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ZT592

Metal Numeric Pad

Specification

Bxx

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1. Introduction

The Numeric Pad with key is designed and developed with particular idea, compliant with ISO/IEC 9995 standard, It surface is waterproof and dust-free.

The Numeric Pad firmware will consist of standard IBM PS/2 compatible keyboard and mouse firmware. The trackball will support standard PC keyboard and mouse capabilities.

The 16-Key metal numeric Pad is a small footprint keyboard suitable for use with Kiosk. This specification must be read before application.

1.1 Shape



Figure 1 –Metal Numeric Pad Panel

1.2 Mounting Description

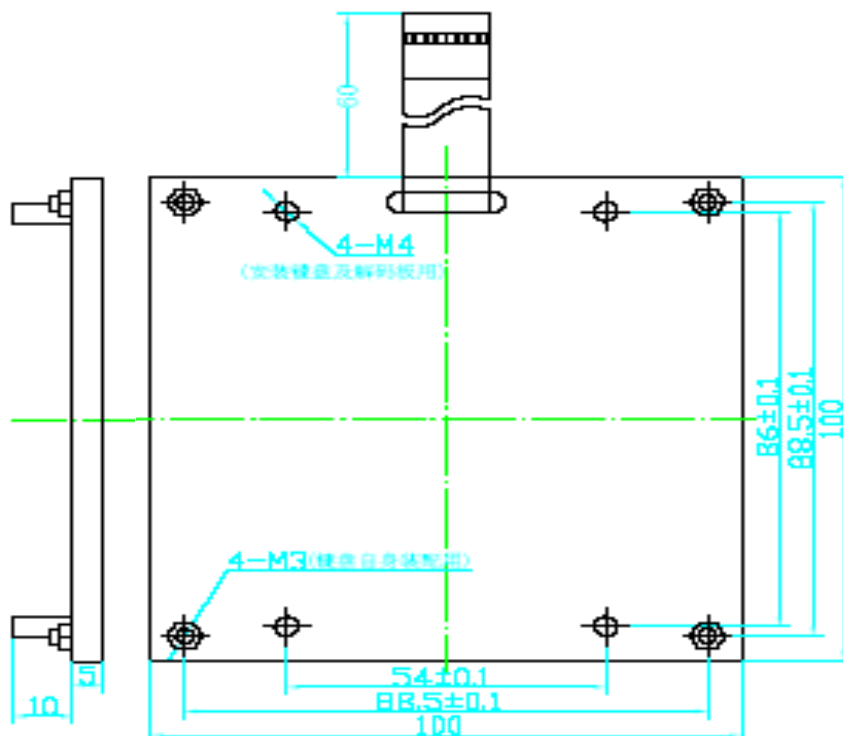


Figure 2 –Metal Numeric Pad

1.3 Operation Principle

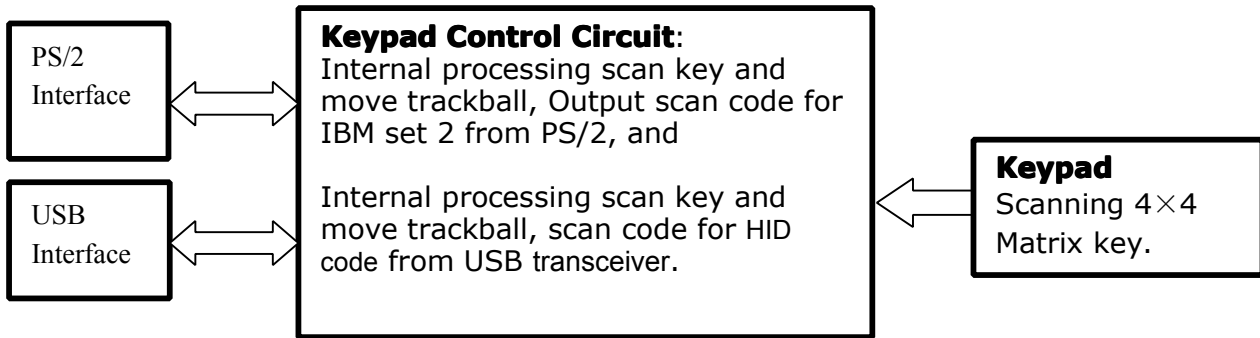
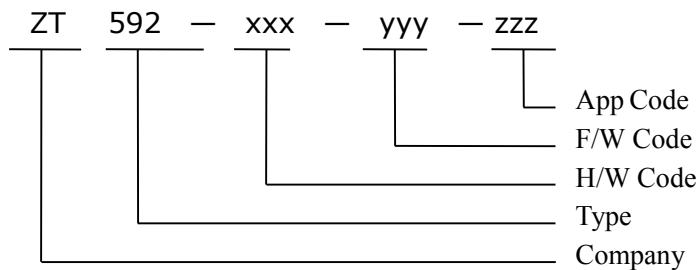


Figure 3 –Metal Numeric Pad Block diagram

2. Product Category

The Metal Numeric Pad is classified according to hardware code, firmware and application code.



