Rockchip
瑞芯微电子

RK Vendor Storage Application Note

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Revision History

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Revision No.	Revised Details	Released Date	Remark
Rev.00	Initial Draft	2016.11.28	
Rew.01	Update ID DEFINE	2016.12.21	
Rew.02	Update ID DEFINE	2017.01.23	

Contents

Application Note Summary

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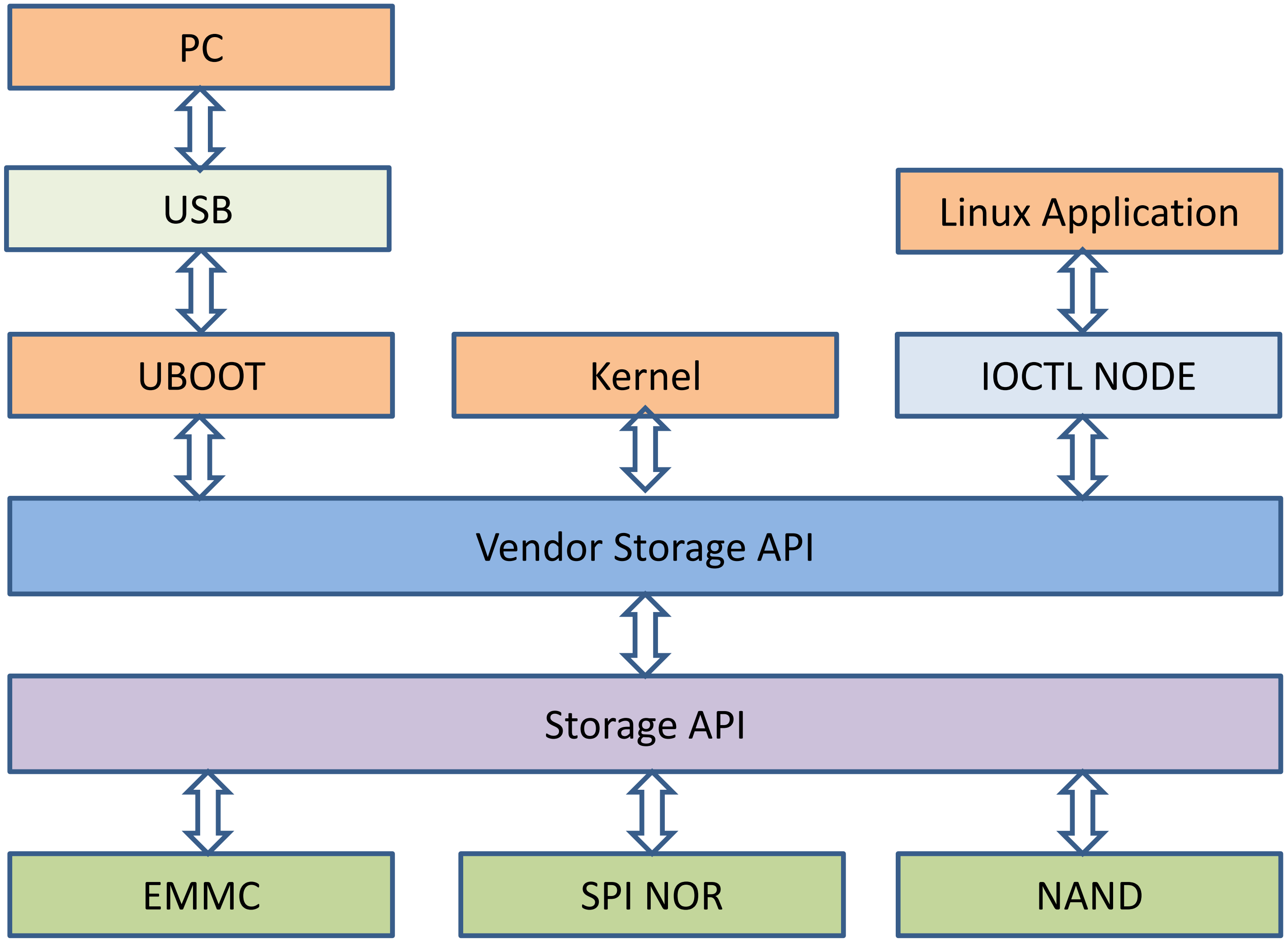
Vendor storage is designed for stored SN, MAC and other vendor data.

