To customise the output codes just download and install the Configuration Utility from *www.storm-interface.com*
This lets you do the following :-

Scan the encoder in order to	Confirm the encoder is connected
	Show which version of firmware is installed
	Show which keypad is set (4, 12 or 16 key)
	Show which code table is selected (default, alternate or customised)
And also	Change the keypad setting
	Change the selected code table
	Change the buzzer volume (450i only)
	Change the brightness on illuminated keypads (450i only)
	Self test the encoder
For re-legendable keypads	Customise the code table by assigning a USB code to each key
	Add a modifier in front of each USB code
	Save this configuration
	Export or Import configuration files
For maintenance purposes	Update the encoder firmware if a new version is released
	Restore all settings to original factory defaults.

F.A.Q's

Does this encoder need a special driver ?	No – it works with the standard USB keyboard driver.
Does the utility work on any pc ?	At present it does not run on Linux or Mac OS. The utility requires Windows 10 or later.

Download from www.storm-interface.com and install on a Windows PC (Win 10 or later)
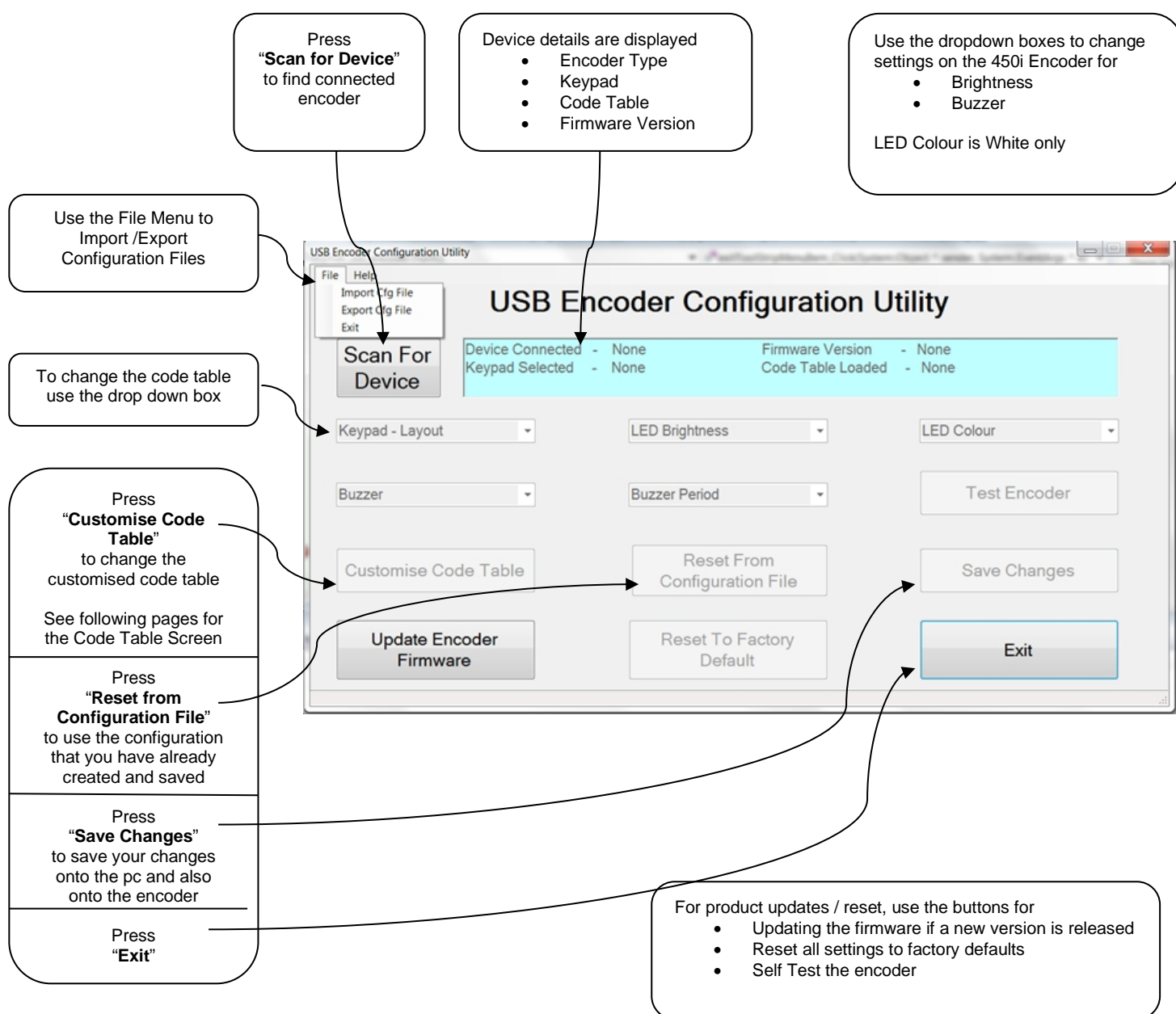
Run the application.

