Elite EL Drive

Developer Guide V2.0.5.0

SENSESHIELD

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1

Overview

About the Guide

Product Name	Model	Version	Releasing Date
Elite EL Drive	--	v2.0.5.0	2017

▪ CONVENTIONS USED

The following conventions are used throughout this document:

Italic	File Names and Directory Names.
Bold	Keystrokes, Menu Items, and Window Names and Fields
`Consolas`	API parameter
Arial	API Macro, Error Code
CAP	API Struct
	Critical Information

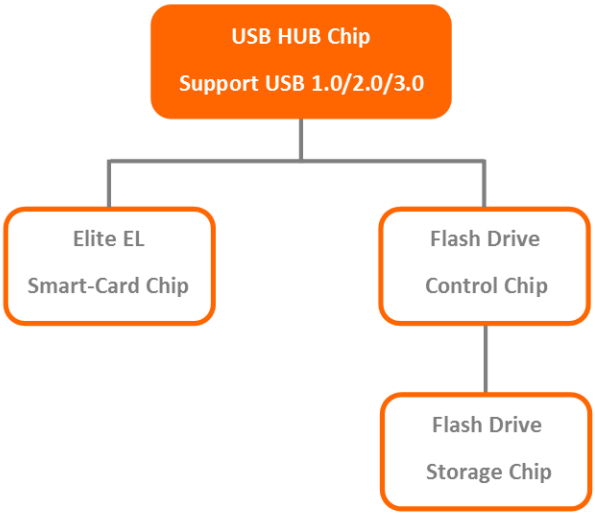
▪ DOCUMENT IMPROVEMENT

Document Writing Team dedicates to insure the accuracy and completeness of context. Your feedback will assist them to make continuous improvement on Elite EL document. Please do not hesitate to email us sense@sense.com.cn.

What is EL Drive?

Elite Drive integrated flash drive mode with EL device based on smart card technology. It is a new option for value-added application of software with flash drive chip featured by great security, rapid communication, strong reliability, and high capacity.

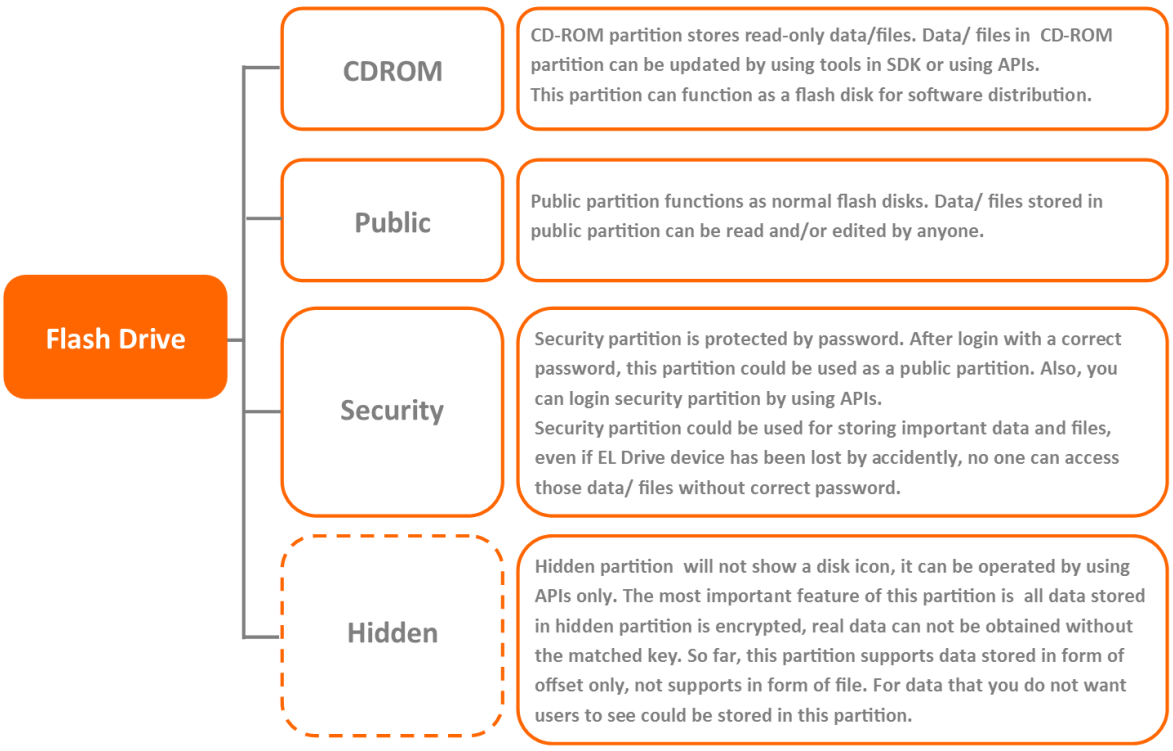
Following is the hardware structure of EL Drive:



(Figure 1)

The dongle part and the flash drive part of EL Drive are separated by hardware and functionally independent to each other.

