. Alphanumeric Point of Sale (ANPOS) Keyboard

2.16 Combined Keyboard/Display

The combined keyboard/display is a combination of a 50-Key keyboard and an
operator display. An optional low-profile dual-track MSR can be attached
to the keyboard. The operator display is permanently mounted in the
keyboard. Its angle can be adjusted for best viewing by the salesperson.

A speaker in the keyboard can generate an alarm tone with a fixed
frequency, fixed volume level, and length of duration, all under program
control. An optional lock is available on the keyboard, which can limit
certain functions or operations to authorized personnel only.

The keyboard can be mounted in an integrated or distributed arrangement.
The integrated arrangement uses a 0.7 m (28 in.) cable and the distributed
arrangement uses a 3.8 m (12 ft) cable. In an integrated arrangement, an
M6 metric screw provided with the terminal can be used to secure the
keyboard to a security base. In a distributed arrangement, you can use an
M6 metric screw of appropriate length to secure the keyboard to your
counter.

PICTURE 24

Figure 24. Combined Keyboard/Display

2.17 Matrix Keyboard

The matrix keyboard has overlays permit you to personalize key descriptors
and to quickly change the overlay. A protective shield can be placed on
top of the overlay. The keyboard can be installed in an integrated or
distributed arrangement. The integrated arrangement uses a 0.7 m (28 in.)
cable and the distributed arrangement uses a 3.8 m (12 ft) cable. In an
integrated arrangement, an M6 metric screw provided with the terminal can
be used to secure the keyboard to a security base. In a distributed
arrangement, you can use an M6 metric screw of appropriate length to
secure the keyboard to your counter.

PICTURE 25

Figure 25. Matrix Keyboard

2.18 Enhanced Alphanumeric Keyboard

An enhanced alphanumeric keyboard is available and can provide additional
administrative functions to the 4684 terminal. The keyboard can not be
used with a 4683 terminal. Because the keyboard will overlap the security
base, it must be placed in a distributed arrangement.

The cable for the keyboard must be ordered separately. It is 2 m (6 1/2
ft) coiled and 3 m (10 ft) extended.

PICTURE 26

Figure 26. Enhanced Alphanumeric Keyboard

2.19 Cash Drawers

Each terminal can have one or two cash drawers, each with a removable cash
till. In an integrated arrangement, the cash drawer is placed under the
system unit and connects with a 0.5 m (20 in.) cable. In a distributed
arrangement, the cash drawer connects to the system unit with a 3.8 m (12
ft) distributed cable.

An optional lock is available on the cash drawer and is recessed into the
front of the cash drawer. There are two threaded inserts in the bottom of
the cash drawer for installing user-supplied screws to secure it to a
counter top.

In the cash drawer a convenient storage area is provided for your backup
copy of the Reference Diskette and the Maintenance Summary Card.

Note: In the fully open position, the cash drawer extends 326 mm (13 in.)
toward the front.

PICTURE 27

Figure 27. Cash Drawer

2.20 Flip-Top Cash Drawer

A flip-top cash drawer is available in some countries. It provides a cash
drawer and removable cash till for applications where space is limited.
The top cover will flip open for access to the till, which has adjustable
note compartments. Cash drawer opening is under program control and a
cash drawer lock is available. The cash drawer has two threaded inserts
in the bottom for securing it to your counter. It can be used in a
distributed arrangement *only* and requires a 3.8 m (12 ft) distributed
cable.

PICTURE 28

Figure 28. Flip-Top Cash Drawer

2.21 Single-Track Magnetic Stripe Reader

The single-track MSR can be attached to the 50-key keyboard or the
alphanumeric keyboard. The MSR and the operator display are mutually
exclusive when mounted on these keyboards. You can have one or the other,
but not both.

The MSR can read a number encoded in a single track on a credit card or
badge as the card or badge is passed through a slot in the reader. It can
read American Banking Association (ABA) track 2 data. Cards or badges
must conform to American National Standards Institute (ANSI)
Specifications, or International Organization for Standardization (ISO)
3554.

The single-track MSR is similar in appearance to the dual-track MSR.
It has one raised mark on top to identify it as a single-track reader. It
connects to the keyboard through a 75 mm (3 in.) cable.

A test card (IBM P/N 4055210) is included with the MSR. A cleaning card
(IBM P/N 6019483) is available. The salesperson can pass it through the
reader occasionally to clean the read head.

|*2.22 Dual-Track Magnetic Stripe Reader*

|The dual-track MSR can be attached to the 50-key keyboard or the
|alphanumeric keyboard. It cannot be attached to the matrix keyboard. The
|dual-track MSR and the operator display are mutually exclusive when
|mounted on these keyboards. You can have one or the other, but not both.

|The MSR can read information encoded in two tracks on a credit card or
|badge as the card or badge is passed through a slot in the reader. Cards
|or badges must conform to American National Standards Institute (ANSI)
|Specifications X4.13 and X4.16, or International Organization for
|Standardization (ISO) 3554.

|The dual-track MSR is similar in appearance to the single-track MSR.
|It has two raised marks on top to identify it as a dual-track reader. It
|also has identifying information on its underside. The MSR attaches
|directly to the system unit, using a cable identical to the one used with
|the keyboard. The cable is 0.7 m (28 in.) long when the keyboard is
|integrated and is 3.8 m (12 ft) long when the keyboard is distributed.

|A test card (IBM P/N 4055210) is included with the MSR. A cleaning card
|(IBM P/N 6019483) is available. The salesperson can pass it through the
|reader occasionally to clean the read head.

|Two models are available, depending on which data will be read:

| IBM P/N 76X0192 can read ISO track 1 and track 2 data
| IBM P/N 76X0193 can read ISO track 2 and track 3 data.

 PICTURE 29

 Figure 29. Single-Track MSR or Dual-Track MSR mounted on a 50-key keyboard

| *2.23 Low-Profile Dual-Track Magnetic Stripe Reader*

| The low-profile dual-track MSR can be installed on the ANPOS keyboard or
| the combined keyboard/display. The keyboards come with a filler cover
| when the MSR is not installed. This filler cover can easily be removed
| and the MSR installed in its place. There are no additional cables
| required for the MSR.

| Two models are available, depending on which data will be read:

| IBM P/N 25F6310 can read ISO track 1 and track 2 data
| IBM P/N 25F6320 can read ISO track 2 and track 3 data.

| PICTURE 30

| Figure 30. Low-Profile Dual-Track MSR on an ANPOS Keyboard

 PICTURE 31

 Figure 31. Low-Profile Dual-Track MSR on a Combined Keyboard/Display

|*2.24 Point of Sale Printer Model 1 and Model 2*

|You can install a Model 1 or Model 2 printer on each terminal. In an
|integrated arrangement, a 0.5 m (20 in.) cable is required. In a
|distributed arrangement, a 3.8 m (12 ft) cable is required.

|The printer prints on two rolls of standard adding machine paper: one at
|the document insert/customer receipt station and the other at the journal
|station. In addition, the salesperson can insert forms for printing at
|the document insert station, located at the left front of the printer.
|The salesperson also can insert checks at this station for printing the
|store's endorsement. If you distribute the printer, be sure the document
|insert station is easily accessible to the salesperson.

|An optional lock on the printer journal station cover limits access to the
|journal print station paper. It is located inside the printer and is
|easily accessible, when the printer top cover is raised.

|The printer uses one print head and one ribbon cartridge. The print head
|is shipped with the printer. A ribbon cartridge and two rolls of paper
|are shipped with the printer cable.

|**Do not block the air vents at the right side of the printer.**

|The printer has a threaded insert in the bottom for securing it to the
|surface it is placed on. In an integrated arrangement, you can secure it
|to a security base, using an M6 metric screw provided with the terminal.
|In a distributed arrangement, you can use an M6 metric screw of
|appropriate length to secure the printer to your counter.

|PICTURE 32

|Figure 32. Point of Sale Printer Model 1 and Model 2

2.25 Point of Sale Printer Model 3

You can install a Model 3 printer on each terminal. In an integrated
arrangement, a 0.5 m (20 in.) cable is required. In a distributed
arrangement, a 3.8 m (12 ft) cable is required.

The printer prints on two rolls of standard adding machine paper: one at
the customer receipt station and the other at the journal station. The
customer receipt station has a paper cutter to make removal of the receipt
easier.

In addition, the salesperson can insert forms to be printed into the top
of the printer or into the front of the printer. The printer will print
the store's endorsement on preprinted checks or it will print the entire
check including the endorsement.

An optional lock on the printer journal station cover limits access to the
journal print station paper. It is located inside the printer and is
easily accessible, when the printer top cover is raised.

The printer uses one print head and one ribbon cartridge. A ribbon
cartridge and two rolls of paper are shipped with the printer cable.

Do not block the air vents on the sides of the printer.

The printer has a threaded insert in the bottom for securing it to a
surface. In an integrated arrangement, you can secure it to a security
base, using an M6 metric screw provided with the terminal. In a
distributed arrangement, you can use an M6 metric screw of appropriate
length to secure the printer to your counter.

PICTURE 33

Figure 33. Point of Sale Printer Model 3

2.26 Proprinter

You can install a printer from the IBM series of Proprinters on each 4684
terminal. Please refer to your Proprinter manual for Proprinter
information.

PICTURE 34

Figure 34. Proprinter

2.27 Scanner

You may attach a point-of-sale scanner to a terminal. Please refer to
your scanner manual for scanner information.

PICTURE 35

Figure 35. Point of Sale Scanner

2.27 Scanner

You may attach a point-of-sale scanner to a terminal. Please refer to
your scanner manual for scanner information.

PICTURE 35

Figure 35. Point of Sale Scanner

2.28 IBM Hand-Held Bar Code Reader

You can attach one hand-held bar code reader to a terminal. The reader
allows item information to be entered into the terminal without keying the
information. It can read the product code symbols affixed to boxes, bags,
packages, or other items. A holder is provided, which affords convenient
storage of the unit when it is not in use. You can attach the holder at
the wrap stand, convenient to the salesperson.

PICTURE 36

Figure 36. Hand-Held Bar Code Reader Model 1

|PICTURE 37

|Figure 37. Hand-Held Bar Code Reader Model 2

2.29 Non-IBM Devices

You can attach non-IBM devices that meet the RS-232-C interface to the
RS-232-C port on the 4684 system unit, and to the RS-232-C ports on the
Feature Expansion Cards C, D, and E of the 4683 base unit.

In addition to the RS-232-C port, dual asynchronous adapters can be used
on the 4684 terminal, allowing two more RS-232-C interfaces for each
adapter installed. Up to five non-IBM devices may be attached by using
these option adapters.

Subtopics
2.29.1 Non-IBM Cash Drawer
2.29.2 Non-IBM External Alarm
2.29.3 Non-IBM Coin Dispenser
2.29.4 Non-IBM Scale
2.29.5 Non-IBM Cables

2.29.1 Non-IBM Cash Drawer

You can attach a non-IBM cash drawer to a terminal. A non-IBM special
attachment cable is available, P/N 63X4997, which is 4 m (13 ft) long.
The non-IBM cash drawer can attach to socket 3A or 3B on both the 4684 and
the 4683 terminal.

2.29.2 Non-IBM External Alarm

You can attach a non-IBM alarm to a terminal. A non-IBM special
attachment cable is available, P/N 63X4997, which is 4 m (13 ft) long.
The non-IBM alarm can attach to socket 3B on both the 4684 and the 4683
terminal.

2.29.3 Non-IBM Coin Dispenser

You can attach a non-IBM coin dispenser to a terminal. If the coin
dispenser matches the RS-232-C interface, it can be attached to the 4684
system unit at the RS-232-C port or the 4683 base unit at the RS-232-C
port on the Feature Expansion Card C, D, and E.

2.29.4 Non-IBM Scale

You can attach a non-IBM scale to a terminal. If the scale matches the
RS-232-C interface, it can be attached to the 4684 system unit at the
RS-232-C port or to the 4683 base unit at the RS-232-C port on the Feature
Expansion Card C, D, and E.

2.29.5 Non-IBM Cables

All cables purchased from IBM meet your government safety requirements.
Make sure that any non-IBM cable you attach meets the same government
safety requirements.

2.30 Summary of Cable Lengths to Attach Distributed Devices
"4684 Cables" in topic 2.30.1 and "4683 Cables" in topic 2.30.2 show the
length of cables when devices are used in distributed arrangements for
both the 4684 and the 4683 Model 002 or A02 terminals. Each device cable
is labeled with a number corresponding to the system unit socket it plugs
into, such as 4 or 7. Some sockets can connect to more than one type of
device. For example, sockets 4A and 4B can connect to a 40-character
alphanumeric display, operator display, or shopper display. Cables are
not interchangeable between devices. Cable connectors are keyed to fit
only certain sockets. This is to ensure that only the proper device cable
can connect to each terminal socket.

Subtopics
2.30.1 4684 Cables
2.30.2 4683 Cables

| 2.30.1 4684 Cables

Table 3. Summary of Cables to Connect Distributed Devices to the 4684

To	From	Cable Length
Cash Drawer	Socket 3A or 3B	3.8 m (12 ft)
40-Character Alphanumeric Display	Socket 4A, 4B, 9A, or 9B	3.8 m (12 ft)
Operator Display Shopper Display	Socket 4A, 4B, 9A, or 9B	2.8 m (9 ft)
9-Inch Monochrome Display (permanently attached 470 mm (18-1/2 in) cable)	Video Symbol	1.4 m (4.6 ft)
IBM 8503 12-Inch Monochrome Display IBM 8504 14-Inch Monochrome Display IBM 8512 14-Inch Color Display IBM 8513 12-Inch Color Display	Video Symbol	1.8 m (6 ft).
Hand-Held Bar Code Reader	Socket 9B or 9A	2.5 m (8 ft) Attached
50-Key Keyboard Alphanumeric Keyboard ANPOS Keyboard Combined Keyboard/Display (MSR) Matrix Keyboard	Socket 5A or 5B	3.8 m (12 ft)
Enhanced Alphanumeric Keyboard	Keyboard Symbol (1)	2 m (6 1/2 ft) coiled 3 m (10 ft) extended
Single-Track MSR	Keyboard Socket 6	3.8 m (12 ft)
Dual-Track MSR	Socket 5A or 5B	3.8 m (12 ft)
Parallel Printer (Proprinter)	Printer Symbol	3.8 m (12 ft)
Point of Sale Printer Model 1, 2, or 3	Socket 7	3.8 m (12 ft)
Point of Sale Scanner	Socket 17	4.7 m (15 ft)
Non-IBM Alarm (Non-IBM Device Cable)	Socket 3B	4 m (13 ft)
Non-IBM Cash Drawer (Non-IBM Device Cable)	Socket 3A or 3B	4 m (13 ft)
IBM 3151 or 3161	Lightning Bolt Symbol	76 m (250 ft)

|2.30.2 4683 Cables

Table 4. Summary of Cables to Connect Distributed Devices to the 4683
To	**From**	**Cable Length**
Cash Drawer Flip-Top Cash Drawer	Socket 3A or 3B	3.8 m (12 ft)
40-Character Alphanumeric Display	Socket 4A, 4B, 9A, or 9B	3.8 m (12 ft)
Operator Display Shopper Display	Socket 4A, 4B, 9A, or 9B	2.8 m (9 ft)
9-Inch Monochrome Display (permanently attached 470 mm (18-1/2 in) cable)	Feature Expansion A Socket 81	3.5 m (11-1/2 ft)
IBM 8503 12-Inch Monochrome Display IBM 8513 12-Inch Color Display (permanently attached 1.8 m (6 ft) cable)	Feature Expansion A Socket 81	180 mm (7 in.) - or - 3.5 m (11-1/2 ft)
Hand-Held Bar Code Reader	Socket 9B or 9A	2.5 m (8 ft) Attached
50-Key Keyboard Alphanumeric Keyboard ANPOS Keyboard Combined Keyboard/Display (MSR) Matrix Keyboard	Socket 5A or 5B	3.8 m (12 ft)
Single-Track MSR	Keyboard Socket 6	3.8 m (12 ft)
Dual-Track MSR	Socket 5A or 5B	3.8 m (12 ft)
Point of Sale Printer Model 1, 2, or 3	Socket 7	3.8 m (12 ft)
Point of Sale Scanner	Socket 17	4.7 m (15 ft)
Non-IBM Alarm (Non-IBM Device Cable)	Socket 3B	4 m (13 ft)
Non-IBM Cash Drawer (Non-IBM Device Cable)	Socket 3A or 3B	4 m (13 ft)
IBM 3151 or 3161	Feature Expansion C/D Socket 23 or 25	76 m (250 ft)

|2.31 Cable Connections at the System Unit Back Panel

|System units of the terminals contain sockets, or ports, in the rear for
|attaching cables to point-of-sale devices. IBM recommends that you follow
|some basic rules in plugging the devices. Appendix E contains worksheets
|to help the planner and installer follow the procedure of attaching
|devices to terminals. Table 5 identifies the port, or socket used with
|each cable.

