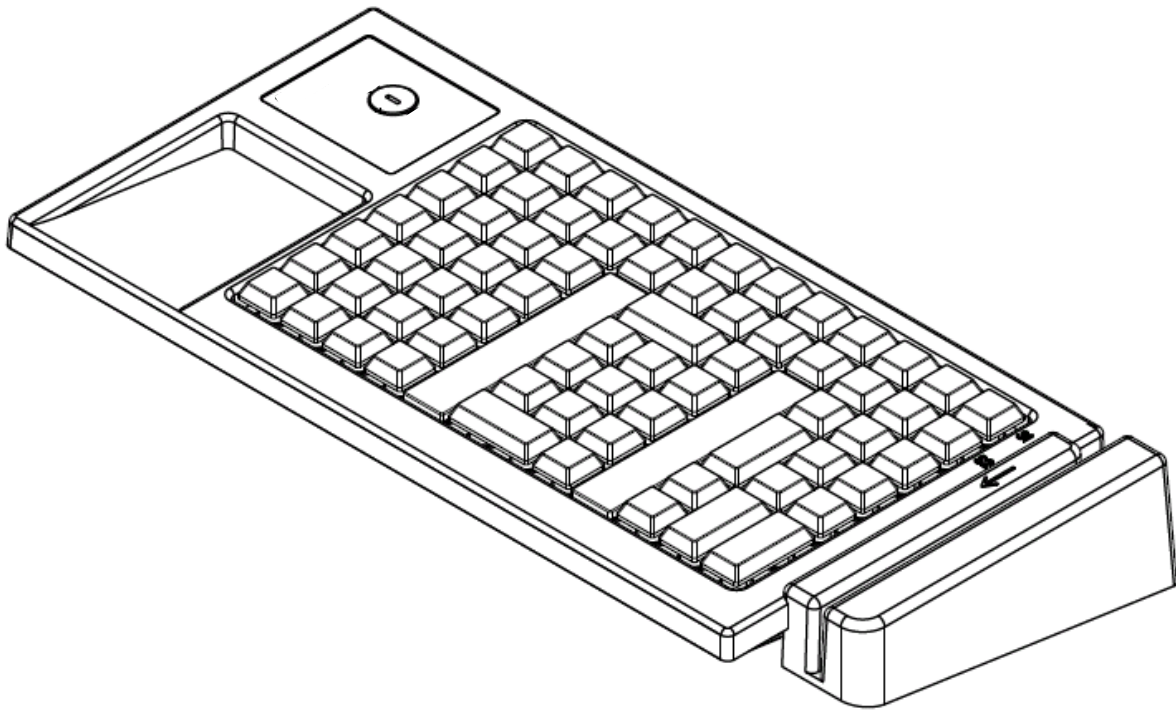**IBM**

IBM 4685-K03 POS Keyboard

Installation, Operation, and Maintenance Guide

IBM is a trademark of the IBM Corporation in the United States or other countries.

First Edition (May 2006)

This manual is revised in accordance with product improvements or for other reasons.

Introduction

This manual provides an overview, installation instructions, operating guidelines, instructions on how to replace the keys, and general maintenance information for the IBM™ 4685-K03 POS Keyboard.

In this manual, the IBM 4685-K03 POS Keyboard may be referred to as the 4685-K03 or as the keyboard. The IBM 4800 POS terminal may be referred to as the POS terminal or as the terminal.

This manual is organized as follows:

- Chapter 1, "An overview of the IBM 4685-K03 POS Keyboard" provides an overview of this product and gives the names of the parts.
- Chapter 2, "Installing the keyboard" provides information about installing the keyboard in the IBM 4800 POS terminal.
- Chapter 3, "Operating the keyboard" provides information about operating procedures for the keyboard and the functions of each part.
- Chapter 4, "Replacing the keys" provides information about exchange procedures for the keys and for the unused key covers.
- Chapter 5, "Maintenance of the keyboard" provides information about problem-solving strategies and part replacement procedures. This section is for service personnel who specialize in maintaining the POS terminal.

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Who should use this guide

This manual is to be used by service personnel who install the IBM 4685-K03 POS Keyboard and by customers. Information for service engineers who specialize in the POS terminal is included in Chapter 5, "Maintenance of the keyboard".

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End of life disposal

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

Notices

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Electronic Emission Notices

Japanese Voluntary Control Council for Interference (VCCI) Statement

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

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

Korean Communications Statement

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

A급 기기(업무용)

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

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Electrostatic Discharge (ESD)

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

ESD Damage Prevention

Anytime a service action involves physical contact with logic cards, modules, back-panel pins, or other ESD-sensitive (ESDS) parts, the service person must be connected to an ESD common ground point on the product through an ESD wrist strap and cord. The ESD ground clip can be attached to any frame ground, ground braid, green wire ground, or the round ground prong on the AC power plug. Coax or connector external shells can also be used.

Handling Removed Cards

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

Related Publications

For related information, please see the following websites:

- *http://www.ibm.com/jp/store/*
- *http://www.pc.ibm.com/store/*

Safety Information for Users

⚠️

Danger:

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

⚠️

危険:

この装置を設置または保守する前に、次の安全上の注意をお読みください。

IBM Safety Information - Read This First, GA27-4004 このブックレットは、電気機器の安全な配線方法や接続手順について説明しています。

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

Safety Information for service personnel

Before you begin to install or service this product, please read the following safety information.

Note: In these notices, the term, qualified service personnel, refers to a person with the skills to perform a PC upgrade.

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Safety Information for Japan

⚠ 危険
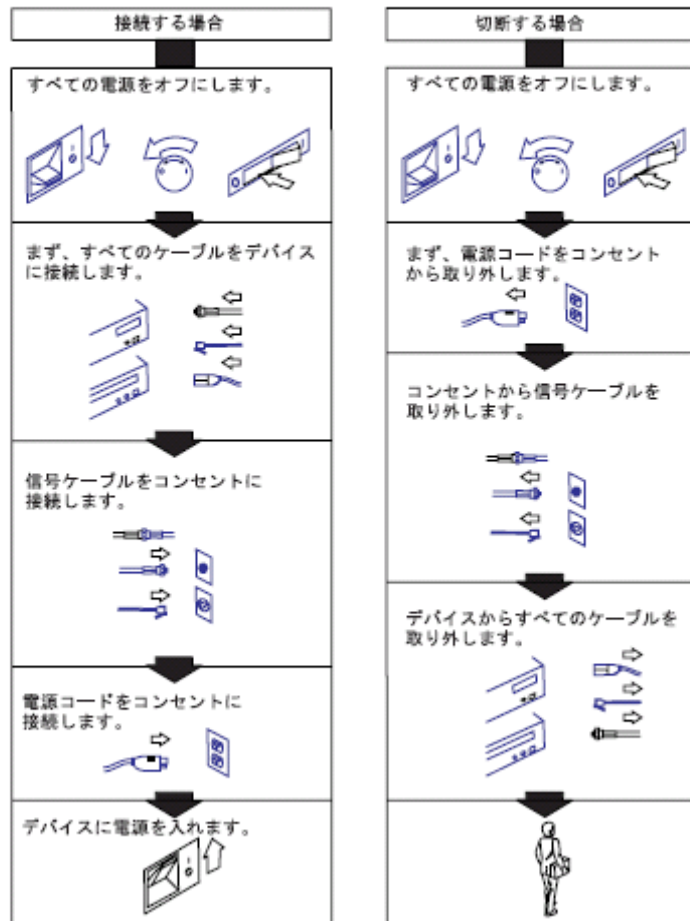
感電事故を防止するために、雷雨中に装置の設置、保守および
再構成を行ったり、ケーブルなどの接続および切り離しは
行わないでください。