There are 4 storage types in the flash drive part, showing as following:



(Figure 2)

These 4 different partitions can combine with each other in 6 combination modes:

Mode	Partition Combination
Initialize	Public Only
Mode-A	Public/ Security
Mode-B	CD-ROM+ Public only
Mode-C	Public +Public/ Security
Mode-D	CD-ROM+ Public/ Security
Mode-E	CD-ROM Only

All these above modes can be set with hidden partition. Under each mode, the volume of each partition can be set by tool or by using APIs.

Features

- **Multi-options for Partition**
  Elite Drive is customizable for a verity of partition schemes (Security Partition, Public Partition, Hidden Partition, and CD-ROM). It enables developers to choose the most feasible for the unique demand of software product and determines the size of partition freely.

- **Password Protection**
  Only user with valid password can access the protection zone. Even if the Elite Drive is lost, data is still under protection. (Windows systems only)

- **No Interference**
  The dongle and the Flash drive works independently from each other, without interference. Users may need to develop encryption functions respectively according to their requirements.

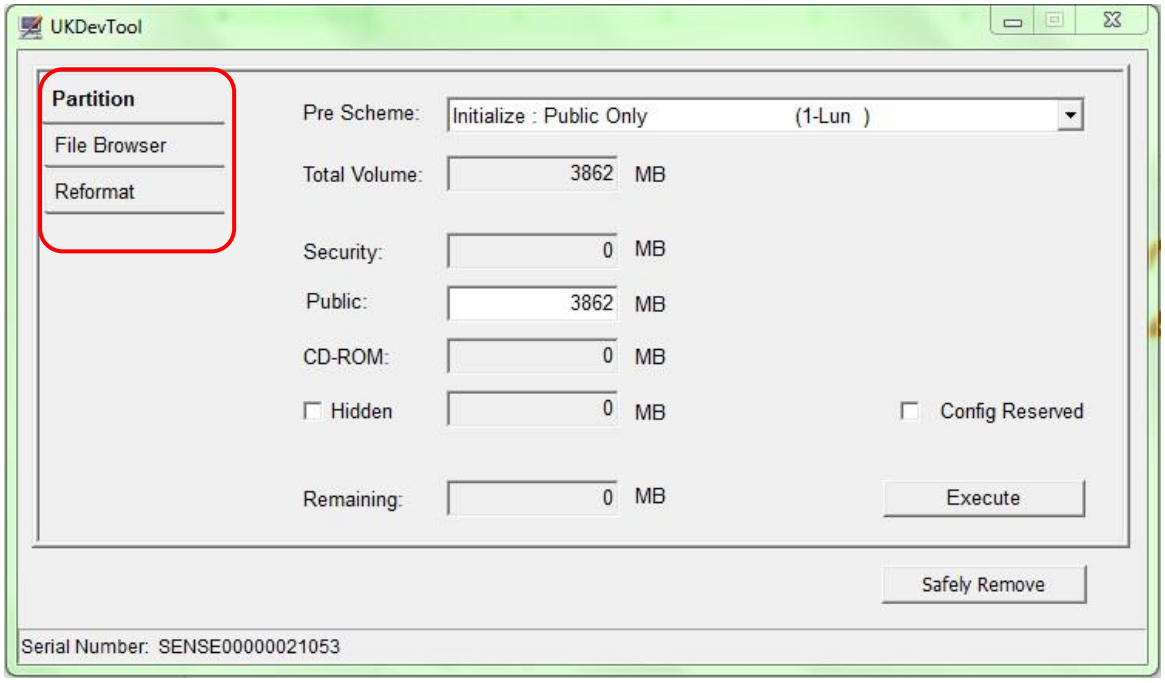
- **Two-color LED Display**
  It is clear to know the working status of the dongle and the flash drive respectively.

2

Developer Tool – UKDevTool

The *UKDevTool* is the tool for developers to customize the flash disk for meeting requirements of software products. As a verity of software differed in size and operating mode, the *UKDevTool* is built with more flexibility, especially that developers could partition the flash chip with multiple schemes and self-defined capacities.

The *UKDevTool* has 3 main functions: **Partition**, **File Browser** and **Reformat**, as the labels at the left of the tool interface show below (Figure 3).