Feature:

- ◆ Unique ID Access
- ◆ Reliable Data Validation
- ◆ Power Lost Recovery
- ◆ Writable and Readable for PC
- ◆ Writable and Readable for UBOOT
- ◆ Writable and Readable for Kernel
- ◆ Writable and Readable for Linux Application

Vendor Storage Architecture



Data Layout (1)

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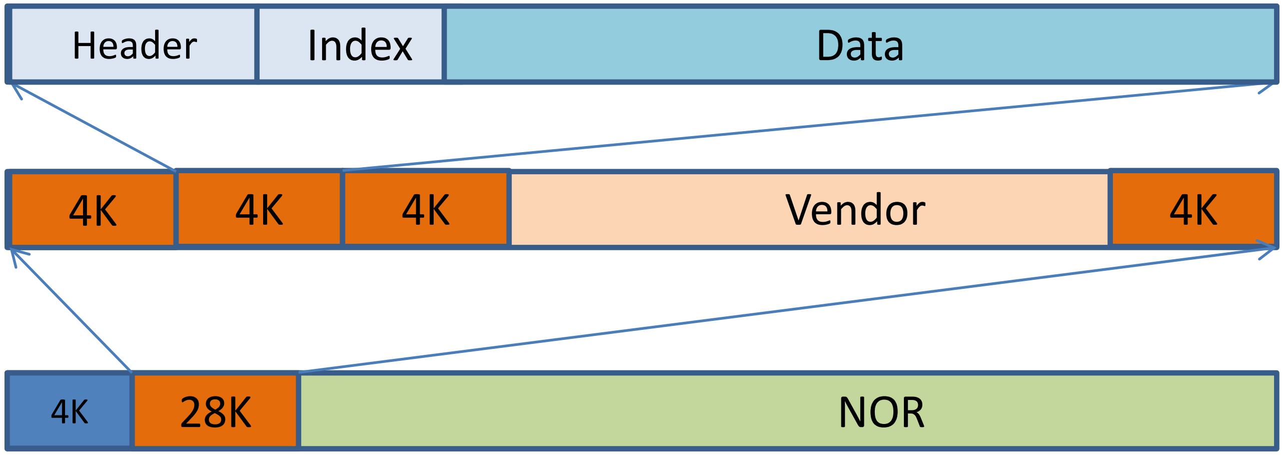
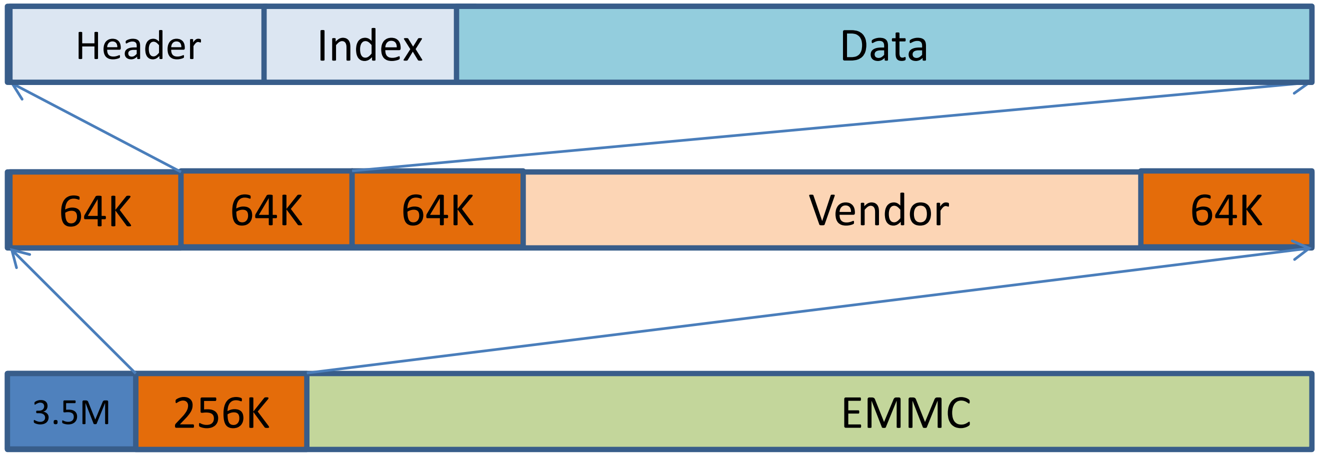
SPI NOR Data Layout:



EMMC Data Layout:



Data Layout (2)

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Offset(B)	Size(B)	Name
0x0000	0x0004	Tag, the value is 0x524B5644.
0x0004	0x0004	Version, increase after write
0x0008	0x0002	Next index
0x000A	0x0002	Total items
0x000C	0x0002	Free offset
0x000E	0x0002	Free size
0x0010	0x0002	Item0->id
0x0012	0x0002	Item0->offset
0x0014	0x0002	Item0->size
0x0016	0x0002	Item0->flag(reversed)
0x0018	0x0008	Item1
…	…	Item x
---	---	Data
Size – 0x08	0x0004	Hash
Size – 0x04	0x0004	Version2, the value is the same as the Version

ID DEFINE

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ID	Function
0	reserved
1	SN
2	WIFI MAC
3	LAN MAC
4	BT MAC
5	HDPC KEY
6 – 15	RK reserved for future use
16 - 65535	Vendor use

Note:

Data is in accordance with the 64 - bytes alignment stored in the NVM, this suggests that a minimum allocation for each item is 64 bytes, so write 1-64 bytes, the space will be allocated as 64 bytes, write 65-128 bytes, the space will be allocated as 128 bytes.

