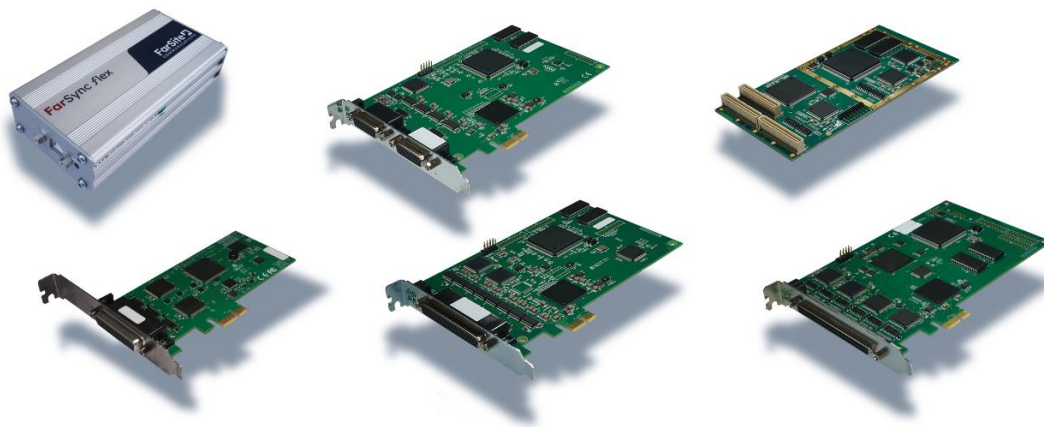




Configure And Test LAPB On RedHat Enterprise Linux 8



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For use with FarSync Device Software versions 2.3.6 and 4.0.0

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1 Introduction

This document describes how to configure and test LAPB on RedHat Enterprise Linux 8.

In order to test LAPB using the sample application, either a FarSync T-Series card or two FarSync Flex's are required. This guide is meant only to allow the user to configure and test LAPB, more advanced and detailed information, such as the LAP-B API information is contained within the SDK.

It is assumed that the SDK and the product archive have been expanded to the user's home directory.

1.1 Prerequisites

Before continuing, please make sure the following are in place:

- **The Kernel source has been installed.**
- **A symbolic link has been added in /usr/src/ pointing to the kernel source**

```
[strawberry@STRAWBERRY ~]$ ls -la /usr/src/ | grep linux
lrwxrwxrwx. 1 root root 45 Mar  9 2022 linux -> /usr/src/kernels/4.18.0-240.22.1.el8_3.x86_64
[strawberry@STRAWBERRY ~]$
```

- **Kernel development system should be installed including: C compiler, Make system and Patch utility.**
- **farsync_SDK_2.3.6 should have been copied to the system and expanded.**
- **farsync_2.3.6 should have been copied to the system, expanded and the product archive (in the linux directory) expanded.**



2 Preparing and Installing the WAN driver

2.1 Assemble required files into the kernel-hdlc directory

2.1.1 Change to the kernel-hdlc directory

```
cd ~/farsync-2.3.6-b307/kernel-hdlc
```

2.1.2 Copy files

```
cp Makefile-with-hdlc-3.17.0 Makefile
cp /usr/src/linux/drivers/net/wan/hdlc* .
cp /usr/src/linux/include/linux/hdlc.h .
cp /usr/src/linux/net/lapb/lapb_* .
```