⚠ 危険

・感電を避けるには、次のようにします。電源コードは、正しく
　配線され接地されたコンセントに接続してください。

・この装置を接続するすべての機器も、正しく配線された
　コンセントに接続してください。

⚠ 危険

電位の異なる2つの物体の表面に同時に触れると感電すること
がありますので、信号ケーブルの接続や切り離しはできるだけ
片方の手で行ってください。

⚠ **危険** : 電源、電話、および通信ケーブルからの電流は
危険です。感電を避けるには、この製品や接続
デバイスのカバーを取り付け、移動、または開く
ときに、以下のような手順でケーブルの接続や
切断を行います。

接続する場合	切断する場合
すべての電源をオフにします。	すべての電源をオフにします。
まず、すべてのケーブルをデバイスに接続します。	まず、電源コードをコンセントから取り外します。
信号ケーブルをコンセントに接続します。	コンセントから信号ケーブルを取り外します。
電源コードをコンセントに接続します。	デバイスからすべてのケーブルを取り外します。
デバイスに電源を入れます。	

Safety Information for Korea

⚠

위 험

감전 쇼크의 위험을 피하기 위하여 천둥번개가 치는 동안에는 전원을 연결
하거나 또는 끊지 마시고 또한 본 제품의 설치, 수리 및 시스템 재구성을
하지 마시오.

⚠

위 험

감전 쇼크의 위험을 피하기 위하여:
● 전원은 반드시 적정 규격의 전선을 사용하시고
  접지선이 연결된 접속기와 연결 하십시오.
● 본 제품과 연결되는 모든 기기는 반드시 적정
  규격의 전선으로 접지선이 연결된 접속기와
  연결되어 있어야 합니다.

⚠

위험 통지 사항

위험

신호케이블을 연결하거나 단절할 때는 가
능하면 한 손만을 사용하십시오. 전위
가 다른 두 표면을 동시에 만지면 전기
적 충격을 받을 수 있기 때문입니다.

⚠️ 위험: 전원, 전화 및 통신 케이블에 흐르는 전류는 위험합니다. 전기 쇼크를 방지하려면 이 제품이나 부속장치를 설치, 이동하거나 덮개를 열때 아래에 표시된 대로 케이블을 연결하거나 단절하십시오.

연결 방법	단절 방법
모든 스위치를 끄십시오.	모든 스위치를 끄십시오.
모든 케이블을 장치에 연결하십시오.	전원 코드를 콘센트에서 뽑으십시오.
신호 케이블을 콘센트에 꽂으십시오.	신호 케이블을 콘센트에서 뽑으십시오.
전원 코드를 전원 콘센트에 꽂으십시오.	모든 케이블을 장치에서 뽑으십시오.
장치를 켜십시오.	
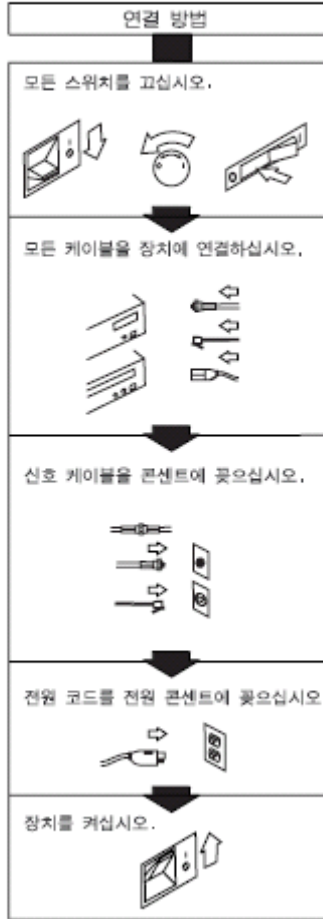
Note: In the UK, by law, the telephone cable must be connected after the power cord.
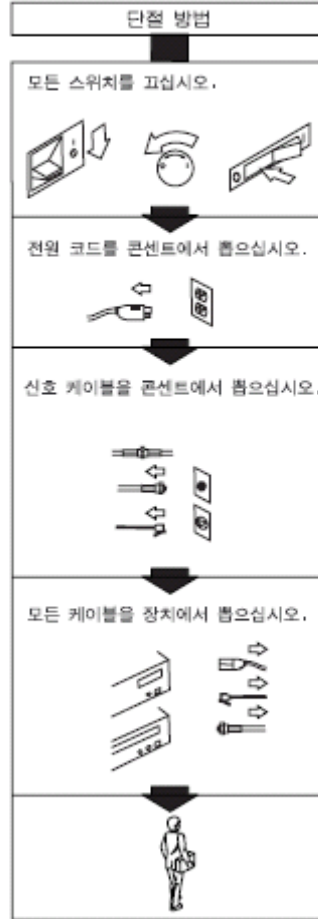
Note: In the UK, by law, the power cord must be disconnected after the telephone line cable.

Contents

Chapter 1 "An overview of the IBM 4685-K03 POS Keyboard"

This chapter provides an overview of the IBM 4685-K03 POS Keyboard, explains how to confirm the identification of the product, gives the names of the parts, and describes the key layout at time of shipment.

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An overview

The IBM 4685-K03 POS keyboard is equipped with an MSR (Magnetic Stripe Reader). The 4685-K03 keyboard is to be connected to an IBM 4800 POS terminal. This keyboard connects using the IBM RS-485 or powered USB, but using both interfaces at the same time is not supported.

⚠ Caution	Connecting two different interface cables at the same time may damage the keyboard.

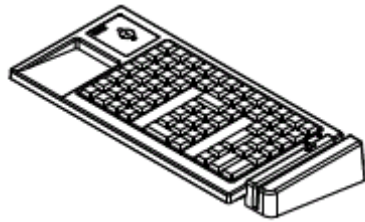The primary hardware configuration for the 4685-K03 is as follows:

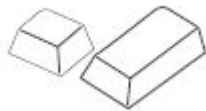|		**4685-K03**
Key matrix		12 rows × 7 columns
At shipment	Single keys	54 pieces
	Double keys	4 pieces
MSR		Read only
Mode key		4 positions
Interfaces		RS-485, Powered USB

Confirmation of product

Confirm the following parts are included.

