Advanced Keyboard Manuals

This Document System was last updated on November 24, 2010

Update history can be found here

Contents

Hardware Manuals

This part of documentation describes all the hardware of KB2xx/KB800/ACT810H keyboards supplied by GIGA-TMS.

Comparison Chart for Keyboards

The following table compares main characteristics of KB2xx/KB800/ACT810H keyboards.

Item	KB200	KB220	KB240	KB270	KB280	KB800	ACT810H
Keys	20	58	84	119	128	84	16***
Magnetic Card Reader	NO		Optional				
Key Lock	NO		Optional				NO
Display	NO					YES	
Interface	USB						
Power Consumption	5V DC/Max.60mA, Min.30mA					5V DC / 250 mA**	5V DC/Max. 60mA
Mechanical dimensions, mm (L x W x H)	177 x 108 x 37	230 x 200 x 42	190 x 260 x 43	235 x 350 x 50	235 x 350 x 50	260 x 215 x 58	177 x 108 x 37

Note:

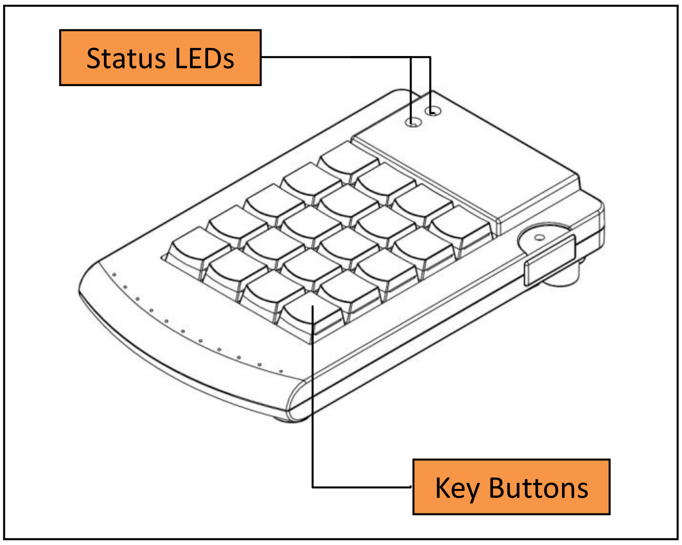
****** Excluding 3 extended USB ports.

*** Keys are not allowed to be programmed. Default settings only.

KB200

KB200 is a fully programmable input device that provides simultaneous connection of another keyboard. KB200 also features as standalone keyboards that are great for dedicated applications. KB200 with built in Cherry mechanical key switch to assure of the long life data entry usage.

KB200 Connectors and Controls

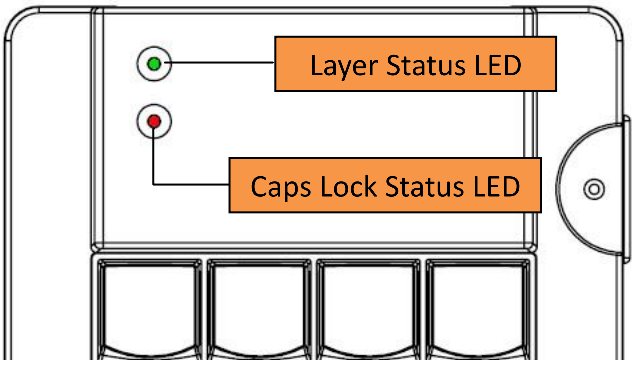


Click on the area on the picture above to learn more about the KB200:

Status LEDs

There are two status LEDs, Green and Red, both are located on the up-left corner of keyboard:

- **Layer Status LED** (green) is used to indicate current used layer (number). If is turned on, it is indicating the used layer number is 1 (base layer). If is blinking, it is indicating the used layer number is 2.
- **Caps Lock Status LED** (red) is turned on when the Caps Lock of PC keyboard is on. The LED is off when the Caps Lock of PC keyboard is off.

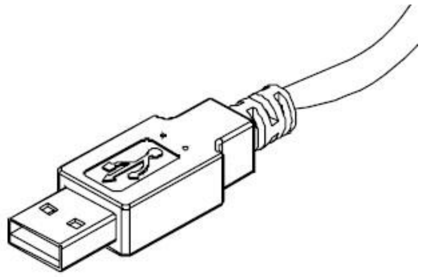


Key Buttons

KB200 has 20 user programmable keys (5 x 4 keyboard matrix). Each key can be programmed up to 127 bytes characters.

USB Interface Connector

The cable that KB200 uses is USB interface, which is compatible with USB1.1 to 2.0. The USB cable also provides the power for KB200.



Specifications and KB200 Modifications

The KB200 has one submodel in circulation- KB200-00.

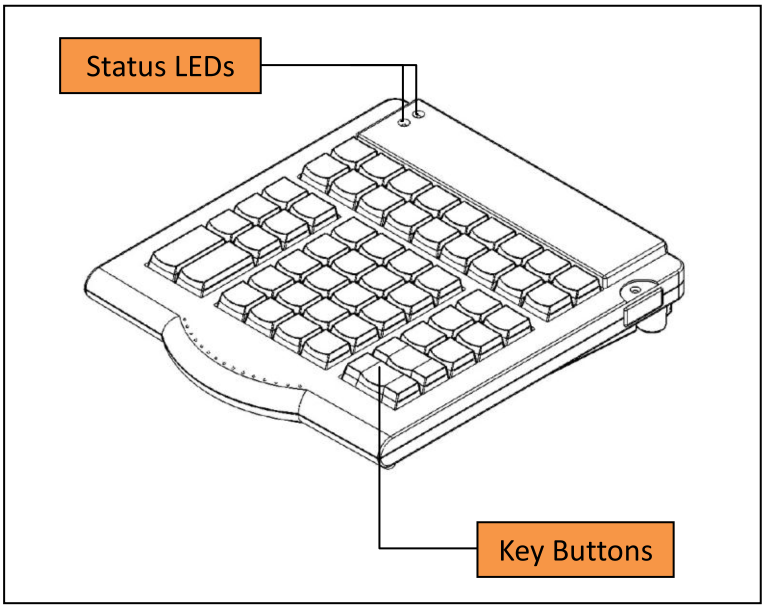
Device specifications are presented in the table below.

Parameter	**KB200-00**
Key Switch type	Cherry Mechanical Key, with 19.05 mm pitch.
Key Switch lift time	20 million operations
Number of Keys	20
Cable	USB interface (compatible with 1.1 to 2.0)
Power requirements	USB port power / 5V DC, max. 60mA
Operating temperature	0 to +50 degrees C
Operating relative humidity	10-90%
Mechanical dimensions	177x108x37mm
Gross weight ("bare" KB200)	280g

KB220

KB220 is a fully programmable input device that provides simultaneous connection of another keyboard. KB220 also features as standalone keyboards that are great for dedicated applications. KB220 with built in Cherry mechanical key switch to assure of the long life data entry usage.

KB220 Connectors and Controls

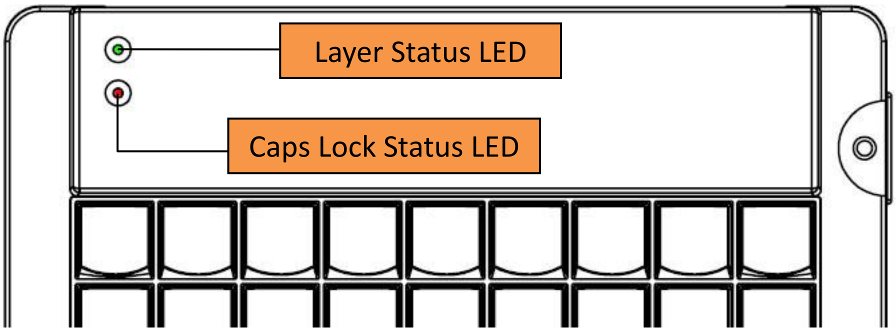


Click on the area on the picture above to learn more about the KB220:

Status LEDs

There are two status LEDs, Green and Red, both are located on the up-left corner of keyboard:

- **Layer Status LED** (green) is used to indicate current used layer (number). If is turned on, it is indicating the used layer number is 1 (base layer). If is blinking, it is indicating the used layer number is 2.
- **Caps Lock Status LED** (red) is turned on when the Caps Lock of PC keyboard is on. The LED is off when the Caps Lock of PC keyboard is off.

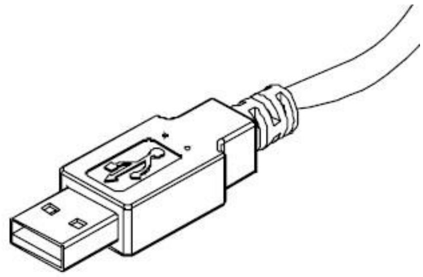


Key Buttons

KB220 has 58 user programmable keys. Each key can be programmed up to 127 bytes characters.

USB Interface Connector

The cable that KB220 uses is USB interface, which is compatible with USB1.1 to 2.0. The USB cable also provides the power for KB220.



Specifications and KB220 Modifications

The KB220 has one submodel in circulation- KB220-00.

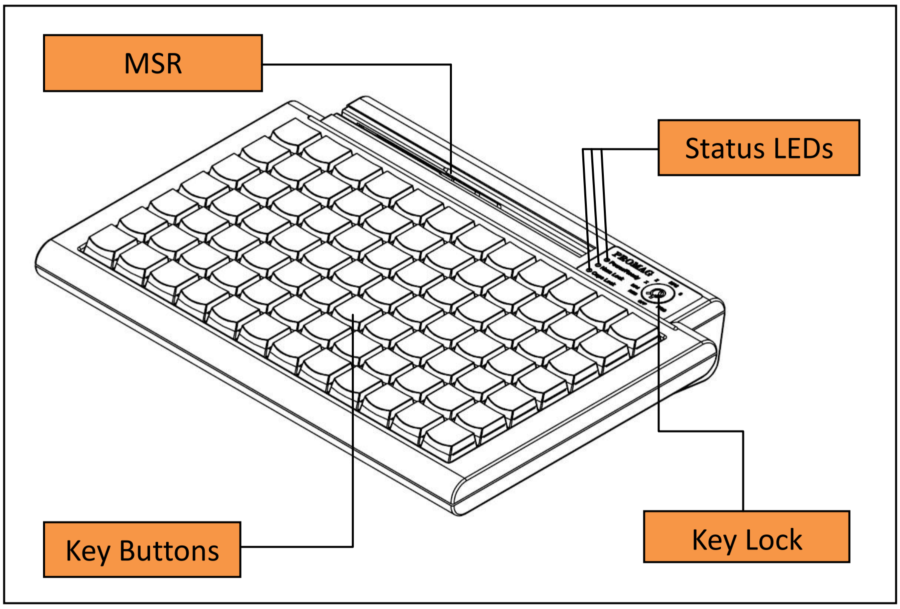
Device specifications are presented in the table below.

Parameter	**KB220-00**
Key Switch type	Cherry Mechanical Key, with 19.05 mm pitch.
Key Switch lift time	20 million operations
Number of Keys	58
Cable	USB interface (compatible with 1.1 to 2.0)
Power requirements	USB port power / 5V DC, max. 60mA
Operating temperature	0 to +50 degrees C
Operating relative humidity	10-90%
Mechanical dimensions	230 x 200 x 42mm
Gross weight ("bare" KB220)	820g

KB240

KB240 84-Keys programmable keyboard is specially designed for most dedicated applications, such as banking system, POS system etc. Each key can be programmable up to 127 characters and can be defined through PC by the user. The integrated magnetic stripe reader can read authorization cards, credit card or bank card etc. Also KB240 with built in Cherry mechanical key switch to assure of the long life data entry usage.

KB240 Connectors and Controls

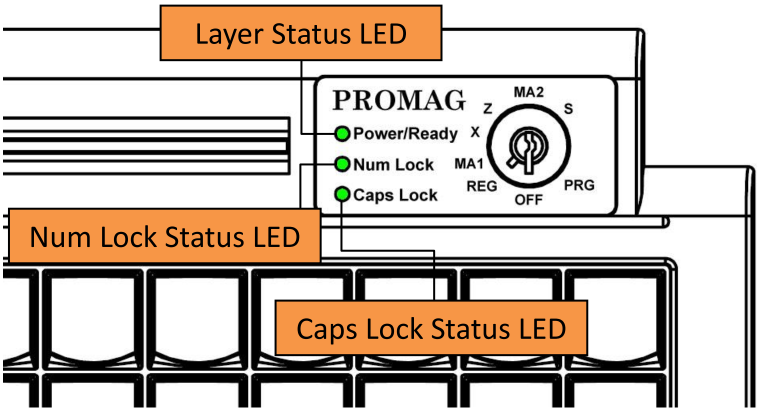


Click on the area on the picture above to learn more about the KB240:

Status LEDs

There are three status LEDs, Green and Red, which are:

- **Layer Status LED** (green) is used to indicate current used layer (number). If is turned on, it is indicating the used layer number is 1 (base layer). If is off, it is indicating the used layer number is 2.
- **Num Lock Status LED** (green) is turned on when the Num Lock of PC keyboard is on. The LED is off when the Caps Lock of PC keyboard is off.
- **Caps Lock Status LED** (green) is turned on when the Caps Lock of PC keyboard is on. The LED is off when the Caps Lock of PC keyboard is off.



Key Buttons

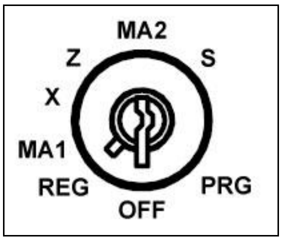
KB240 has 84 user programmable keys (7 x 12 keyboard matrix). Each key can be programmed up to 127 bytes characters.

MSR

The Magnetic Stripe Reader is able to read ISO 7116 standard Track 1, Track 2 and Track 3. If the swipe card process is OK, there will be a beep sound from the internal buzzer. If failed, there will be a three short beep sound.

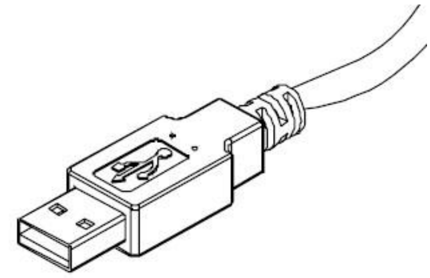
Key Lock

The 8 position rotary key lock comes with a master key and 6 more keys with limited access to positions - S/MA2/Z/X/MA1/REG/PRG. All keys enter and exit at position OFF.



USB Interface Connector

The cable that KB240 uses is USB interface, which is compatible with USB1.1 to 2.0. The USB cable also provides the power for KB240.



Specifications and KB240 Modifications

There are four modifications of the KB240: the KB240-00, KB240-10, KB247-00 and KB247-10.

Device specifications are presented in the table below.

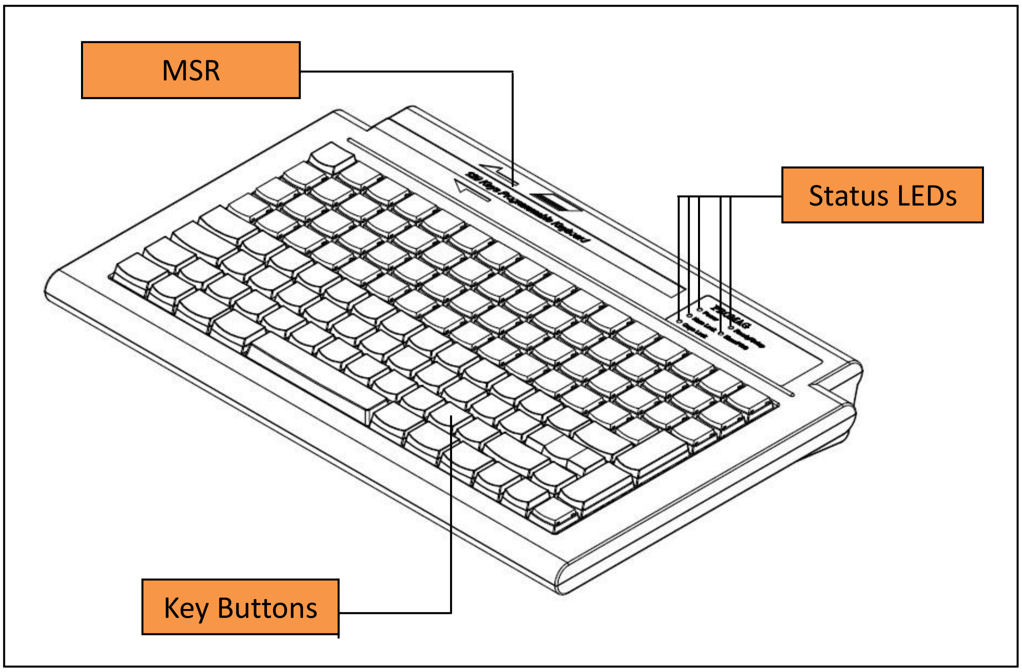
Parameter	**KB240-00**	**KB240-10**	**KB247-00**	**KB247-10**
Key Switch type	Cherry Mechanical Key, with 19.05 mm pitch.			
Key Switch lift time	20 million operations			
Number of Keys	84			
MSR	NO		YES	

Key Lock	NO	YES	NO	Yes
Cable	USB interface (compatible with 1.1 to 2.0)			
Power requirements	USB port power / 5V DC, max. 60mA			
Operating temperature	0 to +50 degrees C			
Operating relative humidity	10-90%			
Mechanical dimensions	190 x 260 x 43mm			
Gross weight ("bare" KB240)	980g			

KB270

KB270 119-Keys programmable keyboard is specially designed for most dedicated applications, such as banking system, POS system etc. Each key can be programmable up to 127 characters and can be defined through PC by the user. The integrated magnetic stripe reader can read authorization cards, credit card or bank card etc. Also KB270 with built in Cherry mechanical key switch to assure of the long life data entry usage.

KB270 Connectors and Controls

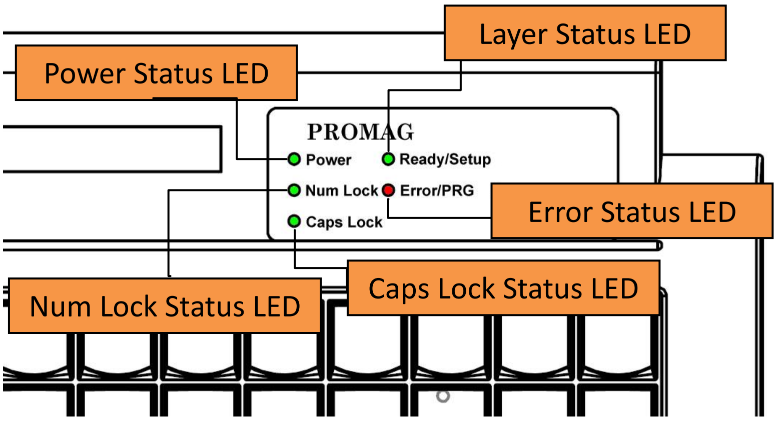


Click on the area on the picture above to learn more about the KB270:

Status LEDs

There are five status LEDs, Green and Red, which are:

- **Power Status LED** (green) is used to indicate the power status of keyboard. If is turned on, it is indicating the power of keyboard is on. If is off, it is indicating the power is off.
- **Num Lock Status LED** (green) is turned on when the Num Lock of PC keyboard is on. The LED is off when the Caps Lock of PC keyboard is off.
- **Caps Lock Status LED** (green) is turned on when the Caps Lock of PC keyboard is on. The LED is off when the Caps Lock of PC keyboard is off.
- **Layer Status LED** (green) is used to indicate current used layer (number). If is turned on, it is indicating the used layer number is 1 (base layer). If is off, it is indicating the used layer number is 2.
- **Error Status LED** (red) is used to indicate the result of swiping magnetic stripe card. If is turned on, it is indicating the result is failed. If is off, it is indicating the result is OK.



Key Buttons

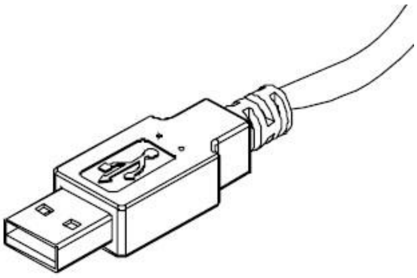
KB270 has 119 user programmable keys. Each key can be programmed up to 127 bytes characters.