Plug in the encoder + keypad.

Scan the encoder. The configuration will be displayed as below on the home screen.

If you have a standard layout keypad then the output from the default code table will correspond to the keypad
If you have a keypad designed to allow customisation of keytop graphics then you need to assign a code to each key.

The configuration file is saved to the pc and to the encoder when the **Save Changes** button is pressed.

Press
"**Scan for Device**"
to find connected encoder

Device details are displayed
- Encoder Type
- Keypad
- Code Table
- Firmware Version

Use the dropdown boxes to change settings on the 450i Encoder for
- Brightness
- Buzzer

LED Colour is White only

Use the File Menu to Import /Export Configuration Files

To change the code table use the drop down box

Press
"**Customise Code Table**"
to change the customised code table

See following pages for the Code Table Screen

Press
"**Reset from Configuration File**"
to use the configuration that you have already created and saved

Press
"**Save Changes**"
to save your changes onto the pc and also onto the encoder

Press
"**Exit**"

For product updates / reset, use the buttons for
- Updating the firmware if a new version is released
- Reset all settings to factory defaults
- Self Test the encoder

USB Encoder Configuration Utility

File   Help
Import Cfg File
Export Cfg File
Exit

USB Encoder Configuration Utility

Scan For Device

Device Connected   -   None   Firmware Version   -   None
Keypad Selected   -   None   Code Table Loaded   -   None

Keypad - Layout   LED Brightness   LED Colour

Buzzer   Buzzer Period   Test Encoder

Customise Code Table   Reset From Configuration File   Save Changes

Update Encoder Firmware Reset To Factory Default   Exit

Customising the Code Table

The utility displays a screen that shows for each key

- Which USB code is assigned

- Which modifier (if any) is applied to the USB code.

Modifier   USB Code

Click on each position
and select a USB code
from the drop down list.

Add a modifier for each
position if required.

Press
"**Apply**"
to reserve your changes.
*This does not save the
changes at this stage.*

Press
"**Close**"
to return to the home
screen

"**Reset**"
reloads the default code
table

Customise 12 Way Code Table
(USB Codes in Hex)

None	0x04	None	0x04	None	0x04	
None	0x04	None	0x0D	None	0x0D	Reset
None	0x0D	None	0x0D	None	0x0D	Apply
None	0x06	None	0x06	None	0x06	Close

The full list of USB Codes is shown on the following pages.
USB Codes that have been checked in Word are shown in the relevant column, for example :

	Un-shifted	Shifted
Code 0x04 gives	a	A

Where the same USB code gives a different character dependent on the host language setting then this is shown in the relevant language column.

The actual function of the USB code is determined by the application; not all codes have a function in every application.
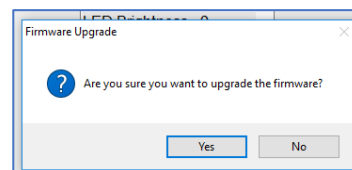
Updating the Firmware

When you update the firmware the utility keeps a copy of your configuration (including any customised codes, and reloads it back on the encoder as part of the firmware update process

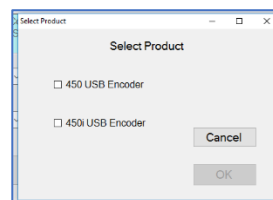Download the new firmware from www.storm-interface.com,

Connect the encoder.

Press **Scan for Device** to find the connected encoder
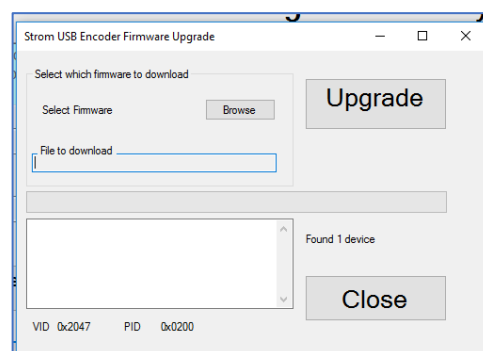
Press **Update Encoder Firmware** and press **Yes**

