

Scrambler Wio

Scrambler Wio is small device that is used to keep, and to send and receive private information. It consists of an open source program “Scrambler3.ino” running in a Wio Terminal with a SD card. Reference <https://wiki.seeedstudio.com/Wio-Terminal-Getting-Started/>.



Scrambler Wio’s main function is to scramble and unscramble files using four dedicated subdirectories on the SD card; “ScrambleIn”, “ScrambleOut”, “UnScrambleIn” and “UnScrambleOut”. Files in ScrambleIn are scrambled and placed in ScrambleOut with a file extension of “.SCB”. The files in ScrambleIn are overwritten and deleted in this process. “*.SCB” files in UnScrambleIn are unscrambled and placed in UnScrambleOut. The files in UnScrambleIn are deleted in this process.

The “*.SCB” files contain the original file information in randomized bytes that randomly appear in a file of random bytes that is over four times larger than the original file. The scrambling/unscrambling is controlled by a 4 to 10 digit “KEY” and static data in the program and in the SD card. All three of these are required for the successful scrambling and unscrambling of files! Only somebody with the exact three will be able to unscramble files created by these three. The static data in the program and the SD card are intended to be independently set up for a particular user or set of users.

The Scrambler program will take the user through four modes in the following order.

1. All the files in UnScrambleOut will be overwritten and deleted. Note, the user should never delete files in this subdirectory!
2. The user is allowed to create, view, and edit files in ScrambleIn. Only the first 256 characters can be viewed/changed!
3. The user can enter a 4 to 10 digit “KEY” to preform the main function of scrambling and unscrambling of files. The user can also first enter a separate 4 to 10 digit “KEY” to further mutate the program.
4. The user is allowed to create, view, and edit files in UnScrambleOut. Only the first 256 characters can be viewed/changed!

The 2nd and 4th modes use a mini-editor and is only intentioned to be used for simple editing. It displays/uses special “symbols” for new-line (carriage-return) and blank (or NULL) as follows: ‘Ç’ & ‘■’. The display only displays the basic english characters. All other characters (bytes) are replaced with blank. It is intended to edit/view things like passwords/pins that will only leave Scrambler Wio by it’s display or in scrambled files.

The mini-editor input is by the Wio joystick. It is used to move through a file's characters or to select a different character. A joystick-press is alternately used to select a file character or a different character. A different character is selected by navigating a 4 line by 26 character table of available characters (see following table). This table also includes four special characters ('«', '»', '■' and '▣') for backspace, insert, password-creation, and file-deletion. To save the file and/or exit press the edge-button on the top-left opposite the joystick.

The "different character" table:

«	»	Ç	▪	0	1	2	3	4	5	6	7	8	9	.	,	"	'	-	?	:	!	;	▪	▪	▪
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
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
&	_	`	~	@	#	\$	%	()	=	+	-	*	/	^	<	>	[]	{	}	\		■	▣



The 3rd mode is controlled by a simple display/interface. The joystick is used to control the entry of digits into the displayed "KEY", and to select actions as follows: '←' will remove the last entered digit. '→' will use the displayed "KEY" to scramble and unscramble files. 'R' will reset this 3rd mode to it's original state. 'M' will use the displayed "KEY" to mutate the program. 'E' will exit without scrambling and unscrambling files. '?' is a spare action (and is the same as 'E').

Scrambler Wio can not guaranty that files stay private. Only a knowledgeable user can do that.

Notes:

1. After using the unscrambled files in UnScrambleOut, Scrambler Wio should be turn on with the SD card inserted, so that the 1st mode can overwrite and delete the unscrambled files! All other unscrambled files should be deleted by moving them to UnScrambleIn and then turning Scrambler Wio on with the SD card inserted, so that these files are overwritten and deleted.
2. Files that are frequently unscrambled can be write-protected to keep them in UnScrambleIn.
3. See "SDCARD" folder for example of the SDCARD setup that also contains test files.

Know Bugs or Issues:

1. Scrambler Wio (program) can hangup when unscrambling a bad .SCB file or with an incorrect key or static data.