Company code: ZT means Shenzhen Zhengtong Electronics Co.,. Ltd.

Product Type: 592 means commercial Metal Numeric Pad code.

Hardware code: description code embodies the change of external product form. Great change happens as the first letter is different; if the first letter is same, the following two letters will change a little.

Firmware code: the description code embodies the change of internal control program, Great change happens as the first letter is different; if the first letter is same, the following two letters will change a little.

Application code: the code embodies supply situation to customer, in convenience for customer ordering.

Hardware code	Great change happens as the first letter is different
Axx	Overall size 116mm × 97.5mm × 23mm, Front plate 116 x 97.5mm, 16 key, stainless steel material
Bxx	Overall size 100mm × 100mm × 23mm, Front plate 100 x 100mm, 16 key, stainless steel material

3 Performance Data

3.1 Communication Parameters

3.1.1 Standard PS/2 communication interface:

The set of make and break codes for every key comprises a "scan code set". There are three standard scan code sets, named one, two, and three. All modern keyboards default to set two.(APPENDIX A: Keyboard code)

Initialization:

The following is the communication between my computer and Numeric Pad when it boots-up.

- Typematic delay 500 ms.
- Typematic rate 10.9 cps.
- Scan code set 2.
- Set all keys typematic/make/break.

Command to The Numeric Pad From The Host Terminal:

<u>PC STANDARD COMMANDS</u>	<u>HEX</u>
RESET	FF
RESEND	FE
(NOT SUPPORTED)	F7-FD
SET DEFAULT	F6
DEFAULT DISABLE	F5
ENABLE	F4
SET TYPEMATIC RATE/DELAY	F3
READ ID	F2
(NOT SUPPORTED)	EF-F1
ECHO	EE
SET/RESET MODE INDICATORS	ED

Commands to The Host Terminal From The Numeric Pad

<u>COMMAND</u>	<u>HEX</u>
Resend	FE
BAT Failure	FC
ACK	FA
Echo	EE
BAT Completion	AA
Keyboard ID	83AB
Error/Overrun	00

For detailed information on these commands, please refer to IBM PS/2 Hardware Interface Technical Reference - Common Interfaces, Keyboards (101- and 102-key) section. IBM document number 84F9735.

The metal numeric pad Interface as keyboard Timing Diagram:

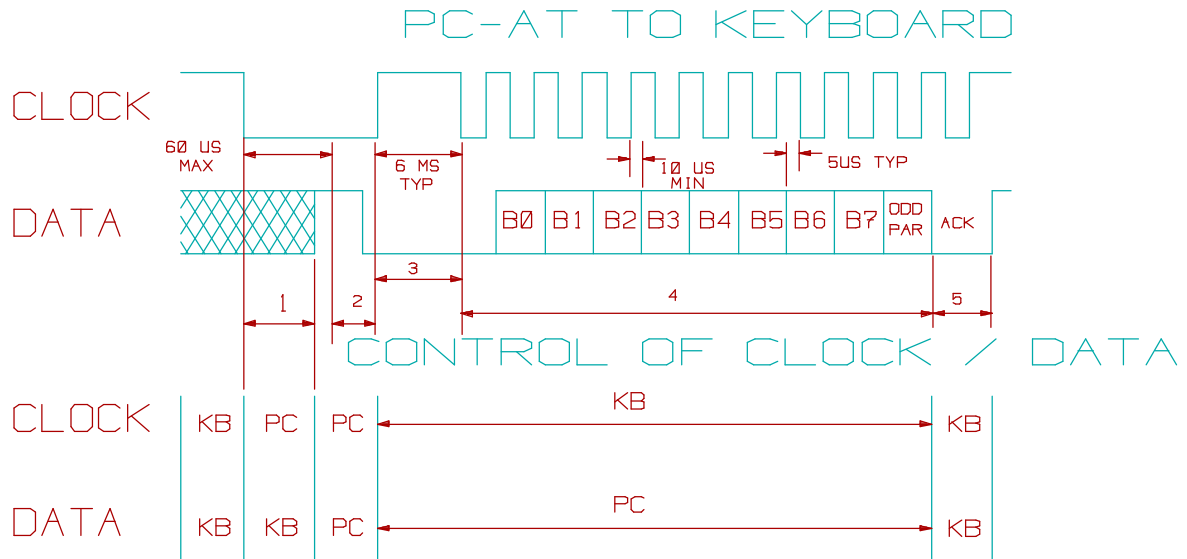


Figure 4 -Time for PC-AT to keyboard

1. Keyboard sees low clock line and releases clock line: 60 us (maximum)
2. PC asserts data line and releases clock line: PC's request to send
3. Keyboard responded to request by asserting clock line: 6 ms (Typical)
4. Keyboard clocks in data from PC
5. PC releases data line, keyboard asserts data line and clocks acknowledge

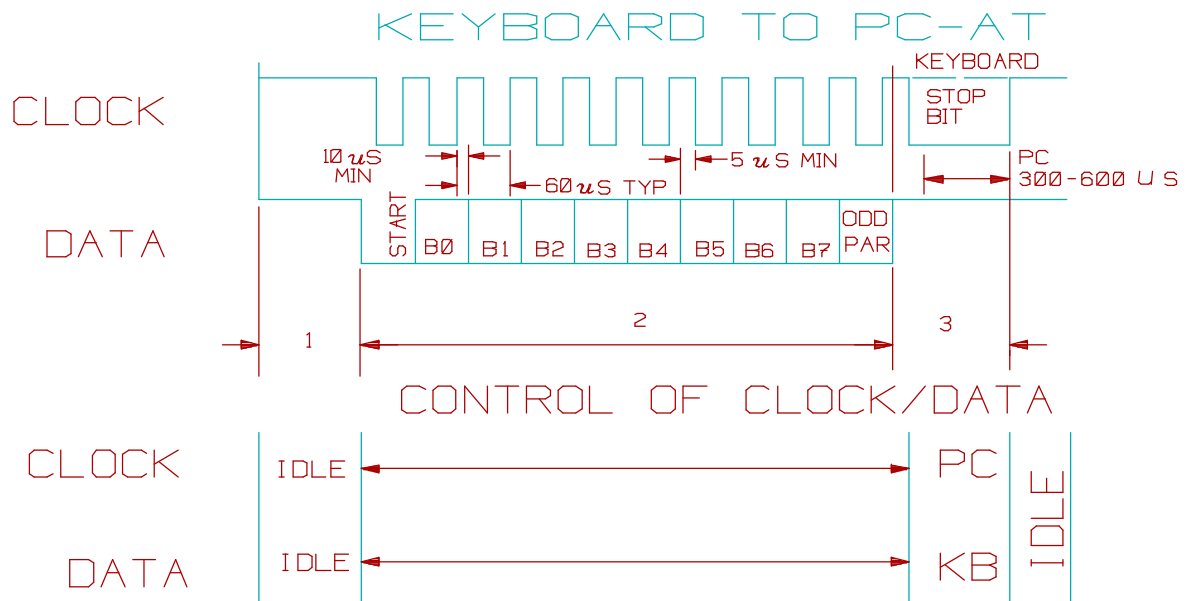


Figure 5 -Time for keyboard to PC-AT

1. Idle. Clock and data lines high.
2. Keyboard asserts data and strobes clock line.
3. Keyboard releases data line (stop bit), sends 11th clock. PC asserts clock line to hold off further data transfers until byte is accepted.

A sequence of 11 bits is sent/received. Data transmission is bi-directional timing above-mentioned.

Cable:

The metal numeric pad mutual cable is to be a round straight cable made up of four discrete jacketed wire and conductors. The CLOCK and DATA wires are to be #28 AWG,

whereas GROUND and +5V wires must be #22 AWG.

The insulation material of the inner conductors shall be PVC. Insulator: PBT 94V-O thermoplastic. Electrical Voltage rating: 300V. Temperature rating: 80 de.C.

The length of the cable from the keyboard cabinet to the end of the connector shall be 2100+/-20 mm.

The signals and voltages for the connector are assigned as shown in the following figure.



Figure 6 –PS/2 connector (Wire Side Shown)

Pin	Signal Name
1	m-Data
2	Reserved
3	Ground
4	+5 Vdc
5	m-Clock
6	Reserved

3.1.2 Standard USB communication interface

USB 1.1 or USB 2.0 (Option) HID-Conformity to all operating systems.

Endpoint 0 is a **Control** pipe always present in USB devices. Therefore, only the **Interrupt In** pipe is described for the **Interface** descriptor using an **Endpoint** descriptor.