MSR

The Magnetic Stripe Reader is able to read ISO 7116 standard Track 1, Track 2 and Track 3. If the swipe card process is OK, there will be a beep sound from the internal buzzer. If failed, there will be a three short beep sound, and the Error LED will turn on last about 0.5 second and then off.

USB Interface Connector

The cable that KB270 uses is USB interface, which is compatible with USB1.1 to 2.0. The USB cable also provides the power for KB270.



Specifications and KB270 Modifications

There are two modifications of the KB270: the KB270-GR/US and KB277-GR/US.
Device specifications are presented in the table below.

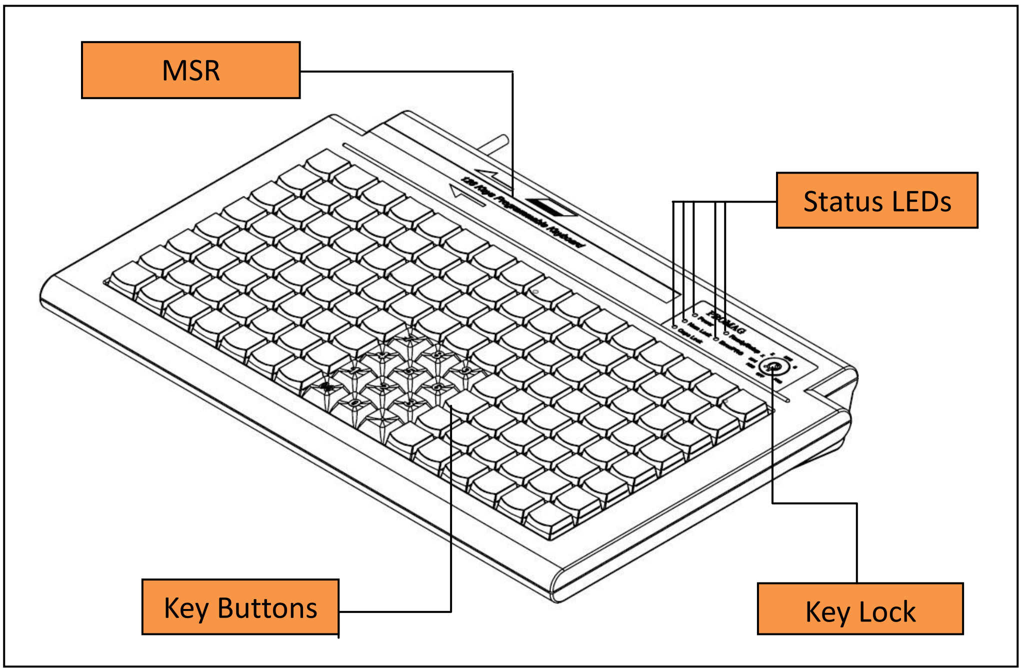
Parameter	KB270-GR/US	KB277-GR/US
Key Switch type	Cherry Mechanical Key, with 19.05 mm pitch.	
Key Switch lift time	20 million operations	
Number of Keys	119	
MSR	NO	YES
Key Lock	NO	
Cable	USB interface (compatible with 1.1 to 2.0)	

Power requirements	USB port power / 5V DC, max. 60mA
Operating temperature	0 to +50 degrees C
Operating relative humidity	10-90%
Mechanical dimensions	235 x 350 x 50mm
Gross weight ("bare" KB280)	1480g

KB280

KB280 128-Keys programmable keyboard is specially designed for most dedicated applications, such as banking system, POS system etc. Each key can be programmable up to 127 characters and can be defined through PC by the user. The integrated magnetic stripe reader can read authorization cards, credit card or bank card etc. Also KB280 with built in Cherry mechanical key switch to assure of the long life data entry usage.

KB280 Connectors and Controls

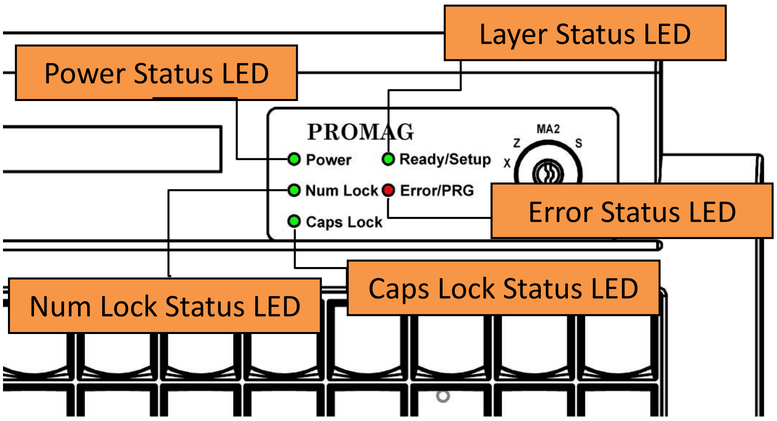


Click on the area on the picture above to learn more about the KB280:

Status LEDs

There are five status LEDs, Green and Red, which are:

- **Power Status LED** (green) is used to indicate the power status of keyboard. If is turned on, it is indicating the power of keyboard is on. If is off, it is indicating the power is off.
- **Num Lock Status LED** (green) is turned on when the Num Lock of PC keyboard is on. The LED is off when the Caps Lock of PC keyboard is off.
- **Caps Lock Status LED** (green) is turned on when the Caps Lock of PC keyboard is on. The LED is off when the Caps Lock of PC keyboard is off.
- **Layer Status LED** (green) is used to indicate current used layer (number). If is turned on, it is indicating the used layer number is 1 (base layer). If is off, it is indicating the used layer number is 2.
- **Error Status LED** (red) is used to indicate the result of swiping magnetic stripe card. If is turned on, it is indicating the result is failed. If is off, it is indicating the result is OK.



Key Buttons

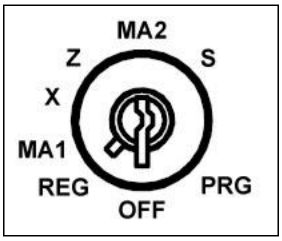
KB280 has 128 user programmable keys (8 x 16 keyboard matrix). Each key can be programmed up to 127 bytes characters.

MSR

The Magnetic Stripe Reader is able to read ISO 7116 standard Track 1, Track 2 and Track 3. If the swipe card process is OK, there will be a beep sound from the internal buzzer. If failed, there will be a three short beep sound, and the Error LED will turn on last about 0.5 second and then off.

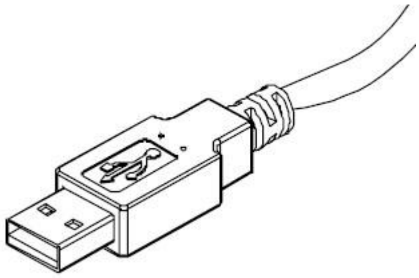
Key Lock

The 8 position rotary key lock comes with a master key and 6 more keys with limited access to positions - S/MA2/Z/X/MA1/REG/PRG. All keys enter and exit at position OFF.



USB Interface Connector

The cable that KB280 uses is USB interface, which is compatible with USB1.1 to 2.0. The USB cable also provides the power for KB280.



Specifications and KB280 Modifications

There are four modifications of the KB280: the KB280-00, KB280-10, KB287-00 and KB287-10.

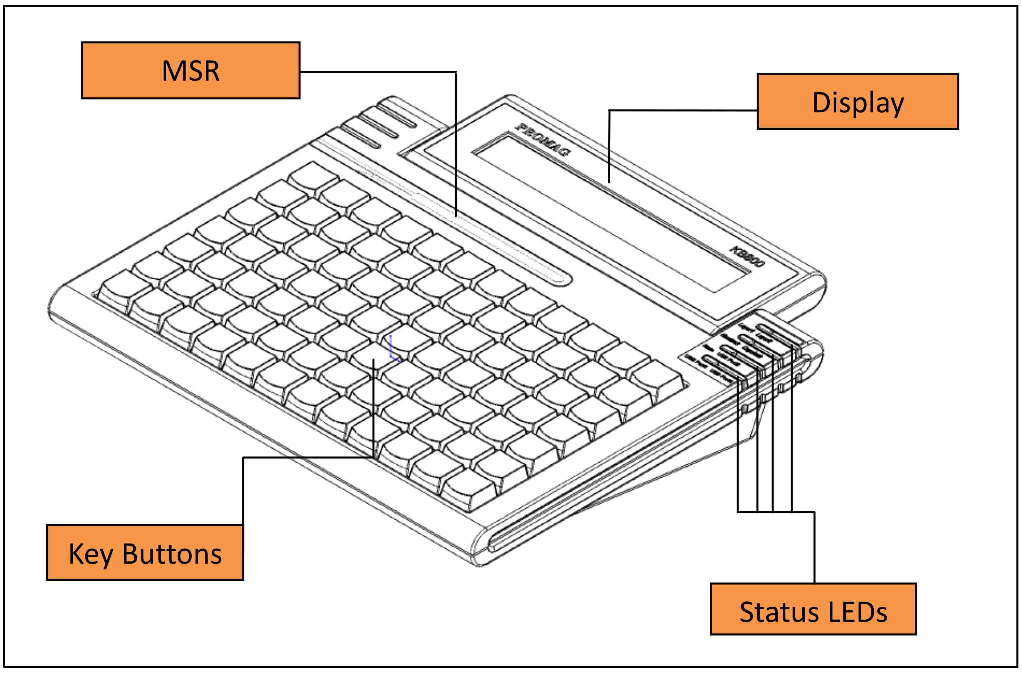
Device specifications are presented in the table below.

Parameter	**KB280-00**	**KB280-10**	**KB287-00**	**KB287-10**
Key Switch type	Cherry Mechanical Key, with 19.05 mm pitch.			
Key Switch lift time	20 million operations			
Number of Keys	128			
MSR	NO		YES	
Key Lock	NO	YES	NO	YES
Cable	USB interface (compatible with 1.1 to 2.0)			
Power requirements	USB port power / 5V DC, max. 60mA			
Operating temperature	0 to +50 degrees C			
Operating relative humidity	10-90%			
Mechanical dimensions	235 x 350 x 50mm			
Gross weight ("bare" KB280)	1480g			

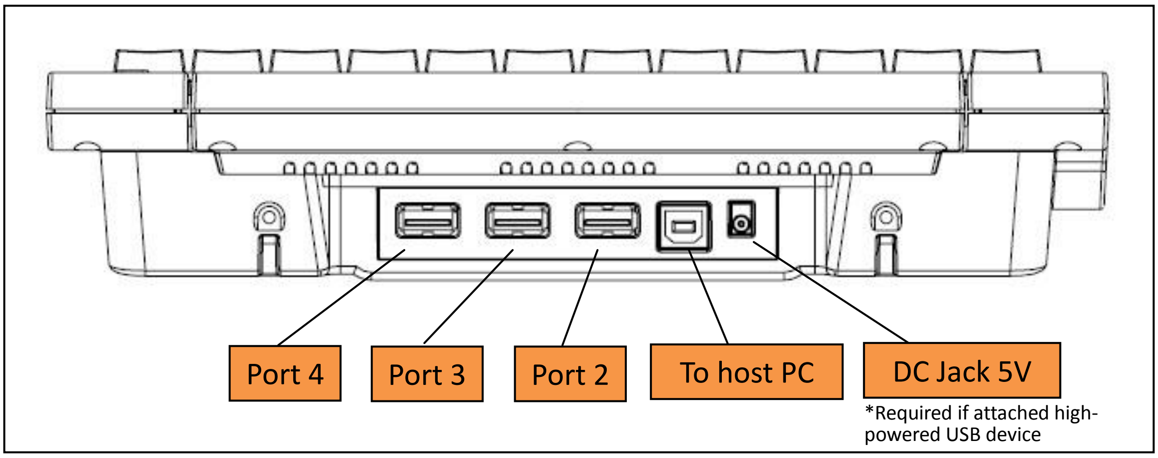
KB800

KB800 84-Keys programmable keyboard is specially designed for most dedicated applications, such as banking system, POS system etc, and it is also built in one USB hub which is able to provide additional 3 attached USB peripherals or devices to their USB ready PC. For the key buttons, each key can be programmable up to 127 characters and can be defined through PC by the user. The integrated magnetic stripe reader can read authorization cards, credit card or bank card etc. The Display is able to show up to 40 characters (20 columns x 2 lines). Also KB800 with built in Cherry mechanical key switch to assure of the long life data entry usage.

KB800 Connectors and Controls



The back connectors:

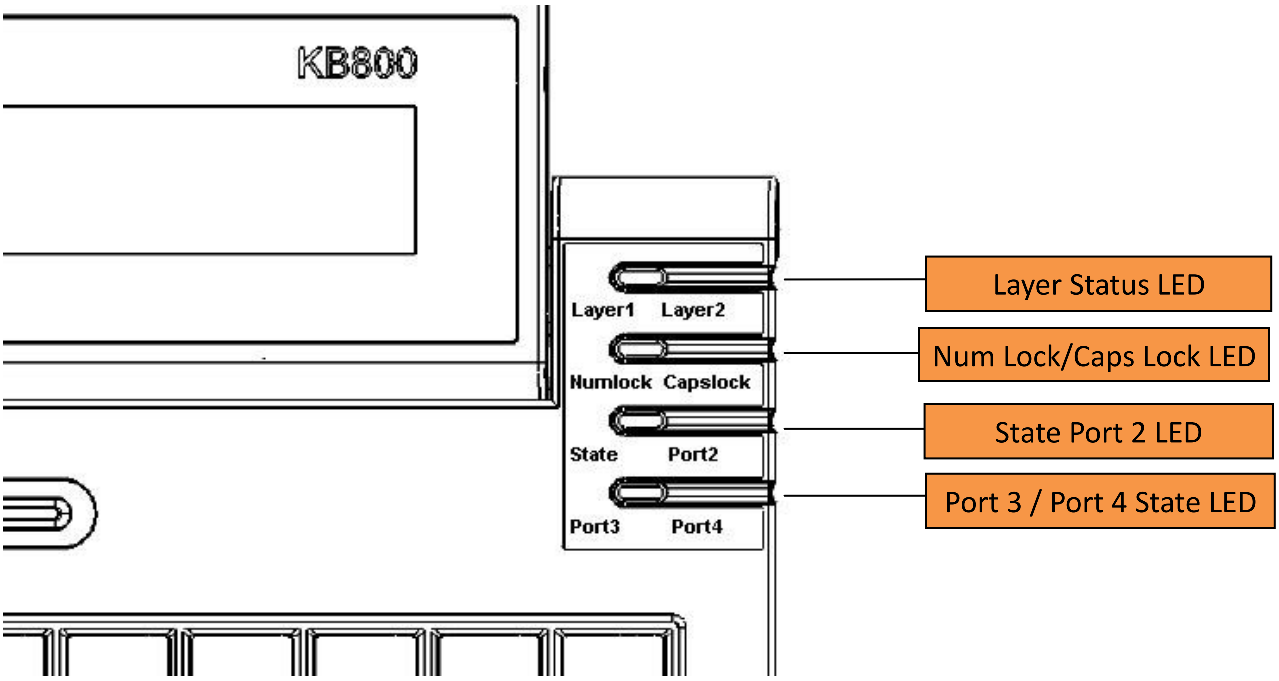


Click on the area on the picture above to learn more about the KB800:

Status LEDs

There are four status LEDs which are able to light 3 colors: Green, Red and orange. The four LEDs are:

- **Layer Status LED** is used to indicate current used layer (number). If is green light, it is indicating the used layer number is 1 (base layer). If is red light, it is indicating the used layer number is 2.
- **Num Lock / Caps Lock LED** the possible lights are listed below:
  - **Off:** The Num Lock and the Caps Lock are all off.
  - **Green:** The Num Lock is on and the Caps Lock is off.
  - **Red:** The Num Lock is off and the Caps Lock is on.
  - **Orange:** The Num Lock and Caps Lock are both on.
- **State Port 2 LED** the possible lights are listed below:
  - **Green:** Not attached any USB device.
  - **Orange:** Attached USB device.
  - **Blinking in Green:** Keyboard error.
- **Port 3 / Port 4 State LED** the possible lights are listed below:
  - **Off:** The Port 3 and the Port 4 are not attached any USB peripherals or devices.
  - **Green:** The Port 3 is attached USB peripheral or device, but Port 4 is not attached any USB peripheral or device.
  - **Red:** The Port 4 is attached USB peripheral or device, but Port 3 is not.
  - **Orange:** The Port 3 and Port 4 are both attached USB peripherals and devices.



Key Buttons

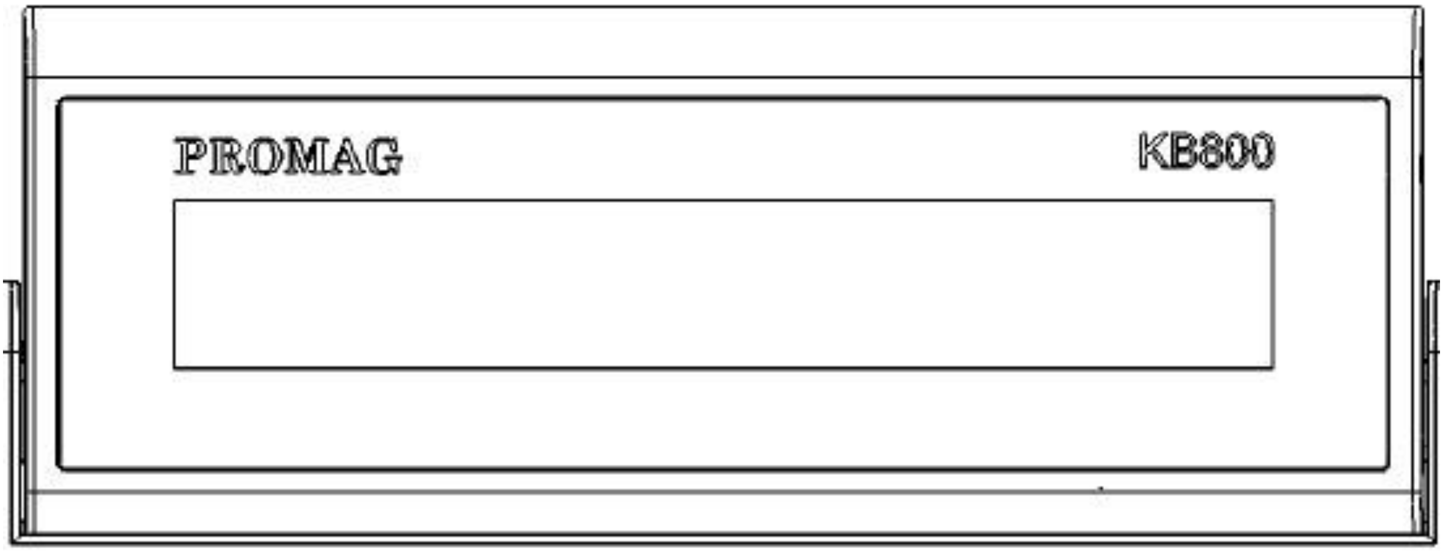
KB800 has 84 user programmable keys (7 x 12 keyboard matrix). Each key can be programmed up to 127 bytes characters.

MSR

The Magnetic Stripe Reader is able to read ISO 7116 standard Track 1, Track 2 and Track 3. If the swipe card process is OK, there will be a beep sound from the internal buzzer. If failed, there will be a three short beep sound.

Display

The display that KB800 uses is featuring 20x2 characters displayed, STN, Positive, Reflective, Yellow green text LCD with backlight. The displayed message can be performed by the KB800 OPOS driver (customer display class).



Refer to Appendix for the used pattern of all characters.

USB Hub (Port 2 ~ Port 4)

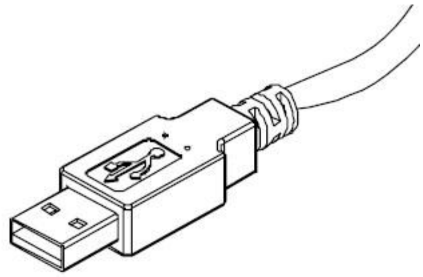
The KB800 provides 3-port Universal Serial Bus USB hub that allows a user to connect up to three USB peripherals or devices to their USB ready PC, and is compatible with USB1.1 to 2.0.