API For UBOOT

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Source code : u-boot/board/rockchip/common/storage/storage.c

API:

- int vendor_storage_init(void)

  function: Initialize vendor storage

  input : none

  return: 0, Initialize success

  other, Initialize fail

- int vendor_storage_read(u32 id, void *pbuf, u32 size)

  function: read vendor storage by id

  input : id, item id; pbuf, data buffer; size, number byte to read.

  return: other: number byte have read.

  -1, read fail.

API For UBOOT

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- int vendor_storage_write(u32 id, void *pbuf, u32 size)

  function: write vendor storage by id

  input : id: item id; pbuf: data buffer; size: number bytes to write.

  return: 0: write success

  other: write fail

API For Kernel

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Source code : kernel/drivers/soc/rockchip/rk_vendor_storage.c
kernel/drivers/soc/rockchip/sdmmc_vendor_storage.c

API:

- ◆ int rk_vendor_read(u32 id, void *pbuf, u32 size)
  function: read vendor storage by id
  input : id: item id; pbuf: data buffer; size: number bytes to read.
  return: other: number byte have read.
  -1: read fail
- ◆ int rk_vendor_write(u32 id, void *pbuf, u32 size)
  function: write vendor storage by id
  input : id, item id; pbuf: data buffer; size: number bytes to write.
  return: 0: write success
  other : write fail

Kernel configuration

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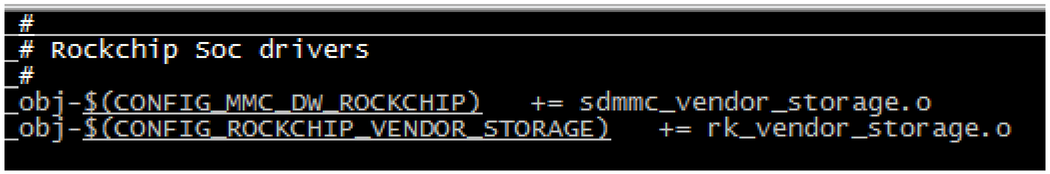
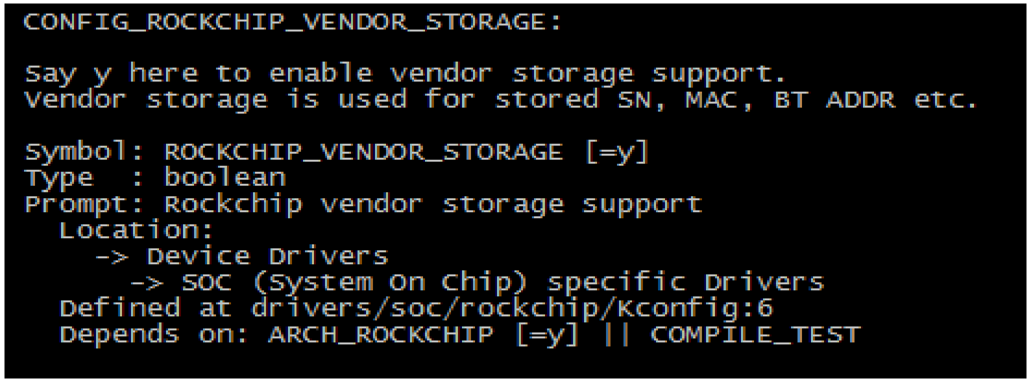
Makefile:



```
#
# Rockchip Soc drivers
#
obj-$(CONFIG_MMC_DW_ROCKCHIP)    += sdmmc_vendor_storage.o
obj-$(CONFIG_ROCKCHIP_VENDOR_STORAGE)    += rk_vendor_storage.o
```

Menuconfig:



```
CONFIG_ROCKCHIP_VENDOR_STORAGE:

Say y here to enable vendor storage support.
Vendor storage is used for stored SN, MAC, BT ADDR etc.

Symbol: ROCKCHIP_VENDOR_STORAGE [=y]
Type  : boolean
Prompt: Rockchip vendor storage support
  Location:
    -> Device Drivers
      -> SOC (System On Chip) specific Drivers
  Defined at drivers/soc/rockchip/Kconfig:6
  Depends on: ARCH_ROCKCHIP [=y] || COMPILE_TEST
```