Socket Number	Device Cable
Table 5. Cable Connections at the Rear of the 4684 System Unit	
1A	Baseband network
1B	Baseband network or Token Ring Network (4684 Model 300 Only)
3A	Cash Drawer A
3B	Cash Drawer A or B or Non-IBM Alarm
4A	40-Character Alphanumeric Display, Operator Display, or Shopper Display
4B	40-Character Alphanumeric Display, Operator Display, or Shopper Display
5A	50-Key Keyboard, Alphanumeric Keyboard, ANPOS Keyboard, Combined Keyboard/Display, Matrix Keyboard, or Dual-Track MSR
5B	50-Key Keyboard, Alphanumeric Keyboard, ANPOS Keyboard, Combined Keyboard/Display, Matrix Keyboard, or Dual-Track MSR
6	Single-Track MSR (Socket 6 is on the 50-Key Keyboard and the Alphanumeric Keyboard.)
7	Point of Sale Printer Models 1, 2, or 3
9A	40-Character Alphanumeric Display, Operator Display, Shopper Display, or Hand-Held Bar Code Reader
9B	40-Character Alphanumeric Display, Operator Display, Shopper Display, or Hand-Held Bar Code Reader
11	4683 Point of Sale Terminal Model 002 or A02
17	Point of Sale Scanner
Keyboard Symbol 1	Enhanced Alphanumeric Keyboard
Symbol 2	Pointing Device (Mouse)
Printer Symbol	Parallel Printer (Proprinter)
Video Symbol	Video Display
Lightning Bolt Symbol	RS-232-C Device, Asynchronous Port Devices

|The following list identifies the figures that show the socket that each
|device plugs into on the back panel of the 4684 system unit. The sockets
|are labeled with both numbers and symbols.

|4684 Model 300 Back Panel without   Figure 38
|Side Card Option (Slot 6)

|4684 Model 300 Back Panel with   Figure 39
|Baseband Network Side Card Option
|(Slot 6)

|4684 Model 300 Back Panel with   Figure 40
|Token-Ring Network Side Card Option
|(Slot 6)

|4684 Model 200 without Baseband   Figure 41
|Network Option

|4684 Model 200 with Baseband Network   Figure 42

|Option

|PICTURE 38

|Figure 38. 4684 Model 300 Back Panel without Side Card Option (Slot 6)

|PICTURE 39

|Figure 39. 4684 Model 300 Back Panel with Baseband Network Side Card
| Option (Slot 6)

|PICTURE 40

|Figure 40. 4684 Model 300 Back Panel with Token-Ring Network Side Card
| Option (Slot 6)

|PICTURE 41

|Figure 41. Model 200 without Baseband Network Option

|PICTURE 42

|Figure 42. Model 200 with Baseband Network Option

2.32 Security Considerations

Several options are available to enhance physical security for the
terminals and devices. They include:

    Two styles of optional security bases to help prevent unauthorized
    removal of devices when they are placed on top of the system unit or
    cash drawer. The devices that can be attached to the security bases
    include:

    -   Keyboards
    -   Point of Sale Printer Model 1, Model 2, or Model 3
    -   9-Inch Monochrome Display
    -   Operator display, when it is mounted on the tray base.

    Purple printing ribbon available with the printer to prevent copying
    of sales receipts.
    Optional locks for the keyboard, cash drawer, and printer.
    A security lock on machines with diskette drives.
    Threaded inserts in the bottom of the system unit and cash drawer for
    securing them to a wrap stand or counter top.

Subtopics
2.32.1 Security Base
2.32.2 Security Base for Attaching a 9-Inch Monochrome Display
2.32.3 Locks on Terminal Devices
2.32.4 Securing the Cash Drawer or System Unit to the Wrap Stand

2.32.1 Security Base

The optional security base is a plastic plate that fits on top of a system
unit or cash drawer. Its purpose is to secure the keyboard, printer, and
operator display to help prevent unauthorized removal of the devices from
the terminal. In addition, you can attach the 9-inch monochrome display
to the security base when the display is placed in the location usually
occupied by the printer.

The security base does not attach to the system unit or cash drawer. In
an integrated arrangement, it rests on top of the system unit. In a
distributed arrangement, it can rest on top of the base unit or the cash
drawer. It is approximately the same length and width as the system unit
and cash drawer and is about 19 mm (3/4 in.) high.

It comes with 16 mm long M6 metric security screws for attaching the
devices. You can install security screws in the bottom of the devices to
be attached. With security screws installed, you press the head of the
screw down through a hole in the security base. Once in place, the
security screw will hold the device to the security base.

In order to separate the devices from the security base, you must raise
the security base and remove the security screw from each device.
Figure 43 shows a security base in place on top of a system unit.

PICTURE 43

Figure 43. Security Base Placed on System Unit

2.32.2 Security Base for Attaching a 9-Inch Monochrome Display

A special security base is available, which must be used when you
integrate a 9-Inch monochrome display on a terminal that has an integrated
printer. It permits the display to extend past the right side of the
terminal and contains a tilt/swivel mechanism that allows the salesperson
to adjust the position of the display. Like the security base described
in "Security Base" in topic 2.32.1, it can secure a keyboard, printer, and
operator display to help prevent unauthorized removal of the devices from
the terminal.

The security base does not attach to the system unit or cash drawer. In
an integrated arrangement, it rests on top of the system unit. In a
distributed arrangement, it can rest on top of the base unit or the cash
drawer. It is approximately the same depth as the system unit and cash
drawer. An extension at the right side supports the 9-inch monochrome
display.

It comes with 16 mm long M6 metric security screws for attaching the
devices. You can install security screws in the bottom of the keyboard,
display, and printer. With security screws installed, you press the head
of the screw down through a hole in the security base. Once in place, the
security screw will hold the device to the security base.

In order to separate the devices from the security base, you must raise
the security base and remove the security screw from each device.

PICTURE 44

Figure 44. Security Base for Integrating a 9-Inch Monochrome Display

2.32.3 Locks on Terminal Devices

Locks are available on certain devices to prevent unauthorized operation
or access, depending on the device. They include:

     A lock on the keyboard to limit access to certain functions or
     operations to authorized personnel only. The enhanced alphanumeric
     keyboard is the only keyboard that does not have a lock.

     A lock inside the printer cover to limit access to the journal print
     station.

     A lock on the cash drawer to limit access to the cash drawer.

     A lock on the 4684 terminal system unit diskette drive to prevent
     removal or insertion of diskettes. The lock also secures the top
     cover to prevent access to the fixed disk drive. The key for *this*
     lock must be available to service personnel.

Locks may be ordered to accept either specific keys or random keys
selected from a large group of lock combinations. The locks are installed
by your personnel when they install the terminals.

Subtopics
2.32.3.1 Blank Lock Inserts
2.32.3.2 Replacement Keys and Lock Inserts

2.32.3.1 Blank Lock Inserts

Blank lock inserts are available to cover the holes for the lock inserts
when no locks are installed.

2.32.3.2 Replacement Keys and Lock Inserts

Replacement keys, locks, and blank lock inserts can be ordered as supply
items. Part numbers and lock serial numbers can be found under
"Replacement Locks Serial Numbers and Part Numbers" in topic B.3.

2.32.4 Securing the Cash Drawer or System Unit to the Wrap Stand

The bottom of the system unit and the cash drawer have threaded inserts
for installing screws to secure either of them to a wrap stand or counter
top. These inserts are located at two points on the bottom of the cash
drawer and at one point on the system unit. Appendix C contains
illustrations of the bottom view of the units.

You must provide M6 metric screws for securing the devices. The screws
can extend approximately 9 mm (11/32 in.) into the bottom of the system
unit or cash drawer.

2.33 Safety Considerations

Safety is a major consideration in the design of all IBM products. All
machines meet or exceed the standards required by your local government.

Environmental safety is your responsibility. You should:

    Adhere to local and national electrical codes

    Provide enough service clearances so that your personnel can easily
    connect and disconnect cables and devices

    Ensure that the power ON/OFF switches for all units are accessible.

2.34 Declaration of Noise Emission Values

Type	Description	LwAd		LpAm		<LpA>m	
		Operating (bels)	Idling (bels)	Operating (dB)	Idling (dB)	Operating (dB)	Idling (dB)
4684	Point of Sale Terminal	7.0	5.5	62	48	54	42

Table 6. Declaration of Noise Emissions Values, 4684 Point of Sale Terminal

Notes:

LwAd   The declared sound power emission level for a production series of machines.

LpAm   The mean value of the sound pressure emission levels at the operator position (if any) for a production series of machines.

<LpA>m   The mean value of the space-averaged sound pressure emission levels at the one meter positions for a production series of machines.

N/A   Not Applicable (No operator position)

All measurements made in accordance with ISO DIS 7779, and reported in conformance with ISO DIS 7574/4.

These values are subject to change.

For a declaration of noise emission values for the 4683 Point of Sale
Terminal, refer to *IBM 4680 Store System: Preparing Your Site*.

2.35 Environmental Considerations

Subtopics
2.35.1 Operating Environment
2.35.2 Heat Output
2.35.3 Maximum Operating Altitude
2.35.4 Static Electricity

2.35.1 Operating Environment

The operating temperature and humidity limits for the 4684 terminals are:

```
Temperature        10° C to 32° C (50° F to 90° F)
Relative Humidity  8% to 80%
Maximum Wet Bulb   23° C (73° F)
```

Note: The IBM 4684 Point of Sale Terminal is designed to operate in a store environment where heating and cooling facilities are provided as required for normal store operations. A 4684 terminal may contain both a diskette drive and a fixed disk drive. Do not locate them where dust might be drawn into the units by the cooling fan.

2.35.1 Operating Environment

The operating temperature and humidity limits for the 4684 terminals are:

```
Temperature        10° C to 32° C (50° F to 90° F)
Relative Humidity  8% to 80%
Maximum Wet Bulb   23° C (73° F)
```

Note: The IBM 4684 Point of Sale Terminal is designed to operate in a store environment where heating and cooling facilities are provided as required for normal store operations. A 4684 terminal may contain both a diskette drive and a fixed disk drive. Do not locate them where dust might be drawn into the units by the cooling fan.

2.35.2 Heat Output

The heat outputs of the units are shown in the following table. You
should refer to the documentation with any non-IBM devices for information
regarding their heat output.

```
+--------------------------------------------------------------------+
¦ Table 7. Heat Output                                               ¦
+--------------------------------------------------------------------¦
¦ Machine Type                            ¦ Heat Output              ¦
+-----------------------------------------+--------------------------¦
¦ IBM 4684 Point of Sale Terminal         ¦ 350 watts                ¦
¦                                         ¦ (1194 Btu/hr)            ¦
+-----------------------------------------+--------------------------¦
¦ IBM 4683 Point of Sale Terminal         ¦ 275 watts (940 Btu/hr)   ¦
¦ Model 002 or A02                        ¦                          ¦
+-----------------------------------------+--------------------------¦
¦ 9-Inch Monochrome Display               ¦ 25 watts (90 Btu/hr)     ¦
+-----------------------------------------+--------------------------¦
¦ IBM 8503 12-Inch Monochrome Display     ¦ 55 watts (190 Btu/hr)    ¦
+-----------------------------------------+--------------------------¦
¦ IBM 8504 14-Inch Monochrome Display     ¦ 55 watts (190 Btu/hr)    ¦
+-----------------------------------------+--------------------------¦
¦ IBM 8512 14-Inch Color Display          ¦ 80 watts (270 Btu/hr)    ¦
+-----------------------------------------+--------------------------¦
¦ IBM 8513 12-Inch Color Display          ¦ 80 watts (270 Btu/hr)    ¦
+--------------------------------------------------------------------+
```

¦ Machine Type   ¦ Heat Output

2.35.3 Maximum Operating Altitude

The maximum operating altitude is 2135 m (7000 ft) above sea level.

2.35.3 Maximum Operating Altitude

The maximum operating altitude is 2135 m (7000 ft) above sea level.

2.35.4 Static Electricity

When the humidity is low, static electricity can build up a charge due to
the movement of people, paper, or objects. These charges create an
annoying static shock when discharged to or near another person or object.
If discharged to or near data processing equipment, errors can result. A
proven method of controlling static buildup is to maintain a relative
humidity level of 40% to 50%. Some other ways to minimize static buildup
are:

     Use anti-static carpet
     Use anti-static treatment on your floor covering
     At the machines, install pads or mats designed to reduce static
     buildup.

2.36 Checklist of Plans and Schedules

This checklist can help in planning the installation. It lists some of
the tasks that must be done, with guidelines to help ensure that they are
completed on time. Modify the list of items and recommended schedules, or
add other items to the list to fit your needs.

Table 8. Planning Checklist			
Task	**Weeks Before Delivery**	**Date Scheduled**	**Date Completed**
Determine equipment schedules	24		
Determine terminal arrangements	24		
Order planning and installation manuals	24		
Review communication plans for store	24		
Determine wrap stand requirements	24		
Determine electrical power requirements	24		
Determine requirements for store cabling	24		
Determine requirements for baseband network	24		
Determine requirements for Token-Ring network	24		
Develop plans for preparing the store	24		
Review plans for preparing the store	20		
Order store cables and accessories	20		
Order cables and accessories for optional baseband network	20		
Order modems and telephone connections	20		
Install and test store wiring	10		
Order expendable supplies	8		
Complete wrap stand installation	4		
Complete all site preparations	2		

3.0 Topic 3. Planning the Store Wiring

The user is responsible for obtaining, installing, testing, and
maintaining the store wiring. This chapter provides information on
planning both the wiring for electrical power and the wiring to connect
the terminals to one another.

Several types of cabling hardware and store wiring are required for the
4684 Point of Sale Terminal, the 4683 Point of Sale Terminal, and the
PS/2. They are described in this chapter and include:

    Electrical power wiring that provides power to the point-of-sale
    terminals and optional PS/2s

    Cabling to provide an optional baseband network for communication
    between 4684 terminals and PS/2s

    Cabling to provide an optional Token-Ring network for communication
    between 4684 terminals and PS/2s

    Cabling to provide a connection between a 4684 terminal and an IBM
    3151 or 3161

    Store wiring that connects a 4683 terminal Model 002 or A02 to a 4684
    terminal.

This chapter also contains the following information:

    4684 cabling specifications and safety requirements
    Store wiring test procedure.

If you are planning the store wiring for connecting 4684 terminals to an
X.25 network or an integrated services digital network (ISDN), see the
appropriate X.25 or ISDN documentation.

All cables purchased from IBM meet government safety requirements. Make
sure that any non-IBM cable you attach meets the same government safety
requirements.

Subtopics
3.1 Electrical Requirements
3.2 Checklist for Planning Store Wiring
3.3 Backup Electrical Power
3.4 Baseband Network Cabling Requirements
3.5 Token-Ring Network Cabling Requirements
3.6 IBM 4684 to 3151 and 3161 Cabling Requirements
3.7 Connecting a 4683 Model 002 or A02 Terminal to a 4684 Terminal
3.8 Testing User-Provided Store Wiring

3.1 Electrical Requirements
The IBM terminals require standard electrical wiring. The following
topics provide guidelines for planning the installation of electrical
power wiring for the IBM terminals. They include information regarding
the option of providing backup electrical power to the point-of-sale
terminals. You should review the wiring and electrical requirements for
non-IBM machines or equipment with the electrical contractor.

Subtopics
3.1.1 Electrical Power Requirements
3.1.2 Location of AC Power Receptacles
3.1.3 Grounding Electrical Branch Circuits

3.1.1 Electrical Power Requirements

Table 9. Electrical Requirements (These units require an ac power receptacle.)

Machine or Device	Nominal Volts ac	Minimum Volts ac	Maximum Volts ac	Maximum kVA/Watts	Frequency (in Hz)
IBM 4684 Terminal	100 to 125 200 to 240	90 180	137 259	0.40/280	50/60 ±3 50/60 ±3
IBM 4683 Model 002 or A02	100 to 125 200 to 240	90 180	137 259	0.40/280	50/60 ±3 50/60 ±3
9-Inch Monochrome Display	100 to 125 200 to 240	90 180	137 259	0.03/25	50/60 ±3 50/60 ±3
IBM 8503 12-Inch Monochrome Display	100 to 125 200 to 240	90 180	137 259	0.09/95	50/60 ±3 50/60 ±3
IBM 8504 14-Inch Monochrome Display	100 to 125 200 to 240	90 180	137 259	0.09/95	50/60 ±3 50/60 ±3
IBM 8512 14-Inch Color Display	100 to 125 200 to 240	90 180	137 259	0.10/115	50/60 ±3 50/60 ±3
IBM 8513 12-Inch Color Display	100 to 125 200 to 240	90 180	137 259	0.10/115	50/60 ±3 50/60 ±3

Note: Refer to the documentation that accompanied the scanner and Proprinter for their electrical requirements.

3.1.2 Location of AC Power Receptacles

The power receptacles should be installed in locations where the power
cords are safe from being accidentally disconnected. The power cords for
the 4684 terminals are 2.8 m (10 ft) or 4.3 m (14 ft) long, except in
areas where local codes require a 1.8 m (6 ft) power cord. The power
cords for all video displays but the 9-inch display are 1.8 m (6 ft) long.
The power cords for the 9-inch displays are 2.8 m (9 ft) long.

3.1.3 Grounding Electrical Branch Circuits

The IBM machines use standard electrical branch circuits; however, you should plan separate branch circuits for the IBM equipment. For safety, all receptacles located near those receptacles used for IBM machines must be grounded. This will ensure that all nearby equipment is connected to grounded receptacles.

The power cords for all IBM machines include an equipment ground conductor. Each user-supplied branch circuit *must* have a wire conductor for the purpose of grounding the equipment. *This equipment grounding wire is a dedicated ground, not a neutral*. All branch circuit grounding wires must be connected to a common ground point at the distribution panel and, by a single ground wire, to the nearest building ground station. Conduit *must not* be used as the only means of grounding. Grounding must comply with local and national electrical codes.

