K.I.T.T. USB Coding SpaceMat

Hardware revision: 2.0; User manual revision: 2.1

Coding spacemat has 32 working keys and a USB-B connector. Device is self-powered by USB port. Please connect to a PC with a USB A/B cable (sold separately). Keyboard is auto-detected within a few seconds, it doesn't require any special driver in most common operating systems: Windows, Linux, Mac, Android.

Predefined Keys

The 32 keys are arranged in 8 rows by 4 columns. Factory setting gives these assignments:

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P
Q	R	S	T
U	V	W	X
Y	Z	SPACE	BACKSPACE
LEFT ARROW	UP ARROW	DOWN ARROW	RIGHT ARROW

Factory settings for keys assignments

Restore factory assignment predefined keys

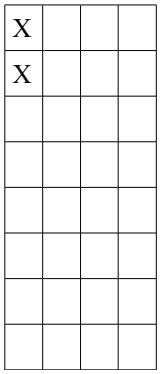
If by chance you get really messed up with keys assignments (see below) you may restore coding spacemat to factory settings, by following this procedure:
1) unplug/power-down the coding spacemat
2) connect back to USB port the coding spacemat while holding down the last two keys of the first column (that's seventh and eighth row, first column), marked with a X on the scheme on the right
3) factory settings are already restored, and you may use the device as a USB keyboard with the above assignment for keys

X			
X			

Restore factory settings

Assigning different codes and functions to keys

1) Open the notepad on PC, and keep it open and focused on a new, empty document.
2) If plugged, unplug the coding spacemat from USB port
3) Plug-in/power-up the coding spacemat while holding down the first two keys of the first colum (that's first and second row, first column), marked with a X on the scheme on the right
4) As soon as the connector is plugged in, you may release the keys
5) Now wait 10 seconds while on the PC it's still the notepad open on empy document
6) While in programming mode, the coding spacemat will send keystrokes to PC to show messages on screen, guiding the reprogramming process. User must respond to each request by pressing the correct keys in the correct sequence on the coding spacemat
7) When you're done with programming, just unplug the USB cable
8) Plug it back in to use the coding with the newly programmed codes as keyboard



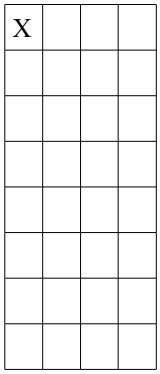
Keys to hold down to enter programming mode

Let's pretend we don't like that the first row keys are assigend to A B C D and we prefer PAGEUP, ALT+F4, MUTE and WINDOWS+D. Needless to say, ALT+F4 will close current application, MUTE will turn audio on and off, WINDOWS+D will show desktop on a windows PC.

As soon as the coding spacemat enters programming mode, it will propose on notepad the request `KEY` and wants to know which key is to be redefined.

In response to `KEY` request, we will press the key in the upper left corner, which was previously assigned to A, but we want to redefine to PAGEUP.

`KEY`



Let's redefine this key

As soon as the key is pressed, the spacemat asks us the first part of the code by outputting `NEW1` on notepad. Since we want to assign PAGEUP, let's look on the Scan Code Table in the last page of this manual, which code is for PAGEUP. We find out that the code is 4B. First digit of code if 4, second digit B.

To `NEW1` request we must reply 4, by pressing the key associated with 4 on the coding spacemat, look at the scheme on the right. That's the fifth key on the first column. It's in Bold in the scheme. So press this key.

`NEW1`

0	8
1	9
2	A
3	B
4	C
5	D
6	E
7	F

First digit of code

At subsequent request `NEW2` must respond with B, the second digit of the code. Look at the scheme again, B is in bold in the scheme on the right. So we must press the key in the fourth row, second column.

`NEW2`

0	8
1	9
2	A
3	**B**
4	C
5	D
6	E
7	F

Second digit of code

Lastly the coding spacemat will ask if we want to insert any modifier (CTRL, ALT, SHIFT, WINDOWS). We don't want for this key, so when asked MOD we'll reply pressing the key in the upper left corner, corresponding to 0: None. If we wanted a CTRL+PAGEUP we instead would press the key on second row on first column, and so on. Key is redefined. Spacemat will tell us DONE to confirm we're done with this key.