(Figure 3)

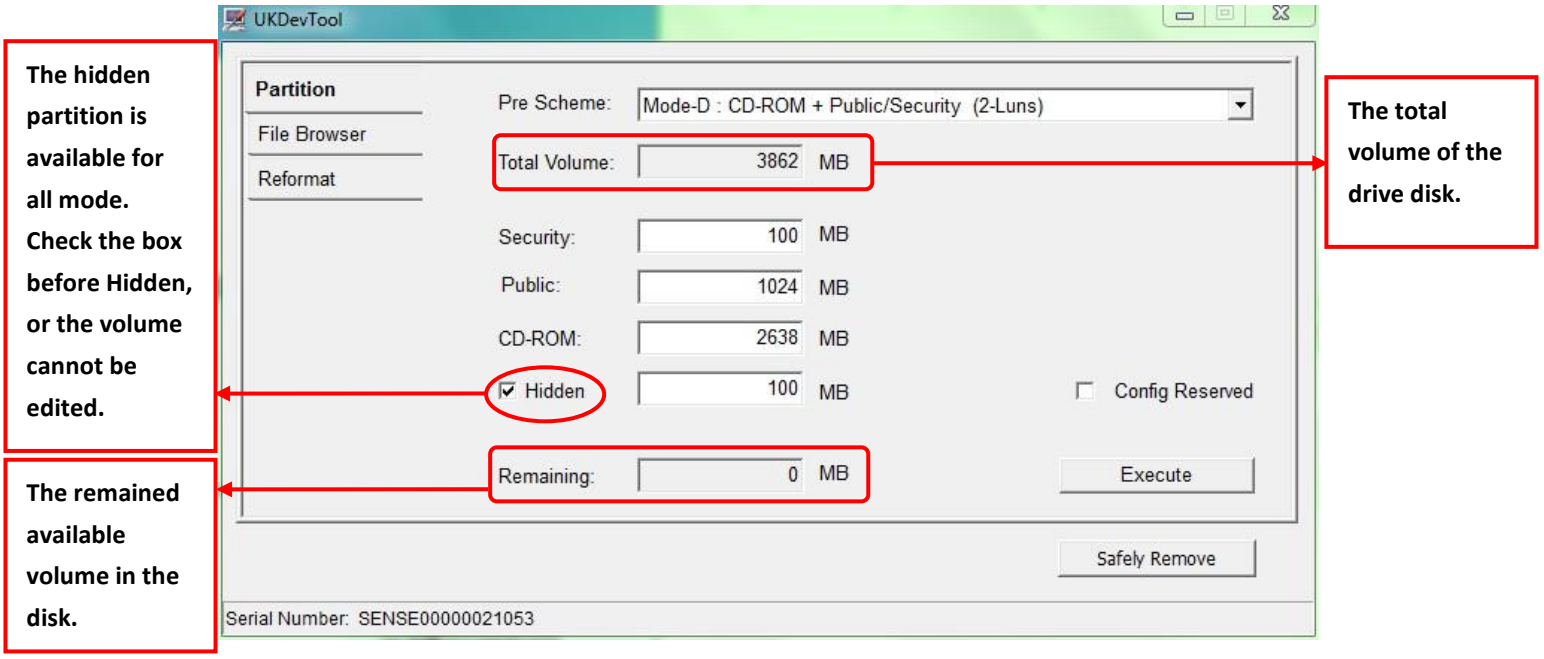
At **Partition** sheet, you can set partition mode, and the volume for different partitions for the flash disk.

At **File Browser** sheet, you can check data stored in *Security Partition* and *Public Partition*, as well as update the *CD-ROM Partition*.

