Unix & Linux

Dual Boot Bluetooth LE (low energy) device pairing

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I'm trying to pair two bluetooth devices, a mouse and a keyboard on fedora 26. I also have Windows 10 installed. What I did was: pair them on linux on the Windows, but when I tried to insert the key that I get from windows, I don't find the `lisinkeys` that was mentioned on the guide I followed.

This is what I have on the info file for one of the devices:

```
[General]
Name=Logitech Mouse
Appearance=0x0242
AddressType=static
SupportedTechnologies=LE;
Trusted=true
Blocked=false
Services=00001800-0000-1000-8000-00805f9b34fb;00001801-0000-1000-8000-00805f9b3
[IdentityResolvingKeys]
Key=DF3A8A1A4F5FF5BF2D2DF76AC3BDF4
[LongTermKeys]
Key=2368787B9D3A7F8F9722CF7441145b58
EncSize=16
Authenticated=false
[SlaveLongTermKeys]
Key=D5E6E8A8C21778C4B87BAF22C8F0B8
Authenticated=0
EncSize=16
EDiv=0x5B9F
Rand=18393783117906147958
[DeviceID]
Source=2
Vendor=1118
Product=2053
Version=272
[ConnectionParameters]
MinInterval=6
MaxInterval=6
Latency=48
Timeout=300
```

According to the guide, it should be `lisinkeys` entry, but there is none.

I already have the key from windows and also tried the method mentioned on this question

fedora windows dual-boot bluetooth

Share Improve this question Follow edited Sep 24, 2020 at 7:08 RuFR 103 ● 3 asked Nov 4, 2017 at 12:01 Gonzalo Castillo 101 ● 1 ● 1 ● 4

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The problem is that your device is a Bluetooth LE (Low Energy) device and they are handled differently. I've found the following two solutions that helped me set up my Microsoft 3000 mouse for dual boot:

Check here for a tutorial on how to do it manually with Bluetooth LE devices: http://conrads.systems/2016/08/how-to-pair-low-energy-le-bluetooth.html

The key steps are:

- First pair in Linux
- Reboot
- Pair in Windows
- Get the key values from HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Services\BTHPORT\Parameters\Keys\ (computer-bluetooth-mac)\(device-bluetooth-id)
  - It may be ControlSet001 or ControlSet002 which one can be found in SYSTEM\Select but it's usually ControlSet001
- This can be done e.g. using chntpw (from linux) cd [PATH_TO_WINDOWS_PARTITION]\Windows\System32\config/ chntpw -e SYSTEM
- Go to /var/lib/bluetooth/(computer-bluetooth-mac)
- Check for a directory that closely resembles the device bluetooth-id (they are usually a bit off because they may change whenever you pair again)
- Rename that directory to match the device id
- Edit the info file in the renamed directory
- Copy the value of:
  - `IRK` into `Key` in `IdentityResolvingKey`
  - `CSRK` into `Key` in `LocalSignatureKey`
  - `LTK` into `Key` in `LongTermKey`
  - `Ediv` into `Ediv`. Take the hex value as of ref, byte reverse it (of of ab) and convert it into decimal (e.g. using the Programming mode of the calculator application)
  - `Rand` into `Rand`. Just take the hex value and convert it normally or use the decimal value directly if it is displayed (chntpw displays it)
- Reboot

Alternatively

Use this python script by Mygod that does these steps for you: https://bitbucket.org/Mygod/bluetooth-bt7x86/raw/tip/bt7x86/bt7x86.pl

I've used the script and just copied the Key entries for the groups `LongTermKey`, `LocalSignatureKey` and `IdentityResolvingKey`, and the `Ediv` and `Rand` entries in the `LongTermKey` group.

Notes for the linked manual route

It didn't really work for me which is why I didn't use it but these are common fixes if it didn't work that worked for other people:

- The tutorial doesn't mention it but if you have an IRK entry, copy the value to the `IdentityResolvingKey` key
- Don't copy the KeyLength to EncSize. Just leave it at what it is (in my case 16)
- Don't forget to move the directory if the device names aren't exactly equal.
  - In my case the 5th group was counting up with every pairing.

