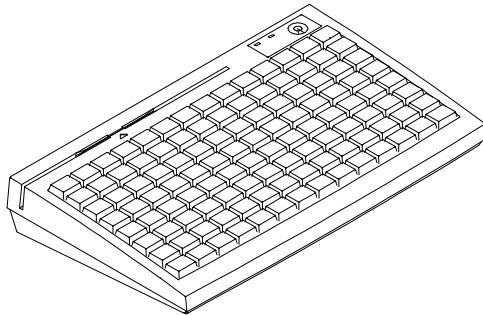


**KB3100 SERIES
PROGRAMMABLE KEYBOARD
USER'S MANUAL**

Rev. : B1





SOME IMPORTANT NOTES

FCC NOTES

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with limits for a Class A digital device pursuant to subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures to correct the interference.

WARRANTY LIMITS

Warranty will terminate automatically when the machine is opened by any person other than the authorized technicians. The user should consult his/her dealer for the problem happened. Warranty voids if the user does not follow the instructions in application of this merchandise. The manufacturer is by no means responsible for any damage or hazard caused by improper application.

ABOUT THIS MANUAL

This manual is written in an attempt with full strength to assist the user to utilize the powerful programmable keyboard KB3100 series which consists of a 6 positioned electronic control key and 112 press keys which provides excellent tactile click when pressed, and an optional magnetic stripe reader for either ISO or JIS standards. The KB3100 not only is capable of being programmed to transmit whatever code a standard PC or PS2 keyboard can deliver, but also provides a great variety of programmability such that contains all capabilities of the most modern programmable keyboards.

The manufacturer of this product heartily apologizes to the user for reserving the right to change or to modify this manual without notice due to the rapid and constant progress and improvement on science and technology.

© Copyright Mustek Corp. 1999

All rights are strictly reserved. No part of this documentation may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, or otherwise, without the prior written consent of Mustek Corp. the publisher of this documentation.

TRADE MARKS AND SERVICE MARKS

POSIFLEX is a registered trademark of Mustek Corp..

Other brand and product names are trademarks and registered trademarks and service marks of their respective owners.



TABLE OF CONTENTS

OVERVIEW	1	-	1
SCOPE	1	-	1
FEATURES	1	-	1
MODEL NUMBERS	1	-	2
PACKAGE CONTENTS	2	-	1
OPTION LIST	2	-	1
INSTALLATION	3	-	1
CABLE CONNECTION	3	-	1
KEYTOP LAYOUT	3	-	2
APPLICATION	4	-	1
KEYBOARD CONSTRUCTION	4	-	1
PRELOADED PATTERN	4	-	3
MSR (Magnetic Stripe Reader)	4	-	5
PROGRAMMING THE KEYBOARD	5	-	1
EASINESS IN PROGRAMMING	5	-	1
ANSWER BACK CODE	5	-	2
HOT KEY PROGRAMMING	5	-	3
PREPARATION	5	-	3
ENTER "HOT KEY PROGRAMMING" MODE	5	-	3
INPUT THE CONTENT TO BE PROGRAMMED	5	-	4
EXIT "HOT KEY PROGRAMMING" MODE	5	-	4
SPECIFICATIONS	6	-	1
CONSTRUCTION	6	-	1
CASE MATERIALS	6	-	1
POWER ON LED	6	-	1
KEY SWITCH TYPE	6	-	1
KEY STROKE TRAVEL	6	-	1
KEY TOP SIZE	6	-	1

PREPRINTED KEYS	6	- 1
KEY CAP	6	- 1
PROGRAMMABILITY	6	- 1
POSITION CONTROL KEY	6	- 1
OUTPUT INTERFACE	6	- 1
MAGNETIC STRIPE READER	6	- 2
<i>READER SPECIFICATION</i>	<i>6</i>	<i>- 2</i>
<i>CARD DATA FORMAT</i>	<i>6</i>	<i>- 2</i>
POWER CONSUMPTION	6	- 3
MECHANICAL	6	- 3
ENVIRONMENTAL	6	- 3
RELIABILITY INFORMATION	6	- 3
APPLICABLE CONFORMITY	6	- 3

I. OVERVIEW

A. SCOPE

The KB3100 series is a series of powerful programmable keyboard suitable for application in both IBM PC compatible system and PS2 compatible system, programmable without TSR under DOS, Windows 3.1 and also Windows95/Windows98 environment. This series provides 112 keys (max.) of a comfortable size 18 x 22 mm in 8 x 14 matrix and a 6 position control key which is capable of sending answer back codes according to the position of the key.