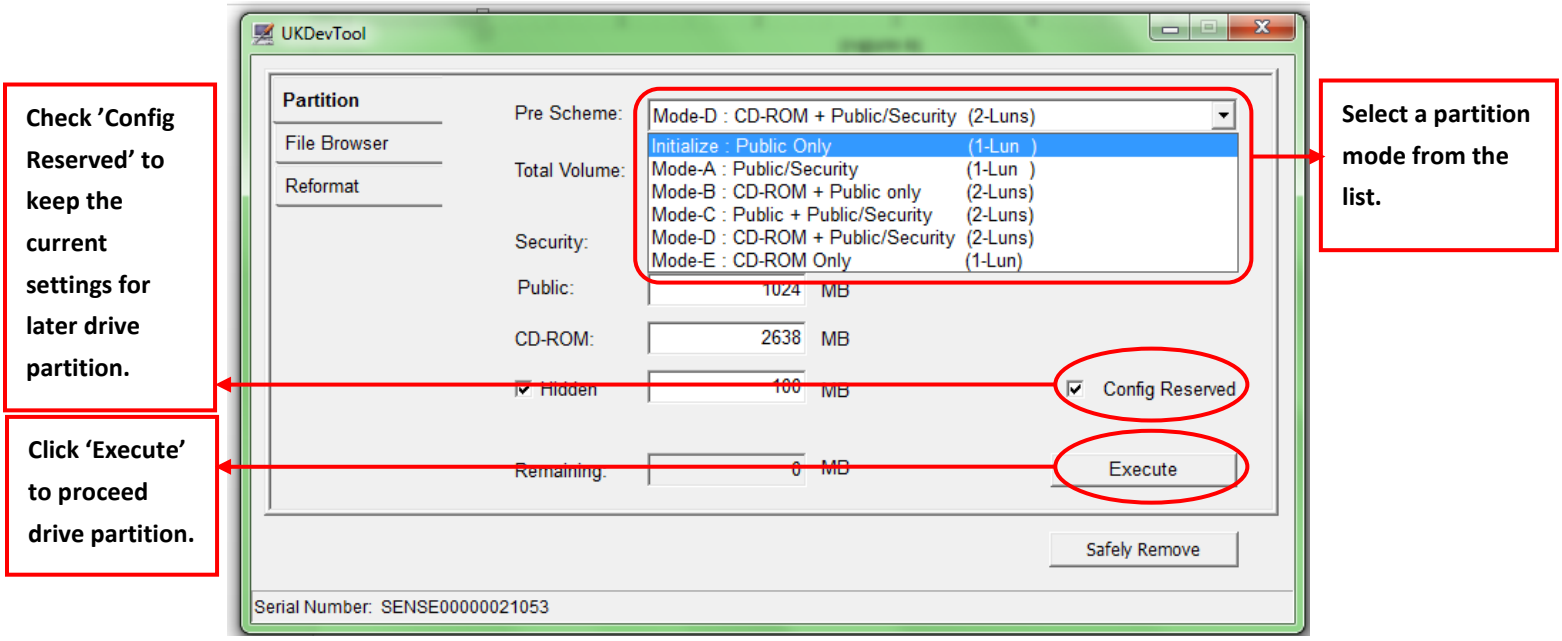
At **Reformat** sheet, you can reformat *Security Partition* or *Public Partition* separately.

Partition

Plug in EL Drive device and double click to open *UKTool*.exe under directory of *%SDK% /tools*, showing as following (Figure 4-5). The default current interface is the **Partition** panel. In this panel, you can set partition mode and customize volume for each partition.



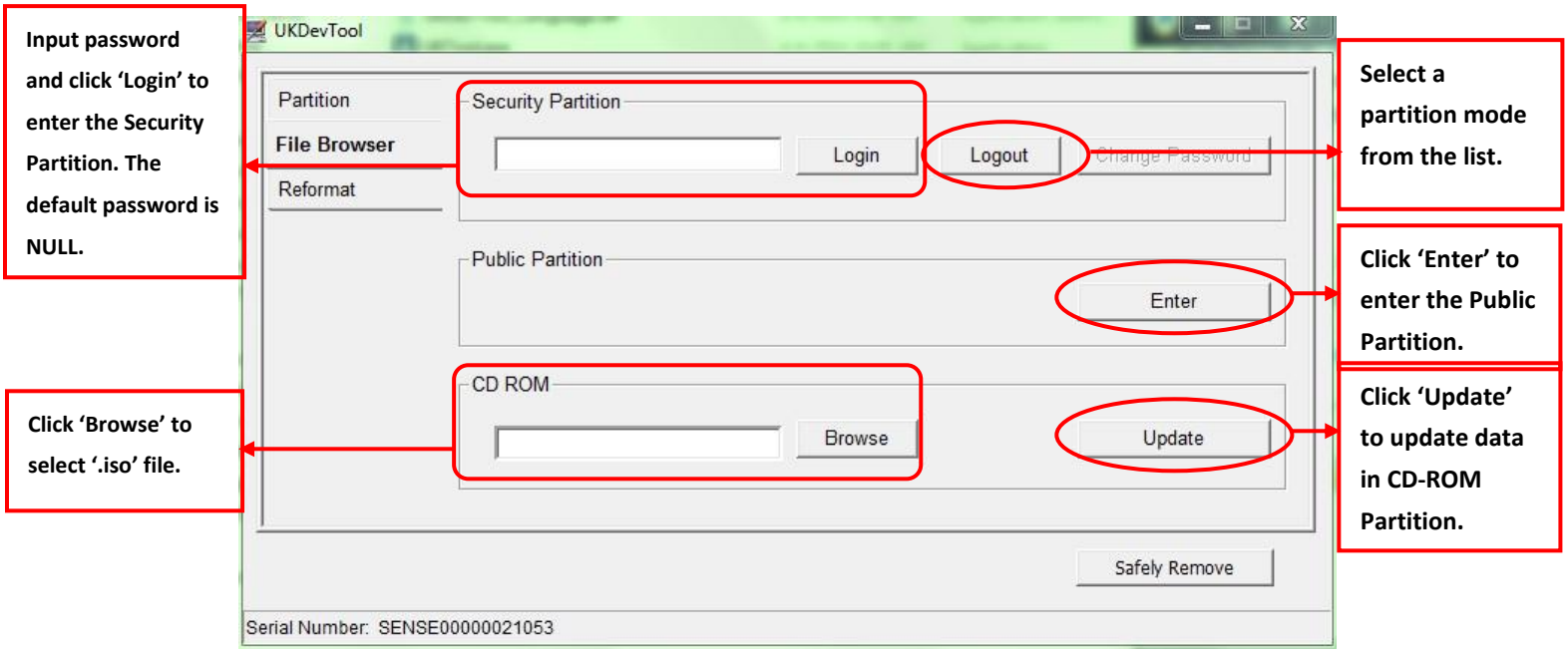
(Figure 4)



(Figure 5)

File Browser

Click **File Browser** label to bring the file browser panel to the front (Figure 6).