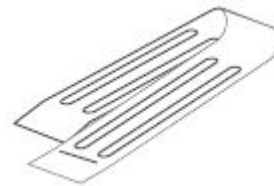## 4685-K03 Model

☐ 4685-K03 Keyboard

☐ Keys 1 set

    (Single keys: 54 pieces

      Double keys: 4 pieces)

☐ Mode keys Label 1

☐ Mode keys

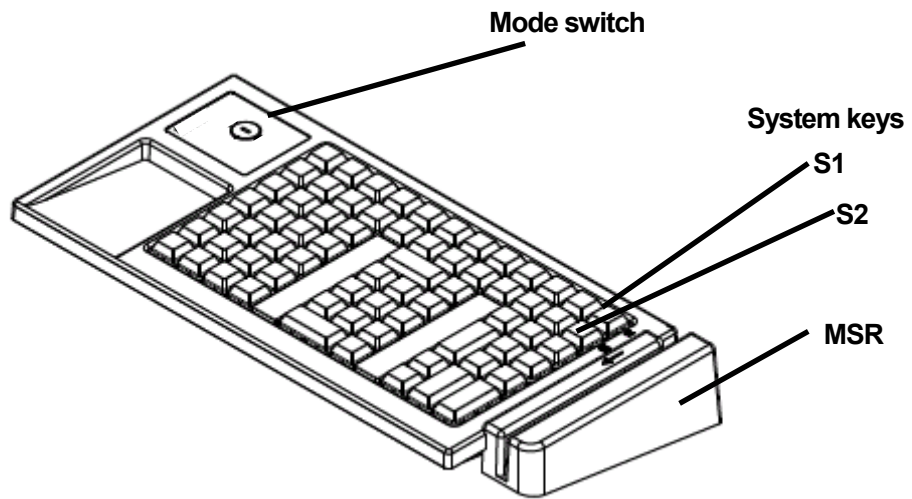   Operator Key ("OP") 2 pieces

    Manager Key ("MGR") 2 pieces

☐ Removal tool for key caps

_____

Parts name

4685-K03 model

Mode switch

System keys

S1

S2

MSR

Key layout at shipment time

4685-K03 model

Chapter 2 "Installing the keyboard"

This section explains how the Keyboard is installed on the IBM 4800 POS terminal.
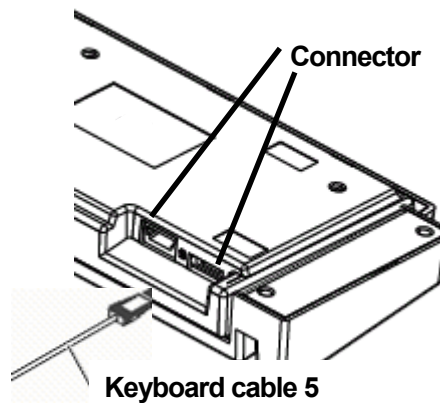
_____

Installation for IBM 4800 POS terminal

This section explains how Keyboard is installed on the IBM 4800 POS terminal (also referred to as the system device).

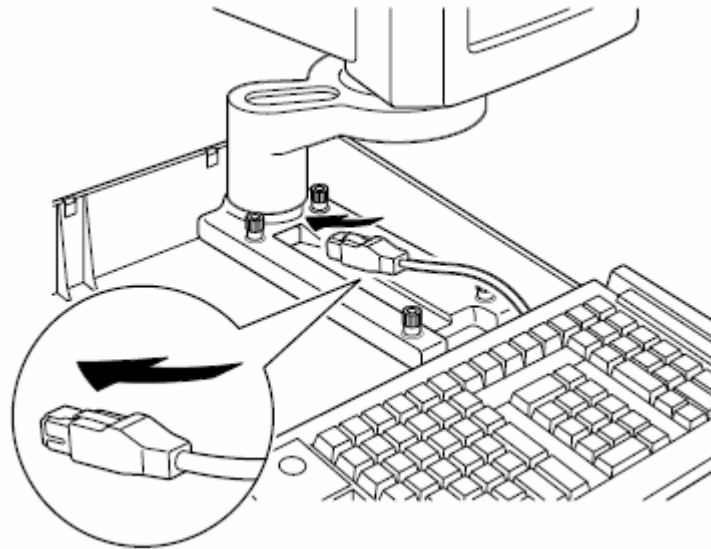1. Connect the keyboard cable 5 to the keyboard.

    Notes:

    a. Turning the keyboard over and looking from the front side, connect the keyboard cable 5 to the right side socket of the two connections.

Keyboard cable 5

    b. If also installing the video display, it should be installed before going on to Step 2. After the display is connected, continue with Step 2, "With the video display". (See the instruction manual that comes with the IBM 4800 POS terminal for more information about how to install the video display.)

2. Plug the other connector on the keyboard cable into the system device as shown in the following figure, routing it through the back side of the system device.

With the video display

Without the video display
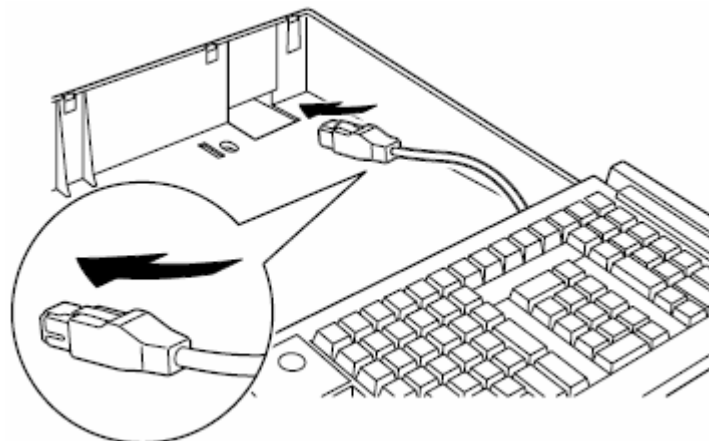
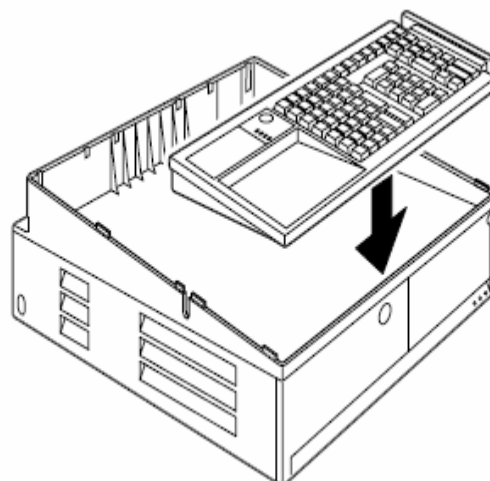3. Put the keyboard in place on the system device.

4. Connect the keyboard cable to the system device. (See the instruction manual that comes with the IBM 4800 POS terminal for more information about how to connect the keyboard cable to the system device.)

Chapter 3 "Operating the keyboard"

This chapter explains the operating procedures and the functions of the parts.

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System keys

The system keys are used to input system functions, which are run under the control of a program. Regarding the usage of these keys, please refer to the operating manual in your store or call your system representatives.

The layout of the system keys is shown in the following chart.

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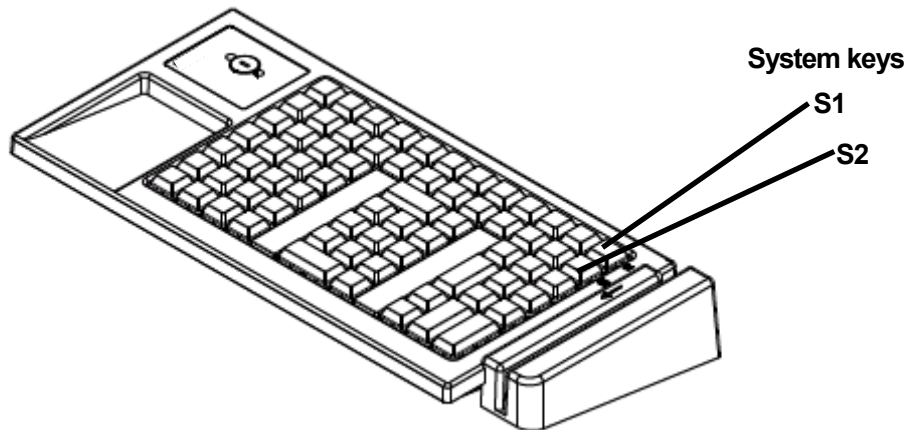
Volume adjustment