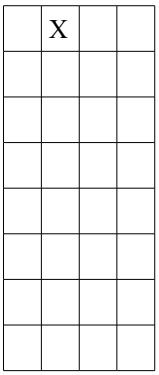
MOD

0: None	8: WIN		
1: CTRL	9: WIN+CTLR		
2: SHIFT	A: WIN+SHIFT		
3: CTRL+SHIFT	B: WIN+CTRL+SHIFT		
4: ALT	C: WIN+ALT		
5: CTRL+ALT	D: WIN+CTRL+ALT		
6: ALT+SHIFT	E: WIN+ALT+SHIFT		
7: CTRL+ALT+SHIFT	F: WIN+CTRL+ALT+SHIFT		

Available modifiers

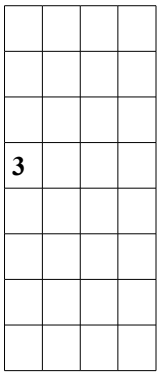
Coding spacemat will just start proposing to modify another key, by outputting KEY again. So we can repeat the process for the second key (KEY), it was factory defaults to B, but we don't like B any more, and we prefer ALT+F4. The scan code for the "F4 function key" is 3D. So first digit is 3 (NEW1) and second digit is D (NEW2). As modifier (MOD) this time we want ALT, so we'll press the 4:ALT when asked for MOD. To tell this short, to reprogram second key for ALT+F4, 4 keystrokes are required, in this order:

Key



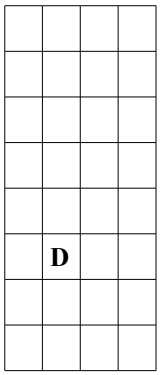
Let's redefine second key

New1



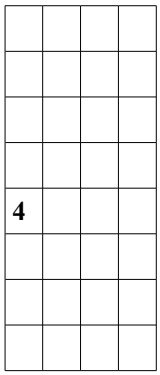
First digit of scan code

New2



Second digit of scan code

Mod



Modifier for ALT

Not to mess up or get wrong with programming, it's advised to take note of the codes we want to input before starting the programming sequence itself. For our example, we wanted to assign PAGEUP to first key. PAGEUP has scan code 4B, therefore we will write 4 and B in the first key zone and 0 as MOD (modifier) in the zone for the first key in this table. Follows 3D (scan code for "function key F4") and modifier 4 (for ALT) for second key. Then to the third key we want to assign MUTE: scan code is 7F and modifier is 0 (no modifiers). And then we assign "D" (which has code 07) and modifier 7 (Windows key) to assign WIN+D to fourth key.
Complete the table by writing down with a pen what you want to assign, then use the table while programming as quick-reference of what to enter as NEW1 NEW2 and MOD for each key to redefine.

New1	New2	Mod	New1	New2	Mod	New1	New2	Mod	New1	New2	Mod
4	B	0	3	D	4	7	F	0	0	7	0

When you're done inputting keys, must unplug the coding spacemat from USB port to exit programming mode. Plug it in again to use with the freshly programmed key. If you mess up with one or a few key, just reprogram these ones. If you mess up with all keys, and want to restore factory settings, refer to “Restore factory assigned predefined keys” paragraph.

Here is an empty and big table for you, just photocopy or printout this page, and note down your assignment for the 32 keys.

New1	New2	Mod	New1	New2	Mod	New1	New2	Mod	New1	New2	Mod

Let's repeat the scheme for the input of NEW1 NEW2 e MOD.

New1

0	8		
1	9		
2	A		
3	B		
4	C		
5	D		
6	E		
7	F		

First digit of scan code

New2

0	8		
1	9		
2	A		
3	B		
4	C		
5	D		
6	E		
7	F		

Second digit of scan code

Mod

0: None	8: WIN		
1: CTRL	9: WIN+CTLR		
2: SHIFT	A: WIN+SHIFT		
3: CTRL+SHIFT	B: WIN+CTRL+SHIFT		
4: ALT	C: WIN+ALT		
5: CTRL+ALT	D: WIN+CTRL+ALT		
6: ALT+SHIFT	E: WIN+ALT+SHIFT		
7: CTRL+ALT+SHIFT	F: WIN+CTRL+ALT+SHIFT		