External Power Port (DC Jack 5V)

Power for the KB800 can be provided directly from the USB bus for connection up to three low-powered USB devices. When using the included 5V DC adapter in self-powered mode, the KB800 can support up to three high-powered USB devices. The time to attach the adapter is when the power consumption of attached USB device(s) is over than 250 mA.

USB Interface Connector (to Host PC)

The cable that KB800 uses is USB interface, which is compatible with USB1.1 to 2.0. The USB cable also provides the power for KB800.



Specifications and KB800 Modifications

The KB800 has one submodel in circulation- KB800-00.

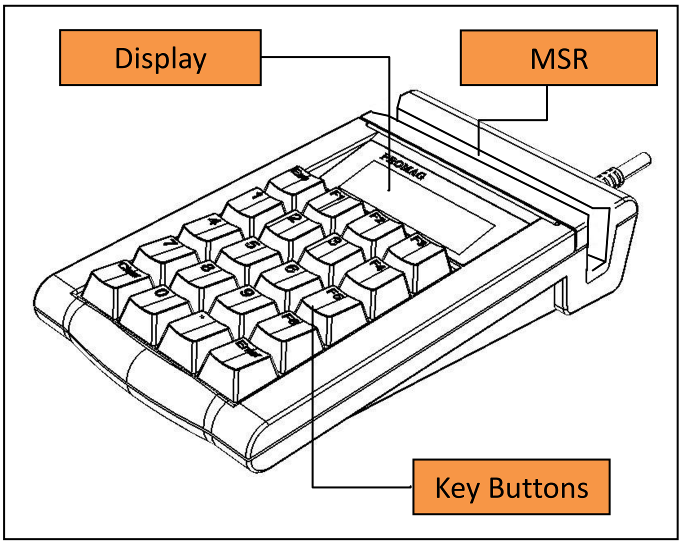
Device specifications are presented in the table below.

Parameter	**KB800-00**
Interface	(1 USB HUB: 1 USB HID KB + Extend 3 USB-A receptacle) One USB extend cable to PC
Magnetic reader (Optional)	ISO standard, 3 tracks, reading speed: 3 ~ 50 IPS.
Display	STN, Positive, Yellow Green 20 characters * 2 lines View area 149 * 23 mm Character size 6(W) * 9.66 (H) mm Backlight type Tilt angle 45 degree
Keyboard	Key: Cherry, 7*12 (total 84) keys Key switch life: 20 Million operations Key cap type: Relegendable Key stroke: 4mm Dimensions: 260 x 215 x 58 mm
Programmable string per key	127 byte ASCII string, 2 layers
Audio/Visual Indication	4 LEDs and Buzzer
Power consumption	250 mA @ 5V dc (excluding 3 extended USB port)
Power Adaptor	APR-T0018 or APR-T0019 (depending on the socket)
External Power Adaptor (optional)	5VDC, 2A (inner/outer diameter : 1.35mm / 3.5mm) DC Power Jack: * Center: +5VDC * Outer: Ground
Operating temperature	0 ~ +50 degree C
Weight (bare “KB800”)	1300 g
Weight (with accessory, box)	1810 g
Gift box dimensions	385 x 290 x 70 mm

ACT810H

ACT810H 16-Keys HID keyboard is specially designed for most dedicated applications, such as banking system, POS system etc. The integrated magnetic stripe reader (optinal) can read authorization cards, credit card or bank card etc. The Display is able to show up to 32 characters (16 columns x 2 lines).

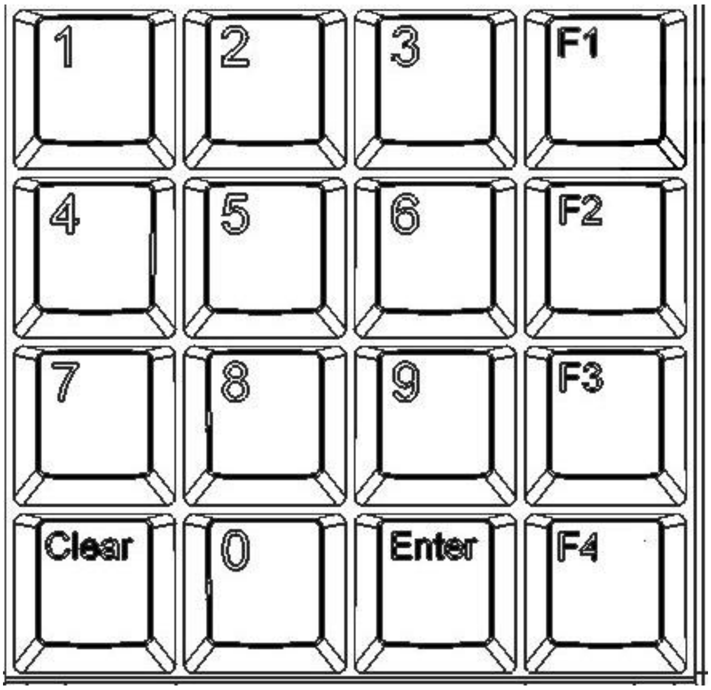
ACT810H Connectors and Controls



Click on the area on the picture above to learn more about the ACT810H:

Key Buttons

ACT810H has 16 keys (4 x 4 keyboard matrix). Each key output setting is fixed and listed as below:



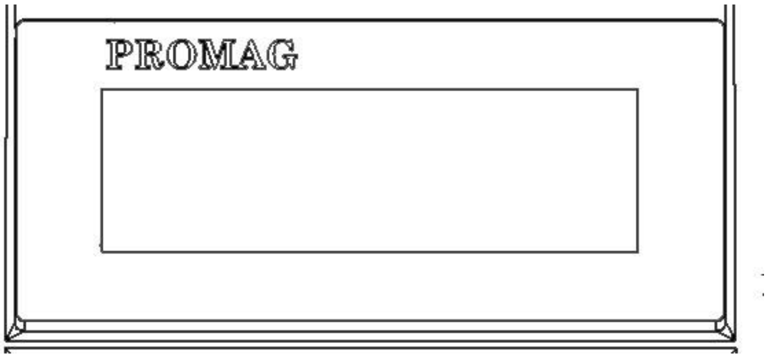
1	2	3	F1
4	5	6	F2
7	8	9	F3
Clear	0	Enter	F4

MSR

The Magnetic Stripe Reader is able to read ISO 7116 standard Track 1, Track 2 and Track 3. If the swipe card process is OK, there will be a beep sound from the internal buzzer. If failed, there will be a three short beep sound.

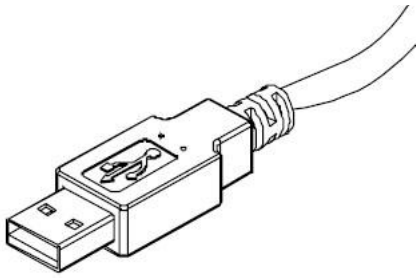
Display

The display that ACT810H uses is featuring 16x2 characters displayed, STN, Positive, Reflective, Yellow green text LCD with backlight.



USB Interface Connector

The cable that ACT810H uses is USB interface, which is compatible with USB1.1 to 2.0. The USB cable also provides the power for ACT810H.



Specifications and ACT810H Modifications

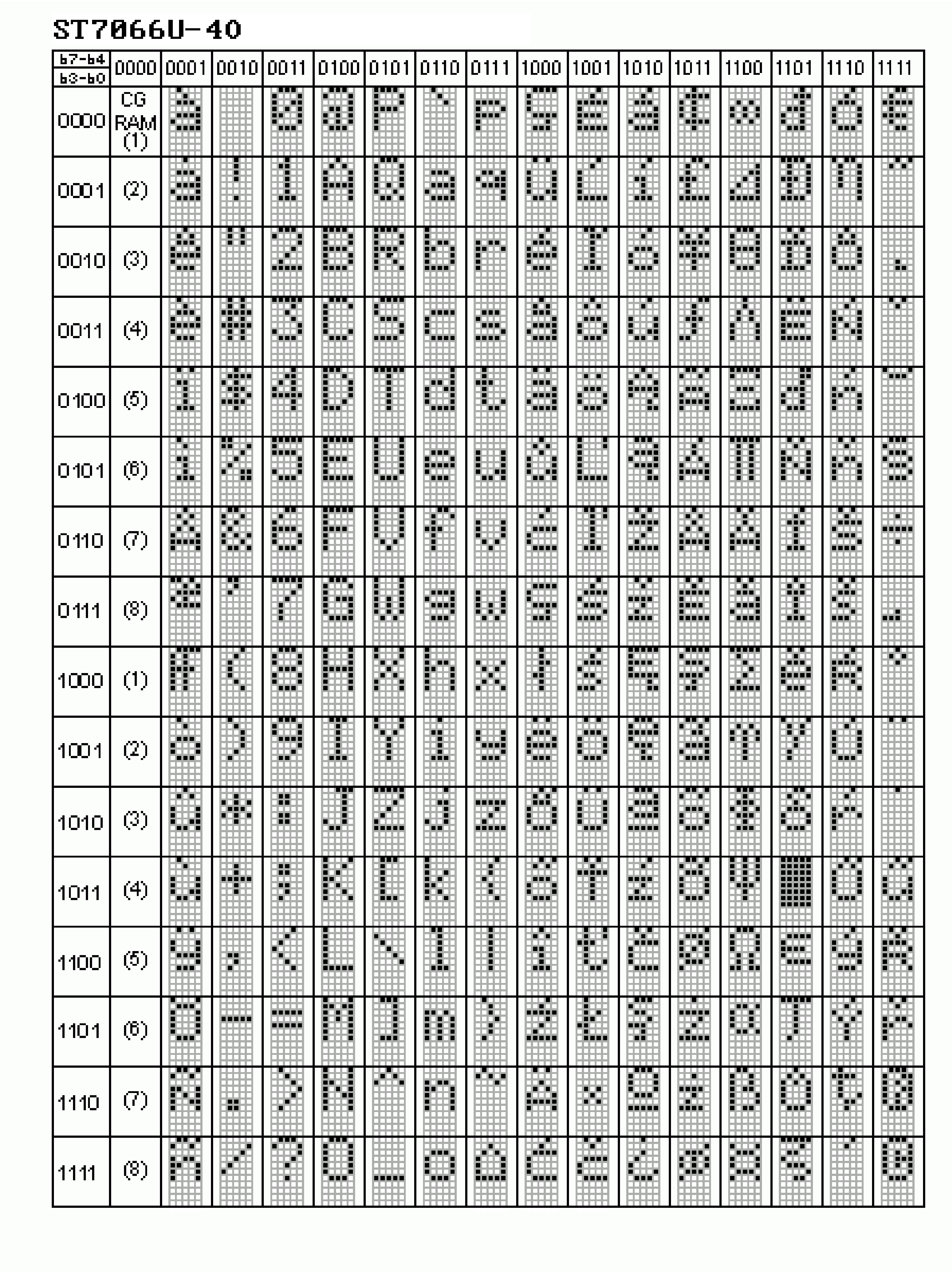
The ACT810H has two submodel in circulation- ACT810H-00 and ACT817-00.
Device specifications are presented in the table below.

Parameter	**ACT810H-00**	**ACT817-00**
Number of Keys	16	
MSR	NO	YES
Display	STN, Positive, Yellow Green 16 characters * 2 lines Backlight type	

	Tilt angle 45 degree	
Cable	USB interface (compatible with 1.1 to 2.0)	
Power requirements	USB port power / 5V DC, max. 60mA	
Operating temperature	0 to +50 degrees C	
Operating relative humidity	10-90%	
Mechanical dimensions	177x108x37mm	
Gross weight ("bare" ACT810H)	325g	345g

Appendix –Characters Table

Europe


ST7066U-40
b7-b4
b3-b0
0000
0001
0010
0011
0100
0101
0110
0111
1000
1001
1010
1011
1100
1101
1110
1111
0000 CG RAM (1)
0001 (2)
0010 (3)
0011 (4)
0100 (5)
0101 (6)
0110 (7)
0111 (8)
1000 (1)
1001 (2)
1010 (3)
1011 (4)
1100 (5)
1101 (6)
1110 (7)
1111 (8)

Japanese

Upper 4 bit Lower 4 bit	LLLL	LLLH	LLHL	LLHH	LHLL	LHLH	LHHL	LHHH	HLLL	HLLH	HLHL	HLHH	HHLL	HHLH	HHHL	HHHH
LLLL	CG RAM (1)			0	@	P	`	p				ー	タ	ミ	α	p
LLLH	(2)		!	1	A	Q	a	q			。	ア	チ	ム	ä	q
LLHL	(3)		"	2	B	R	b	r			「	イ	ツ	メ	β	θ
LLHH	(4)		#	3	C	S	c	s			」	ウ	テ	モ	ε	∞
LHLL	(5)		$	4	D	T	d	t			、	エ	ト	ヤ	μ	Ω
LHLH	(6)		%	5	E	U	e	u			・	オ	ナ	ユ	σ	ü
LHHL	(7)		&	6	F	V	f	v			ヲ	カ	ニ	ヨ	ρ	Σ
LHHH	(8)		'	7	G	W	g	w			ァ	キ	ヌ	ラ	g	π
HLLL	(1)		(	8	H	X	h	x			ィ	ク	ネ	リ	√	x̄
HLLH	(2)		)	9	I	Y	i	y			ゥ	ケ	ノ	ル	⁻¹	y
HLHL	(3)		*	:	J	Z	j	z			ェ	コ	ハ	レ	j	千
HLHH	(4)		+	;	K	[	k	{			ォ	サ	ヒ	ロ	ˣ	万
HHLL	(5)		,	<	L	¥	l	|			ャ	シ	フ	ワ	¢	円
HHLH	(6)		-	=	M	]	m	}			ュ	ス	ヘ	ン	£	÷
HHHL	(7)		.	>	N	^	n	→			ョ	セ	ホ	゛	ñ	
HHHH	(8)		/	?	O	_	o	←			ッ	ソ	マ	゜	ö	█

Slavic

Upper 4 bit Lower 4 bit	LLLL	LLLH	LLHL	LLHH	LHLL	LHLH	LHHL	LHHH	HLLL	HLLH	HLHL	HLHH	HHLL	HHLH	HHHL	HHHH
LLLL	CG RAM (1)			0	@	P	`	p			Б	Ю	ч	,	Д	[illegible]
LLLH	CG RAM (2)		!	1	A	Q	a	q			Г	Я	ш	¡	Ц	[illegible]
LLHL	CG RAM (3)		"	2	B	R	b	r			Ё	б	ъ	[illegible]	Щ	[illegible]
LLHH	CG RAM (4)		#	3	C	S	c	s			Ж	в	ы	‼	д	[illegible]
LHLL	CG RAM (5)		$	4	D	T	d	t			З	г	ь	[illegible]	ф	[illegible]
LHLH	CG RAM (6)		%	5	E	U	e	u			И	ё	э	[illegible]	ц	[illegible]
LHHL	CG RAM (7)		&	6	F	V	f	v			Й	ж	ю	[illegible]	щ	[illegible]
LHHH	CG RAM (8)		'	7	G	W	g	w			Л	з	я	I	´	[illegible]
HLLL	CG RAM (1)		(	8	H	X	h	x			П	и	«	Ⅱ	¨	[illegible]
HLLH	CG RAM (2)		)	9	I	Y	i	y			У	й	»	↑	˘	[illegible]
HLHL	CG RAM (3)		*	:	J	Z	j	z			Ф	к	„	↓	ê	[illegible]
HLHH	CG RAM (4)		+	;	K	[	k	10			Ч	л	”	[illegible]	ç	[illegible]
HHLL	CG RAM (5)		,	<	L	¥	l	12			Ш	м	№	[illegible]	ü	[illegible]
HHLH	CG RAM (6)		-	=	M	]	m	15			Ъ	н	¿	[illegible]	[illegible]	§
HHHL	CG RAM (7)		.	>	N	^	n	[illegible]			Ы	п	ƒ	[illegible]	[illegible]	[illegible]
HHHH	CG RAM (8)		/	?	O	_	o	[illegible]			Э	т	£	▪	○	█

Firmware Manuals

This part of the documentation describes the communication protocol of firmware related to KB2xx/KB800 keyboards.

Vender ID and Product ID

Before starting the communication, it needs to get the control handle for the later data transferring. The KB2xx/KB8xx using the same vender ID, the value is 5735 (0x1667 in hex format). The product IDs are listed as below:

Model	Product ID (decimal)
KB200	10
KB220	11
KB240	12
KB270	13
KB280	14
KB800	8
ACT810H	19

Programming

Using feature report function to tranfer the HID USB command and data. The **HidD_SetFeature**[1] function is used to send out the data. The **HidD_GetFeature**[2] function is used to retrieve the incoming data. The command data size is 131 bytes. Below is the command and data format:

1st byte	2nd byte	3rd ~ 131st
Report ID	Command Code	Data

The value of Report ID is always to be 0x00.

Note:

1. The **HidD_SetFeature** routine sends a feature report to HID control. For more details, please refer to Microsoft MSDN website.
2. The **HidD_GetFeature** routine returns a feature report from HID control. For more details, please refer to Microsoft MSDN website.

Commands

The commands are used to control the keyboard device and can be issued through the USB port. Below table list all available commands:

Command Code	Description
0x10	Set Macro Key definition of Layer #1 command
0x20	Set Macro Key definition of Layer #2 command
0x30	Set Language Key Map command
0x40	Set MSR Prefix/Suffix command

0x50	Set MSR Output Mode command
0x60	Get Macro Key definition of Layer #1 command
0x70	Get Macro Key definition of Layer #2 command
0x80	Get Language Key Map command
0x90	Get MSR Prefix/Suffix command
0xA0	Get MSR Output Mode command
0xB0	Display Instructions command
0xC0	Get Firmware Version command
0xD0	Jump to Firmware Loading Mode command

Set Macro Key Definition of Layer #1 command

Function: Defines the macro key of layer #1

Data format: **KL*dd…d***, where **K** is the binary value that indicates the index number of key button, **L** is the binary value that indicates the length of macro key string, ***dd…d*** is the content of macro key string

Details:

The index number of key button for each keyboard can refer to the Appendix A. The macro key string may contain the letters, numbers, function keys, control keys or special keys.

For the macro key string, the letters and numbers are presented as their own ASCII code. For the others (function/control/special keys), will use the keyword to present. Please refer Appendix B for details.

Example: here is a sample to show how to define a macro key with the key combination – Alt+F+O, most of the programs implement this key combination to open a file.

The report ID is 0x00. The command code is 0x10 (for layer #1), and the key index number to be programmed is 3 (key location is in the upper-right corner of keyboard layout). The macro key string will be: <Alt>FO

The length of macro key string is 7. Then the command data will be as follow:

.	Rpt ID	Cmd	Key Idx	Length	Macro Key Definition							
No.	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12 th-131th
Value	0x00	0x10	0x03	0x07	0x3c	0x41	0x6c	0x74	0x3e	0x46	0x4f	0x00
Char.					<	A	l	t	>	F	O	

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0         ‘Report ID
bCmdData(1)=&H10        ‘Command Code for layer #1
bCmdData(2)=&H03        ‘Key Index
bCmdData(3)=&H7         ‘The string length of “<Alt>FO”
bCmdData(4)=&H3C        ‘ASCII code of ”<”
bCmdData(5)=&H41        ‘ASCII code of ”A”
bCmdData(6)=&H41        ‘ASCII code of ”l”
bCmdData(7)=&H6C        ‘ASCII code of “t”
bCmdData(8)=&H74        ‘ASCII code of “>”
bCmdData(9)=&H3E        ‘ASCII code of “F”
bCmdData(10)=&H4F       ‘ASCII code of “O”
HidD_SetFeature(HidDevice, bCmdData(0), 131)
```

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard.

Set Macro Key Definition of Layer #2 command

Function: Defines the macro key of layer #2

Data format: **KL*dd…d***, where **K** is the binary value that indicates the index number of key button, **L** is the binary value that indicates the length of macro key string, ***dd…d*** is the content of macro key string

Details:

The index number of key button for each keyboard can refer to the Appendix A. The macro key string may contain the letters, numbers, function keys, control keys or special keys.

For the macro key string, the letters and numbers are presented as their own ASCII code. For the others (function/control/special keys), will use the keyword to present. Please refer Appendix B for details.

Example: here is a sample to show how to the define a macro key with the key combination – Alt+F+O, most of the programs implement this key combination to open a file.

The report ID is 0x00. The command code is 0x20 (for layer #2), and the key index number to be programmed is 3 (key location is in the upper-right corner of keyboard layout). The macro key string will be: <Alt>FO

The length of macro key string is 7. Then the command data will be as follow:

.	Rpt ID	Cmd	Key Idx	Length	Macro Key Definition							
No.	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12 th-131th
Value	0x00	0x20	0x03	0x07	0x3c	0x41	0x6c	0x74	0x3e	0x46	0x4f	0x00
Char.					<	A	l	t	>	F	O	

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0         ‘Report ID
bCmdData(1)=&H20        ‘Command Code for layer #2
bCmdData(2)=&H03        ‘Key Index
bCmdData(3)=&H7         ‘The string length of “<Alt>FO”
bCmdData(4)=&H3C        ‘ASCII code of ”<”
bCmdData(5)=&H41        ‘ASCII code of ”A”
bCmdData(6)=&H41        ‘ASCII code of ”l”
bCmdData(7)=&H6C        ‘ASCII code of “t”
bCmdData(8)=&H74        ‘ASCII code of “>”
bCmdData(9)=&H3E        ‘ASCII code of “F”
bCmdData(10)=&H4F       ‘ASCII code of “O”
```

```
HidD_SetFeature(HidDevice, bCmdData(0), 131)
```

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard.