The volume adjustment adjusts the speaker volume when keys are pressed. To maximize the volume, turn the volume adjustment control all the way to the right. To minimize the sound, turn it all the way to the left.
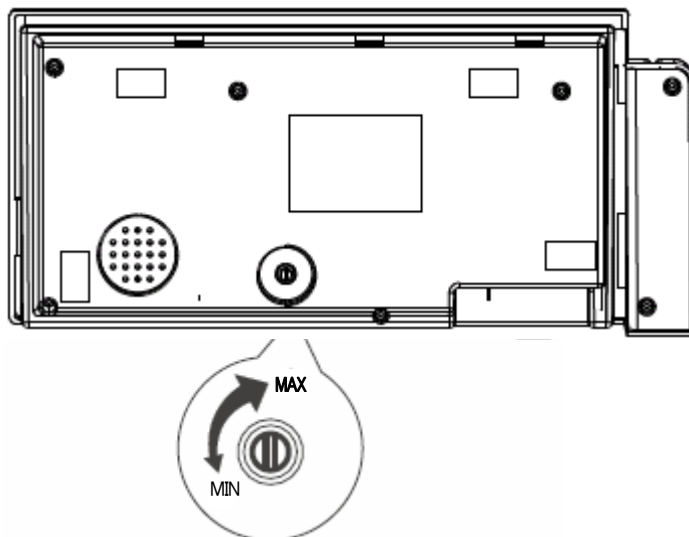
Notes:

1. Use your fingers, not a tool, when adjusting the speaker volume.
2. The volume adjustment control is on the bottom of the keyboard. The speaker volume should be set when installing the keyboard on the system device.

Mode switch

The key-controlled mode switch is used to select the operating mode of the 4685-K03.

The mode switch has four positions that are selected with mode keys. Both the operator key and manager key will control the switch. A mode key cannot be removed unless the current mode is set to "Inactive" or "Operator".

4-position mode key

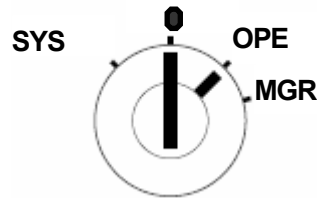**Operator ("OP") key:**   This key can select two modes: "Inactive," "Operator."
                              The letter "A" is engraved on this key.

Manager '("MGR") key: This key can select all four modes.
                              The letter "H" is engraved on this key.

Mode	Meaning	Operator ("OP") key	Manager '("MGR") key
SYS (System)	When setting up items and terminal addresses by using the application program, select this mode.	Not selectable	Selectable
· (Inactive)	Keyboard functions are disabled.	Selectable	Selectable
OPE (Operator)	Normal operating mode	Selectable	Selectable
MGR (Manager)	The store manager or designated person can use this mode for special operations, such as canceling a transaction or changing prices, etc.	Not selectable	Selectable

How to swipe a card through the MSR

This section explains how to swipe a card through the MSR (magnetic stripe reader).

1. Hold the card horizontally with the stripe at the bottom and facing away from the keyboard.
2. Position the card at the farther end of the MSR and swipe the card through the slot toward the operator with a smooth, steady motion.
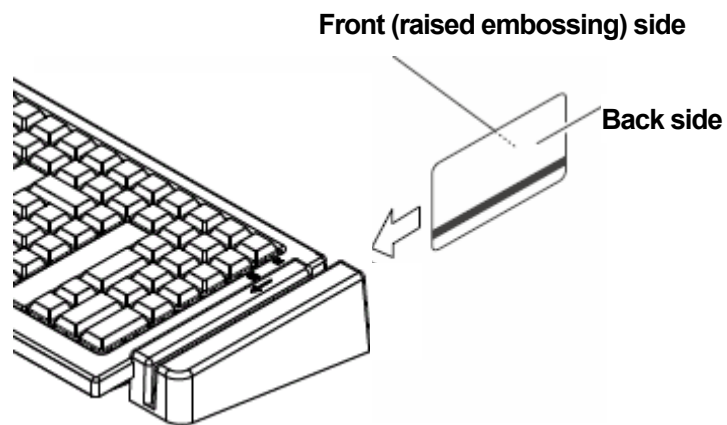
Daily care

- Stains on plastic parts should to be wiped off with a soft, dry cloth. Wiping with a wet or oily cloth can cause damage to the electronic components or plastic parts.
- Do not use chemicals such as glass cleaners, ammonia, acetone, or ketene. To remove ink stains, use a soft cloth with a small amount of a mild detergent.

Chapter 4 "Replacing the keys"

You are free to change the layout of the keys except for the ten keys of the numeric keypad. For example, frequently used keys can be made into larger double keys by replacing two single keys with one double key.
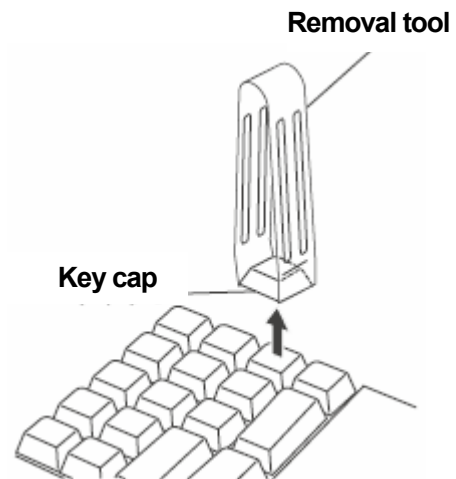
This chapter explains how to replace single keys, double keys, quadruple keys, and unused key covers on the keyboard.

⚠ Danger	Before replacing keys, put the POS terminal into standby mode (system lamp off) by pushing the standby button.

Replacing a single key

Removal

1. Pinch the key cap lightly with the removal tool, and pull it up, rocking it to the left and right.

2. Pull out the key in the same way as the key cap. Be careful not to bend the spring attached to the key.
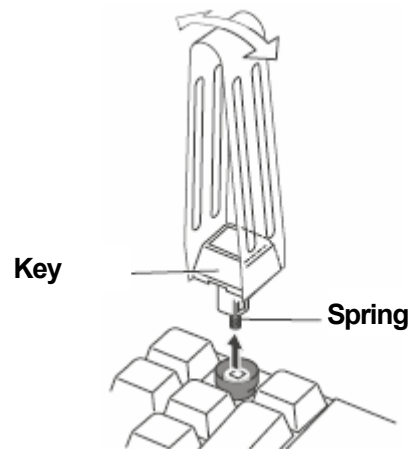
3.   Remove the black rubber ring.
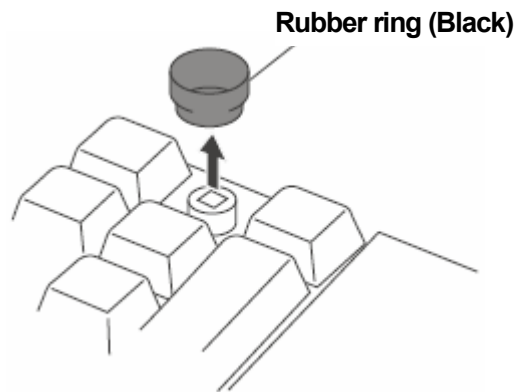
Rubber ring (Black)

Attaching

1.   Insert the black rubber ring. Insert the cup with the larger opening facing up.

Rubber ring (Black)
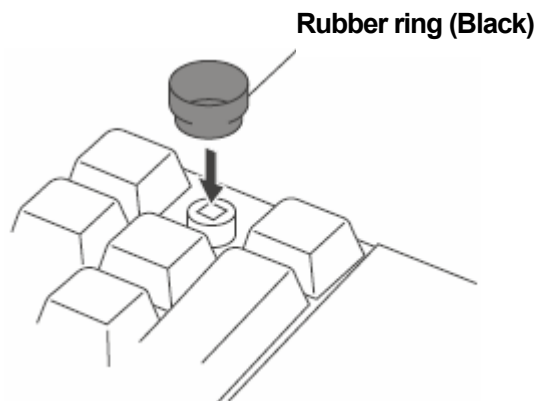
2.   Insert the key. Be careful not to bend the spring attached to the key.