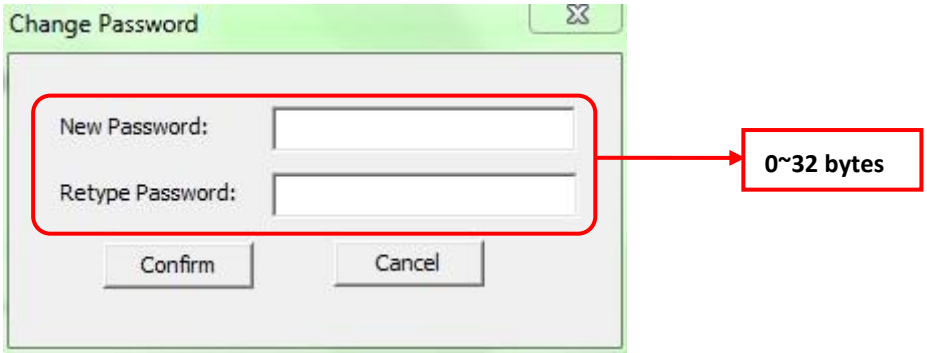


(Figure 6)

The default password is NULL, click 'Login' to enter into the Security Partition.

The password will be re-set to NULL after drive re-partition.

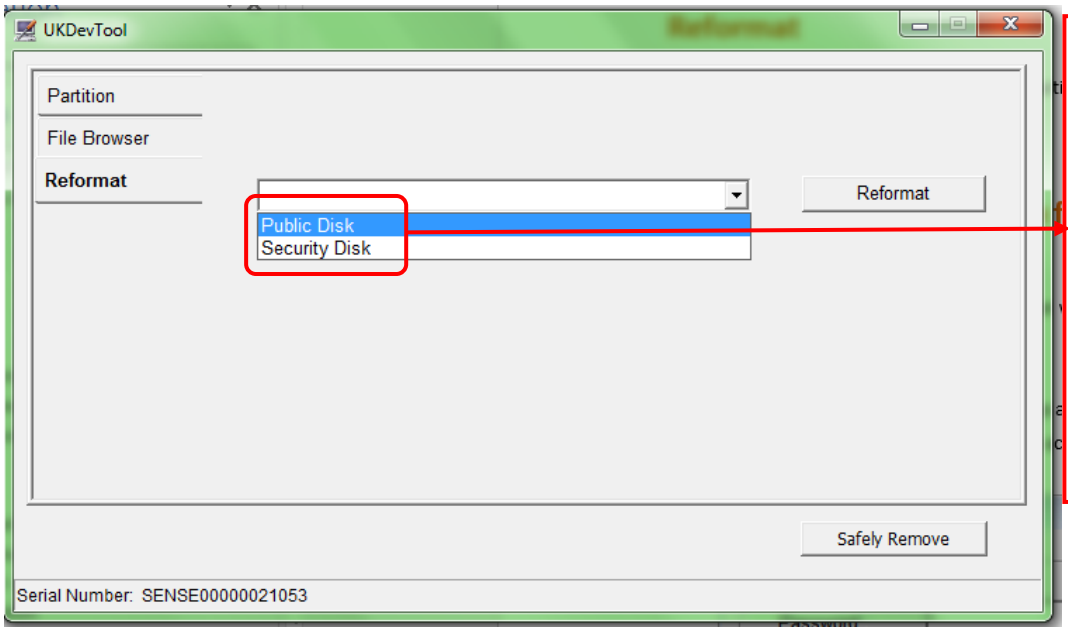
Input password and login into the Security Partition, click 'Change Password' button, a box as following will pups out. Input new password twice to change the password (Figure 7).



(Figure 7)

Reformat

Click Reformat label to bring the reformat panel to the front (Figure 8). Mode *Initialize: Public Only* and *Mode-E: CD-ROM Only* are NOT support reformat function.



Select 'Public Disk' and then click 'Reformat' to reformat the Public Partition.