B. FEATURES

- Powerful programming ability (hot key programming, programming under DOS, off-line programming under DOS, programming under Windows, multiple page, multiple level, whole range key content, time delay, position sense answer back code, etc.)
- True spill proof structure
- Reliable and pleasant key click
- Comfortable key size
- Alternative blank key, double key and quad key
- Optional MSR (Magnetic Stripe Reader), soft dust cover

C. MODEL NUMBERS

MODEL #	DESCRIPTION
KB3100	Standard model (8 KB non-volatile memory)
KB3100M2	Keyboard with 2 tracks ISO7811 MSR (tracks 1 & 2)
KB3100M2/3	Keyboard with 2 tracks ISO7811 MSR (tracks 2 & 3)
KB3100M3	Keyboard with 3 tracks ISO7811 MSR (tracks 1, 2 & 3)
KB3100MJ	Keyboard with 2 tracks JIS II MSR (JIS I track 2 & JIS II)

NOTE: PS/II or PC interface selectable.

II. PACKAGE CONTENTS

- Programmable keyboard
- Key clip x 1 (mounted at bottom of the programmable keyboard)
- Accessory bag including:
 - ⇒ Interface cable CCBLA-055-2 for PC KB
or CCBLA-055-1 for PS/II KB x 1
 - ⇒ Legend sheet x 4
 - ⇒ Control keys 4 pcs/set x 1 (set)
 - ⇒ Utility software diskette x 1
 - ⇒ User's manual x 1
 - ⇒ Key cap (for single key) x 100
 - ⇒ Key top (for single key) x 8
 - ⇒ Blank key x 2

A. OPTION LIST

- MSR (ISO track 1 & 2, ISO track 2 & 3, ISO track 1, 2 & 3,
or JIS I track 2 + JIS II) /pc
- Quad key with key cap / set
- Double key with key cap / set
- Blank key / pc
- Single key top and key cap / set

POSIFLEXTM

III. INSTALLATION

A. CABLE CONNECTION

Take the cable CCBLA-055-2 out of the accessory bag and connect the 6 pin DIN male plug of the cable to the central 6 pin female connector at the bottom of the programmable keyboard (ref. Fig. 3-1), connect the other end (5 pin DIN male plug) to the PC or a compatible system. Connect the PC keyboard or any other keyboard wedged input device such as a CCD scanner to the 5 pin DIN female connector at the bottom of the programmable keyboard if such connection is required.

For installation in a PS2 or a compatible system with a PS2 interface type KB3100, the cable in the accessory bag should be CCBLA-055-1. Connect the 6 pin DIN male plug of cable CCBLA-055-1 to the central 6 pin DIN female connector at the left of the bottom of the programmable keyboard as the way for PC. Connect the mini DIN 6 male plug of the cable to the PS2 or a compatible system. Connect the PS2 keyboard or other PS2 keyboard wedged device like a CCD scanner to the 6 pin mini DIN female connector at the bottom of the programmable keyboard.

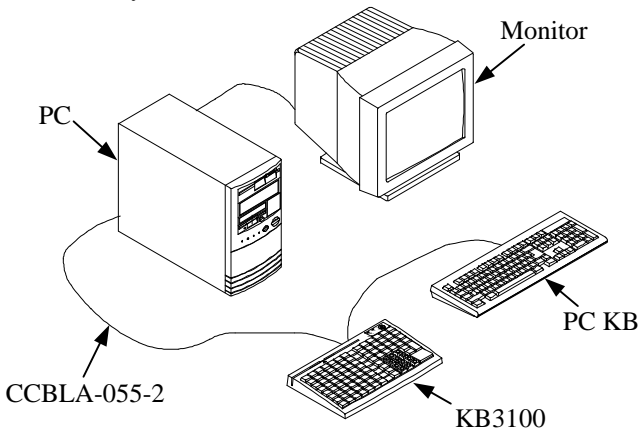


Fig. 3 - 1

B. KEYTOP LAYOUT

The basic layout of this programmable keyboard is a matrix with 8 rows and 14 columns to provide maximum 112 keys with the 6 position control key. However, there are means for the user to break the monotony and to improve the efficiency in application of this programmable keyboard.