Some additional help for the script:

- It's run in linux
- The Windows partition has to be mounted.
- The command should look like this: `./mygod-bt-bin-config.pl -m [PATH_TO_WINDOWS_PARTITION]/Windows/System32/config/SYSTEM`
  - You can also copy the SYSTEM file somewhere else and pass the path with `-s [PATH]`
- It crashes if there are other bluetooth devices that windows knows which aren't LE or at least not in this format.

Share Improve this answer Follow edited Dec 30, 2017 at 17:06 Stefan Falzon 242 ● 2 ● 9 answered Dec 30, 2017 at 16:40 Dylan Fabian 1 ● 1

Magic! This worked for my Bluetooth keyboard. I was a bit frustrated when this didn't work for me your answer showed me the light at the end of the tunnel :) – Frederick Zhang May 20, 2018 at 11:38

Works great with MS 3600. To convert hex to base-10 echo $((16#AF5A9A0)) – v2ex Jun 14, 2018 at 18:37

@Stefan Fabian I'm sorry its been so long. I tried with the methods you mentioned but it didn't work. I'm guessing it has something to do with Fedora... Thanks anyway :) – Gonzalo Castillo Sep 7, 2018 at 23:51

Awesome, that worked (MS3600)! Just exported entire registry key into .reg file, next it was easy to remove all comma (byte separator) with text editor and directly paste keys into info file. – Stanislav Mamontov Apr 30, 2020 at 12:13

Works with Ubuntu 20 and Windows 10, but I reversed the hex order for IRK from Windows, since that way it matched all but one character with the Ubuntu version. As soon as `systemctl service restart bluetooth` is completed the mouse connected and started working. – Mikael R ♦ Jul 30, 2020 at 19:31

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I have tried the method described in the previous answer (i.e. following the tutorial in http://conrads.systems/2016/08/how-to-pair-low-energy-le-bluetooth.html) to set up a Surface Keyboard to work seamlessly on a Surface Book 2 with a dual-boot configuration with Windows 10 and Ubuntu 18.04.1 LTS. **I did not work.**

First, to get the most of your Surface on Ubuntu 18.04 you need to install the Jakeday kernel (https://github.com/jakeday/linux-surface). Secondly, to use the Microsoft Surface Keyboard (Bluetooth) you need to get the last version of libev (https://medium.com/@lyonzade/fixing-bluetooth-in-ubuntu-osx-os-18-04-d4b6bf74d00).

The idea is to reverse the order of pairing, disable authentication in Ubuntu and then copy the keys to the Windows 10 registry:

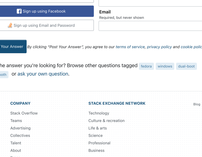
1. Pair your Surface Keyboard in Windows 10. This will create the registry entries for the device.
2. Reboot in Ubuntu.
3. Pair the keyboard in Ubuntu and get the keyboard Bluetooth address from `SettingsBluetooth`, click on the connected `Surface Keyboard` to copy the `Address` on my system it's at `D0:2B:B5:B5:D0:8C`, keep this in mind).
4. Open a Terminal console and enter root `sudo -i`.
5. Edit the `info` Bluetooth configuration file to remove authentication. Go to the keyboard configuration directory `cd /var/lib/` Get the Bluetooth MAC address by listing the content of this directory `ls`, then `ls -l /var/lib/bluetooth` to list contents in my system its `cd /var/lib/bluetooth/B0:D1:86:F6:5D:1D/D0:2B:B5:B5:D0:8C`, with the last bit being the keyboard Bluetooth address from step 3). Use your favorite editor to open the `info` file on this directory to change the `[LongTermKeyDevKey]` `Authenticated` field to `false` and the `[LongTermKey]` `Authenticated` field to `0`. This is how the `info` file looks on my machine:

```
[General]
Name=Surface Keyboard
Appearance=0x03c1
AddressType=static
SupportedTechnologies=LE;
Trusted=true
Blocked=false
Services=00001800-0000-1000-8000-00805f9b34fb;00001801-0000-1000-8000-00805
MinInterval=12
MaxInterval=12
Latency=28
Timeout=288

[DeviceID]
Source=2
Vendor=1118
Product=3327
Version=36c

[IdentityResolvingKey]
Key=BCB7F8D1F3B5ed1d8b66478C72fe26

[LocalSignatureKey]
Key=C7135D47B8422E12c4e3D9B1F8fbd7F9A6
Counter=0
Authenticated=false

[LongTermKey]
Key=A2D7A4E42FD5B8BDFF8fbd7F9A6
Authenticated=0
EncSize=16
EDiv=0x718
Rand=5395164917123436222
```