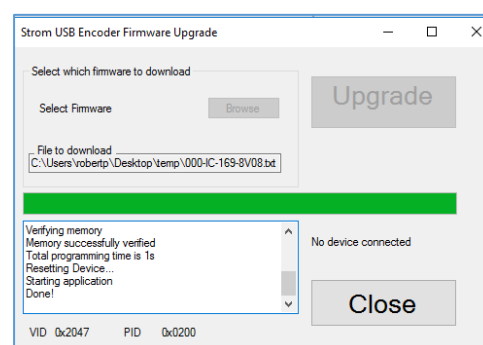Select encoder type and press **OK**

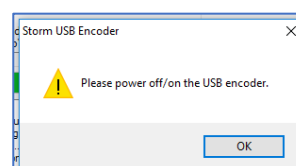Browse to locate the firmware file and press **Upgrade**

The progress bar shows in green.
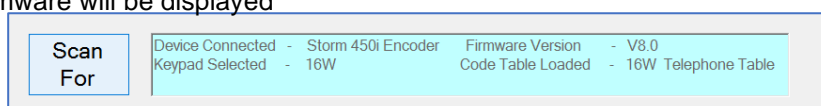
When progress is complete press **Close**

Unplug the cable

Re-connect the cable and press **OK**

Press **Scan For** and the new version of firmware will be displayed

Full Code Table Reference

450 Series USB Encoder with Firmware Revision 8v04
Using Generic HID Keyboard Driver

When customising the code table on the encoder you can place a modifier in front of the USB Code

e.g. E1 , 34 will give you @

USB Usage ID (Dec)	USB Usage ID (Hex)	Usage Name	Note	English U.K. (if different to U.S.) Un-shifted	Shifted	English U.S. Un-shifted	Shifted	Num lock	French	German	Spanish
00	00	Reserved (no event indicated)	9								
01	01	Keyboard Error Roll Over	9								
02	02	Keyboard POST Fail	9								
03	03	Keyboard Error Undefined	9								
04	04	Keyboard a and A	4			a	A				
05	05	Keyboard b and B				b	B				
06	06	Keyboard c and C	4			c	C				
07	07	Keyboard d and D				d	D				
08	08	Keyboard e and E				e	E				
09	09	Keyboard f and F				f	F				
10	0A	Keyboard g and G				g	G				
11	0B	Keyboard h and H				h	H				
12	0C	Keyboard i and I				i	I				
13	0D	Keyboard j and J				j	J				
14	0E	Keyboard k and K				k	K				
15	0F	Keyboard l and L				l	L				
16	10	Keyboard m and M	4			m	M				
17	11	Keyboard n and N				n	N				
18	12	Keyboard o and O	4			o	O				
19	13	Keyboard p and P	4			p	P				
20	14	Keyboard q and Q	4			q	Q				
21	15	Keyboard r and R				r	R				
22	16	Keyboard s and S	4			s	S				
23	17	Keyboard t and T				t	T				
24	18	Keyboard u and U				u	U				
25	19	Keyboard v and V				v	V				
26	1A	Keyboard w and W	4			w	W				
27	1B	Keyboard x and X	4			x	X				
28	1C	Keyboard y and Y	4			y	Y				
29	1D	Keyboard z and Z	4			z	Z				
30	1E	Keyboard 1 and !	4			1	!				
31	1F	Keyboard 2 and @	4	2	"	2	@				
32	20	Keyboard 3 and #	4	3	£	3	#				
33	21	Keyboard 4 and $	4			4	$				
34	22	Keyboard 5 and %	4			5	%				
35	23	Keyboard 6 and ^	4			6	^				
36	24	Keyboard 7 and &	4			7	&				
37	25	Keyboard 8 and *	4			8	*				
38	26	Keyboard 9 and (	4			9	(				
39	27	Keyboard 0 and)				0	)				

Storm Interface

450 Series USB Encoder with Firmware Revision 8v04
Using Generic HID Keyboard Driver

When customising the code table on the encoder you can place a modifier in front of the USB Code