3.2 Checklist for Planning Store Wiring

The following checklist shows some of the tasks necessary in planning and
installing the store wiring and the electrical power wiring for the IBM
equipment. There is space for you to include additional tasks that may
apply.

Table 10. Checklist for Planning Store Wiring			
Task	**Date Scheduled**	**Date Completed**	**Notes**
Determine types of machines to install			
Determine requirements for store cables			
Determine requirements for connecting 4683 Model 002 and A02 terminals to 4684 terminals.			
Determine electrical power requirements			
Review plans for electrical wiring			
Review plans for store wiring			
Order store cables and accessories			
Order IBM Baseband Network or Token-Ring Network components			
Determine need for auxiliary power source			
Develop installation plans with contractor			
Develop plan to test store cables			
Prepare documentation for contractor			
Review installation documentation with contractor			
Install store wiring			
Install IBM Baseband Network or Token-Ring Network wiring			
Install all electrical power wiring			
Test the store wiring			
Complete all site preparations			

+-----------------------+-----------+-----------+---------------------¦
¦   ¦   ¦   ¦   ¦
+-----------------------+-----------+-----------+---------------------¦
¦   ¦   ¦   ¦   ¦
+---+

+-----------------------+-----------+-----------+---------------------¦
¦   ¦   ¦   ¦   ¦
+-----------------------+-----------+-----------+---------------------¦
¦   ¦   ¦   ¦   ¦
+---+

3.3 Backup Electrical Power

You may want to provide a backup source of power in case the store loses
power from the electric utility company. This is sometimes done with an
auxiliary power source, such as a standby motor generator. An
interruption can occur when switching to emergency generator power and
when switching back to utility power.

In stores where the terminals must remain fully functional in the event of
any disruption to power, you may wish to consider an uninterruptible power
source, often referred to as a UPS. It can provide electrical power for
protection from power line disturbances, as well as from a complete loss
of power from the utility company. The units are available from vendors
in several sizes and capacities.

You may want to consider a UPS for only certain terminals. Depending on
your requirements, you can choose from two general types. An *online UPS*
provides power continuously. A less costly *standby power supply* provides
power only when the utility power falls below a certain voltage level.
The following table lists the requirements for a standby type of power
supply to maintain power to the terminals. This information may be
helpful in determining the type of UPS that is best suited to your needs.
You should contact your IBM Marketing Representative for additional
information.

Subtopics
3.3.1 120 Volts ac
3.3.2 200--240 Volts ac
3.3.3 Lightning Protection for the Backup Power Source
3.3.4 Auxiliary Power Systems

3.3.1 120 Volts ac

Table 11. Electrical Power Requirements for Standby Power Supply	
Features of a Standby Power Supply	**Requirements of the IBM 4684 Point of Sale Terminals**
RMS Voltage Output	120 V ac ±5 V
Waveform	Sinewave Approximation A squarewave is acceptable if the peak voltage requirements are met. (Peak voltage is to be =259 V ac.)
Harmonic Content	<10%
Output Frequency	60 Hz ±3
Transfer Time (length of interruption to the critical load)	=10 milliseconds
Transfer Threshold when Switching from Utility Power to Standby Power Supply	96 to 104 V ac
Transfer Threshold when Switching from Standby Power Supply to Utility Power	=104 V ac
Overcurrent Protection	Current Limiting Circuitry (output should remain stable)
Battery	Sealed Lead Acid, Maintenance-Free

3.3.2 200--240 Volts ac

Table 12. Electrical Power Requirements for Standby Power Supply	
Features of a Standby Power Supply	**Requirements of the IBM 4684 Point of Sale Terminals**
RMS Voltage Output	200 to 240 V ac ±5 V
Waveform	Sinewave Approximation A squarewave is acceptable if the peak voltage requirements are met. (Peak voltage is to be =128 V ac.)
Harmonic Content	<10%
Output Frequency	50 Hz ±3
Transfer Time (length of interruption to the critical load)	=10 milliseconds
Transfer Threshold when Switching from Utility Power to Standby Power Supply	182 to 208 V ac
Transfer Threshold when Switching from Standby Power Supply to Utility Power	=208 V ac
Overcurrent Protection	Current Limiting Circuitry (output should remain stable)
Battery	Sealed Lead Acid, Maintenance-Free

|3.3.3 *Lightning Protection for the Backup Power Source*

| Get the advice of an electrical specialist to determine the need for
| lightning protection.

| IBM recommends lightning protection on the backup (secondary) power
| source when:

| -   Lightning protection is installed on the primary power source
| -   The area is subject to electrical storms or equivalent power
| surges.

| *3.3.4 Auxiliary Power Systems*

| You should verify with the manufacturer that the auxiliary power system
| conforms to the following characteristics. Any auxiliary power system
| such as a motor generator supplying power for the IBM terminals should
| have these characteristics:

| The auxiliary power system must have the capability to provide the
| steady-state kVA power requirements of the terminals. To find this
| steady-state requirement, add the kVA rating for each terminal in the
| store and any additional circuits or equipment that receive power from
| the auxiliary power system.

| The voltages provided by the auxiliary power system should be within
| the ranges shown in "Electrical Power Requirements" in topic 3.1.1.

| The input power frequency requirements are either 50 Hz or 60 Hz as
| shown in "Electrical Power Requirements" in topic 3.1.1.

| **Note:** The auxiliary power system should provide output characteristics,
| such as the nominal voltage magnitude level and frequency, equivalent to
| the power provided by the utility company. The transfer from utility
| power to auxiliary power and from auxiliary power back to utility power
| should not cause a power or phase change during the transfer.

3.4 Baseband Network Cabling Requirements

The IBM 4684 Point of Sale Terminals can coexist with PCs or PS/2s on a
baseband network. A total of six devices (4684 terminals, PCs, or PS/2s)
can exist on the same network. The terminals attach in a daisy-chain
arrangement, with one device attached to the next in the chain. The
terminals are connected with baseband network cables. The network is
closed on the terminals with a **wrap plug** at the first terminal and a
terminator plug at the last terminal.

PICTURE 45

Figure 45. 4684 Baseband Network Connector Sockets

Subtopics
3.4.1 Connecting Baseband Network Cables
3.4.2 Baseband Network Interconnect Hardware
3.4.3 Baseband Network Data Connectors
3.4.4 Removing a 4684 Terminal from a Baseband Network
3.4.5 Determining Maximum Cable Length of Baseband Network
3.4.6 IBM-Tested Cable for Building Wiring (Baseband Network)
3.4.7 4684 Baseband Network Cable Specifications

3.4.1 Connecting Baseband Network Cables

The baseband network cables, the wrap plugs, and the terminator plugs are
connected to the 4684 system unit at connector sockets 1A and 1B. In any
installation, the wrap plug and the terminator plug must be plugged into
the remaining two connector sockets. For instance, the first terminal
receives the wrap plug in socket 1A and the last terminal receives the
terminator plug in socket 1B. However both sockets 1A and 1B can be used
interchangeably. The example below shows a typical baseband network
installation, where the wrap plug begins the network and the terminator
plug finishes the network.

PICTURE 46

Figure 46. A Typical Baseband Network Installation

Note: Even if a terminal is the only terminal of a network, it requires
both the wrap plug and the terminal plug to be plugged into its system
unit's 1A and 1B sockets.

If you are planning an installation of a baseband network, it is important
to map out for your installer the specific sockets where the wrap plug and
terminator plug should be connected. Please use the Installation
Worksheets located in Appendix E of this book to show your installer where
these plugs should be connected.

3.4.2 Baseband Network Interconnect Hardware
The hardware components that may be necessary to properly wire a baseband
network with the IBM 4684 Point of Sale Terminals are:

    Wrap Plug
    Terminator Plug
    4684 Baseband Network Cable Adapter
    Data Connectors
    4684 Baseband Network Cable (Direct Attach)
    4684 Baseband Network Adapter Cable
    PS/2 Baseband Network Cable (Direct Attach)
    PS/2 Baseband Network Adapter Cable
    User-Provided Cable
    Baseband Network Extender.

You may not need all of these hardware components. Your needs will depend
on your store's configuration and the situations you anticipate. A
Customer Store Ship Group contains one wrap plug and one terminator plug.

The following figures illustrate the hardware necessary to install
baseband network wiring for your IBM 4684 Point of Sale Terminals. They
are followed by their respective IBM part numbers.

PICTURE 47


```
+------------------------------------------------------------------------+
¦ 4684 Wrap Plug                    ¦ IBM P/N 96X4974                     ¦
+-----------------------------------+-------------------------------------¦
¦ 4684 Terminator Plug              ¦ IBM P/N 96X4975                     ¦
+------------------------------------------------------------------------+
```

Figure 47. 4684 Wrap Plug and Terminator Plug

PICTURE 48


```
+------------------------------------------------------------------------+
¦ 4684 Baseband Network Cable       ¦ IBM P/N 96X5037                     ¦
¦ Adapter                           ¦                                     ¦
+------------------------------------------------------------------------+
```

Figure 48. 4684 Baseband Network Cable Adapter

PICTURE 49


```
+------------------------------------------------------------------------+
¦ Cable, 6 m length (19.7 ft)       ¦ IBM P/N 16F0887                     ¦
+-----------------------------------+-------------------------------------¦
¦ Cable, 20 m length (65.6 ft)      ¦ IBM P/N 16F0888                     ¦
+------------------------------------------------------------------------+
```

Figure 49. 4684 Direct Attach Baseband Network Cable (4684 to 4684)

PICTURE 50


```
+------------------------------------------------------------------------+
¦ Cable, 4 m length (13.1 ft)       ¦ IBM P/N 16F0889                     ¦
+------------------------------------------------------------------------+
```

Figure 50. 4684 Baseband Network Adapter Cable

PICTURE 51


```
+------------------------------------------------------------------------+
¦ Cable, 6 m length (19.7 ft)       ¦ IBM P/N 39F6306                     ¦
+-----------------------------------+-------------------------------------¦
¦ Cable, 20 m length (65.6 ft)      ¦ IBM P/N 39F6307                     ¦
```

```
+------------------------------------------------------------------------+
```

Figure 51. 4684 to PS/2 Direct Attach Baseband Network Cable

PICTURE 52

```
+------------------------------------------------------------------------+
¦ Cable, 4 m length (13.1 ft)        ¦ IBM P/N 39F6305                   ¦
+------------------------------------------------------------------------+
```

Figure 52. PS/2 Baseband Network Adapter Cable

3.4.3 Baseband Network Data Connectors

The IBM 4684 Point of Sale terminal uses a connector, referred to as a
data connector, to terminate the ends of cable connecting the 4684
terminals within a baseband network. Figure 58 in topic 3.4.5.1 shows the
application that would require the use of data connectors.

The data connectors attach to the cables with solderless connections.
They terminate the four signal wires and the braided shield ground in the
cable. The data connectors also maintain the continuity of the braided
shield ground throughout the baseband network cable.

The terminal's attachment cable has a matching data connector. Figure 53
illustrates a data connector installed in a wall outlet and the matching
data connector on the terminal's attachment cable. It shows how the
"T-tab" interlocks with the "T-cutout" to lock the data connectors
together. To connect or disconnect a data connector, simply squeeze the
lock tabs. A locking clip that slides over each connector is included and
should be installed on both connectors. When the locking clip is in
place, the connector cannot be accidentally disconnected.

Be sure to carefully label the data connectors you install, to avoid
connecting the wrong attachment cable from a terminal.

Contact your IBM Marketing Representative for sources of the IBM data
connector.

PICTURE 53

Figure 53. Data Connectors for Baseband Network Cables

3.4.4 Removing a 4684 Terminal from a Baseband Network

Situations may arise where it may be necessary to disconnect one or more
of your 4684 terminals from a baseband network and still maintain
communications. The following two figures illustrate two possible
conditions that may occur when changing, for instance, from three
terminals to two terminals.

Subtopics
3.4.4.1 Condition A
3.4.4.2 Condition B

3.4.4.1 Condition A

In Figure 54 the third terminal is removed from the network, its cable
disconnected, and the terminator plug is moved to the second terminal.
this procedure can be followed in any daisy-chain arrangement.

PICTURE 54

Figure 54. Condition A (Shifting the terminator plug)

3.4.4.2 Condition B

In Figure 55 the second, or middle terminal is removed from the network.
To connect the two cables of the surrounding terminals to one another, a
4684 baseband network cable adapter must be used. The 4684 baseband
network cable adapter joins the two remaining cables together. The IBM
4684 baseband network cable adapter and part number are shown in Figure 48
in topic 3.4.2.

PICTURE 55

Figure 55. Condition B (Using the 4684 Baseband Network Cable Adapter)

3.4.5 Determining Maximum Cable Length of Baseband Network

The maximum cable length or the total length of cable in the baseband
network depends on the number of units attached to the network, not the
distances between terminals. Figure 56 and Table 13 show a network's
maximum cable length and how it is governed by the number of units on that
network.

PICTURE 56

Figure 56. Maximum Baseband Network Cable Length

+--+
¦ Table 13. 4684 Baseband Network Cabling   ¦
¦   Distances   ¦
+--¦
¦ **Number of**   ¦ **Maximum Cable Length of**   ¦
¦ **Units**   ¦ **Baseband Network**   ¦
+--------------+-----------------------------------¦
¦ 2   ¦ 91.4 m (300 ft)   ¦
+--------------+-----------------------------------¦
¦ 3   ¦ 83.8 m (275 ft)   ¦
+--------------+-----------------------------------¦
¦ 4   ¦ 76.0 m (250 ft)   ¦
+--------------+-----------------------------------¦
¦ 5   ¦ 68.5 m (225 ft)   ¦
+--------------+-----------------------------------¦
¦ 6   ¦ 68.5 m (225 ft)   ¦
+--+

PICTURE 57

Figure 57. Schematic of User-Provided Wiring

Subtopics
3.4.5.1 Reaching the Maximum Baseband Network Cable Length
3.4.5.2 Baseband Network Extender

3.4.5.1 Reaching the Maximum Baseband Network Cable Length

You may extend the maximum cable distance between two 4684 terminals by installing your own wiring. However, the cable must meet certain requirements. These cabling specifications are described in "4684 Baseband Network Cable Specifications" in topic 3.4.7.

You must use a baseband network Adapter Cable, IBM P/N 16F0889 to attach the 4684 to your building wiring. See Figure 58 for an example of where to install your wiring.

PICTURE 58

Figure 58. Extending the Baseband Network Cable Length with User-Provided
        Wiring

3.4.5.2 Baseband Network Extender

The cabling distance of the network can also be increased with the use of
a baseband network extender. More information on the baseband network
extender can be found in the *IBM PC Network Baseband Planning Guide*.

3.4.6 IBM-Tested Cable for Building Wiring (Baseband Network)

IBM has tested three types of building cable for the 4684 baseband
network. This cable may also be used for connecting a 4683 Model 002 or
A02 to a 4684 terminal. These two types of cable are not available from
IBM. Contact your IBM Marketing Representative to obtain them.