6. Turn off your Surface Keyboard (extract the batteries) and reboot Ubuntu.
7. In Settings>Bluetooth>Surface Keyboard turn on the connection and re-insert the batteries. Your keyboard should connect and work properly. Reboot again (without extracting the batteries) to check that the keyboard is working properly.
8. Sandfind the `info` file to access the keys to update the Windows 10 registry entries for the keyboard. In my case I have saved the file to a disk which is mounted on both Windows 10 and Ubuntu (to be able to copy/paste data into the Windows 10 registry).
9. Turn off your Surface Keyboard (extract the batteries) and reboot into Windows 10. Use `PSTools` (`psexec`) to edit the registry. First, download `PSTools` from http://technet.microsoft.com/en-us/sysinternals/bb896523.aspx . Extract the zip file and open a terminal console with administrator privileges, change directory to the extracted files and run `psexec -s -i regedit.exe`, this allows access to the privileged registry entries where the pairing keys are stored.
10. Copy the keys from the `info` file to the Windows registry entries for the Surface Keyboard. First, you need to rename the two entries for the keyboard: Navigate to `ComputerHKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\BTHPORT\Parameters\Keys`. Rename the entries in under `Devices` and `Keys` which correspond to the Surface Keyboard. Each time you pair the keyboard, the address changes slightly to differentiate from prior pairings. In my case the entries for pairing was on `D0:2B:B5:B5:D0:8C` while the subsequent Ubuntu pairing was on `D0:2B:B5:B5:D0:8E` (almost same address, excluding the `C` and with letters in lower case, but notice the increase in `8E` to `8F`). Right-click on the registry names which correspond to the original Windows 10 pairing address to rename to the Ubuntu address.

After renaming the registry entries it looked like this on my system:

11. Copy the keys from the `info` file to the `Keys(MAC Address)(Bluetooth Address)` registry entry (`/Keys/d2b8b81adbc8/c0e25b9f40c` in my example). First, `Modify` the `Address` field by right-clicking on it and updating the Bluetooth address to the one used to pair in Ubuntu (in HEX from `c0e25b9f40c` in the original Windows 10 pairing to `D0e25b9f40c` in Ubuntu in my example).



Similarly, `Modify` each of the following registry fields copying/typing the data from the Ubuntu `info` file to the corresponding Windows 10 registry field:

- `IdentityResolvingKey` key value goes into the `IRK` registry field. When modifying, erase the HEX entries and type the `Key` from the `info` file saved on step 8) in HEXADECIMAL format.
- `LocalSignatureKey` key value goes into `CSRK`
- `LongTermKey` Key goes into `LTK`
- `Rand` goes into `ERand` enter the data from the `info` file in DECIMAL format
- `Ediv` goes into `EDiv` enter the data in DECIMAL format.

12.Copy the Interval, Latency and Timeout values from the `info` file to the `Device` registry entry (all in DECIMAL format):

- `MaxInterval` goes into `LEMaxConnParamsInterval`Max
- `MinInterval` goes into `LEMaxConnParamsInterval`Min
- `Latency` goes into `LEMaxConnParamsLatency`
- `Timeout` goes into `LEMaxConnParamsLSTO`

13. Reboot Windows and re-insert the batteries into the Surface Keyboard, which should connect to the Windows Bluetooth service. You should be able to boot seamlessly from Windows 10 to Ubuntu 18.04 and vice versa without having to re-pair your keyboard.

Share Improve this answer Follow edited Oct 20, 2019 at 5:49 Digital Ninja 20 ● 2 answered Oct 20, 2019 at 5:22

Note, if you're using regedit.exe from Windows to extract the values, there's no need to byte-reverse ERand as in @Stefan Fabian's answer. That's probably a thing for registry editor for Linux. – Ted0 Feb 21, 2022 at 8:18.

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