Key
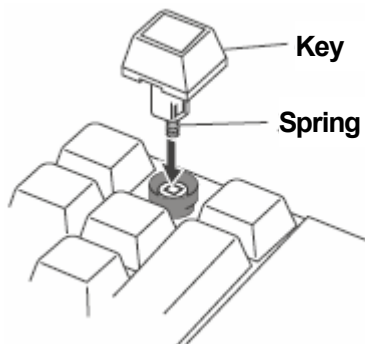
Spring

3.   Attach the key.

Replacing a double key

Removal

1. Pull off the key cap with the removal tool. (See "Replacing a single key" on page 17.)

2. Pinch the key lightly with the removal tool, and pull it out. Be careful not to bend the springs attached to the key.
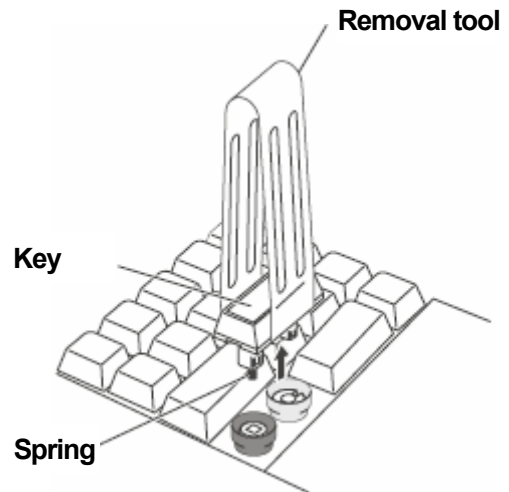
3. Remove the two rubber rings (black and brown).
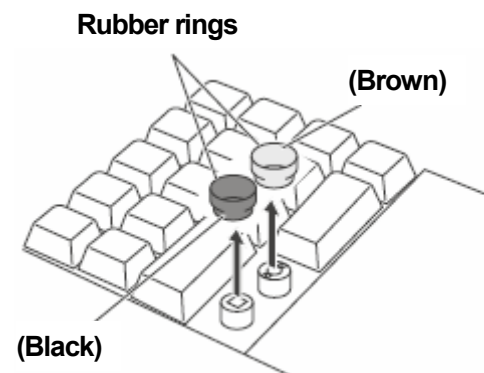
4. Remove the key guide by using the opposite end of the removal tool.
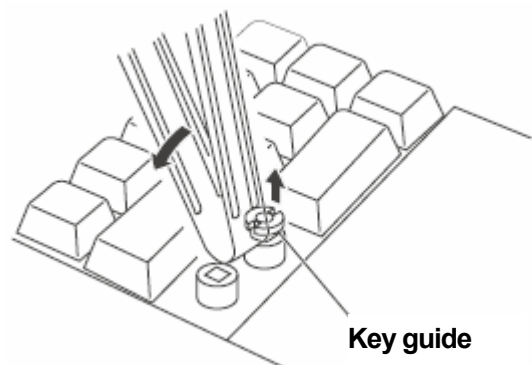
Attaching

1. Insert the key guide into the hole that will not use a scan code.
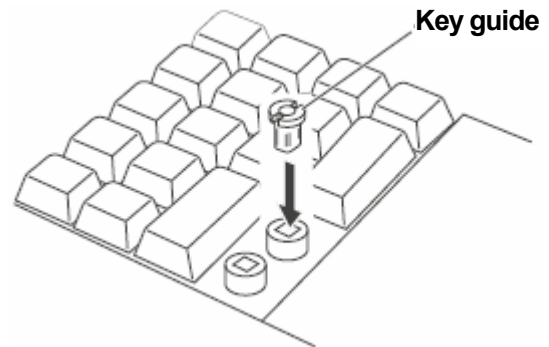
Key guide

2. Insert the brown rubber ring around the hole where the key guide was inserted. Insert the black rubber ring at the location without the key guide.

(Brown)

(Black)
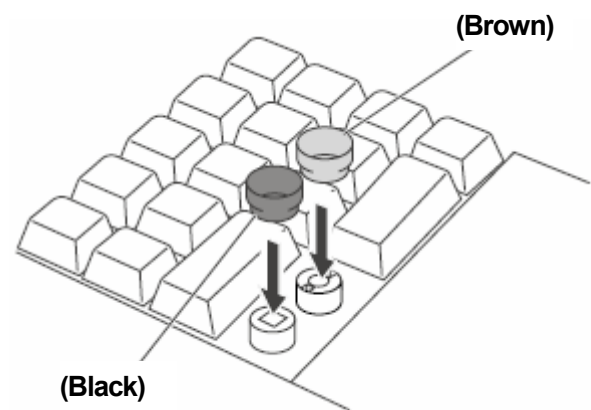
3. Insert the key. Be careful not to bend the springs attached to the key.

Key

Spring
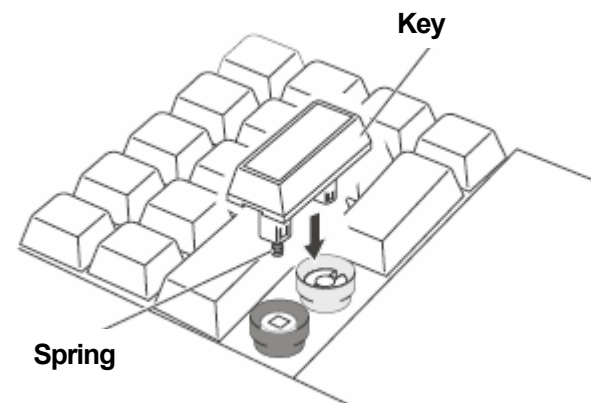
4. Attach the key.

_____

Replacing a quadruple key

Removal

The removal procedure for quadruple keys is the same as for single or double keys.

1. Pull off the key cap with the removal tool.
2. Pull off the key with the removal tool. Be careful not to bend the springs attached to the key.
3. Remove the two black rubber rings.
4. Remove the two key guides with the opposite end of the removal tool.

Attaching

Note: Make sure the smaller keys, the rubber rings, and the key guides are removed from the place where the quadruple key will be attached.