First of all, there are 4 legend sheets of different colors in the accessory bag that the user may want to print the identification for each programmed key into each cell of the sticker matrix and then stick each cell printed with the identification onto the surface of the corresponding key top. A key cap from the accessory bag can be snapped on the key top to protect the sticker (ref. Fig. 3-2). In this way the user may feel a lot easier in using the programmable keyboard.

At the bottom of the programmable keyboard, the user may find an adjustable key clip which can be used to pick up the key cap whenever required (ref. Fig. 3-2). The two “feet” of the key clip should be pulled wide for use with double key and quad key (ref. Fig. 3-5). It is advisable to use a flattop (minus sign) screw driver to help getting the key top off when necessary (ref. Fig. 3-2, 3-3 and 3-4).

Whenever there comes the need to install a key top onto the programmable keyboard, the user should notice that at the bottom of each key top, one of the four walls is springy and in the hole on the keyboard to accept the bottom of the key top there is a protuberance at the lower side. The user should match the springy wall of key top against the protuberance in the hole (ref. Fig. 3-6) and press the key top down till a click sound is heard. The key cap (except the blank key) should be placed after the printed label is stuck onto the key top.

Among the options available for this programmable keyboard is a set of “numerical keys” which is composed of 12 individual keys each is preprinted with one from the set of “0”, “00”, “.”, “1”, “2”, “3”, “4”, “5”, “6”, “7”, “8” and “9”. These numerical keys are molded in a little different shape from the normal individual keys and are suitable for the user to create a particular “numerical keypad” at any zone on the programmable keyboard which is convenient to the user (ref. Fig. 3-7).

Furthermore, there are blank keys available which the user can use to form visible partitions or clusters of key tops on the programmable keyboard. When the user wants to make a group of keys on the programmable keyboard clearly separated from the rest part of the keyboard for certain specific application, he/she can use the blank keys to replace the normal individual keys around the area. The top surface of a blank key is at the ground level of the key stroke for other keys (ref. Fig. 3-7). The blank key will not be pressed down when pressed. The user may order for accessional quantity of the blank keys as option for his/her application.

There are also double key and quad key available for the user to configure the programmable keyboard such that the most frequently used keys may occupy larger areas. The double key occupies two “vertically” adjacent positions and uses only the bottom position for key content (ref. Fig. 3-3). The quad key occupies a two by two matrical area and uses only the lower right position for key content (ref. Fig. 3-4).

An example of using the above mentioned alternate key tops is shown in Fig. 3-7.

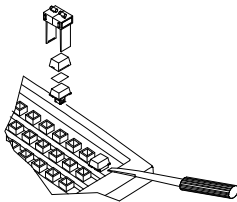


Fig. 3 - 2

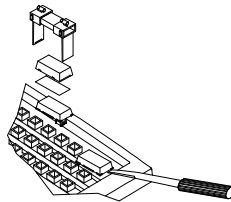


Fig. 3 - 3

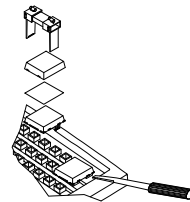


Fig. 3 - 4

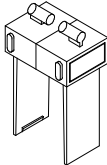


Fig. 3 - 5

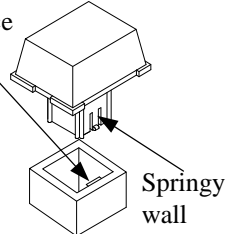
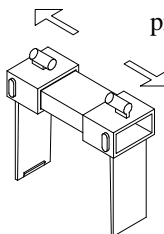