Note: The cable you install in your building must meet certain safety
requirements if your installation is in the U.S. where the National
Electrical Code Article 725 is now in effect.

```
+-----------------------------------------------------------------------+
¦ Cable Part Number ¦ UL/NEC Rating    ¦ Suitable Installation          ¦
+-------------------+------------------+--------------------------------¦
¦ 16F0891           ¦ CL2              ¦ Non-Plenum General Purpose     ¦
+-------------------+------------------+--------------------------------¦
¦ 25F6478           ¦ CL2P             ¦ Riser and Plenum               ¦
+-------------------+------------------+--------------------------------¦
¦ 39F6309           ¦ CMP              ¦ Riser and Plenum               ¦
+-------------------+------------------+--------------------------------¦
¦ UL/NEC:  Underwriters Laboratory/National Electrical Code             ¦
+-----------------------------------------------------------------------+
```

3.4.7 4684 Baseband Network Cable Specifications

If you provide your own wiring for the baseband network, it must meet the
following cable specifications.

```
+----------------------------------------------------------------------+
¦ Table 14. Mechanical Characteristics for Baseband Network Cables      ¦
+----------------------------------------------------------------------+
¦ Cable Type            ¦ Two Twisted Pair (4 conductor) Shielded       ¦
+-----------------------+----------------------------------------------¦
¦ Twist Per Pair        ¦ 3 inches ± .5 inches (76 mm ± 13 mm)          ¦
+-----------------------+----------------------------------------------¦
¦ Wire Size             ¦ 22 AWG Stranded or Solid Copper, Tin Coated   ¦
+-----------------------+----------------------------------------------¦
¦ Shield                ¦ Copper Braid, 85 % Coverage and Aluminum      ¦
¦                       ¦ Polyester Tape                                ¦
+-----------------------+----------------------------------------------¦
¦ Wire Color            ¦                                               ¦
¦                       ¦                                               ¦
¦ Pair #1               ¦ Red, Green                                    ¦
¦ Pair #2               ¦ Orange, Black                                 ¦
+-----------------------+----------------------------------------------¦
¦ Jacket                ¦ To Meet Local Codes                           ¦
+----------------------------------------------------------------------+


+----------------------------------------------------------------------+
¦ Table 15. Electrical Characteristics for Baseband Network Cables      ¦
+----------------------------------------------------------------------+
¦ Characteristic        ¦ 100 ohms at 1 MHz and 2 MHz                   ¦
¦ Impedance             ¦                                               ¦
+-----------------------+----------------------------------------------¦
¦ Conductor DC          ¦ 17 ohms Maximum per 76.2 Meters (1000 ft)     ¦
¦ Resistance            ¦                                               ¦
+----------------------------------------------------------------------+
```

| *3.5 Token-Ring Network Cabling Requirements*

| The IBM 4684 Point of Sale Terminal Model 300, equipped with the
| Token-Ring side card or a Token-Ring option adapter, can coexist with PCs
| or PS/2s on a Token-Ring network. The terminals are connected to the
| network with Token-Ring network cables.

| PICTURE 59

| Figure 59. 4684 Model 300 Token-Ring Network Side Card Socket

Subtopics
3.5.1 Token-Ring Network Interconnect Hardware
3.5.2 Token-Ring Network Data Connectors

|*3.5.1 Token-Ring Network Interconnect Hardware*

|These are the hardware components that may be necessary to properly wire a
|Token-Ring network with the IBM 4684 Point of Sale Terminals. You may not
|need all of the components. Your needs will depend on your store's
|configuration and the situations you anticipate.

| 4684 Token-Ring Network Adapter Cable
| Data Connectors
| PS/2 Token-Ring Network Adapter Cable
| User-Provided Cable.

|The following figures illustrate some of the hardware needed to install
|Token-Ring for you 4684 point-of-sale terminals.

|PICTURE 60

```
 +------------------------------------------------------------------------+
|¦ Cable, 4 m length (13.1 ft)         ¦ IBM P/N 16F0889                  ¦
 +------------------------------------------------------------------------+
```

|Figure 60. 4684 Token-Ring Network Side Card or Adapter Cable

|PICTURE 61

```
 +------------------------------------------------------------------------+
|¦ Cable, 4 m length (13.1 ft)         ¦ IBM P/N 39F6305                  ¦
 +------------------------------------------------------------------------+
```

|Figure 61. PS/2 Token-Ring Network Adapter Cable

3.5.2 Token-Ring Network Data Connectors

The IBM 4684 Point of Sale terminal uses a connector, referred to as a
data connector, to terminate the ends of cables connecting the 4684
terminals within a Token-Ring network. The data connectors attach to the
cables with solderless connections. They terminate the four signal wires
and the braided shield ground in the cable. The data connectors also
maintain the continuity of the braided shield ground throughout the
Token-Ring network cable.

The terminal's attachment cable has a matching data connector. Figure 62
illustrates a data connector installed in a wall outlet and the matching
data connector on the terminal's attachment cable. It shows how the
"T-tab" interlocks with the "T-cutout" to lock the data connectors
together. To connect or disconnect a data connector, simply squeeze the
lock tabs. A locking clip that slides over each connector is included and
should be installed on both connectors. When the locking clip is in
place, the connector cannot be accidentally disconnected.

Be sure to carefully label the data connectors you install, to avoid
connecting the wrong attachment cable from a terminal.

Contact your IBM Marketing Representative for sources of the IBM data
connector.

PICTURE 62

Figure 62. Data Connectors for Token-Ring Network Cables

3.6 IBM 4684 to 3151 and 3161 Cabling Requirements

The IBM 4684 Point of Sale Terminal can be connected to an IBM 3151 or
3161 by the RS-232-C connector. Only one 4684 and one 3151 (or 3161) can
be connected.

PICTURE 63

Figure 63. RS-232-C Connector

The attachment cable between the 4684 and the 3151 (or 3161) is a
user-provided cable. The maximum cable length is 76 m (250 ft). You can
use the following cable and connector specification to purchase a complete
cable assembly from suppliers who specialize in RS-232-C cables.

Subtopics
3.6.1 RS-232-C Cable Specifications
3.6.2 RS-232-C Connector Specifications

3.6.1 RS-232-C Cable Specifications

If you provide your own cable for connecting the 4684 to the 3151 or 3161,
it must meet the following cable specifications.

```
+------------------------------------------------------------------------+
¦ Table 16. Mechanical Characteristics of Cable for 3151 and 3161        ¦
+------------------------------------------------------------------------¦
¦ Cable Type                   ¦ Nine to Twelve Conductor Shield         ¦
+------------------------------+-----------------------------------------¦
¦ Wire Size                    ¦ 24 AWG Stranded                         ¦
+------------------------------+-----------------------------------------¦
¦ Shield                       ¦ Aluminized Polyester with Drain Wire     ¦
+------------------------------+-----------------------------------------¦
¦ Jacket                       ¦ To Meet Local Codes                     ¦
+------------------------------------------------------------------------+
```

```
+------------------------------------------------------------------------+
¦ Table 17. Electrical Characteristics of Cable for 3151 and 3161        ¦
+------------------------------------------------------------------------¦
¦ Conductor DC Resistance      ¦ 79 ohms per kilometer (24 ohms per 1000 ¦
¦                              ¦ ft)                                     ¦
+------------------------------+-----------------------------------------¦
¦ Mutual Capacitance between   ¦ 33 pf to 50 pf per meter (10 pf to 15 pf ¦
¦ Conductors                   ¦ per ft)                                 ¦
+------------------------------------------------------------------------+
```

Note: The cable you install in your building must meet certain safety
requirements if your installation is in the U.S. where the National
Electrical Code Article 725 is now in effect.

```
+------------------------------------------------------------------------+
¦ **UL/NEC Rating**              ¦ **Suitable Installation**             ¦
+------------------------------+-----------------------------------------¦
¦ CL2                          ¦ Non-Plenum General Purpose              ¦
+------------------------------+-----------------------------------------¦
¦ CL2R                         ¦ Riser                                   ¦
+------------------------------+-----------------------------------------¦
¦ CL2P                         ¦ Plenum                                  ¦
+------------------------------------------------------------------------+
```

3.6.1 RS-232-C Cable Specifications

If you provide your own cable for connecting the 4684 to the 3151 or 3161,
it must meet the following cable specifications.

3.6.2 RS-232-C Connector Specifications

The cable uses the standard, shielded, metal shell D connector and pin
assignments defined for RS-232-C. The voltage levels are EIA only.
Current loop interface is not supported.

Figure 64 shows the pin arrangements and the gender of the connector
provided with the IBM 4684. The RS-232-C interface of the 4684 is a Data
Terminal Equipment (DTE) type. Connecting a 4684 to a serial device such
as a printer usually requires an attachment cable commonly called a
"null-modem" cable that reverses the transmit and receive lines for proper
operation. In addition, you should verify whether the attaching serial
device requires a plug or receptacle on the attachment cable, because the
connector type varies by device.

PICTURE 64

Figure 64. RS-232-C Connector Wiring

Table 18 lists the pin assignments on the connector.

Table 18. Pin assignments on the IBM 4684 RS-232-C Connector			
Pin Number	**Signal Name**	**Pin Number**	**Signal Name**
1	Not Connected	14	Not Connected
2	Transmit Data	15	Not Connected
3	Receive Data	16	Not Connected
4	Request to Send	17	Not Connected
5	Clear to Send	18	Not Connected
6	Data Set Ready	19	Not Connected
7	Signal Ground	20	Data Terminal Ready
8	Data Carrier Detect	21	Not Connected
9	Not Connected	22	Ring Indicate
10	Not Connected	23	Not Connected
11	Not Connected	24	Not Connected
12	Not Connected	25	Not Connected
13	Not Connected		

3.7 *Connecting a 4683 Model 002 or A02 Terminal to a 4684 Terminal*

One 4683 Model 002 or A02 terminal can be attached to each 4684 terminal.
The terminals can be connected with either:

    A preassembled cable, either 6 m (20 ft) or 20 m (65 ft) long if the
    distance between terminals is less than 20 m (65 ft). The cables have
    modular connectors at both ends to attach directly to the rear of each
    terminal. When using either of these cables, no other cable is
    required.

    A user-provided cable, which can be up to 150 m (490 ft) long, for
    distances farther than 20 m (65 ft).

Subtopics
3.7.1 Preassembled Cables for Cable Distances Up to 20 Meters (65 Feet)
3.7.2 User-Provided Cable for Distances More than 20 Meters (65 Feet)
3.7.3 Restrictions When Cabling Terminals

3.7.1 Preassembled Cables for Cable Distances Up to 20 Meters (65 Feet)

When the 4684 and the 4683 Model 002 (or A02) terminals will be located
near one another, you can directly attach them with a preassembled cable.
The cables are available from IBM in two lengths: 6 m (20 ft) and 20 m (65
ft).

The preassembled cables have modular connectors at both ends, which plug
directly to the rear of the system unit or base unit of each terminal.
When using either of these cables, no other wiring is required to connect
the two terminals.

You cannot remove the modular connectors from the cables, so be certain
the connectors will pass through any conduit you use. The cable and
modular connectors are fragile. Be careful not to damage them when
placing them in conduit. Do not install this cable in a plenum or air
duct. Figure 65 illustrates the cable and modular connectors.

PICTURE 65

Figure 65. Preassembled Cable for Distances Up to 20 m (65 ft)

3.7.2 User-Provided Cable for Distances More than 20 Meters (65 Feet)

When the 4684 terminal and the 4683 terminal are separated by greater
distances, you must provide and install a separate cable, with a data
connector at each end. This cable can have a maximum length of 150 m (490
ft).

Route the cable from one terminal to the other and attach a data connector
at each end. When an Interconnect cable is ordered, two 4 m (13 ft)
cables are shipped. Use these attachment cables to connect the two
terminals to your cable. Figure 66 below illustrates the wiring to
connect the terminals. The cabling specifications for the user-provided
cable are in Table 14 in topic 3.4.7 and Table 15 in topic 3.4.7.
Figure 57 in topic 3.4.5 shows a schematic of the user-provided cable.

PICTURE 66

Figure 66. Cable to Connect a 4683 Model 002 or A02 to a 4684 Terminal

Note: Be sure to label the data connectors you install to avoid
connecting the wrong attachment cables.

3.7.3 Restrictions When Cabling Terminals

The following restrictions apply to installing the wiring that connects a
4684 terminal to another 4684, or a 4683 Model 002 or A02 terminal to a
4684.

Do not route the cable outside a building.

There must be no splices in the cable. You must install data
connectors on the ends of cable where a splice might otherwise be
required. This provides proper termination for both the twisted-pair
wiring and the braided shield. You should note the location of any
such connections for a permanent record.

Do not place the cable in the same duct with other signal cable.

To prevent unwanted electrical interference from electrical power
wiring, you must maintain certain minimum distances between the cable
and electrical power wiring. Plan the routing of the cable to keep it
separated from electrical power wiring.

The minimum distances to maintain between the cable and electrical
power wiring or fixtures are shown in the following chart. The
distances shown are a guide for voltages only up to 440 V ac. Do not
route the cable near power lines or equipment that have voltages
higher than 440 V ac.

Table 19. Cable Separation Guide			
Minimum Distance Between Cable with Braided Shield and:	**Less Than 2 kVA**	**2-5 kVA**	**More Than 5 kVA**
Unshielded power lines or electrical equipment	127 mm (5 in.)	305 mm (12 in.)	610 mm (24 in.)
Unshielded power lines or electrical equipment, with cable enclosed in a grounded metallic conduit	64 mm (2.5 in.)	152 mm (6 in.)	305 mm (12 in.)
Power lines enclosed in grounded metallic conduit (or lead sheathed or aluminum sheathed power lines) with store loop cable enclosed in a separate metallic conduit	38 mm (1.5 in.)	76 mm (3 in.)	152 mm (6 in.)

Notes:

1. Local codes may require greater distances and take precedence over the
    distances shown here.

2. Maintain at least 127 mm (5 in.) between the store loop cable and all
    fluorescent, neon, incandescent, or high intensity discharge (HID)
    lighting fixtures.

3.8 Testing User-Provided Store Wiring

User-provided store wiring must be thoroughly tested when it is installed.
This section provides the testing procedure that applies to an IBM 4684
terminal when attached to an IBM 4684 terminal or an IBM 4683 Model 002 or
A02 terminal. It also describes how to make the test cables that are
required in this procedure. The test procedure requires an ohmmeter.

Note: Some ohmmeters give false readings if an ac or dc voltage potential
is present. The ohmmeter you use should have an iron vane meter movement.
It should be accurate within ± 10%.

The following definitions apply only to these test procedures:

   Continuity. An uninterrupted data wire or shield having a resistance
   of less than 500 ohms.

   Open. A data wire or shield that is normally not connected and has a
   resistance greater than 10,000 ohms.

   Short circuit or short. A connection of two normally unconnected wires
   or shield with a resistance of less than 1000 ohms.

Before disconnecting any cables, note the proper location of each cable.

Subtopics
3.8.1 Data Wire Test Cable
3.8.2 Test Procedure Using an Ohmmeter

3.8.1 Data Wire Test Cable

When you are using an ohmmeter for testing cables, you need to have two
test cables available. In this section, they are referred to as data wire
test cables. These data wire test cables have a data connector on one
end. You can use the IBM General Purpose Attachment Cable, P/N 8310554,
which comes with spade lugs on the wire ends. If you prefer, you can make
your own test cables using the following procedure. You can either attach
spade lugs to the cables you make or strip away enough insulation so you
can attach your ohmmeter test leads.

1. Cut a 2.44 m (8 ft) patch cable, IBM P/N 8642551, in half.
    (This cable has a data connector on each end.)

2. Strip off about 200 mm (8 in.) of the cable outer jacket.

3. Carefully cut the exposed shield along the cable and twist it into a
    single strand.

4. Remove the foil and plastic wrap around the data wires.

5. Strip off approximately 25 mm (1 in.) of insulation from each of the
    data wires. In the test procedures, you will connect the ohmmeter
    leads to these wires.

You may also choose to make a data wire test cable by attaching a data
connector to a short length of cable. Refer to the *IBM Cabling System
Planning and Installation Guide* for the recommended type of cable and
instructions on how to install the data connectors.

PICTURE 67

Figure 67. Data Wire Test Cable

3.8.2 Test Procedure Using an Ohmmeter

The following procedure applies to an IBM 4684 terminal when attached to
an IBM 4684 terminal or an IBM 4683 Model 002 or A02 terminal.

1. See Figure 68 and plug the data wire test cable into the data
    connector at the first terminal.

2. Using an ohmmeter, check for a maximum resistance reading of 10 ohms
    at the data wire test cable (red and orange wires, and green and black
    wires). If resistance exceeds 10 ohms, the cable is too long or its
    connections are faulty. Go to Step 11.

3. Using an ohmmeter, check for an open circuit between:

        The red or orange wires and the green or black wires of the data
        wire test cable

        All the data wires and the shield of the data wire test cable.

    If you do not find an open circuit in every case, the cable is
    defective. Go to Step 11.

4. Disconnect the data wire test cable and plug it into the data
    connector at the next terminal.

5. Using the ohmmeter, repeat Steps 2 and 3.

6. To check the continuity of the cable shield, plug a data wire test
    cable into one end of the cable.

7. Twist the red lead with the cable shield.

8. Plug a second data wire test cable into the other end of the cable.

9. Using an ohmmeter, check for continuity between the red wire and the
    shield.

    If continuity is not found, the cable is defective. Go to Step 11.

10. The test is complete. Continue with testing other elements of the
    system. For example, continue using the test procedure in the
    succession of your chain of terminals.

11. Disconnect the data wire test cable(s).

12. Repair or replace the cable.

PICTURE 68

Figure 68. Data Wire Test Procedure

4.0 Topic 4.   Planning the Communication Facilities

To communicate with a host processor, the primary system unit must have
some kind of communications link. When the host processor is located in
the store, the connection can be made directly.

When the host processor is in another location, most stores communicate
over telephone lines. In these stores, a device called a modem connects
the 4684 terminal to the telephone line and enables the transmission of
data.

You must obtain and install a modem at both the store location and the
host processor location. Before ordering the modem, you should determine
which type of telephone line you will use.

Subtopics
4.1 Nonswitched Line
4.2 Switched Line
4.3 Modems
4.4 Data Coupler
4.5 Line Attachment Types
4.6 Exclusion-Key Telephone
4.7 Ordering the Communication Facilities

4.1 Nonswitched Line

One type of transmission line you can use is a nonswitched line. It can
be a voice-grade private transmission line dedicated to communication
between the 4684 terminal and the host processor. It may also be referred
to as a leased line.

4.2 Switched Line

Another type of line uses the public switched telephone network that is
accessible to dial telephones and is referred to as a switched line. In
the United States, the Federal Communications Commission (FCC) requires
that any device connected to the public switched telephone network must be
registered with the FCC. Users in World Trade countries should review the
requirements for connecting modems to a switched network with their
appropriate communication agencies.

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that any device connected to the public switched telephone network must be
registered with the FCC. Users in World Trade countries should review the
requirements for connecting modems to a switched network with their
appropriate communication agencies.

4.3 Modems

You must provide a modem at both the 4684 terminal and host processor
locations. There are many modems available that operate on either type of
telephone line. Your choice may depend on the operating speed, error
handling capability, and other data telephone options. You should review
your modem requirements with your IBM Marketing Representative or other
supplier of your modems.

4.4 Data Coupler

Not all modems have been registered with the FCC. If you plan to use a
non-registered modem on a switched line, you must connect the modem to the
switched line through an FCC-registered data coupler. A data coupler is
sometimes referred to by the now obsolete term, Data Access Arrangement
(DAA).