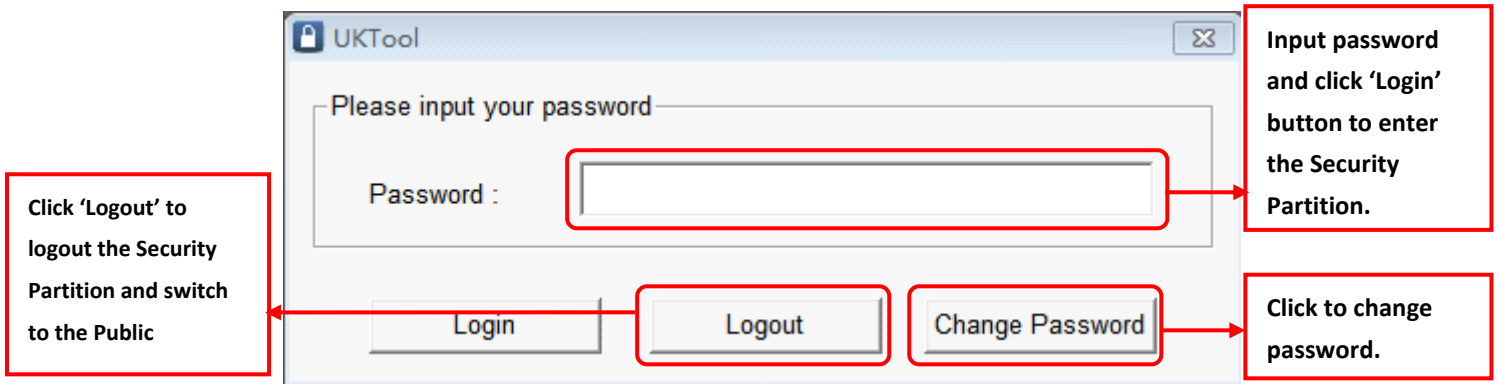
Select 'Security Disk' and then click 'Reformat' to reformat the Security Partition.

(Figure 8)

3

User Tool – UKTool

This tool is for users visiting **Security Partition** (supported windows only). This application is install-free. Double click *UKTool.exe* under *%SDK% \Tools* to run the **UKTool** (Figure 9).



(Figure 9)

After login, a lock-like icon will show in the tray bar. Right-click the icon a menu list will show up.



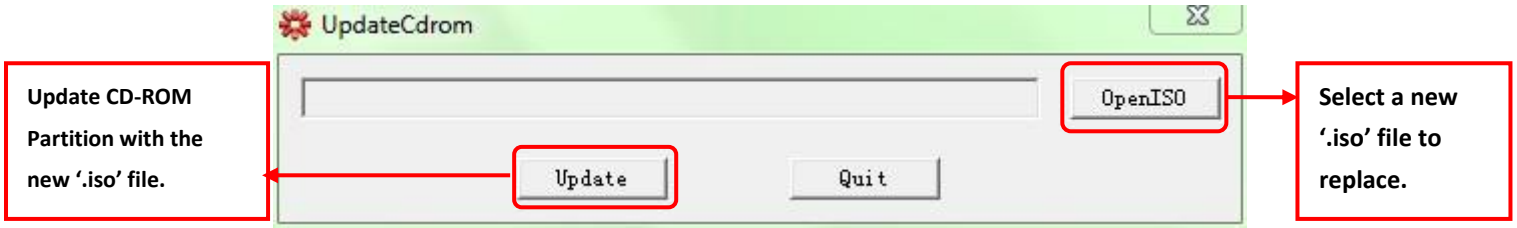
(Figure 10 & 11)

4

User Tool – UpdateCdrom

UpdateCdrom is a little tool used for updating data in CD-ROM Partition, same as the CD-ROM update function in the *UKDevTool*.

Double click *UpdateCdrom.exe* under*%SDK%\Tools* to open (Figure 12).



(Figure 12)

API References 5

APIs are for developers to read & write on all partitions (Windows only).

Following APIs are used for flash drive part operating only, please refer to *Elite EL Developer Guide v3.3.0.0* for APIs of Elite EL device part.

UKGetLetters

Retrieve the drive letter of removable disk.

```
DWORD WINAPI UKGetLetters (IN DWORD dLetterType,
                           OUT CHAR *pcLetters,
                           OUT DWORD *pdLetterNum);
```

Parameters

dLetterType	[IN] Type of drive letter.
pcLetters	[OUT] Name of drive letter.
pdLetterNum	[OUT] Number of drive letter.

Return Value

Refer to ***Returned Value***.

Remarks

1. The buffer that *pcLetters* pointed should be large enough to accommodate the acquired U-disk drive letter (A drive letter occupies one byte with a '\0' as terminator), otherwise access array bounds error will be occurred.

2. Type of drive letter

UK_GET_ALL_LETTER	Get all drive letter, including drive letters of all El Drive device.
UK_GET_REMOVE_LETTER	Get all drive letter for Public Partition, including drive letters for Public Partition of all EL Drive devices.

UK_GET_CDROM_LETTER	Get all drive letter for CD-ROM Partition, including drive letters for Public Partition of all EL Drive devices.



