

Bluetooth Integration

Laird ST60 Products

Application Note

v1.0

There are currently six interface options for the Laird ST60 products:

Interface	Wi-Fi	Bluetooth
Available	SDIO	UART
Available	SDIO	SDIO
Available	PCIE	UART
Available	PCIE	USB
Available	USB	UART
Not available	USB	USB

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

For all options, the firmware must be first loaded by the Wi-Fi driver. This means that you must first complete the Wi-Fi backports integration before you complete the Bluetooth integration.

HARDWARE SETUP

The ST60 interface is controlled by three CONFIG_HOST [2-0] pins. See [Table 1](#).

Table 1: CONFIG_HOST [2-0] pins

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

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

BUILD BACKPORTS

To build the backports, follow these steps:

1. Use the `defconfig-sterling60` build option to build both the Wi-Fi and Bluetooth drivers in backports.

#untar package

```
tar xf backports-laird-7.0.0.52.tar.bz2 -C projects/
cd projects/laird-backport-7.0.0.52/
```

```
# From the backports directory
make defconfig-sterling60
make
```

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

LOAD WI-FI DRIVERS

To load the Wi-Fi drivers, follow these steps:

1. Copy the firmware into the host device.
 - a. Create the 60 firmware folder.
 - b. Copy the firmware from the extracted folder to the correct location.
 - c. Create a symlink point to the firmware.

SDIO-UART Option Steps

```
cp regulatory_stereling60.db /lib/firmware/
ln -s /lib/firmware/regulatory_stereling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdrmwl
cp 88W8997_ST_uart_v8.5.20.55.bin /lib/firmware/lrdrmwl
cd /lib/firmware/lrdrmwl
ln -s 88W8997_ST_sdio_uart_v8.5.20.55.bin 88W8997_sdio.bin
```

SDIO-SDIO Option Steps

```
cp regulatory_stereling60.db /lib/firmware/
ln -s /lib/firmware/regulatory_stereling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdrmwl
cp 88W8997_ST_sdio_sdio_v8.5.20.55.bin /lib/firmware/lrdrmwl
cd /lib/firmware/lrdrmwl
ln -s 88W8997_ST_sdio_sdio_v8.5.20.55.bin 88W8997_sdio.bin
```

PCIE-USB Option Steps

```
cp regulatory_stereling60.db /lib/firmware/
ln -s /lib/firmware/regulatory_stereling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdrmwl
cp 88W8997_ST_pcie_usb_v5.4.20.1.bin /lib/firmware/lrdrmwl
cd /lib/firmware/lrdrmwl
ln -s 88W8997_ST_pcie_usb_v5.4.20.1.bin 88W8997_pcie.bin
```

PCIE-UART Option Steps

```
cp regulatory_stereling60.db /lib/firmware/
ln -s /lib/firmware/regulatory_stereling60.db /lib/firmware/regulatory.db
mkdir /lib/firmware/lrdrmwl
cp 8997_pcie_uart_v5.4.20.1.bin /lib/firmware/lrdrmwl
cd /lib/firmware/lrdrmwl
ln -s 88W8997_pcie_uart_v5.4.20.1.bin 88W8997_pcie.bin
```

USB-UART Option Steps

```
cp regulatory_stereling60.db /lib/firmware/  
ln -s /lib/firmware/regulatory_stereling60.db /lib/firmware/regulatory.db  
mkdir /lib/firmware/lrdmwl  
cp 88W8997_ST_usb_uart_v8.6.20.55.bin /lib/firmware/lrdmwl  
cd /lib/firmware/lrdmwl  
ln -s 88W8997_ST_usb_uart_v8.6.20.55.bin 88W8997_usb.bin
```

2. Load the Wi-Fi driver.

To load the Wi-Fi drivers, use the same step for the first four ko files. **You must load them in sequence.**

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

For SDIO in Wi-Fi, load the fifth ko as below.

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

For PCIE in Wi-Fi, load the fifth ko as below.

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

For USB in Wi-Fi, load the fifth ko as below.

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

BLUETOOTH INITIALIZATION

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 wire to the ST60 module from the host.

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

If using FTDI chipset to transfer UART to USB interface, then should 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. Once loaded, you should be able to find the HCI0 interface by the **hciconfig** command.

Option 3: PCIE-USB

1. Load the Bluetooth drivers.

```
insmod net/bluetooth/bluetooth.ko  
insmod drivers/bluetooth btmrvl.ko  
insmod drivers/bluetooth btmrvl_usb.ko
```

2. Once loaded, you should be able to find the HCI0 interface by the **hciconfig** command.

Option 4: USB-USB option (Not available yet)

REVISION HISTORY

Version	Date	Notes	Contributor(s)	Approver
1.0	08 July 2019	Initial Release	Miles Chung	Jay White