1. Find the pair of diagonally opposite holes that will not need scan codes. Insert two key guides in those holes.
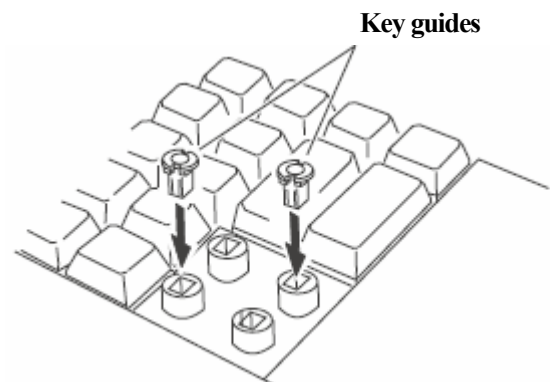
Key guides

2. Place the two black rubber rings around the key guides.

Rubber dome (black)
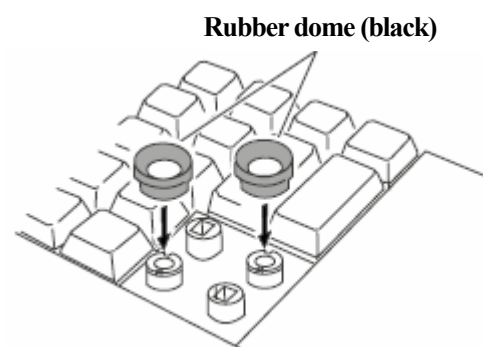
3. Make sure the scan code leg is aligned with the proper hole, and insert the quadruple key. Be careful not to bend the springs attached to the key.


Key

Spring
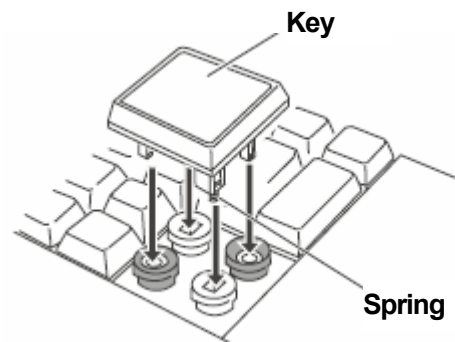
4. Label the key cap. Attach the key cap on top of the key.

_____

Replacing an unused key cover

Removal

1. Pinch the unused key cover with the removal tool. Pull up on the unused key cover.

Removal tool
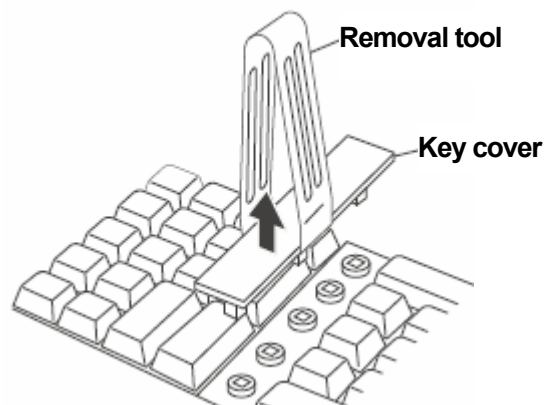
Key cover

Attaching

Note: Make sure the keys, rubber rings, and key guides are all removed from the place where the unused key cover will be inserter.

1. Insert the unused key cover as shown in the figure.

Unused key cover
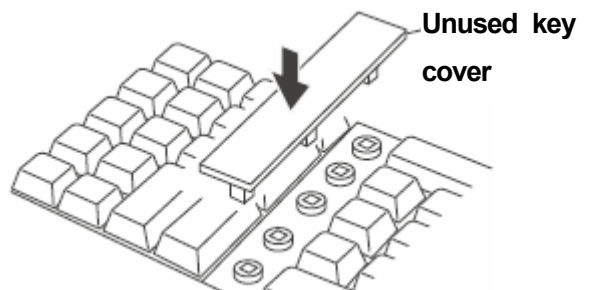
Chapter 5 "Maintenance of the keyboard"

This section is provided for the maintainer of the IBM 4685-K03 POS keyboard.

⚠ Danger	Be sure to read "Safety instructions" on page v and "Safety inspection guide" on page vii before working on this product.

If problems occur

This section explains how to handle problems encountered when using the IBM 4685-K03 keyboard.

Symptom	Causes and actions	
There is no response to any of the keyboard keys.	**Cause 1**	Status of the mode key is "Inactive".
	Action 1	Select a mode other than "Inactive". See "Mode switch" on page 13 for more information.
	Cause 2	The setup for the operating system (OS) had problems.
	Action 2	Confirm the validity of the keyboard type as set up for the OS. Check the OS documentation for more information.
	Cause 3	The keyboard cable, the top cover assembly, or the control card for the keyboard has problems.
	Cause 3	Replace the keyboard cable, then the top cover assembly, and then the control card (until the faulty part is identified).
There is no response to one or several keyboard keys.	**Cause**	The key cap, the top cover assembly or the control card has troubles.
	Actions	**a.** Identify the disabled keys by using the diagnostic program or the self-diagnostic test. See "Diagnostic tests" on page 20 for more information.
		b. Replace the key, the unused key cover over the non-functioning keys, or the control card. For more about replacing keys, see Chapter 4 "Replacing a single key" on page 13. For more about replacing unused key covers, see "Replacing an unused key cover" on page 18.
The mode cannot be changed with a mode key.	**Cause**	The mode key or the control card has problems.
	Action 1	Check the status of the mode key switches using the diagnostic program or the self-diagnostic test. See "Diagnostic tests" on page 20 for more information.
	Action 2	If the status is still unchanged by Action 1, replace the mode key or the control card.

Symptom	Causes and actions	
The MSR is unable to read cards.	**Cause 1**	There MSR reading head needs to be cleaned.
	Action 1	Clean the MSR reading head by using the MSR cleaning card in the hardware service kit (P/N: 48G9045).
	Cause 2	The MSR or the control card has a problem.
	Action 2	Check if the MSR is functional using the diagnostic program or the self-diagnostic test. See "Diagnostic test" on page 20 for more information.
	Action 3	If the condition is still unchanged by Action 2, replace the MSR or the control card.
The keyboard cannot be switched to the online mode.	**Cause**	The keyboard has problems or the OS settings are incorrect.
	Action	**a.** Check that the keyboard is recognized by the diagnostic program. See "Diagnostic test" on page 20 for more information.
		b. Make sure the keyboard type settings for the OS are valid. See the OS documentation for more information.
The mode key is lost.	Contact your dealer or IBM service representative.	

If your problems are not resolved by these procedures, please contact an IBM service engineer.
_____

Diagnostic tests

There are two types of diagnostic tests for 4685-K03. The testing method is different depending on POS terminals connected to the keyboard.

1. Self-diagnostic tests
2. 4800 Diagnostic program

For more about the 4800 Diagnostic program, please see the manual. The manual is available at:

- *http://www.ibm.com/jp/store/*
- *http://www.pc.ibm.com/store/*

Self-diagnostic tests

Self-diagnostic tests are available for checking the functions of the keyboard. During the diagnostic tests, the keyboard has power, but cannot communicate with the terminal. The self-diagnostic tests can be activated at any time, unless the mode key position is "Inactive".

How to enter the self-diagnostic tests

To enter the self-diagnostic tests:

1. Within 2 seconds after turning the power on, press the top left key twice.
2. The keyboard should respond with six beeps, with the frequency increasing from low to high.
3. After one more beep, the keyboard is ready for the self-diagnostic tests.

Mode switch test (Self-diagnostic test)

Switching the mode key switch to a new position should cause the speaker to beep once.

MSR Test (Self-diagnostic test)

If a magnetic card is scanned through the MSR, the speaker should beep twice.

Key Input Test (Self-diagnostic test)

Pressing any key should cause the speaker to beep twice.

Note: This test does not work if the position of the mode key is pointing at "Inactive". The mode key switch must be

in one of the other positions.