Get Macro Key Definition of Layer #1 command

Function: Returns the macro key definition of layer #1

Data format: **K**, where **K** is the binary value that indicates the index number of key button

Details:

The index number of key button for each keyboard can refer to the Appendix A.

Example: here is a sample to show how to the retrieve a macro key definition.

The report ID is 0x00. The command code is 0x60 (for layer #1), and the key index number to be programmed is 3 (key location is in the upper-right corner of keyboard layout). Then the command data will be as follow:

.	Rpt ID	Cmd	Key Idx	Remains
No.	1st	2nd	3rd	4th -131th
Value	0x00	0x60	0x03	0x00

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0          'Report ID
bCmdData(1)=&H60         'Command Code for layer #2
bCmdData(2)=&H03         'Key Index

if (HidD_SetFeature(HidDevice, bCmdData(0), 131)=1 then
   HidD_GetFeature(HidDevice, bCmdData(0), 131)
End if
```

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard.

If succeeded, the macro key string will store in the bCmdData buffer, which the 3rd byte is the length of macro key string, after 4th byte (including 4th byte) data is the macro key string.

Get Macro Key Definition of Layer #2 command

Function: Returns the macro key definition of layer #1

Data format: **K**, where **K** is the binary value that indicates the index number of key button

Details:

The index number of key button for each keyboard can refer to the Appendix A.

Example: here is a sample to show how to the retrieve a macro key definition.

The report ID is 0x00. The command code is 0x70 (for layer #2), and the key index number to be programmed is 3 (key location is in the upper-right corner of keyboard layout). Then the command data will be as follow:

.	Rpt ID	Cmd	Key Idx	Remains

No.	1st	2nd	3rd	4th -131th
Value	0x00	0x70	0x03	0x00

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0          'Report ID
bCmdData(1)=&H60         'Command Code for layer #2
bCmdData(2)=&H03         'Key Index

if (HidD_SetFeature(HidDevice, bCmdData(0), 131)=1 then
   HidD_GetFeature(HidDevice, bCmdData(0), 131)
End if
```

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard.
If succeeded, the macro key string will store in the bCmdData buffer, which the 3rd byte is the length of macro key string, after 4th byte (including 4th byte) data is the macro key string.

Set Language Key Map command

Function: Defines the control value and HID Usage ID of ASCII code

Data format: **R$C_iI_iC_{i+1}I_{i+1}$…**, where **R** is the report index, **C_i** is the binary value that indicates the used control value of following key Usage ID, I_i is the binary value that indicates the key Usage ID. The index value i is the ASCII code that related the control value **C_i** and the Usage ID **I_i**.

Details:

Because the data size of the key map can be up to 512 bytes, so it needs to send 4 reports to keyboard for the updating, so the value of report index **R** is from 0 to 3.

Each ASCII code is related with the control value and the Usage ID, and different language keyboard may use different control value and Usage ID for a certain ASCII code. For example, for the English keyboard, the Usage ID of letter “x” is 0x1C, but for Germany keyboard, the “x” Usage ID is 0x1D.

1st report:

.	Rpt ID	Cmd	Rpt Idx	Key Map						
No.	1st	2nd	3rd	4th	5th	6th	7th	…	130 th	131th
Value	0x00	0x30	0x00	C_0	I_0	C_1	I_1	…	C_{63}	I_{63}

2nd report:

.	Rpt ID	Cmd	Rpt Idx	Key Map						
No.	1st	2nd	3rd	4th	5th	6th	7th	…	130 th	131th
Value	0x00	0x30	0x01	C_{64}	I_{64}	C_{65}	I_{65}	…	C_{127}	I_{127}

3rd report:

.	Rpt ID	Cmd	Rpt Idx	Key Map

No.	1st	2nd	3rd	4th	5th	6th	7th	…	130 th	131th
Value	0x00	0x30	0x02	C*129*	I*129*	C*130*	I*130*	…	C*191*	I*191*

4th report:

.	Rpt ID	Cmd	Rpt Idx	Key Map						
No.	1st	2nd	3rd	4th	5th	6th	7th	…	130 th	131th
Value	0x00	0x30	0x03	C*192*	I*192*	C*193*	I*193*	…	C*255*	I*255*

Control value tells keyboard how to hit the control keys (Shift/Alt/Ctrl) or the way of hitting the key while sending out the Usage ID. For example, the lower case letter "a", the control value is 0. For the upper case letter "A", the control value is 1. Below shows all the **control values**:

- **0**: No control key hit, direct to send out the Usage ID.
- **1**: Press Shift key, and then send out the Usage ID.
- **6**: Press right Alt key, and then send out the Usage ID.
- **16**: Double hit the key button.
- **17**: Press Shift key and double hit the key button.

Not all the ASCII code needs to be defined by the control value and Usage ID. For example, before ASCII code 32, only the value 13 (for Enter key) is needed to be defined. For the undefined ASCII code, just leave 0 value in the buffer.

Get Language Key Map command

Function: Returns the **control value** and HID Usage ID of ASCII code

Data format: **R**, where **R** is the report index

Details:

The index number of key button for each keyboard can refer to the Appendix A.

Example: here is a sample to show how to the retrieve language key map with specified report index.

The report ID is 0x00. The command code is 0x80, and the report index number is 3. Then the command data will be as follow:

.	Rpt ID	Cmd	Rpt Idx	Remains
No.	1st	2nd	3rd	4th -131th
Value	0x00	0x80	0x03	0x00

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0        'Report ID
bCmdData(1)=&H80       'Command Code for retrieve key map
bCmdData(2)=&H03       'Report Index

if (HidD_SetFeature(HidDevice, bCmdData(0), 131)=1 then
   HidD_GetFeature(HidDevice, bCmdData(0), 131)
End if
```

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard. The retrieved data will put in the later 4th byte of bCmdData buffer. The retrieved data format is same to the data format of updating language key map command.

Set MSR Prefix/Suffix command

Function: Defines the prefix or suffix of MSR output data

Data format: **KL*dd…d***, where **K** is the binary value that indicates which type of prefix or suffix to be updated., **L** is the binary value that indicates the length of macro key string, ***dd…d*** is the content of updated prefix or suffix string

Details:

The prefix and suffix string may contain the letters, numbers, function keys, control keys or special keys. There are four kinds of prefix and suffix, which are package, Track 1, Track 2 and Track 3.

Below is the list of type value for prefix and suffix:

0 (Prefix for package)	The prefix string will append in the start of whole track data.
1 (Suffix for package)	The suffix string will append in the end of whole track data.
2 (Prefix for Track 1)	The prefix string will append in the start of track 1 data.
3 (Suffix for Track 1)	The suffix string will append in the end of track 1 data.
4 (Prefix for Track 2)	The prefix string will append in the start of track 2 data.
5 (Suffix for Track 2)	The suffix string will append in the end of track 2 data.
6 (Prefix for Track 3)	The prefix string will append in the start of track 3 data.
7 (Suffix for Track 3)	The suffix string will append in the end of track 3 data.

Example: here is a sample to show how to define the prefix of Track 1.

The report ID is 0x00. The command code is 0x40, and the type value to be programmed is 2. The prefix string will be “<TK1>=”.

The length of macro key string is 6. Then the command data will be as follow:

.	Rpt ID	Cmd	Typ Val	Length	Macro Key Definition						
No.	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th-131th
Value	0x00	0x40	0x02	0x06	0x3c	0x54	0x4B	0x31	0x3D	0x3E	0x00
Char.					<	T	K	1	=	>	

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0         'Report ID
bCmdData(1)=&H40        'Command Code
bCmdData(2)=&H02        'Type value for the Prefix of Track 1
bCmdData(3)=&H6         'The string length of "<TK1=>"
bCmdData(4)=&H3C        'ASCII code of "<"
bCmdData(5)=&H54        'ASCII code of "T"
bCmdData(6)=&H4B        'ASCII code of "K"
bCmdData(7)=&H31        'ASCII code of "1"
bCmdData(8)=&H3D        'ASCII code of "="
bCmdData(9)=&H3E        'ASCII code of ">"
HidD_SetFeature(HidDevice, bCmdData(0), 131)
```

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard.

Get MSR Prefix/Suffix command

Function: Returns the prefix or suffix of MSR output data

Data format: **K**, where **K** is the binary value that indicates which type of prefix or suffix to be updated.

Details:

The prefix and suffix string may contain the letters, numbers, function keys, control keys or special keys.

There are four kinds of prefix and suffix, which are package, Track 1, Track 2 and Track 3.

Below is the list of type value for prefix and suffix:

0 (Prefix for package)	The prefix string will append in the start of whole track data.
1 (Suffix for package)	The suffix string will append in the end of whole track data.
2 (Prefix for Track 1)	The prefix string will append in the start of track 1 data.
3 (Suffix for Track 1)	The suffix string will append in the end of track 1 data.
4 (Prefix for Track 2)	The prefix string will append in the start of track 2 data.
5 (Suffix for Track 2)	The suffix string will append in the end of track 2 data.
6 (Prefix for Track 3)	The prefix string will append in the start of track 3 data.
7 (Suffix for Track 3)	The suffix string will append in the end of track 3 data.

Example: here is a sample to show how to retrieve the prefix of Track 1.

The report ID is 0x00. The command code is 0x90, and the type value to be retrieved is 2.

The length of macro key string is 6. Then the command data will be as follow:

.	Rpt ID	Cmd	Typ Val	Remains
No.	1st	2nd	3rd	4th-131th
Value	0x00	0x90	0x02	0x00

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0         'Report ID
bCmdData(1)=&H90        'Command Code
bCmdData(2)=&H02        'Type value for the Prefix of Track 1

if (HidD_SetFeature(HidDevice, bCmdData(0), 131)=1 then
   HidD_GetFeature(HidDevice, bCmdData(0), 131)
End if
```

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard. The retrieved data will put in the later 4th byte of bCmdData buffer. The retrieved data format is same to the data format of updating MSR prefix/suffix command.

Set MSR Output Mode command

Function: Defines the tracks output sequence, required tracks to be output and the Start Sentinel/End Sentinel for each track

Data format: $\mathbf{BD_1D_2D_3S_1E_1S_2E_2S_3E_3O}$, where **B** is the fixed binary value and the value is always to be 0, $\mathbf{D_1}$, $\mathbf{D_2}$ and $\mathbf{D_3}$ is the binary value of **decode mode** for Track1, Track2 and Track3 separately. $\mathbf{S_1E_1}$ is the ASCII of Start Sentinel and End Sentinel for Track1. $\mathbf{S_2E_2}$ is the ASCII of Start Sentinel and End Sentinel for Track2. $\mathbf{S_3E_3}$ is the ASCII of Start Sentinel and End Sentinel for Track3. **O** is the binary value that indicates the output order.

Details:

Decode mode is used to limit which track needs to be or not to be output. The **decode mode** value has below three values:

0 (Disabled) The specified track will not be output, regardless of the specified track is decoded or not.

1 (Required) The specified track needs to be decoded. If the specified track is not decoded, the MSR will not output any data even other tracks are decoded.

2 (Enabled) The specified track can be output. If the specified track data is not decoded, the track filed will leave blank.

The output order defines the sequence of track1-3 to be output, which can be six kinds of orders. The values are:

0	The track order is Track1-Track2-Track3.
1	The track order is Track1-Track3-Track2.
2	The track order is Track2-Track1-Track3.
3	The track order is Track2-Track3-Track1.
4	The track order is Track3-Track1-Track2.
5	The track order is Track3-Track2-Track1.

Example: here is a sample to show how to define the MSR output mode.

The report ID is 0x00. The command code is 0x50, and the B value fixed to be 0. The Track1, Track2 and Track3 decode modes are enabled, required and disabled separately. The Track1 SS (Start Sentinels) is "%", the Track2 SS is ";" and the Track3 SS is ";". The ES (End Sentinel) is "?" for all tracks. The output order value is 5 (Track3-2-1). Then the command data will be as follow:

.	Rpt ID	Cmd	B	D1	D2	D3	S1	E1	S2	E2	S3	E3	O	Remains
No.	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th-131th
Value	0x00	0x50	0x00	0x02	0x01	0x00	0x25	0x3F	0x3B	0x3F	0x3B	0x3F	0x05	0x00
Char.							%	?	;	?	;	?		

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0          'Report ID
bCmdData(1)=&H40         'Command Code
bCmdData(2)=&H00        'Fixed to 0
bCmdData(3)=&H2         'Track1 decode mode - enabled
bCmdData(4)=&H1         'Track2 decode mode - required
bCmdData(5)=&H0         'Track3 decode mode - disabled
bCmdData(6)=&H25        'Track 1 SS - %
bCmdData(7)=&H3F        'Track 1 ES - ?
bCmdData(8)=&H3B        'Track 2 SS - ;
bCmdData(9)=&H3F        'Track 2 ES - ?
bCmdData(8)=&H3B        'Track 3 SS - ;
bCmdData(9)=&H3F        'Track 3 ES - ?
bCmdData(8)=&H5         'Output order – Track3-2-1

HidD_SetFeature(HidDevice, bCmdData(0), 131)
```

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard.

Get MSR Output Mode command

Function: Returns the tracks output sequence, required tracks to be output and the Start Sentinel/End Sentinel for each track

Data format: **B**, where **B** is the fixed binary value and the value is always to be 0

Details:

The retrieving data content can refer to Updating MSR Output Mode.

Example: here is a sample to show how to retrieve the MSR output mode settings.

The report ID is 0x00. The command code is 0x50.

.	Rpt ID	Cmd	B Val	Remains
No.	1st	2nd	3rd	4th-131th
Value	0x00	0x50	0x00	0x00

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0         'Report ID
bCmdData(1)=&H50        'Command Code
bCmdData(2)=&H00        'Always fixed to 0

if (HidD_SetFeature(HidDevice, bCmdData(0), 131)=1 then
   HidD_GetFeature(HidDevice, bCmdData(0), 131)
End if
```

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard. The retrieved data will put in the later 4th byte of bCmdData buffer. The retrieved data format is same to the data format of updating MSR output mode command.

Display Instructions command

Function: Makes display to perform certain action (Only for KB800 keyboard)

Data format: **D*xx…x***, where **D** is the binary value that indicates the action that display will perform., ***xx…x*** is the parameters of action may use, and the parameter format is related to the action

Details:

The binary values of action and the related parameters are listed as below:

Action Value (D)	**Description**	**Parameters (*xx…x*)**
0	Clear display	-
1	Set cursor position	***rc***, where ***r*** is the row (0~1), ***c*** is the column (0~19)
2	Display message	***mm…m***, where ***mm…m*** is the string that be displayed in the LCD, the string length is 1 ~ 40 long.
3	Read cursor position	-
4	Read message	-
5	Control backlight	***c***, where ***c***: 0 (turn off), 1 (turn on)

Get Firmware Version command

Function: Returns the firmware version of this firmware

Data format: **V**, where **V** is the fixed binary value and the value is always to be 0

Details:

Get Firmware Version command returns current firmware version string.

The version string contains model name, firmware ROM number and version which separated by space character. For example: KB200-USB-TS ROM-T1033 V1.0R0

Example: here is a sample to show how to retrieve the firmware version string.

The report ID is 0x00. The command code is 0x50.

.	Rpt ID	Cmd	Remains
No.	1st	2nd	3th-131th
Value	0x00	0xC0	0x00

Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0          'Report ID
bCmdData(1)=&C50         'Command Code

if (HidD_SetFeature(HidDevice, bCmdData(0), 131)=1 then
   HidD_GetFeature(HidDevice, bCmdData(0), 131)
End if
```

.	Rpt ID	Cmd	Length	Firmware String							
No.	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	…	Remains
Value	0x00	0xC0	0x1D	0x4B	0x42	0x32	0x30	0x30	0x2D		0x00
				K	B	2	0	0	-	…	

HidDevice is the handle to the device path of specified vendor ID and product ID of HID USB keyboard. The retrieved data will put in the later 4th byte of bCmdData buffer.

Jump to Firmware Loading Mode command

Function: Change keyboard state to firmware loading mode

Data format: **- (only command code required only)**

Details:

This command will force keyboard jumps from Operation Mode to Firmware Loading mode.

Before loading the firmware to keyboard, the keyboard must be in the firmware loading mode. When keyboard is in Firmware Loading mode, the PID value will change to 6.

About the process for uploading the firmware to keyboard, please refer to Loading Firmware.

Example: here is a sample to show how to send the Jump to Firmware Loading Mode command.

The report ID is 0x00. The command code is 0x50.

.	Rpt ID	Cmd	Remains
No.	1st	2nd	3th-131th
Value	0x00	0xD0	0x00

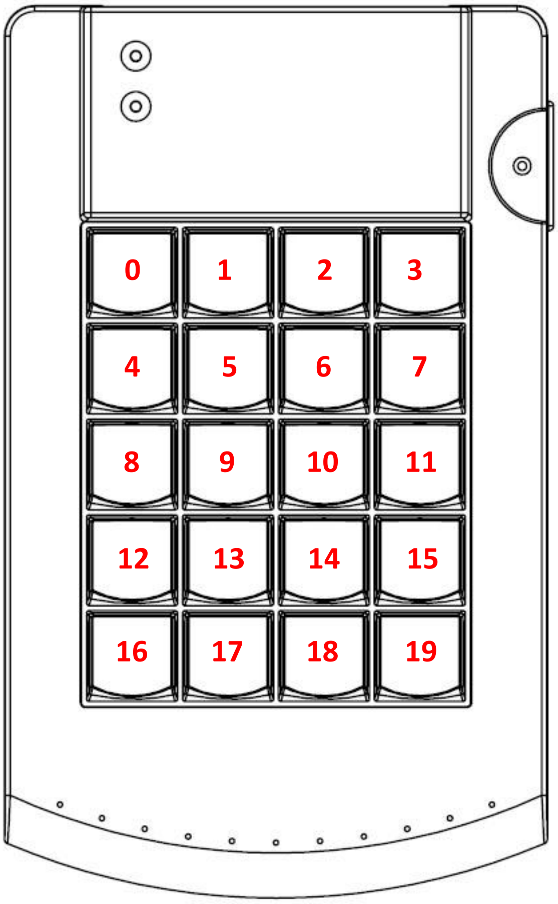
Visual Basic 6 Sample Code:

```
Redim bCmdData(131 - 1) as Byte

bCmdData(0)=&H0        'Report ID
bCmdData(1)=&HD0       'Command Code

if (HidD_SetFeature(HidDevice, bCmdData(0), 131)=1 then
   'OK, it need to restart keyboard to take the command effect
End if
```

Appendix A: Keyboard layout with the key index number

The index number is presented in the key button in red.