Control pipe	Receiving and responding to requests for USB control and class data. Transmitting data when polled by the HID class driver (using the Get_Report request). Receiving data from the host.
Interrupt pipe	Receiving asynchronous (unrequested) data from the device. Transmitting low latency data to the device.

The metal numeric pad will communicate with the host system via a USB interface. The host system can access the retail functions via the same USB interface using HID Device specific commands.

The USB hub communicates with the host system via an "upstream" USB port. The USB hub communicates with each of the USB devices via "downstream" USB ports. Each of the USB devices will be uniquely enumerated by an operating system request. Communication flows bi-directionally between each of the USB devices and the corresponding host system USB device driver via the corresponding "downstream" port, hub, and "upstream" port.

Cable:

The metal numeric pad cable shall be a USB 1.1 compliant cable.

The length of the cable from the keyboard cabinet to the end of the connector shall be 2100 +/- 20 mm.

The signals and voltages for the connector are assigned as shown in the following figure.

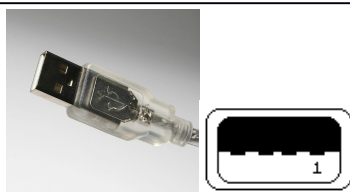


Figure 7 –USB connector (USB –a Male)

Pin	Signal Name
1	VBUS
2	D-
3	D+
4	Ground
Shell	Shield

3.2 Keyboard scan code

16 keys: 4×4 matrix scan Numeric Pad. APPENDIX A: Keyboard code , or Customize design is offer on request.

3.3 Criteria and Operation speed

Comply with ISO/IEC 9995 standard.
All material complies with RoHS

3.4 Mechanical Performance

Item	Specification
Number of keys	16
Key Switch type	Membrane switch with key spring steel
Keytop style	Rectangular
Actuation Force	2~4N
Key travel	0.42~0.45mm
Key protrusion	0.2 mm +/- 0.2 mm
Lifespan	Above 2,000,000 times
Lettering	Laser and protrusive engraving (Customized)
Weight	0.8kg
Dimension	100mm×100mm×23mm

3.4 Electric Performance.

Item	Specification
Power supply	5V DC+ 10%, PS/2 keyboard interface, or USB interface.
Power consuming	≤0.2W(operating), ≤ 0.1W(non-operating)
Contact Material	Cu-Au, Base material Epoxy

3.5 Environment Adaptability

Item	Specification
Operation Temperature:	0°C~+ 40° C
Storage temperature	- 25°C~+ 65°C
Operating RH	20%~95%
Atmospheric pressure	60~106Kpa.

3.6 Reliable

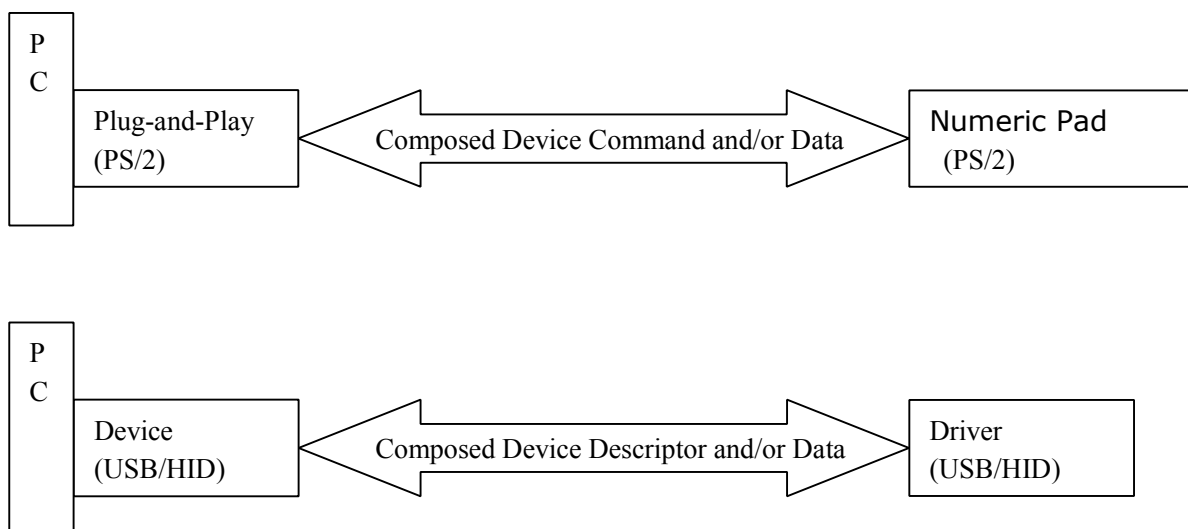
MTBF > 20000h

MTTR < 30min

4 Installation Description

The Metal Numeric Pad will be installed to PC by user. It not need driver because Plug-and-Play to PC whether PS/2 or USB.