PC Demo Tool

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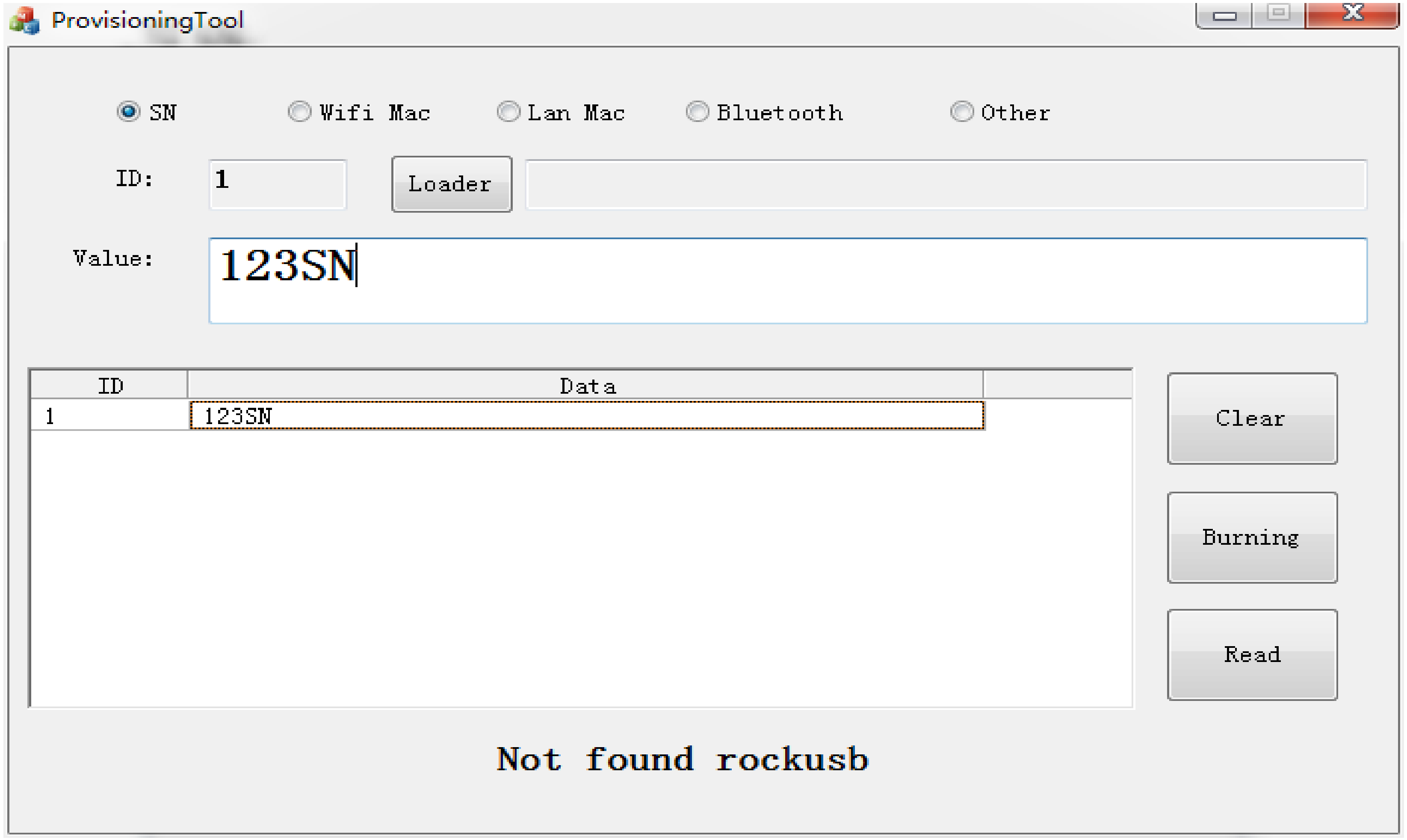
Select SN option and input SN value, press **ENTER** key to add SN item to write request list：