KB200



Appendix B: Keyword list

Keyboard/Keypad

Usage Name	Keyword
Keyboard ESCAPE	<Esc>
Keyboard F1	<F1>
Keyboard F2	<F2>
Keyboard F3	<F3>
Keyboard F4	<F4>
Keyboard F5	<F5>
Keyboard F6	<F6>
Keyboard F7	<F7>
Keyboard F8	<F8>
Keyboard F9	<F9>
Keyboard F10	<F10>
Keyboard F11	<F11>
Keyboard F12	<F12>
Keyboard BackSpace	<BackSpace>
Keyboard Tab	<Tab>
Keyboard Caps Lock	<CapsLock>
Keyboard Enter	<Enter>
Keyboard Left Shift	<LShift>
Keyboard Right Shift	<RShift>
Keyboard Left Ctrl	<LCtrl>
Keyboard Left WinKey	<LGU>
Keyboard Space	<SpaceBar>
Keyboard Right Alt	<RAlt>
Keyboard Right WinKey	<RGUI>
Keyboard Right Ctrl	<RCtrl>
Keyboard Print Screen/SysRq	<PrintScreenSysRq>
Keyboard Scroll Lock	<ScrollLock>
Keyboard Pause/Break	<PauseBreak>
Keyboard Insert	<Insert>
Keyboard Home	<Home>
Keyboard Page Up	< PageUp >
Keyboard Delete	<Delete>
Keyboard End	< End >
Keyboard Page Down	<PageDown>
Keyboard Up Arrow	<UpArrow>

Keyboard Insert	<Insert>
Keyboard Left Arrow	<LeftArrow>
Keyboard Down Arrow	<DownArrow>
Keyboard Right Arrow	<RightArrow>
Keypad Num Lock	<NumLock>
Keypad /	<Pad/>
Keypad *	<Pad*>
Keypad -	<Pad ->
Keypad 7	<Pad7>
Keypad 8	<Pad8>
Keypad 9	<Pad9>
Keypad +	<Pad+>
Keypad 4	< Pad4>
Keypad 5	<Pad5>
Keypad 6	<Pad6>
Keypad 1	<Pad1>
Keypad 2	<Pad2>
Keypad 3	<Pad3>
Keypad Enter	<PadEnter>
Keypad 0	<Pad0>
Keypad .	<Pad.>
Layer Lock	<LayerLock>

Special Keys

Usage Name	Keyword
Power	<Power>
Sleep	<Sleep>
Wake Up	<WakeUp>
Scan Next Track	<ScanNextTrack>
Scan Previous Track	<ScanPreTrack>
Stop	<Stop>
Play/Pause	<Play/Pause>
Mute	<Mute>
Bass Boost	<BassBoost>
Loudness	<Loudness>
Volume Up	<VolumeUp>
Volume Down	<VolumeDown>
Bass Up	<BassUp>
Bass Down	<BassDown>
Treble Up	<TrebleUp>
Treble Down	<TrebleDown>

Media Select	<MediaSelect>
Mail	<Mail>
Calculator	<Calculator>
My Computer	<MyComputor>
Web Search	<WWWSearch>
Home Page	<WWWHome>
Web Page Back	<WWWBack>
Web Page Forward	<WWWForward>
Web Page Stop	<WWWStop>
Refresh Web Page	<WWWRefresh>
Favorites Web Page	<WWWFavorites>
Keyboard F13	<F13>
Keyboard F14	<F14>
Keyboard F15	<F15>
Keyboard F16	<F16>
Keyboard F17	<F17>
Keyboard F18	<F18>
Keyboard F19	<F19>
Keyboard F20	<F20>
Keyboard F21	<F21>
Keyboard F22	<F22>
Keyboard F23	<F23>
Keyboard F24	<F24>
Delay 100 mini-second	<Delay100ms>
Delay 1 second	<Delay1s>
Reset Shift/Ctrl/Alt key states	<->

Appendix C: Loading Firmware

In normal, keyboard is in Operation Mode. But if needs to load new firmware, then the keyboard must be in Firmware Loading mode before the loading.

During the process of loading new firmware, it needs to restart* (by plugging out and plugging in, or power off and power on) keyboard twice. Details as below:

1. Issuing Jump to Firmware Loading Mode command.
2. Keyboard is in Firmware Loading Mode.
   In this stage, the PID value of keyboard will change to 6.
3. Restart Keyboard*.
4. Loading firmware (loaded data is from a DAT file) to keyboard.
5. Loading process is completed.
6. Restart Keyboard*.
7. Now the keyboard is updated and can work.
   In this stage, the PID value of keyboard will return back to original one.

Note:

* For the version of Boot Loader V1.2 or later, it doesn't need to restart keyboard to go for next step, because Boot Loader will start the keyboard by itself. Please be ware that it needs to stay (wait) about 5 seconds for keyboard restarting to get connected with host PC.

Loading Firmware File to Keyboard

After the keyboard is staying in Firmware Loading mode, then it can start to load firmware to the keyboard. The firmware data is stored in a DAT file (in *.dat), but Not All data in DAT file needed to be loaded to keyboard. The loaded firmware data is starting from the address (position) 0x1200 of the DAT file and then to the end. Below are the steps for loading firmware data to keyboard.

1. Issuing Start Loading Firmware Data command
2. Issuing Load Firmware Data command: Reading firmware data from the DAT file and sending to keyboard
3. Sending firmware data completed.
4. Issuing End Loading Firmware Data command

Issuing Start Loading Firmware Data command

The Start Loading Firmware Data command code is 16 (0x10 in hex)

.	Rpt ID	Cmd	Length	Addr#1	Addr#2	Remains
No.	1st	2nd	3rd	4th	5th	6th-131th
Value	0x00	0x10	0x02	0x12	0x00	0x00

Visual Basic 6 Sample Code:

```
Dim b() As Byte
ReDim b(131)
```

```
b(0) = 0
b(1) = 16   'command: start program
b(2) = 2   'data length
b(3) = &H12
b(4) = &H00

HidD_SetFeature(HidDevice, b(0), Capabilities.FeatureReportByteLength)
```

Issuing Load Firmware Data command

The firmware data is store in DAT file (with dat extension file name). Not all the data in DAT file needed to be loaded. The loaded data is from the position 0x1200 to the end of the DAT file.

Below is the Visual Basic 6 Sample Code for reading all the loaded firmware data from DAT file:

```
sStartAddress = "1200"  'in hex format
lStartAddress = Val("&H" & sStartAddress)
lMaxAddress = 0
lEndAddress = 0

Open i_sFile For Binary As #1
lFileLen = FileLen(i_sFile)
ReDim bTmp(lFileLen)
Get #1, 1, bTmp
lEndAddress = lFileLen

For lIdx = lStartAddress To lEndAddress
   m_bData(lIdx) = (255 - bTmp(lIdx)) Xor 68
Next lIdx

Close #1
```

Please take a note, each binary data need to be converted before loaded to keyboard. The converted rule is:

```
  m_bData(lIdx) = (255 - bTmp(lIdx)) Xor 68
```

bTmp(lIdx) is original binary in DAT file, the m_bData(lIdx) is the converted binary data.

After all the firmware is read and stored in the buffer, then it can start send to the keyboard.

The size for each sending package is 128, and the command code is 0x20 (decimal is 32).

.	Rpt ID	Cmd	Length	Remains
No.	1st	2nd	3rd	4th-131th
Value	0x00	0x20	0x80	firmware data

Below is the subroutine for sending firmware data in a 128 bytes package.

The i_bCmd value is 0x20, and the i_bLen value is 128. The i_bData contains 128 bytes firmware data.

```
Private Function program_firmware_data(ByVal i_bCmd As Byte, _
                                       ByVal i_bLen As Byte, _
                                       ByRef i_bData() As Byte) As Long
   Dim b(131) As Byte
   Dim iIdx As Integer

   b(0) = 0
   b(1) = i_bCmd    'command
   b(2) = i_bLen    'data length
```

```
    For iIdx = 0 To UBound(i_bData)
        b(iIdx + 3) = i_bData(iIdx)
    Next iIdx

   'See if the correct device has been detected
    If HidDevice <> INVALID_HANDLE_VALUE Then
        If HidD_SetFeature(HidDevice, b(0),
Capabilities.FeatureReportByteLength) = 1 Then
            If HidD_GetFeature(HidDevice, b(0),
Capabilities.FeatureReportByteLength) = 1 Then
                    program_firmware_data = 0
            Else
                program_firmware_data = -1
                CloseDevice ' maybe the device was unplugged
            End If
        Else
            program_firmware_data = -1
            CloseDevice ' maybe the device was unplugged
        End If
    Else
        program_firmware_data = -1
    End If
End Function
```

Issuing End Loading Firmware Data command

The End Loading Firmware Data command code is 48 (0x30 in hex). Issuing this command will tell keyboard to end the firmware loading process.

.	Rpt ID	Cmd	Length	Remains
No.	1st	2nd	3rd	4th-131th
Value	0x00	0x30	0x01	the last package firmware data

Software Manuals

This part of the documentation describes the PC software related to KB2xx/KB800/ACT810H keyboards.

Advanced Keyboard Utility

Introduction

Thank you for purchasing KB2xx/KB800/ACT810H keyboards. Advanced Keyboard Utility (AKU) program has been designed to work in conjunction with the keyboards equipped with keys, MSR reader, Key Lock and display (depending on the model). The AKU provides an easy way to utilize the functions.

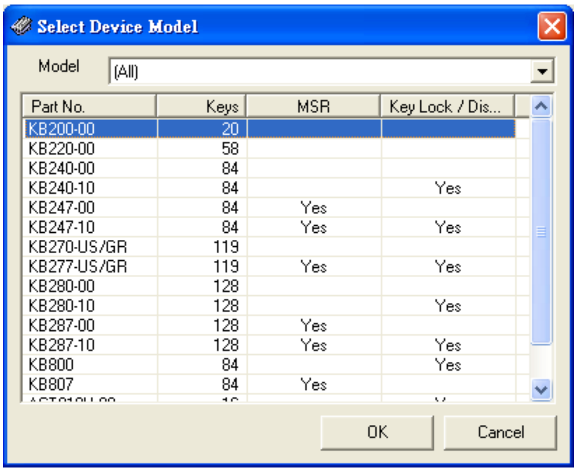
Installing and Launching the Program

If your system has ever installed the old version program, please remove it before installing.

- Insert the AKU Setup CD into the CD-ROM drive of your PC. The setup program begins automatically. There is no need to choose your CD-ROM drive from your on-screen settings, or to use the <RUN> prompt.
- A html page will pop up. Click [Install Advanced Keyboard Utility program]. The setup wizard will now guide you during the setup procedure. You will be prompted to accept a default path for the AKU program, which is "C:\Program Files\GIGA-TMS\Advanced Keyboard Utility”.
- When the setup procedure is completed, remove the software CD-ROM disk from your CD-ROM drive and accept the prompt to restart your PC.
- From the [Start] menu, select the [Programs]/[GIGA-TMS] (default folder), click [Advanced Keyboard Utility].

First Launching

For the first launching, AKU will ask you to select the keyboard model which is connected to PC. Select the connected one and click OK button to open the main window.

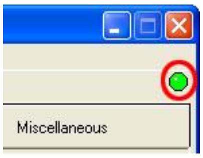


Select Device Model

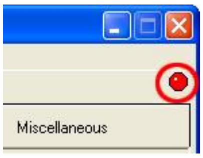
Model: (All)

Part No.	Keys	MSR	Key Lock / Dis...
KB200-00	20		
KB220-00	58		
KB240-00	84		
KB240-10	84		Yes
KB247-00	84	Yes	
KB247-10	84	Yes	Yes
KB270-US/GR	119		
KB277-US/GR	119	Yes	Yes
KB280-00	128		
KB280-10	128		Yes
KB287-00	128	Yes	
KB287-10	128	Yes	Yes
KB800	84		Yes
KB807	84	Yes	

Before loading the main window, AKU will try to establish the connection between keyboard and PC. No matter the result of connection is successful or failed, the main window will pop up and show the connection result. The connection process will take about 3 seconds.
If the connection is OK, a light icon on the top-right corner of main window will turn to green. If failed, the light icon will turn to red.
The successful connection.



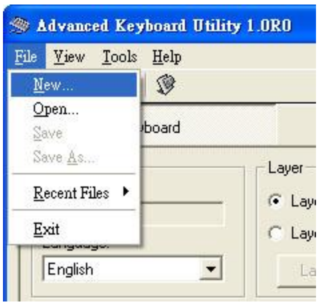
The failed connection.



For the reason of failed connection, it could be caused by the cable disconnected or wrong keyboard model selected.

Creating and Opening the Setting File

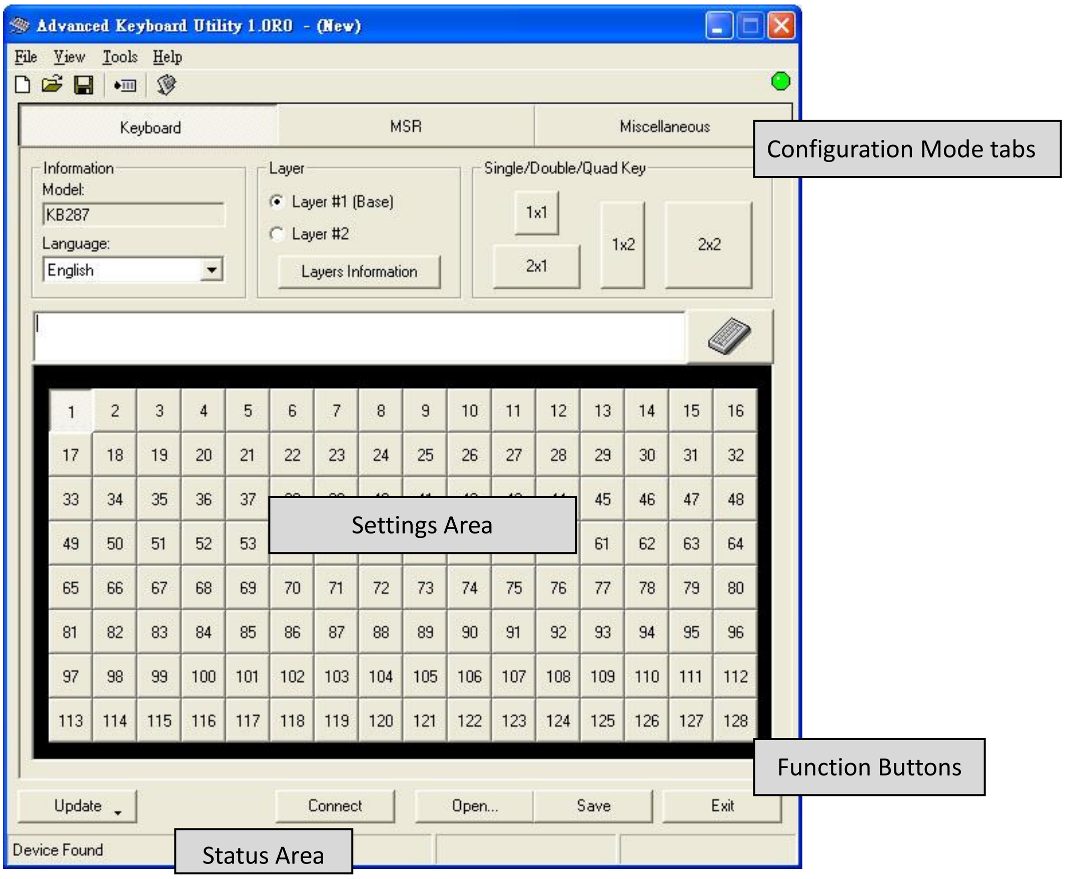
The setting file is a file that stores all the settings related to the keyboard, such as keys definition (macro key), keyboard layout, language used, MSR output format... etc. Each keyboard has its own default setting file (located in the [Default] folder of AKU installed path). AKU allows you to modify the setting file, specify the file name and save the file to your wanted path. The saved file can be restored for future uses.
Before doing any update or change to the connected keyboard, the setting file needs to be loaded first. The file tells AKU what the content of settings updated to the keyboard are.
To create a new setting file, from [File] menu, click [New]. Then a [Select Device Model] window will pop up. Select the connected keyboard model and then click OK button to open the default setting file.



To open a pre-saved setting file, from [File], click [Open].

Configuring the Keyboard

After opening the setting file, all the settings in the file will be displayed in the Settings Area of the main window.
The screenshot of the AKU's main window is shown as below.



Model: KB287

Language: English

● Layer #1 (Base)

○ Layer #2

Device Found

The main window has the following areas and controls:

- **Configuration Mode tabs** provides a selection of three different configuration modes (Keyboard, MSR, and Miscellaneous). Configuration modes define how the AKU setts up the keyboard settings.
- **Settings Area.** The settings shown in the settings area depends on the selected configuration mode tab.
- **Function Buttons.** Actions of the following function buttons apply to current selected keyboard.
  - **Update button** allow you to update the modified settings.
  - **Connect button** will try to re-establish the connection between device and PC.
  - **Open button** opens a dialog that inquires you to select the keyboard setting file.
  - **Save button** opens a dialog that inquires you to save all settings in to a specified file.
  - **Exit button.** Allows you to end the ACU program.
- **Status Area** displays the update action result.

Configuration Mode tabs

The AKU categorizes the settings into three tabs. These tabs are:

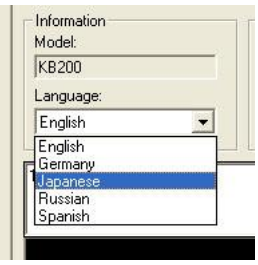
- Keyboard tab. In this tab, the keys will display in the settings area. It allows you to define a selected macro key, the language used and the keyboard layout.
- MSR tab. In this tab, it allows you to specify the output format of magnetic stripe data. This tab may be disabled if the keyboard doesn’t feature MSR reader.
- Miscellaneous tab. This tab contains two kinds of settings – Key Lock and Display, depending on the keyboard model. This tab may be disabled if the keyboard doesn’t feature the Key Lock or Display.

Keyboard tab

In this tab, AKU displays the settings of language used, keyboard layout and macro key definition.

Language Setting

The language defines the code positions of the keyboard. Each language should use its own settings. Wrong language selected will cause the wrong character displayed.



Model: KB200

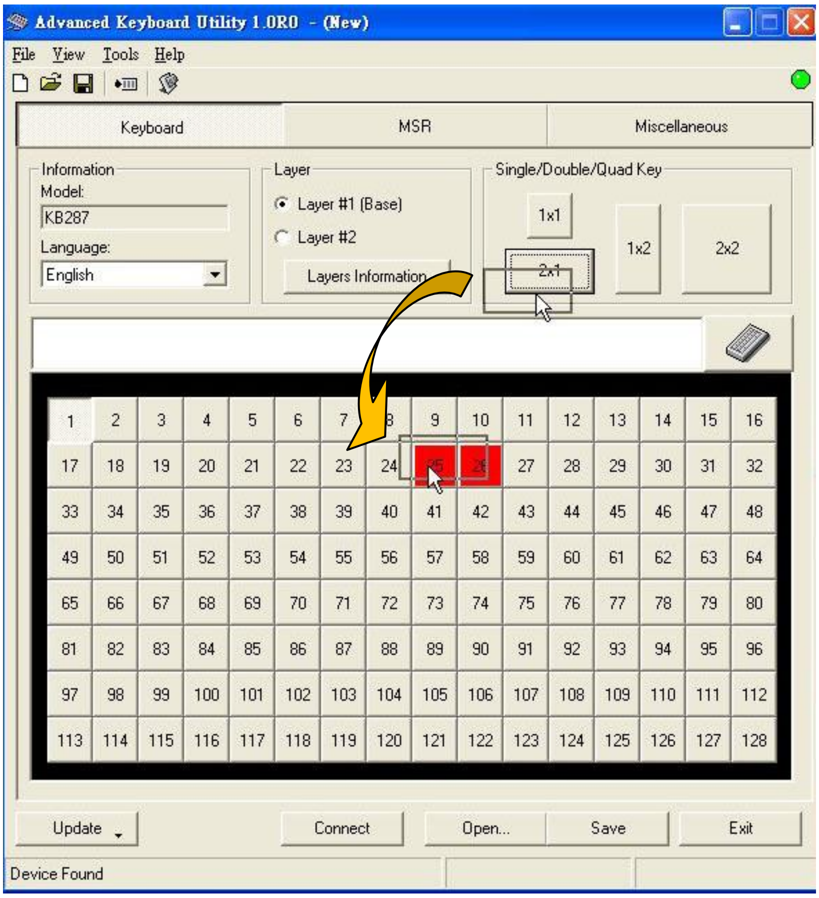
Language: English

Keyboard Layout

The keyboard layout function provides a flexible way to compose the nearby keys into one key. AKU supports two kinds of composed keys – double key (1x2 or 2x1) and quad key (2x2).