The Metal Numeric Pad not need test program.



5 Maintenance

In most case, no need special maintenance. If something wrong comes up, the Numeric Pad is required to be handled by user.

6 Cautions

Appendix A: Keyboard code**1. Set2 for IBM-PC**

Key Number and Symbol		Make/Break Code	Key Number and Symbol		Make/Break Code
~	`	0E/F0 0E	D		23/F0 23
!	1	16/F0 16	F		2B/F0 2B
@	2	1E/F0 1E	G		34/F0 34
#	3	26/F0 26	H		33/F0 33
\$	4	25/F0 25	J		3B/F0 3B
%	5	2E/F0 2E	K		42/F0 42
^	6	36/F0 36	L		4B/F0 4B
&	7	3D/F0 3D	:	;	4C/F0 4C
*	8	3E/F0 3E	"	'	52/F0 52
(	9	46/F0 46	Enter (L)		5A/F0 5A
)	0	45/F0 45	Page up		E0 7D/E0 F0 7D
_	-	4E/F0 4E	Shift (L)		12/F0 12
+	=	55/F0 55	>	<	61/F0 61 *
Back space		66/F0 66	Z		1A/F0 1A
Home		E0 6C/E0 F0 6C	X		22/F0 22
Tab		0D/F0 0D	C		21/F0 21
Q		15/F0 15	V		2A/F0 2A
W		1D/F0 1D	B		32/F0 32
E		24/F0 24	N		31/F0 31
R		2D/F0 2D	M		3A/F0 3A
T		2C/F0 2C	<	,	41/F0 41
Y		35/F0 35	>	.	49/F0 49
U		3C/F0 3C	?	/	4A/F0 4A
I		43/F0 43	Shift(R)		59/F0 59
O		44/F0 44	Up		E0 75/E0 F0 75
P		4D/F0 4D	Page down		E0 7A/E0 F0 7A
{	[	54/F0 54	Ctrl(L)		14/F0 14
}	]	5B/F0 5B	Del		E0 71/E0 F0 71
|	\	5D/F0 5D	Alt(L)		11/F0 11
End		E0 69/E0 F0 69	Win(L)		E0 1F/E0 F0 1F
Caps lock		58/F0 58	Space		29/F0 29
A		1C/F0 1C	Left		E0 6B/E0 F0 6B
S		1B/F0 1B	Down		E0 72/E0 F0 72
			Right		E0 74/E0 F0 74
* : only at 105, 107keyboard is "<" and ">" ,otherwise is "\"and "|".					

2. HID code for USB

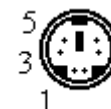
Key Number and Symbol	HID page	HID code	Key Number and Symbol	HID page	HID code
~ `	07	35	D	07	07
! 1	07	1E	F	07	09
@ 2	07	1F	G	07	0A
# 3	07	20	H	07	0B
\$ 4	07	21	J	07	0D
% 5	07	22	K	07	0E
^ 6	07	23	L	07	0F
& 7	07	24	: ;	07	33
* 8	07	25	" `	07	34
(9	07	26	Enter (L)	07	28
) 0	07	27	Page up	07	4B
_ -	07	2D	Shift (L)	07	E1
+ =	07	2E	> <	07	64
Back space	07	2A	Z	07	1D
Home	07	4A	X	07	1B
Tab	07	2B	C	07	06
Q	07	14	V	07	19
W	07	1A	B	07	05
E	07	08	N	07	11
R	07	15	M	07	10
T	07	17	< ,	07	36
Y	07	1C	> .	07	37
U	07	18	? /	07	38
I	07	0C	Shift(R)	07	E5
O	07	12	Up	07	52
P	07	13	Page down	07	4E
{ [	07	2F	Ctrl(L)	07	E0
}]	07	30	Del	07	4C
| \	07	31	Alt(L)	07	E2
End	07	4D	Win(L)	07	E3
Caps lock	07	39	Space	07	2A
A	07	04	Left	07	50
S	07	16	Down	07	51
			Right	07	4F

* : only at 105, 107keyboard is "<" and ">" ,otherwise is "\"and "|".

Appendix B: Interface Description

Mini DIM6 pin for PS/2 connector cable

Pin no.	1	2	3	4	5	6
name	k-Data	Res.	GND	DC+5 V	k-Clock	Res.



Male 4 pin for USB-A series connector cable

Pin no.	1	2	3	4
name	VUSB	D-	D+	GND

