Bluetooth Integration

ST60

Application Note *v1.1*

Introduction

The following table shows the six interface options available with the ST60:

Table 1: Interface options

Interface	Wi-Fi	Bluetooth
Available	SDIO	UART
Available	SDIO	SDIO
Available	PCIE	UART
Available	PCIE	USB
Available	USB	UART
Available	USB	USB

For all options, the firmware must first be loaded by a Wi-Fi driver; you must complete the Wi-Fi backports integration prior to completely the Bluetooth integration.

Note: There is only one firmware for Wi-Fi and Bluetooth initialization.

Hardware Setup

The ST60 interface is controlled by the CONFIG_HOST[2-0] pins ().

Table 2: CONFIG_HOST[2] pin details

CONFIG_HOST [2-0]	Wi-Fi	BT
000	SDIO	UART
001	SDIO	SDIO
010	PCIe	USB 2.0
011	PCIe	UART
100	USB 2.0	UART
101	USB 2.0	USB 2.0

To set up the proper interfaces for Wi-Fi and Bluetooth, you must configure the high/low of these three pins.

Building Backports

To build both the Wi-Fi and Bluetooth drivers in backports, use the defconfig-sterling60 build option.

```
#untar package
   tar xf backports-laird-7.0.0.139.tar.bz2  -C projects/
   cd projects/laird-backport-7.0.0.139/
# From the backports directory
```


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```
make defconfig-sterling60
make
```

Note: To prevent duplicated definitions, you may need to disable or build as module for the Bluetooth options in kernel config.

Loading Wi-Fi drivers

To load the Wi-Fi drivers, you must copy the firmware into the host device. To do this, follow these steps:

1. Create the *60 Firmware* folder.
2. Copy the firmware from the extracted folder to the *60 Firmware* folder.
3. Create a symlink that points to the firmware.

   Refer to the applicable option below:

SDIO-UART

```
cp regulatory_sterling60.db /lib/firmware/
ln -s  /lib/firmware/regulatory_sterling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdmwl
cp 88W8997_ST_sdio_uart_v8.5.23.55.bin /lib/firmware/lrdmwl
cd /lib/firmware/lrdmwl
ln -s 88W8997_ST_sdio_uart_v8.5.23.55.bin 88W8997_sdio.bin
```

SDIO-SDIO

```
cp regulatory_sterling60.db /lib/firmware/
ln -s  /lib/firmware/regulatory_sterling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdmwl
cp 88W8997_ST_sdio_sdio_v8.5.23.55.bin /lib/firmware/lrdmwl
cd /lib/firmware/lrdmwl
ln -s 88W8997_ST_sdio_sdio_v8.5.23.55.bin 88W8997_sdio.bin
```

PCIE-USB

```
cp regulatory_sterling60.db /lib/firmware/
ln -s  /lib/firmware/regulatory_sterling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdmwl
cp 88W8997_ST_pcie_usb_v5.4.23.1.bin /lib/firmware/lrdmwl
cd /lib/firmware/lrdmwl
ln -s 88W8997_ST_pcie_usb_v5.4.23.1.bin 88W8997_pcie.bin
```

PCIE-UART

```
cp regulatory_sterling60.db /lib/firmware/
ln -s  /lib/firmware/regulatory_sterling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdmwl
cp 88W8997_ST_pcie_uart_v5.4.23.1.bin /lib/firmware/lrdmwl
cd /lib/firmware/lrdmwl
```


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```
ln -s 88W8997_ST_pcie_uart_v5.4.23.1.bin 88W8997_pcie.bin
```

USB-UART

```
cp regulatory_sterling60.db /lib/firmware/
ln -s  /lib/firmware/regulatory_sterling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdmwl
cp 88W8997_ST_usb_uart_v8.6.23.55.bin /lib/firmware/lrdmwl
cd /lib/firmware/lrdmwl
ln -s 88W8997_ST_usb_uart_v8.6.23.55.bin 88W8997_usb.bin
```

USB-USB

```
cp regulatory_sterling60.db /lib/firmware/
ln -s  /lib/firmware/regulatory_sterling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdmwl
cp 88W8997_ST_usb_usb_v5.6.23.4.bin /lib/firmware/lrdmwl
cd /lib/firmware/lrdmwl
ln -s 88W8997_ST_usb_usb_v5.6.23.4.bin 88W8997_usb.bin
```

4. Load the following four *.ko* files. Note that they must be loaded in sequence.

```
insmod compat/compat.ko
insmod net/wireless/cfg80211.ko
insmod net/mac80211/mac80211.ko
insmod drivers/net/wireless/laird/lrdmwl/lrdmwl.ko
```

5. Load the following applicable fifth *.ko* file.

For SDIO in Wi-Fi:

```
insmod drivers/net/wireless/laird/lrdmwl/lrdmwl_sdio.ko
```

For PCIE in Wi-Fi:

```
insmod drivers/net/wireless/laird/lrdmwl/lrdmwl_pcie.ko
```

For USB in Wi-Fi:

```
insmod drivers/net/wireless/laird/lrdmwl/lrdmwl_usb.ko
```

BLUETOOTH INITIALIZATION

For Bluetooth initialization, follow the applicable option below.

Option 1: SDIO-UART/PCIE-UART/USB-UART

1. Load the Bluetooth drivers.

```
insmod net/bluetooth/bluetooth.ko
insmod drivers/bluetooth/hci_uart.ko
```

2. Bring up the Bluetooth interface.

   The following is an example in iMX platform with flow control enabled. The TTY interface depends on which interface is wired to the ST60 module from the host.

```
hciattach /dev/ttymxc1 any -s 3000000 3000000 flow dtron
```


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If using an FTDI chipset to transfer UART to USB interface, then use this command to bring up ttyUSB0 (normally no flow control for this).

```
hciattach /dev/ttyUSB0 any 3000000 1
```

Option 2: SDIO-SDIO

1. Load the Bluetooth drivers.

```
insmod net/bluetooth/bluetooth.ko
insmod drivers/Bluetooth/btmrvl.ko
insmod drivers/Bluetooth/btmrvl_sdio.ko
```

2. Use the **hciconfig** command to find the HCI0 interface.

Option 3: PCIE-USB/USB-USB

1. Load the Bluetooth drivers.

```
insmod net/bluetooth/bluetooth.ko
insmod drivers/Bluetooth/btmrvl.ko
insmod drivers/Bluetooth/btusb.ko
```

2. Use the **hciconfig** command to find the HCI0 interface.

Revision History

Version	Date	Notes	Contributor(s)	Approver
1.0	19 Jul 2019	Initial Release	Miles Chung	Jay White
1.1	03 Dec 2019	Changed USB-USB options from *Not Available* to *Available*. Fixed typos.	Miles Chung	Jay White

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