Fig. 3 - 6

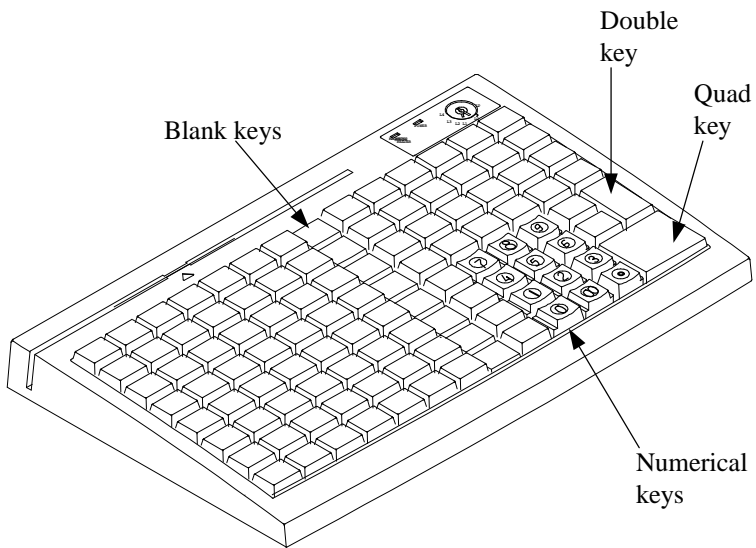


Fig. 3 - 7

IV. APPLICATION

A. KEYBOARD CONSTRUCTION

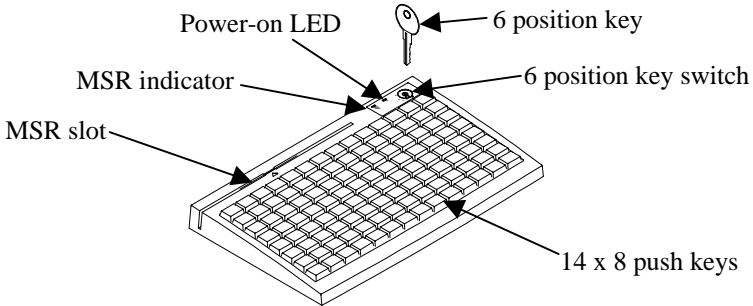


Fig. 4 - 1

This keyboard is constructed of three parts on the top surface (ref. Fig. 4-1). A 6 position turning key switch area is at the upper right corner, a 14 x 8 matrix of push key switches occupies most of the top surface and a left-right slot near the upper edge is designed for the Magnetic Stripe Reader of the -M2, -M2/3, -M3, -MJ models.

In the rectangular area at upper right corner there are one 6 position electronic key switch and two LED's. The left LED is for MSR indication and the right LED between the turning key switch and the MSR indicator is the power-on indicator. The 6 position electronic key can be turned to one of the following 6 positions: LP, L0, L1, L2, L3 and L4. It can only be taken out from the switch at positions L0 and L1. The purpose of this electronic key serves 3 folds: When the key is switched to (and extracted from) position L0, the whole keyboard output will be blocked off by hardware to work as a security measure. A programmable answer back code for the final position of the 6 position electronic key will be sent by the keyboard to the host computer whenever the key is switched to a new position for a programmable delay time or when the host computer sends a specific code (E7h) to inquire the keyboard. The position of the electronic key determines which page of the key content

table for the 112 push keys applies, while the definitions of the same key within different pages can be programmed so absolutely independent to provide instant menu change over.

This turnable electronic key switch is delivered with a set of 4 pcs keys, each marked as “PRG”, “REG”, “Z” and “GT”. The effective range of each of the 4 keys can be illustrated by the following table and drawing.