2.1.3 Copy lapb-api.patch4 from farsync sdk

```
cp ~/farsync_sdk-2.3.6/examples/lapbApi/hdlc/lapb-api.patch4 .
```

2.2 Edit Makefile

Below is an extract from the Makefile, all the parameters in **bold** require to be added or uncommented.

```
#
# Makefile for the Linux farsync & fsflex
#
# $Id$
#
COMPNY_DIR = /etc/farsite
MODULE_DIR = $(COMPNY_DIR)/modules
KMOD_DIR = /lib/modules/`uname -r`/kernel/drivers/net/wan
EXTRA_CFLAGS := -I/etc/farsite/include -DUSE_INTERRUPTS
EXTRA_CFLAGS += -DCONFIG_HDLC_RAW -DCONFIG_HDLC_RAW_ETH -DCONFIG_HDLC_PPP -
DCONFIG_HDLC_CISCO -DCONFIG_HDLC_FR -DCONFIG_HDLC_X25
lapb-objs := lapb_in.o lapb_out.o lapb_subr.o lapb_timer.o lapb_iface.o

ifneq ($(KERNELRELEASE),)
obj-m += lapb.o farsync.o fsflex.o hdlc.o hdlc_raw.o hdlc_raw_eth.o hdlc_cisco.o hdlc_fr.o hdlc_ppp.o hdlc_x25.o
else
KDIR := /lib/modules/$(shell uname -r)/build
PWD := $(shell pwd)
```



2.3 Applying patch to enable LAPB API

```
patch < lapb-api.patch4 -p0
```

```
[strawberry@STRAWBERRY kernel-hdlc]$ patch < lapb-api.patch4 -p0
patching file hdlc_x25.c
Hunk #1 succeeded at 26 with fuzz 2 (offset 1 line).
Hunk #2 succeeded at 53 (offset 1 line).
Hunk #3 succeeded at 86 with fuzz 1 (offset 1 line).
Hunk #4 succeeded at 156 with fuzz 2 (offset 6 lines).
Hunk #5 succeeded at 164 (offset -1 lines).
[strawberry@STRAWBERRY kernel-hdlc]$
```

2.4 Install WAN driver

The install script is located in the farsync-2.3.6-b307 directory.

```
cd ../
sudo ./install wan
```

The following error may well be reported:

```
hdlc_fr.c:1282:2: error: implicit declaration of function 'mark_driver_unmaintained'; did you mean
'mark_driver_unsupported'? [-Werror=implicit-function-declaration]
   mark_driver_unmaintained(THIS_MODULE->name);
   ^~~~~~
   mark_driver_unsupportedfs
```

In which case edit the hdlc_fr.c file and change line 1282. In the extract below, line 1282 has been commented out and a new line added with the required change:

```
1282 /*      mark_driver_unmaintained(THIS_MODULE->name); */
1283      mark_driver_unsupported(THIS_MODULE->name);
```

After making the change:

```
sudo ./install wan
```



3 Post WAN driver install

3.1 Edit /etc/init.d/farsync

Check the commands in **bold** are present and configured correctly (Note: Depending on the version being used **/sbin/modprobe farsync** might not be present):

```
#
# Make sure the kernel modules are loaded
#
if [ -f $KMOD_DIR/farsync.o -o -f $KMOD_DIR/farsync.ko ]
then
#   /sbin/modprobe farsync
#   /sbin/modprobe hdlc_ppp
#   /sbin/insmod $MODULE_DIR/hdlc.ko
#   /sbin/insmod $MODULE_DIR/farsync.ko
#   /sbin/insmod $MODULE_DIR/hdlc_ppp.ko
#   check_farsync_loaded

# If you have used this script to load the syncppp
# and hdlc modules with the farsync module then
# uncomment the next 2 lines to unload syncppp & hdlc with farsync
# /sbin/rmmod $MODULE_DIR/hdlc_ppp.ko
# /sbin/rmmod $MODULE_DIR/hdlc.ko
# /sbin/rmmod $MODULE_DIR/syncppp.ko
```

3.2 Start driver

```
sudo /etc/init.d/farsync start
```

3.3 Load the LAPB and HDLC x25 modules

The modules are currently located in the kernel-hdlc directory

```
sudo insmod kernel-hdlc/lapb.ko
sudo insmod kernel-hdlc/hdlc_x25.ko hdlc_dce_count=1 hdlc_dce_list=1
```

```
[strawberry@STRAWBERRY farsync-2.3.6-b307]$ sudo insmod kernel-hdlc/lapb.ko
[strawberry@STRAWBERRY farsync-2.3.6-b307]$ sudo insmod kernel-hdlc/hdlc_x25.ko hdlc_dce_count=1 hdlc_dce_list=1
[strawberry@STRAWBERRY farsync-2.3.6-b307]$
```

hdlc_dce_count the number of dce interfaces required
hdlc_dce_list a list of the interface indexes of the DCE's



3.4 Edit port configuration files

Two ports are required to be configured for the test. Edit both `/etc/farsite/farsync/ifcfg-hdlc0` and `/etc/farsite/farsync/ifcfg-hdlc1` and configure accordingly. `IPADDR`, `IPV6ADDR`, `POINTOPOINT`, `NETMASK`, `NETWORK` and `MTU`, can be commented out, as they are not required.