ProvisioningTool

[✓ SN] Wifi Mac Lan Mac Bluetooth Other

ID: 1

Value: 123SN

ID	Data
1	123SN

Not found rockusb

PC Demo Tool

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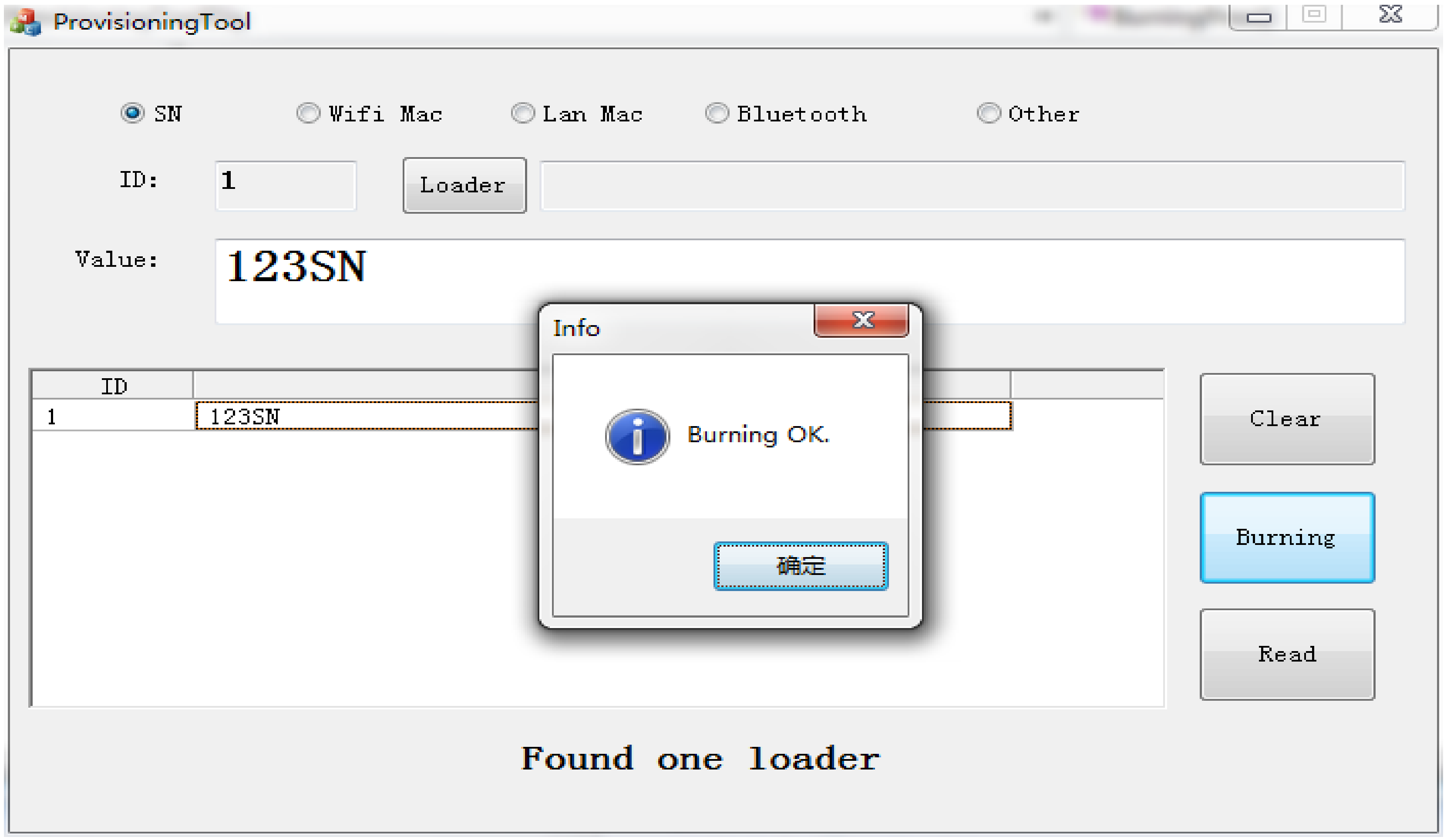
Press **Burning** button will write data to vendor storage:



ProvisioningTool

[✓ SN] Wifi Mac Lan Mac Bluetooth Other

ID: 1

Value: 123SN

ID	
1	123SN

Info

Burning OK.

Found one loader

PC Demo Tool

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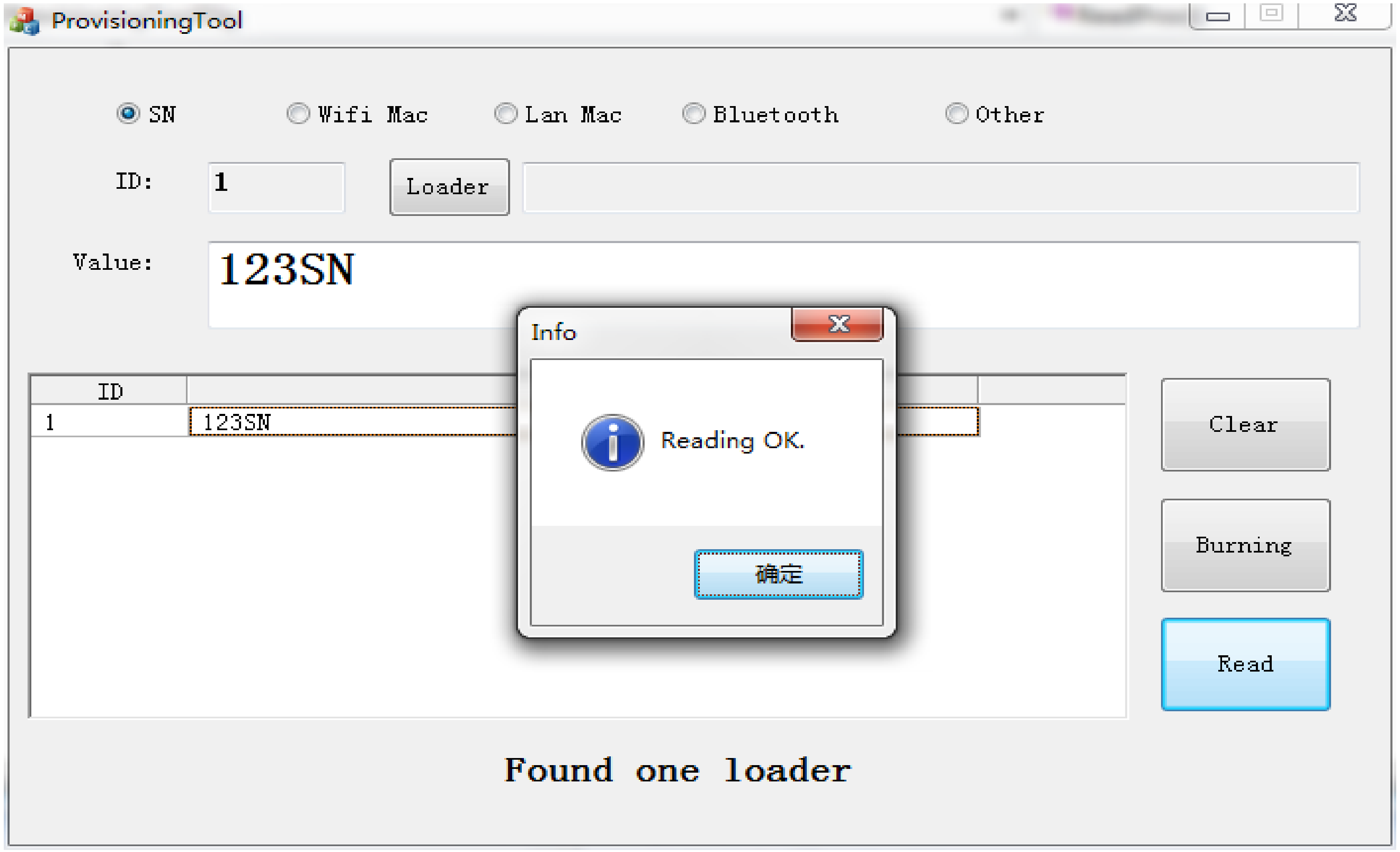
Select SN option and press **Read** button to read data form vendor storage：