If you want some keys presented on the keyboard to be double/quad keys in order to provide special entries (00, 000, Enter... etc.), please follow the procedure as below:

- Move the mouse cursor on the double/quad key button (the double key marked with “1x2 " or "2x1”, the quad key marked with “2x2”).
- Click the *Double/Quad key* button and drag it onto any key you want to change the key layout.
- Release the push button on the mouse and you will find that the key has been changed into "1x2” or "2x1" double key or the “2x2” quad key.



Model: KB287

Language: English

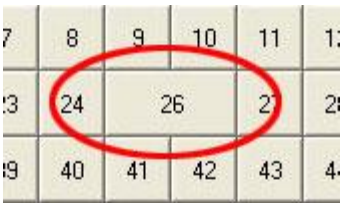
● Layer #1 (Base)

○ Layer #2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128

Device Found

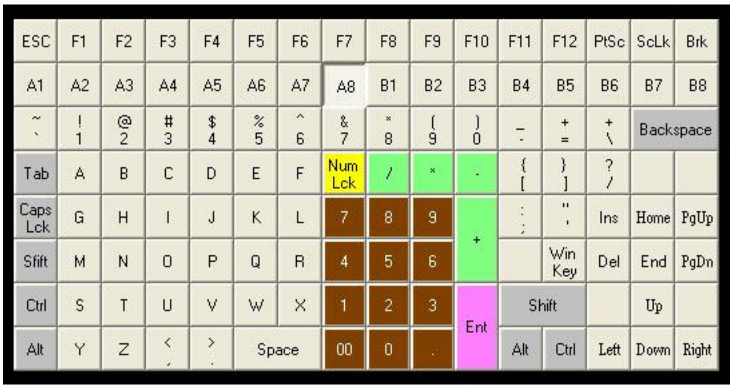
Appeared as a double key.



To return the double/quad key to the single key, please move mouse cursor on the single key button (1x1), click and drag it on to the key that you want to change back to single.

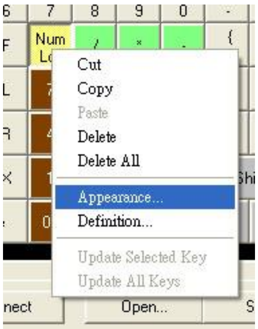
Key Button Appearance

The appearance provides several properties for each key button that makes users easy to understand what the key is used for. By using the appearance, it allows you to fill out your wanted color or caption on the specified key button. The screen shot as below gives an example of the appearance properties that are set.

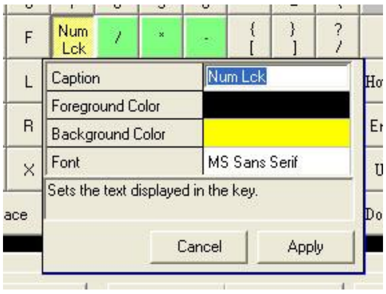

ESC F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 PtSc ScLk Brk
A1 A2 A3 A4 A5 A6 A7 A8 B1 B2 B3 B4 B5 B6 B7 B8
~ ` ! 1 @ 2 # 3 $ 4 % 5 ^ 6 & 7 * 8 (9) 0 _ - + = + \ Backspace
Tab A B C D E F Num Lck / * - { [}] ? /
Caps Lck G H I J K L 7 8 9 + : ; " ' Ins Home PgUp
Sfift M N O P Q R 4 5 6 Win Key Del End PgDn
Ctrl S T U V W X 1 2 3 Ent Shift Up
Alt Y Z < , > . Space 00 0 . Alt Ctrl Left Down Right

To setup the appearance, please follow steps as below:

- Double click the key button, or right click the key button, select Appearance.



- In the Properties window, double click the property item, and then enter or select your wanted setting.



Caption	Num Lck
Foreground Color	■
Background Color	🟨
Font	MS Sans Serif

Sets the text displayed in the key.

- Click Apply to apply and save the settings.

Macro Key Definition

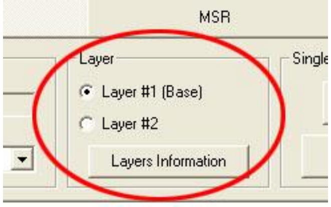
In default, each key doesn't have any key code definition. This means all keys are blank. So before using the keyboard, the keys need to be defined first.

The macro key means each key can contain more than one key code. Each key can contain up to 127 bytes. For alpha-numeric and symbol key, each one occupies one byte. For function keys (F1, F2, Shift, Alt, ESC, Tab, Insert etc) and arrow keys (Up, Down, Left, Right), it depends on the length of presented key string it uses. For example, the function key F1, the presented key string is “<F1>” that occupies 4 bytes. For print screen key, the presented key string is “<PrintScreenSysRq>” that occupies 18 bytes.

Besides, there are two layers for each key. Layer #1 is the base layer. If two layers are both used, it is necessary to define a Layer Lock key to switch the layer.

To define a macro key, please follow below steps:

- Select the layer number that you want to define.

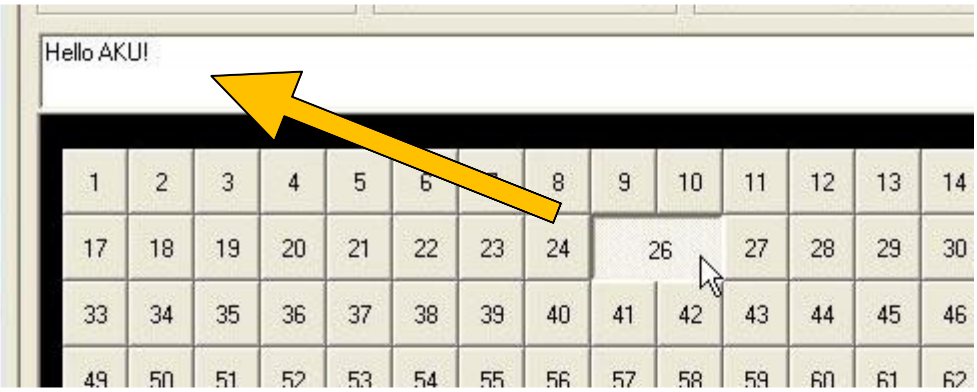


Layer

◉ Layer #1 (Base)

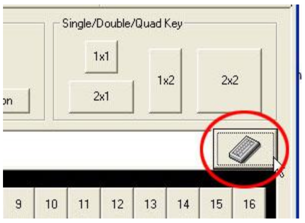
○ Layer #2

- In the keyboard layout of settings area, click a key you want to define.
- After clicking the key, the focus will be automatically located in the data entry box.
- Enter the data for the specified key.

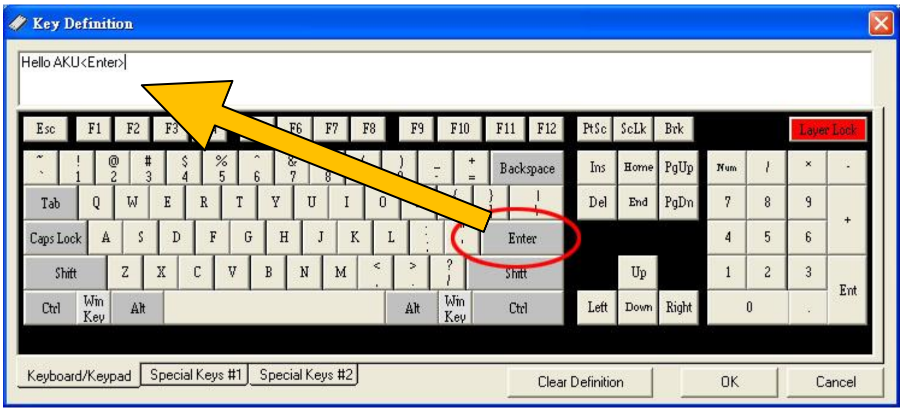


Hello AKU!

- For the control keys, function keys and number keypad keys, such as Page Up, Alt or Num Lock, using “Software keyboard” (the Key Definition window) to do the entry is recommended. Please click the button appearing with keyboard icon to launch the Key Definition window.



- To enter the control or function key, click the key button of the Key Definition window.

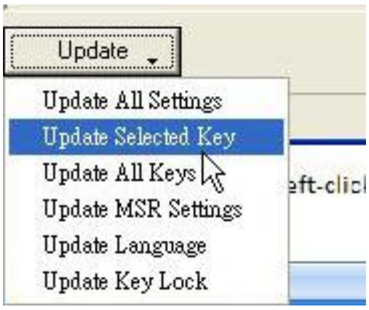


Hello AKU<Enter>|

Key Definition
Esc F1 F2 F3 F6 F7 F8 F9 F10 F11 F12 PtSc ScLk Brk Layer Lock
Backspace Ins Home PgUp Num / × -
Tab Q W E R T Y U I O Del End PgDn 7 8 9 +
Caps Lock A S D F G H J K L Enter 4 5 6
Shift Z X C V B N M Shift Up 1 2 3 Ent
Ctrl Win Key Alt Alt Win Key Ctrl Left Down Right 0 .
Keyboard/Keypad
Special Keys #1
Special Keys #2
Clear Definition
OK
Cancel

When finishing, click OK button to return to main window.

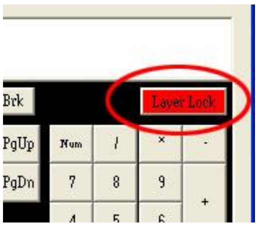
- To update the selected key, click *Update* button, and then click *Update Selected Key*.



Layer Lock

The Layer Lock is a layer switch key. This key is used to switch the layer for all the keys with layers. The Layer Lock can be assigned to any key or key lock you select. To define a key to be the Layer Lock key, please follow steps:

- In the keyboard layout of main window, select a key.
- Click the button with keyboard icon (in the right side of key data input box) to load the Key Definition window.
- Click *Layer Lock* button (in red color).

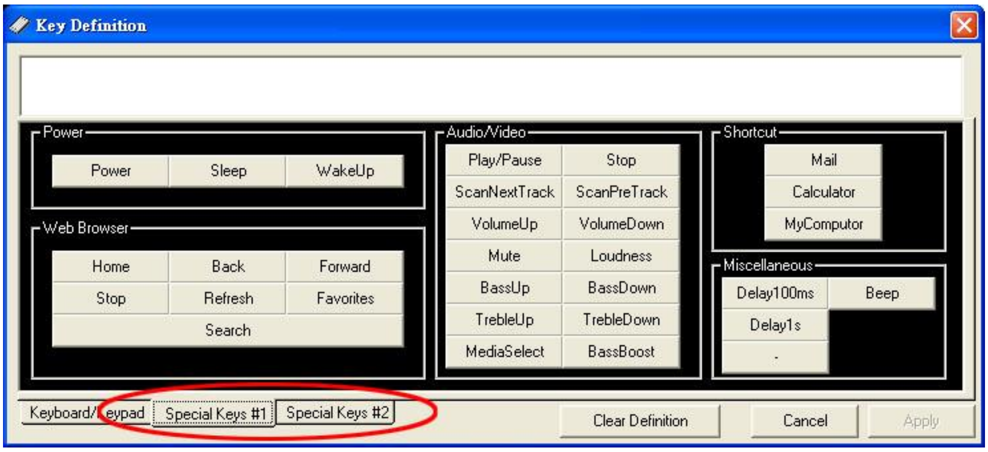


- Click OK button to complete the definition.
- To update the selected key, click *Update* button and then click *Update Selected Key*.
- Once the Layer Lock is programmable to the specified key. To perform to switch the layer, the key must be kept pressing about 2 seconds, then the layer will be switched. For KB2xx keyboards, the light of layer status LED will be changed (keep lighting is layer #1, blinking is layer #2). For KB800, please refer to Layer Status LED for light behavior of layer switched.

Special Keys

Besides the Keyboard/Keypad usage page of HID that AKU supports, the some usage IDs of Generic Desktop usage page are supported too, such as the controls for Power, Web Bower or Audio/Video media application. The special keys are allowed to be assigned with the Generic Desktop usage IDs to the specified key button. To do this, please follow below steps:

- In the keyboard layout of main window, select a key.
- To load Key Definition window, clicking the button with keyboard icon (in the right side of key data input box).
- Regarding the needs, select Special Keys #1 or Special Keys #2 tab.



- Click the wanted key definition button.
- Click OK to save the setting.

Below lists the special keys supported:

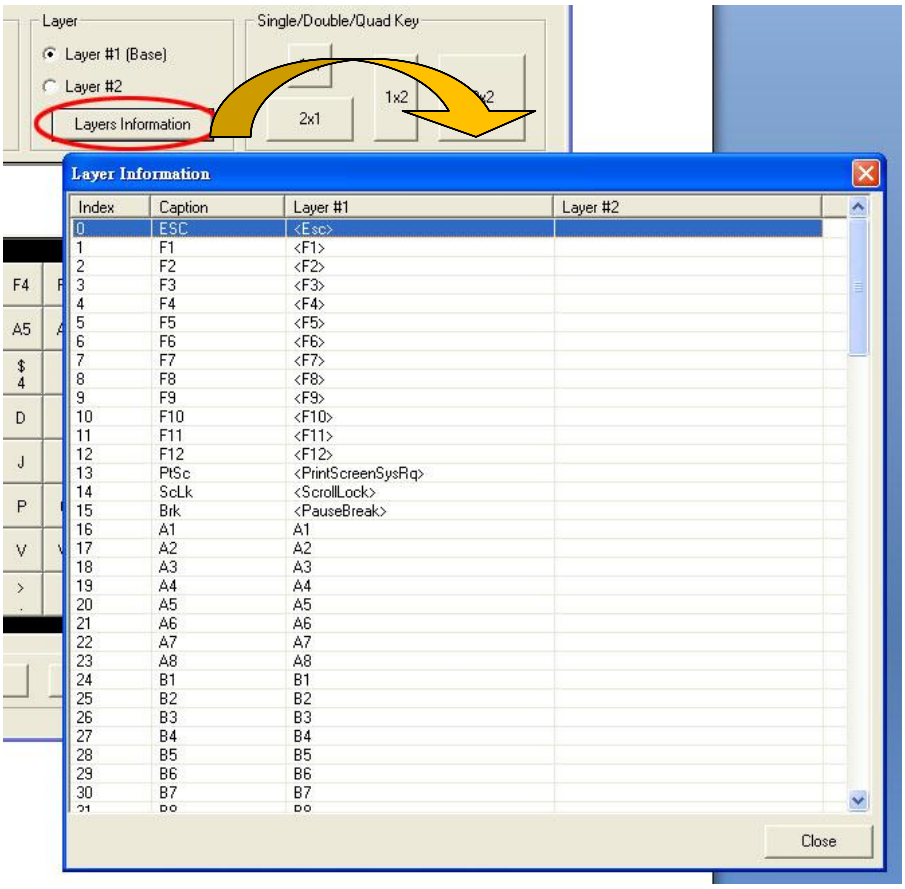
- **Power** special keys:
  - **Power** key: Power down the system.
  - **Sleep** key: Turn to low power mode.
  - **WakeUp** key: Turn to full power state.
- **Web Brower** special keys:
  - **Home** key: Load web home page.
  - **Back** key: Load previous web page.
  - **Forward** key: Load next web page.
  - **Stop** key: Stop loading web page.
  - **Refresh** key: Reload current view web page.
  - **Favorites** key: List favorite web pages.
  - **Search** key: Load search window.
- **Audio/Video** special keys:
  - **Play/Pause** key: If media is playing, stop playing. If is paused, resume playing.
  - **Stop** key: Halts scanning, playing or recording media.
  - **ScanNextTrack** key: Move to next track.
  - **ScanPreTrack** key: Move to previous track.
  - **VolumeUp** key: Increase the volume value of media.
  - **VolumeDown** key: Decrease the volume value of media.
  - **Mute** key: Audio mute control.
  - **Loudness** key: Apply boost to audio base and treble.
  - **BassUp** key: Increase the audio base value.
  - **BassDown** key: Decrease the audio base value.
  - **TrebleUp** key: Increase the audio treble value.
  - **TrebleDown** key: Decrease the audio treble value.
  - **MediaSelect** key: Load media player.
  - **BassBoost** key: Enable audio bass boost.
- **Shortcut** specialkeys:
  - **Mail** key: Load email program.
  - **Calculator** key: Load calculator program.

- **MyComputer** key: Open MyComputer folder.

- **Miscellaneous** special keys:
  - **Delay100ms** key: Delay 100 mini-second between each key.
  - **Delay1s** key: Delay 1 second between each key.
  - **-** key: Release control key (such as shift, ctrl and alt keys) before sending out next key.
  - **Beep** key**:** Sound a beep when hit key. Only available for Mode - KB240/270/280.
- **Function** special keys:
  - **F13** ~ **F24** keys: Keyboard F13 to F24 function keys.

List View of Key Definition

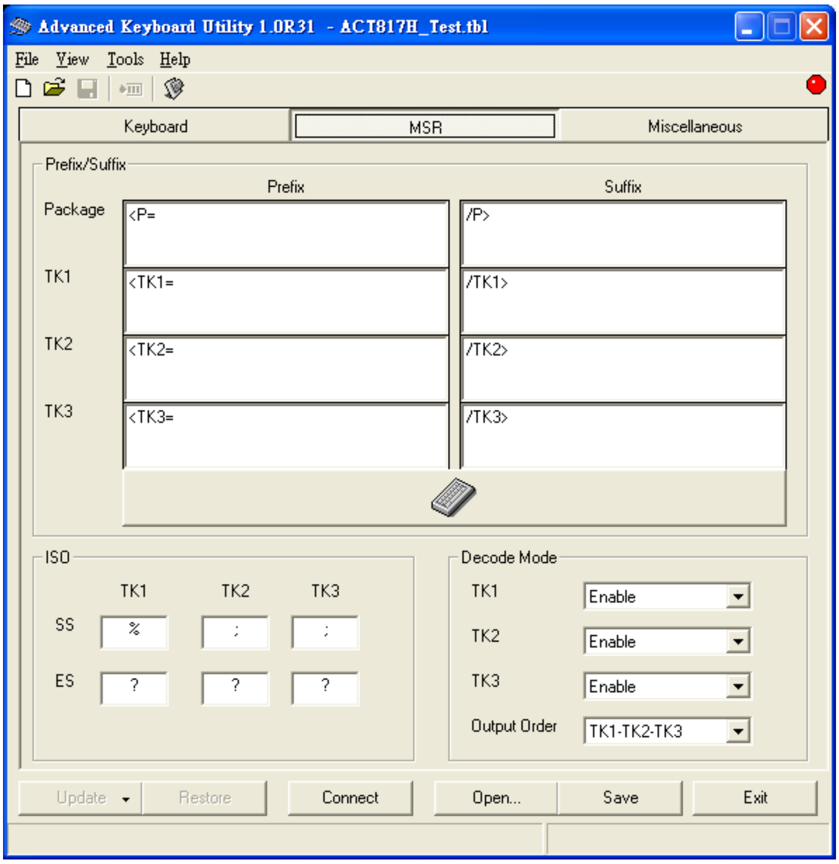
To view all the macro key definition, please click Layer Information. The popped up window will give you a brief view of the definition for all micro keys.



Index	Caption	Layer #1	Layer #2
0	ESC	<Esc>	
1	F1	<F1>	
2	F2	<F2>	
3	F3	<F3>	
4	F4	<F4>	
5	F5	<F5>	
6	F6	<F6>	
7	F7	<F7>	
8	F8	<F8>	
9	F9	<F9>	
10	F10	<F10>	
11	F11	<F11>	
12	F12	<F12>	
13	PtSc	<PrintScreenSysRq>	
14	ScLk	<ScrollLock>	
15	Brk	<PauseBreak>	
16	A1	A1	
17	A2	A2	
18	A3	A3	
19	A4	A4	
20	A5	A5	
21	A6	A6	
22	A7	A7	
23	A8	A8	
24	B1	B1	
25	B2	B2	
26	B3	B3	
27	B4	B4	
28	B5	B5	
29	B6	B6	
30	B7	B7	

MSR tab

In this tab, AKU displays the settings of output format of MSR (**M**agnetic **S**tripe **R**eader), which are all restored from the selected file. If the selected keyboard model doesn't feature the MSR, this tab will be disabled.