	<u>PRG</u>	<u>REG</u>	<u>Z</u>	<u>GT</u>
LP	Y	N	N	N
L0	Y	Y	Y	Y
L1	Y	Y	Y	Y
L2	Y	Y	Y	Y
L3	Y	N	Y	Y
L4	N	N	N	Y

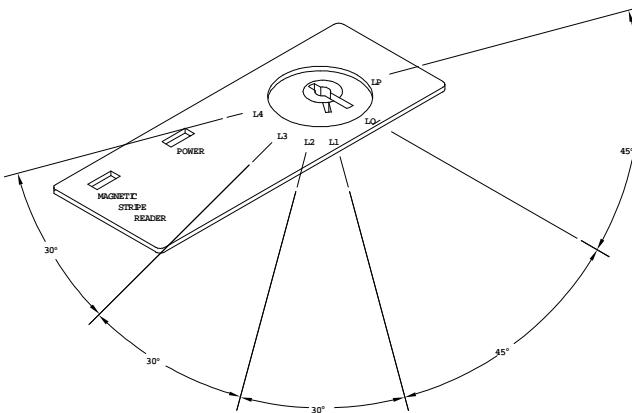


Fig. 4 - 2 Range for each key type

B. PRELOADED PATTERN

As the KB3100 series satisfies so many application requirements easily, it is naturally impossible to give a definite set of key definitions to serve most of its application. However, this keyboard is preloaded with a particular pattern on the page LP before it is delivered. Please refer to the print-out on next page for the key definition of each location of this preloaded pattern. The purpose of this preloaded page is to serve the software designer so that you won't have to connect an external PC keyboard when you start to program the POS programmable keyboard.

To preserve this preloaded pattern into a computer file for later use, the user should refer to the "readme" file on the attached diskette in the accessory box and issue the following command from the subdirectory where the user keeps the keyboard driver to store the preloaded pattern in the file "KB3100.TPL":

```
rwm kb3100.tpl -r ←
```



+	-	×	÷								Print Screen	Scroll Lock	Pause
Esc	F1	F2	F3	F4	F5	F6		↑			Ins	Home	PgUp
Esc	F7	F8	F9	F10	F11	F12	←	↓	→		Del	End	PgDn
~ `	! 1	@ 2	# 3	\$ 4	% 5	^ 6	& 7	* 8	(9) 0	- =	+ =	↵
Tab	Q	W	E	R	T	Y	U	I	O	P	{ [}]	 \ _
Cap	A	S	D	F	G	H	J	K	L	: ;	” ,	Enter	Enter
Shift	Shift	Z	X	C	V	B	N	M	< ,	> .	? /	Shift	Shift
Ctrl		Alt	Space	Space	Space	Space	Space	Space	Space	Space	Alt		Ctrl

PRINT - OUT OF PRELOADED KEY DEFINITIONS FOR PAGE LP

C. MSR (Magnetic Stripe Reader)

The MSR slot is near the upper edge of the Programmable Keyboard. The MSR indicator LED is located at the upper left corner of the block containing the electronic key. There are four choices of the reader types – ISO 1,2 or 2,3 dual tracks, ISO triple tracks and JIS types. For card reading, be sure to insert the card to the bottom with magnetic stripe of ISO card or JIS I track 2 facing downward. The movement of an ISO card can be either inserting the card from the top surface at the right end then sliding the card to the left out of the slot, or sliding the card from the left of the slot till it reaches the right end of the slot (ref. Fig. 4-3). Yet the movement of a JIS card is limited to the leftward movement, i.e. inserting the card from the top surface at the right end then sliding the card to the left out of the slot (ref. Fig. 4-4). The reverse movement of a JIS card is not guaranteed. The MSR indicator will light up in green when the MSR is ready to read, blink during reading, and then give a green light if the reading is successful. The MSR indicator will turn to be red if the reading fails due to improper sliding or poor magnetic intensity of the magnetic stripe, the MSR indicator will then turn back to green when the MSR is again ready to read.