ProvisioningTool

[✓ SN] Wifi Mac Lan Mac Bluetooth Other

ID: 1

Loader

Value: 123SN

ID	
1	123SN

Info

Reading OK.

确定

Clear

Burning

Read

Found one loader

PC Tool Source Code

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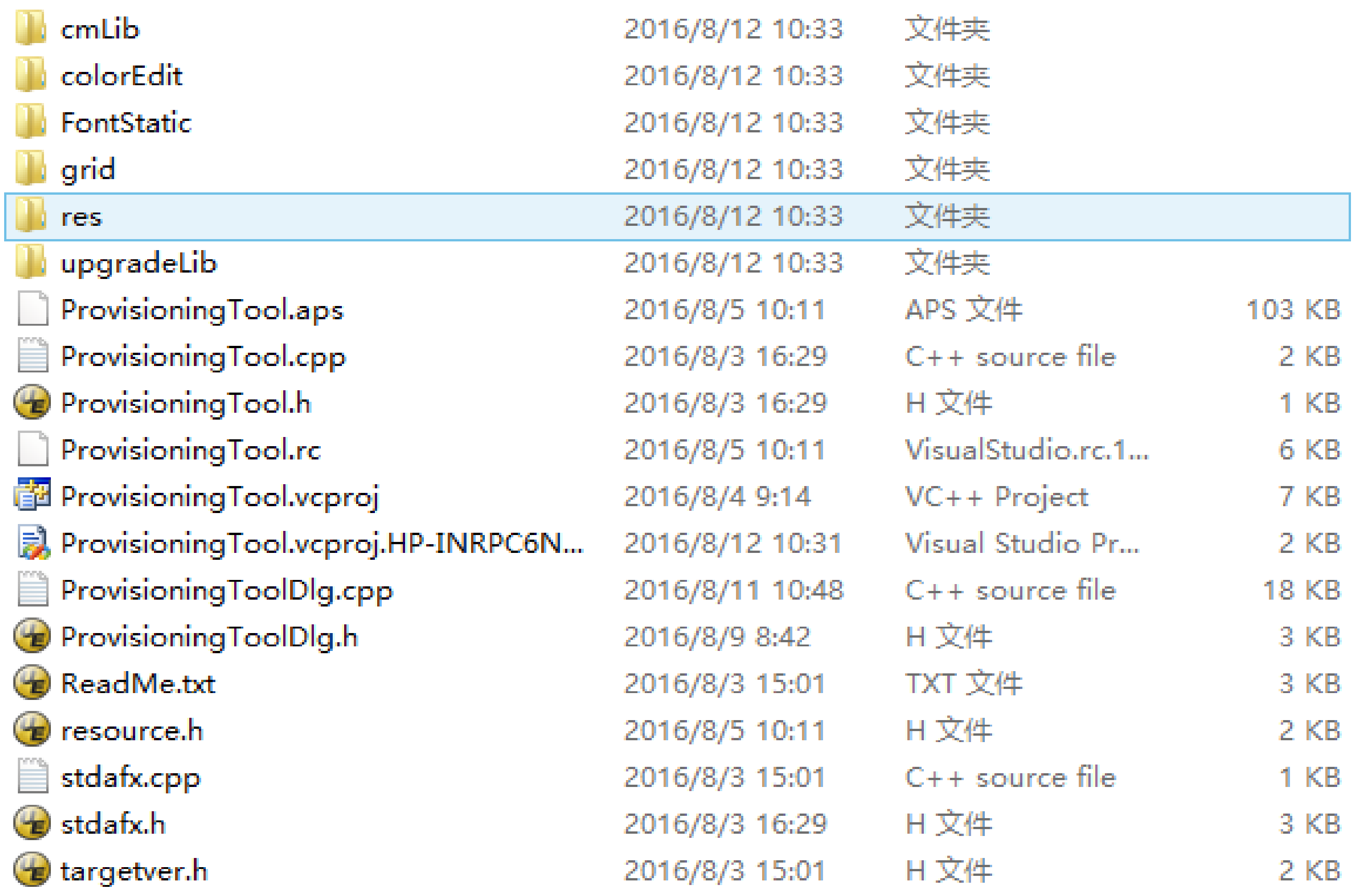

