



# Keypad Application Note

**AN\_ Keypad function\_V1.0**



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## Version history

Date	Version	Description of change	Author
2010-03-23	1.0	Origin	libing

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## 1 Introduction

SIMcom modules provide a keypad interface that supports five sense lines, or columns, and five keypad rows. The columns are used for sensing (KEYSENSE\_Nx); The rows are used for driving (KEYPAD\_x). The interface generates an interrupt when any key is pressed. This document describes the decoding of keyboard matrix application of SIMcom modules that is used to design for POS,handset, include the dual-mode mobile phone, PDA, and the others.

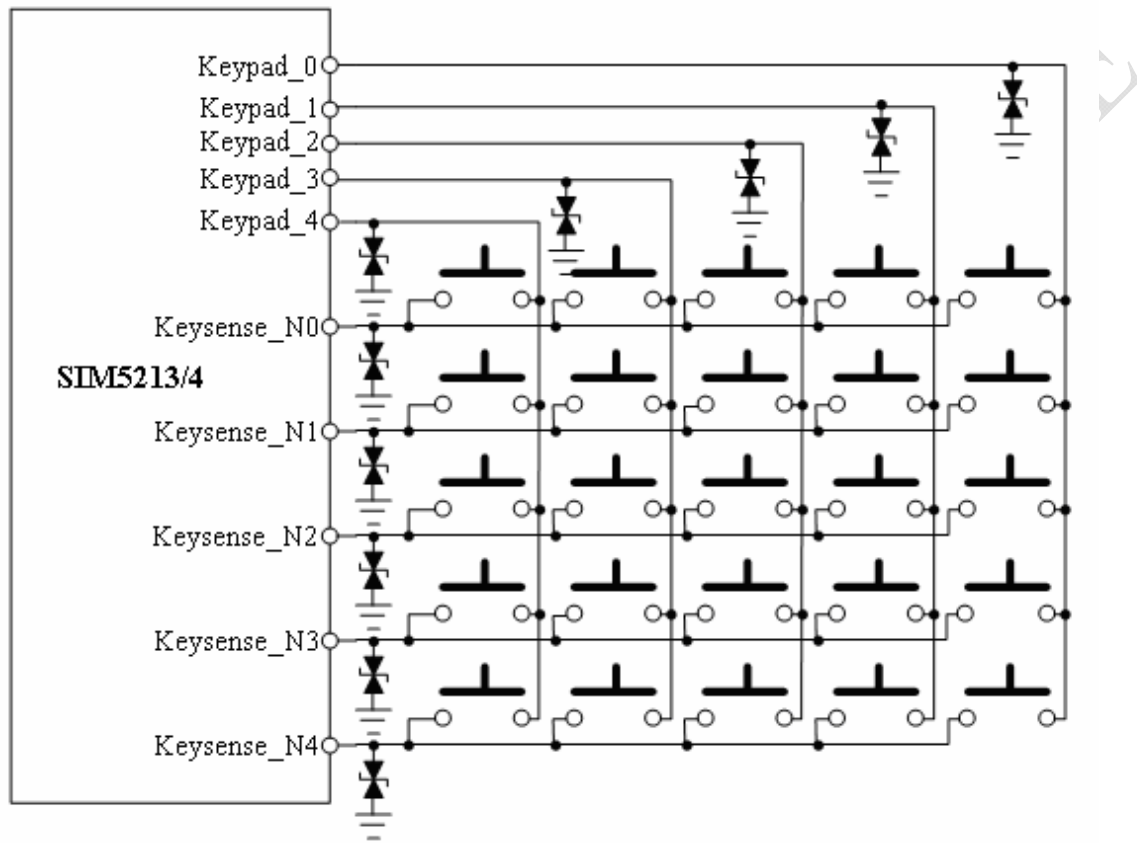
## 2 Scope of the document

This document is intended for the following versions of the SIMCom modules

- SIM5213E/ SIM5214E
- SIM5213J/SIM5214J

## 3 Recommended application circuit

### 3.1 Keypad interface circuit



**Figure 1: keypad interface matrix(With ESD protection)**

When a keypad button is pressed, its corresponding column is pulled low (since all rows are low). Since it is an active low sense line, the module begins scanning the keypad. During a scan, each row is sequentially driven low, one at a time. As each row is driven low, the columns are sensed. The precise keypad button being pressed is revealed when that button's column reads low while that button's row is driven low.

*Note: keypad is 1.8V operation.*

### 3.2 Codes of keyboard matrix

The following table shows codes of keyboard matrix. Key codes is hexadecimal format. The function can be redefined by customer. Functions in table 1 are reference.

**Table 1: Key codes**

KEY VALUE REFERENCE				
<key>	<key_row>	<key_column>	function(default)	description
0x01	2	4	"MSG"	Message select
0x02	1	3	"#"	# key
0x03	1	1	"*"	* key
0x04	1	2	"0"	Number 0
0x05	4	1	"1"	Number 1
0x06	4	2	"2"	Number 2
0x07	4	3	"3"	Number 3
0x08	3	1	"4"	Number 4
0x09	3	2	"5"	Number 5
0x0A	3	3	"6"	Number 6
0x0B	2	1	"7"	Number 7
0x0C	2	2	"8"	Number 8
0x0D	2	3	"9"	Number 9
0x0E	1	0	"BACK"	Back key
0x0F	4	0	"REJECT"	Cancel a operation
0x10	3	4	"UP"	Up key
0x11	0	4	"DOWN"	Down key
0x12	1	4	"CALL"	Setup a call
0x13	3	0	"MENU"	Show function list
0x14	4	4	"SELECT"	Affirm key
0x15	0	0	"HANDFREE"	Talk without hang up
0x16	0	2	"NAMES"	address list
0x17	0	3	"V+"	Volume increase
0x18	0	1	"V-"	Volume decrease
0x19	2	0	"SET"	Setting key
0xFF	row and column is same as the key pressed		"RELEASE"	



## 4 Setting of keypad

AT+CKGSWT command is used to switch pins' function between keypad interface and general GPIO. If no keypad subsystem, the total 10 pins can be used as general GPIO after switching mode successfully. Keypad is factory mode.

```
AT+CKGSWT=?  
+CKGSWT: (0-1)
```

```
OK  
at+ckgswt?  
+CKGSWT: 1
```

```
OK
```

The system can capture an interrupt when any key is pressed, then a correlated function is operated. Key codes can be shown on hyperterminal. For example:

```
(Press the menu key, and then release the key):  
+KEY: 0x16, [0, 2], "NAMES"  
+KEY: 0xFF, [3, 0], "RELEASE"
```

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