Modifiers table

List of scan codes

04	a A	2C	SPACE	54	KEYPAD /	7C	KB COPY
05	b B	2D	- _ ' ?	55	KEYPAD *	7D	KB PASTE
06	c C	2E	= + ì ^	56	KEYPAD -	7E	KB FIND
07	d D	2F	[{ è é [	57	KEYPAD +	7F	KB MUTE
08	e E	30	] } + *]	58	KEYPAD ENTER	80	KB VOLUME UP
09	f F	31	\ | ù §	59	KEYPAD 1 END	81	KB VOLUME DOWN
0A	g G	32	EUR1 ù §	5A	KEYPAD 2 DOWN	82	KB LOCKING CAPS
0B	h H	33	; : ò ç @	5B	KEYPAD 3 PGDOWN	83	KB LOCKING NUM
0C	i I	34	' “ à ° #	5C	KEYPAD 4 LEFT	84	KB LOCKING SCROLL
0D	j J	35	` ~ \ |	5D	KEYPAD 5	85	KEYPAD . BRAZIL
0E	k K	36	, < , ;	5E	KEYPAD 6 RIGHT	86	KB =
0F	l L	37	. > . :	5F	KEYAPD 7 HOME	87	INT'L1 “Ro”
10	m M	38	/ ? - _	60	KEYPAD 8 UP	88	INT'L2 “Katakana”
11	n N	39	CAPS LOCK	61	KEYAPD 9 PGUP	89	INT'L3 “Yen”
12	o O	3A	F1	62	KEYPAD 0 INSERT	8A	INT'L4 “Henkan”
13	p P	3B	F2	63	KEYPAD . DELETE	8B	INT'L5 “Muhenkan”
14	q Q	3C	F3	64	EUR2 < >	8C	INT'L6 “PC9800 ,”
15	r R	3D	F4	65	APP	8D	INT'L7
16	s S	3E	F5	66	KB POWER	8E	INT'L8
17	t T	3F	F6	67	KEYPAD =	8F	INT'L9
18	u U	40	F7	68	F13	90	KB LANG1 English
19	v V	41	F8	69	F14	91	KB LANG2 Hanja
1A	w W	42	F9	6A	F15	92	KB LANG3 Katakana
1B	x X	43	F10	6B	F16	93	KB LANG4 Hiragana
1C	y Y	44	F11	6C	F17	94	KB LANG5 Zenkaku
1D	z Z	45	F12	6D	F18	95	KB LANG6
1E	1 ! 1!	46	PRINT SCREEN	6E	F19	96	KB LANG7
1F	2 @ 2 “	47	SCROLL LOCK	6F	F20	97	KB LANG8
20	3 # 3 £	48	PAUSE	70	F21	98	LB LANG9
21	4 $ 4 $	49	INSERT	71	F22	99	KB ERASE
22	5 % 5 %	4A	HOME	72	F23	9A	KB SYSREQ
23	6 ^ 6 &	4B	PAGE UP	73	F24	9B	KB CANCEL
24	7 & 7 /	4C	DELETE	74	KB EXECUTE	9C	KB CLEAR
25	8 * 8 (	4D	END	75	KB HELP	9D	KB PRIOR
26	9 (9)	4E	PAGE DOWN	76	KB MENU	9E	KB RETURN
27	0) 0 =	4F	RIGHT ARROW	77	KB SELECT	9F	KB SEPARATOR
28	RETURN	50	LEFT ARROW	78	KB STOP	A0	KB OUT
29	ESC	51	DOWN ARROW	79	KB AGAIN	A1	KB OPER
2A	BACKSPACE	52	UP ARROW	7A	KB UNDO	A2	KB CLEAR/AGAIN
2B	TAB	53	NUM LOCK	7B	KB CUT	A3	KB CRSEL/PROPS

In the table you find the standard keys (A B C D), special keys (TAB, ESC), multimedia keys found on multimedia keyboards (VOLUME UP, VOLUME DOWN, MUTE), and keys you hardly find on commercial keyboards (F13, F14, F15, KB SELECT, KB AGAIN) but you may still program these keys in, and have your PC receive them out, to use in your own software or commercial “system hot-keys” software to activate various functions without messing up with “common” keystrokes.