cmLib	2016/8/12 10:33	文件夹	
colorEdit	2016/8/12 10:33	文件夹	
FontStatic	2016/8/12 10:33	文件夹	
grid	2016/8/12 10:33	文件夹	
res	2016/8/12 10:33	文件夹	
upgradeLib	2016/8/12 10:33	文件夹	
ProvisioningTool.aps	2016/8/5 10:11	APS 文件	103 KB
ProvisioningTool.cpp	2016/8/3 16:29	C++ source file	2 KB
ProvisioningTool.h	2016/8/3 16:29	H 文件	1 KB
ProvisioningTool.rc	2016/8/5 10:11	VisualStudio.rc.1...	6 KB
ProvisioningTool.vcproj	2016/8/4 9:14	VC++ Project	7 KB
ProvisioningTool.vcproj.HP-INRPC6N...	2016/8/12 10:31	Visual Studio Pr...	2 KB
ProvisioningToolDlg.cpp	2016/8/11 10:48	C++ source file	18 KB
ProvisioningToolDlg.h	2016/8/9 8:42	H 文件	3 KB
ReadMe.txt	2016/8/3 15:01	TXT 文件	3 KB
resource.h	2016/8/5 10:11	H 文件	2 KB
stdafx.cpp	2016/8/3 15:01	C++ source file	1 KB
stdafx.h	2016/8/3 16:29	H 文件	3 KB
targetver.h	2016/8/3 15:01	H 文件	2 KB

PC Tool Read Data

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```
/*---------------------------------------------------------------------
Name    :  RK_ReadProvisioningData
Desc    :  Read provisioning data by id
Params  :  (IN)nID        id
           (OUT)pDataBuffer:    buffer to save data, malloc by caller
           (IN|OUT)nBufferSize: in = size of buffer,out = actual data size
           (IN)dwLayer:device layer
Return  :  TRUE:      SUCCESSED
           FALSE:     FAILED
---------------------------------------------------------------------*/
BOOL RK_ReadProvisioningData(USHORT nID,PBYTE pDataBuffer,USHORT
&nBufferSize,DWORD dwLayer=0);
```

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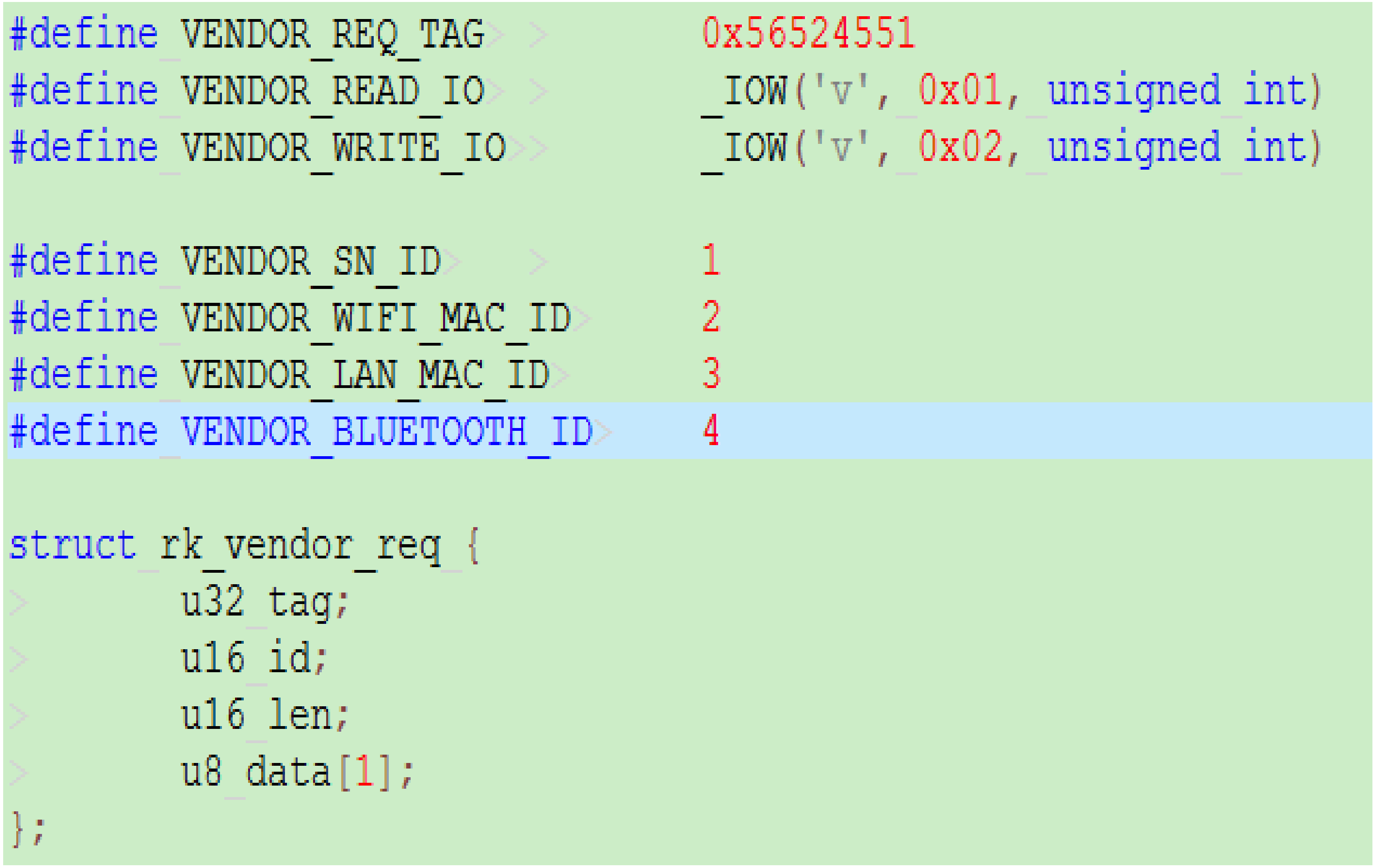
PC Tool Write Data