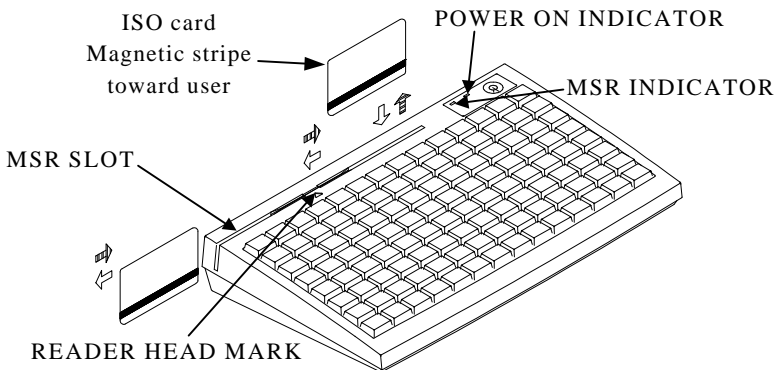


Fig. 4 - 3 Reading magnetic stripe cards of ISO standard

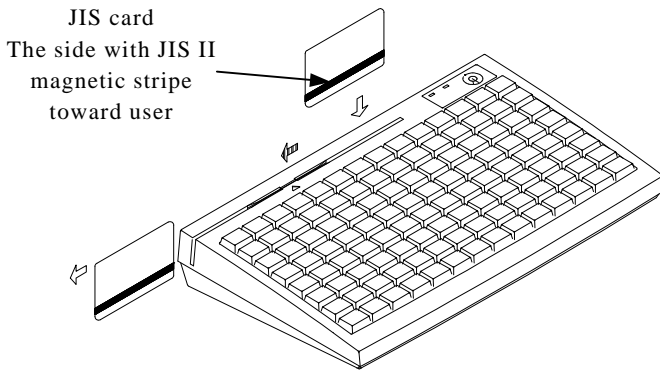


Fig. 4 - 4 Reading magnetic stripe cards of JIS standard

V. PROGRAMMING THE KEYBOARD

A. EASINESS IN PROGRAMMING

The programmable keyboard series KB3100 is a very powerful programmable keyboard. It can be used under any environment that any PC or PS2 keyboard can be applicable with its immense programmability. However the programming could seem to be a little bit more restrictive yet very convenient. The KB3100 series can be programmed under Windows95, Windows 3.1, and DOS environment through application of the utility diskette attached in the accessory. Throughout this chapter, intention is to cover all environments possible, so the user may skip those parts not related to the actual system of the user.

In the diskette that comes along with the KB3100 series keyboard, there is a program called KBM.EXE that is meant to be called upon under DOS prompt or in the WINDOWS application after proper installation to program the programmable keyboard. Yet, there are three important points to bear in mind before entering this programming program.

- As a common practice on applying any software, the user is advised to make a backup copy of the programming utility before he/she uses it.
- It is also recommended to connect an external PC or PS2 keyboard (ref. Fig. 5-1) during the task programming this programmable keyboard for the best convenience though not being a must.
- A straight DOS environment is required to ensure no keyboard interception to affect the auto-detect function in KBM.EXE if the programming is to be executed without proper installation. In other words, to perform programming to KB3100 in the DOS box of any Windows environment, that Windows system has to be installed with the installation utility provided in the utility diskette attached.

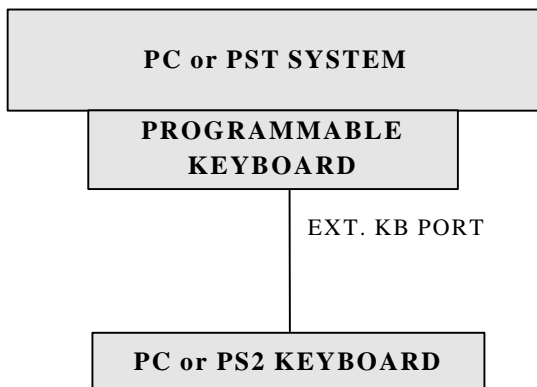


Fig. 5 - 1 Preparations

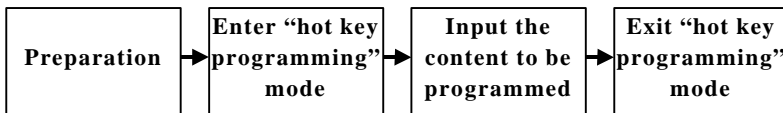
1. ANSWER BACK CODE

Programming the answer back codes of the 6 position electronic key-lock is also very easy as they are included in the keyboard programming with the locations coded as “KLP”, “KL0”, “KL1”, “KL2”, “KL3” and “KL4” in the key-layout map of page L1. These answer back codes will be issued by the programmable keyboard to PC whenever the 6 position electronic key is switched to a new position (there will be a time delay as determined in the configuration of the keyboard programming utility and is adjustable by “r” and “t” key presses, this time delay is useful to give only the answer back code of the last position of control key when it is turned across multiple positions) or when the keyboard receives an “enquiry” code (E7h) from the PC or the PST system. Here are some examples of sending this “enquiry” code in different languages:

Language	Syntax
C	outp (0x60, 0xE7)
BASIC	out &H60, &H0E7
DEBUG	o 60 E7

2. HOT KEY PROGRAMMING

The POSIFLEX programmable keyboard KB3100 series supports the “hot key programming” method which is most useful in instant modification of a few keys in a preprogrammed keyboard without entering the more sophisticated programming utility. Of course, the user may also use this feature to program through out all 112 keys by 5 pages (LP and L1 to L4) at will. The whole process of “Hot key programming” contains 4 steps for each key to be programmed and is illustrated as following:



a. Preparation

Please refer to Fig. 5 -1, a standard PC or PS-2 keyboard must be connected to the KB3100 series before entering “hot key programming” mode. The user shall then decide which key of which page is to be programmed and turn the 6 position control key to the proper position before entering the “hot key programming” mode. Please note that the answer back codes of the position control key is not covered by the “hot key programming” feature.

b. Enter “hot key programming” mode

To enter the “hot key programming” mode, the user must input the “hot key” and identify the key on the programmable keyboard to be programmed. The so called “hot key” is a special combination of keys pressed on the standard PC or PS-2 keyboard. In KB3100 series, the “hot key” is defined as pressing and holding the left “Alt” key while pressing the “PRT SC” (“Print Screen”) key on the PC or PS-2 keyboard. And by doing so, the KB3100 will give 2 beeps to notify that it is ready to receive the identification of which key to be programmed. Right after the “hot key” is released, the user shall press the key to be programmed on the programmable keyboard once to identify which key to be

programmed. If the “hot key” is pressed for the second time or the “Esc” key is pressed prior to the press of the key on the programmable keyboard, this mode will be aborted immediately. The user should not enter the “hot key programming” mode when the programmable keyboard is already fully loaded (no more free memory for further programming) by the key contents previously programmed.

c. Input the content to be programmed

Once the programmable keyboard enters the “hot key programming” mode with the key to be programmed identified, what the user types on the standard PC or PS-2 keyboard will be taken for the content to be programmed into that key of the programmable keyboard till the user exits the “hot key programming” mode.

The legal input in this mode includes all alphabetical letters (including both upper and lower cases), numerical digits (applicable only for keys at the area above the alphabetical keys and excluding those on the numerical keypad), symbols (such as `!`#\$ and excluding those arithmetic signs in the numerical keypad) and the “Enter” key. The “Shift” key, the “Caps lock” key and the “Back space” key are also accepted in this mode to serve an editing purpose (for example, pressing “Back space” will erase the last character of the input instead of being treated as a character for input). Pressing the “Esc” key in this mode will abort the “hot key programming” mode immediately. All the rest keys (such as the “Ctrl”, “Alt”, “Home”, any function key or arrow key or any key in the numerical keypad) on the standard PC or PS-2 keyboard are illegal inputs in this mode. The maximum number of key presses acceptable to any key by “hot key programming” is 32.

All the input from the standard PC or PS-2 keyboard in this mode will also be sent to the host computer.

d. Exit “hot key programming” mode

After the intended content of the key is completely entered, the user shall press the “hot key” again to notify the end of “hot key programming”. The programmable keyboard will give one beep to signify the normal exit of the “hot key programming” mode. Should there be any illegal entry in the content of the key or any other improper operation during the programming, the programmable keyboard will give three beeps to signify the failure of “hot key programming” and the key content is not changed. If the user pressed the “Esc” key to abort “hot key programming”, the programmable keyboard will also give three beeps immediately as a response to signify the abort.