4.5 Line Attachment Types

The FCC-registered modems and data couplers attach to the switched network
by one of three FCC-defined types of attachment.

```
    Programmed type
    Fixed loss loop (FLL) type
    Permissive type.
```

The type of attachment must be specified at the time the modem or data
coupler is purchased. The programmed and FLL types are defined as data
attachments. They may be used only on data lines that connect directly to
the telephone company central exchange.

The permissive type of attachment is designed for use on lines that go
through a private branch exchange (PBX) or a key telephone system (KTS),
where data attachments are not allowed.

Of the three types of attachments, the programmed type is preferred. It
provides optimum signal level into the network and it does not attenuate
the signal being received from the network. Regardless of the type of
attachment, the user is responsible to determine whether or not the data
transmission is satisfactory.

4.6 Exclusion-Key Telephone

An exclusion-key telephone contains a switch or button that permits a user
to switch between voice mode and data mode. IBM recommends that you
provide an exclusion-key telephone when using a switched line. The
telephone should be near the modem to aid personnel at the store and host
processor locations in problem determination. Exclusion-key telephones
are available from suppliers of communication hardware.

4.7 Ordering the Communication Facilities

After you determine the type of modem and transmission facilities you will
use, you must order the service and connection. If necessary, you must
order a data coupler that has been registered with the FCC.

The procedures described here for ordering communication facilities apply
to the United States. Users in World Trade countries should review their
communication requirements with their IBM Marketing Representative and the
appropriate communication agency.

Subtopics
4.7.1 Telephone Connection for a Nonswitched Line
4.7.2 Telephone Connection for a Switched Line
4.7.3 Programmed or Fixed Loss Loop Data Coupler
4.7.4 Telephone Connection for a Permissive Data Coupler
4.7.5 Exclusion-Key Telephone

4.7.1 Telephone Connection for a Nonswitched Line

Specify a connection for a nonswitched (private) voice grade line for data
if you plan to use an IBM modem. If you plan to use a non-IBM modem,
refer to the manufacturer's recommendations when ordering the telephone
facilities.

It is important that you order the telephone facilities as early as
possible to be sure the correct type of service and connector can be
installed when needed.

You should consider locating a regular telephone near the modem to aid
store personnel and host processor personnel in problem determination.

4.7.2 Telephone Connection for a Switched Line

If you plan to use a switched line telephone facility, you must provide
certain information to the telephone company at the time you order the
service.

   Request a data line for FCC-registered equipment for data telephone at
   1200 bps or greater.

   Provide the following information about the modem or data coupler to
   the telephone company:

   -   The device name, manufacturer, and model number
   -   The FCC registration number
   -   The ringer equivalence number (REN)
   -   The type of data jack required.

   Note: The FCC registration number and the ringer equivalence number
   is on the modem or data coupler and is available from the supplier.

   Order a telephone connection for the modem or data coupler. The
   telephone company usually refers to this connection as a *data jack*.
   Depending on the type of modem or data coupler, you will need one of
   the following types of data jacks:

   -   Registered jack number RJ45S, which is a programmed type of data
       jack

   -   Registered jack number RJ41S, which has a switch to enable it to
       operate either as a programmed type or as a fixed loss loop type
       data jack.

Notes:

1. The telephone company will install an RJ41S or RJ45S data jack on a
    line specified for use as a data line. Only lines that terminate at a
    telephone company central exchange can be specified as data lines.
    Extensions from a user-owned or telephone-company-owned private branch
    exchange (PBX) or key telephone system (KTS) cannot be considered as
    data lines.

2. The data jack should be located next to the modem or data coupler and
    within 1.8 m (6 ft) of an electrical outlet.

4.7.3 Programmed or Fixed Loss Loop Data Coupler

If you plan to use a modem that has not been registered with the FCC, you
must order a data coupler. Provide the following information to your
supplier:

    Depending on the type of modem you will use, specify a data coupler of
    either the programmed or fixed loss loop type whose modem protective
    interface is equivalent to the USOC type CBS.

    Specify the service as: "Manual Originate/Automatic Answer".

The supplier of the data coupler can provide you with the FCC registration
number and the ringer equivalence number. You must provide this
information to the telephone company when you order the telephone
connection.

4.7.4 Telephone Connection for a Permissive Data Coupler

If you plan to connect your modem to a switched line through a user-owned
or telephone company-owned private branch exchange (PBX) or key telephone
system (KTS), you cannot use either a programmed or fixed loss loop data
coupler. Instead, you must use a "permissive" data coupler. This type of
coupler limits the signal level to prevent possible interference with
other voice communications within the PBX or key telephone system. It is
not as reliable for data telephone as a data line, as described earlier in
this chapter. If the quality of data telephone is unacceptable, you may
want to consider the installation of a data line to bypass the PBX or key
telephone system.

When using a permissive data coupler, you must order a voice jack,
registered jack number RJ11C, rather than the RJ41S or RJ45S data jack.
The type of voice jack you need depends on the requirements of the
permissive data coupler. Provide the following information about the
modem or data coupler to the telephone company:

    The device name, manufacturer, and model number
    The FCC registration number
    The ringer equivalence number (REN).

    The FCC registration number and the ringer equivalence number is on
    the data coupler and is available from the supplier.

4.7.5 Exclusion-Key Telephone
The exclusion-key telephone should meet the requirements of EIA RS514
(telephone exclusion-key standard). It may be either a Type 503, for use
with pulse-dialing (rotary) facilities, or a Type 2503, for use with
Dual-Tone Multi-Frequency (DTMF) push button tone-dialing facilities.

In the U.S., the exclusion-key telephone may be available with several
options. When you order it, specify the following options:

        Data set controls the line
        Aural monitoring provided
        Touch-tone dial or rotary dial, as appropriate
        Voice mode indication.

As with other devices, the exclusion-key telephone must be registered with
the FCC. Provide the FCC registration number and the ringer equivalence
number to the telephone company when you order the telephone jack. These
numbers are on the telephone or are available from the supplier.

Order a registered jack number, RJ36X series jack, from the telephone
company to connect this phone. They will install the jack between the
telephone line and the RJ41S or RJ45S data jack. If the modem is a
permissive type, they will install a connecting arrangement. The 6-pin
modular plug on the modem will connect to the RJ45S data jack.

A.0 Appendix A. World Trade Considerations

Subtopics
A.1 Accessories for Use in European Countries
A.2 Communication Facilities

A.1 Accessories for Use in European Countries

For European single-device boxes, kits containing 1 a Type 1W faceplate
and 2 a data connector mounting plate are available as part of the IBM
Cabling System. Any of several types of European faceplates can be used
instead of the part provided in the kit. Two of these are available from
IBM, which are:

    Type 1 faceplate (87 mm square) and mounting plate (kit IBM P/N
    6091048)

    Type 1W faceplate (80 mm square) and mounting plate (kit IBM P/N
    6091049).

PICTURE 69

Figure 69. Faceplate and Mounting Plate for Use in European Countries

A.2 Communication Facilities

If you plan to use communication facilities to communicate with a host
processor, you should review your requirements with your IBM Marketing
Representative or your dealer and the appropriate communication agencies.

A.2 Communication Facilities

If you plan to use communication facilities to communicate with a host
processor, you should review your requirements with your IBM Marketing
Representative or your dealer and the appropriate communication agencies.

B.0 Appendix B. Expendable Supplies and Replaceable Parts

You should plan to have expendable supplies available for the 4684 and
attached devices. In addition, several replaceable parts, such as print
heads and batteries are available and should be stocked according to your
needs. This section describes some of the supplies and parts, and tells
how to order them.

Subtopics
B.1 How to Order Expendable Supplies
B.2 How to Order Replaceable Parts
B.3 Replacement Locks Serial Numbers and Part Numbers

|*B.1 How to Order Expendable Supplies*

|In the U.S., order expendable supplies from IBM Direct, telephone
|800-IBM-2468. In IBM World Trade countries, order from IBM Direct if it
|is available in your country. If IBM Direct is not available in your
|country, order through your IBM Marketing Representative or your dealer.

Table 20. Expendable Supplies	
Item	**IBM Part Number**
Ribbon Cartridges (Point of Sale Printer Model 1 or 2)	4483015 (black ink) 1040247 (purple ink)
Ribbon Cartridges (Point of Sale Printer Model 3)	1040888 (black ink) 1040875 (purple ink) 1040900 (black Auto-Inking*)
Roll Paper (Point of Sale Printer Model 1, 2, or 3)	432767 (1 Case, 50 Rolls per Case)
5-1/4 inch - Type 2HC Diskettes (IBM Personal Computer AT*)	6109660 (Box of 10)
5-1/4 inch - Type 2D Diskettes (IBM Personal Computer AT)	6023450 (Box of 10)
3-1/2 inch - 2.0 Mb High Density Diskettes (IBM Personal System/2)	6404078 (Box of 10)

Subtopics
B.1.1 Ribbon Cartridge for Point of Sale Printer Model 1, 2, or 3
B.1.2 Ribbons for the 4684 System Unit Printer
B.1.3 Roll Paper for Point of Sale Printer Model 1, 2, or 3
B.1.4 Designing Forms and Documents for the Point of Sale Printer
B.1.5 Determining Number of Motor Steps Required for Top of Print Line on Model 1 or 2
B.1.6 Determining Number of Motor Steps Required for Top of Print Line on Model 3 (Bottom Insert)
B.1.7 Determining Number of Motor Steps Required for Top of Print Line on Model 3 (Top Insert)
B.1.8 Additional Forms for Point of Sale Printer Model 1 or 2
B.1.9 Additional Forms for Point of Sale Printer Model 3
B.1.10 Paper for the 4684 System Unit Printer

B.1.1 Ribbon Cartridge for Point of Sale Printer Model 1, 2, or 3

A ribbon cartridge is shipped with the printer cable. Replacement ribbon cartridges are available, that the salesperson can install. You should maintain a supply of spare ribbon cartridges at each store.

Note: Use the IBM printer ribbons listed in Table 20 in topic B.1 or other equivalent ribbons that use dye-based ink. The use of carbon-particle ribbons or other ribbons that are not equivalent to the IBM ribbons will affect print head life and print quality.

|*B.1.2 Ribbons for the 4684 System Unit Printer*

|If you plan to have a system unit printer attached to the 4684, you should
|have spare ribbons available. Refer to the documentation for your printer
|for the ribbon part number.

| B.1.3 Roll Paper for Point of Sale Printer Model 1, 2, or 3

| Two rolls of paper are shipped with the printer cable. One for the
| journal print station and the other for the document insert/customer
| receipt station. For additional rolls, you can order the IBM part numbers
| listed in Table 20 in topic B.1 or equivalent. Both print stations use
| standard adding machine roll paper. The roll paper must meet the
| specifications in the following table.

Table 21. Specifications - Roll Paper for Point of Sale Printers	
Width	69.85 +0.5 mm -0.76 mm (2.75 +0.02 in. -0.03 in.) The maximum the core may protrude on either side is 0.76 mm (0.030 in.).
Outside Diameter	89 mm (3.5 in.) Maximum (Model 1 or 2) 81 mm (3.2 in.) Maximum (Model 3)
Thickness	0.076 ±10% (0.003 ±10%)
Weight	61 grams/m² (16 lb)
Grade	Service or High Grade (Economy or Bond)
Attachment	The inner end of the roll must be secured by a reverse-tuck-start with a 19 mm (0.75 in.) maximum fold back. *Paper must not be attached to the core in any way*.
Splices	There must be no splices within the paper roll.
Marking	Dye stripes must be on the paper beginning 122 ±15 cm (48 ±6 in.) from the inner end of the roll and extending to within 30 cm (12 in.) of the end of the roll.
Core	Core material and center hole diameter are optional.

| *B.1.4 Designing Forms and Documents for the Point of Sale Printer*

| The point-of-sale printer can be used to print on forms and documents that
| you design for your store's daily operations. Each document should be
| designed so that pre-printed information on the form is not overlapped by
| data printed by the terminal.

| Use the dimensions provided in Figure 70 in topic B.1.4.1 to design blank
| areas for printing terminal data on your forms and documents.

Subtopics
B.1.4.1 Documents for IBM Point of Sale Printer Model 1 or 2
B.1.4.2 Documents for IBM Point of Sale Printer Model 3

B.1.4.1 Documents for IBM Point of Sale Printer Model 1 or 2

To design forms and documents properly for the point-of-sale printer model
1 or 2, the designer needs to consider where text characters are printed
in relation to:

- Document alignment edges
- The printer cover alignment notch
- Document gate.

PICTURE 70

Figure 70. Alignment Dimensions for IBM Point of Sale Printer Model 1 or 2

Notes:

1. The top edge of the protrusion in the top cover is even with the
   bottom edge of the print line.

2. A standard line feed on the document is 11 motor steps or 4.19 mm
   (0.165 in.). One motor step advances the document 0.381 mm (0.015
   in.).

3. All print line dimensions are in reference to the default print
   character height of 2.67 mm (0.105 in.).

4. All dimensions are nominal and for reference only. Because of printer
   manufacturing tolerances, document variations, and insert registration
   variations, any preprinted box (area) should be designed as large as
   possible to ensure printing within the box.

5. After the document makes contact with the document gate (stop), a
   minimum of six line feeds (66 motor steps) is required to advance the
   document to the first printable line. Additional steps are required
   if the desired print line is in a location other than that shown in
   Figure 70. The number of motor steps may be calculated by referring
   to Figure 73 in topic B.1.5 to determine the top of the print line for
   any other line location.

6. It is recommended that forms be tested in the printer with appropriate
   code before ordering large quantities.

7. Bottom corners of printed forms may be diagonally cut as indicated to
   ensure that overprinting does not occur. Overprinting may occur when
   the terminal attempts to print below the last printable line on the
   form (31 mm (1.24 in.) from the bottom edge).

|*B.1.4.2 Documents for IBM Point of Sale Printer Model 3*

|To design forms and documents properly for the point-of-sale printer model
|3, the designer needs to consider where text characters are printed in
|relation to:

| Document alignment edges
| Document feed rolls
| Printer print line.

|Use the dimensions provided in Figure 71 and Figure 72 to design blank
|areas for printing data on your forms and documents.

|PICTURE 71

|Figure 71. Station Paper Path for Model 3 Printer

|PICTURE 72

|Figure 72. Print Field for Model 3 Printer

|**Note:** The recommended maximum form width is 184 mm (7.25 in.) when
|aligning the form against the molded guide on the right side of the front
|document insert area.

|The form width is 216 mm (8.5 in.) when aligning the form against the
|right wall of the front document insert area.

B.1.5 Determining Number of Motor Steps Required for Top of Print Line on Model 1 or 2

PICTURE 73

Figure 73. Calculating Distance from Top of Document to Top of Print Line
for a Model 1 or 2 Printer

Notes:

1. Measure the distance D as shown in Figure 73 from the top of the
    document to the top of the desired print line. If the distance D is
    expressed in **millimeters**, use the following equation to determine the
    number of required motor steps from the document gate stop position
    (top of document) to the top of the desired print line in the machine:

    Number of Required Motor Steps = 2.62 (D) + 63.5

    After calculating the number of motor steps, round off your answer to
    the next highest whole motor step.