```
 /*------------------------------------------------------------
Name    :  RK_WriteProvisioningData
Desc    :   Write provisioning data by id
Params  :  (IN)nID         id
           (IN)pDataBuffer:   buffer to save data, malloc by caller
           (IN)nBufferSize:   size of buffer
           (IN)dwLayer:device layer
Return  :  TRUE:       SUCCESSED
            FALSE:       FAILED
------------------------------------------------------------*/
BOOL RK_WriteProvisioningData(USHORT nID,PBYTE pDataBuffer,USHORT
nBufferSize,DWORD dwLayer=0);
```

Linux Demo Code



```
#define VENDOR_REQ_TAG          0x56524551
#define VENDOR_READ_IO          _IOW('v', 0x01, unsigned int)
#define VENDOR_WRITE_IO         _IOW('v', 0x02, unsigned int)

#define VENDOR_SN_ID            1
#define VENDOR_WIFI_MAC_ID      2
#define VENDOR_LAN_MAC_ID       3
#define VENDOR_BLUETOOTH_ID     4

struct rk_vendor_req {
        u32 tag;
        u16 id;
        u16 len;
        u8 data[1];
};
```

Linux Demo Code

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```c
int vendor_storage_read_test(void)
{
        uint32 i;
        int ret ;
        uint8 p_buf[2048]; /* malloc req buffer or used extern buffer */
        struct rk_vendor_req *req;

        req = (struct rk_vendor_req *)p_buf;
        int sys_fd = open("/dev/vendor_storage",O_RDWR,0);
        if(sys_fd < 0){
                ERROR("vendor_storage open fail\n");
                return -1;
        }

        req->tag = VENDOR_REQ_TAG;
        req->id = VENDOR_SN_ID;
        req->len = 512; /* max read length to read*/

        ret = ioctl(sys_fd, VENDOR_READ_IO, req);
        rknand_print_hex_data("vendor read:", (uint32*)req, req->len + 8);
        /* return req->len is the real data length stored in the NV-storage */
        if(ret){
                ERROR("vendor read error\n");
                return -1;
        }

        return 0;
}
```

Linux Demo Code

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```c
int vendor_storage_write_test(void)
{
        uint32 i;
        int ret ;
        uint8 p_buf[2048]; /* malloc req buffer or used extern buffer */
        struct rk_vendor_req *req;

        req = (struct rk_vendor_req *)p_buf;
        int sys_fd = open("/dev/vendor_storage",O_RDWR,0);
        if(sys_fd < 0){
                ERROR("vendor_storage open fail\n");
                return -1;
        }

        req->tag = VENDOR_REQ_TAG;
        req->id = VENDOR_SN_ID;
        req->len = 32; /* data len */
        for (i = 0; i < 32; i++)
                req->data[i] = i;
        rknand_print_hex_data("vendor write:", (uint32*)req, req->len + 8);
        ret = ioctl(sys_fd, VENDOR_WRITE_IO, req);
        if(ret){
                ERROR("vendor write error\n");
                return -1;
        }

        return 0;
}
```