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USB Usage ID (Dec)	USB Usage ID (Hex)	Usage Name	Note	English U.K. (if different to U.S.) Un-shifted	English U.K. Shifted	English U.S. Un-shifted	English U.S. Shifted	English U.S. Num lock	French	German	Spanish
40	28	Keyboard Return (ENTER)	5								
41	29	Keyboard ESCAPE									
42	2A	Keyboard DELETE (Backspace)	13								
43	2B	Keyboard Tab									
44	2C	Keyboard Spacebar									
45	2D	Keyboard - and (underscore)4	4			-	_				
46	2E	Keyboard = and +	4			=	+				
47	2F	Keyboard [and {	4			[	{				
48	30	Keyboard] and }	4			]	}				
49	31	Keyboard \ and |				\	|				
50	32	Keyboard Non-US # and ~	2	#	~	\	|				
51	33	Keyboard ; and :	4			;	:				
52	34	Keyboard ' and "	4	'	@	'	"				
53	35	Keyboard Grave Accent and Tilde	4			`	~				
54	36	Keyboard, and <	4			,	<				
55	37	Keyboard . and >	4			.	>				
56	38	Keyboard / and ?	4			/	?				
57	39	Keyboard Caps Lock11	11								
58	3A	Keyboard F1				F1					
59	3B	Keyboard F2				F2					
60	3C	Keyboard F3				F3					
61	3D	Keyboard F4				F4					
62	3E	Keyboard F5				F5					
63	3F	Keyboard F6				F6					
64	40	Keyboard F7				F7					
65	41	Keyboard F8				F8					
66	42	Keyboard F9				F9					
67	43	Keyboard F10				F10					
68	44	Keyboard F11				F11					
69	45	Keyboard F12				F12					
70	46	Keyboard PrintScreen	1								
71	47	Keyboard Scroll Lock	11								
72	48	Keyboard Pause	1								
73	49	Keyboard Insert	1								
74	4A	Keyboard Home	1			Home Select line of text					
75	4B	Keyboard PageUp	1			PgUp Select text above					
76	4C	Keyboard Delete Forward	1,14			Delete Select text forward					
77	4D	Keyboard End	1			End Select to end					

450 Series USB Encoder with Firmware
Revision 8v04
Using Generic HID Keyboard Driver

When customising the code table on the encoder
you can place a modifier in front of the USB Code

e.g. E1 , 34 will give you @

USB Usage ID (Dec)	USB Usage ID (Hex)	Usage Name	Note	English U.K. (if different to U.S.)		English U.S.			French	German	Spanish
				Un-shifted	Shifted	Un-shifted	Shifted	Num lock			
78	4E	Keyboard PageDown	1			PgDn	Select to page down				
79	4F	Keyboard RightArrow	1			Goes right	Select to right				
80	50	Keyboard LeftArrow	1			Goes left	Select to left				
81	51	Keyboard DownArrow	1			Goes down	Select line down				
82	52	Keyboard UpArrow	1			Goes up	Select line up				
83	53	Keypad Num Lock and Clear	11			Toggles Numlock					
84	54	Keypad /	1			/					
85	55	Keypad *				*					
86	56	Keypad -				-					
87	57	Keypad +				+					
88	58	Keypad ENTER				Enter					
89	59	Keypad 1 and End				End		1			
90	5A	Keypad 2 and Down Arrow				Down arrow		2			
91	5B	Keypad 3 and PageDn				Page down		3			
92	5C	Keypad 4 and Left Arrow				Left arrow		4			
93	5D	Keypad 5						5			
94	5E	Keypad 6 and Right Arrow				Right arrow		6			
95	5F	Keypad 7 and Home				Home		7			
96	60	Keypad 8 and Up Arrow				Up arrow		8			
97	61	Keypad 9 and PageUp				Page up		9			
98	62	Keypad 0 and Insert						0			
99	63	Keypad . and Delete				.		.			
100	64	Keyboard Non-US \ and |	3,6			\	|				
101	65	Keyboard Application	12								
102	66	Keyboard Power	9								
103	67	Keypad =				= on Mac O/S only					
104	68	Keyboard F13									
105	69	Keyboard F14									
106	6A	Keyboard F15									
107	6B	Keyboard F16									
108	6C	Keyboard F17									
109	6D	Keyboard F18									
110	6E	Keyboard F19									
111	6F	Keyboard F20									
112	70	Keyboard F21									

Any Language differences (using Word)

450 Series USB Encoder with Firmware Revision 8v04
Using Generic HID Keyboard Driver

When customising the code table on the encoder you can place a modifier in front of the USB Code

e.g. E1 , 34   will give you @

USB Usage ID (Dec)	USB Usage ID (Hex)	Usage Name	Note	English U.K. (if different to U.S.) Un-shifted	Shifted	English U.S. Un-shifted	Shifted	Num lock	French	German	Spanish
113	71	Keyboard F22									
114	72	Keyboard F23									
115	73	Keyboard F24									
116	74	Keyboard Execute									
117	75	Keyboard Help									
118	76	Keyboard Menu									
119	77	Keyboard Select									
120	78	Keyboard Stop									
121	79	Keyboard Again									
122	7A	Keyboard Undo									
123	7B	Keyboard Cut									
124	7C	Keyboard Copy									
125	7D	Keyboard Paste									
126	7E	Keyboard Find									
127	7F	Keyboard Mute									
128	80	Keyboard Volume Up									
129	81	Keyboard Volume Down									
130	82	Keyboard Locking Caps Lock	12								
131	83	Keyboard Locking Num Lock	12								
132	84	Keyboard Locking Scroll Lock	12								
133	85	Keypad Comma	27								
134	86	Keypad Equal Sign	29								
135	87	Keyboard International115									
136	88	Keyboard International216									
137	89	Keyboard International317									
138	8A	Keyboard International418									
139	8B	Keyboard International519									
140	8C	Keyboard International620									
141	8D	Keyboard International721									
142	8E	Keyboard International822									
143	8F	Keyboard International922									
144	90	Keyboard LANG125									