3.4.1 ifcfg-hdlc0

```
# Other media options are shdsl, E1, T1, x21d, v24, v35, rs530 and rs449
MEDIA=x21
# Network protocols are PPP or CISCO
PROTO=x25
# We are a DTE and use the external clock from the line/DCE
CLOCK=ext
# Make sure hdlc linemode is selected
LINEMODE=hdlc
```

3.4.2 ifcfg-hdlc1 (configured as a DCE)

```
# Other media options are shdsl E1, T1, x21d, v24, v35, rs530 and rs449
MEDIA=x21
# Network protocols are PPP or CISCO
PROTO=x25
# We are a DCE and provide clock at the specified rate
CLOCK=64000
# Make sure hdlc linemode is selected
LINEMODE=hdlc
```

3.5 Open both ports

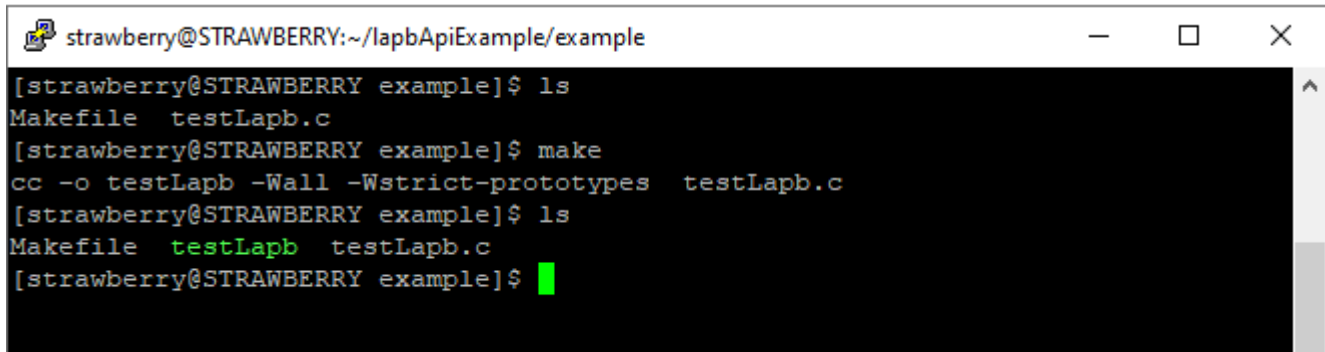
```
sudo ifup hdlc0
sudo ifup hdlc1
```




4 Testing LAPB

4.1 Build the LAPB sample application

```
$cd ~/farsync_sdk-2.3.6/examples/lapbApi/example/  
$ make  
cc -o testLapb -Wall -Wstrict-prototypes testLapb.c  
$
```