2. Measure the distance D as shown in Figure 73 from the top of the
    document to the top of the desired print line. If the distance D is
    expressed in **inches**, use the following equation to determine the
    number of required motor steps from the document gate stop position
    (top of document) to the top of the desired print line in the machine:

    Number of Required Motor Steps = 66.67 (D) + 63.5

    After calculating the number of motor steps, round off your answer to
    the next highest whole motor step.

|B.1.6 *Determining Number of Motor Steps Required for Top of Print Line on Model 3 (Bottom Insert)*

|PICTURE 74

|Figure 74. Calculating Distance from Top of Document to Top of Print Line
| on a Model 3 Printer (Bottom Insert)

|**Notes:**

|1. Measure the distance D as shown in Figure 74 from the top of the
| document to the top of the desired print line. If the distance D is
| expressed in **millimeters**, use the following equation to determine the
| number of required motor steps from the document gate stop position
| (top of document) to the top of the desired print line in the machine:

| **Number of Required Motor Steps = 2.83 (D) + 72 mm**

| After calculating the number of motor steps, round off your answer to
| the next highest whole motor step.

|2. Measure the distance D as shown in Figure 74 from the top of the
| document to the top of the desired print line. If the distance D is
| expressed in **inches**, use the following equation to determine the
| number of required motor steps from the document gate stop position
| (top of document) to the top of the desired print line in the machine:

| **Number of Required Motor Steps = 72 (D) + 72 inches.**

| After calculating the number of motor steps, round off your answer to
| the next highest whole motor step.

|3. The calculations above are for reference only and refer to nominal
| printer dimensions. Mechanical tolerances from printer to printer may
| cause the print line locations to vary by ±3 mm.

| B.1.7 *Determining Number of Motor Steps Required for Top of Print Line on Model 3 (Top Insert)*

| PICTURE 75

| Figure 75. Calculating Distance from Top of Document to Top of Print Line
| on a Model 3 Printer (Top Insert)

| **Notes:**

| 1. Measure the distance D as shown in Figure 75 from the top of the
| document to the top of the desired print line. If the distance D is
| expressed in **millimeters**, use the following equation to determine the
| number of required motor steps from the document gate stop position
| (top of document) to the top of the desired print line in the machine:

| **Number of Required Motor Steps = 2.83 (D - 23.37) mm.**

| After calculating the number of motor steps, round off your answer to
| the next highest whole motor step.

| 2. Measure the distance D as shown in Figure 75 from the top of the
| document to the top of the desired print line. If the distance D is
| expressed in **inches**, use the following equation to determine the
| number of required motor steps from the document gate stop position
| (top of document) to the top of the desired print line in the machine:

| **Number of Required Motor Steps = 72 (D - 0.92) inches.**

| After calculating the number of motor steps, round off your answer to
| the next highest whole motor step.

| 3. The calculations above are for reference only and refer to nominal
| printer dimensions. Mechanical tolerances from printer to printer may
| cause the print line locations to vary by ±3 mm.

|B.1.8 Additional Forms for Point of Sale Printer Model 1 or 2

|The use of printed forms at the document insert station is optional. The
|following specifications apply to forms that may be used at the document
|insert station.

```
+------------------------------------------------------------------------------------+
|¦ Table 22. Specifications - Document Insert Forms                                   |
+------------------------------------------------------------------------------------|
|¦   Paper - Size         ¦      Single-Part Form -  216 mm x 330 mm (8.5 in. x 13 in.) |
|¦                        ¦                          is the recommended maximum.        |
| ¦                       ¦                                                            |
|¦                        ¦                          69.9 mm x 152.4 mm (2.75 x 6 in.) |
|¦                        ¦                          is the recommended minimum.        |
| ¦                       ¦                                                            |
|¦                        ¦                          69.9 mm x 82.5 mm (2.75 in. x 3.25 in.)   |
|¦                        ¦                          is the minimum single-part form that     |
|¦                        ¦                          can be used but it will only allow       |
|¦                        ¦                          approximately 3 lines of printing.       |
| ¦                       ¦                                                            |
|¦                        ¦      Multipart Form   -  216 mm x 330 mm (8.5 in. x 13 in.)|
|¦                        ¦                          is the recommended maximum.        |
| ¦                       ¦                                                            |
|¦                        ¦                          82.5 mm x 187.3 mm (3.25 in. x 7.37 in.) |
|¦                        ¦                          is the recommended minimum.        |
+----------------------+-------------------------------------------------------------|
|¦   Tab Card - Size      ¦      82.5 mm x 123.2 mm (3.25 in. x 4.85 in.)              |
| ¦                       ¦                                                            |
|¦          Weight        ¦      57 to 90 grams/m² (15 to 24 lb) Paper or Tab Card Stock     |
| ¦                       ¦                                                            |
|¦         Thickness      ¦      0.0762 mm (0.003 in.) paper to 0.2 mm (0.008 in.)     |
|¦                        ¦      Ledger Card Stock Maximum (uncoated card stock only)  |
+------------------------------------------------------------------------------------+
```

Subtopics
B.1.8.1 Multipart Forms for Point of Sale Printer Model 1 or 2

B.1.8.1 Multipart Forms for Point of Sale Printer Model 1 or 2

Multipart forms may be used in the document insert station. The maximum
form thickness is 0.47 mm (0.0185 in.)

Top fastening is recommended on all forms regardless of size. Fastening
is permitted on the left side of forms that are a minimum of 101.6 mm (4
in.) wide. Fastening on the right side is not permitted. Fastening must
not extend more than 19.05 mm (.75 in.) from the top, bottom, or left
edge of a form.

When bottom fastening is used, printing must start at least 63.5 mm (2.5
in.) from the fastening to help eliminate potential document feeding
problems.

Note: No staples or metal inserts may be used on any area of the form
that is inserted in the machine. No holes or openings are allowed on the
form or its fastening. Forms with pre-printed lines or boxes located in
areas to be printed can be used. However, the accuracy of printing
between lines or in the boxes depends on the positioning of the document
by the operator.

B.1.9 *Additional Forms for Point of Sale Printer Model 3*

The following specifications apply to forms that may be used for document
insertion.

```
+--------------------------------------------------------------------------------+
|¦ Table 23. Specifications - Document Insert Forms                               ¦
+--------------------------------------------------------------------------------|
|¦   Paper - size           ¦        Single-part form -  216 mm x 330 mm (8.5 in. x 13 in.)      ¦
|¦                          ¦                            is the recommended maximum.            ¦
|¦                          ¦                                                                   ¦
|¦                          ¦                            82.5 mm x 69.9 mm (3.25 x 2.75 in.)    ¦
|¦                          ¦                            is the recommended minimum.            ¦
|¦                          ¦                                                                   ¦
|¦                          ¦                            69.9 mm (2.75 in.)                     ¦
|¦                          ¦                            is the minimum width for check franking. ¦
|¦                          ¦                                                                   ¦
|¦                          ¦        Multipart Form   -  216 mm x 330 mm (8.5 in. x 13 in.)      ¦
|¦                          ¦                            is the recommended maximum.            ¦
|¦                          ¦                                                                   ¦
|¦                          ¦                            82.5 mm x 69.9 mm (3.25 in. x 2.75 in.) ¦
|¦                          ¦                            is the recommended minimum.            ¦
+--------------------------------------------------------------------------------+
```

Subtopics
B.1.9.1 Multipart Forms for Point of Sale Printer Model 3

B.1.9.1 Multipart Forms for Point of Sale Printer Model 3

Multipart forms may be used for document insertion. The maximum form
thickness is 0.47 mm (0.0185 in.) when inserted into the front of the
printer and 0.25 mm (0.010 in.) when inserted into the top of the printer.
The front sheet should not exceed 0.08 mm (0.003 in.) in thickness and if
the multipart form contains card stock, the card stock must be the last
copy and not exceed 0.2 mm (0.008 in.) in thickness. Also, the sheets of
a multipart form should be the same size, not uneven or stepped.

Forms handling works best if the binding or glued edge of the form goes
into the printer first. On all inserted forms, regardless of size, top or
bottom binding (glued edge) is recommended depending on whether the
document is inserted in the top or the front of the printer. When forms
are inserted bind-edge-first, significantly less form damage and jamming
occur.

>   If multipart forms are inserted other than binding first, they can
>   curl and separate. This is especially true when the edge of the form
>   opposite the binding is uneven or stepped. When the form curls and
>   separates, it can catch inside the printer, get crumpled, and jam.
>   This causes lost time for the operator and terminal operations.

We suggest that information about how to insert a form into the printer be
printed on the top of form. We also suggest that when printing on an
inserted form, the printing be done on a blank section of the form. If
printing is done inside boxes on the form, the boxes should be three
characters high and the margins should be three characters wide to allow
for printer tolerances and operator variances.

If it becomes necessary to print on a damaged form, the printer works best
if the damaged part of the form remains outside the printer. Once the
form is in place the operator can tell the application to print on the
form by pressing the application's "print" key.

No staples or metal inserts should be used on any area of the forms that
are inserted in the machine and no holes or openings are allowed on the
forms or their fastening.

B.1.10 Paper for the 4684 System Unit Printer

If you plan to have a system unit printer attached to the 4684, you should
plan to have a supply of paper. Refer to the documentation for your
printer to determine the type and size of paper to use.

|*B.2 How to Order Replaceable Parts*

|In the U.S., see your IBM Marketing Representative or your dealer for the
|address to order these parts. In World Trade countries, order from IBM
|Direct if it available in your country. If IBM Direct is not available in
|your country, order through your IBM Marketing Representative or your
|dealer.

|**Note:** Replaceable parts identified for the MSR are also for the
|dual-track MSR and the low-profile dual-track MSR.

Table 24. Miscellaneous Replaceable Parts	
Item	**IBM Part Number**
Cash Till with Fixed Bill Dividers (Without Cover)	4783879
Cash Till with Adjustable Bill Dividers (Without Cover)	4783880
Cash Till Cover with Lock and Keys	6316718
Print Head for Point of Sale Printer Model 1	4483100 - or - 25F6405
Print Head for Point of Sale Printer Model 2	25F6405
Replacement Tip for the Magnetic Wand Reader	1756864
Test Card for the Single-Track MSR (One shipped with each MSR)	4055210
Test Card for the Dual-Track MSR (One shipped with each MSR) **Note:** The Single-Track MSR can also be tested with this card.	90X9640
Cleaning Card for MSRs	6019483
Wrap Kit	96X5047
4684 Wrap Plug	96X4974
4684 Terminator Plug	96X4975
4684 Baseband Network Cable Adapter	96X5037

Subtopics
B.2.1 Print Head for Point of Sale Printer Model 1 or 2
B.2.2 Cleaning Card for the Magnetic Stripe Reader
B.2.3 Replaceable Parts for the 50-Key Keyboard or Combined Keyboard/Display
B.2.4 Replaceable Parts for the Alphanumeric Keyboard
B.2.5 Replaceable Parts for the ANPOS Keyboard
B.2.6 Replaceable Parts for the Matrix Keyboard
B.2.7 Replaceable Parts for the Enhanced Alphanumeric Keyboard

B.2.1 Print Head for Point of Sale Printer Model 1 or 2

A print head is shipped with the printer in the initial order. (Printers
that you receive as part of an exchange do not contain a print head.)
Replacement print heads are available, that the salesperson can replace
without the use of tools. If the availability of printers is critical,
you should consider having a spare print head available. The print head
for the Model 2 printer can also be used in the Model 1 printer.

| *B.2.2 Cleaning Card for the Magnetic Stripe Reader*

| The cleaning card is available for the all MSR models. The salesperson
| can occasionally pass the cleaning card through the reader to clean the
| read head.

B.2.3 Replaceable Parts for the 50-Key Keyboard or Combined Keyboard/Display

Table 25. Preprinted Label Sheets (50-Key Keyboard or Combined Keyboard/Display)

Item	IBM Part Number
Preprinted Keybutton Label Sheets (U.S. English)	6316691
Preprinted Keybutton Label Sheets (Canadian English)	6316691
Preprinted Keybutton Label Sheets (Canadian French)	6316702
Preprinted Keybutton Label Sheets (Spanish)	6316700
Preprinted Keybutton Label Sheets (Swedish)	6316697
Preprinted Keybutton Label Sheets (Norway)	6316698
Preprinted Keybutton Label Sheets (Dutch)	6316696
Preprinted Keybutton Label Sheets (Danish)	6316695
Preprinted Keybutton Label Sheets (Spanish)	6317000
Preprinted Keybutton Label Sheets (Italian)	6316699
Preprinted Keybutton Label Sheets (French)	6316693
Preprinted Keybutton Label Sheets (German)	6316692
Preprinted Keybutton Label Sheets (U.K. English)	6316694

Table 26. Blank Label Sheets (50-Key Keyboard or Combined Keyboard/Display)

Item	IBM Part Number
Blank Label Sheets (white)	63X5179
Blank Label Sheets (yellow)	63X5180
Blank Label Sheets (red)	63X5181
Blank Label Sheets (blue)	63X5182
Blank Label Sheets (green)	63X5183
Blank Label Sheets (tan)	63X5184

Table 27. Miscellaneous Devices (50-Key Keyboard or Combined Keyboard/Display)

Item	Height	Package Quantity	IBM Part Number
Single Lens	Standard	50	63X5169
Double Lens	Standard	25	63X5170
Single Lens	Raised	25	63X5171
Double Lens	Raised	25	63X5172
Single Keybutton	Raised	25	63X5173
Key Shield		10	63X5174
Keybutton Removal Tool		3	63X5175

|B.2.4 Replaceable Parts for the Alphanumeric Keyboard

Table 28. Preprinted Label Sheets (Alphanumeric Keyboard)	
Item	**IBM Part Number**
Preprinted Keybutton Label Sheets (U.S. English)	76X0060
Preprinted Keybutton Label Sheets (Canadian French)	76X0051
Preprinted Keybutton Label Sheets (Spanish)	76X0052
Preprinted Keybutton Label Sheets (Swedish)	76X0067
Preprinted Keybutton Label Sheets (Norway)	76X0055
Preprinted Keybutton Label Sheets (Danish)	76X0056
Preprinted Keybutton Label Sheets (French)	76X0051
Preprinted Keybutton Label Sheets (Swiss)	76X0068
Preprinted Keybutton Label Sheets (German)	76X0054
Preprinted Keybutton Label Sheets (U.K. English)	76X0060

|B.2.5 Replaceable Parts for the ANPOS Keyboard

Table 29. Preprinted Label Sheets (ANPOS Keyboard)	
Item	**IBM Part Number**
Preprinted LED Label Sheets (U.S. English)	IBM P/N 25F6352 (left side of keyboard) IBM P/N 25F6353 (right side of keyboard)
Preprinted LED Label Sheets (Canadian French)	IBM P/N 25F6348 (left side of keyboard) IBM P/N 25F5159 (right side of keyboard)
Preprinted LED Label Sheets (Spanish)	IBM P/N 25F6358 (left side of keyboard) IBM P/N 25F5162 (right side of keyboard)
Preprinted LED Label Sheets (French)	IBM P/N 25F6347 (left side of keyboard) IBM P/N 25F5158 (right side of keyboard)
Preprinted LED Label Sheets (German)	IBM P/N 25F6357 (left side of keyboard) IBM P/N 25F5161 (right side of keyboard)
Preprinted LED Label Sheets (U.K. English)	IBM P/N 25F6359 (left side of keyboard) IBM P/N 25F5163 (right side of keyboard)

|B.2.5 Replaceable Parts for the ANPOS Keyboard

Item	**IBM Part Number**
Preprinted LED Label Sheets (U.S. English)	IBM P/N 25F6352 (left side of keyboard) IBM P/N 25F6353 (right side of keyboard)

|B.2.6 Replaceable Parts for the Matrix Keyboard

Table 30. Blank Label Sheets (Matrix Keyboard)	
Item	**IBM Part Number**
Blank Label Sheets (white)	76X0120
Blank Label Sheets (yellow)	76X0121
Blank Label Sheets (red)	76X0122
Blank Label Sheets (blue)	76X0123
Blank Label Sheets (green)	76X0124
Blank Label Sheets (tan)	76X0125

Table 31. Overlays and Devices (Matrix Keyboard)	
Item	**IBM Part Number**
Protective Overlay Shield	76X0128
Paper Overlay	76X0129
Keybutton Removal Tool	1647720

|B.2.7 *Replaceable Parts for the Enhanced Alphanumeric Keyboard*

```
+-----------------------------------------------------------------+
|¦ Table 32. Key Caps and Inserts (Enhanced Alphanumeric Keyboard) ¦
+-----------------------------------------------------------------+
|¦                                              ¦ IBM Part         ¦
|¦ Item                                         ¦ Number           ¦
+----------------------------------------------+------------------|
|¦ Blank light key caps                         ¦ 1351710          ¦
+----------------------------------------------+------------------|
|¦ Blank dark key caps                          ¦ 1351728          ¦
+----------------------------------------------+------------------|
|¦ Clear key caps                               ¦ 6341707          ¦
+----------------------------------------------+------------------|
|¦ Paper Inserts                                ¦ 6341704          ¦
+----------------------------------------------+------------------|
|¦ Key cap removal tool                         ¦ 1351717          ¦
+----------------------------------------------+------------------+
```

```
|¦ Paper Inserts
```

|B.3 Replacement Locks Serial Numbers and Part Numbers

|Table 33 is a list of the IBM lock serial numbers and part numbers for
|devices attached to the 4683 or 4684. When replacement locks are needed,
|order the part number that corresponds to the IBM lock serial number
|stamped in your lock insert. Two keys are included with each lock insert.
|Replacement keys are not available separately.

Type of Lock	IBM Lock Serial Number	IBM Part Number
Table 33. Lock Serial Numbers and Part Numbers		
Random Lock	MM750 through MM925	4783901
Specific Lock	MM926	4783902
	MM927	4783903
	MM987	4783904
	MM929	4783905
	MM930	4783906
	MM931	4783907
	MM932	4783908
	MM933	4783909
	MM934	4783910
	MM935	4783911
	MM936	4783912
	MM937	4783913
	MM938	4783914
	MM939	4783915
	MM940	4783916
	MM941	4783917
	MM942	4783918
	MM943	4783919
	MM944	4783920
	MM945	4783921
Blank Insert	Blank	4783923

Subtopics
B.3.1 Lock Installation and Removal Tools

|*B.3.1 Lock Installation and Removal Tools*

|The following items are shipped with each 4684. Use them when you install
|or remove lock cylinders or blank lock inserts. Order these parts in a
|kit (IBM P/N 4783922):

| Lock Cylinder Aligner (IBM P/N 4783941)
| Lock Installation-Removal Key (IBM P/N 4783943)
| Dummy Lock Insert Handle (IBM P/N 7231).