Any Language differences (using Word)

450 Series USB Encoder with Firmware Revision 8v04
Using Generic HID Keyboard Driver

When customising the code table on the encoder you can place a modifier in front of the USB Code

e.g. E1 , 34   will give you @

USB Usage ID (Dec)	USB Usage ID (Hex)	Usage Name	Note	English U.K. (if different to U.S.) Un-shifted	Shifted	English U.S. Un-shifted	Shifted	Num lock	French	German	Spanish
145	91	Keyboard LANG226									
146	92	Keyboard LANG330									
147	93	Keyboard LANG431									
148	94	Keyboard LANG532									
149	95	Keyboard LANG68									
150	96	Keyboard LANG78									
151	97	Keyboard LANG88									
152	98	Keyboard LANG98									
153	99	Keyboard Alternate Erase7									
154	9A	Keyboard SysReq/Attention1									
155	9B	Keyboard Cancel									
156	9C	Keyboard Clear									
157	9D	Keyboard Prior									
158	9E	Keyboard Return									
159	9F	Keyboard Separator									
160	A0	Keyboard Out									
161	A1	Keyboard Oper									
162	A2	Keyboard Clear/Again									
163	A3	Keyboard CrSel/Props									
164	A4	Keyboard ExSel									
224	E0	Keyboard LeftControl									
225	E1	Keyboard LeftShift									
226	E2	Keyboard LeftAlt									
227	E3	Keyboard Left GUI	10,23								
228	E4	Keyboard RightControl									
229	E5	Keyboard RightShift									
230	E6	Keyboard RightAlt									
231	E7	Keyboard Right GUI	10.24								

Notes on the Code Tables 1-15, 20-34

1 Usage of keys is not modified by the state of the Control, Alt, Shift or Num Lock keys. That is, a key does not send extra codes to compensate for the state of any Control, Alt, Shift or Num Lock keys.

2 Typical language mappings: US: \| Belg: ƒÊ`🯅' FrCa: <}> Dan:🯅f* Dutch: <> Fren:*ƒÊ Ger: #🯅f Ital: u🯅˜ LatAm: }`] Nor:,* Span: }C Swed: ,* Swiss: $🯅' UK: #~.

3 Typical language mappings: Belg:<\> FrCa:🯅á🯅‹🯅â Dan:<\> Dutch:]|[Fren:<> Ger:<|> Ital:<> LatAm:<> Nor:<> Span:<> Swed:<|> Swiss:<\> UK:\| Brazil: \|.

4 Typically remapped for other languages in the host system.

5 Keyboard Enter and Keypad Enter generate different Usage codes.

6 Typically near the Left-Shift key in AT-102 implementations.

7 Example, Erase-Eaze. key.

8 Reserved for language-specific functions, such as Front End Processors and Input Method Editors.

9 Reserved for typical keyboard status or keyboard errors. Sent as a member of the keyboard array. Not a physical key.

10 Windows key for Windows 95, and 🯅gCompose.🯅h

11 Implemented as a non-locking key; sent as member of an array.

12 Implemented as a locking key; sent as a toggle button. Available for legacy support; however, most systems should use the non-locking version of this key.

13 Backs up the cursor one position, deleting a character as it goes.

14 Deletes one character without changing position.

15-20 See additional foot notes in the USB spec

21 Toggle double-byte/single-byte mode

22 Undefined, available for other front end language processors

23 Windowing environment key, examples are Microsoft left win key, mac left apple key, sun left meta key

24 Windowing environment key, example are Microsoft right win key, macintosh right apple key, sun right meta key

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Change History

Instructions for Config Utility		Date	Version	Details	
		16 Aug 24	1.0	Split out from Engineering Manual	

USB Configuration Utility		Date	Version	Details
4500-SW01		1 Aug 13	2.1	First Release
		20 Aug 13	3.0	Increased size of modifier button + Increased size of Select Code Combo box.
		12 Nov 13	4.0	Update in line with 8v04 release
		01 Feb 22	5.1	Update user agreement wording