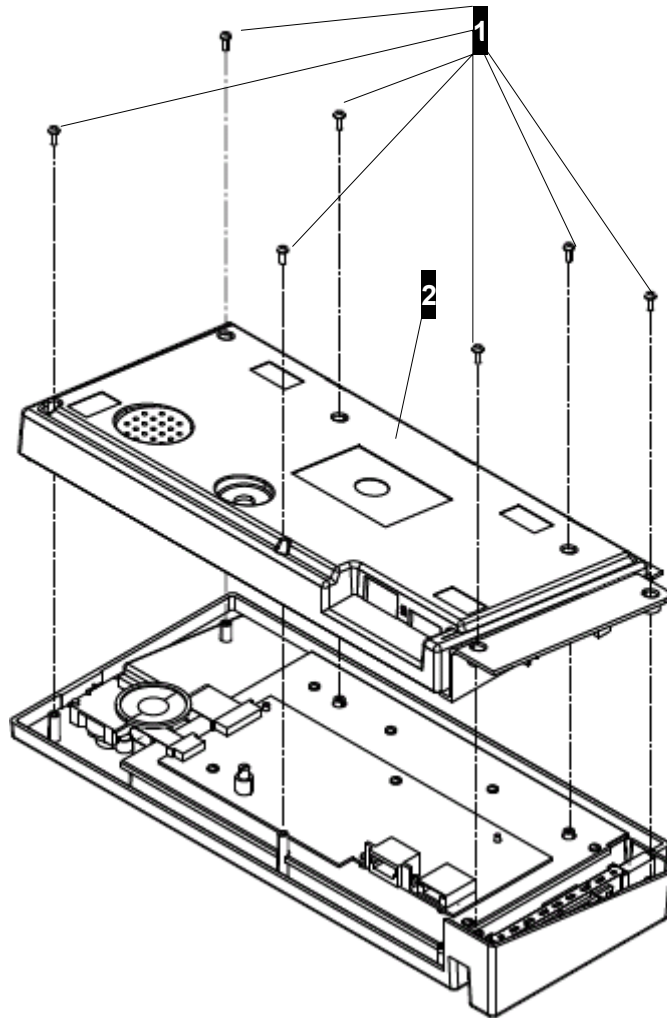**How to terminate the self-diagnostic tests**

To terminate the self-diagnostic tests, turn off the POS terminal by pressing the standby switch.

Removing and replacing parts

Replacing the rear cover

1. Remove the 7 screws labeled **1**. Remove the rear cover **2**.

Reverse the procedure to reassemble.

Replacing the control card

1. Remove the rear cover. See "Replacing the rear cover" on page 22.
2. Remove the screw labeled **2** which holds the ground cable **1** and the cover.
3. Open the cover. Disconnect the cables of two sheets for the membrane **4** and the other connectors from the control card **3**.
4. Remove the four screws labeled **5**. Remove the control card **3**.

Reverse the procedure to reassemble.

Dip Switch Setting
Before you replace the control card, please check the Dip Switch (S1) **6** setting on the control card.

POS Keyboard Model	1	2	3	4
4685-K03	Off	On	On	Off
4685-K02	Off	Off	Off	On

Replacing the MSR

1. Remove the rear cover. See "Replacing the rear cover" on page 22.
2. Remove the two screws labeled **2** which hold the MSR **1** in place.
3. Disconnect the cable leading to the control card. Remove the MSR **1**.

Reverse the procedure to reassemble.
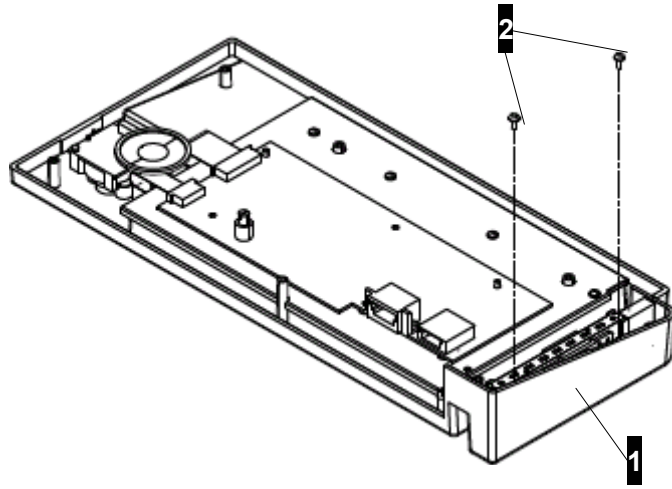
Replacing the mode key

1. Detach the guide label. Remove the two screws labeled **1**
2. Remove the rear cover. See "Replacing the rear cover" on page 22.
3. Disconnect the cable leading to the control card. Remove the mode key **2**.

Reverse the procedure to reassemble. Use the new guide label attached to the FRU.
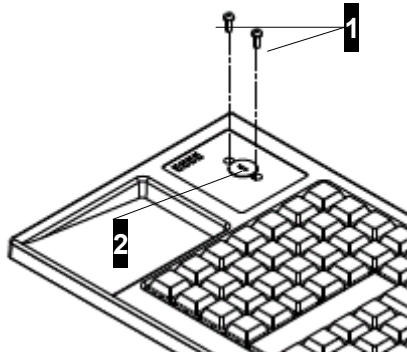
Replacing the speaker

1. Remove the rear cover. See "Replacing the rear cover" on page 22.
2. Open the two latches labeled **1** that hold the speaker in place.
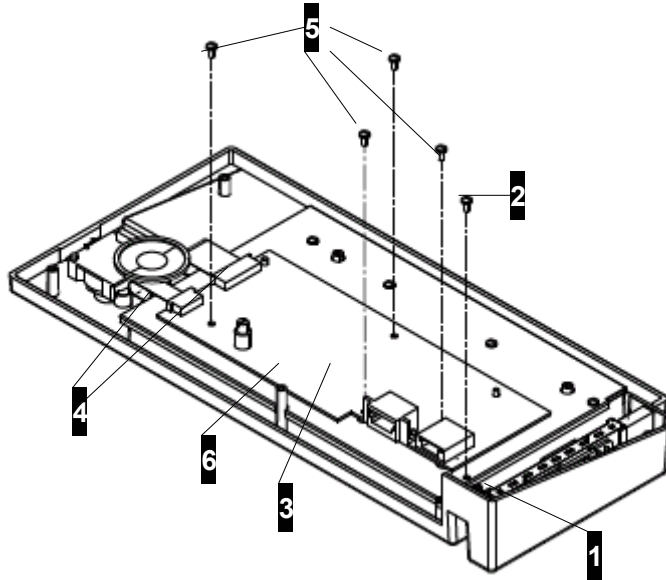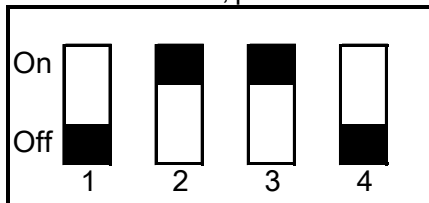3. Disconnect the cable labeled **2** from the control card. Remove the speaker **3**.

Reverse the procedure to reassemble.
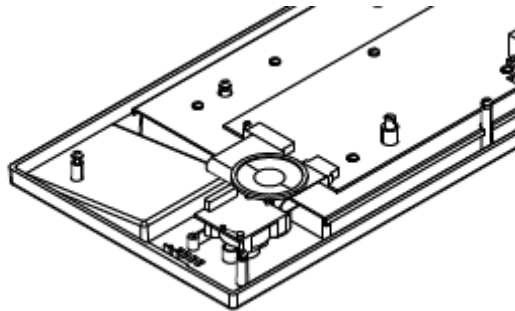
Replacing the top cover assembly

1. Remove the rear cover. See "Replacing the rear cover" on page 22.
2. Remove the control card. See "Replacing the control card" on page 23.
3. Remove the speaker. See "Replacing the speaker."
4. Remove the MSR. See "Replacing the MSR" on page 23.
5. Remove the mode key. See "Replacing the mode key" on this page.
6. Use the new guide label attached to the FRU.
7. Replace the key labels.