POSIFLEXTM

VI. SPECIFICATIONS

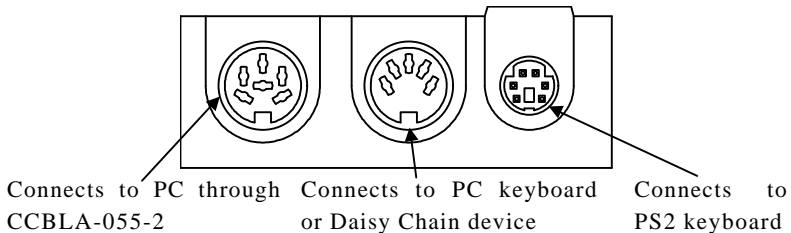
CONSTRUCTION:	Spill-proof, 112 keys + 6 position control key
CASE MATERIALS:	ABS 94V0
POWER ON LED:	Green
KEY SWITCH TYPE:	membrane plus rubber dome
KEY STROKE TRAVEL:	3.2 mm
KEY TOP SIZE:	18 x 22 mm for normal keys (ivory)
PREPRINTED KEYS:	“.”, “00”, “0” to “9”
KEY CAP:	18 x 22 mm transparent
PROGRAMMABILITY:	
• METHOD:	Software under DOS, Windows 3.1, or Windows95/Windows98 without TSR program
• COVERAGE:	112 keys in 5 pages by 6 position control key
• CODE TYPE:	ASCII or scan codes
• LANGUAGE:	English or European, software configured
• KEY-CONTENTS	
LENGTH:	1 - 255 byte(s)/key
• MEMORY:	Non-volatile memory, 8KB
• INTERCHARACTOR	
OUTPUT SPEED:	programmable 0 - 140 msec
• COMMANDED	
TIME DELAY:	programmable 0 - 240 sec
• MULTILEVEL:	8 levels max.
• DOWN LOAD SPEED:	≤ 40 sec. For 8 KB
• CONTROL KEY:	6 positions with programmable answer back code for each position

POSITION CONTROL KEY:

- 6 positions (LP, L0, L1, L2, L3, L4), key extractable at L0 and L1
- Hardware lock off all keyboard input after return signal sent at L0
- Capable of giving programmable answer back code of each position on position change of the key
- Capable of giving programmable answer back code of each position on receiving a specific code (E7h) from host computer

OUTPUT INTERFACE:

- 6 pin DIN female connector: connect to host computer
- 5 pin DIN female connector: connect to input PC keyboard or Daisy Chain device
- 6 pin mini DIN female connector: connect to input PS2 keyboard



MAGNETIC STRIPE READER:

- Decoder & interface.. Built in keyboard wedge interface
- Tracks.....1 & 2 (KB3100M2 for ISO7811) or 2 & 3 (KB3100M2/3 for ISO7811) or 1, 2 & 3 (KB3100M3 for ISO7811) or 2 & rear (KB3100MJ for JIS X 6302)
- Start/end sentinels..... Can be disabled by hardware jumper

Reader specification

Applicable card type	ISO 7811	JIS X 6302
Card feed method	Manual	Manual
Card feed direction	Bi-direction	Uni-direction
Read / write function	Read only	Read only
Card feed speed	5 to 55 inches/sec.	100 ~ 1200 mm/sec.
Error rate	Less than 0.5%	Less than 0.1%

Card data format

Card standard	IATA	ABA	THRIF T	JIS I	JIS II
Track used	Track 1	Track 2	Track 3	Track 2	Rear side
Recording method	F2F (FM)	F2F (FM)	F2F (FM)	F2F (FM)	F2F (FM)
Recording density	210 BPI	75 BPI	210 BPI	75 BPI	210 BPI
Recording capacity characters / bits	79 / 7	40 / 5	107 / 5	40 / 5	72 / 7

POWER CONSUMPTION:

Voltage.....	5VDC±10%
Current.....	125 mA max. (Model KB3100) 150 mA max. (Models KB3100M2, KB3100M2/3, KB3100M3, KB3100MJ)

MECHANICAL:

Dimension in mm.....	346 mm x 210 mm x 57 mm
Dimension in inches.....	13.6" x 8.3" x 2.2" (W x D x H)

ENVIRONMENTAL:

Operating temperature.....	0°C to + 50°C
Storage temperature.....	-20°C to + 70°C
Relative humidity.....	90%, non-condensing
Vibration.....	4G
Shock.....	40G



RELIABILITY INFORMATION:

- Push key switch:..... 15,000,000 strokes min.
- Memory:..... 100 years min.
- MSR head life: 300,000 passes min.

APPLICABLE CONFORMITY:

CE, FCC CLASS A