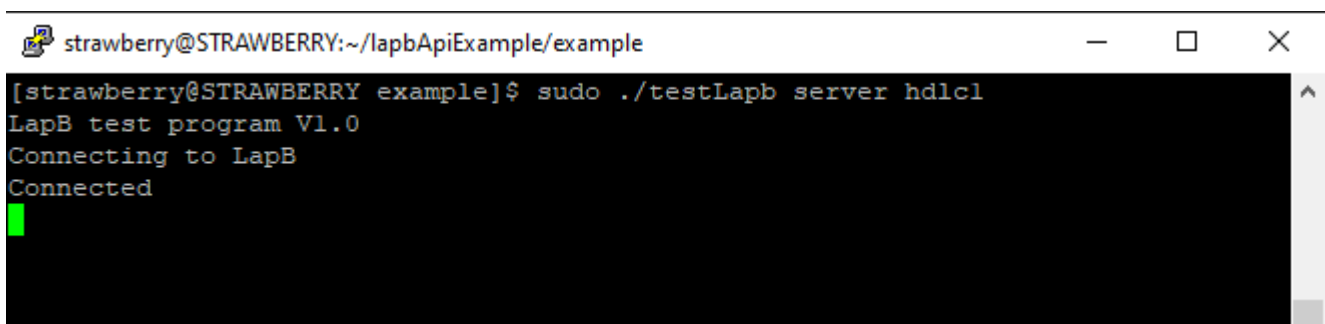
```
strawberry@STRAWBERRY:~/lapbApiExample/example  
[strawberry@STRAWBERRY example]$ ls  
Makefile testLapb.c  
[strawberry@STRAWBERRY example]$ make  
cc -o testLapb -Wall -Wstrict-prototypes testLapb.c  
[strawberry@STRAWBERRY example]$ ls  
Makefile testLapb testLapb.c  
[strawberry@STRAWBERRY example]$
```

4.2 Connect two ports together

In this case the card being used is a T4Ue with an MTU4 cable. Connected to both A & B ports are UCX1 cables which are then connected together using a NULL-MX cable.

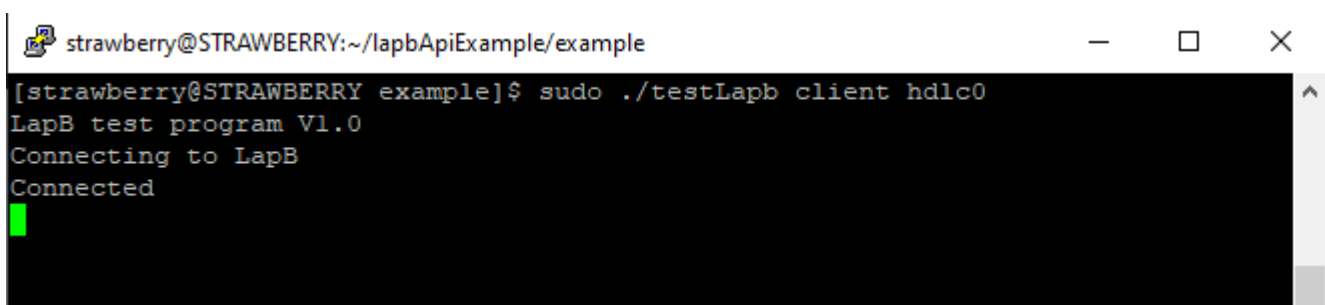
4.3 Run the sample application in two terminals

4.3.1 Start Server



```
strawberry@STRAWBERRY:~/lapbApiExample/example  
[strawberry@STRAWBERRY example]$ sudo ./testLapb server hdlc1  
LapB test program V1.0  
Connecting to LapB  
Connected  
█
```

4.3.2 Start Client



```
strawberry@STRAWBERRY:~/lapbApiExample/example  
[strawberry@STRAWBERRY example]$ sudo ./testLapb client hdlc0  
LapB test program V1.0  
Connecting to LapB  
Connected  
█
```



4.4 Test Results

After around 20 – 30 seconds the test should finish and the results displayed

```
strawberry@STRAWBERRY:~/lapbApiExample/example
[strawberry@STRAWBERRY example]$ sudo ./testLapb server hdlc1
LapB test program V1.0
Connecting to LapB
Connected
Transfer stats for hdlc1
Received 102401 bytes in 101 frames with 0 errors.
Transmitted 102401 bytes in 101 frames with 0 errors & 0 pauses.
[strawberry@STRAWBERRY example]$
```

```
strawberry@STRAWBERRY:~/lapbApiExample/example
[strawberry@STRAWBERRY example]$ sudo ./testLapb client hdlc0
LapB test program V1.0
Connecting to LapB
Connected
Transfer stats for hdlc0
Received 102401 bytes in 101 frames with 0 errors.
Transmitted 102401 bytes in 101 frames with 0 errors & 0 pauses.
[strawberry@STRAWBERRY example]$
```



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