Reverse the procedure to reassemble.

Bill of material

Assembly: Keyboard
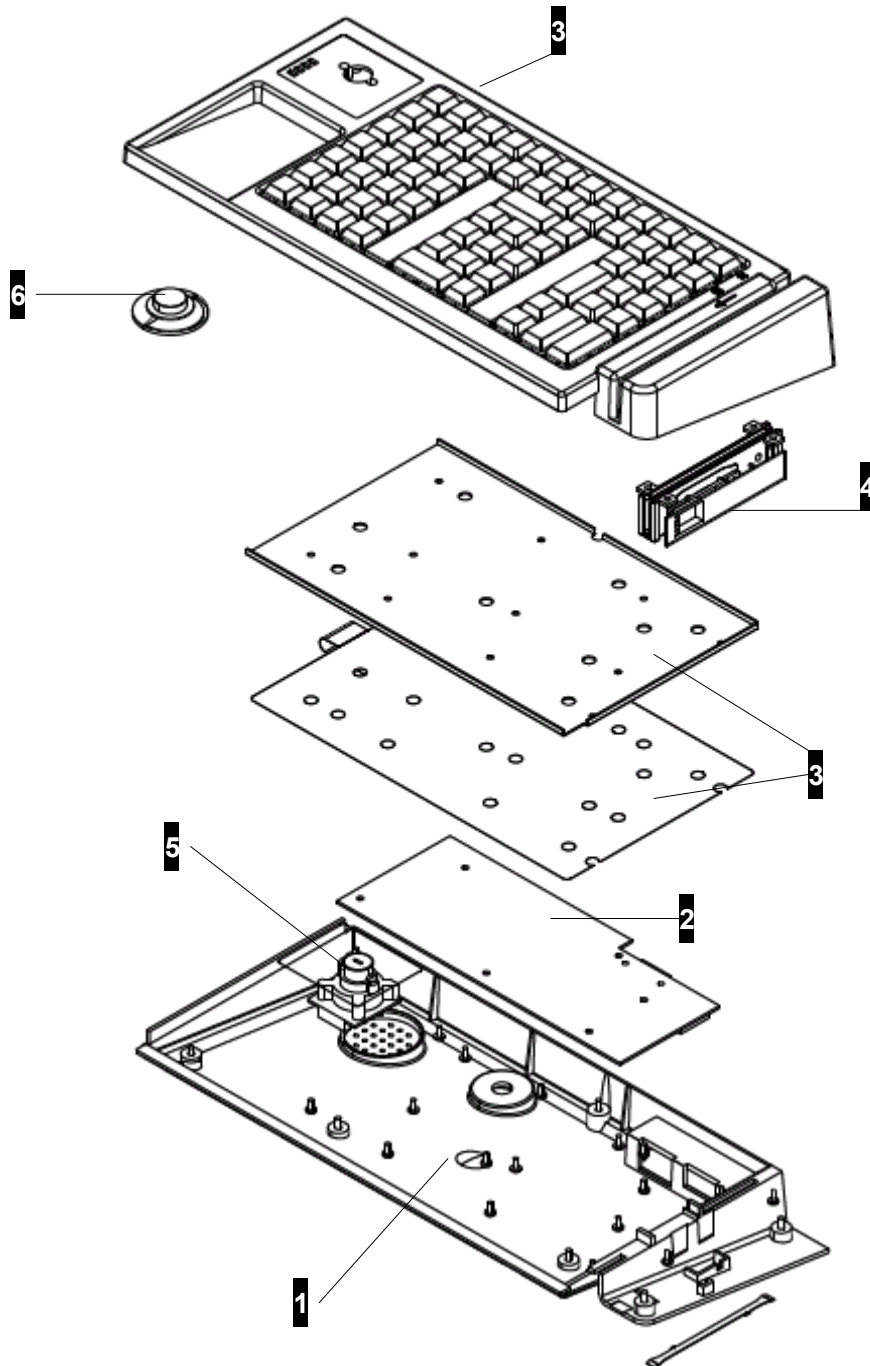
ASM-Index	Part Number	Unit	Description
	29R0782		POS Keyboard Unit, 4685-K03
1	29R0784	1	● Bottom Cover Asm
2	29R0786	1	● Control Card Asm
3	29R0783	1	● Top Cover, Asm
4	29R0785	1	● Magnetic Stripe Reader (MSR) with MSR Cable
5	29R0787	1	● 4 position Mode Key Switch Asm with Cable
6	29R0788	1	● Speaker Asm
	07N1027		● Ten Key for 4685-K02/K03
	07N1032		● Key 1x1 (5 sets)
	07N1033		● Key 1x2 (5 sets)
	48G9045		● Hardware Service Kit
			— MSR Cleaning Card
			— MSR Test Card
	29R0789		● Dummy Cover 1x5

Appendix A. Accessory unit

You should order accessory units from an IBM sales representative or your dealer.

Accessory units

Item number	Name	Content	Quantity
3891	Key (Single)	Key (Single)	10 sets
		Key cap (Single)	10 sets
		Key rubber ring 50 g	10 sets
3892	Key (Double)	Key (Double)	10 sets
		Key cap (Double)	10 sets
		Key black rubber ring 50 g	10 sets
		Key brown rubber ring 20 g	10 sets
		Key guide	10 sets
3893	Key (Quadruple)	Key (Quadruple)	10 sets
		Key cap (Quadruple)	10 sets
		Key black rubber ring 50 g	20 sets
		Key guide	20 sets
3894	Key cover (Single)	Key cover (Single)	10 sets
3895	Key cover (1x5)	Key cover (1x5)	5 sets
3896	Mode key	Manager key	2 pieces
		Operator key	2 pieces
3897	H/W Service Kit	MSR Cleaning Card	1 Piece
		JIS-I/II Test Card	1 Piece
3325	KBD SIO Cable-Short	0.48m	1 Piece
3326	KBD SIO Cable-Long	3.8m	1 Piece
3327	KBD SIO Cable-Medium	1.8m	1 Piece
3290	KBD USB Cable-Short	0.5m	1 Piece
3285	KBD USB Cable-Long	3.8m	1 Piece

Appendix B. Product specifications

Dimensions

	4685-K03
Width	365 mm
Depth	170 mm
Height	50 mm
Weight	1.1 Kg

Consumption current

Peak: 400 mA
Normal: 100 mA

Environment condition

Condition	Temperature(℃)	Humidity (%)	Max wet bulb temperature(℃)
Operating	0 ～ +40	8 ～ 90	+23
Standby	0 ～ +43	8 ～ 90	+27
Storage	10 ～ +60	5 ～ 95	+29
Shipping	40 ～ +60	5 ～ 100	+29

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MSR readable cards

Compatible MSR cards are described in the following chart.

Card specifications	JIS Ⅱ	ISO/JIS I
		Track 2
Record density	210 BPI (Bit Per Inch)	75 BPI
Record capacity	72 digits (8 bits)	40 digits (5 bits)
Recording method	FM	FM
Read/Write	Readable	Readable

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