C.0 Appendix C. Dimensions of Units and Devices

This section provides dimensions of the machines and individual devices.
It also provides additional information and dimensions to help you plan
the design of your wrap stand or sales stations. It includes the
dimensions of connectors that are attached to device cables, to aid in
routing cables to distributed devices.

|PICTURE 76

|Figure 76. IBM 4684 Point of Sale Terminal with Printer Model 3
| (Integrated Configuration)

PICTURE 77

Figure 77. IBM 4684 Point of Sale Terminal with Printer Model 1 or 2
           (Integrated Configuration)

PICTURE 78

Figure 78. 4684 System Unit

PICTURE 79

Figure 79. 4683 Base Unit

PICTURE 80

Figure 80. Threaded Insert Location, System or Base Unit

PICTURE 81

Figure 81. Security Base

PICTURE 82

Figure 82. Security Base for Integrating a 9-Inch Monochrome Display

PICTURE 83

Figure 83. Cash Drawer

PICTURE 84

Figure 84. Threaded Insert Location, Cash Drawer

PICTURE 85

Figure 85. Flip-Top Cash Drawer

PICTURE 86

Figure 86. Threaded Insert Location, Flip-Top Cash Drawer

PICTURE 87

Figure 87. 40-Character Alphanumeric Display

PICTURE 88

Figure 88. Shopper Display on a Post

PICTURE 89

Figure 89. Shopper Display and Mounting Arm

PICTURE 90

Figure 90. Operator Display on a Tray Base

PICTURE 91

Figure 91. IBM 9-Inch Monochrome Display

PICTURE 92

Figure 92. IBM 8503 12-Inch Monochrome Display

|PICTURE 93

|Figure 93. IBM 8504 14-Inch Monochrome Display

PICTURE 94

Figure 94. IBM 8512 14-Inch Color Display

PICTURE 95

Figure 95. IBM 8513 12-Inch Color Display

PICTURE 96

Figure 96. 50-Key Modifiable Keyboard (height increases with MSR
           installed.)

PICTURE 97

Figure 97. Alphanumeric Keyboard

|PICTURE 98

|Figure 98. ANPOS Keyboard

PICTURE 99

Figure 99. Matrix Keyboard

PICTURE 100

Figure 100. Enhanced Alphanumeric Keyboard

PICTURE 101

Figure 101. Combined Keyboard/Display

PICTURE 102

Figure 102. Point of Sale Printer Model 1 or 2

|PICTURE 103

|Figure 103. Point of Sale Printer Model 3

PICTURE 104

Figure 104. Proprinter

PICTURE 105

Figure 105. Hand-Held Bar Code Reader

Subtopics
C.1 Cable Connector Dimensions for 4684 Distributed Devices

C.1 Cable Connector Dimensions for 4684 Distributed Devices

PICTURE 106

Figure 106. Cable Connector Model

Table 34. Dimensions of Connectors on 4684 Distributed Device Cables			
Cable Connector To Distributed:	**Width mm (in.)**	**Length mm (in.)**	**Height mm (in.)**
Cash Drawer	17 (3/4)	22 (7/8)	9 (3/8)
Flip-Top Cash Drawer	17 (3/4)	22 (7/8)	9 (3/8)
40-Character Alphanumeric Display	17 (3/4)	22 (7/8)	9 (3/8)
Operator Display	35 (1-3/8)	40 (1-5/8)	22 (7/8)
Shopper Display	35 (1-3/8)	40 (1-5/8)	22 (7/8)
9-Inch Monochrome Display	70 (3)	50 (2)	40 (1-5/8)
8503 12-Inch Monochrome Display	35 (1-3/8)	60 (2-3/8)	15 (5/8)
8504 14-Inch Monochrome Display	35 (1-3/8)	60 (2-3/8)	15 (5/8)
8512 14-Inch Color Display	35 (1-3/8)	60 (2-3/8)	15 (5/8)
8513 12-Inch Color Display	35 (1-3/8)	60 (2-3/8)	15 (5/8)
50-Key Modifiable Keyboard	22 (7/8)	22 (7/8)	9 (3/8)
Alphanumeric Keyboard	22 (7/8)	22 (7/8)	9 (3/8)
ANPOS Keyboard	22 (7/8)	22 (7/8)	9 (3/8)
Combined Keyboard/Display	22 (7/8)	22 (7/8)	9 (3/8)
Matrix Keyboard	22 (7/8)	22 (7/8)	9 (3/8)
Enhanced Alphanumeric Keyboard	15 (5/8)	50 (2)	15 (5/8)
Point of Sale Printer Model 1, 2, or 3	32 (1-1/4)	22 (7/8)	9 (3/8)
Hand-Held Bar Code Reader	17 (3/4)	22 (7/8)	9 (3/8)
4684 to 4683 Terminals	17 (3/4)	22 (7/8)	9 (3/8)
RS-232-C Interface	55 (2-1/4)	65 (2-5/8)	17 (3/4)
Non-IBM Special Attachment Cable	31 (1-1/4)	49 (2)	16 (5/8)

D.0 Appendix D.   Power Plugs and Receptacles

A power cord to match the most commonly used ac voltage in your country
will be shipped with your terminal. Table 35 identifies the number of the
type of plug that accompanies the terminals in shipment. Figure 107
illustrates the different types of plugs and receptacles.

Table 35. Power Plug Numbers			
Country	**Number**	**Country**	**Number**
Australia	6	Italy	25
Austria	18	Malaysia	23
Argentina	2	Mexico	4
Belgium	18	Netherlands	18
Canada	4	New Zealand	6
Chile	25	Norway	18
Columbia	4	Peru	5
Denmark	19	Philippines	4
Finland	18	Singapore	23
France	18	South Africa	22
Germany	18	Spain	18
Guatemala	4	Sweden	18
Hong Kong	23	Switzerland	24
Indonesia	18	Thailand	5
Ireland	23	United Kingdom	23
Israel	32	United States	4,7

PICTURE 107

Figure 107. Types of Plugs and Receptacles

E.0 Appendix E.   Configuration Worksheets to Attach Devices to Terminals

E.0 Appendix E.   Configuration Worksheets to Attach Devices to Terminals

E.1 Planning Worksheets

This appendix contains installation worksheets to be completed before your
terminals arrive. It includes a 4684 Installation Worksheet as well as a
4683 Installation Worksheet for those stores with 4683s. They provide
useful information to the person who installs and configures the terminals
and can help ensure a smoother installation. They can serve as a guide
when setting up the terminals and in the configuration procedure that
follows the hardware installation. The worksheets provide the installer
with the following:

    Terminal identification

    Identification of any attached terminal

    The kind of devices the terminal should have

    The cable number used with each device

    The socket number on the terminal

    Information about connecting optional items, such as feature cards and
    PS/2 adapters

    A place for identifying the optional device locks.

E.2 Completing the Worksheets

Make a copy of the blank worksheet for each terminal you will have. On
each worksheet:

    Identify the devices and features the terminal will have.
    Indicate the socket connection for each device.
    Note any unique information that will be helpful to the person who
    installs and configures the terminals.

IBM recommends that you follow these basic rules in connecting the
devices:

    Connect the first display (usually the 40-Character Alphanumeric
    Display) to socket 4A.

    If you have two Alphanumeric Displays to connect, one must connect to
    socket 4A and the other to **one** of the following sockets: 4B, 9A, or
    9B.

    If you have two Operator Displays to connect, one must connect to
    socket 4A and the other to **one** of the following sockets: 4B, 9A, or
    9B.

    If you have two Shopper Displays to connect, one must connect to
    socket 4A and the other to **one** of the following sockets: 4B, 9A, or
    9B.

    If you have a Combined Keyboard/Display to connect to socket 5A, **do
    not** connect an Operator Display to socket 4A.

    If you have a Combined Keyboard/Display to connect to socket 5B, **do
    not** connect an Operator Display to socket 4B, 9A, or 9B.

    Connect the first point-of-sale keyboard (usually a 50-Key Keyboard)
    to
    socket 5A.

    If you have a second point-of-sale keyboard, connect it to socket 5B.

Subtopics
E.2.1 Assigning a Primary Display and Keyboard
E.2.2 Attaching Other Devices to the 4684 and 4683

E.2.1 Assigning a Primary Display and Keyboard

To help simplify problem determination procedures when using the 4684
Reference Diskette, all system messages appear on a primary display and
all input is given or provided from a primary keyboard.

During the configuration procedure, the program determines the devices
that are installed and the socket where each is connected to the system
unit. As it runs the 4684 configuration, it automatically assigns one
display as the primary display and one keyboard as the primary keyboard.
Use VIEW ACTIVE CONFIGURATION from MENU-C1 to display the configuration
assignments. Depending on the displays connected to the 4684, it assigns
one of them as the primary display, based on the following priority
sequence:

1. Video display connected to the video display socket on the system unit
2. Alphanumeric display connected to socket 4A
3. Operator display connected to socket 4A
4. Alphanumeric display connected to socket 4B
5. Operator display connected to socket 4B.

Depending on the keyboards connected to the 4684, it assigns one of them
as the primary keyboard, based on the following priority sequence:

1. Enhanced Alphanumeric Keyboard or ANPOS Keyboard connected to socket 1
2. The Keyboard connected to socket 5A
3. The Keyboard connected to socket 5B.

IBM recommends that you keep the assignments that are made by the
configuration program. If you must change them, advise the person who
will perform the configuration procedure of the changes. Also, if you
change the assignments that are automatically selected, remember that
should you reconfigure the machine, you lose the changes you made and you
must enter them again.

E.2.2 Attaching Other Devices to the 4684 and 4683

You can attach a number of IBM and non-IBM devices to a 4684 terminal,
using the RS-232-C connections. In the 4684, the devices can attach to
the system unit or to optional adapters installed in the system unit.   In
an attached 4683 terminal, the devices attach to the RS-232-C connectors
on optional Feature Expansion Cards C, D, and E. For devices attached to
a 4683, indicate the appropriate device address: 64, 65, 68, or 69.

E.3 4684 Installation Worksheets

4684 Terminal No. ____ Location _____

This 4684 is associated with 4683 Terminal No. ____ (if one is attached)

Planner: Enter the terminal numbers and locations.
Mark the boxes to indicate how the Installer should connect the
devices.

Installer: Connect the devices as the Planner has indicated.

Device	Cable Number	Plug into Socket Number
__ Alphanumeric (A/N) Display (1)	4	__ 4A __ 4B __ 9A __ 9B
__ Operator Display (1)	4	__ 4A __ 4B __ 9A __ 9B
__ Shopper Display (1)	4	__ 4A __ 4B __ 9A __ 9B Mount the display on: __ Post __ Arm
__ Primary Display (The program automatically assigns a primary display. No action is required, unless the Planner directs you to change the assignment.	Not applicable	Not applicable
__ System Video Display (9, 12, or 14-Inch Display.)	Cable may not be labeled.	__ Socket marked with symbol for a video display
__ Cash Drawer 1	3	__ 3A __ 3B
__ Cash Drawer 2	3	__ 3A __ 3B
__ Single-Track Magnetic Stripe Reader (MSR)	None	The cable plugs into socket 6 on the keyboard. Keyboard cable 5 connects to socket 5A or 5B.
__ Dual-Track Magnetic Stripe Reader (MSR)	5	__ 5A __ 5B
__ 50-Key Modifiable Keyboard	5	__ 5A __ 5B
__ Alphanumeric Keyboard	5	__ 5A __ 5B
__ ANPOS Keyboard	5	__ 5A __ 5B
__ Matrix Keyboard	5	__ 5A __ 5B
__ Enhanced Alphanumeric Keyboard (Distributed only)	Cable may not be labeled.	__ 1
__ Combined Keyboard/Display (1)	5	__ 5A __ 5B
__ Dual-Track MSR in the Combined Keyboard/Display	None	Not applicable
__ Primary Keyboard (The program auto- matically assigns a primary keyboard. No action is required, unless the Planner directs you to change the assignment.	Not applicable	Not applicable
__ Point of Sale Printer Model 1, 2, or 3	7	__ 7
__ Proprinter	Cable may not be labeled.	__ Socket marked with symbol for a printer
__ Hand-Held Bar Code Reader	9	__ 9B or __ 9A (choose only **one**)
__ Non-IBM Alarm	Cable may not be labeled.	__ 3B

Device	Cable Number	Plug into Socket Number
__ Totals Retention (This is an internal feature. No action is required.)	Not applicable	Not applicable
__ Point of Sale Scanner	Cable may not be labeled.	__ 17
__ RS-232-C device attached to RS-232-C socket on the system unit	Cable may not be labeled.	__ Socket marked with symbol for a lightning bolt
__ RS-232-C device attached to a Dual Async Option Adapter	Cable may not be labeled.	__ Socket on PS/2 Option Adapter
__ An attached 4683 Point of Sale Terminal	11	__ 11 Plug cable into socket 11 at both the 4684 and 4683.

```
+-------------------------------------------------------------------------------+
¦ System Unit Options in the 4684:                                              ¦
+-------------------------------------------------------------------------------¦
¦ __ Feature Card Expansion  (packaged in Box 1C)                               ¦
+-------------------------------------------------------------------------------¦
¦ __ Feature Card and Memory Expansion  (packaged in Box 1D)                    ¦
+-------------------------------------------------------------------------------¦
¦ __ FIRST PS/2 Option Adapter Card                                             ¦
¦                                                                               ¦
¦      __ Write name of FIRST PS/2 Option Adapter (if present) _____ ¦
¦                                                                               ¦
¦          Install in:                                                          ¦
¦                                                                               ¦
¦               __ Slot 1 (lower position)                                      ¦
¦               __ Slot 2 (upper position)                                      ¦
¦                                                                               ¦
¦     If this is a Multiprotocol Communication Adapter (MPCA), assign it as:    ¦
¦          __  Async                                                            ¦
¦          __  Bisync                                                           ¦
¦          __  SDLC                                                             ¦
¦     A Dual Async adapter has two sockets.  If this is a Dual Async adapter,   ¦
¦     indicate the socket for plugging the RS-232-C device:                     ¦
¦                                                                               ¦
¦          __ RS-232-C device in left (2) socket on the adapter _____      ¦
¦                                                                               ¦
¦          __ RS-232-C device in right (2) socket on the adapter _____     ¦
¦                                                                               ¦
¦     If this is an IBM Token-Ring Network 16/4 Adapter/A, indicate speed       ¦
¦     selection:                                                                ¦
¦          __ 4Mbps                                                             ¦
¦          __ 16Mbps                                                            ¦
¦     If this is an IBM Realtime Interface Co-Processor Multiport/2 or          ¦
¦     X.25/2, selection choices are:                                            ¦
¦          Port 0 (P0) Transmit                                                 ¦
¦               __ Port 0 = DCE Transmit Clocking                               ¦
¦               __ Port 0 = DTE Transmit Clocking                               ¦
¦          Port 0 (P0) Receive                                                  ¦
¦               __ Port 0 - Receive clock source = DCE sourced remote clocking  ¦
¦               __ Port 0 - Receive clock source = DPLL Clk/16 local clocking   ¦
¦               __ Port 0 - Receive clock source = DPLL Clk/32 local clocking   ¦
¦          Port 1 (P1) Transmit                                                 ¦
¦               __ Port 1 = DCE Transmit Clocking                               ¦
¦               __ Port 1 = DTE Transmit Clocking                               ¦
¦          Port 1 (P1) Receive                                                  ¦
¦               __ Port 1 - Receive clock source = DCE sourced remote clocking  ¦
¦               __ Port 1 - Receive clock source = DPLL Clk/16 local clocking   ¦
¦               __ Port 1 - Receive clock source = DPLL Clk/32 local clocking   ¦
¦                                                                               ¦
¦ Notes:                                                                        ¦
¦                                                                               ¦
¦ 1.  The MPCA or X.25 external cable may interfere with the placement of the   ¦
¦     4684 rear cover.  IBM recommends that you install either the MPCA or      ¦
¦     X.25 card in slot 1 (the lower slot).                                     ¦
¦                                                                               ¦
¦ 2.  If an ISDN adapter is to be installed in conjunction with an X.25         ¦
¦     adapter or any other Realtime Interface Co-Processor, it must be          ¦
¦     installed in slot 1.                                                      ¦
+-------------------------------------------------------------------------------+


+-------------------------------------------------------------------------------+
¦ __ SECOND PS/2 Option Adapter Card                                            ¦
```

```
__ Write name of SECOND PS/2 Option Adapter (if present)
_____

    Install in:

        __ Slot 1 (lower position)
        __ Slot 2 (upper position)

If this is a Multiprotocol Communication Adapter (MPCA), assign it as:
    __  Async
    __  Bisync
    __  SDLC
A Dual Async adapter has two sockets.  If this is a Dual Async adapter,
indicate the socket for plugging the RS-232-C device:

    __ RS-232-C device in left (3) socket on the adapter _____

    __ RS-232-C device in right (3) socket on the adapter _____

If this is an IBM Token-Ring Network 16/4 Adapter/A, indicate speed
selection:
    __ 4Mbps
    __ 16Mbps
If this is an IBM Realtime Interface Co-Processor Multiport/2 or
X.25/2, selection choices are:
    Port 0 (P0) Transmit
        __ Port 0 = DCE Transmit Clocking
        __ Port 0 = DTE Transmit Clocking
    Port 0 (P0) Receive
        __ Port 0 - Receive clock source = DCE sourced remote clocking
        __ Port 0 - Receive clock source = DPLL Clk/16 local clocking
        __ Port 0 - Receive clock source = DPLL Clk/32 local clocking
    Port 1 (P1) Transmit
        __ Port 1 = DCE Transmit Clocking
        __ Port 1 = DTE Transmit Clocking
    Port 1 (P1) Receive
        __ Port 1 - Receive clock source = DCE sourced remote clocking
        __ Port 1 - Receive clock source = DPLL Clk/16 local clocking
        __ Port 1 - Receive clock source = DPLL Clk/32 local clocking
```

Notes:

1. If two MPCA cards are installed, the card in slot 1 (the lower position)
    is the primary adapter.

2. PS/2 Option Adapters can be installed in either slot. When using some
    combinations of PS/2 Option Adapters, the handles on the adapters may
    interfere with each other. If this happens, move the adapter in slot 1
    to slot 2 and move the adapter in slot 2 to slot 1.