Generally, without special requirement, it is recommended to use *UK_GET_ALL_LETTER* to get the first drive letter of EL Drive device.

UKControl

Send control code to EL Drive device.

```
DWORD WINAPI UKControl(IN CHAR    cLetter,
                       IN DWORD   dwCtrCode,
                       IN VOID    *pInBuffer,
                       IN DWORD   dwInBufferLen,
                       OUT VOID   *pOutBuffer,
                       IN DWORD   dwOutBufferLen,
                       OUT DWORD  *pdwBytesReturned);
```

Parameters

cLetter	[IN] Drive letter of flash drive.
dwCtrCode	[IN] Type of the control message.
pInBuffer	[IN] Pointer for the input buffer, storing additional data for the control code.
dwInBufferLen	[IN] Length of the data in input buffer.
pOutBuffer	[OUT] Pointer to the output buffer, storing the returned information from device after sending the control code.
dwOutBufferLen	[IN] Size of output buffer.
pdwBytesReturned	[OUT] Address for a DWORD variable, saving length of the data actually returned to *pOutBuff*, cannot be NULL.

Return Value

Refer to ***Returned Value***.

Remarks

UKControl supports following control code types:

Parameter	Attributes
UK_GET_SERIAL_NUMBER	Purpose: Get device serial number.
	Input: None
	Output: 16 bytes serial number. Output buffer must be more than 16 bytes for the output include a '\0' terminator.

UKHiddenAreaWrite

Write data into hidden partition.

```
DWORD WINAPI UKHiddenAreaWrite(IN CHAR       cLetter,
                               IN ULONGLONG WritePos,
                               IN UCHAR    *pWriteBuff,
                               IN DWORD    WriteLength ,
                               IN UCHAR *pTdesKey);
```

Parameters

cLetter	[IN] Drive letter of flash drive.
WritePos	[IN] Inputted initial offset (in byte, start with 0).
pWriteBuff	[IN] Inputted data.
WriteLength	[IN] Length of the inputted data.
pTdesKey	[IN] Key of TDES, must be 16 bytes (cannot be all 0x00).

Return Value

Refer to ***Returned Value***.

Remarks

1. If TDES key has been set, all data written into the Hidden Partition is encrypted with the key.
2. If the TDES key set as NULL, all data written into the Hidden Partition as plaintext.



The last 512 bytes in Hidden Partition cannot be used, the actual available volume of the Hidden Partition is the setting volume minus 512 bytes.

UKHiddenAreaRead

Read data stored in Hidden Partition.

```
DWORD WINAPI UKHiddenAreaRead(IN  CHAR    cLetter,
                              IN  ULONGLONG  ReadPos,
                              OUT UCHAR  *pReadBuff,
                              IN  DWORD  ReadLength ,
                              IN UCHAR *pTdesKey);
```

Parameters

cLetter	[IN] Drive letter of flash drive.
ReadPos	[IN] Inputted initial offset (in byte, start with 0).
pReadBuff	[IN] Inputted data.
ReadLength	[IN] Length of the Inputted data.
pTdesKey	[IN] Key of TDES, must be 16 bytes (cannot be all 0x00).

Return Value

Refer to ***Returned Value***.

Remarks

1. If TDES key has been set, all data read from the Hidden Partition will be decrypted with the key.
2. If the TDES key set as NULL, all data from the Hidden Partition will be read as plaintext.



The last 512 bytes in Hidden Partition cannot be used, the actual available volume of the Hidden Partition is the setting volume minus 512 bytes.

UKPassAreaLogin

Security Partition, login authentication.

```
DWORD WINAPI UKPassAreaLogin(IN CHAR   cLetter,
                             IN CHAR  *pLoginPass);
```

Parameters

cLetter	[IN] Drive letter of flash drive.
pLoginPass	[IN] Login password, must be less than 32 bytes (could be NULL).

Return Value

Refer to ***Returned Value***.

Remarks

If the there is no password for the Security Partition, the data transfer into *pLoginPass* is NULL.

UKPassAreaLogout

Log out the Security Partition.

```
DWORD WINAPI UKPassAreaLogout(IN CHAR  cLetter);
```

Parameters

cLetter	[IN] Drive letter of flash drive.

Return Value

Refer to ***Returned Value***.

UKPassAreaChangePwd

Change password for the Security Partition.

```
DWORD WINAPI UKPassAreaChangePwd(IN CHAR   cLetter,
                                 IN CHAR  *pOldPass,
                                 IN CHAR  *pNewPass);
```

Parameters

cLetter	[IN] Drive letter of flash drive.
pOldPass	[IN] Old Password (less than 32 byte, NULL available)
pNewPass	[IN] New Password (less than 32 byte, NULL available)

Return Value

Refer to ***Returned Value***.