Prefix/Suffix

	Prefix	Suffix
Package	<P=	/P>
TK1	<TK1=	/TK1>
TK2	<TK2=	/TK2>
TK3	<TK3=	/TK3>

ISO

	TK1	TK2	TK3
SS	%	;	;
ES	?	?	?

Decode Mode

TK1	Enable
TK2	Enable
TK3	Enable
Output Order	TK1-TK2-TK3

MSR tab divided the settings into 3 groups, which are:

- Prefix/Suffix: Define the data string which you would like to append in front or end of the MSR data string.
- ISO: Define start and end sentinel character.
- Decode Mode: Determine the way of outputting the three tracks data.

Shown below is the data structure of the output string for MSR.

PP	PR1	SS1	**TK1**	ES1	SU1	PR2	SS2	**TK2**	ES2	SU2	PR3	SS3	**TK3**	ES3	SU3	SU

- **PP:** Prefix for package.
- **PR1:** Prefix for track 1.
- **SS1:** Start sentinel for track 1.
- **TK1:** Data for track 1.
- **ES1:** End sentinel for track 1.
- **SU1:** Suffix for track 1.
- **PR2:** Prefix for track 2.
- **SS2:** Start sentinel for track 2.
- **TK2:** Data for track 2.
- **ES2:** End sentinel for track 2.
- **SU2:** Suffix for track 2.
- **PR3:** Prefix for track 3.
- **SS3:** Start sentinel for track 3.
- **TK3:** Data for track 3.
- **ES3:** End sentinel for track 3.
- **SU3:** Suffix for track 3.
- **SU:** Suffix for package.

Prefix/Suffix

In default, the prefix and suffix settings are all keep blank. There are 4 kinds of prefix and suffix to be defined, which are:

- **Package:** For the prefix string, it is appended in the front of the whole MSR data. For the suffix, it is appended in the end of the whole MSR data. In most case, the suffix for package is always to be the “Enter” or “Tab” character. The max data length of the prefix and suffix for the package can be up to 127.
- **TK1:** For the prefix string, it is appended in the front of the start sentinel of track 2. For the suffix, it is appended in the end of the end sentinel of track 2. The max data length of the prefix and suffix for the TK1 can be up to 127.
- **TK2:** For the prefix string, it is appended in the front of the start sentinel of track 2. For the suffix, it is appended in the end of the end sentinel of track 2. The max data length of the prefix and suffix for the TK1 can be up to 127.
- **TK3:** For the prefix string, it is appended in the front of the start sentinel of track 3. For the suffix, it is appended in the end of the end sentinel of track 3. The max data length of the prefix and suffix for the TK1 can be up to 127.

ISO

This group defines the start and end sentinel for each track. The sentinel is always used to extract the track data from the whole MSR data string. The data length for each sentinel is fixed to one character. Because there is ISO standard that defining the start and end sentinel for the three tracks. For the compatible reason, please do not modify the default value if possible.

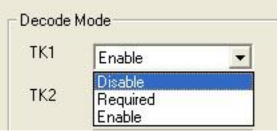
Decode Mode

For this group, it contains two kinds of settings, which are:

- Track Data Filtering: Determine which track to be, not to be output or needed to be output.
- Switch Output Order: Change the output order of track 1 ~ 3.

Track Data Filtering

Shown below is the filter setting for track 1. This provides a fool-proofing method in case of receiving unwanted or uncompleted track data.



Decode Mode

TK1: Enable

These three filter settings are:

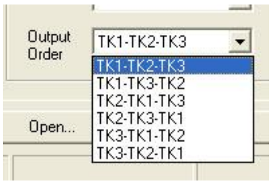
- **Enable:** If selected, the data of specified track will be packaged in the MSR data string. If the specified track data is not decoded, it will leave blank in the MSR data string.
- **Required:** If selected, which means the output MSR data string must contain the specified track data. If the specified track data is not decoded, even MSR data string contains other track data, it will still not to

be output.

- **Disable:** If selected, the data of specified track will not be packaged in the MSR data string. No matter it is decoded or not.

Switch Output Order

Show below is the selection of the three track data output order (sequence). The default order is Track 1–Track 2–Track 3.



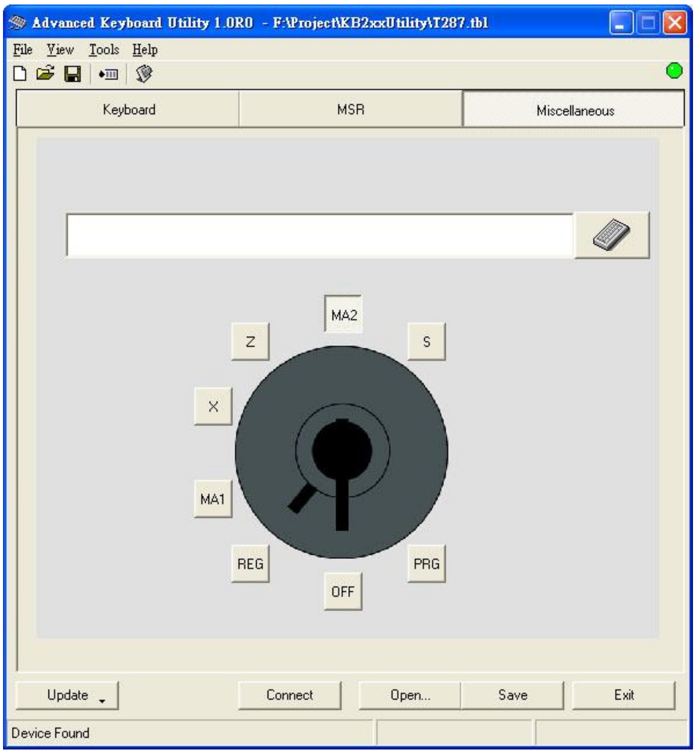
There 6 orders allow to be selected. Please select one to fit your application needs.

Miscellaneous tab

There are two kinds of settings for this tab – Key Lock and Display. As so far, for KB2xx keyboard, it shows the Key Lock settings if featured. For KB800 keyboard, it shows the Display settings.
This tab will be disabled if the selected keyboard model doesn't feature the Key Lock and Display.

Key Lock

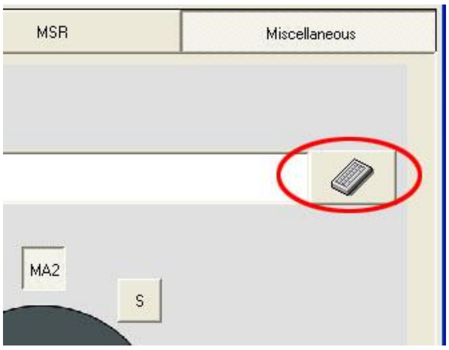
The Key Lock, with 8 positions, is most used to switch for layer selection, or for supervisory use.



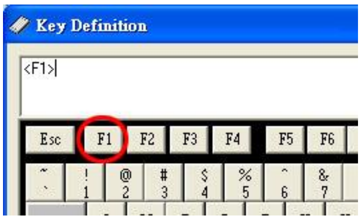
Device Found

The definition process is same to macro key. Below steps is to define the MA2 position to send out the function "F1" if the key is switched to.

- Use mouse click the MA2 button.
- Click the button with keyboard icon to load the Key Definition window.



- Click F1 button to entry the key string.

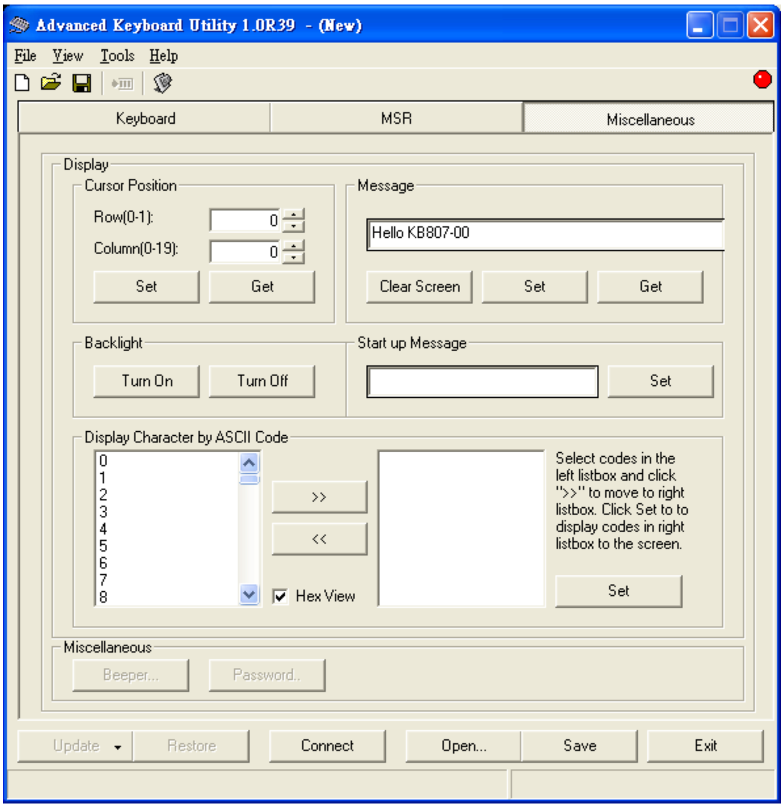


<F1>

- Click OK button to return to main window.

Display

As so far, only KB800 features the display. Below instructions are used to make the display perform a certain action, such as showing specified message, turning on the backlight... etc. These instructions are all used under on-line, which means the changes will not save into the flash memory and take immediate effect.



Row(0-1): 0

Column(0-19): 0

Hello KB807-00

0 1 2 3 4 5 6 7 8

☑ Hex View

Select codes in the left listbox and click ">>" to move to right listbox. Click Set to to display codes in right listbox to the screen.

There are four kinds of instructions for the display, which are:

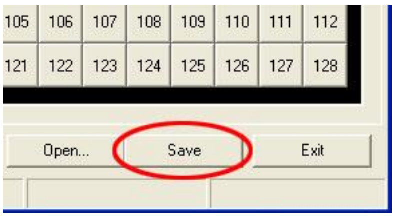
- **Cursor Position Instructions** are used to move or get the current cursor position. To specify the cursor position, adjust the value of row and column, and then click Set button to update. To retrieve the cursor position, click Get button, then the position value will be displayed in the Row and Column text box.
- **Message Instructions** are used to show, get and clear the message. To show wanted message, enter the

message in the text box (in the Message frame), then click Set button to show the message. The message will start to be located in the pre-specified cursor position. To retrieve the entire message in the display, click Get button, the message in display will be shown in the message text box. To clear the message in display, click Clear Screen button.

- **Backlight Instructions** are used to turn on or off backlight function of display. To turn on the backlight, click Turn On button. To turn off the backlight, click Turn Off button.
- **Start up Message instructions** is used to specify the message displayed after powering on the KB800.
- **Display Character by ASCII Code** is usually used to display un-typed character. Select the ASCII code in left list box, and click **>>** to move the selected codes to right list box. Then click **Set** to display on KB800's LCD screen.
- **Miscellaneous** is used for special functions. The standard model will always keep disabled.

Saving the Settings to a File

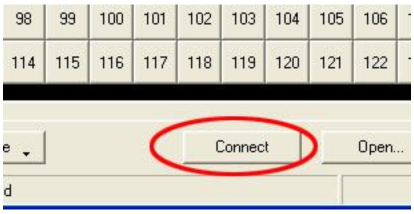
The AKU also lets you save current values of keyboard settings into a file (click Save button) and load setting values from file (click Open button). Settings files have the .tbl extension.



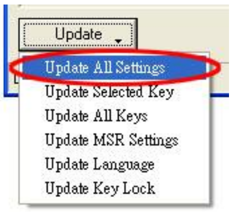
Whenever completing the settings, keep a good habit to save in a file right away.

Updating the Settings to Keyboard

Before updating the opening or editing settings to keyboard, make sure the connection is established between PC and keyboard. If the connection is disconnected, click Connect button to establish the connection.



To update the settings, click Update button (in the left-down corner of main window), in the drop down menu, click Update All Settings.



For flexible and time saving reason, AKU provides 6 ways to do the update, which are:

- **Update All Settings:** All the settings will be updated to keyboard. This will take most of the time, which could be up to 18 seconds.
- **Update Selected Key:** Only update the selected key definition. This may just take one second.

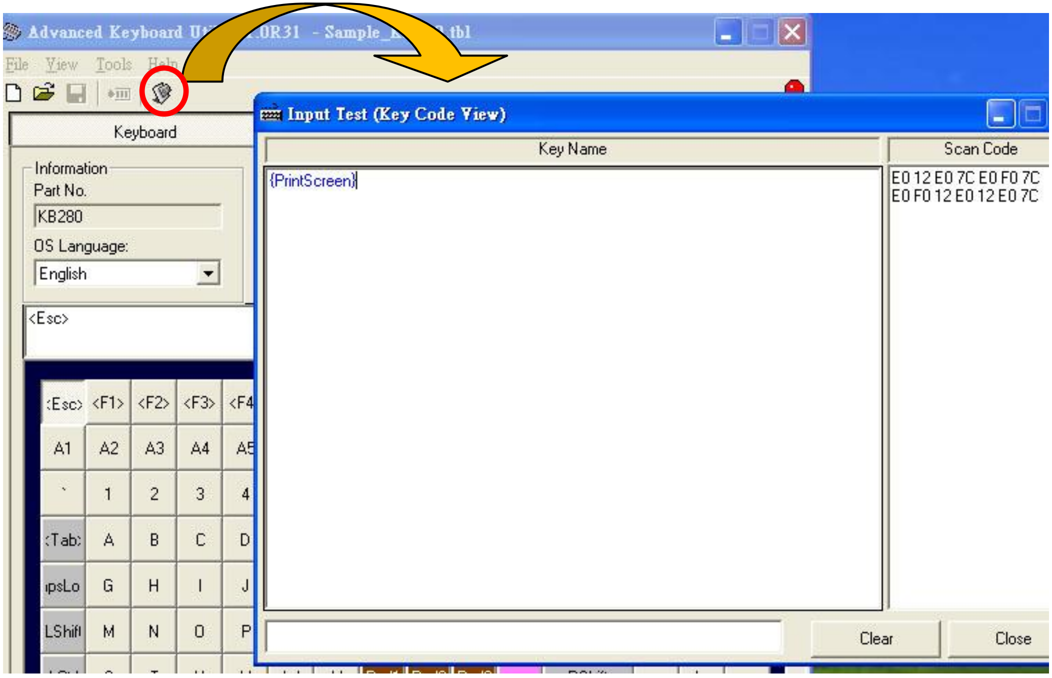
- **Update All Keys:** All keys will be updated. The time took is depending on how many keys the keyboard has.
- **Update MSR Settings:** Only update the MSR settings to keyboard. This may just take 2 seconds.
- **Update Language:** Only update the Language settings(related to the key code and keyboard position). This may just take 2 seconds.
- **Update Key Lock:** Only update the Key Lock settings. This may just take 2 seconds.

Note: About time took of updating is tested under Windows XP SP2.

Testing the Keyboard

AKU provides a text box window for you to have a quick test. This test is only suitable for alpha-numeric or symbol characters.

To do the test, click the Device Input Test icon in the toolbar. After popping up the test window, you can begin a test to hit the key button or swipe the magnetic card to view the result.



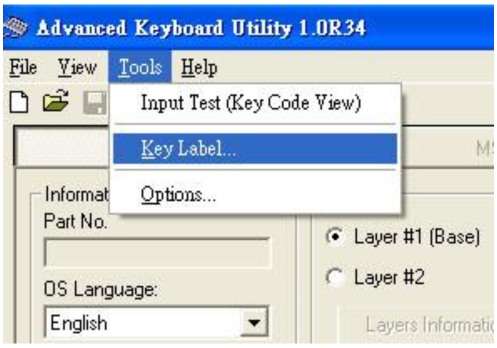
Information
Part No.: KB280
OS Language: English
<Esc>

Key Name: {PrintScreen}

Scan Code: E0 12 E0 7C E0 F0 7C E0 F0 12 E0 12 E0 7C

Tools

Key Labels

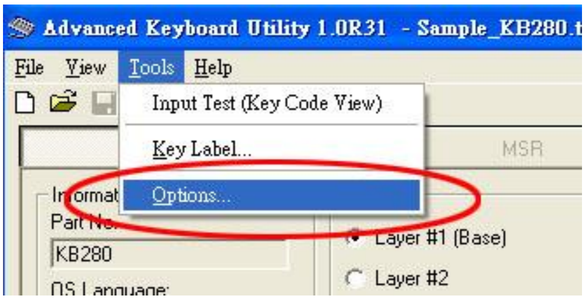


Part No.:
OS Language: English
● Layer #1 (Base)
○ Layer #2

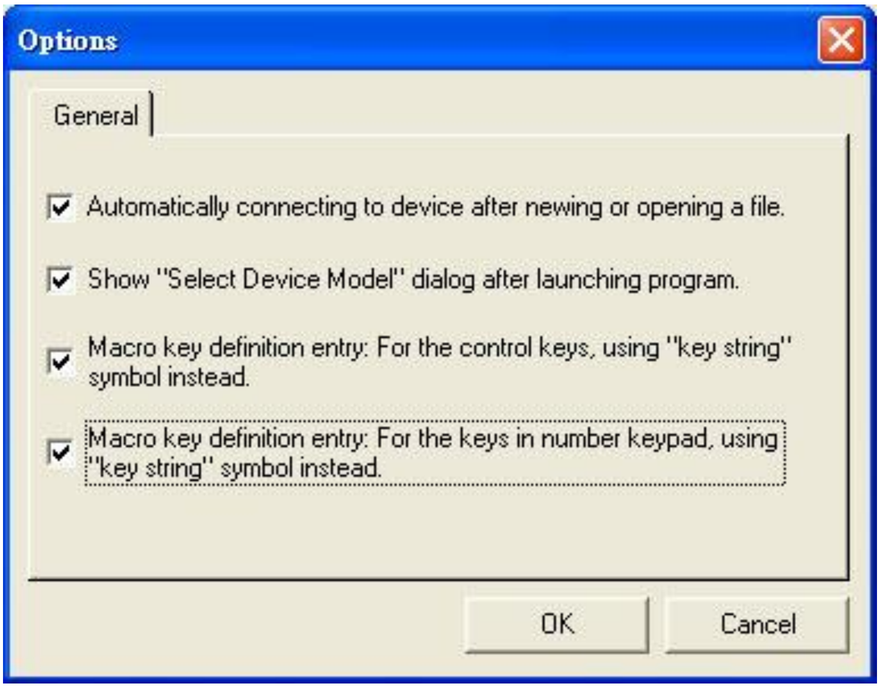
There are two samples - MS Office Word files that are allowed you to print out the key cap label sheet.

Options

The **Options** window provides different operation ways of using **AKU**, such as auto detecting keyboard on loading program or using keyword for control key instead of using software keyboard.
To load the **Tools** window, from Tools click **Options**.



Below is the settings, click your wanted settings and click OK to save the changes.



☑ Automatically connecting to device after newing or opening a file.

☑ Show "Select Device Model" dialog after launching program.

☑ Macro key definition entry: For the control keys, using "key string" symbol instead.

☑ Macro key definition entry: For the keys in number keypad, using "key string" symbol instead.

Advanced Keyboard Firmware Loader

Introduction

The **Advanced Keyboard Firmware Loader** (AKFL) is used to upgrade the internal firmware of KB2xx/KB8xx keyboard.