3. The X.25 or MPCA external cable may interfere with the placement of the
    4684 rear cover. IBM recommends that you install either the X.25 or
    MPCA card in slot 1 (the lower slot).

```
+-------------------------------------------------------------------------+
| The code numbers for the locks on this 4684 terminal are:               |
+-------------------------------------------------------------------------+
| __ Cash Drawer 1 _____                                   |
|     (The top one, if you have two)                                      |
|                                                                         |
| __ Cash Drawer 2 _____                                   |
|     (The bottom one, if you have two)                                   |
|                                                                         |
| __ System Unit _____                                     |
|                                                                         |
| __ Keyboard _____                                        |
|                                                                         |
| __ Printer _____                                         |
+-------------------------------------------------------------------------+
```

(1) Refer to "Completing the Worksheets" in topic E.2 for
    important information about connecting these devices.

(2) When viewed from the rear of the machine.

(3) When viewed from the rear of the machine.

E.4 4683 Installation Worksheet

4683 Terminal No. ____ Location _____

This 4683 is attached to 4684 Terminal No. ____ located at _____

Planner: Enter the terminal numbers and locations.
Mark the boxes to indicate how the Installer should connect the
devices.

Installer: Connect the devices as the Planner has indicated.

Device	Cable Number	Plug into Socket Number
__ Alphanumeric (A/N) Display (4)	4	__ 4A __ 4B __ 9A __ 9B
__ Operator Display (4)	4	__ 4A __ 4B __ 9A __ 9B
__ Shopper Display (4)	4	__ 4A __ 4B __ 9A __ 9B Mount the display on: __ Post __ Arm
__ Cash Drawer 1	3	__ 3A __ 3B
__ Cash Drawer 2	3	__ 3A __ 3B
__ Single-Track Magnetic Stripe Reader (MSR)	None	The cable plugs into socket 6 on the keyboard. Keyboard cable 5 connects to Base Unit socket 5A or 5B.
__ Dual-Track Magnetic Stripe Reader (MSR)	5	__ 5A __ 5B
__ 50-Key Modifiable Keyboard	5	__ 5A __ 5B
__ Alphanumeric Keyboard	5	__ 5A __ 5B
__ ANPOS Keyboard	5	__ 5A __ 5B
__ Matrix Keyboard	5	__ 5A __ 5B
__ Combined Keyboard/Display (4)	5	__ 5A __ 5B
__ Dual-Track MSR in the Combined Keyboard/Display	None	Not applicable
__ Point of Sale Printer Model 1, 2, or 3	7	__ 7
__ 9-Inch Monochrome Display __ Integrated on Security Base __ Distributed	81	__ 81 in Position __ 2A __ 81 in Position __ 2B
__ IBM 8503 12-Inch Monochrome Display (Distributed only)	81	__ 81 in Position __ 2A __ 81 in Position __ 2B
__ IBM 8513 12-Inch Color Display (Distributed only)	81	__ 81 in Position __ 2A __ 81 in Position __ 2B
__ Hand-Held Bar Code Reader	9	__ 9B or __ 9A (choose only **one**)
__ Non-IBM Alarm	Cable may not be labeled.	__ 3B
__ Totals Retention (This is an internal feature. No action is required.)	Not applicable	Not applicable

Device	Cable Number	Plug into Socket Number
__ Point of Sale Scanner	Cable may not be labeled.	__ 17
__ RS-232-C device attached	Cable may	__ Socket 23 of card in 2A

```
¦ to Feature Expansion C card ¦ not be    ¦ __ Socket 25 of card in 2A   ¦
¦ __ Device 64    __ Device 65 ¦ labeled.  ¦ __ Socket 23 of card in 2B   ¦
¦ __ Device 68    __ Device 69 ¦           ¦ __ Socket 25 of card in 2B   ¦
+-----------------------------+----------+------------------------------¦
¦ __ RS-232-C device attached  ¦ Cable may ¦ __ Socket 23 of card in 2A   ¦
¦ to Feature Expansion D card  ¦ not be    ¦ __ Socket 25 of card in 2A   ¦
¦ __ Device 64    __ Device 65 ¦ labeled.  ¦ __ Socket 23 of card in 2B   ¦
¦ __ Device 68    __ Device 69 ¦           ¦ __ Socket 25 of card in 2B   ¦
+-----------------------------+----------+------------------------------¦
¦ __ RS-232-C device attached  ¦ Cable may ¦ __ Socket 23 of card in 2A   ¦
¦ to Feature Expansion E card  ¦ not be    ¦ __ Socket 25 of card in 2A   ¦
¦ __ Device 64    __ Device 65 ¦ labeled.  ¦ __ Socket 23 of card in 2B   ¦
¦ __ Device 68    __ Device 69 ¦           ¦ __ Socket 25 of card in 2B   ¦
+-----------------------------+----------+------------------------------¦
¦ __ An attached 4684 Point    ¦ 11        ¦ __ 11  Plug cable 11 into     ¦
¦ of Sale Terminal             ¦           ¦ socket 11 at both the 4683    ¦
¦                              ¦           ¦ and 4684.                     ¦
+------------------------------------------------------------------------+
```

```
+--------------------------------------------------------------------------------+
¦ Feature Expansion Cards in the 4683:   ¦ Plug into                              ¦
+----------------------------------------+---------------------------------------¦
¦ __ One Feature Expansion A card        ¦ __ Position  2A        __ Position  2B ¦
+----------------------------------------+---------------------------------------¦
¦ __ Second Feature Expansion A card     ¦ __ Position  2A        __ Position  2B ¦
+----------------------------------------+---------------------------------------¦
¦ __ One Feature Expansion C card        ¦ __ Position  2A        __ Position  2B ¦
+----------------------------------------+---------------------------------------¦
¦ __ Second Feature Expansion C card     ¦ __ Position  2A        __ Position  2B ¦
+----------------------------------------+---------------------------------------¦
¦ __ One Feature Expansion D card        ¦ __ Position  2A        __ Position  2B ¦
+----------------------------------------+---------------------------------------¦
¦ __ Second Feature Expansion D card     ¦ __ Position  2A        __ Position  2B ¦
+----------------------------------------+---------------------------------------¦
¦ __ One Feature Expansion E card        ¦ __ Position  2A        __ Position  2B ¦
+----------------------------------------+---------------------------------------¦
¦ __ Second Feature Expansion E card     ¦ __ Position  2A        __ Position  2B ¦
+--------------------------------------------------------------------------------+
```

```
+---------------------------------------------------------------------+
¦ The code numbers for the locks on this 4683 terminal are:           ¦
+---------------------------------------------------------------------¦
¦ __ Cash Drawer 1 _____                               ¦
¦      (The top one, if you have two)                                 ¦
¦                                                                     ¦
¦ __ Cash Drawer 2 _____                               ¦
¦      (The bottom one, if you have two)                              ¦
¦                                                                     ¦
¦ __ Keyboard _____                                     ¦
¦                                                                     ¦
¦ __ Printer _____                                      ¦
+---------------------------------------------------------------------+
```

 (4) Refer to "Completing the Worksheets" in topic E.2 for
     important information about connecting these devices.

GLOSSARY Glossary
This glossary includes terms and definitions from the *IBM Dictionary of Computing*, SC20-1699.

address. A location in the memory of a computer where particular data is stored. Also, the digits that identify such a location.

alphanumeric. Pertaining to a character set containing letters, digits, and other characters, such as punctuation marks.

American National Standards Institute (ANSI). An organization for the purpose of establishing voluntary industry standards.

ANSI. American National Standards Institute.

ASCII. American Standard Code for Information Interchange. The standard character set used for information interchange among data processing systems, data communications systems, and associated equipment. The ASCII set consists of printed characters, such as letters, numbers, and special symbols, and control characters, such as line feed and carriage return.

backup. Pertaining to a system, device, file, or facility that can be used in the event of a malfunction or the loss of data.

base unit. The part of the IBM 4683 Point of Sale terminal that contains the power supply and the interfaces.

cash drawer. A drawer at a point-of-sale terminal that can be programmed to open automatically. See *till*.

chain. (1) Transfer of control from the currently executing program to another program or overlay. (2) Referencing a data record from a previous data record.

charge. A sales transaction in which a customer has the partial or total value of purchased merchandise added to an account for later payment.

clear. To delete data from a screen or from memory.

conduit. A tube or duct used to enclose electrical wiring or cables.

configuration. The group of devices, options, and programs that make up a data processing system or network.

customer receipt. An itemized list of merchandise purchased and paid for by the customer.

DAA. Data access arrangement. See *data coupler*.

data. Facts, concepts, or instructions suitable for communication, interpretation, or processing.

data access arrangement (DAA). See *data coupler*.

data coupler. An electrical device for connecting modems to the public switched network in the United States. The data coupler limits the amount of signal applied to the network. It is sometimes referred to as a data access arrangement (DAA).

data file. A collection of related data records organized in a specific manner; for example, a payroll file (one record for each employee, showing such information as rate of pay and deductions) or an inventory file (one record for each inventory item, showing such information as cost, selling price, and number in stock.) See also *data set, file*.

data processing system. A network, including computer systems and associated personnel, that accepts information, processes it according to a plan, and produces the desired results.

data set. Logically related records treated as a single unit. See also *file*.

dialing. Using a dial or pushbutton telephone to initiate a telephone call. In telecommunication, attempting to establish a connection between a terminal and a telecommunication device over a switched line.

disk. A round, flat plate coated with a magnetic substance on which computer data is stored. See also *integrated disk, fixed disk*.

diskette. A thin, flexible magnetic disk permanently enclosed in a protective jacket. A diskette is used to store information for processing.

diskette drive. A mechanism used to seek, read, and write data on

diskettes.

display. (1) A visual presentation of data. (2) A device that presents visual information to the point-of-sale terminal operator and to the customer, or to the display station operator.

distributed. Physically separate but connected by cables.

driver. Software component that controls a device.

EIA. Electronic Industries Association. See *EIA interface*.

EIA interface. An industry-accepted interface for connecting devices having voltage related limits.

event. Processing unit containing price changes and item file updates. All records in an event share common characteristics such as type of change and event due date.

feature. A specific design addition to an IBM product, quoted by the sales manual and that can be ordered by the user.

feature expansion. A card that plugs into an IBM 4684 Point of Sale Terminal and allows additional devices to be used.

Federal Communications Commission (FCC). A board of commissioners appointed by the President under the Communications Act of 1934, having the power to regulate all interstate and foreign electrical communication systems originating in the USA.

field. In a record, a specified area used for a particular category of data.

file. The term for a collection of logically related records treated as a single unit. For example, an invoice may form a record and the complete set of such records may form a file. See also *data set, data file*.

fixed disk. A disk of rigid material with a magnetic coating, used for mass storage and retrieval of data.

function. (1) A specific purpose or characteristic action. (2) In data communications, a machine action such as a carriage return or line feed. (3) A subroutine that returns the value of a single variable and usually has a single exit.

group. Category of identification defined for file access protection.

host processor. In a network, a computer that primarily provides services such as computation, data base access, or special programs or programming languages.

integrated. Arranged together as one unit.

integrated disk. An integral part of the processor that is used for magnetically storing files, application programs, and diagnostics. Synonymous with *disk*.

interface. Hardware or software that allows two independent systems to communicate with each other.

I/O. Input/output.

item. (1) One member of a group. (2) In a store, one unit of a commodity, such as one box, one bag, or one can. Usually an item is the smallest unit of a commodity to be sold.

jack. A receptacle provided by a communication common carrier to connect a data coupler, modem, or telephone to the communication facility.

keyboard. A group of numeric keys, alphabetic keys, special character keys, or function keys used for entering information into the terminal and into the system.

label. Constant, either numeric or literal, that references a statement or function.

line. On a terminal, one or more characters entered before a return to the first printing or display position.

link. In SNA, the combination of the link connection and link stations joining network nodes.

Note: A link connection is the physical medium of transmission; for example, a telephone wire or a microwave beam. A link includes the

physical medium of transmission, the protocol, and associated devices and programming; it is both logical and physical.

load. In computer programming, to enter data into memory or working registers.

local area network (LAN). A network in which communications are limited to a moderate-sized geographic area, such as a single office building, warehouse, or campus, and do not extend across public rights-of-way.

magnetic stripe. The magnetic material (similar to recording tape) on merchandise tickets, credit cards, and employee badges. Information is recorded on the stripe for later "reading" by the magnetic stripe reader (MSR) or magnetic wand reader attached to the point-of-sale terminal.

magnetic stripe reader (MSR). A device that reads coded information from a magnetic stripe on a card, such as a credit card, as it passes through a slot in the reader.

Mb. Megabyte. A megabyte equals 1,048,576 bytes of information.

memory. Program-addressable storage from which instructions and other data can be loaded directly into registers for subsequent execution or processing.

modem. MOdulator - DEModulator. A device that converts data from a form that is compatible with data processing equipment to a form that is compatible with transmission facilities, and vice-versa.

monochrome display. See *video display*.

MSR. Magnetic stripe reader.

nonswitched line. A telecommunication line on which connections do not have to be established by dialing. Contrast with *switched line*.

online. Operation of a functional unit that is under the continual control of a computer or control unit. The term also describes a user's access to a computer using a terminal.

operating system. A collection of programs that is loaded when the processor is turned on and works as a supervisor for the computer.

operator. (1) A symbol that represents the action being performed in a mathematical operation. (2) A person who operates a machine.

overlay. Part of a larger program read into a computer's main memory only when needed. An overlay replaces other portions of the larger program that are no longer needed. The use of overlays reduces the amount of main memory required by a program. An overlay is only supported on the store controller and requires its own copy of the runtime subroutine library.

owner. In relation to files, an owner is the user that creates the file and therefore has complete access to the file.

plug. A connector for attaching wires from a device to a cable. A plug is inserted into a receptacle.

point-of-sale terminal. An IBM 4684 or 4683 Point of Sale Terminal. A unit that provides point-of-sale transaction, data collection, credit authorization, price look-up, and other inquiry and data entry functions.

polling characters (address). A set of characters specific to a terminal and the polling operation; response to these characters indicates to the computer whether the terminal has a message to enter.

private branch exchange (PBX). A manual exchange connected to the public telephone network on the user's premises and operated by an attendant supplied by the user.

problem determination. The process of determining the source of a problem as being a program component, a machine failure, a change in the environment, a common-carrier link, a user-supplied device, or a user error.

procedure. A sequenced set of statements that may be used at one or more points in one or more computer programs, and that usually has one or more input parameters and yields one or more output parameters.

public switched telephone network. Part of a nation-wide telephone network that provides lines and exchanges to the public. It is operated by the communication common carriers in the USA and Canada, and by the PTT Administrations in other countries.

read. To acquire or to interpret data from a storage device, from a data medium, or from another source.

receptacle. A connector for receiving wires from a device. A plug is inserted into a receptacle.

record. A collection of related items of data, treated as a unit; for example, in stock control, each invoice could constitute one record. A complete set of such records may form a file.

scanner. A device that examines the bar code on merchandise tickets, credit cards, and employee badges and generates analog or digital signals corresponding to the bar code.

SDLC. Synchronous Data Link Control.

segment. Generically, segment refers to any individual part of a whole program. Specifically, segment refers to any 64K byte portion of a program being compiled or linked. Internally the compiler groups all code segments into a larger group called the CGROUP, and groups all data segments into a larger group called the DGROUP.

source. The origin of any data involved in a data transfer.

station. (1) One of the input or output points of a communications system. (2) A point-of-sale terminal that consists of a processing unit, a keyboard, and a display. It can also have input/output devices, such as a printer, a magnetic stripe reader and cash drawers.

switched line. A mode of operating a data link in which a circuit or channel is established through switching facilities, as, for example, in a public switched network.

Synchronous Data Link Control (SDLC). A discipline for managing synchronous, transparent, serial-by-bit information transfer over a communication channel. Transmission exchanges can be duplex or half-duplex, over switched or nonswitched communication channels. The communication channel configuration can be point-to-point, multipoint, or loop.

system. (1) See *data processing system*. (2) See *operating system*.

task. A basic unit of work.

terminal. A device, usually equipped with a keyboard and a display, capable of sending and receiving information over a communication channel.

till. A tray in the cash drawer of the point-of-sale terminal, used to keep the different denominations of bills and coins separated and easily accessible.

transaction. The process of recording item sales, processing refunds, recording coupons, handling voids, verifying checks before tendering, and arriving at the amount to be paid by or to a customer. The receiving of payment for merchandise or service is also included in a transaction.

transmission. The sending of data from one place for reception elsewhere.

uninterruptible power source (UPS). A device connected between the electric utility power and a user's equipment. Its output supplies constant electrical power in the event of power line fluctuations or a complete loss of utility power for a limited time.

UPS. Uninterruptible power source.

user. (1) Category of identification defined for file access protection. (2) A person using a program or system.

video display. (1) An electronic transaction display that presents visual information to the point-of-sale terminal operator and to the customer. (2) An electronic display screen that presents visual information to the display operator.

world. Category of identification defined for file access protection.

COMMENTS Readers' Comments -- We'd Like to Hear from You
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Introduction and Planning Guide

Publication No. SA27-3835-02

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