UKWriteCdrom

Write ISO file into CD-ROM Partition.

```
DWORD WINAPI UKWriteCdrom(IN CHAR   cLetter,
                          IN CHAR  *pFilePathName);
```

Parameters

cLetter	[IN] Drive letter of CDROM.
pFilePathName	Pointer of the directory of ISO file.

Return Value

Refer to ***Returned Value***.

Remarks

It is required to use CDROM drive letter in this function.

UKSetDiskCurrentMode

Repartition the flash drive.

```
DWORD WINAPI UKSetDiskCurrentMode(IN DWORD  dwPublicSize,
                                  IN DWORD dwSecuritySize,
                                  IN DWORD dwIndLunSize,
                                  IN DWORD dwResvAreaSize,
                                  IN INT   nCurrentMode,
                                  IN CHAR  cLetter);
```

Parameters

dwPublicSize	[IN] Volume of Public Partition (MB).
dwSecuritySize	[IN] Volume of Security Partition (MB).
dwIndLunSize	[IN] Volume of Public Partition or CD-ROM Partition when current mode is 2, 3, 4, 5 (MB).
dwResvAreaSize	[IN] Volume of Hidden Partition (MB).
nCurrentMode	[IN] Partition Mode. 6 modes, from 0 to 5.
cLetter	[IN] Drive letter of flash drive.

Return Value

Refer to ***Returned Value***.

Remarks

Mode number, macro definition constant parameter and mode details showing as following chart:

Mode No.	Macro Definition Constant Parameters	Details	
0	MODE_ONLY_PUBLIC	Public only	(1-Lun)
1	MODE_PUBSEC	Public/Security	(1-Lun)
2	MODE_CDROM_PUBLIC	CDROM + Public	(2-Luns)
3	MODE_PUBLIC_PUBSEC	Public + Public/Security	(2-Luns)
4	MODE_CDROM_PUBSEC	CDROM + Public/Security	(2-Luns)
5	MODE_ONLY_CDROM	CDROM only	(1-Lun)

- Without change the partition mode, data that already stored in the Hidden Partition or CD-ROM Partition will not be delete by re-partitioning. For example, you can reset the Hidden Partition from 100MB to 50MB without changing the data stored in the Hidden Partition.

- If the total partition volume parameters are less than the actual device volume:



  a) When there is a Public Partition (Mode 1-5), the unassigned volume will be assigned to the Public Partition.
  b) When there is CD-ROM Partition only (Mode 6), the unassigned volume will be assigned to the Hidden Partition.

  If the total partition volume parameters are more than the actual device volume, it will return an error value.

- After re-partition, the drive letter might not updated automatically. Re-plug in EL Drive device to PC could solve this problem.

UKGetDiskCurrentMode

Get current partition mode and the volume for each partition.

```
DWORD WINAPI UKGetDiskCurrentMode(OUT  DWORD   *pdwTotalSize,
                                       OUT  DWORD  *pdwPublicSize,
                                       OUT  DWORD  *pdwSecuritySize,
                                       OUT  DWORD  *pdwIndLunSize,
                                       OUT  DWORD  *pdwResvAreaSize,
                                       OUT  INT    *pnCurrentMode,
                                       IN  CHAR    cLetter);
```

Parameters

pdwTotalSize	[OUT] Pointer of total volume (MB).
pdwPublicSize	[OUT] Pointer of Public Partition (MB).
pdwSecuritySize	[OUT] Pointer of Security Partition (MB).
pdwIndLunSize	[OUT] Volume of Public Partition or CD-ROM Partition when current mode is 2, 3, 4, 5(MB).
pdwResvAreaSize	[OUT] Pointer of Hidden Partition (MB).
pnCurrentMode	[OUT] Pointer of current partition mode.
cLetter	[IN] Drive letter of flash drive.

Return Value

Refer to ***Returned Value***.

UKGetApiVersion

Get current partition mode and the volume for each partition.

```
DWORD WINAPI UKGetApiVersion(OUT DWORD *pdwVersion);
```

Parameters

pdwTotalSize	[OUT] Pointer of version.

Return Value

Refer to ***Returned Value***.

Returned Value

Returned Value		Explanation
UK_SUCCESS	0x00000000	Operation succeeded.
UK_ERROR_NO_LETTER	0x00000081	Cannot find the drive letter.
UK_ERROR_LETTER	0x00000082	Drive letter error.
UK_ERROR_PARA	0x00000083	Parameter error.
UK_ERROR_PASSWORD	0x00000084	Password error.
UK_ERROR_OFFSET	0x00000085	Read/write offset of Hidden Partition error.
UK_ERROR_FILESIZE	0x00000086	File size error.
UK_ERROR_OTHER	0x00000087	Other error.

Samples

6

- CD-ROM Auto run
- Write data in to the Hidden Partition and read data from the Hidden Partition
- Login/logout the Security Partition, change password