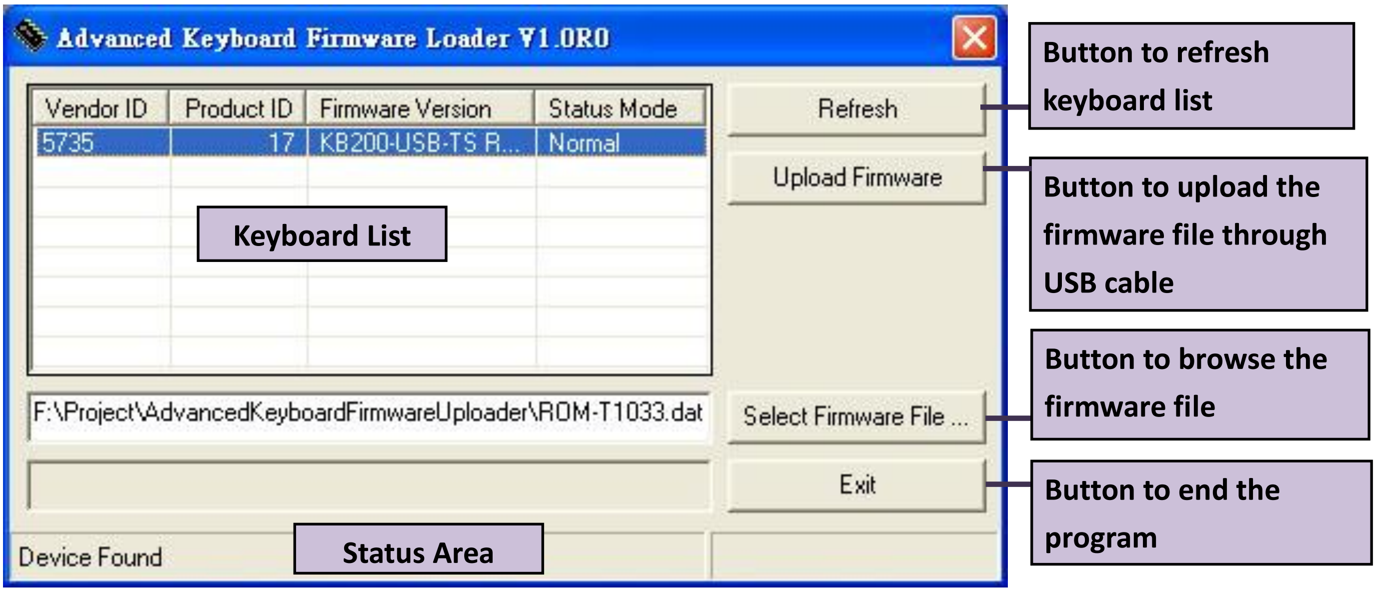
Installing and Launching the Program

If your system has ever installed the old version program, please remove it before installing.

- Insert the AKFL Setup CD into the CD-ROM drive of your PC. The setup program begins automatically. There is no need to choose your CD-ROM drive from your on-screen settings, or to use the <RUN> prompt.
- A html page will pop up. Click [Install Advanced Keyboard Firmware Loader program]. The setup wizard will now guide you during the setup procedure. You will be prompted to accept a default path for the AKU program, which is "C:\Program Files\GIGA-TMS\Advanced Keyboard Firmware Loader".
- When the setup procedure is completed, remove the software CD-ROM disk from your CD-ROM drive and accept the prompt to restart your PC.
- From the [Start] menu, select the [Programs]/[GIGA-TMS] (default folder), click [Advanced Keyboard Firmware Loader].

Running the Program

Shown below is the screenshot of the AKFL's main window. Click on the picture area to jump to the related topic or select the topic from the list under the screenshot.



Vendor ID	Product ID	Firmware Version	Status Mode
5735	17	KB200-USB-TS R...	Normal

F:\Project\AdvancedKeyboardFirmwareUploader\ROM-T1033.dat

Device Found

Button to refresh keyboard list

Button to upload the firmware file through USB cable

Button to browse the firmware file

Button to end the program

Refresh

Click the *Refresh button* to scan the connected KB2xx/KB8xx keyboard, if is detected, it will be shown in the Keyboard List. AKFL always finds the keyboard automatically after starting the program or loading the firmware file.

Keyboard List

The discovered keyboard will be displayed in the *keyboard list*. The *keyboard list* is always updated if *Refresh button* is clicked, or at each stage of uploading the firmware.

The keyboard list has the following fields:

- **Vendor ID**: The vendor ID value of discovered keyboard. It should be always the value 5735.
- **Product ID**: The product ID value of discovered keyboard. Each keyboard model owns its unique product ID value. The values can refer to the firmware manual.

  There is a special product ID, which value is 6, indicates the keyboard is under "firmware upload" mode. For all the keyboard models, the product ID under "firmware upload" mode is using the same value 6.
- **Firmware Version**: After discovering the keyboard, **AKFL** will issue a Get Firmware Version command and display the value in this field. If the keyboard is under "Firmware Upload" mode, the firmware version will show the Boot Loader version.
- **Status Mode**: There are two available modes: "Normal" means the keyboard is under normal working mode. "Firmware Upload" means the keyboard is always waiting for the firmware file data from PC, any hit on the keyboard will not take any effect.

Uploading the Firmware

Internal firmware of the KB2xx/KB800 keyboard can be upgraded by **AKFL** program. Before uploading, make sure the keyboard is already plugged in and discovered by **AKFL**.

To upload the firmware file into keyboard, please follow below steps:

- Click *Select Firmware File button* to browse to a file (**.dat*) you want to upload into keyboard and click OK.
- Click *Upload Firmware button* to start uploading firmware.
- **AKFL** will issue a go into "Firmware Upload" command. If succeeded, keyboard will restart.
- **AKFL** rescans the keyboard, if detected, and then the firmware will be directly uploaded by **AKFL** into the keyboard to complete whole process.

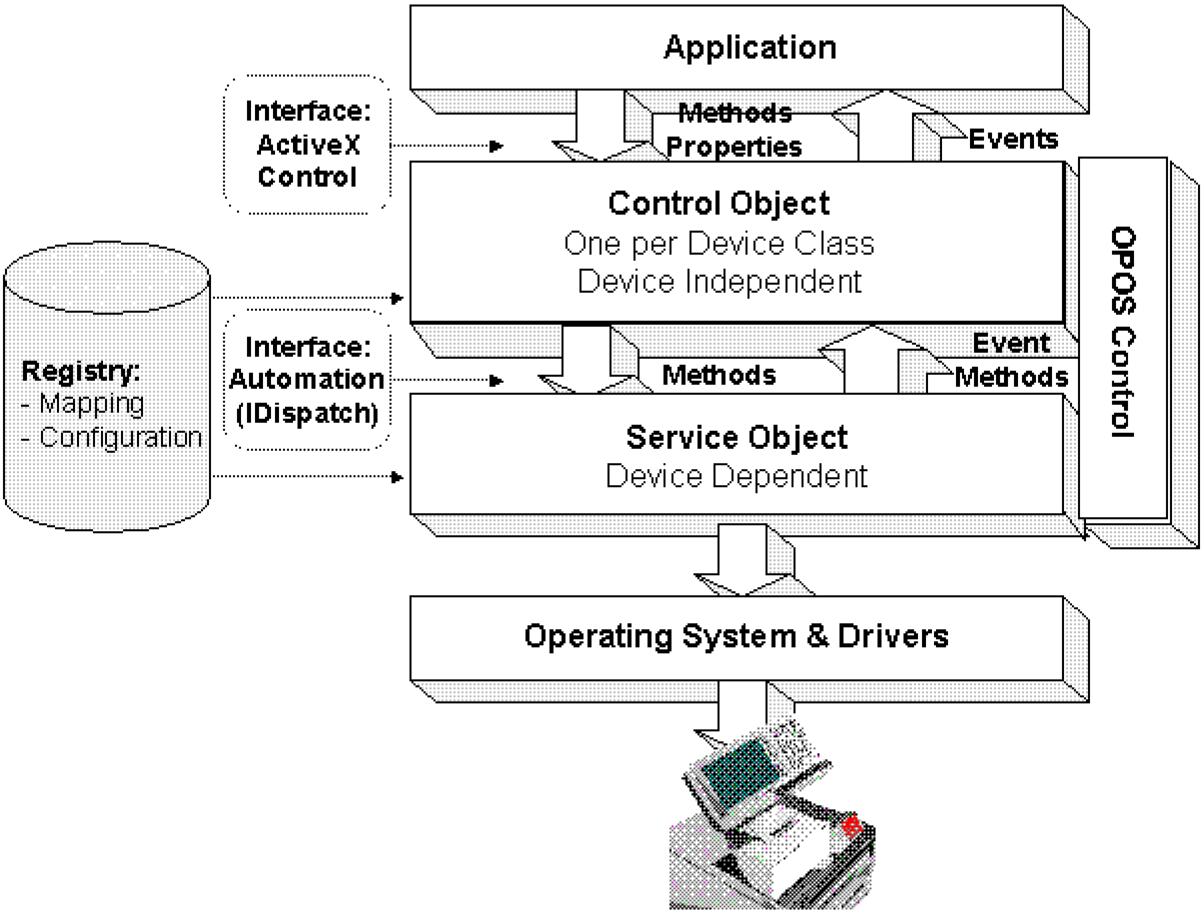
Status Area

The status area displays the result of discovering the keyboard or uploading the firmware.

Testing Nodes: After several firmware loadings, it may cause the keyboard KB2xx/8xx work abnormal (the possible reason is the HID buffer problem on PC side). If this happens,, please restart the system to solve the problem.

OPOS Driver

The OPOS (**O**LE for Retail **POS** Controls) driver is based on the architecture for Win32-based POS device access, and the OLE for Retail POS software is implemented using the layers shown in the following diagram:



Line Display Class - KB800 Display

Driver Installation

If your system has ever installed the old version program, please remove it before installing.

- Insert the AKU Setup CD into the CD-ROM drive of your PC. The setup program begins automatically. There is no need to choose your CD-ROM drive from your on-screen settings, or to use the <RUN> prompt.
- A html page will pop up. Click [Install OPOS driver for KB800 Display]. The setup wizard will now guide you through the setup procedure. You will be prompted to accept a default path for the OPOS driver, which is "C:\Program Files\OPOS\GIGA-TMS\LineDisplay”.

The **Common Control Object** (CCO) and **Service Object** (SO) files are all located in the installed path, and the file names are OPOSLineDisplay.ocx and SoLineDisplay.dll separately.

Supported Properties and Methods

Type	Name	OPOS Ver.
Properties	BinaryConversion	1.2
	CheckHealthText	1.0
	Claimed	1.0
	DeviceEnabled	1.0
	OpenResult	1.5
	ResultCode	1.0
	ResultCodeExtended	1.0
	ControlObjectDescription	1.0
	ControlObjectVersion	1.0
	ServiceObjectDescription	1.0
	ServiceObjectVersion	1.0
	DeviceDescription	1.0
	DeviceName	1.0
	CapCharacterSet	1.0
	CharacterSet	1.0
	CharacterSetList	1.0
	Columns	1.0
	CurrentWindow	1.0
	CursorColumn	1.0
	CursorRow	1.0
	CursorUpdate	1.0
	DeviceColumns	1.0
	DeviceRows	1.0
	Rows	1.0
Methods	Open	1.0
	Close	1.0
	Claim	1.0
	ClaimDevice	1.5
	Release	1.0
	ReleaseDevice	1.5
	CheckHealth	1.0
	ClearText	1.0
	DisplayText	1.0
	DisplayTextAt	1.0
	ReadCharacterAtCursor	1.6

Note:

1. There is not any event supported.

Registry Information

The default device name is “KB800”. Below is the registry information for the KB800 display.

```
[HKEY_LOCAL_MACHINE\SOFTWARE\OLEforRetail\ServiceOPOS\LineDisplay\KB800]
"Port"="COM1"
"Baudrate"="19200"
"Command"="1"
@="GIGATMS.OPOSPOSLineDisplay.Service"
"Parity"="NONE"
"Protocol"="Hardware"
"DeviceDescription"="GIGA-TMS KB800 POS LineDisplay"
"DefaultCharacterSet"="437"
"CharacterSetList"="437"
"DeviceRows"="2"
"DeviceColumns"="20"
"Debug"="1"
"FileName"=""
"Interface"="USB"
"ProductID"=dword:00000008
```

Sample OPOS Program

Sample OPOS Program implements the Common Control Object (CCO) that shows an easy way to utilize the OPOS powered device. Before running the **Sample OPOS Program**, make sure the OPOS driver has already installed. Below lists the **Sample OPOS Program**:

- Line Display Class: The program name is "OPOS LineDisplay Test".

So far only Line Display class is supported.

Line Display Class – KB800 Display

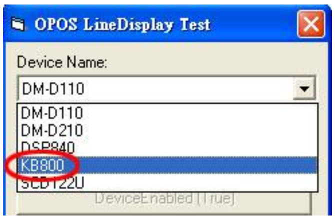
Installing and Launching Program

If your system has ever installed the old version program, please remove it before installing.

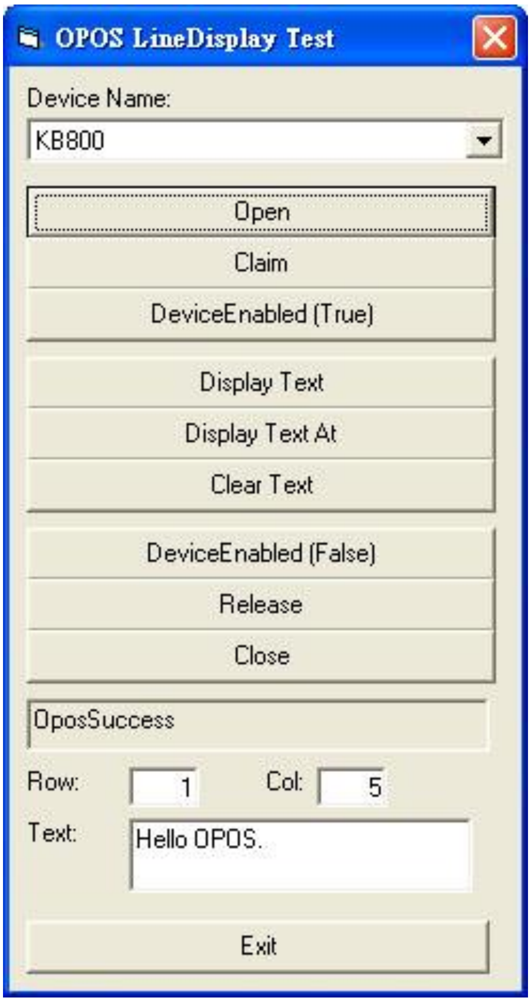
- Insert the AKU Setup CD into the CD-ROM drive of your PC. The setup program begins automatically. There is no need to choose your CD-ROM drive from your on-screen settings, or to use the <RUN> prompt.
- A html page will pop up. Click [Install Sample OPOS Program]. The setup wizard will now guide you through the setup procedure. You will be prompted to accept a default path for the Sample OPOS program, which is "C:\Program Files\GIGA-TMS\OPOS Sample\LineDisplay".
- When the setup procedure is complete, remove the software CD-ROM disk from your CD-ROM drive and accept the prompt to restart your PC.
- From the [Start]/[Programs], select the [GIGA-TMS]\[Sample OPOS] (default folder), click [OPOS LineDisplay Test].

Testing the KB800 Display

The **OPOS LineDisplay Test** program will list all the Line Display class devices. Please select the "KB800" and then click **Open** to load the SO driver.



Shown below is the **OPOS LineDisplay Test** program's main window.



Device Name: KB800

OposSuccess

Row: 1 Col: 5

Text: Hello OPOS.

The main window has the follows buttons and entries:

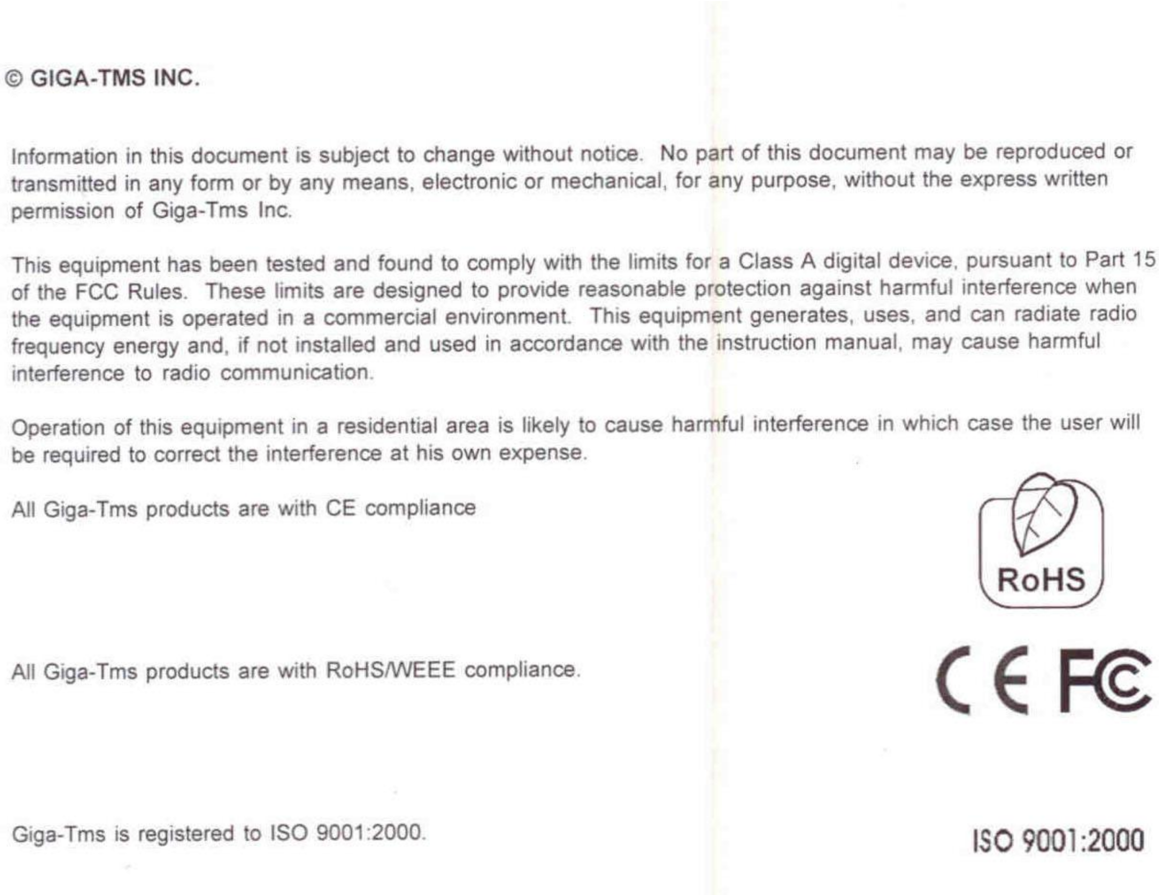
- **Open**: Load the SO driver with selected device name.
- **Claim**: Set exclusive access permission to the device.
- **DeviceEnable (True)**: Enable the device.
- **Display Text**: Display the specified message (in Text box) on the device screen.
- **Display Text At**: Display the specified message (in **Text** box) on the device screen at specified location (in **Row** and **Col** text box).
- **Clear Text**: Clear the screen.
- **DeviceEnable (False)**: Disble the device.
- **Release:** Disable the exclusive access permission.
- **Close:** Unload the SO driver.
- **Exit:** End the program.

Source Code

The source code is coded by Visual Basic 6 language and zipped in a file: OPOSLineDisplayTest_PSC00000.zip which is located in the **SourceCode** folder of setup CD.

Copies of CE, FCC and RoHS Certificates

KB800



Information in this document is subject to change without notice. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of Giga-Tms Inc.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

All Giga-Tms products are with CE compliance

RoHS

All Giga-Tms products are with RoHS/WEEE compliance.

CE FC

Giga-Tms is registered to ISO 9001:2000.

ISO 9001:2000

Update History

This topic details update history for this document system.

24-November-10 release

- Modify Firmware Updating progress.
- Add KB800 Power Adaptor information.

4-August-10 release

- Update AKU's miscellaneous information.

5-January-10 release

- Update KB240 specification
- Update KB270 specification
- Update KB280 specification
- Update Firmware Upload procedure

5-November-09 release

Add ACT810H manual

25-May-09 release

Add Solvic character table (for KB800 display)

11-March-09 release

- Add Advanced Keyboard Firmware Loader program
- Add Get Firmware Version Command

7-Jan-09 ("base") release